Dとして、それぞれ記憶する（Ｓ５４６０，Ｓ５４７０，Ｓ５４８０，Ｓ５４９０）。

【０１０２】

次に、図４０に進み、メモリ６６から、まず左前のタイヤの空気圧センサ１０に対応するＩＤを読み出してこれを当該空気圧センサ１０に送信する（Ｓ５５１０）、続いて、空気圧センサ１０に対してローテーション時ＩＤ再登録を指示するコマンドを送信する（Ｓ５５２０）、そして、空気圧センサ１０から登録完了の返信が来たか否かを判定する（Ｓ５５３０）、所定時間以上待ってもこの返信が来ない場合は（Ｓ５５３０：ＮＯ）、Ｓ５５１０へ戻る、一方、登録完了の返信が来た場合には（Ｓ５５３０：ＹＥＳ）、次に、メモリ６６から、左後のタイヤの空気圧センサ２０に対応するＩＤを読み出してこれを当該空気圧センサ２０に送信する（Ｓ５５４０）、続いて、空気圧センサ２０に対してローテーション時ＩＤ再登録の指示コマンドを送信する（Ｓ５５５０）、そして、空気圧センサ２０から登録完了の返信が来たか否かを判定する（Ｓ５５６０）、所定時間以上待ってもこの返信が来ない場合は（Ｓ５５６０：ＮＯ）、Ｓ５５４０へ戻る、一方、登録完了の返信が来た場合には（Ｓ５５６０：ＹＥＳ）、次に、メモリ６６から、右後のタイヤの空気圧センサ３０に対応するＩＤを読み出してこれを当該空気圧センサ３０に送信する（Ｓ５５７０）、続いて、空気圧センサ３０に対してローテーション時ＩＤ再登録の指示コマンドを送信する（Ｓ５５８０）、そして、空気圧センサ３０から登録完了の返信が来たか否かを判定する（Ｓ５５９０）、所定時間以上待ってもこの返信が来ない場合は（Ｓ５５９０：ＮＯ）、Ｓ５５７０へ戻る、一方、登録完了の返信が来た場合には（Ｓ５５９０：ＹＥＳ）、次に、メモリ６６から、右前のタイヤの空気圧センサ４０に対応するＩＤを読み出してこれを当該空気圧センサ４０に送信する（Ｓ５６００）、続いて、空気圧センサ４０に対してローテーション時ＩＤ再登録の指示コマンドを送信する（Ｓ５６１０）、そして、空気圧センサ４０から登録完了の返信が来たか否かを判定する（Ｓ５６２０）、所定時間以上待ってもこの返信が来ない場合は（Ｓ５６２０：ＮＯ）、Ｓ５３１０へ戻る、一方、登録完了の返信が来た場合には（Ｓ５６２０：ＹＥＳ）、空気圧センサ１０、２０、３０、４０に対して、通常モードへの復帰を指示するトリガ信号を出力する（Ｓ５６３０）。

【０１０３】

次に、図４１に進み、メモリ６６から、まず左前のタイヤの空気圧センサ１０に対応するＩＤを読み出してこれをタイヤ空気圧監視装置５０に送信する（Ｓ５７１０）、続いて、監視装置５０に対してローテーション時ＩＤ再登録を指示するコマンドを送信する（Ｓ５７２０）、そして、監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ５７３０）、所定時間以上待ってもこの返信が来ない場合は（Ｓ５７３０：ＮＯ）、Ｓ５７１０へ戻る、一方、登録完了の返信が来た場合には（Ｓ５７３０：ＹＥＳ）、次に、メモリ６６から、左後のタイヤの空気圧センサ２０に対応するＩＤを読み出してこれをタイヤ空気圧監視装置５０に送信する（Ｓ５７４０）、続いて、監視装置５０に対してローテーション時ＩＤ再登録の指示コマンドを送信する（Ｓ５７５０）、そして、監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ５７６０）、所定時間以上待ってもこの返信が来ない場合は（Ｓ５７６０：ＮＯ）、Ｓ５７４０へ戻る、一方、登録完了の返信が来た場合には（Ｓ５７６０：ＹＥＳ）、次に、メモリ６６から、右後のタイヤの空気圧センサ３０に対応するＩＤを読み出してこれをタイヤ空気圧監視装置５０に送信する（Ｓ５７７０）、続いて、監視装置５０に対してローテーション時ＩＤ再登録の指示コマンドを送信する（Ｓ５７８０）、そして、監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ５７９０）、所定時間以上待ってもこの返信が来ない場合は（Ｓ５７９０：ＮＯ）、Ｓ５７７０へ戻る、一方、登録完了の返信が来た場合には（Ｓ５７９０：ＹＥＳ）、次に、メモリ６６から、右前のタイヤの空気圧センサ４０に対応するＩＤを読み出してこれを監視装置５０に送信する（Ｓ５８００）、続いて、監視装置５０に対してローテーション時ＩＤ再登録の指示コマンドを送信する（Ｓ５８１０）、そして、監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ５８２０）、所定時間以上待ってもこの返信が来ない場合は（Ｓ５８２０：ＮＯ）、Ｓ５８００へ戻る、一方、登録完了の返信が来た場合に

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は（Ｓ５８２０：ＹＥＳ）、監視装置５０に対して、通常モードへの復帰を指示するトリガ信号を出力して処理を終了する（Ｓ５８３０）。

【０１０４】

また、再登録再登録ボタンが押下され（Ｓ４９００：再登録）、さらに、タイヤ交換が指定された場合は（Ｓ５４１０：タイヤ交換）、図４２に示す様に、新たに取り付けるセンサ及びタイヤ空気圧監視装置５０に対して信号線を接続すべき旨の指示メッセージをディスプレイ６９に表示して（Ｓ５９０２）、接続完了のパネル操作を待つ（Ｓ５９０４）、接続完了のパネル操作があったら（Ｓ５９０４：ＹＥＳ）、次に、センサ用の信号線６３ａ～６３ｄに対して接続確認のためのリクエスト信号を送信し（Ｓ５９０６）、このリクエスト信号への応答を待つ（Ｓ５９０８）、応答があったら（Ｓ５９０８：ＹＥＳ）、応答があったセンサ用の信号線だけをアクティブ状態に設定する（Ｓ５９１０）、そして、このアクティブ状態に設定した信号線に対してだけタイヤ空気圧センサをＩＤ登録モードにするためのトリガ信号を送信する（Ｓ５９２０）。

【０１０５】

次に、乱数発生部を作動させて乱数を発生させる（Ｓ５９３０）。続いて、この乱数の下位ビットとして、”００”、”０１”、”１０”、”１１”をそれぞれ付加した4つのコードデータを自動的に生成し（Ｓ５９４０）、メモリ６６内に、下位ビットとして”００”を付加したデータを左前のタイヤ用ＩＤとして、下位ビットとして”０１”を付加したデータを左後のタイヤ用ＩＤとして、下位ビットとして”１０”を付加したデータを右後のタイヤ用ＩＤとして、下位ビットとして”１１”を付加したデータを右前のタイヤ用ＩＤとして、それぞれ記憶する（Ｓ５９６０、Ｓ５９７０、Ｓ５９８０、Ｓ５９９０）。

【０１０６】

次に、図４３に示す様に、アクティブ状態に設定した信号線の内の一つを特定し（Ｓ６０００）、この信号線に対応するタイヤ位置のＩＤ設定値をメモリ６６から読み出し（Ｓ６０１０）、このＩＤ設定値を当該信号線に送信する（Ｓ６０２０）。続いて、ＩＤを送信した信号線に対してタイヤ交換時ＩＤ再登録を指示するコマンドを送信する（Ｓ６０３０）。そして、この信号線を介して空気圧センサから登録完了の返信が来たか否かを判定する（Ｓ６０４０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ６０４０：ＮＯ）、Ｓ６０１０へ戻る。一方、登録完了の返信が来た場合には（Ｓ６０４０：ＹＥＳ）、次に、この信号線に対して空気圧センサを通常モードへ復帰させるためのトリガ信号を出力すると共に（Ｓ６０５０）、当該信号線をアクティブ状態からノンアクティブ状態に設定変更する（Ｓ６０６０）。次に、Ｓ６０１０で読み出したＩＤ設定値を、タイヤ位置情報と共にタイヤ空気圧監視装置５０へと送信する（Ｓ６０７０）。続いて、タイヤ空気圧監視装置５０に対してタイヤ交換時ＩＤ再登録を指示するコマンドを送信する（Ｓ６０８０）。そして、タイヤ空気圧監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ６０９０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ６０９０：ＮＯ）、Ｓ６０７０へ戻る。一方、登録完了の返信が来た場合には（Ｓ６０９０：ＹＥＳ）、Ｓ６０１０でアクティブ状態に設定した信号線がまだ残っているか否かを判定する（Ｓ６１００）。まだ残っているときは（Ｓ６１００：ＹＥＳ）、その内の1の信号線を特定し（Ｓ６１１０）、Ｓ６０１０へ戻る。一方、アクティブ状態に設定した信号線が残っていない場合は（Ｓ６１１０：ＮＯ）、タイヤ空気圧監視装置５０を通常モードへ復帰させるためのトリガ信号を出力して（Ｓ６１２０）、処理を終了する。

【０１０７】

次に、タイヤ空気圧監視装置５０において実行される制御処理の内容について図４４～図４６に基づいて説明する。この制御処理では、図４４に示す様に、まず最初に、ＩＤ登録モードへの切替を指示するトリガ信号を受信したか否かを判定する（Ｓ６２００）。ＩＤ登録モードへの切替を指示するトリガ信号を受信した場合には（Ｓ６２００：ＹＥＳ）、ＩＤ登録モードに切り替え（Ｓ６２１０）、ＩＤを受信したか否かを判定する（Ｓ６２２０）。ＩＤを受信した場合は（Ｓ６２２０：ＹＥＳ）、このＩＤをタイヤ位置情報と共にＲＡＭのワークエリアに一時記憶する（Ｓ６２３０）。そして、ＩＤ初回登録、ローテー

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ション時ＩＤ再登録又はタイヤ交換時ＩＤ再登録のいずれの指示を受信したか否かを判定する（Ｓ６２４０）。ＩＤ初回登録の指示を受信した場合は（Ｓ６２４０：初回登録）、Ｓ６２３０で一時記憶したＩＤを、メモリ５５内へ、左前のタイヤの空気圧センサのＩＤとして登録する（Ｓ６２５０）。そして、ＩＤ登録完了の返信を実行する（Ｓ６２６０）。続いて、ＩＤを受信したか否かを判定する（Ｓ６２７０）。ＩＤを受信した場合は（Ｓ６２７０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ６２８０）。そして、ＩＤ初回登録の指示を受信したか否かを判定する（Ｓ６２９０）。ＩＤ初回登録の指示を受信した場合は（Ｓ６２９０：ＹＥＳ）、Ｓ６２８０で一時記憶したＩＤを、メモリ５５内へ、左後のタイヤの空気圧センサのＩＤとして登録する（Ｓ６３００）。そして、ＩＤ登録完了の返信を実行する（Ｓ６３１０）。続いて、ＩＤを受信したか否かを判定する（Ｓ６３２０）。ＩＤを受信した場合は（Ｓ６３２０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ６３９０）。そして、ＩＤ初回登録の指示を受信したか否かを判定する（Ｓ６３４０）。ＩＤ初回登録の指示を受信した場合は（Ｓ６３４０：ＹＥＳ）、Ｓ６３３０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして登録する（Ｓ６３５０）。そして、ＩＤ登録完了の返信を実行する（Ｓ６３６０）。続いて、ＩＤを受信したか否かを判定する（Ｓ６３７０）。ＩＤを受信した場合は（Ｓ６３７０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ６３８０）。そして、ＩＤ初回登録の指示を受信したか否かを判定する（Ｓ６３９０）。ＩＤ初回登録の指示を受信した場合は（Ｓ６３９０：ＹＥＳ）、Ｓ６３８０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして登録する（Ｓ６４００）。そして、ＩＤ登録完了の返信を実行する（Ｓ６４１０）。その後、モードを通常モードへ切り替えるべき旨のトリガ信号を受信したか否かを判定する（Ｓ６４２０）。通常モードへの切替を指示するトリガ信号を受信したら（Ｓ６４２０：ＹＥＳ）、通常モードに切り替えて処理を終了する（Ｓ６４３０）。

【０１０８】

また、Ｓ６２４０において、ローテーション時ＩＤ再登録の指示を受信した場合は（Ｓ６２４０：ローテーション）、図４５に示す様に、Ｓ６２３０で一時記憶したＩＤを、メモリ５５内へ、左前のタイヤの空気圧センサのＩＤとして上書きによる再登録を実行する（Ｓ６５５０）。そして、ＩＤ登録完了の返信を実行する（Ｓ６５６０）。続いて、ＩＤを受信したか否かを判定する（Ｓ６５７０）。ＩＤを受信した場合は（Ｓ６５７０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ６５８０）。そして、ＩＤ初回登録の指示を受信したか否かを判定する（Ｓ６５９０）。ＩＤ初回登録の指示を受信した場合は（Ｓ６５９０：ＹＥＳ）、Ｓ６５８０で一時記憶したＩＤを、メモリ５５内へ、左後のタイヤの空気圧センサのＩＤとして上書きによる再登録を実行する（Ｓ６６００）。そして、ＩＤ登録完了の返信を実行する（Ｓ６６１０）。続いて、ＩＤを受信したか否かを判定する（Ｓ６６２０）。ＩＤを受信した場合は（Ｓ６６２０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ６６３０）。そして、ＩＤ初回登録の指示を受信したか否かを判定する（Ｓ６６４０）。ＩＤ初回登録の指示を受信した場合は（Ｓ６６４０：ＹＥＳ）、Ｓ６６３０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして上書きによる再登録を実行する（Ｓ６６５０）。そして、ＩＤ登録完了の返信を実行する（Ｓ６６６０）。続いて、ＩＤを受信したか否かを判定する（Ｓ６６７０）。ＩＤを受信した場合は（Ｓ６６７０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ６６８０）。そして、ＩＤ初回登録の指示を受信したか否かを判定する（Ｓ６６９０）。ＩＤ初回登録の指示を受信した場合は（Ｓ６６９０：ＹＥＳ）、Ｓ６６８０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして上書きによる再登録を実行する（Ｓ６７００）。そして、ＩＤ登録完了の返信を実行する（Ｓ６７１０）。その後、モードを通常モードへ切り替えるべき旨のトリガ信号を受信したか否かを判定する（Ｓ６７２０）。通常モードへの切替を指示するトリガ信号を受信したら（Ｓ６７２０：ＹＥＳ）、通常モードに切り替えて処理を終了する（Ｓ６７３０）。

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【０１０９】
また、Ｓ６２４０において、タイヤ交換時ＩＤ再登録の指示を受信した場合は（Ｓ６２４０：タイヤ交換）、図４６に示す様に、Ｓ６２３０で一時記憶したＩＤを読み出すと共に、Ｓ６２３０で受信したタイヤ位置の情報に基づいて、メモリ５５内の該当するタイヤ位置の空気圧センサのＩＤとして上書きによる登録を実行する（Ｓ６８１０）。そして、ＩＤ登録完了の返信を実行する（Ｓ６８２０）。続いて、ＩＤを受信したか否かを判定する（Ｓ６８３０）。ＩＤを受信した場合は（Ｓ６８３０：ＹＥＳ）、このＩＤをタイヤ位置情報と共にＲＡＭ内に一時記憶した上で（Ｓ６８４０）、タイヤ交換時ＩＤ再登録の指示を受信したか否かを判定する（Ｓ６８５０）。そして、タイヤ交換時ＩＤ再登録の指示を受信した場合は（Ｓ６８５０：ＹＥＳ）、Ｓ６８１０に戻る。一方、ＩＤを受信しない場合は（Ｓ６８３０：ＮＯ）、モードを通常モードへ切り替えるべき旨のトリガ信号を受信したか否かを判定する（Ｓ６８６０）。通常モードへの切替を指示するトリガ信号を受信したら（Ｓ６８６０：ＹＥＳ）、通常モードに切り替えて処理を終了する（Ｓ６８７０）。

【０１１０】
なお、空気圧センサにおいて実行される制御処理の内容は、第７の実施の形態と同様である。

【０１１１】
この第８の実施の形態においても、タイヤ交換による再登録は、新たに取り付けるタイヤのセンサに対してだけ実行すればよいので、タイヤ交換時のＩＤ登録作業の工数を軽減することができる。また、ツールの乱数発生機能を利用してセンサＩＤを設定するので、初回登録及び再登録のいずれにおいても、作業者の負担を軽減することができる。

【０１１２】
以上、本発明の実施の形態について説明したが、本発明はこの実施の形態に限られるものではなく、その要旨を逸脱しない範囲内においてさらに種々の形態を採用することができることはもちろんである。

【０１１３】
各実施の形態としては、有線でツールからセンサ１０、２０、３０、４０及びタイヤ空気圧監視装置５０へとＩＤを送信して登録を行うものを説明したが、ツールから設定したＩＤを無線で電波により送信する様にしても構わない。この場合、例えば、センサ１０，２０，３０，４０及びタイヤ空気圧監視装置５０の受信回路を、ＩＤ登録モードにするためのトリガ信号を受信したら、通常の圧力検出信号とは異なる特定の周波数帯の信号のみを受信し得る状態になる様に特定のバンドパスフィルタを機能させる様にしておき、ツール６０からはこの特定の周波数帯の信号としてＩＤ設定値を送信する様にしたり、ツール６０からの電波の指向性を高めて混信を防止したり、あるいは、指向性の高い情報伝送媒体（例えば超音波など）をＩＤ登録に採用するなどといった構成をとっても構わない。

【０１１４】
また、例えば、乱数によりＩＤを設定する場合、偶然の一致を避けるために、さらに、日時やＬＦの情報などを組み合わせてＩＤを生成する様にしてもよい。ツールにＩＤを手入力で設定する場合も、入力値だけではなく、日時やＩＤ登録場所、あるいは作業者コードなどを組み合わせる様にすれば、偶然の一致を避けることができる。

【０１１５】
さらに、第８の実施の形態ではローテーションやタイヤ交換による再登録時にはタイヤ空気圧監視装置５０へは上書きによりＩＤを再登録することとしたが、上書きではなく、以前のＩＤを登録したままで新たなＩＤを登録する様にしても構わない。これは、センサ側のＩＤが初回登録時とは変更されることで、圧力検出信号は再登録後のＩＤと共にしか送信されて来ないので、初回登録時のＩＤが監視装置５０内に残っていても機能上差し支えないからである。

【０１１６】
加えて、ローテーションやタイヤ交換による再登録時にはタイヤ空気圧監視装置５０内に

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は、再登録である旨や、さらに再登録の回数をＩＤに付随させた情報として記憶する様にしておくと、ローテーション履歴やタイヤ交換頻度を監視装置５０のＩＤ登録情報から把握することが可能になるという効果も期待できる。

【図面の簡単な説明】

【図１】実施の形態のタイヤ空気圧監視システムの構成を示すブロック図である。

【図２】実施の形態におけるＩＤ登録のための装置構成を示す模式図である。

【図３】実施の形態におけるＩＤ登録手順を示すフローチャートである。

【図４】図３に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図５】図３に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図６】図３に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図７】図３に示したＩＤ登録手順を実現するためのタイヤ空気圧監視装置における制御処理の内容を示すフローチャートである。

【図８】図３に示したＩＤ登録手順を実現するためのタイヤ空気圧センサにおける制御処理の内容を示すフローチャートである。

【図９】第２の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図１０】第２の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図１１】第２の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図１２】第３の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図１３】第３の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図１４】第３の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図１５】第４の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図１６】第４の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図１７】第４の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図１８】第５の実施の形態におけるＩＤ登録のための装置構成を示す模式図である。

【図１９】第５の実施の形態におけるＩＤ登録手順を示すフローチャートである。

【図２０】第５の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図２１】第５の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図２２】第５の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図２３】第６の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図２４】第６の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。

【図２５】第６の実施の形態におけるタイヤ空気圧監視装置における制御処理の内容を示すフローチャートである。

【図２６】第７の実施の形態におけるＩＤ登録手順を示すフローチャートである。

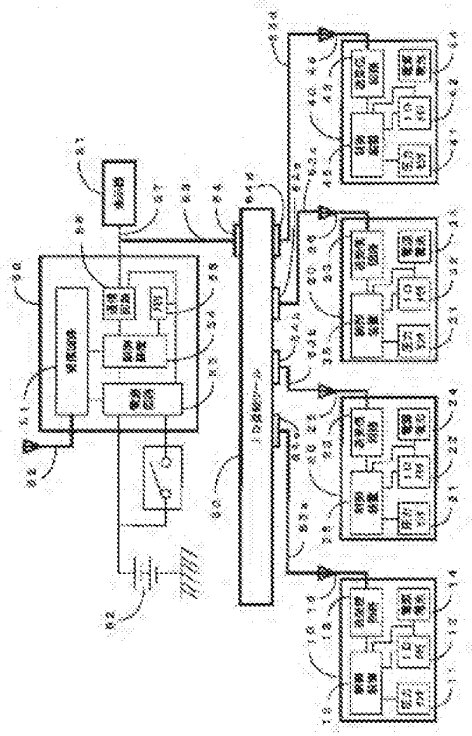
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【図２７】第７の実施の形態におけるＩＤ登録手順を示すフローチャートである。
【図２８】第７の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図２９】第７の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図３０】第７の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図３１】第７の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図３２】第７の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図３３】第７の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図３４】第７の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図３５】第７の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図３６】第８の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図３７】第８の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図３８】第８の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図３９】第８の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図４０】第８の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図４１】第８の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図４２】第８の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図４３】第８の実施の形態におけるＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図４４】第８の実施の形態におけるタイヤ空気圧監視装置の制御処理の内容を示すフローチャートである。
【図４５】第８の実施の形態におけるタイヤ空気圧監視装置の制御処理の内容を示すフローチャートである。
【図４６】第８の実施の形態におけるタイヤ空気圧監視装置の制御処理の内容を示すフローチャートである。
【図４７】従来例のタイヤ空気圧監視システムの構成を示すブロック図である。
【図４８】例におけるＩＤ登録手順の内容を示すフローチャートである。
【符号の説明】
１０，２０，３０，４０・・・空気圧センサ
１１，２１，３１，４１・・・圧力センサ
１２，２２，３２，４２・・・ＩＤメモリ
１３，２３，３３，４３・・・送信回路
１３ａ，２３ａ，３３ａ，４３ａ・・・送受信回路
１４，２４，３４，４４・・・電源電池
１５，２５，３５，４５・・・制御装置
１６，２６，３６，４６・・・アンテナ

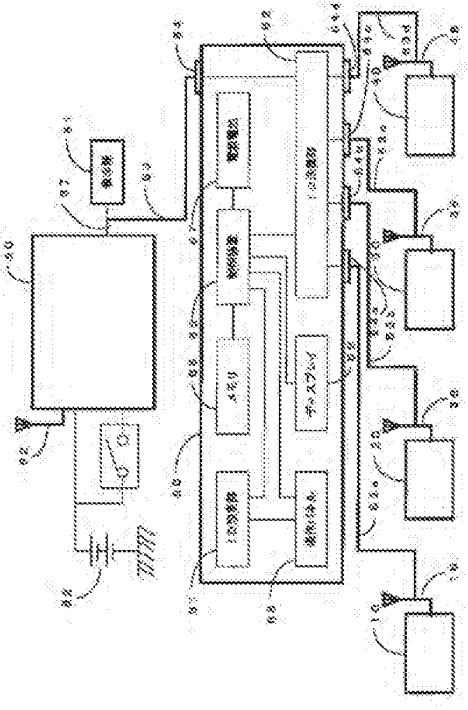
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５０・・・タイヤ空気圧監視装置
５１・・・受信回路
５２・・・アンテナ
５３・・・電源回路
５４・・・制御装置
５５・・・メモリ
５６・・・通信回路
５７・・・信号線
６０・・・ＩＤ登録ツール
６１・・・ＩＤ設定部
６２・・・ＩＤ送信部
６３，６３ａ，６３ｂ，６３ｃ，６３ｄ・・・信号線
６４，６４ａ，６４ｂ，６４ｃ，６４ｄ・・・コネクタ
６５・・・制御装置
６６・・・メモリ
６７・・・電源電池
６８・・・操作パネル
６９・・・ディスプレイ
７１・・・信号線
７２・・・コネクタ
８１・・・表示器
８２・・・車載バッテリ
９０・・・生産管理用コンピュータ

【図１】

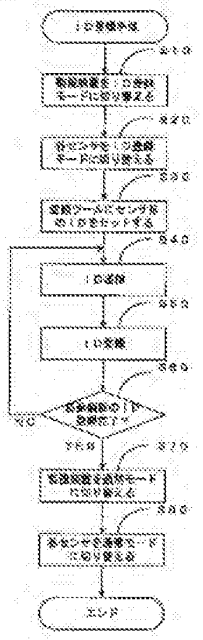


【図２】

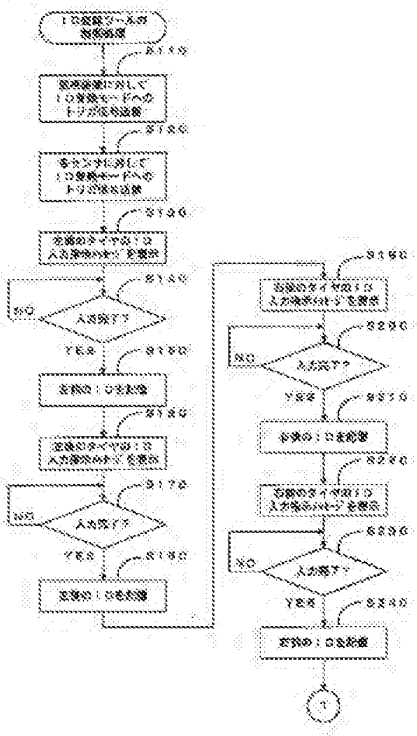


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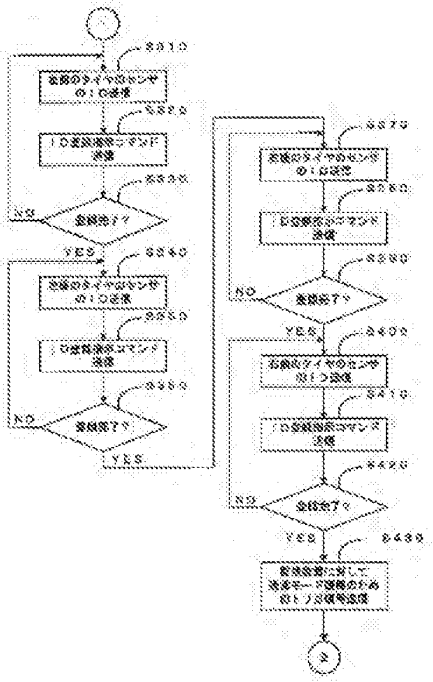
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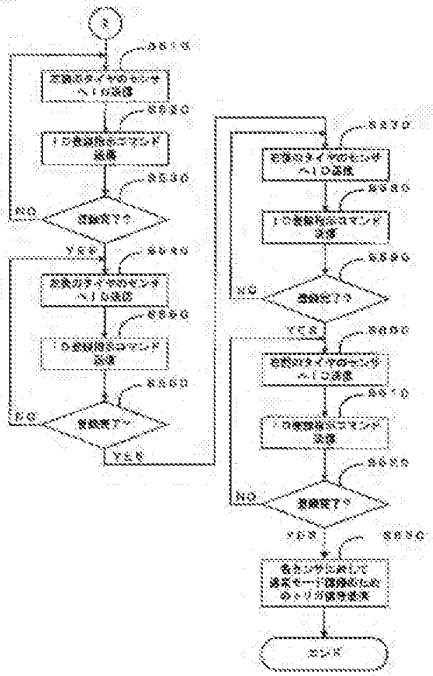
【図4】



【図5】



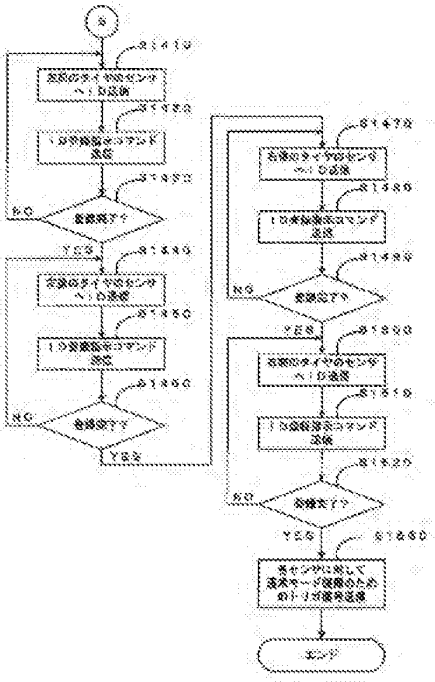
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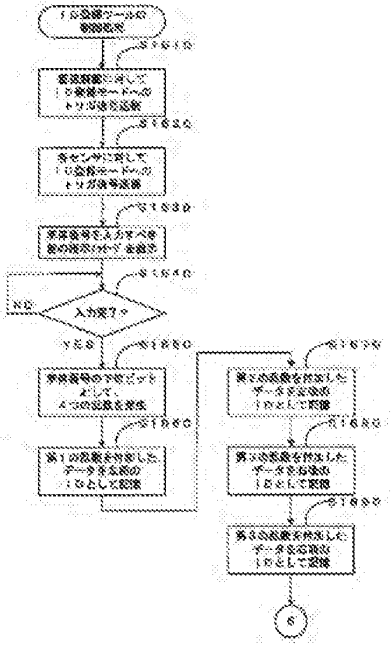
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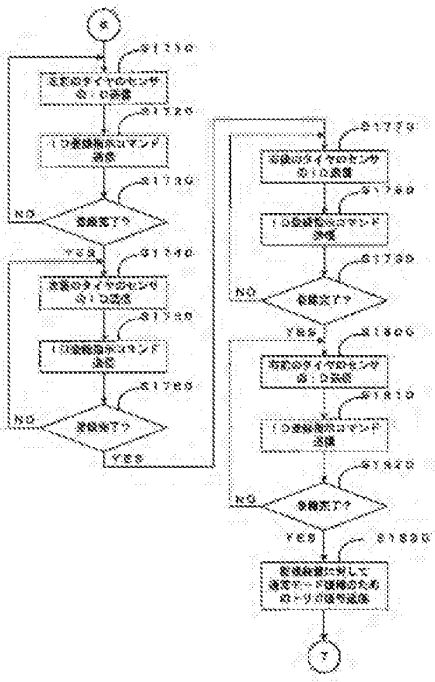
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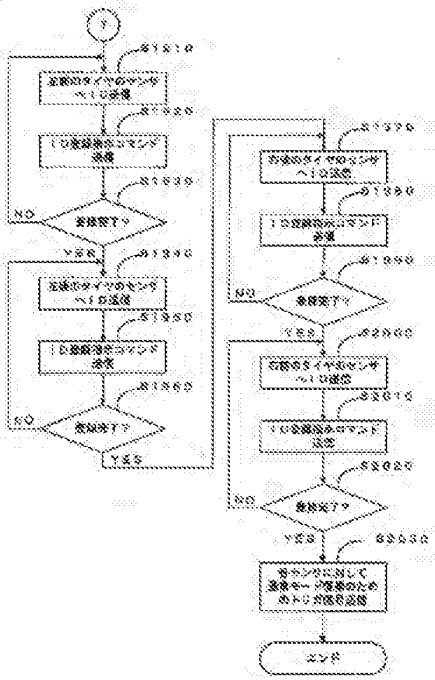
【図12】



【図13】

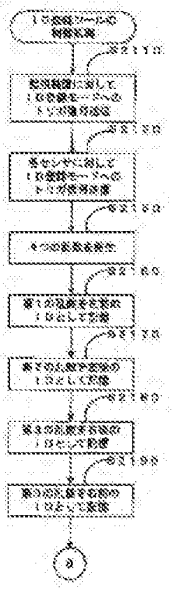


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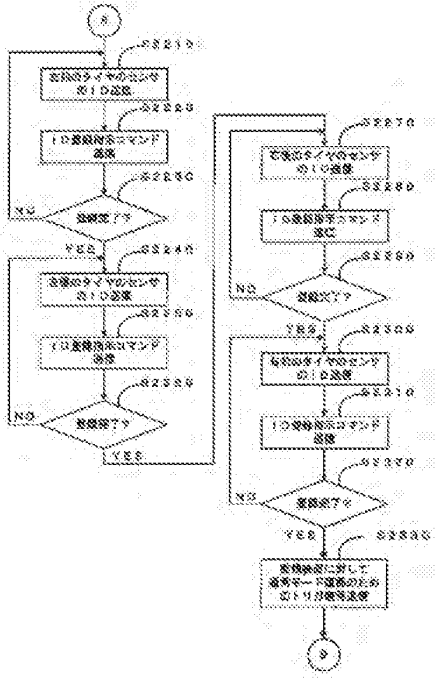


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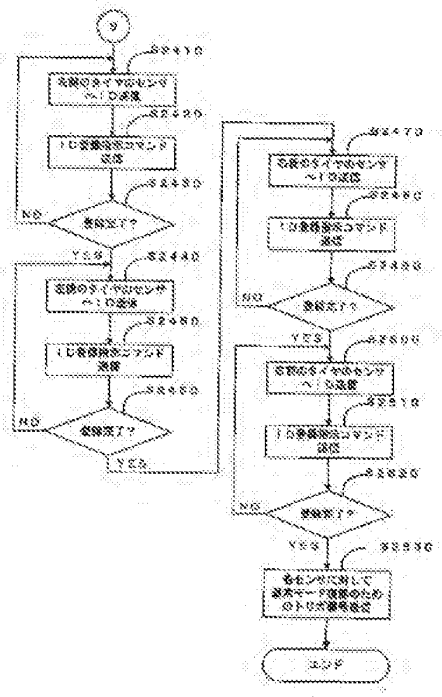
【図15】



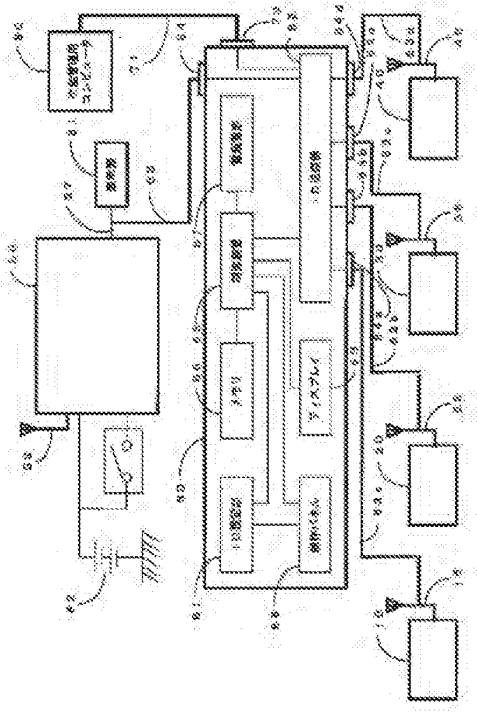
【図16】



【図17】

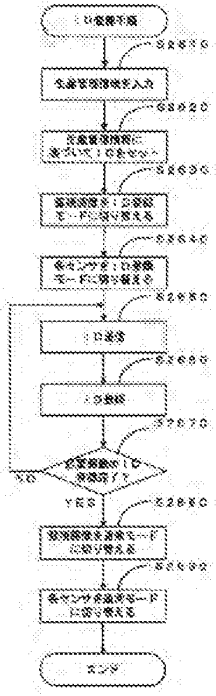


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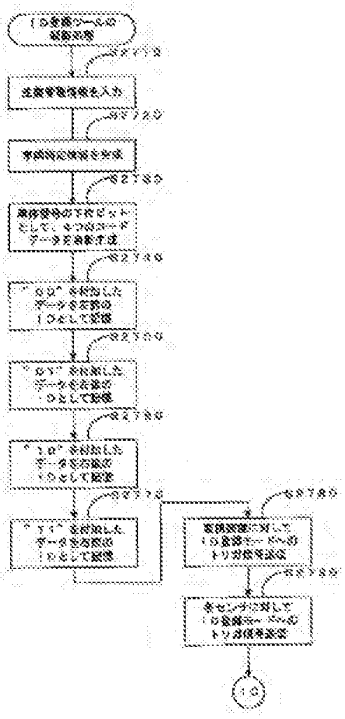


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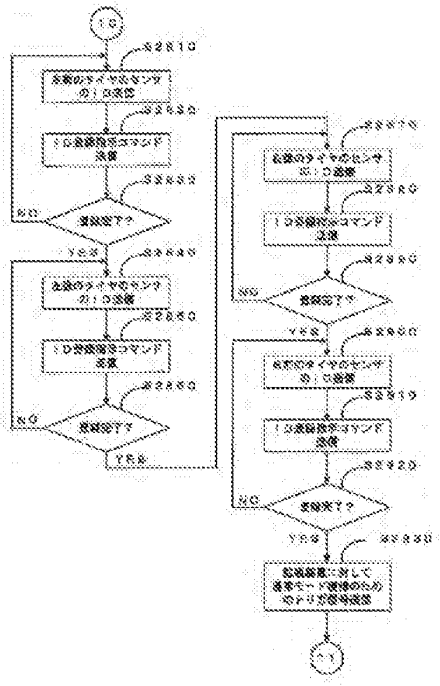
【図19】



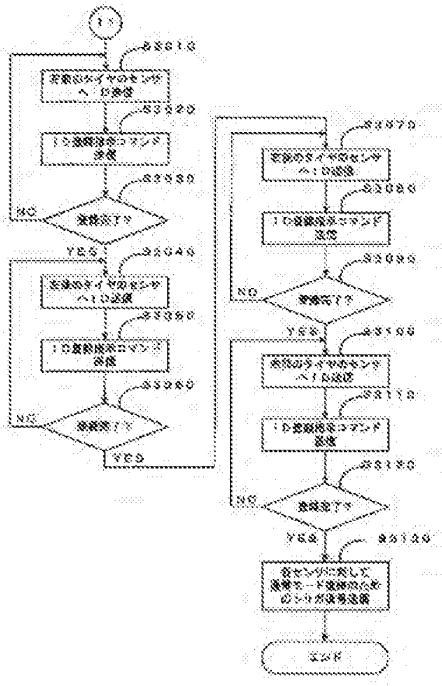
【図20】



【図21】

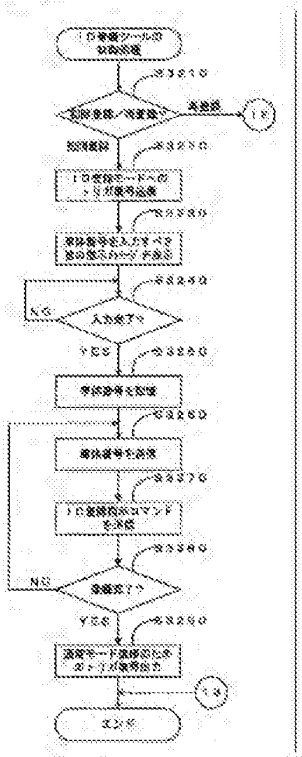


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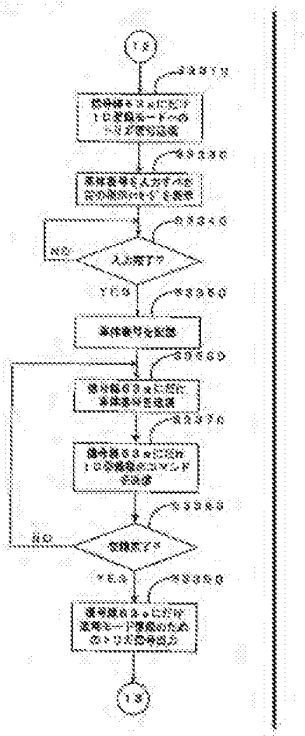


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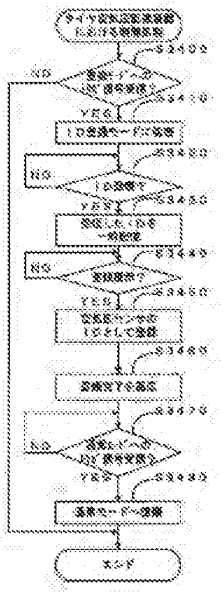
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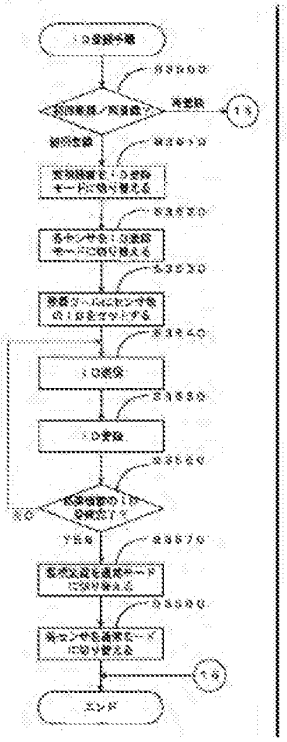
【図24】



【図25】

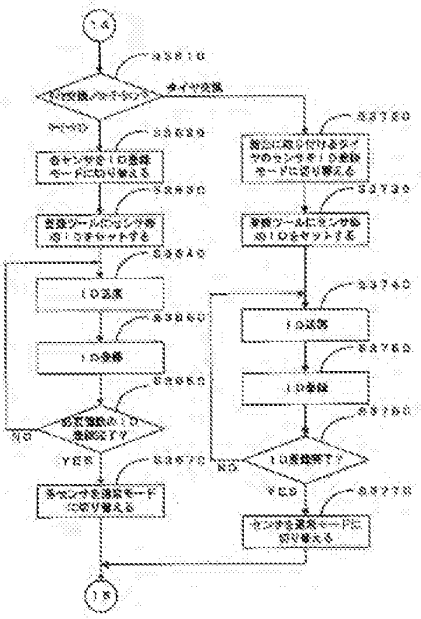


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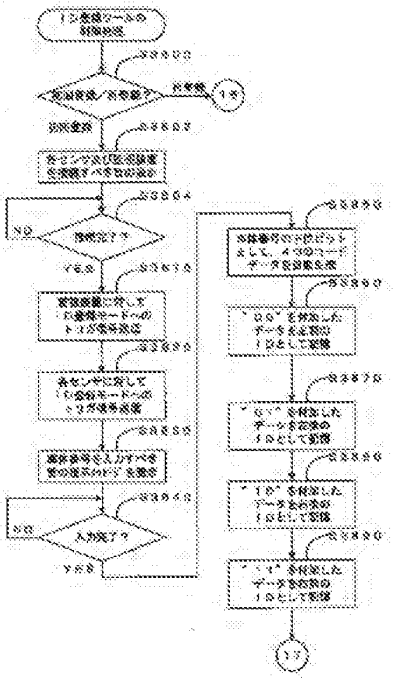


Orange Exhibit No. 2004
IPR2024-00744

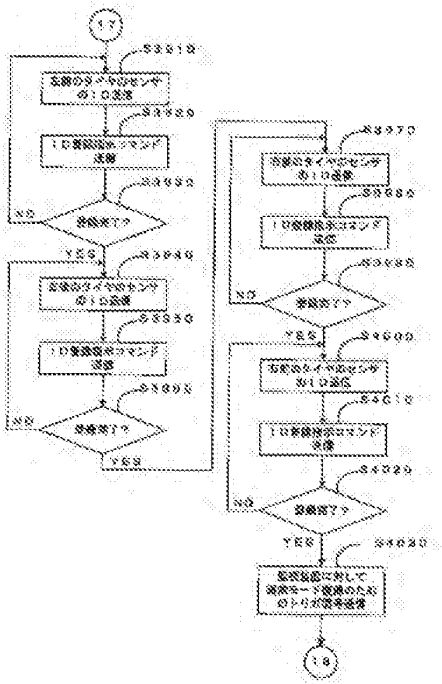
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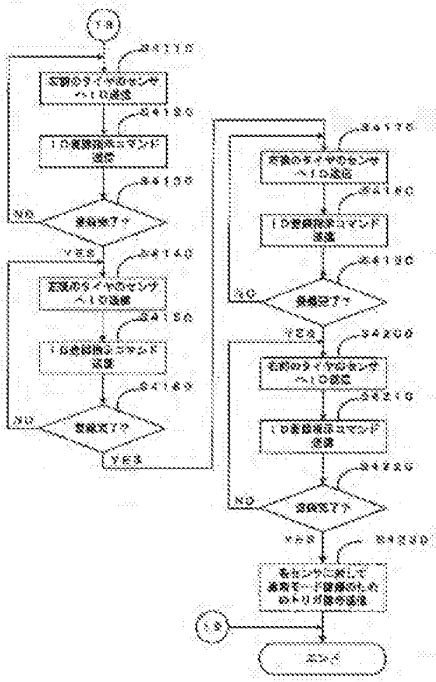
【図28】



【図29】

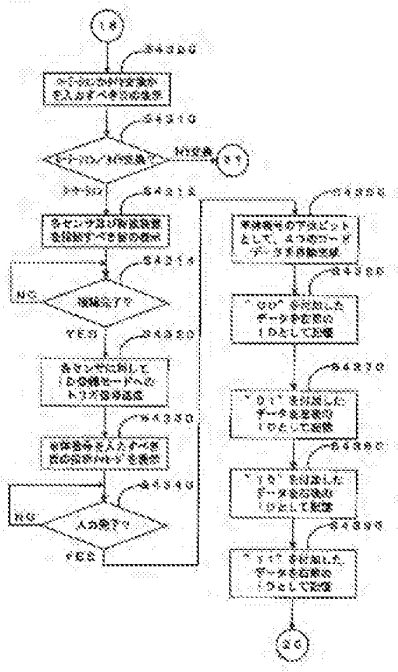


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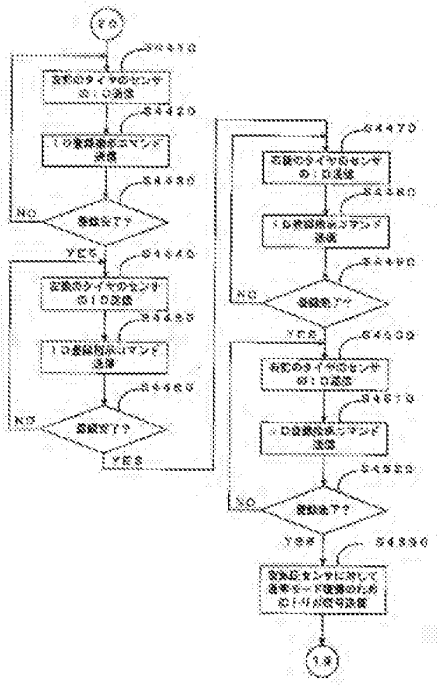


Orange Exhibit No. 2004
IPR2024-00744

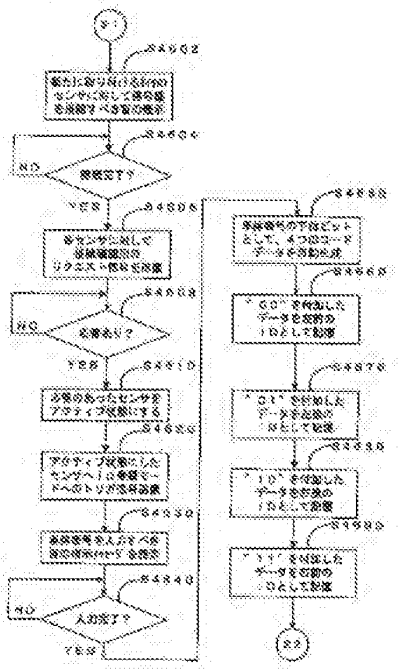
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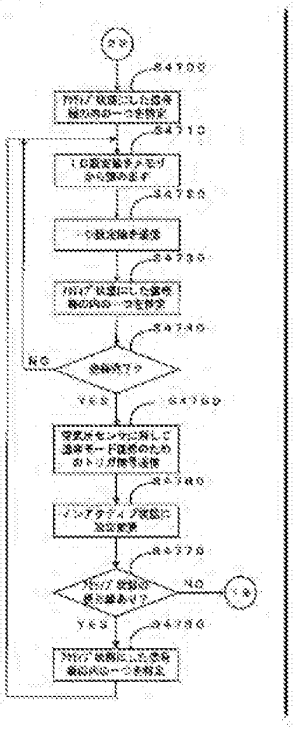
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【図33】

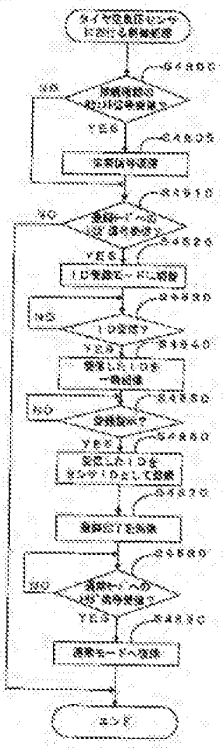


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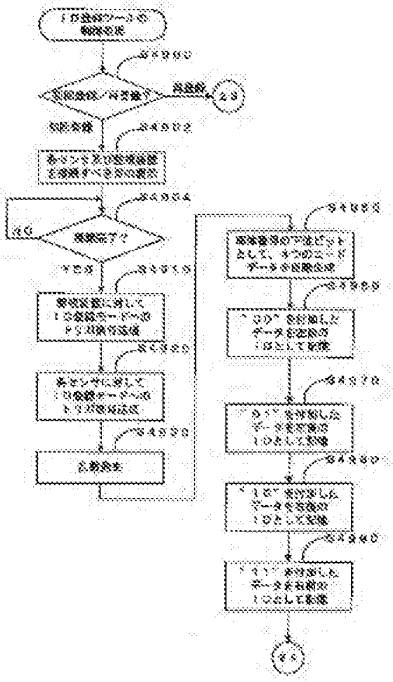


Orange Exhibit No. 2004
IPR2024-00744

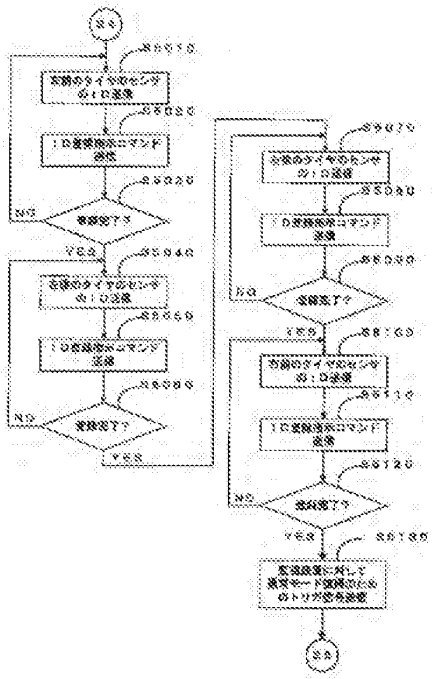
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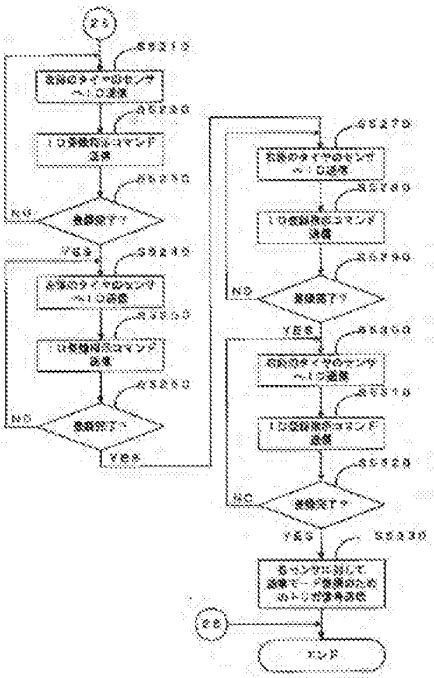
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【図37】

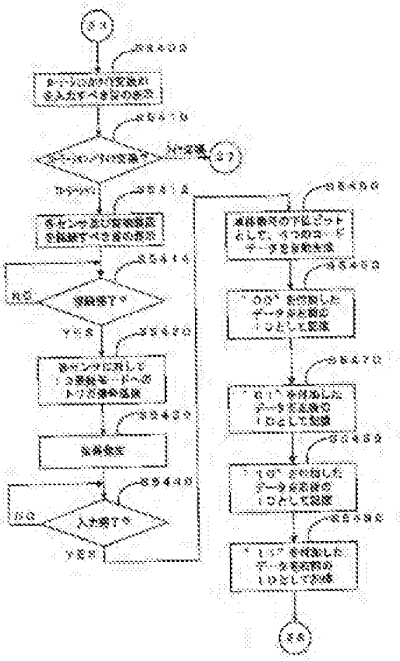


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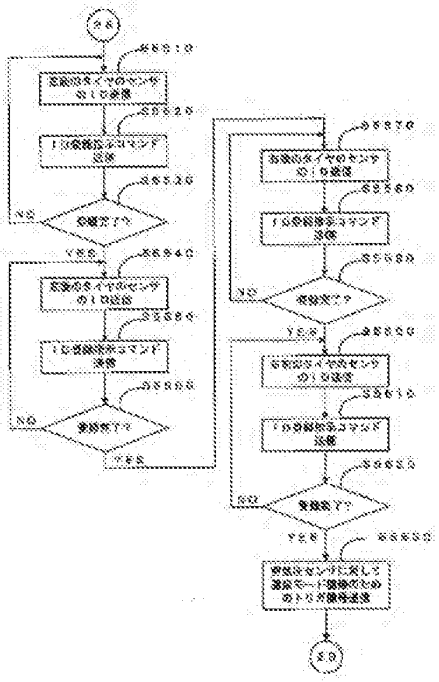


Orange Exhibit No. 2004
IPR2024-00744

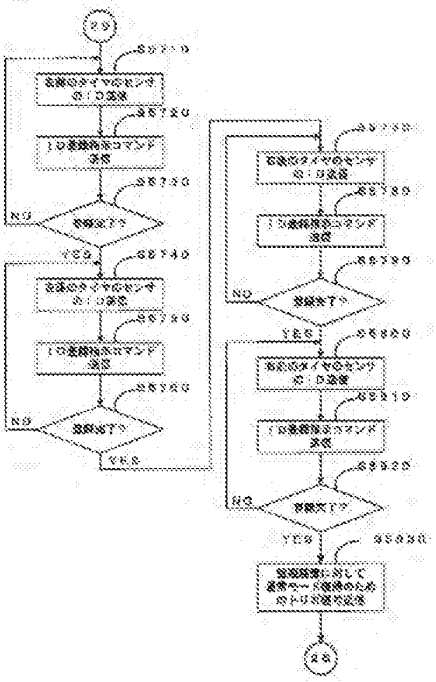
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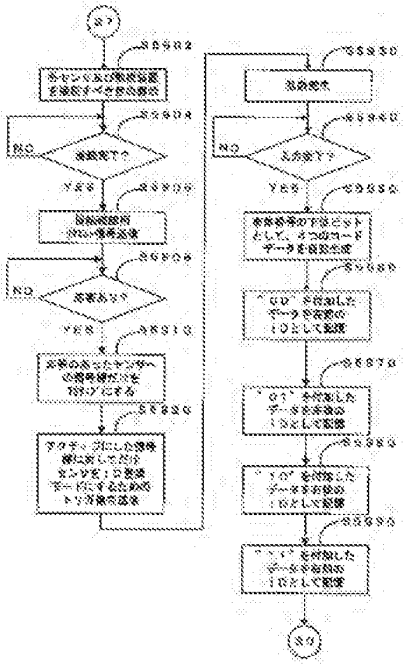
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【図41】

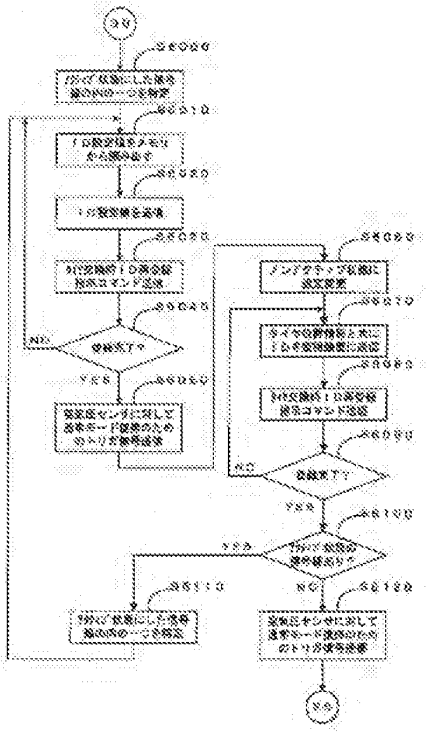


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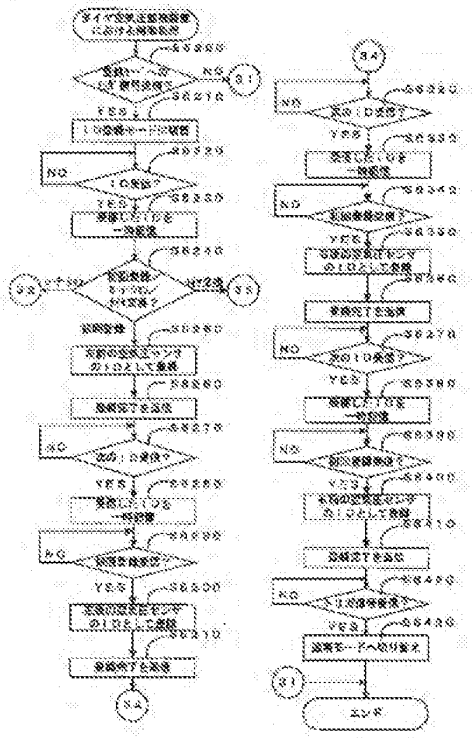


Orange Exhibit No. 2004
IPR2024-00744

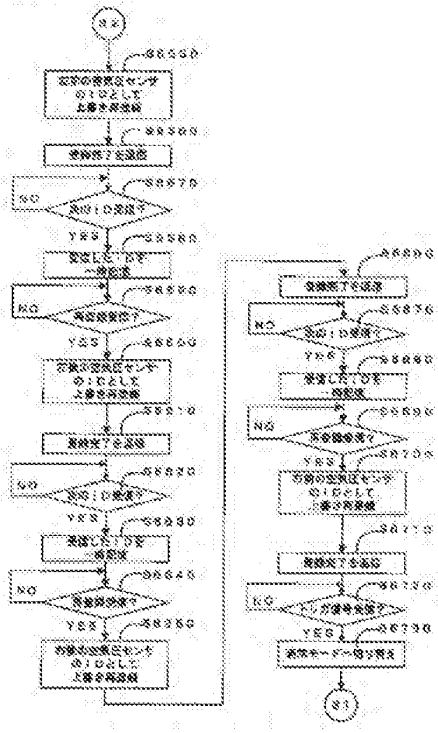
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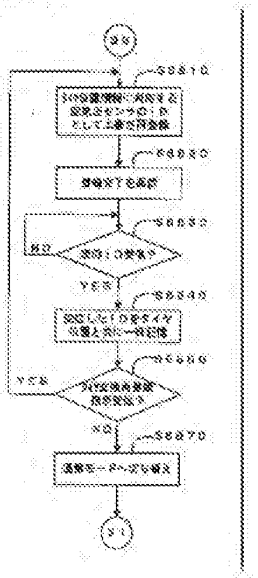
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【図45】

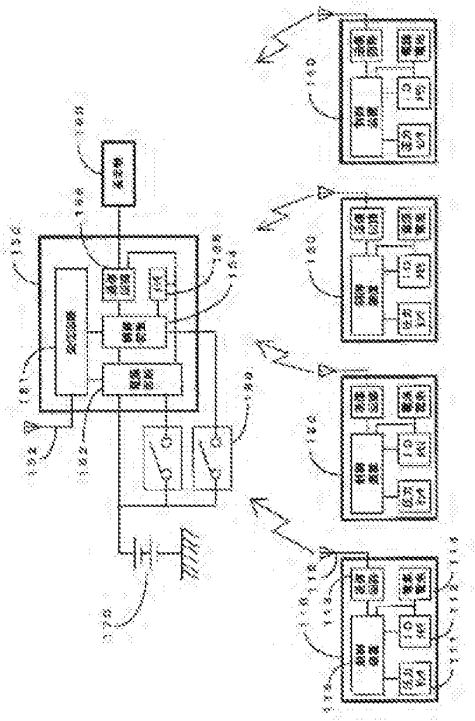


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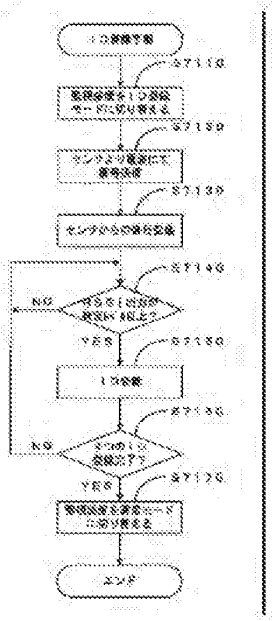


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IPR2024-00744

【図47】



【図48】



Orange Exhibit No. 2004
IPR2024-00744

(51)Int.Cl.⁷	FI		テーマコード(参考)
G08C 25/04	G08C 17/09	B	

Orange Exhibit No. 2004
IPR2024-00744

Electronic Patent Application Fee Transmittal

Application Number:	12283979
Filing Date:	17-Sep-2008
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	Hung-Chih Yu
Filer:	Tim Tingkang Xia/Debby Yew
Attorney Docket Number:	17808 B (CFP-021439)

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Orange Exhibit No. 2004
IPR2024-00744

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	2806	1	90	90
		Total in USD ($)		**90**

Electronic Acknowledgement Receipt

EFS ID:	16701091
Application Number:	12283979
International Application Number:	
Confirmation Number:	9522
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	Hung-Chih Yu
Customer Number:	99536
Filer:	Tim Tingkang Xia/Debby Yew
Filer Authorized By:	Tim Tingkang Xia
Attorney Docket Number:	17808 B (CFP-021439)
Receipt Date:	27-AUG-2013
Filing Date:	17-SEP-2008
Time Stamp:	17:17:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$90
RAM confirmation Number	4322
Deposit Account	503537
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees) Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	**Document Description**	**File Name**	**File Size(Bytes)/ Message Digest**	**Multi Part /.zip**	**Pages (if appl.)**
1	Information Disclosure Statement (IDS) Form (SB08)	3622392835IDS.pdf	612583	no	4
Warnings:					
Information:					
2	Foreign Reference	JP2001322411.pdf	6004677	no	13
Warnings:					
Information:					
3	Foreign Reference	WO02094368A1.pdf	2923375	no	22
Warnings:					
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4	Foreign Reference	JP20049859.pdf	7487656	no	37
Warnings:					
Information:					
5	Foreign Reference	JP200417909.pdf	18017271	no	47
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	30785	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	35076327		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/17a (09-13)
Approved for use through 07/31/2014. OMB 0651-0059
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number

PROCESSING FEE Under 37 CFR 1.17(f), (g) & (h) TRANSMITTAL

(Fees are subject to annual revision)

[Page 1 of 2]

Send completed form to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

Application Number	12283979
Filing Date	September 17, 2008
First Named Inventor	Hung-Chih Yu
Art Unit	2612
Examiner Name	ANH V LA
Practitioner Docket No.	26223-92835

Enclosed is a petition filed under 37 CFR 1.17(g) **that requires a processing fee (37 CFR 1.17(f), (g), or (h)).**

Payment of $ 100 **is enclosed.**

This form should be included with the above-mentioned petition and faxed or mailed to the Office using the appropriate Mail Stop (e.g., Mail Stop Petition), if applicable. *For transmittal of processing fees under 37 CFR 1.17(i), see form PTO/SB/17i.*

☑ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

Payment of Fees

☑ The Commissioner is hereby authorized to charge the following fees to Deposit Account No. 503537

☑ petition fee under 37 CFR 1.17(f), (g) or (h) ☐ any deficiency of fees and credit of any overpayments

☐ Check in the amount of $ _____ is enclosed. ☑ Payment via EFS-Web.

☐ Payment by credit card (Form PTO-2038 or equivalent is enclosed). Do not provide credit card information on this form.

Processing Fees Under 37 CFR 1.17(f):

Undiscounted Fee $400 (Fee Code 1462) Small Entity Fee $200 (Fee Code 2462) Micro Entity Fee $100 (Fee Code 3462)

For papers filed under:

§ 1.36(a) - for revocation of a power of attorney by fewer than all of the applicants.
§ 1.53(e) - to accord a filing date.
§ 1.57(a) - to accord a filing date.
§ 1.182 - for decision on a question not specifically provided for.
§ 1.183 - to suspend the rules.
§ 1.378(e) - for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in an expired patent.
§ 1.741(b) - to accord a filing date to an application under § 1.740 for extension of a patent term.

Processing Fees Under 37 CFR 1.17(g):

Undiscounted Fee $200 (Fee Code 1463) Small Entity Fee $100 (Fee Code 2463) Micro Entity Fee $50 (Fee Code 3463)

For papers filed under:

§ 1.12 - for access to an assignment record.
§ 1.14 - for access to an application.
§ 1.47 - for filing by other than all the inventors or a person not the inventor.
§ 1.59 - for expungement of information.
§ 1.103(a) - to suspend action in an application.
§ 1.136(b) - for review of a request for extension of time when the provisions of § 1.136(a) are not available.
§ 1.295 - for review of refusal to publish a statutory invention registration.
§ 1.296 - to withdraw a request for publication of a statutory invention registration filed on or after the date the notice of intent to publish issued.
§ 1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of a patent.
§ 1.550(c) - for patent owner requests for extension of time in *ex parte* reexamination proceedings.
§ 1.956 - for patent owner requests for extension of time in *inter partes* reexamination proceedings.
§ 5.12 - for expedited handling of a foreign filing license.
§ 5.15 - for changing the scope of a license.
§ 5.25 - for retroactive license.

This collection of information is required by 37 CFR 1.17. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 5 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Orange Exhibit No. 2004
IPR2024-00744

PTO/SB/17a (09-13)
Approved for use through 07/31/2014. OMB 0651-0059
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number

PROCESSING FEE
Under 37 CFR 1.17(f), (g) & (h)
TRANSMITTAL

Processing Fees Under 37 CFR 1.17(h):

Undiscounted Fee $140 (Fee Code 1464) **Small Entity Fee $70 (Fee Code 2464)** **Micro Entity Fee $35 (Fee Code 3464)**

For papers filed under:
§ 1.19(g) - to request documents in a form other than provided in this part.
§ 1.84 – for accepting color drawings or photographs.
§ 1.91 – for entry of a model or exhibit.
§ 1.102(d) – to make an application special.
§ 1.138(c) - to expressly abandon an application to avoid publication.
§ 1.313 – to withdraw an application from issue.
§ 1.314 - to defer issuance of a patent.

SUBMITTED BY

Signature	/Tim Tingkang Xia/	Registration No. (Attorney/Agent) 45242	Telephone 4044953678
Name (Print/Type)	Tim Tingkang Xia		Date August 28, 2013

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Orange Exhibit No. 2004
IPR2024-00744

Electronic Patent Application Fee Transmittal

Application Number:	12283979
Filing Date:	17-Sep-2008
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	Hung-Chih Yu
Filer:	Tim Tingkang Xia/Debby Yew
Attorney Docket Number:	17808 B (CFP-021439)

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Petition Fee-37CFR 1.17(g)(GroupII)	2463	1	100	100
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	100

Electronic Acknowledgement Receipt

EFS ID:	16714326
Application Number:	12283979
International Application Number:	
Confirmation Number:	9522
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	Hung-Chih Yu
Customer Number:	99536
Filer:	Tim Tingkang Xia/Debby Yew
Filer Authorized By:	Tim Tingkang Xia
Attorney Docket Number:	17808 B (CFP-021439)
Receipt Date:	28-AUG-2013
Filing Date:	17-SEP-2008
Time Stamp:	18:07:48
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$100
RAM confirmation Number	5854
Deposit Account	503537
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	2622392835StmtPetitionTransmital.pdf	81580	no	2
Warnings:					
Information:					
2	Petition for review by the Office of Petitions.	2622392835PetitionTransmital.pdf	222651	no	3
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30549	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	334780		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Hung-Chih Yu	Examiner:	Anh V La
Application No.:	12/283,979	Group Art Unit:	2612
Filing Date:	September 17, 2008	Confirmation No.:	9522
Title:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME		

PETITION UNDER 37 CFR 1.17(g)

August 28, 2013

Mail Stop: Office of Petitions
P.O. Box 1450
Arlington, VA 22313-1450

CUSTOMER NO. 24728

Dear Sir:

Petitioner hereby Petitions under 37 CFR 1.59(b) that a copy of the REEXAMINATION-PATENT OWNER POWER OF ATTORNEY, which was inadvertently filed on August 21, 2013, and an Information Disclosure Statement, which was inadvertently filed on August 27, 2013 in the above-referenced application, be expunged from the application file.

The REEXAMINATION-PATENT OWNER POWER OF ATTORNEY and the Information Disclosure Statement should have been filed under Reexamination No. 90/012,430 as a Reexamination file, rather than a Prosecution file of the above-referenced application.

Petitioner hereby requests that the REEXAMINATION-PATENT OWNER POWER OF ATTORNEY and the Information Disclosure Statement be expunged from the above-referenced application file.

The Commissioner is hereby authorized to charge any deficiency of fees that may be required, and credit of any overpayments to Deposit Account No. 50-3537.

Respectfully submitted,
MORRIS, MANNING & MARTIN, LLP

August 28, 2013



Tim Tingkang Xia
Attorney for Applicant on the Record
Reg. No. 45,242

1600 Atlanta Financial Center
3343 Peachtree Road, N.E.
Atlanta, Georgia 30326-1044
Phone: 404-233-7000
Direct: 404-495-3678
Customer No. 24728

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Hung-Chih Yu	Examiner:	Anh V La
Application No.:	12/283,979	Group Art Unit:	2612
Filing Date:	September 17, 2008	Confirmation No.:	9522
Title:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME		

REQUEST FOR REFUND

Mail Stop 16
Director of the U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

August 28, 2013

CUSTOMER NO. 24728

Dear Sir:

An Information Disclosure Statement was inadvertently filed on August 27, 2013 in the above-referenced application, which was patented on October 4, 2011. The Information Disclosure Statement should be filed under Reexamination No. 90/012,430 as a Reexamination file.

A Petitions under 37 CFR 1.59(b) was filed on August 28, 2013 to expunge the Information Disclosure Statement, that were submitted on August 27, 2013.

Petitioner respectfully requests a refund in the amount of $90.00 for the information disclosure statement fee. Therefore, please credit our deposit account no. 50-3537 in the amount of $90.00.

Respectfully submitted,

MORRIS, MANNING & MARTIN, LLP

August 28, 2013

Tim Tingkang Xia
Reg. No. 45,242
Attorney for Assignee on the Record
TTX

MORRIS, MANNING & MARTIN, LLP
1600 Atlanta Financial Center
3343 Peachtree Road, N.E.
Atlanta, Georgia 30326-1044
Phone: 404-233-7000
Direct: 404-495-3678
Customer No. 24728

Electronic Acknowledgement Receipt

EFS ID:	16714396
Application Number:	12283979
International Application Number:	
Confirmation Number:	9522
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	Hung-Chih Yu
Customer Number:	99536
Filer:	Tim Tingkang Xia/Debby Yew
Filer Authorized By:	Tim Tingkang Xia
Attorney Docket Number:	17808 B (CFP-021439)
Receipt Date:	28-AUG-2013
Filing Date:	17-SEP-2008
Time Stamp:	18:12:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Refund Request	2622392835RequestRefund.pdf	88268	no	2
Warnings:					
Information:					

Orange Exhibit No. 2004
IPR2024-00744

Total Files Size (in bytes):	88268

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
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New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/17a (09-13)
Approved for use through 07/31/2014. OMB 0651-0059
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PROCESSING FEE Under 37 CFR 1.17(f), (g) & (h) TRANSMITTAL

(Fees are subject to annual revision)

[Page 1 of 2]

Send completed form to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

Application Number	12283979
Filing Date	September 17, 2008
First Named Inventor	Hung-Chih Yu
Art Unit	2612
Examiner Name	ANH V LA
Practitioner Docket No.	26223-92835

Enclosed is a petition filed under 37 CFR 1.17(g) **that requires a processing fee (37 CFR 1.17(f), (g), or (h)).**

Payment of $ 100 **is enclosed.**

This form should be included with the above-mentioned petition and faxed or mailed to the Office using the appropriate Mail Stop (e.g., Mail Stop Petition), if applicable. *For transmittal of processing fees under 37 CFR 1.17(i), see form PTO/SB/17i.*

☑ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

Payment of Fees

☑ The Commissioner is hereby authorized to charge the following fees to Deposit Account No. 503537

☑ petition fee under 37 CFR 1.17(f), (g) or (h) ☐ any deficiency of fees and credit of any overpayments

☐ Check in the amount of $ _____ is enclosed. ☑ Payment via EFS-Web.

☐ Payment by credit card (Form PTO-2038 or equivalent is enclosed). Do not provide credit card information on this form.

Processing Fees Under 37 CFR 1.17(f):

Undiscounted Fee $400 (Fee Code 1462) Small Entity Fee $200 (Fee Code 2462) Micro Entity Fee $100 (Fee Code 3462)

For papers filed under:

§ 1.36(a) - for revocation of a power of attorney by fewer than all of the applicants.
§ 1.53(e) - to accord a filing date.
§ 1.57(a) - to accord a filing date.
§ 1.182 - for decision on a question not specifically provided for.
§ 1.183 - to suspend the rules.
§ 1.378(e) - for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in an expired patent.
§ 1.741(b) - to accord a filing date to an application under § 1.740 for extension of a patent term.

Processing Fees Under 37 CFR 1.17(g):

Undiscounted Fee $200 (Fee Code 1463) Small Entity Fee $100 (Fee Code 2463) Micro Entity Fee $50 (Fee Code 3463)

For papers filed under:

§ 1.12 - for access to an assignment record.
§ 1.14 - for access to an application.
§ 1.47 - for filing by other than all the inventors or a person not the inventor.
§ 1.59 - for expungement of information.
§ 1.103(a) - to suspend action in an application.
§ 1.136(b) - for review of a request for extension of time when the provisions of § 1.136(a) are not available.
§ 1.295 - for review of refusal to publish a statutory invention registration.
§ 1.296 - to withdraw a request for publication of a statutory invention registration filed on or after the date the notice of intent to publish issued.
§ 1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of a patent.
§ 1.550(c) - for patent owner requests for extension of time in *ex parte* reexamination proceedings.
§ 1.956 - for patent owner requests for extension of time in *inter partes* reexamination proceedings.
§ 5.12 - for expedited handling of a foreign filing license.
§ 5.15 - for changing the scope of a license.
§ 5.25 - for retroactive license.

This collection of information is required by 37 CFR 1.17. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 5 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Orange Exhibit No. 2004
IPR2024-00744

PTO/SB/17a (09-13)
Approved for use through 07/31/2014. OMB 0651-0059
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number

PROCESSING FEE
Under 37 CFR 1.17(f), (g) & (h)
TRANSMITTAL

Processing Fees Under 37 CFR 1.17(h):

Undiscounted Fee $140 (Fee Code 1464) **Small Entity Fee $70 (Fee Code 2464)** **Micro Entity Fee $35 (Fee Code 3464)**

For papers filed under:
§ 1.19(g) - to request documents in a form other than provided in this part.
§ 1.84 – for accepting color drawings or photographs.
§ 1.91 – for entry of a model or exhibit.
§ 1.102(d) – to make an application special.
§ 1.138(c) - to expressly abandon an application to avoid publication.
§ 1.313 – to withdraw an application from issue.
§ 1.314 - to defer issuance of a patent.

SUBMITTED BY

Signature	/Tim Tingkang Xia/	Registration No. (Attorney/Agent) 45242	Telephone 4044953678
Name (Print/Type)	Tim Tingkang Xia		Date August 28, 2013

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Orange Exhibit No. 2004
IPR2024-00744

Electronic Patent Application Fee Transmittal

Application Number:	12283979
Filing Date:	17-Sep-2008
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	Hung-Chih Yu
Filer:	Tim Tingkang Xia/Debby Yew
Attorney Docket Number:	17808 B (CFP-021439)

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Petition Fee-37CFR 1.17(g)(GroupII)	2463	1	100	100
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	100

Electronic Acknowledgement Receipt

EFS ID:	16714240
Application Number:	12283979
International Application Number:	
Confirmation Number:	9522
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	Hung-Chih Yu
Customer Number:	99536
Filer:	Tim Tingkang Xia/Debby Yew
Filer Authorized By:	Tim Tingkang Xia
Attorney Docket Number:	17808 B (CFP-021439)
Receipt Date:	28-AUG-2013
Filing Date:	17-SEP-2008
Time Stamp:	18:02:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	28223928355tmtPetitionTransmittal.pdf	81580	no	2
			[illegible]		
Warnings:					
Information:					

2	Petition for review by the Office of Petitions.	2622392835PetitionTransmittal.pdf	222651 [redacted]	no	3
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30550 [redacted]	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	334781		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Hung-Chih Yu	Examiner:	Anh V La
Application No.:	12/283,979	Group Art Unit:	2612
Filing Date:	September 17, 2008	Confirmation No.:	9522
Title:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME		

PETITION UNDER 37 CFR 1.17(g)

August 28, 2013

Mail Stop: Office of Petitions
P.O. Box 1450
Arlington, VA 22313-1450

CUSTOMER NO. 24728

Dear Sir:

Petitioner hereby Petitions under 37 CFR 1.59(b) that a copy of the REEXAMINATION-PATENT OWNER POWER OF ATTORNEY, which was inadvertently filed on August 21, 2013, and an Information Disclosure Statement, which was inadvertently filed on August 27, 2013 in the above-referenced application, be expunged from the application file.

The REEXAMINATION-PATENT OWNER POWER OF ATTORNEY and the Information Disclosure Statement should have been filed under Reexamination No. 90/012,430 as a Reexamination file, rather than a Prosecution file of the above-referenced application.

Petitioner hereby requests that the REEXAMINATION-PATENT OWNER POWER OF ATTORNEY and the Information Disclosure Statement be expunged from the above-referenced application file.

The Commissioner is hereby authorized to charge any deficiency of fees that may be required, and credit of any overpayments to Deposit Account No. 50-3537.

Respectfully submitted,

MORRIS, MANNING & MARTIN, LLP

August 28, 2013



Tim Tingkang Xia
Attorney for Applicant on the Record
Reg. No. 45,242

1600 Atlanta Financial Center
3343 Peachtree Road, N.E.
Atlanta, Georgia 30326-1044
Phone: 404-233-7000
Direct: 404-495-3678
Customer No. 24728

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
ADDRESS: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/283,979	09/17/2008	Hung-Chih Yu	26223-92835

CONFIRMATION NO. 9522

24728
MORRIS MANNING MARTIN LLP
3343 PEACHTREE ROAD, NE
1600 ATLANTA FINANCIAL CENTER
ATLANTA, GA 30326

POA ACCEPTANCE LETTER



Date Mailed: 09/06/2013

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/21/2013.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/mbeyene/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

MORRIS MANNING MARTIN LLP
3343 PEACHTREE ROAD, NE
1600 ATLANTA FINANCIAL CENTER
ATLANTA GA 30326

MAILED
OCT 17 2013
OFFICE OF PETITIONS

In re Patent No. 8,031,064
Issue Date : October 4, 2011
Application No. 12/283,979
Filed: September 17, 2008
Attorney Docket No. 26223-92835

DECISION ON PETITION

This is a decision on the Petition Under 37 CFR 1.17(g), filed August 28, 2013, which is being treated as a petition under 37 CFR 1.59(b), to expunge information from the above identified application and as a petition to remove papers from the application file.

The petition under 37 CFR 1.59(b) is **dismissed**.

The petition to remove papers from the file is **granted**.

As to the petition under 37 CFR 1.59(b):

Petitioner requests that an Information Disclosure Statement (IDS), filed August 27, 2013 be removed from the file. Petitioner states the IDS was intended for a different application.

MPEP 724.05(III) INFORMATION SUBMITTED IN INCORRECT APPLICATION indicates that grant of a petition under 37 CFR 1.59(b) is governed by the factors enumerated in paragraph II of this section.

MPEP 724.05(II) states in part:

> II. INFORMATION UNINTENTIONALLY SUBMITTED IN APPLICATION
> A petition to expunge information unintentionally submitted in an application (other than information forming part of the original disclosure) may be filed under 37 CFR 1.59(b), provided that:
>
> (A) the Office can effect such return prior to the issuance of any patent on the application in issue;
> (B) it is stated that the information submitted was unintentionally submitted and the failure to obtain its return would cause irreparable harm to the party who

Orange Exhibit No. 2004
IPR2024-00744

submitted the information or to the party in interest on whose behalf the information was submitted;
(C) the information has not otherwise been made public;
(D) there is a commitment on the part of the petitioner to retain such information for the period of any patent with regard to which such information is submitted;

The petition is deficient because the patent has issued and thus item (A) cannot be met.

As to the petition to remove papers from the file:

Petitioner requests that the Reexamination Patent Owner Power of Attorney, filed August 21, 2013, be expunged from the file . Petitioner states that this paper was erroneously filed in the instant application and was meant for another application.

The paper in question has been determined by the undersigned to not be material to the examination of the instant application. The paper was clearly intended to be filed in a different application.

The paper in question has been removed from the official file.

USPTO information that exists in the public domain, such as file records for patents or patent application publications, is open to the public for inspection and copying. Although this information has been removed from USPTO records, the Office cannot ensure that parties outside the USPTO do not already have copies of information previously publically available from the USPTO.

Telephone inquiries concerning this communication should be directed to Carl Friedman at (571) 272-6842.

Carl Friedman
Petitions Examiner
Office of Petitions

Orange Exhibit No. 2004
IPR2024-00744

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
address: COMMISSIONER FOR PATENTS
PO Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
12/283,979	8031064	2612	9200



Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 24728 on 06/10/2014

- Correspondence Address
- Maintenance Fee Address

The address of record for Customer Number 24728 is:

24728
MORRIS MANNING MARTIN LLP
3343 PEACHTREE ROAD, NE
1600 ATLANTA FINANCIAL CENTER
ATLANTA, GA 30326

PART 1 - ATTORNEY/APPLICANT COPY

Orange Exhibit No. 2004
IPR2024-00744

EXHIBIT
PAT-C

Orange Exhibit No. 2004
IPR2024-00744

Atty. Doc.: YUHO3002RX/BEU

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Reexamination of:	)
	)
U.S. Patent No. 8,031,064	)
	)
Inventor: Hung-Chih YU	)
	)
Patentee: Orange Electronic Co., Ltd.	)
	)
Issued: October 4, 2011	)

For: TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDEINTICATION COPYING METHOD FOR THE SAME

REQUEST FOR *EX PARTE* REEXAMINATION

Honorable Commissioner For Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

Re-examination under 35 U.S.C. §302-307 and 37 C.F.R. §1.510 is requested of U.S. Patent No. 8,031,064, which issued on October 4, 2011, to Orange Electronic Co., Ltd. (hereinafter "the '064 patent").

A Certificate of Service, copy of U.S. Patent No. 8,031,064, PTO-1449 form, copies of listed publications; and the fee of $2520 set forth in 37 CFR 1.20(c)(1) are attached.

I. Claims for Which Re-Examination is Requested

Re-examination is requested of claims 1-13 of the '064 patent in view of the publications listed on the attached PTO-1449 form, for the reasons set forth in detail below.

II. Summary of Substantial New Questions of Patentability

The reason for requesting re-examination of claims 1-13 of the '064 patent is that the feature on which allowance of the '064 was based, namely the inclusion in a tire pressure

monitoring device of "an input module" for "allowing an operator to input an identification to be written into the identification rewriteable memory unit" (hereinafter, the "manual ID input" feature) is disclosed in advertisements for CUB sensor model PUR-TPMS (hereinafter, the PUR-TPMS sensor) published in "*Tire Rack Wholesale Update,*" listed on the attached PTO-1449 form, before the effective filing date of the '064 patent. The manual ID input feature of the PUR-TPMS sensor would have been an obvious addition to the tire pressure monitor described in U.S. Patent No. 6,927,679 (Taguchi). As explained in more detail below, claim 1 of the '064 patent was originally rejected as anticipated by the Taguchi patent, but was allowed upon addition of a limitation to the manual ID input feature.

III. Detailed Explanation of the Pertinency of the Cited Prior Art With Respect of Each of the Claims for Which Re-Examination is Requested

Claim 1

Claim 1 of the '064 patent broadly recites a tire pressure detecting apparatus with (a) an "identification rewritable tire pressure detector" and (b) "a setting apparatus."

(a) **tire pressure detector**

The **tire pressure detector** recited in claim 1 includes a micro-processing module having a **rewriteable** memory unit, a sensing module with a pressure-detecting unit, a transmitting module, a power module, and a receiving interface. The transmitting module transmits both a detection result and an identification of the detector. The receiving interface receives an external signal that "comprises an **external identification to be written into the rewriteable memory unit.**" The features of the memory unit being rewriteable and an external identification being written into the memory unit were added in an amendment dated March 29, 2011, in response to an initial rejection mailed December 27, 2010 and based on the Taguchi patent. The Taguchi patent was cited by the Examiner as teaching each of the elements of the claimed tire pressure detector, except that the claim did not originally recite writing of an external identification, received through the receiving interface, into the memory unit.

(b) **setting apparatus**

The **setting apparatus** recited in claim 1 includes a control module, an input module that is:

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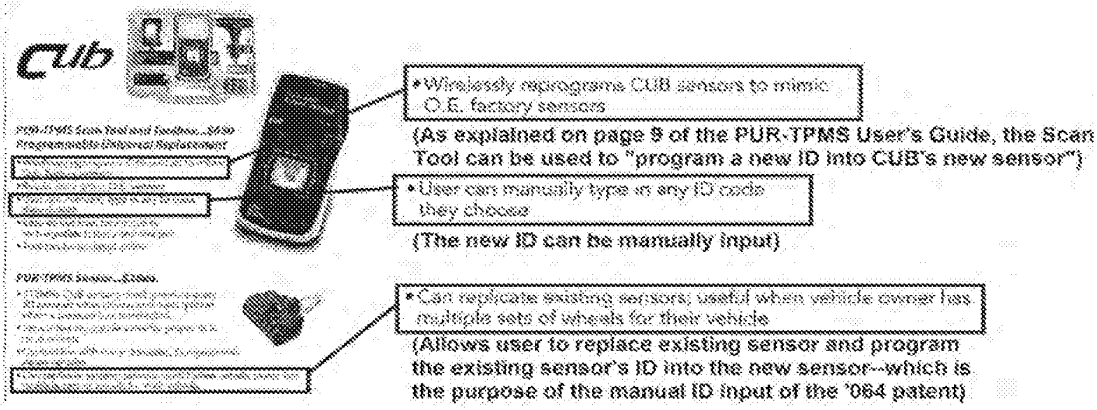
> *. . .electronically connected to the control module and* ***allowing an operator to input an identification*** *to be written into the identification rewriteable tire pressure* [*sic.*, detector].

In addition, the setting apparatus includes a receiving module, a setting output module, and a power source. Again, the Examiner indicated in the first Official Action that all of the elements of the setting apparatus were met by the Taguchi patent, and the patent owner responded by adding the recitation that the setting apparatus allows an operator to input an identification (to be transmitted to the detector and written into the rewriteable memory).

The prosecution history of the '064 patent thus makes clear that the Taguchi patent shows a tire pressure detector and setting apparatus with all features of the invention recited in claim 1 of the '064 patent, except for the inclusion of a manual ID input to the setting apparatus and the feature that the manually input ID can be transmitted to the detector for writing into the ID memory. The features of manual ID input to a setting apparatus, and storage of the ID in a rewriteable memory of the tire pressure detector, were added to the claims in response to the initial rejection, and resulted in allowance of the application. The "remarks" section of the March 27, 2011 response that added the recitations of manual ID input did not dispute that Taguchi disclosed the basic tire pressure and setting apparatus, but rather argued for patentability based on the manual ID input feature.

While the Taguchi patent did teach ID registration, the patent owner argued in the March 27, 2011, response that the ID registration required a separate tool, rather than integration of the ID input into a pressure-monitoring setting apparatus (see item 1 on page 10 of the March 27, 2011, response. On the other hand, the manual ID input of the PUR-TPMS tire pressure monitor is integrated into a pressure-monitoring setting apparatus, and the manually input ID is transmitted to the pressure detector for storage, exactly as recited in claim 1 of the Taguchi patent. Thus, the PUR-TPMS sensor, as described in the published advertisement, includes the function on which patentability of claim 1 was based, in exactly the same context as the claimed sensor.

The following is a copy of the published advertisement of the PUR-TPMS sensor as published in "*Tire Rack Wholesale Update*" publication dated July 20, 2008 through August 19, 2008:

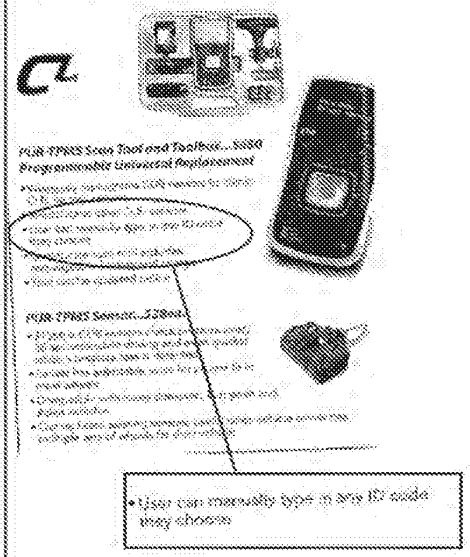


A copy of the "PUR-TPMS User's Guide" is included herewith and cited on the attached PTO-1449 form. The User's Guide has a copyright notice indicating a 2008 publication year, and appears to provide details of the PUR-TPMS scan tool and sensor illustrated in the PUR-TPMS advertisement of July 20, 2008 to August 19, 2008.

The correspondence between the tire pressure detecting apparatus recited in claim 1 of the '064 patent and the tire pressure detecting apparatus described in the Taguchi patent, considered in view of the PUR-TMPS sensor, can be further understood from the following claim chart:

Claim 1	U.S. Patent No. 6,927,679 (Taguchi) and PUR-TPMS Sensor
A tire pressure detecting apparatus, comprising:	**Taguchi**, pressure sensor 10 and monitoring apparatus 50 (Fig. 2)
an identification rewritable tire pressure detector comprising:	**Taguchi**, "pressure sensor 10" (Fig. 2), including rewritable ID memory 12; into which a transmitter ID is written during a "registration process" (see, *e.g.*, abstract and col. 11, lines 49-54)
a micro-processing module having a rewritable memory unit being capable of recording an identification;	**Taguchi**, ID memory 12 (Fig. 2)

a sensing module electrically connected to the micro-processing module and having a pressure-detecting unit, the pressure-detecting unit detecting a tire pressure and sending a detection result to the micro-processing module;	**Taguchi**, pressure sensor 11 (Fig. 2)
a transmitting module controlled by the micro-processing module to transmit a radio frequency (RF) signal comprising the detection result and an identification of the identification rewritable tire pressure detector;	**Taguchi**, transmit/receive circuit 13 and antenna 16 (Fig. 2), col. 11, lines 16-25 (describing transmission of detected pressure signal from sensor 11 and sensor ID stored in memory unit 12)
a power module electrically connected to the micro-processing module and providing electric power to the identification rewriteable tire pressure detector;	**Taguchi**, power battery 14 (Fig. 2)
a receiving interface electronically connected to the microprocessing module, receiving and sending an external signal to the micro-processing module, where the external signal comprises an external identification to be written into the rewritable memory unit;	**Taguchi**, transmit/receive circuit 13 (Fig. 2), step S140, "receive transmitted receiver ID by sensor" (Fig. 3)
a setting apparatus communicating with the identification rewriteable tire pressure detector and having a control module;	**Taguchi**, tire pressure monitor 50, which transmits the receiver ID to the pressure sensor 10 for storage in the ID memory unit 12

an input module being electronically connected to the control module and allowing an operator to input an identification to be written into the identification rewriteable tire pressure;	**Taguchi** discloses a separate registration device rather than an "input module" of an integrated setting apparatus. However, the PUR-TPMS Scan Tool includes the feature that "***User can manually type in any ID code they choose***" 
a receiving module electronically connected to the control module, receiving the RF signal from the identification rewritable tire pressure detector or a tire pressure detector and sending the RF signal to the control module;	**Taguchi**, transmit/receive circuit 51 and antenna 52 (Fig. 2), step S21 (Fig. 3B), col. 11, lines 27-35
a setting output module controlled by the control module to send the external signal to the receiving interface, where the external signal is generated by the control module and comprises the identification that is provided by the input module or provided by the RF signal received from the receiving module;	**Taguchi**, transmit/receive circuit 51 and antenna 52 (Fig. 2), which transmits a receiver ID from the monitoring apparatus to the sensor, step S130 (Fig. 4), col. 11, lines 60-62. Taguchi does not disclose that the identification is provided by an RF signal received from the receiving module or from a manual input module. Instead, the "receiver ID," which an ID of the monitoring apparatus, is transmitted to the sensor. However, **Taguchi**, col. 20, lines 29-42 point out that *any* ID, and not just the receiver ID, could be registered in the

	sensor. **The only difference between what is taught by Taguchi and the claimed invention is the use of a manually input ID or an ID received by the monitor as the registration ID to be sent to the sensor**. The PUR-TPMS Scan Tool includes the feature that the "[U]ser can manually type in any ID code they choose," and thus substituting a manually input ID for the "receiver ID" of Taguchi, which would meet this limitation
a power source electronically connected to the control module and providing electrical power to the setting apparatus.	**Taguchi**, power circuit 53 (Fig. 2)

As is apparent from the claim chart, Taguchi anticipates all limitations of claim 1, except that the ID registered in the sensor ("rewritable tire pressure detector") is, in the described embodiments, a "receiver ID," *i.e.*, an ID associated with the monitor that, in registration mode, functions as the "setting apparatus." However, Taguchi mentions that the ID to be registered is not required to be a receiver ID. Furthermore, the claimed ID source, namely a manual input, is a feature of an otherwise analogous tire pressure monitor, identified as PUR-TPMS Scan Tool in the Tire Rack Wholesale Update publications dated before the filing date of the '854 patent.

In summary, the claimed invention will result from integration of Taguchi's setting tool 20 (which is already capable of wirelessly reprogramming a tire pressure detector) with a tire pressure monitoring device, as in the PUR-TPMS monitoring/setting tool, and further including a manual input corresponding to the manual input of the PUR-TPMS monitoring/setting tool (as a supplement to the code scanner 274 of the Taguchi patent). Since the modified monitoring/setting tool will carry out the same functions with results that are completely predictable based on the teachings of the Taguchi patent and the PUR-TPMS publications, the motivation for the combination being to enable replacement and monitoring of tire pressure sensors without previously storing the ID according to the teachings of, for example, in col. 3, lines 47-52 of the Taguchi patent (by enabling the user to visually observe the ID and manually input it into the programming/monitoring device), the subject matter of claim 1 would have been obvious to one of ordinary skill in the art, and therefore claim 1 is

unpatentable over **35 USC §103(a)**. The **obviousness** issue resulting from the PUR-TPMS monitoring device is a **substantial new question of patentability** with respect to claim 1.

While the published advertisements for the PUR-TPMS sensor are believed to raise a substantial new question of patentability, the publication entitled Cub **PUR-TMPS User Guide** is believed to raise additional substantial new questions of patentability and/or to supplement the published advertisements. This publication explains in greater detail the re-programming feature of the PUR-TPMS scan tool described in the published advertisements, and describes the manual re-programming feature in further detail. In particular, the PUR-TPMS User Guide describes a monitoring apparatus with an integrated ID registration tool that, as explained in page 13, "allows the user to manually enter an existing sensor's ID code in case the original sensor's electronics had been damaged," in order to transfer the ID code from a sensor that has been physically damaged or in included in a wheel swap to a new programmed sensor ("That ID code can be transferred into the new programmed CUB sensor").

Although the publication year (2008) of this User Guide is provided in the copyright notices on each page, the identification of the User Guide as being for the PUR-TPMS monitoring device illustrated in the published advertisements of June through August, 2008, indicates that the User Guide has an actual publication date of earlier than June, 2008, and therefore that the User Guide may also be considered a prior art publication with respect to the '064 patent, which has an effective date of September 17, 2008.

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Additional evidence of an earlier publication date for the PUR-TMPS User Guide is listed on the PTO-1449 form and includes: an invoice dated February 26, 2012, issued by Shanghai Vei Sheng Auto Parts Manufacturing Co., Ltd. to Wells Manufacturing, L.P., an export declaration filed by Vei Sheng Auto on August 30, 2008, and a certification of the TPMS Sensor submitted by a Canadian agency for industrial product certification and dated March 7, 2008. These documents are not submitted as printed publications, but rather as evidence to show export of the PUR-TMPS scan tool and sensor before September 17, 2008, and therefore an earlier publication date of the PUR-TMPS User Guide which accompanied the scan tool. As explained in MPEP 2216:

> **Affidavits or declarations or other written evidence which explain the contents or pertinent dates of prior art patents or printed publications in more detail may be considered in reexamination.** See **MPEP § 2258**. (emphasis added).

It is believed that the invoice, export declaration, and test report documents constitute "other written evidence which explain contents or pertinent dates of the cited printed publication, and in particular the pertinent date of the PUR-TMPS User Guide. In addition, the PUR-TMPS User Guide may be considered to be evidence which explains the contents of the PUR-TMPS advertisements included in the *Tire Rack* publications of June to August 2008.

2. Dependent Claims 2-9

Claim 2 recites that the receiving interface (of the tire pressure detector) is a connector, and that the setting output module (of the setting apparatus) is a corresponding connector. **Taguchi**, Fig. 10, shows an embodiment in which the respective interfaces are in the form of connectors, as described in col. 14, lines 61-65, as follows: "*Furthermore, the ID registration tool 60 has connectors 64 and 64a-64d of signal lines 63 and 63a-63d connecting the ID registration tool 60 to the pneumatic tire pressure monitoring apparatus*

50 and to respective pneumatic pressure sensors 10, 20, 30, and 40. . . ." As a result, this limitation is met by the Taguchi patent.

Claim 3 recites a "low frequency" wireless connection between the receiving interface and the setting output module. The term "low frequency" is defined in the specification of the '064 patent as "kilo-Hz scale such like 125 kHz" (col. 3, line 20). Fig. 2 of **Taguchi** clearly shows a wireless connection, but only mentions a signal of "predetermined frequency" (col. 11, lines 21-27 and col. 12, lines 26-28). However, the tire pressure is a single value and the ID code is a four bit value (col. 13, lines 36-39), so a high frequency transmission is not necessary. Therefore, it is either inherent or obvious that the transmission of Taguchi is a low frequency transmission, and this limitation is met by the Taguchi patent.

Claim 4 recites that the input module is a dip switch. Although the input module of the PUR-TPMS scan tool is based on a cursor-control button arrangement, used in connection with a display, use of dip switches to input numbers is a well known expedient and would have been an obvious substitute for the cursor-based input of the PUR-TPMS scan tool.

Claims 5-7 recite inclusion in the sensing module of an acceleration and temperature detection units. As explained in the Official Action of December 27, 2010, rejecting corresponding claims 8 and 9 of the original application, the acceleration *and* temperature detection feature of the sensor was considered to be obvious in view of the teachings of U.S. Patent No. 6,920,296 (**Toyofuku**). In the subsequent response dated March 29, 2011, the patent owner did not dispute the Examiner's characterization of the teachings of Toyofuku. In addition, the examiner stated in the first Official Action that, with respect to original claims 10 and 11, corresponding to patented claim 7, the acceleration detector is taught in U.S. Patent No. 7,137,296 (**Shida**).

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Claim 8 recites that the input module is a code scanner. This feature was alleged by the examiner to be illustrated in Fig. 3 of the **Toyofuku** patent, which characterization was also not disputed by the patent owner.

Claim 9 recites that the input module is a keyboard, which was alleged by the examiner to correspond to element 41 shown in Fig. 3 of Toyofuku. Again, this characterization was not disputed by the patent owner during prosecution of the patent. In addition, the scanner and keyboard claimed in the '064 patent are clearly functionally equivalent to the cursor control input of the PUR-TPMS scan tool, and therefore obvious modifications of the scan tool of Taguchi in view of the PUR-TPMS as discussed above.

Claim 10 is a method claim, and is clearly anticipated by the PUR-TPMS sensor, as follows:

Claim 10	PUR-TPMS sensor/scan tool
A tire pressure detector identification copying method comprising steps of:	The scan tool "reads/scans other O.E. sensors." A "copy sensor" and ID swap procedure is described on pages 10-17 of the User Guide.
providing a setting device;	The PUR-TPMS scan tool is a "setting device"
reading an old identification from an old tire pressure detector by the setting apparatus and storing the old identification in the setting apparatus; and	The existing sensor ID can either be input by scanning the old sensor, or by manual input, as explained on page 13 of the User Guide. Manual input is specifically mentioned in the June to August 2008 *Tire Rack* advertisements.
wirelessly writing the old identification into a new identification rewriteable tire pressure detector by the sensor apparatus.	As explained in the published advertisements, the PUR-TPMS scan tool "wirelessly reprograms" the sensors to mimic original equipment sensors that are being replaced.

Claim 11 recites a verification step, which is described on page 17 of the User Guide. Verification involves "two beep tones" and display of the reprogrammed sensor ID on a display screen of the scan tool.

Claims 12 and 13 recite the two input options of wireless receiving an old ID or manual input of the ID, exactly as described on 13 of the User Guide.

Since the publications describing the PUR-TPMS scan tool and sensor describe every step of the method of **claims 10-13**, these claims are **anticipated** by the publications, raising **substantial new issues of patentability**.

CONCLUSION

Since claims 1-13 of the '064 patent are not patentable over the prior art references cited in this request for the reasons set forth in detail above, and these references show elements of the claims not shown in the references of record, substantial new questions of patentability are raised. Accordingly, the Patent and Trademark Office is requested to institute a re-examination proceeding for the '640 patent and declare claims 1-13 unpatentable over the prior art.

Respectfully submitted,
BACON & THOMAS, PLLC

/Benjamin E. Urcia/

Benjamin E. Urcia
Registration Number 33,805

Date: July 17, 2007

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Alexandria, Virginia 22314

(703) 683-0500

Orange Exhibit No. 2004
IPR2024-00744

Atty. Doc.: YUHO3002RX/BEU

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Reexamination of:	)
	)
U.S. Patent No. 8,031,064	)
	)
Inventor: Hung-Chih YU	)
	)
Patentee: Orange Electronic Co., Ltd.	)
	)
Issued: October 4, 2011	)

For: TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDEINTICATION COPYING METHOD FOR THE SAME

CERTIFICATE OF SERVICE

Honorable Commissioner For Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

I, Ms. Jeanette Holmes, declare as follows:

I am and was at the time of service mentioned in this declaration, employed in the City of Alexandria, Virginia. I am over the age of 18 years, and not a party to this cause. My business address is Bacon & Thomas, PLLC, 625 Slaters Lane, 4th Floor, Alexandria, VA. 22314.

I hereby certify that, pursuant to 37 C.F.R. §530(c), a copy of the attached document entitled:

REQUEST FOR *EX PARTE* REEXAMINATION

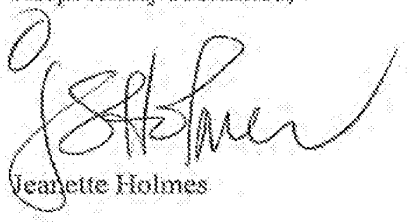
submitted in the above-identified application was served on the owner of U.S. Patent No. 8,031,064 via Certified Mail on August 10, 2012, by placing it in a sealed envelope addressed as follows:

Charles E. Baxley, Esquire
90 John Street, Suite 403, New York, NY 10038.

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IPR2024-00744

I declare under penalty of perjury under the laws of the Commonwealth of Virginia that the foregoing is true and correct, and that this declaration was executed on August 10, 2012, at Alexandria, Virginia.

Respectfully submitted,



Jeanette Holmes

Date: August 10, 2012

BACON & THOMAS, PLLC
625 Slaters Lane, 4th Floor
Alexandria, Virginia 22314

Telephone: (703) 683-0500

S/O Form PTO-1449	Atty. Docket Number	Serial Number
U.S. Department of Commerce Patent and Trademark Office	YUHO3802RX/BEU	12/283,979
	Applicant: Hung-Chin YU	
Information Disclosure Statement by Applicant	Filing Date: September 17, 2008	Group: unassigned

U.S. Patent Documents

Examiner Initial		Document Number	Date	Patentee/Applicant	Class	Subclass	Filing Date if Appropriate
		2008/0094198A1	4/28/08	Yu, San-Chuan			

Foreign Patent Documents

Examiner Initial		Document Number	Publication Date	Country/Agency	Class	Subclass	Translation	
							Yes	No

Other Documents (Including Author, Title, Date, Pertinent Pages, Place of Publication, Etc.)

		The User Manual of PUR-TMPS sold by SHANGHAI VEI SHENG AUTO PARTS MANUFACTURING CO., LTD.
		Invoice issued by SHANGHAI VEI SHENG AUTO PARTS MANUFACTURING CO., LTD. to WELLS MANUFACTURING, L.P.
		Export declaration filed by VEI SHENG AUTO on August 30, 2008 (in Chinese)
		Test report of 49D040 TPMS SENSOR submitted to Canada for industrial product certification in 2008
		Certification radio measurement technical support of 49D040 TPMS SENSOR submitted to FCC
		Cover and page 22 of Magazine Tire Rack Wholesale "UPDATE" for automobile parts and components, issued on July 20, 2008
		Cover and page 22 of Magazine Tire Rack Wholesale "UPDATE" for automobile parts and components, issued on July 20, 2008

Examiner	Date Considered

S:\Producer\Ied\Pending C...\YUHO3802 (Reexam)\1449.wpd

EXAMINER: Initial if citation is considered, whether or not citation is in conformance with MPEP 609; Draw a line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Orange Exhibit No. 2004
IPR2024-00744

出口退税专用

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主页

中华人民共和国海关出口货物报关单

1

预录入编号：048175674　　海关编号：224420080948175674

出口口岸 上海快件 2244	备案号	出口日期 2008-03-30	申报日期 2008-03-29
经营单位 上海为彪汽配制造有限公司 3116940259	运输方式 航空运输	运输工具名称 /	提运单号 406609434?3 406
收货单位 上海为彪汽配制造有限公司 3116940259	贸易方式 一般贸易 0110	征免性质 一般征税 (101)	结汇方式 电汇
许可证号	运抵国(地区) 美国 (502)	指运港 美国 (502)	境内货源地 南汇 (31169)
批准文号 101344217	成交方式 FOB	运费	保费	杂费
合同协议号	件数	包装种类 纸箱	毛重(公斤) 净重(公斤) 15 15
集装箱号 0	随附单据		生产厂家

标记唛码及备注 H6781270319

项号	商品编号	商品名称、规格型号	数量及单位	最终目的国(地区)	单价	总价	币制	征免
1	9033000090	压力传感器	4.520千克	美国	331.8584	1500.00	USD 照章征税	
			0.000	(502)			美元	
(0)	VS-490040 100PCS		4.520千克			用途：		
2	8467180000	编程工具	5.000台	美国	380.0000	1900.00	USD 照章征税	
			0.000	(502)			美元	
(0)	VS-490041		5.000台			用途：		

报关员评估

录入员	录入单位	兹声明以上申报无讹并承担法律责任	海关审单批注及放行日期(签章)
			审单 审价
报关员		申报单位(签章)	征税 统计
单位地址		优比速包裹运送(广东)有限公司上海分公司	查验 放行
邮编	电话		验发关员： 填制日期： 2008-03-29

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	Hung-Chih YU
Filer:	Benjamin E. Urcia/jeanette holmes
Attorney Docket Number:	YUHO3002RX/BEU

Filed as Large Entity

ex parte reexam Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Request for ex parte reexamination	1812	1	2520	2520
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Orange Exhibit No. 2004
IPR2024-00744

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	2520

Electronic Acknowledgement Receipt

EFS ID:	13472091
Application Number:	90012430
International Application Number:	
Confirmation Number:	6179
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	Hung-Chih YU
Customer Number:	33364
Filer:	Benjamin E. Urcia/jeanette holmes
Filer Authorized By:	Benjamin E. Urcia
Attorney Docket Number:	YUHO3002RX/BEU
Receipt Date:	10-AUG-2012
Filing Date:	
Time Stamp:	16:29:23
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2520
RAM confirmation Number	3375
Deposit Account	020200
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Receipt of Orig. Ex Parte Request by Third Party	ReexaminationRequest.pdf	794283	no	12
Warnings:					
Information:					
2	Receipt of Orig. Ex Parte Request by Third Party	CertificateofService.pdf	63484	no	2
Warnings:					
Information:					
3	Receipt of Orig. Ex Parte Request by Third Party	1449.pdf	63424	no	2
Warnings:					
Information:					
4	Receipt of Orig. Ex Parte Request by Third Party	UserGuide.pdf	3195693	no	24
Warnings:					
Information:					
5	Receipt of Orig. Ex Parte Request by Third Party	Invoice.pdf	32070	no	1
Warnings:					
Information:					
6	Receipt of Orig. Ex Parte Request by Third Party	ExportDeclaration.pdf	137517	no	1
Warnings:					
Information:					
7	Receipt of Orig. Ex Parte Request by Third Party	MaganizeAdvertisementJuly2008.pdf	5088900	no	3
Warnings:					
Information:					
8	Receipt of Orig. Ex Parte Request by Third Party	MaganizeAdvertisementJune2008.pdf	5345092	no	3

Warnings:					
Information:					
9	Receipt of Orig. Ex Parte Request by Third Party	TestReportSubmittedtoCanada.pdf	56264 [illegible]	no	1
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Warnings:					
Information:					
		Total Files Size (in bytes):	16988518		

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US008031064B2

(12) **United States Patent**
Yu

(10) **Patent No.: US 8,031,064 B2**
(45) **Date of Patent: Oct. 4, 2011**

(54) **TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME**

(75) Inventor: **Hung-Chih Yu**, Taichung (TW)

(73) Assignee: **Orange Electronic Co., Ltd.**, Tanzih Hsiang Taichung Hsien (TW)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 420 days.

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(51) **Int. Cl.**
B60C 23/00 (2006.01)

(52) **U.S. Cl.** **340/447**; 340/442; 340/445; 73/146; 73/146.5

(58) **Field of Classification Search** 340/442–449, 340/425.5, 426.3, 10.06, 10.1; 73/146, 146.2–146.5
See application file for complete search history.

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Primary Examiner — Anh V La
(74) *Attorney, Agent, or Firm* — Charles E. Baxley

(57) **ABSTRACT**

A tire pressure detecting apparatus has an identification rewriteable tire pressure detector and a setting apparatus. The tire pressure detector is securely mounted on a valve stem inside a tire of a vehicle and has a micro-processing module, a sensing module, a transmitting module and a receiving interface, where the micro-processing module has a memory unit. The setting apparatus is capable of reading or inputting an identification from a failure tire pressure detector, transmits the identification to the identification rewriteable tire pressure detector and writes the identification into the memory unit.

13 Claims, 4 Drawing Sheets

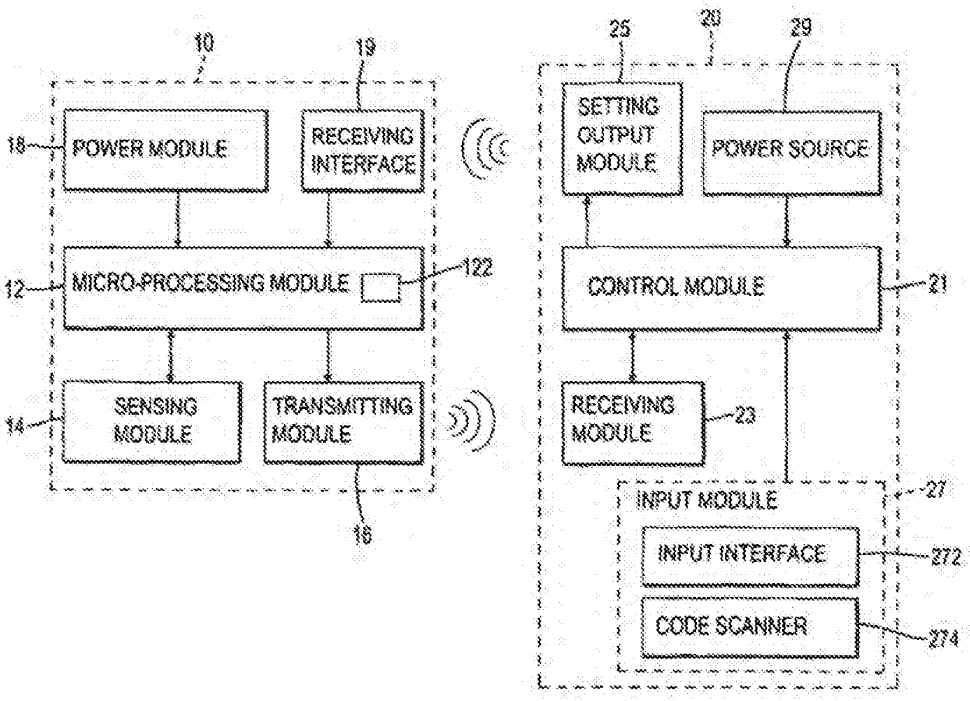


FIG.1

8/21/2012, EAST Version: 3.0.1.1

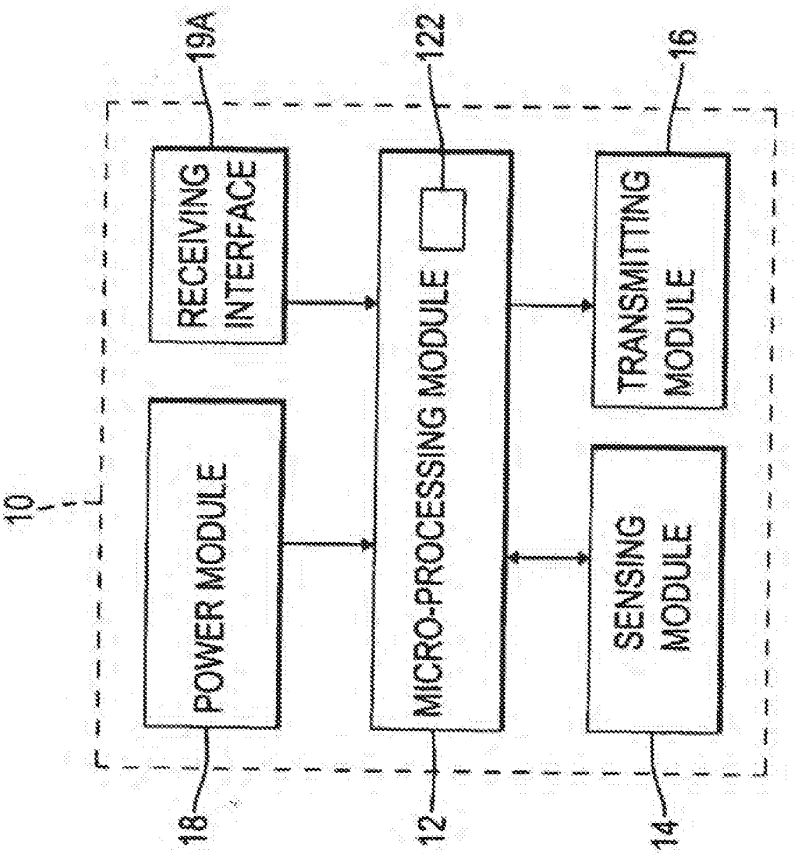

10
19A
RECEIVING INTERFACE
122
MICRO-PROCESSING MODULE
16
TRANSMITTING MODULE
POWER MODULE
SENSING MODULE
18
12
14

FIG.2

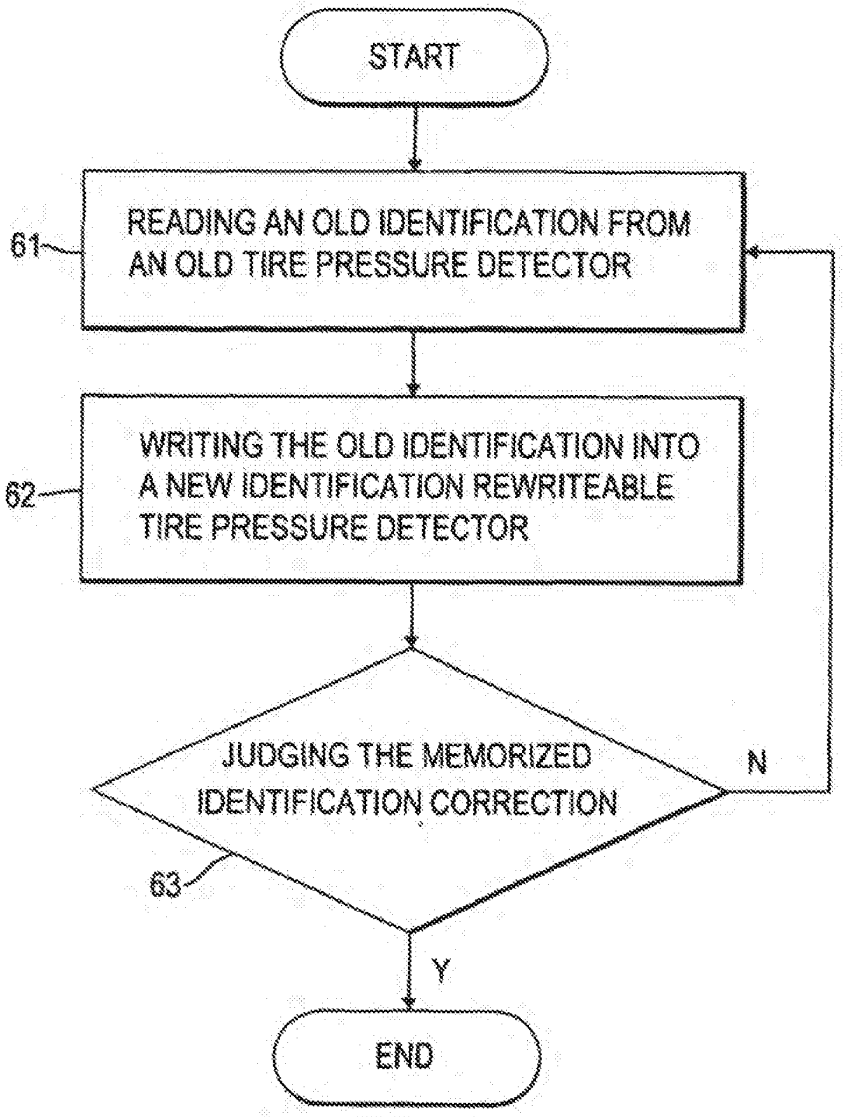

START
READING AN OLD IDENTIFICATION FROM AN OLD TIRE PRESSURE DETECTOR
61
WRITING THE OLD IDENTIFICATION INTO A NEW IDENTIFICATION REWRITEABLE TIRE PRESSURE DETECTOR
62
JUDGING THE MEMORIZED IDENTIFICATION CORRECTION
63
N
Y
END

FIG.3

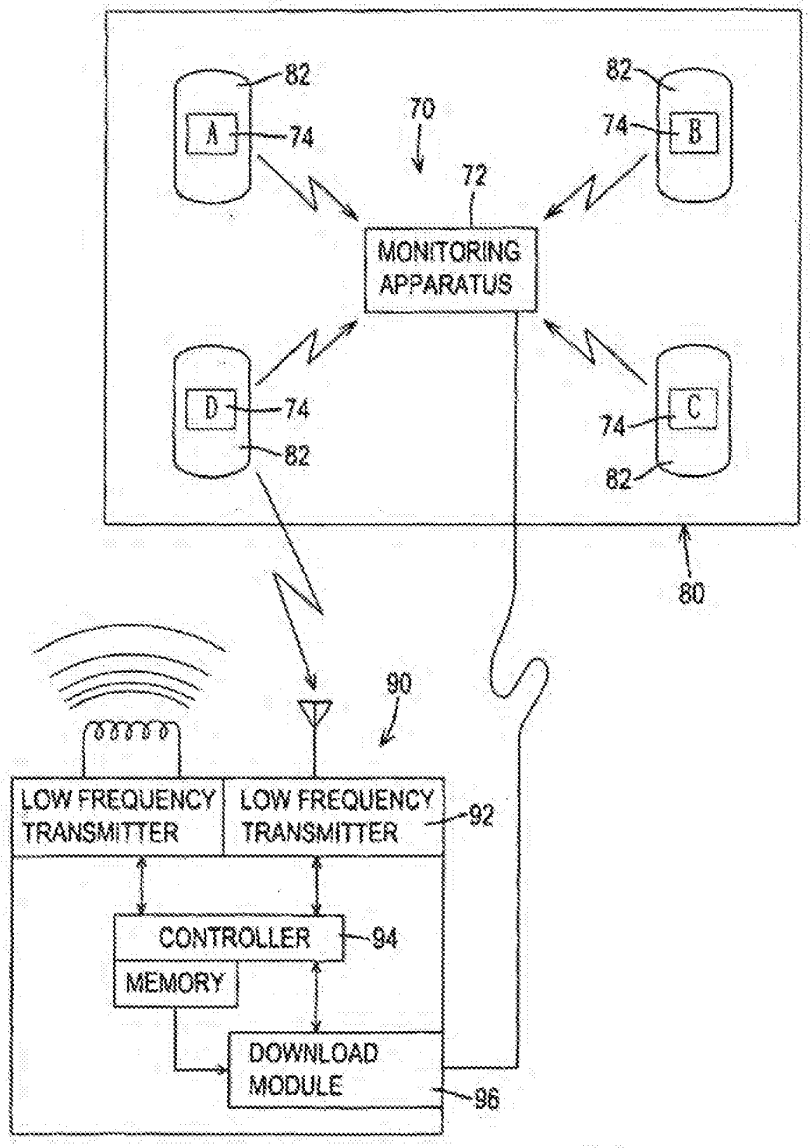

82
82
70
A
74
74
B
72
MONITORING APPARATUS
D
74
74
C
82
82
80
90
LOW FREQUENCY TRANSMITTER
LOW FREQUENCY TRANSMITTER
92
CONTROLLER
94
MEMORY
DOWNLOAD MODULE
96

FIG.4

TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME

BACKGROUND OF THE INVENTION

1. Field of Invention

The present invention relates to a tire pressure detecting apparatus, and more particularly to an identification rewriteable tire pressure detecting apparatus.

2. Description of the Related Art

Various Tire Pressure Monitoring Systems (TPMSs) may be applied for monitoring air pressure inside tires of a vehicle to alert a driver of abnormal tire pressure or to easily check correct tire pressures are set, and a conventional TPMS comprises a tire pressure detector connected to an inner end of a valve stem. Normally, an average lifetime of the tire pressure detectors is five years, users need to change the tire pressure detectors after the tire pressure detector is failure. However, tire pressure detectors have different installation methods depending on manufacturers of the tire pressure detectors, to request an original manufacturer for installing a new tire pressure detector is necessary but troublesome.

For instance, FIG. 4 shows an existed tire pressure detecting system (70), the tire pressure detecting system (70) comprises a monitoring apparatus (72) and four tire pressure detectors (74). The monitoring apparatus (72) is installed inside a car (80) and the tire pressure detectors (74) are respectively installed inside four tires (82) of the car (80). The monitoring apparatus (72) continuously receives wireless signals sent from the tire pressure detectors (74). Each tire pressure detector (74) has an identification (ID) recorded therein so that the wireless signal sent by the tire pressure detector (74) may be recognized by the monitoring apparatus (72) since the wireless signal stream comprises the identification. In other words, the monitoring apparatus (72) recognizes the tire pressure detectors (74) by identifying the IDs in the received wireless signals. Hence, when one of the tire pressure detector (74) is replaced by a new one, a setting apparatus (90) is necessary for introducing a new ID of the new tire pressure detector (74) to the monitoring apparatus (72). The setting apparatus (90) has a receiving module (92), a controller (94) and a download module (96). The receiving module (92) is electronically connected to the controller (94), receives wireless signals from the tire pressure detectors (74) and sends the received wireless signals to the controller (94). The controller (92) controls the download module (96) to write the ID of the tire pressure detector (74) into the monitoring apparatus (72), thereby the monitoring apparatus (72) may start to read wireless signal after the ID is recognizable.

However, the setting apparatus (90) is only fitted with some specific tire pressure detectors (74) that have to be manufactured by the same company. Flexibility and convenience of changing the tire pressure detector (74) are not good since users have to look for specific service centers that have the setting apparatus (90) to change the tire pressure detectors (74).

The present invention provides a tire pressure detecting apparatus to obviate or mitigate the shortcoming of the conventional the tire pressure detector.

SUMMARY OF THE INVENTION

The primary objective of the present invention is to provide a tire pressure detecting apparatus which is identification rewriteable thereby an new tire pressure detector can be easily replaced a failure tire pressure detector by coping the identification of the failure tire pressure detector directly.

The tire pressure detecting apparatus has an identification rewriteable tire pressure detector and a setting apparatus. The tire pressure detector is securely mounted on a valve stem inside a tire of a vehicle and has a micro-processing module, a sensing module, a transmitting module and a receiving interface, where the micro-processing module has a memory unit. The setting apparatus is capable of reading or inputting an identification from a failure tire pressure detector, transmits the identification to the identification rewriteable tire pressure detector and writes the identification into the memory unit.

Other objectives, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a tire pressure detecting apparatus in accordance with the present invention;

FIG. 2 is a block diagram of an identification rewriteable tire pressure detector in accordance with the present invention;

FIG. 3 is a flow chart of a tire pressure detector identification copying method in accordance with the present invention; and

FIG. 4 is a block diagram of a tire pressure detecting system and a setting apparatus in accordance with the prior art.

DETAILED DESCRIPTION OF THE INVENTION

With reference to FIGS. 1 and 2, a tire pressure detecting apparatus in accordance with the present invention has an identification rewriteable tire pressure detector (10) and a setting apparatus (20).

The identification rewriteable tire pressure detector (10) is securely mounted on a valve stem inside a tire of a vehicle and has a micro-processing module (12), a sensing module (14), a transmitting module (16), a power module (18) and a receiving interface (19, 19A).

The micro-processing module (12) has a memory unit (122). The memory unit (122) is a writeable memory and may memorize a preset identification therein, where the preset identification may be an identical 8-bit integer numbered and is given when the identification rewriteable tire pressure detector (10) is manufactured. Either the memory unit (122) is empty without memorizing any preset identification therein.

The sensing module (14) is electronically connected to the micro-processing module (12) and may have a pressure-detecting unit, at least one acceleration-detecting unit, a temperature-detecting unit and/or the like. The sensing module (14) is controlled by the micro-processing module (12) to respectively detect continuously a tire pressure signal, acceleration direction signals and a tire temperature signal of the vehicle and send a detection result to the micro-processing module (12). Wherein, when two acceleration-detecting units are included, the two acceleration-detecting units may detect a turning acceleration and a tuning direction of the vehicle, where the turning acceleration and the tuning direction are calculated from the detection results of the acceleration-detecting units.

The transmitting module (16) is controlled by the micro-processing module (12) to transmit a radio frequency (RF) signal, where the RF signal comprises the detection results

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and may have the preset identification. The RF signal may have frequencies such as 315 MHz, 433 MHz or the like.

The power module (18) is electronically connected to the micro-processing module (12) and provides electric power to the identification rewriteable tire pressure detector (10).

The receiving interface (19, 19A) is electronically connected to the micro-processing module (12), receives an external signal, outputs the external signal to the micro-processing module (12) and may be a connector or a low frequency receiver that are respectively shown on FIG. 1 and FIG. 2. The external signal may have an external identification thereby the micro-processing module (12) receives and memorizes the external identification into the memory unit (122) to overwrite and be the preset identification that is originally memorized in the memory unit (122). The low frequency receiver receives the external signal having a low frequency relating to the frequency of the RF signal. In a preferred embodiment of the present invention, the external signal is at kilo-Hz scale such like 125 kHz and is sent from the setting apparatus (20). A reason for adopting the low frequency receiver is that the low frequency wireless signal has a lower transparency, thereby the receiving interface (19) has to be placed nearby the setting apparatus (20) when receiving the low frequency wireless signal from the source. Hence, a person may decide to receive the external signal from one particular source by adjusting a distance with the particular source.

The setting apparatus (20) communicates with the identification rewriteable tire pressure detector (10) and tire pressure detectors that are generally using a same range of frequencies and has a control module (21), a receiving module (23), a setting output module (25), an input module (27) and a power source (29).

The receiving module (23) is electronically connected to the control module (21) and receives the RF signal from the identification rewriteable tire pressure detector (10) or the tire pressure detectors that are capable of sending the RF signals. The receiving module (23) sends the received RF signal to the control module (21) thereby the control module (21) has the preset identification of the identification rewriteable tire pressure detector (10) or the tire pressure detector.

The setting output module (25) is controlled by the control module (21) to send the external signal to the receiving interface (19, 19A). Wherein, the external signal is generated by the control module (21) and may comprise the external identification that is identical to preset identification in the RF signal received from the receiving module (23). The setting output module (25) may be an outputting connector corresponding and being electronically connected to the connector (19A) or may be a wireless transmitting interface sending the external signal wirelessly to the receiving interface (19).

The input module (27) is electronically connected to the control module (21), accepts the preset identification that is keyed in or scanned in and may have an input interface (272) and a code scanner (274).

The input interface (272) is electronically connected to the control module (21), may be a dip switch, a keyboard or the like, is capable of accepting a setup by a person to input the preset identification of a failure tire pressure detector. The person may acquire the preset identification directly from the failure tire pressure detector since the preset identification is printed or listed on a surface of the tire pressure detector. The identification may be a set of integer or a barcode printed or formed on the surface of the tire pressure detector.

The code scanner (274) is electronically connected to the control module (21) and is controlled by the control module (21) to scan the barcode on the tire pressure detector and interpret the barcode as the preset identification for the control module (21).

The power source (29) is electronically connected to the control module (21) and provides electrical power to the setting apparatus (20).

With reference to FIG. 3, a tire pressure detector identification copying method in accordance with the present invention has steps comprising: reading an old identification from an old tire pressure detector (61), writing the old identification into a new identification rewriteable tire pressure detector (62) and judging the memorized identification correction (63).

In the step of reading an old identification from an old tire pressure detector (61), a serviceman may use the setting apparatus (20) to receive the RF signal wirelessly from any old tire pressure detector or directly input the external identification (i.e. old identification) of the old tire pressure detector. If the old tire pressure detector is totally failed and can not transmit the RF signal, the serviceman may scan the barcode or input the external identification of old tire pressure detector directly through the input module (27).

In the step of writing the old identification into a new identification rewriteable tire pressure detector (62), after the external identification of the old tire pressure detector is acquired, the serviceman may rewrite the external identification into a new identification rewriteable tire pressure detector. If the new identification rewriteable tire pressure detector already has the preset identification therein, the external identification of the old tire pressure detector is overwrote the external identification.

In the step of judging the memorized identification correction (63), after the external identification of the old tire pressure detector has been memorized in the new identification rewriteable tire pressure detector, the serviceman may use the setting apparatus (20) to receive wireless signals from the new identification rewriteable tire pressure detector. The setting apparatus (20) judges the consistence of the identifications acquired from the old tire pressure detector and the new identification rewriteable tire pressure. When the identifications is not consistence, the setting apparatus performs the step of writing the old identification into a new identification rewriteable tire pressure detector (62) again.

As described above, a car user may easily replace a failed tire pressure detector with one identification rewriteable tire pressure detector (10) by few steps as described above. No more complicate sequence is needed to reset or introduce a new identification of a new tire pressure detector to a monitoring system installed inside the car.

Even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only. Changes may be made in detail, especially in matters of shape, size and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

1. A tire pressure detecting apparatus comprising:

an identification rewritable tire pressure detector comprising:

a micro-processing module having a rewritable memory unit being capable of recording an identification;

a sensing module electrically connected to the micro-processing module and having a pressure-detecting unit, the

pressure-detecting unit detecting a tire pressure and sending a detection result to the micro-processing module;

a transmitting module controlled by the micro-processing module to transmit a radio frequency (RF) signal comprising the detection result and an identification of the identification rewritable tire pressure detector;

a power module electronically connected to the micro-processing module and providing electric power to the identification rewriteable tire pressure detector; and

a receiving interface electronically connected to the micro-processing module, receiving and sending an external signal to the micro-processing module, where the external signal comprises an external identification to be written into the rewriteable memory unit; and

a setting apparatus communicating with the identification rewriteable tire pressure detector and having a control module;

an input module being electronically connected to the control module and allowing an operator to input an identification to be written into the identification rewriteable tire pressure;

a receiving module electronically connected to the control module, receiving the RF signal from the identification rewriteable tire pressure detector or a tire pressure detector and sending the RF signal to the control module;

a setting output module controlled by the control module to send the external signal to the receiving interface, where the external signal is generated by the control module and comprises the identification that is provided by the input module or provided by the RF signal received from the receiving module; and

a power source electronically connected to the control module and providing electrical power to the setting apparatus.

2. The tire pressure detecting apparatus as claimed in claim 1, wherein

the receiving interface is a connector; and

the setting output module is an outputting connector corresponding and being electronically connected to the receiving interface and sends the external signal to the receiving interface.

3. The tire pressure detecting apparatus as claimed in claim 1, wherein

the receiving interface is a low frequency receiver and receives the external signal wirelessly; and

the setting output module is a wireless transmitting interface sending the external signal wirelessly to the receiving interface.

4. The tire pressure detecting apparatus as claimed in claim 1, wherein the input module is a dip switch.

5. The tire pressure detecting apparatus as claimed in claim 1, wherein the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit.

6. The tire pressure detecting apparatus as claimed in claim 2, wherein the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit.

7. The tire pressure detecting apparatus as claimed in claim 3, wherein the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit.

8. The tire pressure detecting apparatus as claimed in claim 1, wherein the input module is a code scanner.

9. The tire pressure detecting apparatus as claimed in claim 1, wherein the input module is a keyboard.

10. A tire pressure detector identification copying method comprising steps of;

providing a setting apparatus;

reading an old identification from an old tire pressure detector by the setting apparatus and storing the old identification in the setting apparatus; and

wirelessly writing the old identification into a new identification rewriteable tire pressure detector by the setting apparatus.

11. The method as claimed in claim 10, further comprising a step of;

verifying the identification newly recorded in the new identification rewriteable tire pressure detector.

12. The method as claimed in claim 10, wherein the setting apparatus receives a wireless signal containing the old identification from the old tire pressure detector in the step of reading the old identification.

13. The method as claimed in claim 10, wherein the setting apparatus receives the old identification through an input module in the step of reading the old identification.

* * * * *

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CONFIRMATION NO. 6179

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90/012,430	08/10/2012 RULE	340	3992	YUHO3002RX/BEU

APPLICANTS

8031064, Residence Not Provided;
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BACON & THOMAS, PLLC, ALEXANDRIA, VA

** CONTINUING DATA **********

This application is a REX of 12/283,979 09/17/2008 PAT 8031064

** FOREIGN APPLICATIONS **********

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ yes ☐ no 35 USC 119 (a-d) conditions met ☐ yes ☐ no ☐ Met after Allowance Verified and Acknowledged _____ Examiner's Signature Initials			13	1

ADDRESS

36672

TITLE

TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME

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Litigation Search Report CRU 3999

Reexam Control No. 90/012,430

TO: EXAMINER Location: CRU Art Unit: 3992 Date: 08/20/12 Case Serial Number: 90/012,430	From: Tredelle Jackson Location: CRU 3999 MDE 5D30 Phone: (571) 272-2783 Tredelle.Jackson@uspto.gov

Search Notes

Litigation Search for U.S. Patent Number 8,031,064.

Sources:

1) I performed a KeyCite Search in Westlaw, which retrieves all history on the patent including any litigation.

2) I performed a search on the patent in Lexis CourtLink for any open dockets or closed cases.

3) I performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.

4) I performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.

5) I performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

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Westlaw

Date of Printing: Aug 21, 2012

KEYCITE

© US PAT 8031064 TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME, Assignee: Orange Electronic Co., Ltd. (Oct 04, 2011)

History

Direct History

=> 1 **TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME,** US PAT 8031064 (U.S. PTO Utility Oct 04, 2011)

Patent Family

2 TIRE PRESSURE DETECTING APPARATUS FOR DETECTING AIR PRESSURE INSIDE TIRE OF CAR, HAS POWER SOURCE ELECTRONICALLY CONNECTED TO CONTROL MODULE AND PROVIDING ELECTRICAL POWER TO SETTING APPARATUS, Derwent World Patents Legal 2010-D01202

Assignments

3 Action: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). Number of Pages: 002. (DATE RECORDED: Sep 17, 2008)

Prior Art (Coverage Begins 1976)

C 4 ID REGISTRATION METHOD, ID COLLATION SYSTEM INCORPORATED IN A VEHICLE CONTROL SYSTEM, EMBODIED AS A PNEUMATIC TIRE PRESSURE MONITORING APPARATUS ASSOCIATED WITH PNEUMATIC PRESSURE SENSORS, AND AN ID REGISTRATION TOOL COMBINED WITH PNEUMATIC TIRE PRESSURE MONITORING APPARATUS, US PAT 6927679Assignee: Denso Corporation, (U.S. PTO Utility 2005)

C 5 TIRE AIR PRESSURE MONITORING SYSTEM, US PAT 7137296Assignee: Nissan Motor Co., Ltd., (U.S. PTO Utility 2006)

C 6 TIRE PRESSURE SENSOR UNIT, TIRE PRESSURE MONITORING SYSTEM, AND METHOD OF REGISTERING IDENTIFICATION CODE OF TIRE PRESSURE SENSOR UNIT, US PAT 6920785Assignee: Bridgestone Corporation, (U.S. PTO Utility 2005)

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Patent Search 8031064 8/21/2012

No cases found.

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1. US Fed News, October 8, 2011 Saturday 1:28 PM EST, , 236 words, US Patent Issued to Orange Electronic on Oct. 4 for "Tire Pressure Detecting Apparatus and Tire Pressure Detector Identification Copying Method for the Same" (Taiwanese Inventor), ALEXANDRIA, Va.

   ALEXANDRIA, Va., Oct. **8** -- United States Patent no. 8,031,064, issued on Oct. 4, was assigned to ...
   ... r=1&f=G&l=50&co1=AND&d=PTXT&s1=**8031064**&OS=**8031064**&RS=**8031064**
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2. Plus NEWS, March 22, 2011, 252205027, 279 words, Dodge City; Southwestern Kansas Red Flag Warning.

   ... WARNING REMAINS IN EFFECT FROM 1 PM CDT /NOON MDT/ THIS AFTERNOON TO **8** PM CDT /7 PM MDT/ THIS EVENING FOR GUSTY WINDS AND LOW RELATIVE HUMIDITIES FOR FIRE WEATHER ZONES 030...
   031...043...044...045...046...063...064...065...066... 076... 077.. ...
   ... IN KANSAS...FIRE WEATHER ZONE 030 TREGO... FIRE WEATHER ZONE **031** ELLIS...FIRE WEATHER ZONE 043 SCOTT... FIRE WEATHER ZONE 044 ...
   ... 046 RUSH...FIRE WEATHER ZONE 063 FINNEY... FIRE WEATHER ZONE **064** HODGEMAN...FIRE WEATHER ZONE 065 PAWNEE...FIRE WEATHER ZONE 066 ...

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   Goa. OREANDA-NEWS . July **31,** 2012. Sesa Goa Limited ("SGL" or the "Company") announced its unaudited consolidated results ...
   ... 0.5 - Production (Kt) Pig Iron 39 62 (37) Met Coke **64 64** - Sales (Kt) Pig Iron 45 58 (22) Met Coke 53 ...

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   ... LLP, 2/10-17, 5/10-63, 7/10-90, **8/**10-102, 12/10-156 Beecher Carlson Insurance Services LLC, ...

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RPG, **8**/10-102 Chrysler, 5/10-**64** CHSI Captive & Insurance Managers, LLC, 1/10-6 Chubb & Son ...
... Specialties Insurance Co RRG, 7/10-87 Continental Insurance Co., **8**/10-102 Continuing Care RRG, Inc., 4/10-50, 7/ ...
... 10-153 Eldercare Mutual Insurance Co., RRG, Inc., 5/10-**64** Elite Transportation RRG, Inc., 5/10-**64** Elliott D. Pollack & Co., 1/10-6, 4/10-46 ...
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5. Russia & CIS Business and Financial Newswire, May 17, 2011 Tuesday 4:52 PM MSK, , 455 words, Most IES gencos boost Q1 profit, MOSCOW. May 17

... Sales revenue **8** 029 176 7 053 765 ...
... Gross profit 1 144 457 1 119 **064**
Sales profit 1 144 457 1 119 **064** ...
... Sales revenue 12 614 967 **8** 843 369 ...
... Heat production costs 10 311 082 **8** 780 606 ...
... Revenue 15 572 293 15 **031** 972 ...
... Revenue 46 **064** 392 40 800 719 ...

6. Russia & CIS Energy Newswire, May 17, 2011 Tuesday 4:52 PM MSK, , 455 words, Most IES gencos boost Q1 profit, MOSCOW. May 17

... Sales revenue **8** 029 176 7 053 765 ...
... Gross profit 1 144 457 1 119 **064**
Sales profit 1 144 457 1 119 **064** ...
... Sales revenue 12 614 967 **8** 843 369 ...
... Heat production costs 10 311 082 **8** 780 606 ...
... Revenue 15 572 293 15 **031** 972 ...
... Revenue 46 **064** 392 40 800 719 ...

7. The Washington Daybook, May 2, 2011, Health and Human Services Department (HHS); Food and Drug Administration (FDA) (F.R. Page 19374) holds a meeting of the Cardiovascular and Renal Drugs Advisory Committee and the Drug Safety and Risk Management Advisory Committee to discuss safety considerations of ultrasound contrast agents (materials intended to improve the clarity of ultrasound imaging., 8 a.m., FDA White Oak Campus, Building 31, White Oak Conference Center, 10903 New Hampshire Avenue, Room 1503, Silver Spring, Md.

Agenda includes: (1) New drug application (NDA) 21-**064,** perflutren lipid microsphere injectable suspension, Lantheus Medical Imaging, Inc.; (2) ...

8. School Library Journal Reviews, October 1, 2010, THE BOOK REVIEW; Grades 5-up; Pg. 112, 285 words, The Invisible Order, Connie Tyrrell Burns

Orange Exhibit No. 2004
IPR2024-00744

... USA. Oct. 2010. Tr $16.99. ISBN 978-1-60684-**031**-3; PLB $19.99. ISBN 978-1-60684-**064**-1. LC number unavailable.
Gr 5-**8**--This fantasy has all the right elements, weaving lore of the faeries, a classic ...

9. MISSISSIPPI EMPLOYMENT LAW LETTER, FEBRUARY, 2012, Volume 18, Issue 11, 421 words, A new day at the capitol, Jones Walker

   For the past **eight** years, the Mississippi capitol has been somewhat gridlocked. The governor was an ardently probusiness Republican, and the ...
   ... who presides over the Senate) are both Republicans. The Senate, by a margin of **31**-21, and the House of Representatives, at **64**-58, are also in Republican control. Regardless of your political leanings, the fact remains that the ...

10. Economic News (Information Agency Oreanda), May 31, 2012 Thursday, 631 words, Tata Chemicals Consolidated Net Profit for FY2011-12

    Mumbai. OREANDA-NEWS . May **31**, 2012. TCL India PAT for FY2011-12 up by 44 ...
    ... crore. Segmental performance Living essentials Tata Chemicals remained the market leader with **64** percent market share in the national branded segment. 200,000MT salt capacity ...
    May **31**, 2012

Source: **Combined Source Set 4** i **- News, Most Recent Two Years (English, Full Text)**
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283979 (12) 8031064 October 4, 2011

UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

8031064

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October 4, 2011

Tire pressure detecting apparatus and tire pressure detector identification copying method for the same

INVENTOR: Yu, Hung-Chih - Taichung, Taiwan, Province of China (TW), Taiwan, Province of China (TW)

APPL-NO: 283979 (12)

FILED-DATE: September 17, 2008

GRANTED-DATE: October 4, 2011

CORE TERMS: tire, detector, identification, module, rewriteable, external, micro-processing, preset, monitoring, wireless, electronically, detecting, interface, memory, input, inside, low frequency, transmitting, sensing, valve stem, acceleration-detecting, controller, serviceman, frequency, memorized, barcode, send, car, acceleration, installed

ENGLISH-ABST:

A tire pressure detecting apparatus has an identification rewriteable tire pressure detector and a setting apparatus. The tire pressure detector is securely mounted on a valve stem inside a tire of a vehicle and has a micro-processing module, a sensing module, a transmitting module and a receiving interface, where the micro-processing module has a memory unit. The setting apparatus is capable of reading or inputting an identification from a failure tire pressure detector, transmits the identification to the identification rewriteable tire pressure detector and writes the identification into the memory unit.

Source: **Command Searching > Utility, Design and Plant Patents** i
Terms: **patno=8031064** (Suggest Terms for My Search)
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REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/012,430	08/10/2012	8031064

CONFIRMATION NO. 6179
REEXAMINATION REQUEST
NOTICE

BACON & THOMAS, PLLC
625 SLATERS LANE, FOURTH FLOOR
ALEXANDRIA, VA 22314

Date Mailed: 08/22/2012

NOTICE OF REEXAMINATION REQUEST FILING DATE

(Third Party Requester)

Requester is hereby notified that the filing date of the request for reexamination is 08/10/2012, the date that the filing requirements of 37 CFR § 1.510 were received.

A decision on the request for reexamination will be mailed within three months from the filing date of the request for reexamination. (See 37 CFR 1.515(a)).

A copy of the Notice is being sent to the person identified by the requester as the patent owner. Further patent owner correspondence will be the latest attorney or agent of record in the patent file. (See 37 CFR 1.33). Any paper filed should include a reference to the present request for reexamination (by Reexamination Control Number).

cc: Patent Owner
36672
CHARLES E. BAXLEY, ESQUIRE
90 JOHN STREET
SUITE 403
NEW YORK, NY 10038

/sdstevenson/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

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REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/012,430	08/10/2012	8031064

CONFIRMATION NO. 6179

REEXAM ASSIGNMENT NOTICE

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CHARLES E. BAXLEY, ESQUIRE
90 JOHN STREET
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NEW YORK, NY 10038

Date Mailed: 08/22/2012

NOTICE OF ASSIGNMENT OF REEXAMINATION REQUEST

The above-identified request for reexamination has been assigned to Art Unit 3992. All future correspondence to the proceeding should be identified by the control number listed above and directed to the assigned Art Unit.

A copy of this Notice is being sent to the latest attorney or agent of record in the patent file or to all owners of record. (See 37 CFR 1.33(c)). If the addressee is not, or does not represent, the current owner, he or she is required to forward all communications regarding this proceeding to the current owner(s). An attorney or agent receiving this communication who does not represent the current owner(s) may wish to seek to withdraw pursuant to 37 CFR 1.36 in order to avoid receiving future communications. If the address of the current owner(s) is unknown, this communication should be returned within the request to withdraw pursuant to Section 1.36.

cc: Third Party Requester(if any)
BACON & THOMAS, PLLC
625 SLATERS LANE, FOURTH FLOOR
ALEXANDRIA, VA 22314

/adstevenson/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

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Patent Assignment Abstract of Title

Total Assignments: 1

Application #: 12382979 Filing Dt: 09/17/2008 Patent #: 8031066 Issue Dt: 10/04/2011

PCT #: NONE Publication #: US2010066529A1 Pub Dt: 03/18/2010

Inventor: Hung-Chih Yu

Title: TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION CODING METHOD FOR THE SAME

Assignment: 1

Reel/Frame: 021928/0710 Received: 12/09/2008 Recorded: 09/17/2008 Mailed: 12/29/2008 Pages: 3

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignor: HU, HUNG-CHIH Exec Dt: 09/17/2008

Assignee: ORANGE ELECTRONIC CO., LTD.
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SEC. 3, YANSING RD., TANZIH HSIANG
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,430	08/10/2012	8031064	YUHO3002RX/BEU	6179

36672 7590 08/22/2012

CHARLES E. BAXLEY, ESQUIRE
90 JOHN STREET
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NEW YORK, NY 10038

EXAMINER	
ART UNIT	PAPER NUMBER

DATE MAILED: 08/22/2012

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PTO-90C (Rev. 10/03)

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BACON & THOMAS, PLLC
625 SLATERS LANE, FOURTH FLOOR
ALEXANDER, VA 22314

Date: MAILED

AUG 22 2012

CENTRAL REEXAMINATION UNIT

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90012430
PATENT NO. : 8031064
ART UNIT : 3992

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Ex Parte Reexamination Interview Summary – Pilot Program for Waiver of Patent Owner's Statement	Control No. 90/012,430	Patent For Which Reexamination is Requested 8,031,064
	Examiner Tredelle D. Jackson	Art Unit 3992

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --

All participants (USPTO official and patent owner):

(1) Tredelle D. Jackson (3)

(2) Charles Baxley Reg. # 20149 (4)

Date of Telephonic Interview: 08/20/12.

The USPTO official requested waiver of the patent owner's statement pursuant to the pilot program for waiver of patent owner's statement in *ex parte* reexamination proceedings.*

☐ The patent owner **agreed** to waive its right to file a patent owner's statement under 35 U.S.C. 304 in the event reexamination is ordered for the above-identified patent.

☒ The patent owner **did not agree** to waive its right to file a patent owner's statement under 35 U.S.C. 304 at this time.

The patent owner is not required to file a written statement of this telephone communication under 37 CFR 1.560(b) or otherwise. However, any disagreement as to this interview summary must be brought to the immediate attention of the USPTO, and no later than one month from the mailing date of this interview summary. Extensions of time are governed by 37 CFR 1.550(c).

*For more information regarding this pilot program, see *Pilot Program for Waiver of Patent Owner's Statement in Ex Parte Reexamination Proceedings*, 75 *Fed. Reg.* 47269 (August 5, 2010), available on the USPTO Web site at http://www.uspto.gov/patents/law/notices/2010.jsp.

☐ USPTO personnel were unable to reach the patent owner.

The patent owner may contact the USPTO personnel at the telephone number provided below if the patent owner decides to waive the right to file a patent owner's statement under 35 U.S.C. 304.

/Tredelle. D. Jackson/ 571-272-2783
Signature and telephone number of the USPTO official who contacted or attempted to contact the patent owner.

cc: Requester (if third party requester)

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,430	08/10/2012	8031864	YUHO3802RX/BEU	6179

36672 7590 09/04/2012

CHARLES E. BAXLEY, ESQUIRE
90 JOHN STREET
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NEW YORK, NY 10038

EXAMINER	
ART UNIT	PAPER NUMBER

DATE MAILED: 09/04/2012

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REEXAMINATION CONTROL NO. *90/012,430*.

PATENT NO. *8031064*.

ART UNIT *3992*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Order Granting / Denying Request For Ex Parte Reexamination	Control No. 90/012,430	Patent Under Reexamination 8031064
	Examiner HETUL PATEL	Art Unit 3992

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

The request for *ex parte* reexamination filed *10 August 2012* has been considered and a determination has been made. An identification of the claims, the references relied upon, and the rationale supporting the determination are attached.

Attachments: a)☐ PTO-892, b)☐ PTO/SB/08, c)☒ Other: *PTO-1449*

1. ☒ The request for *ex parte* reexamination is GRANTED.

RESPONSE TIMES ARE SET AS FOLLOWS:

For Patent Owner's Statement (Optional): TWO MONTHS from the mailing date of this communication (37 CFR 1.530 (b)). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

For Requester's Reply (optional): TWO MONTHS from the **date of service** of any timely filed Patent Owner's Statement (37 CFR 1.535). **NO EXTENSION OF THIS TIME PERIOD IS PERMITTED.** If Patent Owner does not file a timely statement under 37 CFR 1.530(b), then no reply by requester is permitted.

2. ☐ The request for *ex parte* reexamination is DENIED.

This decision is not appealable (35 U.S.C. 303(c)). Requester may seek review by petition to the Commissioner under 37 CFR 1.181 within ONE MONTH from the mailing date of this communication (37 CFR 1.515(c)). **EXTENSION OF TIME TO FILE SUCH A PETITION UNDER 37 CFR 1.181 ARE AVAILABLE ONLY BY PETITION TO SUSPEND OR WAIVE THE REGULATIONS UNDER 37 CFR 1.183.**

In due course, a refund under 37 CFR 1.26 (c) will be made to requester:

a) ☐ by Treasury check or,

b) ☐ by credit to Deposit Account No. _____, or

c) ☐ by credit to a credit card account, unless otherwise notified (35 U.S.C. 303(c)).

/HETUL PATEL/ Primary Examiner, Art Unit 3992		

cc:Requester (if third party requester)

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1.0 DECISION ON REQUEST

A substantial new question of patentability affecting claims 1-13 of United States Patent Number 8,031,064 (hereinafter '064 patent) issued October 4, 2011 to Yu of Orange Electronic Co., Ltd. is raised by the request for *ex parte* reexamination.

2.0 REFERENCES

2.1 References Cited by the Requester

The examiner considers a substantial new question of patentability has been raised by at least the following prior art references:

1. U.S. Patent No. 6,927,679 to Taguchi et al. ("Taguchi");
2. Advertisement for CUB sensor model PUR-TPMS published in "Tire Rack Wholesale Update" publication dated 06/20/2008 to 07/19/2008. ("PUR-TPMS").

2.2 IDS

With respect to the Information Disclosure Statements (PTO/SB/08A and 08B or its equivalent) filed on August 10, 2012 and considered with this action, the information cited has been considered as described in the MPEP. Note that MPEP 2256 and 2656 indicate that degree of consideration to be given to such information will be normally limited by the degree to which the party filing the information citation has explained the content and relevance of the information.

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3.0 PROSECUTION HISTORY

3.1 Background

Claims 1-13 are the current claims in the '064 patent which issued on October 4, 2011 from application serial number 12/283,979 originally having 17 claims filed September 17, 2008. During prosecution of 12/283,979 application, a non-final rejection was mailed on December 27, 2010 rejecting claims 1-6 and 16-17 as being anticipated by and claim 7 as being obvious over Taguchi et al. , U.S. Patent No. 6,927,679. Claims 16-17 were also rejected under 35 USC 101. Claims 8-9 and 12-15 rejected as being obvious over Taguchi et al. in view of Toyofuku, U.S. Patent No. 6,920,785. Claims 10-11 were rejected as being obvious over Taguchi et al. in view of Shida, U.S. Patent No. 7,137,296.

A responsive amendment was submitted on March 29, 2011, amending claims 1, 7-10, 12-13 and 16-17; cancelling claims 2, 5-6, 11 and 14-15; newly adding claims 18-19; and pointing out features of claims not taught by Taguchi et al..

A Notice of Allowance was issued on June 9, 2011 indicating claims 1, 3-4, 7-10, 12-13 and 16-19 (correspond, respectively, to claims 1-13 of the '064 patent) allowable.

3.2 Reasons for Allowance at the time of Issuance of Patent

Examiner did not provide any specific reasons for allowance at the time of issuance of patent or during the entire prosecution of the application serial number 12/283,979.

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4.0 SUBSTANTIAL NEW QUESTION

In view of the prosecution history, it is considered that the evaluation of a prior art reference that teaches or suggests following limitation(s) would have been considered important in determining the patentability of the claims.

- An input module allowing an operator to input an identification to be written into the identification rewritable tire pressure (detector) (as in claims 1-9); and
- Wirelessly writing the old identification into a new identification rewriteable tire pressure detector by the setting apparatus (as in claims 10-13).

5.0 CLAIMS UNDER REEXAMINATION

The present request alleges that claims 1-13 of the '064 patent are unpatentable.

6.0 ISSUES RAISED IN THE REQUEST

No	Issue
1.	Requester states that the teaching of PUR-TPMS publication in combination with other references raises a substantial new question of patentability with respect to claims 1-9 of the '064 patent (Request pages 2-11).
2.	Requester states that the teaching of PUR-TPMS publication alone raises

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	a substantial new question of patentability with respect to claims 10-13 of the '064 patent (Request pages 11-12).

7.0 SUBSTANTIAL NEW QUESTIONS OF PATENTABILITY

7.1 Issue 1 (PUR-TPMS publication) (Proposed SNQ 1 Pages 2-11 of Request)

The request indicates that Requester considers that claims 1-9 of the '064 patent is unpatentable over the PUR-TPMS publication in combination with other references.

It is agreed that the consideration of the PUR-TPMS publication in combination with other references raises a substantial new question of patentability with respect to claims 1-9 of the '064 patent.

The PUR-TPMS publication is new prior art that was not previously cited/considered during the prosecution of the '064 patent.

With respect to independent claim 1, the PUR-TPMS publication discloses a tire pressure detecting apparatus (i.e. the PUR-TPMS Scan Tool) having an input module (inherently present since it allows the manual ID code input by the user) allowing an operator to input an identification to be written into the identification rewritable tire pressure detector (i.e. the user can manually type in/write any ID code they choose; see the PUR-TPMS publication page 3).

Since the PUR-TPMS publication presents new technological teachings as indicated above and pointed out in the request (see rejection on pages 4-7 of the Request) that were not considered during prosecution of the '064 patent and is directly

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related to the subject matter considered as the basis for allowability of the patent claims, a reasonable examiner would consider evaluation of the PUR-TPMS publication as important in determining the patentability of the claims. Accordingly, the PUR-TPMS publication in combination with other references raises a substantial new question of patentability with respect to claim 1 and its dependent claims 2-9 of the '064 patent which question has not been decided in a previous examination of the '064 patent.

7.2 Issue 2 (PUR-TPMS publication) (Proposed SNQ 2 Pages 11-12 of Request)

The request indicates that Requester considers that claims 10-13 of the '064 patent is unpatentable over the PUR-TPMS publication in combination with other references.

It is agreed that the consideration of the PUR-TPMS publication alone raises a substantial new question of patentability with respect to claims 10-13 of the '064 patent.

The PUR-TPMS publication is new art that was not previously cited/considered during the prosecution of the '751 patent.

With respect to independent claim 10, the PUR-TPMS publication discloses about wirelessly writing the old identification into a new identification rewriteable tire pressure detector by the setting apparatus (i.e. the PUR-TPMS scan tool wirelessly reprograms the sensors to mimic original equipment sensors that are being replaced; see the PUR-TPMS publication page 3).

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Since the PUR-TPMS publication presents new technological teachings as indicated above and pointed out in the request (see rejection on page 11 of the Request) that were not considered during prosecution of the '064 patent and is directly related to the subject matter considered as the basis for allowability of the patent claims, a reasonable examiner would consider evaluation of the PUR-TPMS publication as important in determining the patentability of the claims. Accordingly, the PUR-TPMS publication in combination with other references raises a substantial new question of patentability with respect to claim 10 and its dependent claims 11-13 of the '064 patent which question has not been decided in a previous examination of the '064 patent.

8.0 CONCLUSION

Claims 1-13 will be reexamined.

Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that *ex parte* reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in ex parte reexamination proceedings are provided for in 37 CFR 1.550(c).

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Waiver of Right to File Patent Owner Statement

In a reexamination proceeding, Patent Owner may waive the right under 37 C.F.R. 1.530 to file a Patent Owner Statement. The document needs to contain a statement that Patent Owner waives the right under 37 C.F.R. 1.530 to file a Patent Owner Statement and proof of service in the manner provided by 37 C.F.R. 1.248, if the request for reexamination was made by a third party requester, see 37 C.F.R 1.550(f). The Patent Owner may consider using the following statement in a document waiving the right to file a Patent Owner Statement:

Patent Owner waives the right under 37 C.F.R. 1.530 to file a Patent Owner Statement.

Amendment in Reexamination Proceedings

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR § 1.52(a) and (b), and must contain any fees required by 37 CFR § 1.20(c). See MPEP § 2250(IV) for examples to assist in the preparation of proper proposed amendments in reexamination proceedings.

Submissions

If the patent owner fails to file a timely and appropriate response to any Office action or any written statement of an interview required under 37 CFR § 1.560(b), the

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ex parte reexamination proceeding will be terminated, and the Director will proceed to issue a certificate under 37 CFR §1.570 in accordance with the last Office action.

Service of Papers

After the filing of a request for reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. See 37 CFR 1.550(f).

Notification of Concurrent Proceedings

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. 8,031,064 throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

Correspondence relating to this ex parte reexamination

All correspondence relating to this *ex parte* reexamination proceeding should be directed:

By Mail to: Mail Stop *Ex Parte* Reexam
Central Reexamination Unit

Orange Exhibit No. 2004
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Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at https://sportal.uspto.gov/authenticate/authenticateuserlocalepf.html. EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS-Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning" process is complete.

Any inquiry concerning this communication should be directed to Hetul Patel at telephone number 571-272-4184.

/HETUL PATEL/
Primary Examiner, Art Unit 3992

Conferees:

/Tuan H. Nguyen/
Primary Examiner, Art Unit 3992

MARK J. REINHART
SPRE-AU 3992
CENTRAL REEXAMINATION UNIT

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90012430	8031064
	Examiner	Art Unit
	HETUL PATEL	3992

SEARCHED

Class	Subclass	Date	Examiner
none		8/27/2012	HBP

SEARCH NOTES

Search Notes	Date	Examiner
Review of patented file's prosecution history	8/27/2012	HBP

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

B/O Form PTO-1449 U.S. Department of Commerce Patent and Trademark Office Information Disclosure Statement by Applicant	Atty. Docket Number YUHO3002RX/BEU	Serial Number 90/012,430 ~~13/200,979~~
	Applicant Hung-Chin YU	
	Filing Date September 17, 2008	Group 3992 ~~unassigned~~

U.S. Patent Documents

Examiner Initial		Document Number	Date	Patentee/Applicant	Class	Subclass	Filing Date if Appropriate
/HBP/		2008/0094198A1	4/28/08	Yu, San-Chuan			

Foreign Patent Documents

Examiner Initial		Document Number	Publication Date	Country/Agency	Class	Subclass	Translation	
							Yes	No

Other Documents (Including Author, Title, Date, Pertinent Pages, Place of Publication, Etc.)

/HBP/		The User Manual of PUR-TMPS sold by SHANGHAI VEI SHENG AUTO PARTS MANUFACTURING CO., LTD.
		Invoice issued by SHANGHAI VEI SHENG AUTO PARTS MANUFACTURING CO., LTD. to WELLS MANUFACTURING, L.P.
		Export declaration filed by VEI SHENG AUTO on August 30, 2008 (in Chinese)
		Test report of 49D040 TPMS SENSOR submitted to Canada for industrial product certification in 2008
		Certification radio measurement technical support of 49D040 TPMS SENSOR submitted to FCC
		Cover and page 22 of Magazine Tire Rack Wholesale "UPDATE" for automobile parts and components, issued on July 20, 2008
/HBP/		Cover and page 22 of Magazine Tire Rack Wholesale "UPDATE" for automobile parts and components, issued on July 20, 2008

Examiner /Hetul Patel/	Date Considered 08/27/2012

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO.
90/012,430	08/10/2012	8031064	YUHO3002RX/BEU	6170

36672 7590 01/25/2013
CHARLES E. BAXLEY, ESQUIRE
90 JOHN STREET
SUITE 403
NEW YORK, NY 10038

EXAMINER
PATEL, RETUL B

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
01/25/2013	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

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United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

BACON & THOMAS, PLLC

625 SLATERS LANE, FOURTH FLOOR

ALEXANDRIA, VA 22314

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/012,430*

PATENT NO. *8031064*

ART UNIT *3992*

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev. 07-04)

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Office Action in Ex Parte Reexamination	Control No. 90/012,430	Patent Under Reexamination 8031064
	Examiner HETUL PATEL	Art Unit 3992

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

a☒ Responsive to the communication(s) filed on *10 August 2012*. b☐ This action is made FINAL.
c☐ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire *3* month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).** If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☒ Notice of References Cited by Examiner, PTO-892.
2. ☐ Information Disclosure Statement, PTO/SB/08.
3. ☐ Interview Summary, PTO-474.
4. ☐ _____.

Part II SUMMARY OF ACTION

1a. ☒ Claims *1-13* are subject to reexamination.
1b. ☐ Claims _____ are not subject to reexamination.
2. ☐ Claims _____ have been canceled in the present reexamination proceeding.
3. ☒ Claims *8 and 10-13* are patentable and/or confirmed.
4. ☒ Claims *1-7 and 9* are rejected.
5. ☐ Claims _____ are objected to.
6. ☐ The drawings, filed on _____ are acceptable.
7. ☐ The proposed drawing correction, filed on _____ has been (7a)☐ approved (7b)☐ disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
   a)☐ All b)☐ Some* c)☐ None of the certified copies have
   1☐ been received.
   2☐ not been received.
   3☐ been filed in Application No. _____.
   4☐ been filed in reexamination Control No. _____.
   5☐ been received by the International Bureau in PCT application No. _____.
   * See the attached detailed Office action for a list of the certified copies not received.
9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.
10. ☐ Other: _____.

cc: Requester (if third party requester)

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***EX PARTE* REEXAMINATION**

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1.0 SUMMARY

This Office Action addresses claims 1-13 (that is all the claims) of United States Patent No. 8,031,064 (hereinafter '064 patent) issued October 4, 2011 to Yu for which it has been determined in the 90/012,430 reexamination, regarding the Order mailed on September 4, 2012 granting *ex parte* reexamination, that at least one substantial new question (hereinafter "SNQ") of patentability was raised in the request for *ex parte* reexamination, filed 08/10/2012 (hereinafter "the Request").

No statement under 37 CFR 1.530 was filed by the patent owner.

2.0 REFERENCES

2.1 References cited in the Request

The requester alleges that a substantial new question of patentability has been raised by at least the following prior art references:

1. U.S. Patent No. 6,927,679 to Taguchi et al. ("Taguchi").
2. Advertisement for CUB sensor model PUR-TPMS published in "Tire Rack Wholesale Update" publication dated 06/20/2008 to 07/19/2008. ("PUR-TPMS").
3. The User manual of PUR-TPMS sold by Shanghai Vei Sheng Auto Parts Manufacturing Co., Ltd. ("User Guide")[1].

[1] User Guide only shows the publication year (2008) in the copyright notices at the bottom of each page. Although the requester has provided (i) explanation on pages 8-9 of the request; and (ii) other additional evidence to show an earlier publication date for the User Guide, they all lack the sufficient proof of when in the 2008 year the User Guide was published. Furthermore, it is possible that the User Guide get edited after it initially published. So it is unclear when the manual was made available to public in its "final" form. While Examiner note the requester was attempted to relate some documents (i.e. (i) an invoice dated 02/26/2008, (ii) an export declaration dated 08/30/2008, and (iii) a certification of TPMS sensor dated 03/07/2008) with the User Guide, but that is not the evidence of the publication date of the User Guide earlier than 09/17/2008 (the priority/filing date of the '064 patent). Hence, the User Guide is **not** considered as a prior art reference.

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2.2 References cited by the Examiner

The Examiner has cited the following prior art references:

1. U.S. Patent No. 6,920,785 to Toyofuku ("Toyofuku").
2. U.S. Patent No. 7,137,296 to Shida et al. ("Shida").
3. U.S. Patent No. 6,838,985 to Ghabra et al. ("Ghabra").

2.3 IDS

With respect to the Information Disclosure Statements (PTO/SB/08A and 08B or its equivalent) filed on August 10, 2012 and considered with this action, the information cited has been considered as described in the MPEP. Note that MPEP 2256 and 2656 indicate that degree of consideration to be given to such information will be normally limited by the degree to which the party filing the information citation has explained the content and relevance of the information.

3.0 ISSUES RAISED IN THE REQUEST

The following issues were raised in the request:

Issue 1: Requester states that the teaching of PUR-TPMS publication in combination with other references raises a substantial new question of patentability with respect to claims 1-9 of the '064 patent (Request pages 2-11).

Issue 2: Requester states that the teaching of PUR-TPMS publication alone raises a substantial new question of patentability with respect to claims 10-13 of the '064 patent (Request pages 11-12).

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4.0 REJECTIONS PROPOSED IN THE REQUEST

The following rejections were proposed in the request:

No.	Issue
1.	Requester proposed that claims 1-9 of the '064 patent should be rejected under 35 U.S.C. 103(a) as being obvious over Taguchi view of PUR-TPMS (Request pages 2-11).
2.	Requester proposed that claims 10-13 of the '064 patent should be rejected under 35 U.S.C. 102(a) as being anticipated by PUR-TPMS (Request pages 11-12).

5.0 CLAIM REJECTIONS – 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5.1 Taguchi ivo PUR-TPMS (claims 1-2 and 4)

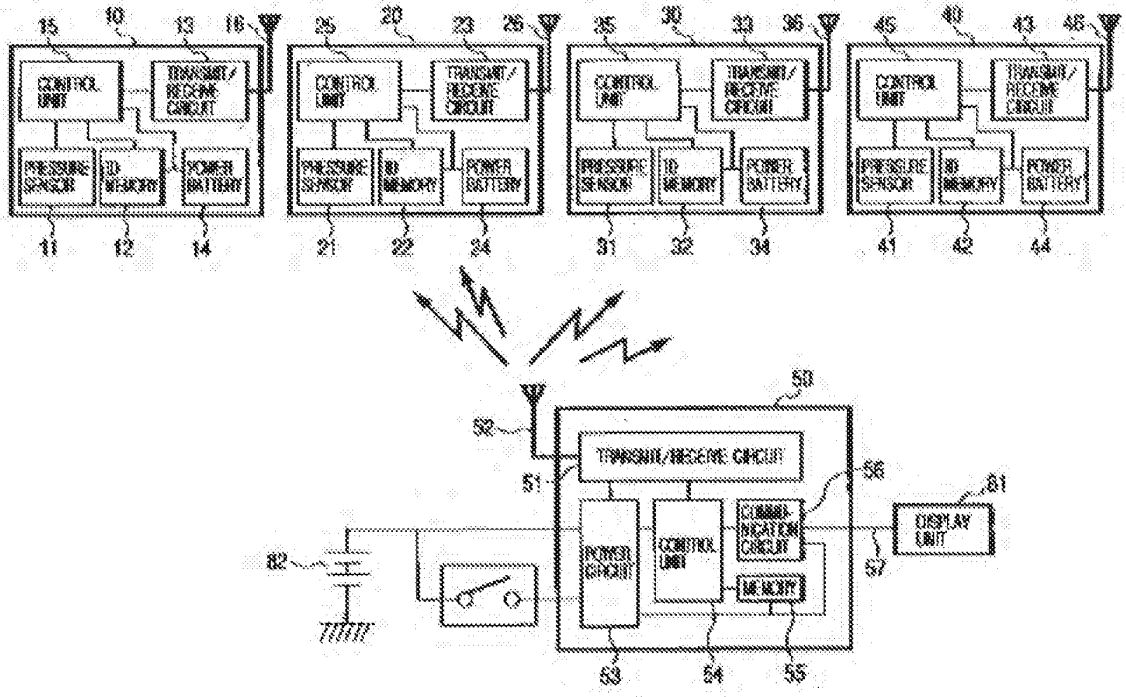
Claims 1-2 and 4 are unpatentable under 35 U.S.C. 103(a) over Taguchi in view of PUR-TPMS (Request pages 2-10).

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This rejection was proposed by the third party requester in the request for reexamination, pages 2-10, which is herein incorporated by reference with additional clarifications provided by the examiner as follows:

As per claim 1, Taguchi teaches a tire pressure detecting apparatus (the combination of pressure sensors 10, 20, 30 and 40, and monitoring apparatus 50 as shown in Fig. 2 (reproduced below)) comprising: an identification rewritable tire pressure detector (The pressure sensors 10, 20, 30 and 40; 10 (and similarly other sensors 20, 30 and 40) includes a rewritable ID memory 12, where a transmitter ID is written during a registration process; see abstract and Col. 11, lines 49-54) comprising:

FIG. 2



a micro-processing module (i.e. the combination of the control unit 15 and the ID

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memory 12 in Fig. 2) having a rewritable memory unit being capable of recording an identification (the ID memory 12 is capable of recording/storing ID; see Fig. 2 and Col. 10, line 65 – Col. 11, line 2); a sensing module electrically connected to the micro-processing module and having a pressure-detecting unit (i.e. the pressure sensor 11; the pressure sensor 11 and ID memory 12 are electrically connected as shown in Fig. 2), the pressure-detecting unit detecting a tire pressure and sending a detection result to the micro-processing module (the pressure sensor 11 detects the tire pressure and sends the results to the control unit 15); a transmitting module (i.e. the combination of transmit/receive circuit 13 and the antenna 16 in Fig. 2) controlled by the micro-processing module to transmit a radio frequency (RF) signal comprising the detection result and an identification of the identification rewritable tire pressure detector (see Col. 11, lines 16-25, where it discloses about periodically transmitting the combination of detected pressure signal and the sensor ID in a signal with a predetermined frequency. See Col. 2, lines 56-59 and Col. 18, lines 4-9 where it teaches about radio (or wireless) signal transmit/receive operation); a power module electronically connected to the micro-processing module and providing electric power to the identification rewriteable tire pressure detector (i.e. the power battery 14 provides the power to the pressure sensor 10 as shown in Fig. 2); and a receiving interface (the transmit/receive circuit 13 in Fig. 2; and 64a-d in Fig. 10) electronically connected to the micro-processing module, receiving and sending an external signal to the micro-processing module, where the external signal comprises an external identification to be written into the rewriteable memory unit (see S140 in Fig. 4); and a setting apparatus (the tire pressure monitor 50

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in Fig. 2) communicating with the identification rewriteable tire pressure detector (the tire pressure monitor 50 sends the receiver ID to the pressure sensors 10 (and similarly to 20, 30 and 40) for storage in the ID memory unit 12; see S130 in Fig. 4) and having a control module (the control unit 54 in Fig. 2); a receiving module (the combination of the transmit/receive circuit 51 and the antenna 52 in Fig. 2) electronically connected to the control module, receiving the RF signal from the identification rewriteable tire pressure detector or a tire pressure detector and sending the RF signal to the control module (See Col. 11, lines 25-35 and S21 in Fig. 3B, where it teaches about receiving the signal of predetermined frequency from one of the four pressure sensors 10, 20, 30 and 40); a setting output module (the combination of the transmit/receive circuit 51 and the antenna 52 in Fig. 2; and 64 in Fig. 10) controlled by the control module to send the external signal to the receiving interface, where the external signal is generated by the control module (i.e. sending a receiver ID from the monitoring apparatus to the pressure sensor 10 (and similarly to 20, 30 and 40); see S130 in Fig. 3 and Col. 11, lines 60-62); and a power source (the power circuit 53 as shown in Fig. 2 above) electronically connected to the control module (the control unit 54) and providing electrical power to the setting apparatus (the tire pressure monitor 50; see Fig. 2).

Taguchi failed to teach an input module, for an operator to manually input an ID to be written into the rewritable tire pressure [detector], as claimed. PUR-TPMS, however, discloses that "User can manually type in any ID code they choose" (see page 22, right column).

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Taguchi, at Col. 20, lines 29-42, further teaches that *any* identification (ID), and not just the receiver ID, could be registered in the pressure sensor 10 (and similarly in 20, 30 and 40). However, Taguchi failed to teach that the identification is provided by the input module or provided by the RF signal received from the receiving module, as claimed. In other words, Taguchi does not use a manually inputted ID or an ID received by the monitor as the registration ID to be sent to the pressure sensor. PUR-TPMS, on the other hand, discloses "User can manually type in any ID code they choose" (see page 22, right column).

Accordingly, it would have been obvious to one of ordinary skills in the art at the time of the current invention was made to implement the teachings of PUR-TPMS by substituting a manually input ID for the "receiver ID" of Taguchi to enable replacement and monitoring of tire pressure sensors without previously storing the ID according to the teachings of, for example, in col. 3, lines 47-52 of the Taguchi patent (by enabling the user to visually observe the ID and manually input it into the programming/monitoring device).

As per claim 2, the combination of Taguchi and PUR-TPMS teaches the claimed tire pressure detecting apparatus as described above and furthermore, Taguchi teaches that the receiving interface is a connector (i.e. 64a-d in Fig. 10); and the setting output module is an outputting connector (i.e. 64 in Fig. 10) corresponding to and being electronically connected to the receiving interface that sends the external signal to the receiving interface (see Col. 14, lines 54-61).

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As per claim 4, the combination of Taguchi and PUR-TPMS teaches the claimed tire pressure detecting apparatus as described above. Although neither Taguchi nor PUR-TPMS specifically discloses that the input module is a dip switch, the use of dip switch as an input device was well-known and notoriously old at the time of the current invention was made. Examiner herein takes Official Notice that the use of a dip switch is old and well known to input data manually. As such it would have been obvious to one of ordinary skill in the art, at the time of the invention, to use the dip switch as an input device because by using it in the apparatus taught by the combination of Taguchi and PUR-TPMS, the user can input data manually plus the dip switches are cheaper comparatively than the other input devices.

5.2 Taguchi ivo PUR-TPMS and Ghabra et al. (claim 3)

Claim 3 is unpatentable under 35 U.S.C. 103(a) over Taguchi in view of PUR-TPMS and Ghabra.

As per claim 3, the combination of Taguchi and PUR-TPMS teaches the claimed tire pressure detecting apparatus as described above and furthermore, Taguchi teaches that the receiving interface (i.e. the transmit/receive circuit 13 in Fig. 2) is a receiver and receives the external signal wirelessly; and the setting output module (i.e. the transmit/receive circuit 51 in Fig. 2) is a wireless transmitting interface sending the external signal wirelessly to the receiving interface (see Fig. 2). Although Taguchi, at Col. 11, lines 21-27 and Col. 12, lines 26-28, only mentions a signal of "predetermined

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frequency", Taguchi does not specifically disclose the use of *low frequency* for transmitting and receiving data as claimed. However, since the data transmitted between the receiving interface and the setting output module is a small amount (i.e. the tire pressure is a single value, and the ID code is a four-bit value as disclosed at Col. 13, lines 36-39 of Taguchi), and since the data is transmitted only over a small distance (i.e. from the tires to the controller of the vehicle), a high-frequency transmission is not necessary. Furthermore, Ghabra clearly teaches a remote vehicle tire monitoring system (10 in Fig. 1), where the receiving interface (i.e. the receiver 32 at each tire 14 of the vehicle 12 in Fig. 1) is a low frequency receiver and wirelessly receives the external signal (i.e. the transmitter initiation signal 36), in the range of 125-135 kHz, transmitted by the setting output module (i.e. the initiator 34 at each tire 14) as claimed (see Col. 5, line 11 – Col. 6, line 43 and Fig. 1). Accordingly, it would have been obvious to one of ordinary skills in the art at the time of the current invention was made to use the low frequency receiver at the receiving interface as taught by Ghabra in the tire pressure detecting apparatus taught by the combination of Taguchi and PUR-TPMS so the power consumption at the battery powered receiving interface (19) of the tire pressure detector (10) can be lowered.

5.3 Taguchi ivo PUR-TPMS and Shida (claims 5-7)

Claims 5-7 are unpatentable under 35 U.S.C. 103(a) over Taguchi in view of PUR-TPMS and Shida (Request page 10).

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Although the Requester appears to rely on Shida at pages 10-11 of the Request, the Requester did not properly propose the rejection including Shida pursuant to 37 CFR 1.510(b)(1) and (2).

As per claims 5-7, the combination of Taguchi and PUR-TPMS teaches the claimed tire pressure detecting apparatus as described above, but failed to teach that the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit. Shida, however, teaches a sensing module (i.e. the tire air pressure sensor 10 in Fig. 4) having an acceleration-detecting unit (i.e. the acceleration sensor 10b in Fig. 4) and a temperature-detecting unit (i.e. the temperature sensor 10g in Fig. 4) (see Col. 5, lines 60-67 and Fig. 4). Accordingly, it would have been obvious to one of ordinary skills in the art at the time of the current invention was made to implement the acceleration sensor and the temperature sensor taught by Shida in the sensing module taught by the combination of Taguchi and PUR-TPMS so information about tire pressure as well as the tire temperature and the tire acceleration can be transmitted to the tire pressure monitor, so that, in addition to the above-mentioned action, more detailed conditions of the tire pressure can be grasped to improve the reliability of the tire pressure monitoring system.

5.4 Taguchi ivo PUR-TPMS and Toyofuku (claim 9)

Claim 9 is unpatentable under 35 U.S.C. 103(a) over Taguchi in view of PUR-TPMS and Toyofuku (Request page 10).

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Although the Requester appears to rely on Toyofuku at pages 10-11 of the Request, the Requester did not properly propose the rejection including Toyofuku pursuant to 37 CFR 1.510(b)(1) and (2).

As per claim 9, the combination of Taguchi and PUR-TPMS teaches the claimed tire pressure detecting apparatus as described above, but failed to teach that the input module is a keyboard. Toyofuku, however, teaches the input module is a keyboard (i.e. the keyboard 41 in Fig. 3, which is used to manually input the data). Accordingly, it would have been obvious to one of ordinary skills in the art at the time of the current invention was made to use a keyboard as an input module as taught by Toyofuku in the tire pressure detecting apparatus taught by the combination of Taguchi and PUR-TPMS so the data can be manually written into the sensor unit body 10 to program it (see Col. 5, lines 26-32 of Toyofuku).

6.0 ALLOWABLE SUBJECT MATTER

Claims 8, 10-12 and 13 are confirmed.

6.1 Statement of Reasons for Patentability and/or Confirmation

The following is an examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding:

The Requester failed to provide a prior art showing the feature/limitation "the input module is a code scanner" as recited in claim 8. The requester, on page 11 of the request, states:

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> "Claim 8 recites that the input module is a code scanner. This feature was alleged by the examiner to be illustrated in Fig. 3 of the Toyofuku patent, which characterization was also not disputed by the patent owner." (Request: 1st paragraph of page 11).

However, nowhere in the Fig. 3 or the specification of the Toyofuku patent, the code scanner is shown, discussed or even mentioned as claimed. Hence, claim 8 is confirmed.

The User Guide only shows the publication year (2008) in the copyright notices at the bottom of each page. Although the requester has provided (i) explanation on pages 8-9 of the request; and (ii) other additional evidence to show an earlier publication date for the User Guide, they all lack the sufficient proof of when in the 2008 year the User Guide was published. Furthermore, it is possible that the User Guide get edited after it initially published. So it is unclear when the manual was made available to public in its "final" form. While Examiner note the requester was attempted to relate some documents (i.e. (i) an invoice dated 02/26/2008, (ii) an export declaration dated 08/30/2008, and (iii) a certification of TPMS sensor dated 03/07/2008) with the User Guide, but that is not the evidence of the publication date of the User Guide earlier than 09/17/2008 (the priority/filing date of the '064 patent). Hence, the User Guide is not considered as a prior art. None of Toyofuku, Shida, Ghabra, Taguchi and PUR-TPMS teach at least the "reading" limitation of claim 10. Hence, claims 10-13 are also confirmed.

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Any comments considered necessary by PATENT OWNER regarding the above statement must be submitted promptly to avoid processing delays. Such submission by the patent owner should be labeled: "Comments on Statement of Reasons for Patentability and/or Confirmation" and will be placed in the reexamination file.

7.0 CONCLUSION

Extensions of Time

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that *ex parte* reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in ex parte reexamination proceedings are provided for in 37 CFR 1.550(c).

Amendment in Reexamination Proceedings

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR § 1.52(a) and (b), and must contain any fees required by 37 CFR § 1.20(c). See MPEP § 2250(IV) for examples to assist in the preparation of proper proposed amendments in reexamination proceedings.

37 CFR § 1.530 under "Statement by patent owner in ex parte reexamination; amendment by patent owner in ex parte or inter partes reexamination" states:

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"(e) Status of claims and support for claim changes. Whenever there is an amendment to the claims pursuant to paragraph (d) of this section, there must also be supplied, on pages separate from the pages containing the changes, the status (i.e., pending or canceled), as of the date of the amendment, of all patent claims and of all added claims, and an explanation of the support in the disclosure of the patent for the changes to the claims made by the amendment paper."

In order to ensure full consideration of any amendments, affidavits or declarations, or other documents as evidence of patentability, such documents must be submitted in response to this Office action.

Submissions

If the patent owner fails to file a timely and appropriate response to any Office action or any written statement of an interview required under 37 CFR § 1.560(b), the *ex parte* reexamination proceeding will be terminated, and the Director will proceed to issue a certificate under 37 CFR §1.570 in accordance with the last Office action.

Service of Papers

After the filing of a request for reexamination by a third party requester, any document filed by either the patent owner or the third party requester must be served on the other party (or parties where two or more third party requester proceedings are

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merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. See 37 CFR 1.550(f).

Notification of Concurrent Proceedings

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. 8,031,064 throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

7.1 Correspondence

Correspondence relating to this ex parte reexamination

All correspondence relating to this *ex parte* reexamination proceeding should be directed:

By Mail to: Mail Stop *Ex Parte* Reexam
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

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By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at https://sportal.uspto.gov/authenticate/authenticateuserlocalepf.html. EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS-Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning" process is complete.

Any inquiry concerning this communication should be directed to Hetul Patel at telephone number 571-272-4184.

/HETUL PATEL/
Primary Examiner, Art Unit 3992

Conferees:

/Erik Kielin/
Primary Examiner, Art Unit 3992

/Sudhanshu C Pathak/

Supervisory Patent Examiner, Art Unit 3992

Orange Exhibit No. 2004
IPR2024-00744

Notice of References Cited	Application/Control No. 90/012,430	Applicant(s)/Patent Under Reexamination 6031064	
	Examiner HETUL PATEL	Art Unit 3992	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,920,785	07-2005	Toyofuku, Masanobu	73/146
*	B	US-7,137,296	11-2006	Shida et al.	73/146.5
*	C	US-6,838,985	01-2005	Ghabra et al.	340/445
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90012430	6031064
	Examiner	Art Unit
	HETUL PATEL	3992

SEARCHED			
Class	Subclass	Date	Examiner
none		8/27/2012	HBP

SEARCH NOTES		
Search Notes	Date	Examiner
Review of patented file's prosecution history	8/27/2012	HBP
Keyword search	1/18/2013	HBP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	296	tire pressure same low frequency	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/18 11:02
L2	9	tire pressure same low frequency receiver	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/18 11:02
L3	29	1.ab.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/18 11:04

EAST Search History (Interference)

< This search history is empty>

1/18/2013 11:04:41 AM

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IPR2024-00744

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90012430	8031064
	Examiner	Art Unit
	HETUL PATEL	3992

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/18/2013								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	=								
	9	✓								
	10	=								
	11	=								
	12	=								
	13	=								

Reexamination	Application/Control No. 90012430	Applicant(s)/Patent Under Reexamination 8031064
	Certificate Date	Certificate Number

Requester Correspondence Address:	☐ Patent Owner	☒ Third Party
BACON & THOMAS, PLLC 625 SLATERS LANE, FOURTH FLOOR ALEXANDRIA, VA 22314		

LITIGATION REVIEW ☒	/HBP/ (examiner initials)	01/16/2013 (date)
Case Name		Director Initials
None		/SP/ for IY

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	NUMBER
1. None	

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO.
90/012,430	08/10/2012	8031064	YUHO3002RX/BEU	6170

36672 7590 02/01/2013
CHARLES E. BAXLEY, ESQUIRE
90 JOHN STREET
SUITE 403
NEW YORK, NY 10038

EXAMINER
PATEL, RETUL B

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
02/01/2013	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Orange Exhibit No. 2004
IPR2024-00744

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

BACON & THOMAS, PLLC
625 SLATERS LANE, FOURTH FLOOR
ALEXANDRIA, VA 22314

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/012,430*.

PATENT NO. *8031064*.

ART UNIT *3992*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

Orange Exhibit No. 2004
IPR2024-00744

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
90/012,430	10 August, 2012	8031064	YUHO3002RX/BEU

CHARLES E. BAXLEY, ESQUIRE
90 JOHN STREET
SUITE 403
NEW YORK, NY 10038

EXAMINER	
HETUL PATEL	
ART UNIT	PAPER
3992	20130130

DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner for Patents

Due to a typographical error, a shorten statutory time period for responding to the FAOM was set to expire 3 months from the mailing date of the FAOM, 01/25/2013, instead of 2 months from the mailing date of the FAOM.

This letter is being issued to correct that error by informing the patent owner that, as per MPEP 2263, the shorten statutory time period for responding to the FAOM will expire TWO months from the mailing date of the FAOM.

MPEP 2263, in part, states,

"A shortened statutory period of 2 months will be set for response to Office actions in reexaminations, except * > as follows. Where< the reexamination results from a court order or litigation is stayed for purposes of reexamination, ** the shortened statutory period will be set at 1 month. > In addition, if (A) there is litigation concurrent with an ex parte reexamination proceeding and (B) the reexamination proceeding has been pending for more than one year, the Director or Deputy Director of the Office of Patent Legal Administration (OPLA), Director of the Central Reexamination Unit (CRU), Director of the Technology Center (TC) in which the reexamination is being conducted, or a Senior Legal Advisor of the OPLA, may approve Office actions in such reexamination proceeding setting a one-month or thirty days, whichever is longer, shortened statutory period for response rather than the two months usually set in reexamination proceedings."

Therefore, the shorten statutory time period for responding to the FAOM will expire TWO months from the mailing date of the FAOM (1/25/2013).

/HETUL PATEL/
Primary Examiner, Art Unit 3992

PTO-90C (Rev.04-03)

Orange Exhibit No. 2004
IPR2024-00744

PTO/SB/81 (01-09)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Application Number	99012,430
Filing Date	08/10/2012
First Named Inventor	YU, Hung-Chih
Title	Tire Pressure Detecting Apparatus
Art Unit	3662
Examiner Name	Patel, Ketan B
Attorney Docket Number	0952.1023REX

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: 99536

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified application to:

☐ The address associated with the above-mentioned Customer Number.

OR

☒ The address associated with Customer Number: 99536

OR

☐ Firm or Individual Name	
Address	
City / State / Zip	
Country	
Telephone / Email	

I am the:

☐ Applicant/Inventor.

OR

☒ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____

SIGNATURE of Applicant or Assignee of Record

Signature	Chang Feng Yi	Date	2013. 3. 20
Name	Chang Feng Yi	Telephone	
Title and Company	Manufacture Dep. Director of Orange Electronic Co., Ltd.		

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☒ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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IPR2024-00744

PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Hung-Chih YU

Application No./Patent No.: 90/012,430 (Patent No. 8,031,064) Filed/Issue Date: 08/10/2012 (issued 10/04/2011)

Titled: TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME

Orange Electronic Co., Ltd, a Corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [X] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 021598, Frame 0710, or for which a copy therefore is attached.

OR

B. [ ] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[ ] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Jessica H. Bui
Signature

3/20/2013
Date

Jessica H. Bui, Esq., Registration No. 40,846
Printed or Typed Name

Patent Attorney
Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Orange Exhibit No. 2004
IPR2024-00744

Electronic Acknowledgement Receipt

EFS ID:	15304317
Application Number:	90012430
International Application Number:	
Confirmation Number:	6179
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	8031064
Customer Number:	36672
Filer:	Jessica H. Bui
Filer Authorized By:	
Attorney Docket Number:	YUHO3002RX/BEU
Receipt Date:	20-MAR-2013
Filing Date:	10-AUG-2012
Time Stamp:	08:01:49
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	Executed_POA.pdf	470406	no	2
Warnings:					
Information:					

Total Files Size (in bytes):	470406

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,430	08/10/2012	INV001 8031864	YUHO3002RX/BEU	6179

36672 7590 03/21/2013

CHARLES E. BAXLEY, ESQUIRE
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NEW YORK, NY 10038

EXAMINER	
ART UNIT	PAPER NUMBER

DATE MAILED: 03/21/2013

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Orange Exhibit No. 2004
IPR2024-00744

Doc Code: N572

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CONTROL NUMBER 90/012430

Date Mailed: 03/21/13

DENIAL OF REQUEST FOR POWER OF ATTORNEY IN A REEXAMINATION PROCEEDING

The request for Power of Attorney filed 03/20/13 is acknowledged. However, the request cannot be granted at this time for the reason stated below.

- ☐ The power of attorney you provided did not comply with 37 CFR 1.32. See 69 Fed. Reg. 29865 (May 26, 2004).
- ☐ The revocation is not signed by the applicant, the assignee of the entire interest, or one particular principal attorney having the authority to revoke.
- ☐ The power of attorney is from an assignee and the statement required by 37 CFR 3.73(b) has not been received.
- ☐ The person signing for the assignee has omitted their empowerment to sign on behalf of the assignee.
- ☐ The inventor(s) is/are without authority to appoint attorneys since the assignee has intervened as provided by 37 CFR 3.71.
- ☐ The signature(s) of _____, co-inventor(s) in this application, has/have been omitted. The power of attorney will be entered upon receipt of confirmation signed by said co-inventor(s).
- ☐ The person(s) appointed in the power of attorney is/are not registered to practice before the U.S. Patent and Trademark Office.

X The correspondence address in the request for power of attorney is different than the address for the patent that is currently of record in the patent file. Pursuant to 37 CFR 1.33, any paper attempting to change the correspondence address in a reexamination proceeding to other than that of record in the patent file is ineffective. See MPEP 2224, 2624. Since the power of attorney will not be separately processed from the change of correspondence address, the power of attorney is ineffective. The correspondence address in the reexamination proceeding is the address of record in the patent file as listed at the top of this letter.

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X PLEASE ENCLUDE A CERTIFICATE OF SERVICE ALSO.

Questions relating to this Notice should be directed to the Central Reexamination Unit at (571) 272-7705.

Docket No.: 0062.1023REX

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Orange Electronic Co., LTD

Patent No.: 8,031,064

Application No.: 90/012,430

Group Art Unit: 3992

Confirmation No. 6179

Filed: August 10, 2012

Examiner: Patel, Hetul B.

For: Tire Pressure Detecting Apparatus
And Tire Pressure Detector Identification
Copying Method for the Same

AMENDMENT IN REPLY TO OFFICE ACTION OF JANUARY 25, 2012

Mail Stop Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

March 25, 2013

Sir:

This is in response to the Office Action mailed January 25, 2013 and Reexamination Miscellaneous Action mailed February 1, 2013, and having a period for response set to expire on **March 25, 2013.**

The following amendments and remarks are respectfully submitted. Reconsideration of the claims is respectfully requested.

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please **AMEND** claim 1, and **ADD** new claims 14-20 in accordance with the following:

Claim 1 (Currently Amended): A tire pressure detecting apparatus comprising:

an identification rewritable tire pressure detector comprising:

a micro-processing module having a rewritable memory unit being capable of recording an identification;

a sensing module electrically connected to the micro-processing module and having a pressure-detecting unit, the pressure-detecting unit detecting a tire pressure and sending a detection result to the micro-processing module;

a transmitting module controlled by the micro-processing module to transmit a radio frequency (RF) signal comprising the detection result and an identification of the identification rewritable tire pressure detector;

a power module electronically connected to the micro-processing module ~~and providing~~ to provide electric power to the identification rewriteable tire pressure detector; and

a receiving interface electronically connected to the micro-processing module, ~~receiving and sending~~ to receive and send an external signal to the micro-processing module, where the external signal comprises an external identification to be written into the rewriteable memory unit; and

a setting apparatus communicating with the identification rewriteable tire pressure detector and having a control module;

an input module ~~being~~ electronically connected to the control module ~~and allowing~~ to

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enable an operator to input an identification to be written into the identification rewriteable tire pressure detector;

a receiving module electronically connected to the control module, to receive receiving the RF signal from the identification rewriteable tire pressure detector or a tire pressure detector and sendingsend the RF signal to the control module;

a setting output module controlled by the control module to send the external signal to the receiving interface, where the external signal is generated by the control module and comprises the identification that is provided by the input module or provided by the RF signal received from the receiving module; and

a power source electronically connected to the control module and providingto provide electrical power to the setting apparatus.

Claim 2 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein

the receiving interface is a connector; and

the setting output module is an outputting connector corresponding and being electronically connected to the receiving interface and sends the external signal to the receiving interface.

Claim 3 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein

the receiving interface is a low frequency receiver and receives the external signal wirelessly; and

the setting output module is a wireless transmitting interface sending the external signal wirelessly to the receiving interface.

Claim 4 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein the input module is a dip switch.

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Claim 5 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit.

Claim 6 (Original): The tire pressure detecting apparatus as claimed in claim 2, wherein the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit.

Claim 7 (Original): The tire pressure detecting apparatus as claimed in claim 3, wherein the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit.

Claim 8 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein the input module is a code scanner.

Claim 9 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein the input module is a keyboard.

Claim 10 (Original): A tire pressure detector identification copying method comprising the steps of:

providing a setting apparatus;

reading an old identification from an old tire pressure detector by the setting apparatus and storing the old identification in the setting apparatus; and

wirelessly writing the old identification into a new identification rewriteable tire pressure detector by the setting apparatus.

Claim 11 (Original): The method as claimed in claim 10, further comprising a step of:

verifying the identification newly recorded in the new identification rewriteable tire pressure detector.

Claim 12 (Original): The method as claimed in claim 10, wherein the setting apparatus receives a wireless signal containing the old identification from the old tire pressure detector in the step of reading the old identification.

Claim 13 (Original): The method as claimed in claim 10, wherein the setting apparatus receives the old identification through an input module in the step of reading the old identification.

Claim 14 (New): A tire pressure detecting system comprising:

an identification rewritable tire pressure detector comprising:

a micro-processing module having a rewritable memory unit to record an identification;

a sensing module electrically connected to the micro-processing module and having a pressure-detecting unit to detect a tire pressure and send a detection result to the micro-processing module;

a transmitting module controlled by the micro-processing module to transmit a radio frequency (RF) signal including the detection result and the identification of the identification rewritable tire pressure detector;

a power module electronically connected to the micro-processing module to supply power to the identification rewriteable tire pressure detector; and

an interface arranged to receive and send an external signal to the micro-processing module, where the external signal comprises an external identification to be written into the rewriteable memory unit; and

a setting apparatus arranged to communicate with the identification rewriteable tire

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pressure detector, via wireless, including:

reading an old identification from an old tire pressure detector by the setting apparatus and storing the old identification in the setting apparatus; and

wirelessly writing the old identification into a new identification rewriteable tire pressure detector by the setting apparatus.

Claim 15 (New): The tire pressure detecting system as claimed in claim 14, wherein the setting apparatus is further configured to verify the identification newly recorded in the new identification rewriteable tire pressure detector.

Claim 16 (New): The tire pressure detecting system as claimed in claim 14, wherein the setting apparatus is further configured to receive a wireless signal containing the old identification from the old tire pressure detector.

Claim 17 (New): The tire pressure detecting system as claimed in claim 14, wherein the setting apparatus is further configured to receive the old identification, via an input module.

Claim 18 (New): The tire pressure detecting system as claimed in claim 14, wherein the setting apparatus comprises:

a control module;

an input module connected to the control module to enable an operator to input an identification to be written into the identification rewriteable tire pressure detector;

a receiving module connected to the control module to receive the RF signal from the identification rewriteable tire pressure detector and to send the RF signal to the control module;

a setting output module controlled by the control module to send the external signal to the identification rewriteable tire pressure detector, via the interface, where the external signal comprises the identification that is provided by the input module or provided by the RF signal

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received from the receiving module; and

a power source connected to the control module to supply power to the setting apparatus.

Claim 19 (New): The tire pressure detecting system as claimed in claim 14, wherein the input module is a code scanner.

Claim 20 (New): The tire pressure detecting system as claimed in claim 14, wherein the input module is a dip switch or a keyboard.

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REMARKS

Claims 1-20 are pending in this *Ex Parte* Reexamination. For purposes of expedition, claim 1 has been amended to correct a typographical error as identified by the Examiner on page 8 of the Office Action for a better form.

As per page 13 of the Office Action in *Ex Parte* Reexamination, claims 8, 10-12 and 13 have been confirmed as containing allowable subject matter and thus have been found patentable over previously cited prior art of record and newly cited prior art, including, for example: (1) Taguchi, U.S. Patent No. 6,927,679 ("Taguchi '679"); (2) Advertisement for CUB sensor model PUR-TPMS published in "Tire Rack Wholesale Update" publication dated 06/20/2008 to 07/19/2008 ("PUR-TPMS"); (3) The User manual of PUR-TPMS sold by Shanghai Vei Sheng Auto Parts Manufacturing Co., Ltd. ("User Guide"); (4) Toyofuku, U.S. Patent No. 6,920,785 ("Toyofuku '785"); (5) Shida, U.S. Patent No. 7,137,296 ("Shida '296"); and (6) Ghara, U.S. Patent No. 6,838,985 ("Ghara '985").

The Examiner's confirmation of patentability of these claims in this reexamination proceeding is noted with appreciation. For purposes of expedition, claims 14-20 have been newly added to capture all limitations of the confirmed patentable claim 10 in the context of a tire pressure detecting system. The Patent Owner submits that: (1) written description support for the newly added claims 14-20 is found throughout the original specification, including the originally issued claims 1-13;and (2) none of the newly added claims 14-20 broaden the claim scope beyond the originally issued claims 1-13. As such, the Patent Owner believes that at least claims 10-13 and newly added claims 14-20 are now in condition for re-issuance.

Separately, the Patent Owner also agrees with the Examiner's analysis and determination that the User Manual of PUR-TPMS sold by Shanghai Vei Sheng Auto Parts Manufacturing Co., Ltd., ("User Guide") does not qualify and is not considered as prior art against U.S. Patent No. 8,031,064 for reasons stated on pages 3 and 14 of the Office Action in *Ex Parte* Reexamination.

Turning now to the substance of the Office Action in *Ex Parte* Reexamination, claims 1-2 and 4 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS for reasons stated on pages 6-10. In particular, the Examiner asserts that Taguchi '679, as a primary reference, discloses a tire pressure detecting apparatus including all the claimed features, except for:

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> "an input module, for an operator to manually input an ID to be written into the rewritable tire pressure [detector], as claimed" and
>
> "Taguchi failed [sic] to teach that the identification is provided by the input module or provided by the RF signal received from the receiving module, as claimed. In other words, Taguchi does not use a manually inputted ID or an ID received by the monitor as the registration ID to be sent to the pressure sensor."

See Office Action, page 9. The Examiner then cites PUR-TPMS for a disclosure that "User can manually type in any ID code they choose" (see page 22) in order to support a legal conclusion of obviousness that:

> "it would have obvious to one of ordinary skills in the art at the time of the current invention was made to implement the teachings of PUR-TPMS by substituting a manually input 10 for the "receiver 10" of Taguchi to enable replacement and monitoring of tire pressure sensors without previously storing the 10 according to the teachings of, for example, in col. 3, lines 47-52 of the Taguchi patent (by enabling the user to visually observe the 10 and manually input it into the programming/monitoring device)."

However, both the Examiner's findings of facts regarding Taguchi '679 and the Examiner's conclusion of law based on Taguchi '679 and PUR-TPMS are incorrect. Patent Owner submits that features of base claim 1 are not disclosed or suggested by Taguchi '679 and PUR-TPMS, whether taken individually or in combination. Therefore, Patent Owner respectfully traverses and requests the Examiner to reconsider and withdraw this rejection for the following reasons.

In order to establish a *prima facie* case of obviousness under 35 U.S.C. §103(a), the Examiner must show that the prior art reference (or references when combined) must teach or suggest all the claim limitations, and that there must be clear articulation of the reasons why the claimed invention would have been obvious. In other words, all the claim limitations must be disclosed or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USQP 494, 496 (CCPA 1970). The Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, 82 USPQ2d 1385 (2007) also noted that the analysis supporting a rejection under 35 U.S.C. §103 should be made

explicit. The Federal Circuit has stated that "rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). See also *KSR*, 550 U.S. at ____, 82 USPQ2d at 1396 (quoting Federal Circuit statement with approval). Moreover, the Examiner "cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1780, 1783 (Fed. Cir. 1988); otherwise, the Examiner has improperly used Applicants' disclosure as an instruction book on how to reconstruct to the prior art to arrive at Applicants' claimed invention. Furthermore, any deficiencies of the cited references cannot be remedied by general conclusions, without evidence in the record, about what is "basic knowledge" or "common sense". *In re Sang Su Lee*, No. 00-1158 (Fed. Cir. 2002).

As previously discussed, the Examiner's findings of facts regarding Taguchi '679 are incorrect and incomplete. For example, the Examiner asserts that Taguchi '679 discloses a setting apparatus in communication with an identification rewritable tire pressure detector and includes, among other features, (1) a receiving module to receive a RF signal from the identification rewritable tire pressure detector or a tire pressure detector and send the RF signal to the control module, and (2) a setting output module to send an external signal to the receiving interface (included in the identification rewritable tire pressure detector) where the external signal comprises the identification that is provided by the input module or provided by the RF signal received from the receiving module.

In support of such an assertion, the Examiner cites both the transmit/receive circuit 51 and the antenna 52 included in a tire pressure monitor apparatus 50 of Taguchi '679 to correspond to both (1) the receiving module and (2) the setting output module of base claim 1 of the '064 patent. However, the Examiner's citation is misplaced. The transmit/receive circuit 51 and the antenna 52 of Taguchi '679 cannot be used to read on both (1) the receiving module and (2) the setting output module of base claim 1. Moreover, nowhere in Taguchi '679, including col. 11, ll. 25-35, and FIG. 3B, is there any disclosure that the transmit/receive circuit 51 and the antenna 52 of Taguchi '679 perform the recited functions of (1) the receiving module and (2) the setting output module of base claim 1 of the '064 patent. Contrary to the Examiner's assertion, the transmit/receive circuit 51 and the antenna 52 of Taguchi '679 are included in a tire pressure monitor apparatus 50 equipped in a vehicle body to monitor the air pressure of a

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corresponding tire, via respective pressure sensors 10, 20, 30, and 40. In contrast to the tire pressure monitor apparatus 50 of Taguchi '679, (1) the receiving module and (2) the setting output module of base claim 1 are included in a setting apparatus to read or input an identification to be written into the rewritable tire pressure detector, as recited in base claim 1 of the '064 patent.

More importantly, even assuming *arguendo* that the Examiner's factual findings regarding Taguchi '679 are correct, which the Patent Owner disagrees, the proposed combination of Taguchi '679 and PUR-TPMS still does not arrive at the invention of base claim 1 for the following reasons.

First, the Examiner admits that Taguchi '679 fails to disclose "an input module electronically connected to the control module to enable an operator to input an identification to be **written** into the identification rewriteable tire pressure [detector]" as recited in base claim 1 of the '064 patent. However, the mere suggestion that "User can manually type in any ID code they choose" as stated on page 22 of PUR-TPMS does **not** enable one skilled in the art to create "an input module electronically connected to the control module to enable an operator to input an identification to be **written** into the identification rewriteable tire pressure [detector]", especially "where the external signal is generated by the control module and comprises the identification that provided by the input module" as recited in base claim 1 of the '064 patent.

Second, the reference to the sentence "User can manually type in any ID code they choose" as stated on page 22 of PUR-TPMS refers to a specific **coding program** and **transmission protocol** used to communicate with a specific outside control module; rather than for "identification copy" as recited in base claim 1 of the '064 patent. This type of coding program and transmission protocol is described, for example, in U.S. Publication Nos. 2008/0094198 and 2012/0050029 both issued to Yu and assigned Cu Elecparts Inc., the same manufacturer of PUR-TPMS, also known as "Programmable Universal Replacement". The "Programmable Universal Replacement" presented in PUR-TPMS is used to embed a specific coding program (protocol) into a tire pressure detector for communicating with an outside device, since each manufacturer of tire pressure monitor has his own coding method and coding program. *See* the "BACKGROUND OF THE INVENTION" section of U.S. Publication No. 2008/0094198; technical details of "coding program (protocol)" can be found in U.S. Patent No. 7,518,495. In short, "coding program (protocol)" is an essential step used PRIOR to

"identification copy (ID copy)" as described in the '064 patent, that is, writing an identification (ID), which is read from an old tire pressure detector into a new tire pressure detector. In fact, nowhere in PUR-TPMS is there any reference or even hint of the function "identification copy (ID copy)" as recited in base claim 1 of the '064 patent.

As evidence of the differences between the "coding program (protocol)" and "identification copy (ID copy)", the Examiner is invited to examine the following web pages: (1) **Schrader** - the product with programming function at http://www.schraderinternational.com/Products/Product-Folder/NA-TPMS-Scan-Programming-Tools?sc_lang=en-US-NA; (2) **Alligator** - the product with programming function at http://f2411101.td-fn.net/index.php?main[4fb0d6c8b2a2c_0]30; and (3) **Orange** - the product with ID-copy function at http://www.orange-electronic.com/en/orange_diagnostic_tools.html.

Furthermore, while PUR-TPMS discloses a function that "User can manually type in any ID code they choose", there is **no** disclosure of any ID code used to write into a new tire pressure detector. When a user uses the "Programmable Universal Replacement" presented in PUR-TPMS for "coding program (protocol)" rather than for "identification copy (ID copy)", the user may manually type an ID code for the following conditions.

i) Verifying whether the procedure of "coding program (protocol)" is completed successfully or not.

After executing the procedure of "coding program (protocol)", a programming tool sends a signal to the tire pressure sensor and requests the sensor to reply in order to confirm whether the sensor has been coded successfully or not. If a program (protocol) is coded successfully, then the sensor will receive the signal and reply to the programming tool, which represents the program (protocol) coded in the sensor is identical with the one processing in the tool. In contrast, if a program (protocol) is coded unsuccessfully, then the signal will not be received by the sensor and the sensor will not reply to the programming tool, which represents the program (protocol) in the sensor does not match to the programming tool, that is, the programming tool and the sensor fail to create a network connection between them.

As we know, a vehicle is typically installed with at least four sensors at respective tires. When the programming tool sends out the signal, it will be received by the four sensors (since they possess the same protocol), and then the four sensors will reply simultaneously. As a

result, the tool is unable to determine which one of the sensors is going to be verified and whether the sensor has been coded successfully or not. For this reason, a user can manually type in an ID code, via the programming tool (since each sensor possesses an unique ID code) in advance. When the tool receives signals replied from the four sensors, the tool filters out the signals sent from the other three sensors which ID codes have not been typed in.

ii) Testing the tire pressure sensor in order to ensure that the tire pressure sensing is working perfectly.

After a tire pressure sensor has been installed in a vehicle, the sensor is usually tested to ensure operation. However, if a vehicle is not equipped with a display for showing the actual pressure value sent from the sensor, the tire pressure monitor can only send out a warning message when the tire pressure detected is out of the normal range. Hence, the tool can only be relied upon to read out the actual tire pressure value detected under this circumstance. However, such tool may read more than one tire pressure signal since four sensors respectively installed in the four tires of a vehicle can all send out signals constantly. In addition, since a user can also manually type in an ID code into the tool, the tool receives signals replied from the four sensors, filters out the signals sent from the other three sensors which ID codes had not been typed, and then displays the pressure value received.

Simply stated, PUR-TPMS does not disclose "an input module" as recited in base claim 1 of '064 patent, as incorrectly alleged by the Examiner. More importantly, PUR-TPMS does not "an input module electronically connected to the control module to enable an operator to input an identification to be **written** into the identification rewriteable tire pressure [detector]", especially "where the external signal is generated by the control module and comprises the identification that provided by the input module" as recited in base claim 1 of the '064 patent.

In view of these reasons, and in view of the fact that neither Taguchi '679 nor PUR-TPMS discloses or suggests "an input module electronically connected to the control module to enable an operator to input an identification to be **written** into the identification rewriteable tire pressure [detector]", especially "where the external signal is generated by the control module and comprises the identification that provided by the input module" as recited in base claim 1 of the '064 patent, Patent Owner respectfully requests that the rejection of claims 1-2 and 4 be withdrawn.

Lastly, dependent claim 3 has been rejected under 35 U.S.C. §103(a) as being

unpatentable over Taguchi '679 in view of PUR-TPMS and Ghara '985 for reasons stated on pages 10-11 of the Office Action. Similarly, dependent claims 5-7 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS and Shida '296 for reasons stated on pages 11-12 of the Office Action. Likewise, claim 9 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS and Toyofuku '785 for reasons stated on pages 12-13 of the Office Action. However, since these rejections are predicated upon the correctness of the rejection of base claim 1, Patent Owner respectfully traverses for the same reasons as discussed.

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone the Patent Owner's attorney at (202) 374-1968.

No fee is incurred by the addition of claims 14-20 and by the filing of this Amendment. However, if there are any additional fees associated with filing of this Amendment to ensure that the *Ex Parte* Reexamination does not go abandoned, please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Bui Garcia-Zamor, Deposit Account No. 50-5593, and credit any excess fees to said deposit account.

Respectfully submitted,
BUI GARCIA-ZAMOR

By: /Jessica H. Bui/
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Electronic Acknowledgement Receipt

EFS ID:	15339038
Application Number:	90012430
International Application Number:	
Confirmation Number:	6179
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	8031064
Customer Number:	36672
Filer:	Jessica H. Bui
Filer Authorized By:	
Attorney Docket Number:	YUHO3002RX/BEU
Receipt Date:	25-MAR-2013
Filing Date:	10-AUG-2012
Time Stamp:	09:41:54
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	Amendment_Reply_OA.pdf	107435	no	14
Warnings:					
Information:					

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/81 (01-09)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Application Number	90/012,439
Filing Date	08/10/2012
First Named Inventor	YU, Hung-Chih
Title	Tire Pressure Detecting Apparatus
Art Unit	3992
Examiner Name	Patel, Hetul B
Attorney Docket Number	0082.1023REX

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

99536

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified application to:

☐ The address associated with the above-mentioned Customer Number.

OR

☒ The address associated with Customer Number: 99536

OR

☐ Firm or Individual Name	
Address	
City / State / Zip	
Country	
Telephone / Email	

I am the:

☐ Applicant/inventor.

OR

☒ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____

SIGNATURE of Applicant or Assignee of Record

Signature	Chang Feng Yi	Date	2013. 3. 30
Name	Chang Feng Yi	Telephone	
Title and Company	Manufacture Dep. Director of Orange Electronic Co., Ltd.		

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☒ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.33 and 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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IPR2024-00744

PTO/SB/96 (07-09)
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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Hung-Chih YU

Application No./Patent No.: 90/012,430 (Patent No. 8,031,064) Filed/Issue Date: 08/10/2012 (issued 10/04/2011)

Titled: TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME

Orange Electronic Co., Ltd, a Corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [X] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 021696, Frame 0710, or for which a copy therefore is attached.

OR

B. [ ] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[ ] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Jessica H. Bui/ — Signature
3/26/2013 — Date
Jessica H. Bui, Esq., Registration No. 40,846 — Printed or Typed Name
Patent Attorney — Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/123A (03-09)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT OWNER CHANGE OF CORRESPONDENCE ADDRESS

Reexamination Proceeding

Address to:
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Control Number(s)	90/012,430
Filing Date(s)	08/10/2012
First Named Inventor	YU, Hung-Chih
Art Unit	3992
Examiner Name	Patel, Hetul B
Attorney Docket Number(s)	0062.1023REX

☒ Please change the **patent owner's** correspondence address in the above-identified reexamination proceeding control no(s) (more than one may be changed **only** if they are merged proceedings) to the address designated below in A or B.

AND

☒ Pursuant to 37 CFR 1.33(c), a PTO/SB/123 has been filed, or is concurrently being filed, in Patent No. 8,031,064 (the subject of the above-identified reexam proceeding control no(s).) to make the same address change in the patent.

A correspondence address change will not be entered in a reexamination, unless the same change is made in the patent. To insure prompt action on the request, form PTO/SB/123 (if not already submitted) must be included together with this form.

NOTE: Address change can only be made by party of record; if not of record - see PTO/SB/81A and PTO/SB/81B.

A. ☒ The address associated with Customer Number: 99536

OR

B. ☐ Firm or individual name _____

Address

City	State	Zip
Country		
Telephone	Email	

This form cannot be used to change the data associated with a Customer Number. To change the data associated with an existing Customer Number use "Request for Customer Number Data Change" (PTO/SB/124).

I am the:

1. ☒ Attorney or agent of record for patent owner, Registration No. 40,846

OR

2. ☐ Patent owner acting *pro se* (PTO/SB/96 is required for an entity which is not individual person(s))

Signature	Jessica H. Bui
Typed or Printed Name	Jessica H. Bui
Date 3/25/2013	Telephone 202-374-1968

NOTE: Signatures of all the patent owners or their representatives are required. Submit multiple forms if more than one signature is required, see below *.

☒ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Docket No.: 0062.1023REX

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Orange Electronic Co., LTD

Patent No.: 8,031,064

Application No.: 90/012,430

Group Art Unit: 3992

Confirmation No. 6179

Filed: August 10, 2012

Examiner: Patel, Hetul B.

For: Tire Pressure Detecting Apparatus
And Tire Pressure Detector Identification
Copying Method for the Same

CERTIFICATE OF SERVICE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

March 25, 2013

Sir:

I, Jessica H. Bui, Esq., declare as follows:

I am and was at the time of service mentioned in this declaration, a Patent Attorney of the law firm, Bui Garcia-Zamor, having an address associated with Customer Number 99536.

I hereby certify that on March 25, 2013, a copy of the attached documents:

(1) New Power of Attorney executed by Patent Owner; and

(2) Amendment prepared in response to the outstanding Office Action in the *Ex Parte* Reexamination

submitted in the above-identified application was served on the Requester, via Certified Mail on March 25,2013, by placing it in a sealed envelope addressed as follows:

Mr. Benjamin E. Urcia
Bacon & Thomas, PLLC
625 Slaters Lane, 4th Floor
Alexandria, Virginia 22314
(703) 683-0500

I declare under penalty of perjury that the foregoing is true and correct, and that this declaration was executed on March 25, 2013.

Respectfully submitted,
BUI GARCIA-ZAMOR

By: _____
Jessica H. Bui, Esq.
Registration No. 40,846

Date: March 25, 2013
Telephone: (202) 280-6625
Facsimile: (202) 280-6645

Orange Exhibit No. 2004
IPR2024-00744

Electronic Acknowledgement Receipt

EFS ID:	15340155
Application Number:	90012430
International Application Number:	
Confirmation Number:	6179
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	8031064
Customer Number:	36672
Filer:	Jessica H. Bui
Filer Authorized By:	
Attorney Docket Number:	YUHO3002RX/BEU
Receipt Date:	25-MAR-2013
Filing Date:	10-AUG-2012
Time Stamp:	11:32:07
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Resubmission_POA.pdf	636946	yes	6

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Miscellaneous Incoming Letter	1	1
	Power of Attorney	2	2
	Assignee showing of ownership per 37 CFR 3.73.	3	3
	Change of Address	4	4
	Miscellaneous Incoming Letter	5	6

Warnings:	
Information:	
Total Files Size (in bytes):	636946

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Docket No.: 0062.1023REX

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Orange Electronic Co., LTD

Patent No.: 8,031,064

Application No.: 90/012,430

Group Art Unit: 3992

Confirmation No. 6179

Filed: August 10, 2012

Examiner: Patel, Hetul B.

For: Tire Pressure Detecting Apparatus
And Tire Pressure Detector Identification
Copying Method for the Same

RESUBMISSION OF EXECUTED POWER OF ATTORNEY

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

March 25, 2013

Sir:

In response to the Denial of Request for Power of Attorney in Ex Parte Reexamination dated on March 21, 2013, for reasons that "the corresponding address in the request for power of attorney is different than the address for the patent that is currently of record in the patent file," enclosed are copies of following items:

(1) Power of Attorney executed by Patent Owner;

(2) Assignee Statement under 37 CFR 3.73(b);

(3) Patent Owner Change of Correspondence Address – PTO/SB/123; and

(4) Certificate of Service to verify the filing of the new Power of Attorney and Amendment prepared in response to the outstanding Office Action in the *Ex Parte* Reexamination.

Please record these items accordingly.

Respectfully submitted,
BUI GARCIA-ZAMOR

By: Jessica H. Bui, Esq.
Registration No. 40,846

Date: March 25, 2013
Telephone: (202) 280-6625
Facsimile: (202) 280-6645

Docket No.: 0062.1023REX

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Orange Electronic Co., LTD

Patent No.: 8,031,064

Application No.: 90/012,430

Group Art Unit: 3992

Confirmation No. 6179

Filed: August 10, 2012

Examiner: Patel, Hetul B.

For: Tire Pressure Detecting Apparatus
And Tire Pressure Detector Identification
Copying Method for the Same

AMENDMENT IN REPLY TO OFFICE ACTION OF JANUARY 25, 2012

Mail Stop Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

March 25, 2013

Sir:

This is in response to the Office Action mailed January 25, 2013 and Reexamination Miscellaneous Action mailed February 1, 2013, and having a period for response set to expire on **March 25, 2013.**

The following amendments and remarks are respectfully submitted. Reconsideration of the claims is respectfully requested.

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please **AMEND** claim 1, and **ADD** new claims 14-20 in accordance with the following:

Claim 1 (Currently Amended): A tire pressure detecting apparatus comprising:

an identification rewritable tire pressure detector comprising:

a micro-processing module having a rewritable memory unit being capable of recording an identification;

a sensing module electrically connected to the micro-processing module and having a pressure-detecting unit, the pressure-detecting unit detecting a tire pressure and sending a detection result to the micro-processing module;

a transmitting module controlled by the micro-processing module to transmit a radio frequency (RF) signal comprising the detection result and an identification of the identification rewritable tire pressure detector;

a power module electronically connected to the micro-processing module [and providing] to provide electric power to the identification rewriteable tire pressure detector; and

a receiving interface electronically connected to the micro-processing module, [receiving and sending] to receive and send an external signal to the micro-processing module, where the external signal comprises an external identification to be written into the rewriteable memory unit; and

a setting apparatus communicating with the identification rewriteable tire pressure detector and having a control module;

an input module [being] electronically connected to the control module [and allowing] to

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IPR2024-00744

enable an operator to input an identification to be written into the identification rewriteable tire pressure detector;

a receiving module electronically connected to the control module, [receiving] to receive the RF signal from the identification rewriteable tire pressure detector or a tire pressure detector and [sending] send the RF signal to the control module;

a setting output module controlled by the control module to send the external signal to the receiving interface, where the external signal is generated by the control module and comprises the identification that is provided by the input module or provided by the RF signal received from the receiving module; and

a power source electronically connected to the control module [and providing] to provide electrical power to the setting apparatus.

Claim 2 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein

the receiving interface is a connector; and

the setting output module is an outputting connector corresponding and being electronically connected to the receiving interface and sends the external signal to the receiving interface.

Claim 3 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein

the receiving interface is a low frequency receiver and receives the external signal wirelessly; and

the setting output module is a wireless transmitting interface sending the external signal wirelessly to the receiving interface.

Claim 4 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein the input module is a dip switch.

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Claim 5 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit.

Claim 6 (Original): The tire pressure detecting apparatus as claimed in claim 2, wherein the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit.

Claim 7 (Original): The tire pressure detecting apparatus as claimed in claim 3, wherein the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit.

Claim 8 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein the input module is a code scanner.

Claim 9 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein the input module is a keyboard.

Claim 10 (Original): A tire pressure detector identification copying method comprising the steps of:

providing a setting apparatus;

reading an old identification from an old tire pressure detector by the setting apparatus and storing the old identification in the setting apparatus; and

wirelessly writing the old identification into a new identification rewriteable tire pressure detector by the setting apparatus.

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Claim 11 (Original): The method as claimed in claim 10, further comprising a step of:

verifying the identification newly recorded in the new identification rewriteable tire pressure detector.

Claim 12 (Original): The method as claimed in claim 10, wherein the setting apparatus receives a wireless signal containing the old identification from the old tire pressure detector in the step of reading the old identification.

Claim 13 (Original): The method as claimed in claim 10, wherein the setting apparatus receives the old identification through an input module in the step of reading the old identification.

Claim 14 (New): A tire pressure detecting system comprising:

an identification rewritable tire pressure detector comprising:

a micro-processing module having a rewritable memory unit to record an identification;

a sensing module electrically connected to the micro-processing module and having a pressure-detecting unit to detect a tire pressure and send a detection result to the micro-processing module;

a transmitting module controlled by the micro-processing module to transmit a radio frequency (RF) signal including the detection result and the identification of the identification rewritable tire pressure detector;

a power module electronically connected to the micro-processing module to supply power to the identification rewriteable tire pressure detector; and

an interface arranged to receive and send an external signal to the micro-processing module, where the external signal comprises an external identification to be written into the rewriteable memory unit; and

a setting apparatus arranged to communicate with the identification rewriteable tire

Orange Exhibit No. 2004
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pressure detector, via wireless, including:

reading an old identification from an old tire pressure detector by the setting apparatus and storing the old identification in the setting apparatus; and

wirelessly writing the old identification into a new identification rewriteable tire pressure detector by the setting apparatus.

Claim 15 (New): The tire pressure detecting system as claimed in claim 14, wherein the setting apparatus is further configured to verify the identification newly recorded in the new identification rewriteable tire pressure detector.

Claim 16 (New): The tire pressure detecting system as claimed in claim 14, wherein the setting apparatus is further configured to receive a wireless signal containing the old identification from the old tire pressure detector.

Claim 17 (New): The tire pressure detecting system as claimed in claim 14, wherein the setting apparatus is further configured to receive the old identification, via an input module.

Claim 18 (New): The tire pressure detecting system as claimed in claim 14, wherein the setting apparatus comprises:

a control module;

an input module connected to the control module to enable an operator to input an identification to be written into the identification rewriteable tire pressure detector;

a receiving module connected to the control module to receive the RF signal from the identification rewriteable tire pressure detector and to send the RF signal to the control module;

a setting output module controlled by the control module to send the external signal to the identification rewriteable tire pressure detector, via the interface, where the external signal comprises the identification that is provided by the input module or provided by the RF signal

received from the receiving module; and

a power source connected to the control module to supply power to the setting apparatus.

Claim 19 (New): The fire pressure detecting system as claimed in claim 14, wherein the input module is a code scanner.

Claim 20 (New): The fire pressure detecting system as claimed in claim 14, wherein the input module is a dip switch or a keyboard.

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IPR2024-00744

REMARKS

Claims 1-20 are pending in this *Ex Parte* Reexamination. For purposes of expedition, claim 1 has been amended to correct a typographical error as identified by the Examiner on page 8 of the Office Action for a better form.

As per page 13 of the Office Action in *Ex Parte* Reexamination, claims 8, 10-12 and 13 have been confirmed as containing allowable subject matter and thus have been found patentable over previously cited prior art of record and newly cited prior art, including, for example: (1) Taguchi, U.S. Patent No. 6,927,679 ("Taguchi '679"); (2) Advertisement for CUB sensor model PUR-TPMS published in "Tire Rack Wholesale Update" publication dated 06/20/2008 to 07/19/2008 ("PUR-TPMS"); (3) The User manual of PUR-TPMS sold by Shanghai Vei Sheng Auto Parts Manufacturing Co., Ltd. ("User Guide"); (4) Toyofuku, U.S. Patent No. 6,920,785 ("Toyofuku '785"); (5) Shida, U.S. Patent No. 7,137,296 ("Shida '296"); and (6) Ghara, U.S. Patent No. 6,838,985 ("Ghara '985").

The Examiner's confirmation of patentability of these claims in this reexamination proceeding is noted with appreciation. For purposes of expedition, claims 14-20 have been newly added to capture all limitations of the confirmed patentable claim 10 in the context of a tire pressure detecting system. The Patent Owner submits that: (1) written description support for the newly added claims 14-20 is found throughout the original specification, including the originally issued claims 1-13;and (2) none of the newly added claims 14-20 broaden the claim scope beyond the originally issued claims 1-13. As such, the Patent Owner believes that at least claims 10-13 and newly added claims 14-20 are now in condition for re-issuance.

Separately, the Patent Owner also agrees with the Examiner's analysis and determination that the User Manual of PUR-TPMS sold by Shanghai Vei Sheng Auto Parts Manufacturing Co., Ltd., ("User Guide") does not qualify and is not considered as prior art against U.S. Patent No. 8,031,064 for reasons stated on pages 3 and 14 of the Office Action in *Ex Parte* Reexamination.

Turning now to the substance of the Office Action in *Ex Parte* Reexamination, claims 1-2 and 4 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS for reasons stated on pages 6-10. In particular, the Examiner asserts that Taguchi '679, as a primary reference, discloses a tire pressure detecting apparatus including all the claimed features, except for:

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> "an input module, for an operator to manually input an ID to be written into the rewritable tire pressure [detector], as claimed" and
>
> "Taguchi failed [sic] to teach that the identification is provided by the input module or provided by the RF signal received from the receiving module, as claimed. In other words, Taguchi does not use a manually inputted ID or an ID received by the monitor as the registration ID to be sent to the pressure sensor."

See Office Action, page 9. The Examiner then cites PUR-TPMS for a disclosure that "User can manually type in any ID code they choose" (see page 22) in order to support a legal conclusion of obviousness that:

> "it would have obvious to one of ordinary skills in the art at the time of the current invention was made to implement the teachings of PUR-TPMS by substituting a manually input 10 for the "receiver 10" of Taguchi to enable replacement and monitoring of tire pressure sensors without previously storing the 10 according to the teachings of, for example, in col. 3, lines 47-52 of the Taguchi patent (by enabling the user to visually observe the 10 and manually input it into the programming/monitoring device)."

However, both the Examiner's findings of facts regarding Taguchi '679 and the Examiner's conclusion of law based on Taguchi '679 and PUR-TPMS are incorrect. Patent Owner submits that features of base claim 1 are not disclosed or suggested by Taguchi '679 and PUR-TPMS, whether taken individually or in combination. Therefore, Patent Owner respectfully traverses and requests the Examiner to reconsider and withdraw this rejection for the following reasons.

In order to establish a *prima facie* case of obviousness under 35 U.S.C. §103(a), the Examiner must show that the prior art reference (or references when combined) must teach or suggest all the claim limitations, and that there must be clear articulation of the reasons why the claimed invention would have been obvious. In other words, all the claim limitations must be disclosed or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USQP 494, 496 (CCPA 1970). The Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, 82 USPQ2d 1385 (2007) also noted that the analysis supporting a rejection under 35 U.S.C. §103 should be made

explicit. The Federal Circuit has stated that "rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). See also *KSR*, 550 U.S. at ____, 82 USPQ2d at 1396 (quoting Federal Circuit statement with approval). Moreover, the Examiner "cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1780, 1783 (Fed. Cir. 1988); otherwise, the Examiner has improperly used Applicants' disclosure as an instruction book on how to reconstruct to the prior art to arrive at Applicants' claimed invention. Furthermore, any deficiencies of the cited references cannot be remedied by general conclusions, without evidence in the record, about what is "basic knowledge" or "common sense". *In re Sang Su Lee*, No. 00-1158 (Fed. Cir. 2002).

As previously discussed, the Examiner's findings of facts regarding Taguchi '679 are incorrect and incomplete. For example, the Examiner asserts that Taguchi '679 discloses a setting apparatus in communication with an identification rewritable tire pressure detector and includes, among other features, (1) a receiving module to receive a RF signal from the identification rewritable tire pressure detector or a tire pressure detector and send the RF signal to the control module, and (2) a setting output module to send an external signal to the receiving interface (included in the identification rewritable tire pressure detector) where the external signal comprises the identification that is provided by the input module or provided by the RF signal received from the receiving module.

In support of such an assertion, the Examiner cites both the transmit/receive circuit 51 and the antenna 52 included in a tire pressure monitor apparatus 50 of Taguchi '679 to correspond to both (1) the receiving module and (2) the setting output module of base claim 1 of the '064 patent. However, the Examiner's citation is misplaced. The transmit/receive circuit 51 and the antenna 52 of Taguchi '679 cannot be used to read on both (1) the receiving module and (2) the setting output module of base claim 1. Moreover, nowhere in Taguchi '679, including col. 11, ll. 25-35, and FIG. 3B, is there any disclosure that the transmit/receive circuit 51 and the antenna 52 of Taguchi '679 perform the recited functions of (1) the receiving module and (2) the setting output module of base claim 1 of the '064 patent. Contrary to the Examiner's assertion, the transmit/receive circuit 51 and the antenna 52 of Taguchi '679 are included in a tire pressure monitor apparatus 50 equipped in a vehicle body to monitor the air pressure of a

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corresponding tire, via respective pressure sensors 10, 20, 30, and 40. In contrast to the tire pressure monitor apparatus 50 of Taguchi '679, (1) the receiving module and (2) the setting output module of base claim 1 are included in a setting apparatus to read or input an identification to be written into the rewritable tire pressure detector, as recited in base claim 1 of the '064 patent.

More importantly, even assuming *arguendo* that the Examiner's factual findings regarding Taguchi '679 are correct, which the Patent Owner disagrees, the proposed combination of Taguchi '679 and PUR-TPMS still does not arrive at the invention of base claim 1 for the following reasons.

First, the Examiner admits that Taguchi '679 fails to disclose "an input module electronically connected to the control module to enable an operator to input an identification to be **written** into the identification rewriteable tire pressure [detector]" as recited in base claim 1 of the '064 patent. However, the mere suggestion that "User can manually type in any ID code they choose" as stated on page 22 of PUR-TPMS does **not** enable one skilled in the art to create "an input module electronically connected to the control module to enable an operator to input an identification to be **written** into the identification rewriteable tire pressure [detector]", especially "where the external signal is generated by the control module and comprises the identification that provided by the input module" as recited in base claim 1 of the '064 patent.

Second, the reference to the sentence "User can manually type in any ID code they choose" as stated on page 22 of PUR-TPMS refers to a specific **coding program** and **transmission protocol** used to communicate with a specific outside control module; rather than for "identification copy" as recited in base claim 1 of the '064 patent. This type of coding program and transmission protocol is described, for example, in U.S. Publication Nos. 2008/0094198 and 2012/0050029 both issued to Yu and assigned Cu Elecparts Inc., the same manufacturer of PUR-TPMS, also known as "Programmable Universal Replacement". The "Programmable Universal Replacement" presented in PUR-TPMS is used to embed a specific coding program (protocol) into a tire pressure detector for communicating with an outside device, since each manufacturer of tire pressure monitor has his own coding method and coding program. See the "BACKGROUND OF THE INVENTION" section of U.S. Publication No. 2008/0094198; technical details of "coding program (protocol)" can be found in U.S. Patent No. 7,518,495. In short, "coding program (protocol)" is an essential step used PRIOR to

"identification copy (ID copy)" as described in the '064 patent, that is, writing an identification (ID), which is read from an old tire pressure detector into a new tire pressure detector. In fact, nowhere in PUR-TPMS is there any reference or even hint of the function "identification copy (ID copy)" as recited in base claim 1 of the '064 patent.

As evidence of the differences between the "coding program (protocol)" and "identification copy (ID copy)", the Examiner is invited to examine the following web pages: (1) **Schrader** - the product with programming function at http://www.schraderinternational.com/Products/Product-Folder/NA-TPMS-Scan-Programming-Tools?sc_lang=en-US-NA; (2) **Alligator** - the product with programming function at http://f2411101.td-fn.net/index.php?main[4fb0d6c8b2a2c_0]30; and (3) **Orange** - the product with ID-copy function at http://www.orange-electronic.com/en/orange_diagnostic_tools.html.

Furthermore, while PUR-TPMS discloses a function that "User can manually type in any ID code they choose", there is **no** disclosure of any ID code used to write into a new tire pressure detector. When a user uses the "Programmable Universal Replacement" presented in PUR-TPMS for "coding program (protocol)" rather than for "identification copy (ID copy)", the user may manually type an ID code for the following conditions.

i) Verifying whether the procedure of "coding program (protocol)" is completed successfully or not.

After executing the procedure of "coding program (protocol)", a programming tool sends a signal to the tire pressure sensor and requests the sensor to reply in order to confirm whether the sensor has been coded successfully or not. If a program (protocol) is coded successfully, then the sensor will receive the signal and reply to the programming tool, which represents the program (protocol) coded in the sensor is identical with the one processing in the tool. In contrast, if a program (protocol) is coded unsuccessfully, then the signal will not be received by the sensor and the sensor will not reply to the programming tool, which represents the program (protocol) in the sensor does not match to the programming tool, that is, the programming tool and the sensor fail to create a network connection between them.

As we know, a vehicle is typically installed with at least four sensors at respective tires. When the programming tool sends out the signal, it will be received by the four sensors (since they possess the same protocol), and then the four sensors will reply simultaneously. As a

result, the tool is unable to determine which one of the sensors is going to be verified and whether the sensor has been coded successfully or not. For this reason, a user can manually type in an ID code, via the programming tool (since each sensor possesses an unique ID code) in advance. When the tool receives signals replied from the four sensors, the tool filters out the signals sent from the other three sensors which ID codes have not been typed in.

ii) Testing the tire pressure sensor in order to ensure that the tire pressure sensing is working perfectly.

After a tire pressure sensor has been installed in a vehicle, the sensor is usually tested to ensure operation. However, if a vehicle is not equipped with a display for showing the actual pressure value sent from the sensor, the tire pressure monitor can only send out a warning message when the tire pressure detected is out of the normal range. Hence, the tool can only be relied upon to read out the actual tire pressure value detected under this circumstance. However, such tool may read more than one tire pressure signal since four sensors respectively installed in the four tires of a vehicle can all send out signals constantly. In addition, since a user can also manually type in an ID code into the tool, the tool receives signals replied from the four sensors, filters out the signals sent from the other three sensors which ID codes had not been typed, and then displays the pressure value received.

Simply stated, PUR-TPMS does not disclose "an input module" as recited in base claim 1 of '064 patent, as incorrectly alleged by the Examiner. More importantly, PUR-TPMS does not "an input module electronically connected to the control module to enable an operator to input an identification to be **written** into the identification rewriteable tire pressure [detector]", especially "where the external signal is generated by the control module and comprises the identification that provided by the input module" as recited in base claim 1 of the '064 patent.

In view of these reasons, and in view of the fact that neither Taguchi '679 nor PUR-TPMS discloses or suggests "an input module electronically connected to the control module to enable an operator to input an identification to be **written** into the identification rewriteable tire pressure [detector]", especially "where the external signal is generated by the control module and comprises the identification that provided by the input module" as recited in base claim 1 of the '064 patent, Patent Owner respectfully requests that the rejection of claims 1-2 and 4 be withdrawn.

Lastly, dependent claim 3 has been rejected under 35 U.S.C. §103(a) as being

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unpatentable over Taguchi '679 in view of PUR-TPMS and Ghara '985 for reasons stated on pages 10-11 of the Office Action. Similarly, dependent claims 5-7 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS and Shida '296 for reasons stated on pages 11-12 of the Office Action. Likewise, claim 9 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS and Toyofuku '785 for reasons stated on pages 12-13 of the Office Action. However, since these rejections are predicated upon the correctness of the rejection of base claim 1, Patent Owner respectfully traverses for the same reasons as discussed.

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone the Patent Owner's attorney at (202) 374-1968.

No fee is incurred by the addition of claims 14-20 and by the filing of this Amendment. However, if there are any additional fees associated with filing of this Amendment to ensure that the *Ex Parte* Reexamination does not go abandoned, please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Bui Garcia-Zamor, Deposit Account No. 50-5593, and credit any excess fees to said deposit account.

Respectfully submitted,
BUI GARCIA-ZAMOR

By: /Jessica H. Bui/
Jessica H. Bui, Esq.
Registration No. 40,846

Date: March 25, 2013
1250 Connecticut Ave., NW
Suite 200
Washington DC 20036
Telephone: (202) 280-6625
Facsimile: (202) 280-6645

Electronic Acknowledgement Receipt

EFS ID:	15349706
Application Number:	90012430
International Application Number:	
Confirmation Number:	6179
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	8031064
Customer Number:	36672
Filer:	Jessica H. Bui
Filer Authorized By:	
Attorney Docket Number:	YUHO3002RX/BEU
Receipt Date:	25-MAR-2013
Filing Date:	10-AUG-2012
Time Stamp:	20:40:36
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	Resubmission_of_Amendment.pdf	264104	no	2
			[illegible]		
Warnings:					
Information:					

Orange Exhibit No. 2004
IPR2024-00744

2	Amendment/Req. Reconsideration-After Non-Final Reject	Amendment_Reply_OA.pdf	107787 [redacted]	no	14
Warnings:					
Information:					
		Total Files Size (in bytes):	371891		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Docket No.: 0062.1023REX

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Orange Electronic Co., LTD

Patent No.: 8,031,064

Application No.: 90/012,430

Group Art Unit: 3992

Confirmation No. 6179

Filed: August 10, 2012

Examiner: Patel, Hetul B.

For: Tire Pressure Detecting Apparatus
And Tire Pressure Detector Identification
Copying Method for the Same

RESUBMISSION OF AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

March 25, 2013

Sir:

Enclosed are copies of (1) the Amendment prepared in response to the outstanding Office Action issued in the Ex Parte Reexamination dated on January 25, 2013 in proper format with changes to base claim 1 and newly added claims 14-20, and (2) the Certificate of Service to certify that a copy of such an Amendment was served on the Requester, via regular mail on the same date.

Respectfully submitted,
BUI GARCIA-ZAMOR

By: _____
Jessica H. Bui, Esq.
Registration No. 40,846

Date: March 25, 2013
Telephone: (202) 280-6625
Facsimile: (202) 280-6645

Docket No.: 0062.1023REX

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Orange Electronic Co., LTD

Patent No : 8,031,064

Application No.: 90/012,430

Group Art Unit: 3992

Confirmation No. 6179

Filed: August 10, 2012

Examiner: Patel, Hetul B.

For: Tire Pressure Detecting Apparatus
And Tire Pressure Detector Identification
Copying Method for the Same

CERTIFICATE OF SERVICE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

March 25, 2013

Sir:

I, Jessica H. Bui, Esq., declare as follows:

I am a Patent Attorney of the law firm, Bui Garcia-Zamor, having an address associated with Customer Number 99536.

I hereby certify that on March 25, 2013, a copy of the Amendment prepared in response to the outstanding Office Action in the *Ex Parte* Reexamination submitted in the above-identified application was served on the Requester, via regular mail on March 25, 2013, by placing it in a sealed envelope addressed as follows:

Mr. Benjamin E. Urcia

Bacon & Thomas, PLLC

625 Slaters Lane, 4th Floor

Alexandria, Virginia 22314 (703) 683-0500

I declare under penalty of perjury that the foregoing is true and correct, and that this declaration was executed on March 25, 2013.

Respectfully submitted,
BUI GARCIA-ZAMOR

By: _____
Jessica H. Bui, Esq.
Registration No. 40,846

Date: March 25, 2013
Telephone: (202) 280-6625
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Orange Exhibit No. 2004
IPR2024-00744

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
90/012,430	08/10/2012	8031064	YUHO3002RX/BFU

CONFIRMATION NO. 6179

99536
Bui Garcia-Zamor
Intellectual Property Attorneys
3102 CLEVELAND AVE., NW
WASHINGTON, DC 20008

POA ACCEPTANCE LETTER

Date Mailed: 03/26/2013

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/25/2013.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/sdstevenson/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
90/012,430	08/10/2012	8031064	YUHO3002RX/BFU

CONFIRMATION NO. 6179

POWER OF ATTORNEY NOTICE



36672
CHARLES E. BAXLEY, ESQUIRE
90 JOHN STREET
SUITE 403
NEW YORK, NY 10038

Date Mailed: 03/26/2013

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/25/2013.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/sdstevenson/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Bib Data Sheet

CONFIRMATION NO. 6179

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
90/012,430	08/10/2012 RULE	340	3992	YUHO3002RX/BEU

APPLICANTS

8031064, Residence Not Provided;
ORANGE ELECTRONIC CO., LTD.(OWNER), TAICHUNG HSIEN, TAIWAN;
BACON & THOMAS, PLLC(3RD PTY REQ.), ALEXANDRIA, VA;
BACON & THOMAS, PLLC, ALEXANDRIA, VA

** CONTINUING DATA **********

This application is a REX of 12/283,979 09/17/2008 PAT 8031064

** FOREIGN APPLICATIONS **********

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ yes ☐ no			13	1
35 USC 119 (a-d) conditions met ☐ yes ☐ no ☐ Met after Allowance				
Verified and Acknowledged _____ Examiner's Signature Initials				

ADDRESS

99536

TITLE

TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
2520	No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

Docket No.: 0062.1023REX

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Orange Electronic Co., LTD

Patent No.: 8,031,064

Application No.: 90/012,430

Group Art Unit: 3992

Confirmation No. 6179

Filed: August 10, 2012

Examiner: Patel, Hetul B.

For: Tire Pressure Detecting Apparatus
And Tire Pressure Detector Identification
Copying Method for the Same

SUBMISSION OF SUPPLEMENTAL AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

May 24, 2013

Sir:

Enclosed are copies of (1) the Supplemental Amendment prepared in response to the outstanding Office Action issued in the Ex Parte Reexamination dated on January 25, 2013 with newly added claims 21-24, and (2) the Certificate of Service to certify that a copy of such Supplemental Amendment was served on the Requester, via regular mail on the same date.

Respectfully submitted,
BUI-GARCIA-ZAMOR

By: Jessica H. Bui

Jessica H. Bui, Esq.
Registration No. 40,846

Date: May 24, 2013
Telephone: (202) 280-6625
Facsimile: (202) 280-6645

Docket No.: 0062.1023REX

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Orange Electronic Co., LTD

Patent No.: 8,031,064

Application No.: 90/012,430

Group Art Unit: 3992

Confirmation No. 6179

Filed: August 10, 2012

Examiner: Patel, Hetul B.

For: Tire Pressure Detecting Apparatus
And Tire Pressure Detector Identification
Copying Method for the Same

SUPPLEMENTAL AMENDMENT

Mail Stop Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

May 24, 2013

Sir:

Supplemental to Patent Owner's earlier Amendment filed on March 25, 2013 in response to the Office Action mailed January 25, 2013 and Reexamination Miscellaneous Action mailed February 1, 2013, the following amendments and remarks are respectfully submitted. Reconsideration of the claims is respectfully requested.

REMARKS

Claims 1-23 are pending in this *Ex Parte* Reexamination.

As previously noted, the Examiner's confirmation of patentability of claims 8, 10-12 and 13 in this reexamination proceeding is noted with appreciation. For purposes of expedition, claims 21-23 have been newly added to capture limitations of the confirmed patentable claim 10 in the context of a tire pressure detecting system with a slightly different scope of coverage. The Patent Owner submits that: (1) written description support for the newly added claims 21-23 is found throughout the original specification, including the originally issued claims 1-13;and (2) newly added claims 21-23 are narrower in scope than the originally issued claims 1-13, and none of the newly added claims 21-23 broadens the claim scope beyond the originally issued claims 1-13. As such, the Patent Owner believes that at least claims 10-13, previously added claims 14-20 and now newly added claims 21-23 are now in condition for re-issuance.

Turning now to the substance of the Office Action in *Ex Parte* Reexamination, claims 1-2 and 4 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS for reasons stated on pages 6-10. Dependent claim 3 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS and Ghara '985 for reasons stated on pages 10-11 of the Office Action. Similarly, dependent claims 5-7 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS and Shida '296 for reasons stated on pages 11-12 of the Office Action. Likewise, claim 9 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS and Toyofuku '785 for reasons stated on pages 12-13 of the Office Action. These rejections are traversed for the same reasons submitted in the Amendment filed on March 25, 2013.

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone the Patent Owner's attorney at (202) 374-1968.

A fee of $330.00 is incurred by the addition of claims 21-23 ($210 for one independent claim in excess of three (3), and $120.00 for three dependent claims in excess of twenty (20)) and by the filing of this Supplemental Amendment. However, if there are any additional fees associated with filing of this Amendment to ensure that the *Ex Parte* Reexamination does not go

abandoned, please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Bui Garcia-Zamor, Deposit Account No. 50-5593, and credit any excess fees to said deposit account.

Respectfully submitted,
BUI GARCIA-ZAMOR

By: Jessica H. Bui

Jessica H. Bui, Esq.
Registration No. 40,846

Date: May 24, 2013
1250 Connecticut Ave., NW
Suite 200
Washington DC 20036
Telephone: (202) 280-6625
Facsimile: (202) 280-6645

Docket No.: 0062.1023REX

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Orange Electronic Co., LTD

Patent No.: 8,031,064

Application No.: 90/012,430

Group Art Unit: 3992

Confirmation No. 6179

Filed: August 10, 2012

Examiner: Patel, Hetul B.

For: Tire Pressure Detecting Apparatus
And Tire Pressure Detector Identification
Copying Method for the Same

CERTIFICATE OF SERVICE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

May 24, 2013

Sir:

I, Jessica H. Bui, Esq., declare as follows:

I am a Patent Attorney of the law firm, Bui Garcia-Zamor, having an address associated with Customer Number 99536.

I hereby certify that on May 24, 2013, a copy of the Supplemental Amendment prepared in response to the outstanding Office Action in the *Ex Parte* Reexamination submitted in the above-identified application was served on the Requester, via regular mail on May 24, 2013, by placing it in a sealed envelope addressed as follows:

Mr. Benjamin E. Urcia

Bacon & Thomas, PLLC

625 Slaters Lane, 4th Floor

Alexandria, Virginia 22314 (703) 683-0500

I declare under penalty of perjury that the foregoing is true and correct, and that this declaration was executed on May 24, 2013.

Respectfully submitted,
BUI GARCIA-ZAMOR

By _____
Jessica H. Bui, Esq.
Registration No. 40,846

Date: May 24, 2013
Telephone: (202) 280-6625
Facsimile: (202) 280-6645

Orange Exhibit No. 2004
IPR2024-00744

Electronic Patent Application Fee Transmittal

Application Number:	90012430
Filing Date:	10-Aug-2012
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	8031064
Filer:	Jessica H. Bui
Attorney Docket Number:	YUHO3002RX/BEU

Filed as Small Entity

ex parte reexam Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Reexamination Independent Claims	2821	1	210	210
REEXAMINATION CLAIMS IN EXCESS OF TWENTY	2822	3	40	120
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	330

Electronic Acknowledgement Receipt

EFS ID:	15871330
Application Number:	90012430
International Application Number:	
Confirmation Number:	6179
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	8031064
Customer Number:	99536
Filer:	Jessica H. Bui
Filer Authorized By:	
Attorney Docket Number:	YUHO3002RX/BEU
Receipt Date:	24-MAY-2013
Filing Date:	10-AUG-2012
Time Stamp:	18:20:40
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

Orange Exhibit No. 2004
IPR2024-00744

1	Supplemental Response or Supplemental Amendment	Supplemental_Amendment_As_Filed.pdf	986116	no	12
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	31699	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1017815		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO.
90/012,430	08/10/2012	8031064	YUHQ3002RX/BEU	6170

99836 7590 07/19/2013

Bui Garcia-Zamor
Intellectual Property Attorneys
3102 CLEVELAND AVE., NW
WASHINGTON, DC 20008

EXAMINER
PATEL, RETUL B

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
07/19/2013	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Orange Exhibit No. 2004
IPR2024-00744

UNITED STATES PATENT AND TRADEMARK OFFICE

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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

BACON & THOMAS, PLLC

625 SLATERS LANE, FOURTH FLOOR

ALEXANDRIA, VA 22314

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/012,430*.

PATENT NO. *8031064*.

ART UNIT *3992*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev. 07-04)

Orange Exhibit No. 2004
IPR2024-00744

Notice Of Defective Paper In Ex Parte Reexamination	Control Number	Patent Under Reexamination
	90/012,430	8031064
	Examiner	Art Unit
	Hetul Patel	3992

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

1. ☐ Since no proof of service was included with the paper filed on _____, it fails to comply with 37 CFR 1.248 and 1.540. Proof of service is required within ONE (1) MONTH or THIRTY (30) DAYS from the mailing date of this letter, whichever is longer. Failure to provide proof of service may result in a refusal to consider the paper. If the failure to comply with this requirement results in a patent owner failure to file a timely and appropriate response to any Office action or any written statement of an interview required under 37 CFR 1.560(b), the prosecution of the reexamination proceeding will be terminated under 37 CFR 1.550(d).

2. ☐ The paper filed on _____ is unsigned. A duplicate paper or ratification, properly signed, is required within ONE (1) MONTH or THIRTY (30) DAYS from the mailing date of this letter, whichever is longer. Failure to comply with this requirement will result in the paper not being considered. If the failure to comply results in a patent owner failure to file a timely and appropriate response to any Office action or any written statement of an interview required under 37 CFR 1.560(b), the prosecution of the reexamination proceeding will be terminated under 37 CFR 1.550(d).

3. ☐ The paper filed on _____ is signed by _____, who is not of record. A duplicate paper or ratification signed by a person of record, a person made of record by way of a new power of attorney, is required within ONE (1) MONTH or THIRTY (30) DAYS from the mailing date of this letter, whichever is longer. Failure to comply with this requirement will result in the paper not being considered. If the failure to comply results in a patent owner failure to file a timely and appropriate response to any Office action or any written statement of an interview required under § 1.560(b), the prosecution of the reexamination proceeding will be terminated under 37 CFR 1.550(d).

4. ☒ The Amendment filed on *24 May 2013* does not comply with 37 CFR 1.530(d)-(j). Patent owner is given ONE (1) MONTH or THIRTY (30) DAYS from the mailing date of this letter, whichever is longer to correct this informality; otherwise, the prosecution of the the reexamination proceeding will be terminated under (37 CFR 1.550(d)).

5. ☐ The amendment filed by patent owner on _____, does not comply with 37 CFR ☐1.20(c)(3) and/or ☐1.20(c)(4), as to excess claim fees. Patent owner is given a time period of ONE (1) MONTH or THIRTY (30) DAYS from the mailing date of this letter, whichever is longer, to correct this fee deficiency, or the prosecution of the reexamination proceeding will be terminated under 37 CFR 1.550(d), to effect the "abandonment" set forth in 37 CFR 1.20(c)(5).

6. ☒ Other :

See Continuation Sheet

NOTE: EXTENSION OF TIME ARE GOVERNED BY 37 CFR 1.550(c). If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

/Hetul Patel/ Primary Examiner, Art Unit 3992		

cc: Requester (if third party requester)

Orange Exhibit No. 2004
IPR2024-00744

Continuation of 6. Other :
The claim amendment filed May 24, 2013 is defective as it is not in compliance with MPEP 2250(I)(B) and 37 CFR 1.530(d)-(j).

The claim amendment filed May 24, 2013 has at least following deficiency listed below:

1) Any claim amendment with respect to original patent claims should be marked with underlining and (single square) bracketing, pursuant to 37 CFR 1.530(f)(1) and (2). Every newly added claim (with respect to the original patent claims) 14-23 must be underlined throughout the claim. The presentation cannot contain any bracketing or other indication (i.e. labeling as "Previously Presented") of what was in the previous version of the claim. This is because all changes in the reexamination are made vis-a-vis the original patent, pursuant to 37 CFR 1.530(i), and not in comparison with any prior amendment. Although the presentation of the amended claim does not contain any indication of what is changed from a previous version of the claim, patent owner MUST point out what is changed, in the "Remarks" portion of the amendment. Also, as per 37 CFR 1.530(e), each change made in the claim must be accompanied by an explanation of the support in the disclosure of the patent (i.e., the reexamination specification) for the change.

The claims filed on May 24, 2013 will be expunged from the record.

The patent owner should timely respond to this notice by only correcting the defects pointed out in this notice (i.e. (i) showing/marking amendment to original claim 1 of the '064 patent with underlining and single square bracketing and labeling it as "Amended"; and (ii) underlining newly added (with respect to the original claims 1-13 of the '064 patent) claims 14-23).

Orange Exhibit No. 2004
IPR2024-00744

Docket No.: 0062.1023REX

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Orange Electronic Co., LTD

Patent No.: 8,031,064

Application No.: 90/012,430

Group Art Unit: 3992

Confirmation No. 6179

Filed: August 10, 2012

Examiner: Patel, Hetul B.

For: Tire Pressure Detecting Apparatus
And Tire Pressure Detector Identification
Copying Method for the Same

SUBMISSION OF CORRECTED SUPPLEMENTAL AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

August 12, 2013

Sir:

Enclosed are copies of (1) the Corrected Supplemental Amendment prepared in response to the Notice of Defective Paper in Ex Parte Reexamination dated on July 19, 2013, and the outstanding Office Action issued in the Ex Parte Reexamination dated on January 25, 2013 in proper format with changes to base claim 1 and newly added claims 14-23, and (2) the Certificate of Service to certify that a copy of such a Corrected Supplemental Amendment was served on the Requester, via regular mail on the same date.

Respectfully submitted,
BUI GARCIA-ZAMOR

By: Jessica H. Bui

Jessika H. Bui, Esq.
Registration No. 40,846

Date: August 12, 2013
Telephone: (202) 280-6625
Facsimile: (202) 280-6645

Orange Exhibit No. 2004
IPR2024-00744

Docket No.: 0062.1023REX

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Orange Electronic Co., LTD

Patent No.: 8,031,064

Application No.: 90/012,430

Group Art Unit: 3992

Confirmation No. 6179

Filed: August 10, 2012

Examiner: Patel, Hetul B.

For: Tire Pressure Detecting Apparatus
And Tire Pressure Detector Identification
Copying Method for the Same

CORRECTED SUPPLEMENTAL AMENDMENT

Mail Stop Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

August 12, 2013

Sir:

In response to the Notice of Defective Paper in Ex Parte Reexamination (Paper No. 20130716) dated on July 19, 2013, and supplemental to Patent Owner's earlier Amendment filed on March 25, 2013 in response to the Office Actions mailed January 25, 2013 and July 19, 2013, the following amendments and remarks are respectfully submitted. Reconsideration of the claims is respectfully requested.

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please **AMEND** claim 1, and **ADD** new claims 14-23 in accordance with the following:

Claim 1 (Amended): A tire pressure detecting apparatus comprising:

an identification rewritable tire pressure detector comprising:

a micro-processing module having a rewritable memory unit being capable of recording an identification;

a sensing module electrically connected to the micro-processing module and having a pressure-detecting unit, the pressure-detecting unit detecting a tire pressure and sending a detection result to the micro-processing module;

a transmitting module controlled by the micro-processing module to transmit a radio frequency (RF) signal comprising the detection result and an identification of the identification rewritable tire pressure detector;

a power module electronically connected to the micro-processing module [and providing] to provide electric power to the identification rewriteable tire pressure detector; and

a receiving interface electronically connected to the micro-processing module, [receiving and sending] to receive and send an external signal to the micro-processing module, where the external signal comprises an external identification to be written into the rewriteable memory unit; and

a setting apparatus communicating with the identification rewriteable tire pressure detector and having a control module;

an input module [being] electronically connected to the control module [and allowing] to

enable an operator to input an identification to be written into the identification rewriteable tire pressure detector;

a receiving module electronically connected to the control module, [receiving] to receive the RF signal from the identification rewriteable tire pressure detector or a tire pressure detector and [sending] send the RF signal to the control module;

a setting output module controlled by the control module to send the external signal to the receiving interface, where the external signal is generated by the control module and comprises the identification that is provided by the input module or provided by the RF signal received from the receiving module; and

a power source electronically connected to the control module [and providing] to provide electrical power to the setting apparatus.

Claim 2 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein

the receiving interface is a connector; and

the setting output module is an outputting connector corresponding and being electronically connected to the receiving interface and sends the external signal to the receiving interface.

Claim 3 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein

the receiving interface is a low frequency receiver and receives the external signal wirelessly; and

the setting output module is a wireless transmitting interface sending the external signal wirelessly to the receiving interface.

Claim 4 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein the input module is a dip switch.

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IPR2024-00744

Claim 5 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit.

Claim 6 (Original): The tire pressure detecting apparatus as claimed in claim 2, wherein the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit.

Claim 7 (Original): The tire pressure detecting apparatus as claimed in claim 3, wherein the sensing module further has at least one acceleration-detecting unit and a temperature-detecting unit.

Claim 8 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein the input module is a code scanner.

Claim 9 (Original): The tire pressure detecting apparatus as claimed in claim 1, wherein the input module is a keyboard.

Claim 10 (Original): A tire pressure detector identification copying method comprising the steps of:

providing a setting apparatus;

reading an old identification from an old tire pressure detector by the setting apparatus and storing the old identification in the setting apparatus; and

wirelessly writing the old identification into a new identification rewriteable tire pressure detector by the setting apparatus.

Claim 11 (Original): The method as claimed in claim 10, further comprising a step of:

verifying the identification newly recorded in the new identification rewriteable tire pressure detector.

Claim 12 (Original): The method as claimed in claim 10, wherein the setting apparatus receives a wireless signal containing the old identification from the old tire pressure detector in the step of reading the old identification.

Claim 13 (Original): The method as claimed in claim 10, wherein the setting apparatus receives the old identification through an input module in the step of reading the old identification.

Claim 14 (New): A tire pressure detecting system comprising:

an identification rewritable tire pressure detector comprising:

a micro-processing module having a rewritable memory unit to record an identification;

a sensing module electrically connected to the micro-processing module and having a pressure-detecting unit to detect a tire pressure and send a detection result to the micro-processing module;

a transmitting module controlled by the micro-processing module to transmit a radio frequency (RF) signal including the detection result and the identification of the identification rewritable tire pressure detector;

a power module electronically connected to the micro-processing module to supply power to the identification rewriteable tire pressure detector; and

an interface arranged to receive and send an external signal to the micro-processing module, where the external signal comprises an external identification to be written into the rewriteable memory unit; and

a setting apparatus arranged to communicate with the identification rewriteable tire pressure detector, via wireless, including:

reading an old identification from an old tire pressure detector by the setting apparatus and storing the old identification in the setting apparatus; and

wirelessly writing the old identification into a new identification rewriteable tire pressure detector by the setting apparatus.

Claim 15 (New): The tire pressure detecting system as claimed in claim 14, wherein the setting apparatus is further configured to verify the identification newly recorded in the new identification rewriteable tire pressure detector.

Claim 16 (New): The tire pressure detecting system as claimed in claim 14, wherein the setting apparatus is further configured to receive a wireless signal containing the old identification from the old tire pressure detector.

Claim 17 (New): The tire pressure detecting system as claimed in claim 14, wherein the setting apparatus is further configured to receive the old identification, via an input module.

Claim 18 (New): The tire pressure detecting system as claimed in claim 14, wherein the setting apparatus comprises:

a control module;

an input module connected to the control module to enable an operator to input an identification to be written into the identification rewriteable tire pressure detector;

a receiving module connected to the control module to receive the RF signal from the identification rewriteable tire pressure detector and to send the RF signal to the control module;

a setting output module controlled by the control module to send the external signal to the identification rewriteable tire pressure detector, via the interface, where the external signal comprises the identification that is provided by the input module or provided by the RF signal received from the receiving module; and

a power source connected to the control module to supply power to the setting

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IPR2024-00744

apparatus.

Claim 19 (New): The tire pressure detecting system as claimed in claim 14, wherein the input module is a code scanner.

Claim 20 (New): The tire pressure detecting system as claimed in claim 14, wherein the input module is a dip switch or a keyboard.

Claim 21 (New): A tire pressure detecting system comprising:

an identification rewritable tire pressure detector comprising:

a micro-processing module having a rewritable memory unit to record an identification;

a sensing module electrically connected to the micro-processing module and having a pressure-detecting unit to detect a tire pressure and send a detection result to the micro-processing module;

a transmitting module controlled by the micro-processing module to transmit a radio frequency (RF) signal including the detection result and the identification of the identification rewritable tire pressure detector;

a power module electronically connected to the micro-processing module to supply power to the identification rewriteable tire pressure detector;

an interface arranged to receive and send an external signal to the micro-processing module, where the external signal comprises an external identification to be written into the rewriteable memory unit; and

a setting apparatus arranged to communicate with the identification rewriteable tire pressure detector, including:

reading an old identification from an old tire pressure detector by the setting apparatus and storing the old identification in the setting apparatus; and

writing the old identification into a new identification rewriteable tire pressure detector by the setting apparatus.

Claim 22 (New): The tire pressure detecting system as claimed in claim 21, wherein the setting apparatus comprises:

a control module;

an input module connected to the control module to enable an operator to input an identification to be written into the identification rewriteable tire pressure detector;

a receiving module connected to the control module to receive the RF signal from the identification rewriteable tire pressure detector and to send the RF signal to the control module;

a setting output module controlled by the control module to send the external signal to the identification rewriteable tire pressure detector, via the interface, where the external signal comprises the identification that is provided by the input module or provided by the RF signal received from the receiving module; and

a power source connected to the control module to supply power to the setting apparatus.

Claim 23 (New): The tire pressure detecting system as claimed in claim 21, wherein the input module is a code scanner, a dip switch or a keyboard.

Orange Exhibit No. 2004
IPR2024-00744

REMARKS

Claims 1-23 are pending in this *Ex Parte* Reexamination.

As a preliminary matter, the Notice of Defective Paper in Ex Parte Reexamination (Paper No. 20130716) dated on July 19, 2013, is noted with appreciation. In that Notice, the claim amendment filed on May 24, 2013 was found defective for lack of compliance to MPEP 2250(I)(B) and 37 C.F.R. §1.530(d)-(j). In response thereto, the previous amendment with respect to original claim 1 has been reintroduced with underlying and (single square) bracketing and labeling it as "Amended"; and all newly added claims (with respect to the original claims 1-13 of the '064 patent), such as claims 14-23, have been underlined and labeled as "Newly Added" as per 37 C.F.R. §1.530. As such, entry of this Corrected Supplemental Amendment is respectfully requested.

As previously noted, the Examiner's confirmation of patentability of claims 8, 10-12 and 13 in this reexamination proceeding is also noted with appreciation. For purposes of expedition, claim 1 has been amended in the Amendment filed March 25, 2013 to correct a typographical error as identified by the Examiner on page 8 of the Office Action for a better form mailed February 1, 2013.

Also for purposes of expedition, claims 14-20 have been newly added, in the Amendment filed March 25, 2013, to capture all limitations of the confirmed patentable claim 10 in the context of a tire pressure detecting system. The Patent Owner submits that: (1) written description support for the newly added claims 14-20 is found throughout the original specification, including the originally issued claims 1-13;and (2) none of the newly added claims 14-20 broaden the claim scope beyond the originally issued claims 1-13.

Similarly, claims 21-23 have also been newly added to also capture limitations of the confirmed patentable claim 10 in the context of a tire pressure detecting system with a slightly different scope of coverage. The Patent Owner also submits that: (1) written description support for the newly added claims 21-23 is found throughout the original specification, including the originally issued claims 1-13; and (2) newly added claims 21-23 are narrower in scope than the originally issued claims 1-13, and none of the newly added claims 21-23 broadens the claim scope beyond the originally issued claims 1-13. As such, the Patent Owner believes that at least claims 10-13, previously added claims 14-20 and now newly added claims 21-23 are now in condition for re-issuance.

Turning now to the substance of the Office Action in *Ex Parte* Reexamination, claims 1-2 and 4 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS for reasons stated on pages 6-10. Dependent claim 3 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS and Ghara '985 for reasons stated on pages 10-11 of the Office Action. Similarly, dependent claims 5-7 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS and Shida '296 for reasons stated on pages 11-12 of the Office Action. Likewise, claim 9 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Taguchi '679 in view of PUR-TPMS and Toyofuku '785 for reasons stated on pages 12-13 of the Office Action. These rejections are traversed for the same reasons submitted in the Amendment filed on March 25, 2013.

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone the Patent Owner's attorney at (202) 374-1968.

A fee of $330.00 is incurred by the addition of claims 21-23 ($210 for one independent claim in excess of three (3), and $120.00 for three dependent claims in excess of twenty (20)). However, the $330.00 fee was paid with the filing of the previously submitted Supplemental Amendment on May 24, 2013, which was not entered as per Notice of Defective Paper in Ex Parte Reexamination dated on July 19, 2013. Nevertheless, if there are any additional fees associated with filing of this Corrected Supplmental Amendment to ensure that the *Ex Parte* Reexamination does not go abandoned, please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Bui Garcia-Zamor, Deposit Account No. 50-5593, and credit any excess fees to said deposit account.

Respectfully submitted,
BUI GARCIA-ZAMOR

By: Jessica H. Bui

Jessica H. Bui, Esq.
Registration No. 40,846

Date: August 12, 2013
1250 Connecticut Ave., NW, Suite 200
Washington DC 20036
Telephone: (202) 280-6625

Electronic Acknowledgement Receipt

EFS ID:	16569523
Application Number:	90012430
International Application Number:	
Confirmation Number:	6179
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	8031064
Customer Number:	99536
Filer:	Jessica H. Bui
Filer Authorized By:	
Attorney Docket Number:	YUHO3002RX/BEU
Receipt Date:	12-AUG-2013
Filing Date:	10-AUG-2012
Time Stamp:	20:55:44
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Supplemental Response or Supplemental Amendment	Corrected_Supplemental_Amendment.pdf	533899	no	11
Warnings:					
Information:					

Total Files Size (in bytes):	533699

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/81 (12-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

REEXAMINATION - PATENT OWNER POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Control Number(s)	90/012,430
Filing Date(s)	06-17-2008
First Named Inventor	Hung-Chih Yu
Title	Tire Pressure Detecting Apparatus....
Patent Number	8,031,064
Examiner Name	LA, ANH V
Attorney Docket No(s).	28223-92835

I hereby revoke all previous patent owner powers of attorney given in the above-identified reexamination proceeding control number(s).

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the proceeding(s) identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: 24728

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the proceeding(s) identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified reexamination proceeding control number(s) (more than one may be changed only if they are merged proceedings) to be:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name	
Address	
City	State / Zip
Country	
Telephone	Email

I am the:

☐ Inventor, having ownership of the patent being reexamined.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on March 25, 2013.

SIGNATURE of Inventor or Patent Owner

Signature		Date	08/19/2013
Name	Chih-Yao Hsu	Telephone	886-04-2635 1558
Title and Company	Title: General Manager	Company: Orange Electronic CO., LTD	

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☒ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to be filed by the USPTO to process an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	16714602
Application Number:	90012430
International Application Number:	
Confirmation Number:	6179
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	8031064
Customer Number:	99536
Filer:	Tim Tingkang Xia/Debby Yew
Filer Authorized By:	Tim Tingkang Xia
Attorney Docket Number:	YUHO3002RX/BEU
Receipt Date:	28-AUG-2013
Filing Date:	10-AUG-2012
Time Stamp:	18:37:41
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	2622392835RevPOA.pdf	433159	no	1
Warnings:					
Information:					

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Total Files Size (in bytes):	433159

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	90012430
Filing Date	2012-08-10
First Named Inventor	Hung-Chih Yu
Art Unit	3992
Examiner Name	HETUL B PATEL
Attorney Docket Number	26223-92835

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6920785	B2	2005-07-26	TOYOFUKU	
	2	6941801	B2	2005-09-13	LEMENSE et al.	
	3	6888449	B2	2005-05-03	LIN et al.	
	4	7137296	B2	2006-11-21	SHIDA et al.	

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	Application Number	90012430
	Filing Date	2012-08-10
	First Named Inventor	Hung-Chih Yu
	Art Unit	3992
	Examiner Name	HETUL B PATEL
	Attorney Docket Number	26223-92835

	1	2001322411	JP	A	2001-11-20	DENSO CORP		☒
	2	02094588	WO	A1	2002-11-28	BRIDGESTONE CORPORATION et al.		☒
	3	2004009859	JP	A	2004-01-15	DENSO CORP		☒
	4	2004017909	JP	A	2004-01-22	DENSO CORP		☒
	5	201009311	TW	A	2010-03-01	ORANGE ELECTRONIC CO., LTD.		☒
	6	2011031759	JP	A	2011-02-17	ORANGE ELECTRONIC CO., LTD.		☒
	7	101881699	CN	A	2010-11-10	ORANGE ELECTRONIC CO., LTD.		☒
	8	101881699	CN	B	2013-07-10	ORANGE ELECTRONIC CO., LTD.		☒

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
	1	Intellectual Property Office, Ministry of Economic Affairs, R.O.C., "Third-Party Reexamination Communication", 06/04/2013, Taiwan.	☐

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	90012430
	Filing Date	2012-08-10
	First Named Inventor	Hung-Chih Yu
	Art Unit	3992
	Examiner Name	HETUL B PATEL
	Attorney Docket Number	26223-92835

	2	Intellectual Property Office, Ministry of Economic Affairs, R.O.C., "Applicant Responded toThird-Party Reexamination Communication", 07/17/2013, Taiwan.	☐
	3	Japan Patent Office, "1st Japanese Office Action", 01/31/2012, Japan.	☐
	4	Tai E International Patent & Law Office, "Comments in Chinese", 02/17/2012, Taiwan.	☐
	5	Japan Patent Office, "Response to 1st Japanese Office Action", 04/24/2012, Japan.	☐
	6	Japan Patent Office, "2nd Japanese Office Action and Chinese Translation", 11/13/2012, Japan.	☐
	7	Tai E International Patent & Law Office, "Comments in Chinese", 11/30/2012, Taiwan.	☐
	8	Japan Patent Office, "Response to 2nd Japanese Office Action", 02/28/2013, Japan.	☐
	9	State Intellectual Property Office of the People's Republic of China, "1st Chinese Office Action", 04/14/2011, China.	☐
	10	State Intellectual Property Office of the People's Republic of China, "Response to 1st Chinese Office Action", 08/08/2011, China.	☐
	11	State Intellectual Property Office of the People's Republic of China, "2nd Chinese Office Action", 12/13/2011, China.	☐
	12	State Intellectual Property Office of the People's Republic of China, "Response to 2nd Chinese Office Action", 12/30/2011, China.	☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	90012430
	Filing Date	2012-08-10
	First Named Inventor	Hung-Chih Yu
	Art Unit	3992
	Examiner Name	HETUL B PATEL
	Attorney Docket Number	26223-92835

	13	State Intellectual Property Office of the People's Republic of China, "3rd Chinese Office Action", 05/11/2012, China.	☐
	14	State Intellectual Property Office of the People's Republic of China, "Response to 3rd Chinese Office Action", 07/04/2012, China.	☐
	15	State Intellectual Property Office of the People's Republic of China, "4th Chinese Office Action", 12/26/2012, China.	☐
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Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Application Number	90012430
	Filing Date	2012-08-10
	First Named Inventor	Hung-Chih Yu
	Art Unit	3992
	Examiner Name	HETUL B PATEL
	Attorney Docket Number	26223-92835

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Tim Tingkang Xia/	Date (YYYY-MM-DD)	2013-08-29
Name/Print	Tim Tingkang Xia	Registration Number	45242

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Electronic Acknowledgement Receipt

EFS ID:	16714927
Application Number:	90012430
International Application Number:	
Confirmation Number:	6179
Title of Invention:	TIRE PRESSURE DETECTING APPARATUS AND TIRE PRESSURE DETECTOR IDENTIFICATION COPYING METHOD FOR THE SAME
First Named Inventor/Applicant Name:	8031064
Customer Number:	99536
Filer:	Tim Tingkang Xia/Debby Yew
Filer Authorized By:	Tim Tingkang Xia
Attorney Docket Number:	YUHO3002RX/BEU
Receipt Date:	29-AUG-2013
Filing Date:	10-AUG-2012
Time Stamp:	12:05:31
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Foreign Reference	JP2001322411.pdf	6004677	no	13
Warnings:					
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2	Foreign Reference	WO02094588A1.pdf	2923375	no	22
Warnings:					
Information:					
3	Foreign Reference	JP20049859.pdf	7487686	no	37
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4	Foreign Reference	JP300417909.pdf	18017271	no	47
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5	Foreign Reference	TWI381155.pdf	278238	no	7
Warnings:					
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6	Foreign Reference	CN101881699A.pdf	8701011	no	15
Warnings:					
Information:					
7	Foreign Reference	CN1018816998.pdf	7438093	no	13
Warnings:					
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8	Non Patent Literature	TWThirdPartyReExamCommute.pdf	4916327	no	16
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Warnings:					
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13	Non Patent Literature	JP2OA.pdf	2488279	no	6
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14	Non Patent Literature	JP2OAChineseComment.pdf	2090699	no	2
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15	Non Patent Literature	JP2Re.pdf	4010052	no	16
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17	Non Patent Literature	CN1Amen.pdf	7486410	no	16
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18	Non Patent Literature	CN2OA.pdf	544982	no	4
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19	Non Patent Literature	CN2Amen.pdf	6495334	no	14
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20	Non Patent Literature	CN3OA.pdf	4146869	no	6
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21	Non Patent Literature	CN3Amen.pdf	3040059	no	8
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23	Non Patent Literature	CN4Amen.pdf	4497931	no	12
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Information:					
24	Foreign Reference	JP2011031758.pdf	2673203	no	10
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25	Information Disclosure Statement (IDS) Form (SB08)	262239283SIDS.pdf	613423	no	6
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Espacenet

Bibliographic data: JP2001322411 (A) — 2001-11-20

AIR-PRESSURE DETECTING DEVICE AND TIRE CONDITION MONITORING SYSTEM

Inventor(s): TAGUCHI AKIHIRO; OTSUKA MITSUGI ± (TAGUCHI AKIHIRO, ; OTSUKA MITSUGI)

Applicant(s): DENSO CORP ± (DENSO CORP)

Classification: - **International:** ***B60C23/04; G01L17/00; G08C17/02; G08C19/00;*** (IPC1-7): B60C23/04; G01L17/00
- **European:** B60C23/04C; B60C23/04C6D2K9

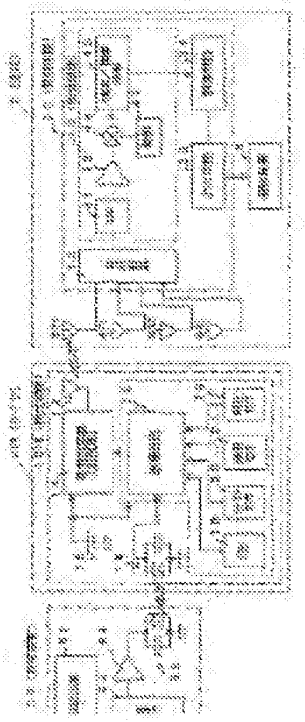
Application number: JP20000140099 20000512

Priority number(s): JP20000140099 20000512

Also published as: JP3632561 (B2)

Abstract of JP2001322411 (A)

PROBLEM TO BE SOLVED: To arbitrarily determine the operation mode of an air-pressure detecting device built in a tire from the external. SOLUTION: In this system having detecting devices 10 respectively built in the tire 4 of each wheel of a vehicle for detecting the air-pressure and periodically radio transmitting the detected air-pressure to monitor a condition of each tire by receiving the radio wave from each detecting device 20 by a receiver on the car body side, each detecting device 10 receives the radio wave of kHz band transmitted from a setting device 50, and determines the self-operation mode on the basis of the received data.; As a result, the consumption of a battery 18 can be reduced by operating the detecting device 10 only when necessary, and the collision of the transmitted radio waves from the detecting device 10 can be prevented by



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arbitrarily determining a transmission interval of the detecting devices 10. As the radio wave transmitted from the setting device has the kHz band, a receiving circuit on the detecting device 10 side can be simplified, and its power consumption can be reduced.

Last updated: 04.12.2012 Worldwide Database 5.7.44.6; 92p

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(19)日本国特許庁（JP）　(12)公開特許公報(A)　(11)特許出願公開番号
特開2001－322411
(P2001－322411A)
(43)公開日　平成13年11月20日(2001.11.20)

(51)Int.Cl.'	識別記号	FI	テーマコード'(参考)
B60C 23/04		B60C 23/04	N 3F065
G01L 17/00		G01L 17/00	D

審査請求　未請求　請求項の数5　OL　(全 11 頁)

(21)出願番号　特願2000－140060(P2000－140060)

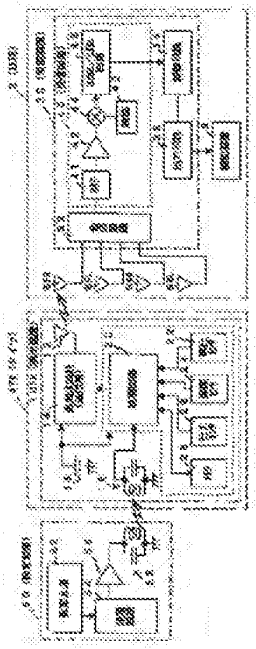
(22)出願日　平成12年5月12日(2000.5.12)

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Fターム(参考)　2F055 AA12 BB20 CC60 DD20 EE40
FF31 FF34 FF38 FF49 GG31
GG49 HH18

(54)【発明の名称】　空気圧検出装置及びタイヤ状態監視システム

(57)【要約】
【課題】　タイヤに組み込まれた空気圧検出装置の動作モードを外部から任意に設定できるようにする。
【解決手段】　車両各車輪のタイヤ4内に、空気圧を検出して無線にて周期的に送信する検出装置10を組み込み、各検出装置10からの電波を車体側の受信装置で受信することにより各タイヤの状態を監視するシステムにおいて、各検出装置10を、設定装置50から送信されたkHz帯の電波を受信し、その受信データに基づき自己の動作モードを設定するように構成する。この結果、検出装置10を必要なときにだけ動作させて電池18の消耗を抑制するとか、検出装置10の送信間隔を任意に設定することにより各検出装置10からの送信電波の衝突を防止する、といったことができる。また設定装置からの送信電波はkHz帯であるので、検出装置10側の受信回路を簡単にしてその電力消費量を低減できる。



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【特許請求の範囲】
【請求項１】　車両のタイヤ内に電力供給用の電池と共に組み込まれ、該タイヤ内の空気圧を検出してその検出結果を無線により車体側の受信装置に送信する空気圧検出装置であって、
タイヤ外部の動作モード設定装置からの送信電波を受信し、動作モード設定用データを復調する受信手段と、
該受信手段にて復調された動作モード設定用データに従い当該装置の動作モードを設定する動作モード設定手段と、
を備えたことを特徴とする空気圧検出装置。
【請求項２】　前記受信手段は、動作モード設定装置から送信されてくるｋＨｚ帯の送信電波を受信するよう構成されていることを特徴とする請求項１記載の空気圧検出装置。
【請求項３】　前記動作モード設定手段は、当該装置の動作モードを、当該装置が空気圧を検出してその検出結果を送信する通常動作を実行する通常モードと、該通常動作を停止する停止モードとの何れかに設定可能であることを特徴とする請求項１又は請求項２に記載の空気圧検出装置。
【請求項４】　前記動作モード設定手段は、当該装置の動作モードとして、前記通常モード時に前記タイヤ空気圧の検出結果を送信する際の送信間隔を設定可能であることを特徴とする請求項３記載の空気圧検出装置。
【請求項５】　請求項１～請求項４の何れかに記載の空気圧検出装置を内蔵した複数のタイヤと、
該各タイヤ内の空気圧検出装置に対して前記動作モード設定用データを送信するために、前記各タイヤに対応して車体側に設けられた複数の動作モード設定装置と、
該複数の動作モード設定装置を介して前記各タイヤ内の空気圧検出装置の動作モードを各々設定すると共に、前記各タイヤ内の空気圧検出装置からの送信電波を受信・復調し、該復調データから前記各タイヤの異常を判定して、異常判定時に警報を発する受信装置と、
を備えたことを特徴とするタイヤ状態監視システム。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、車両のタイヤ内に組み込まれ、タイヤ内の空気圧を検出してその検出結果を車体側の受信装置に無線で送信する空気圧検出装置、及び、その空気圧検出装置を用いたタイヤ状態監視システムに関する。
【０００２】
【従来の技術】従来より、空気注入タイプのタイヤを備えた車両には、走行時の安全性を高めるために、タイヤ内に、空気圧や空気圧の異常を検出して、車体側の受信装置に無線で報知する空気圧検出装置を内蔵したものが知られている。また空気圧検出装置は、車体側より電力を供給することが困難であることから、通常、電力供給用の電池を備えている。そして、このように空気圧検出装置と共にタイヤ内に組み込まれる電池は、消耗した際に交換することは極めて困難である。
【０００３】そこで、この種の空気圧検出装置においては、従来より、例えば下記①～④のように消費電力を低減して電池の寿命を延ばすための各種提案がなされている。
①　タイヤ（車輪）の回転状態を検出し、タイヤの回転停止時（停車時）には、空気圧を検出して検出結果を送信する間隔を、車両走行時よりも長くすることにより、空気圧検出用のセンサや送信用回路で消費される電力を低減する（特表平１０－５０４７８３号公報参照）。
【０００４】②　タイヤ内の空気圧が所定レベル以下に低下したときに、送信用回路を動作させて検出結果を送信することにより、送信用回路での消費電力を低減する。
③　タイヤの空気圧が所定レベル以上になったときに、空気圧検出用のセンサ及び送信用回路への給電を開始することにより、タイヤが車両に組み付けられるまでの間の電力消費をなくす（特開平９－４８２２０号公報参照）。
【０００５】④　タイヤ毎に空気圧検出装置の起動間隔を設定しておき、空気圧検出装置が、内部タイマによって、所定時間間隔で起動するようにする（特許公報第２６３９８５６号参照）。
【０００６】
【発明が解決しようとする課題】上記①～④の技術は、空気圧の検出及び検出結果の送信といった通常動作を周期的に実行させるか或いは空気圧の検出が不要なときに通常動作を停止させることにより、空気圧検出装置での電力消費量を低減するものであるが、上記のような対策では、夫々、下記のような問題があり、タイヤの異常判定精度を確保しつつ消費電力を充分低減することはできなかった。
【０００７】即ち、①の技術では、空気圧検出装置は、タイヤが車両に組み付けられる前（換言すれば空気圧の検出が不要なとき）に、通常動作を実行することから消費電力を充分低減することができない。また、②の技術では、タイヤの空気圧が低下したとき（換言すればタイヤに異常が発生したとき）にだけ、その旨を報知するための送信動作を実行することから、③の技術に比べて消費電力を低減することはできるものの、空気圧検出装置が故障した場合に、車体側の受信装置にてその旨を検出することができず、タイヤの異常判定精度（換言すれば装置の信頼性）が低下する。
【０００８】また、④の技術では、タイヤが車両に組み付けられるまでの間は、消費電力を低減することができるが、タイヤが車両に組み付けられると、通常動作を開始することから、例えば、製造後の車両輸送時等、タイヤ空気圧の検出が不要なときに無駄な電力を消費してし

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まうことになり、上記⑩と同様、消費電力を充分低減することができない。

【0009】一方、⑪の技術は、車両の各タイヤ内に組み込まれた空気圧検出装置が夫々異なる周期で通常動作を実行するように構成することにより、各空気圧検出装置からの送信電波が混信するのを防止できるようにしたものであるが、各空気圧検出装置は、製造後（或いはタイヤが車両に組み付けられた後）、通常動作を周期的に実行することから、上記⑩、⑨の技術と同様、消費電力を充分低減することはできない。

【0010】また、⑫の技術では、混信防止のために各空気圧検出装置の通常動作の実行間隔（換言すれば検出データの送信間隔）を互いに異なる周期に設定するが、このためには、空気圧検出装置の製造時にその送信間隔を設定しておかなければならず、しかも、タイヤを車両に組み付ける際には、送信間隔が異なるタイヤを選んで車両に組み付けなければならない。このため、空気圧検出装置を製造してタイヤに組み込み更にそのタイヤを車両に組み付けるまでの空気圧検出装置の管理が極めて面倒になる。また、⑫の技術では、車両のタイヤを新しいものに交換する際にも、送信間隔が異なる空気圧検出装置が組み込まれたタイヤを組み合わせなければならず、タイヤ交換時の作業性も低下する。

【0011】本発明は、こうした問題に鑑みなされたものであり、タイヤに組み込まれた空気圧検出装置の動作モードを外部から任意に設定できるようにすることにより、空気圧検出装置での電力消費を必要最小限に抑え、且つ、その管理を容易に行えるようにすることを目的とする。

【0012】

【課題を解決するための手段】かかる目的を達成するためになされた請求項1記載の空気圧検出装置においては、動作モード設定装置から動作モード設定用データにて変調した送信電波を送信すると、受信手段が、その電波を受信して動作モード設定用データを復調し、動作モード設定手段が、その復調された動作モード設定用データに従い当該空気圧検出装置の動作モードを設定する。

【0013】このため、本発明の空気圧検出装置によれば、例えば、空気圧の検出及びその検出結果の送信といった通常動作が不要なときに、その動作を停止させて、電池の寿命を延ばすとか、或いは、上記⑫の従来技術のように、車両に組み付けられたタイヤ毎に空気圧検出装置からの検出結果の送信周期を異なる周期に設定する、といったことが、タイヤへの組み付け後（或いはそのタイヤの車両への組み付け後）に簡単に行うことができる。

【0014】またこのように動作モードを変更できることから、空気圧検出装置の製造時に、空気圧検出装置が組み付けられるタイヤの種類やそのタイヤが組み付けられる車両の種類等に応じて、空気圧検出装置の動作モードを設定する必要がなく、空気圧検出装置の生産性を向上することもできる。

【0015】ここで、動作モード設定用の送信電波を受信する受信手段の受信周波数としては、請求項2に記載のように、kHz帯（換言すれば超長波（VLF）～中波（MF））の比較的低い周波数を設定するとよい。つまり、データ通信には、kHz帯以外にも、kHz帯よりも周波数が高いMHz帯（換言すれば短波（HF）～極超短波（UHF））や、これよりも更に周波数が高いGHz帯（換言すればマイクロ波）を使用することができる。しかし、MHz帯或いはGHz帯の送信電波を受信してその受信信号の中から動作モード設定用データを復調するには受信手段を構成する受信・復調回路が複雑になり、空気圧検出装置のコストアップになる。また、例えば、MHz帯の受信信号から動作モード設定用データを復調するには、受信信号の周波数が高すぎるので、一旦中間周波信号に周波数変換する必要があるが、このためには、受信手段に周波数変換回路を設けなければならず、受信手段による電力消費量が増大して、電池の寿命を延ばすことができなくなる。

【0016】これに対して、kHz帯の受信信号から動作モード設定用データを復調する場合には、受信信号自体の周波数が低いので、受信信号をそのまま検波し（必要に応じて増幅した後）、検波後の信号を波形整形するようにすれば、動作モード設定用データを復元することができることから、受信手段による電力消費量を充分低減することができる。よって、受信手段を請求項2に記載のように構成すれば、受信手段の消費電力を少なくして、受信手段を設けたことにより電池の寿命が短くなるのを防止できる。

【0017】尚、本発明の空気圧検出装置は、タイヤ内の空気圧を検出してその検出結果を無線にて送信するものであるため、より具体的には、空気圧検出手段や送信手段が設けられることになるが、この送信手段が検出結果を送信するのに使用する搬送波（送信電波）には、MHz帯の信号を使用するとよい。これは、MHz帯の電波は、kHz帯に比べて少ない送信電力で到達距離を確保することができ（換言すれば、車体側の受信装置に検出結果を送信するのに要する消費電力を低減できる）、しかも、GHz帯の電波のように、車体側の受信装置との間に存在する遮蔽物によって反射し、送信電波が受信装置に届かなくなるのを防止できるためである。

【0018】また、本発明の空気圧検出装置において、空気圧の検出及びその検出結果の送信といった通常動作を必要なときにだけ実行させるには、請求項3に記載のように、動作モード設定手段を、当該装置の動作モードとして、通常動作を実行する通常モードと、通常動作を停止する停止モードとの何れかに設定できるように構成すればよく、更に、車両に組み付けられたタイヤ毎に空気圧検出装置からの検出結果の送信周期を異なる周期に

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設定して、各空気圧検出装置からの送信電波が混信するのを防止できるようにするためには、請求項4に記載のように、動作モード設定手段を、当該装置の動作モードの一つとして、通常モード時に空気圧の検出結果を送信する際の送信間隔を設定できるように構成すればよい。

【0019】一方、請求項5に記載の発明は、車両に設けられる複数のタイヤに、上述した請求項1～請求項4の何れかに記載の空気圧検出装置を組み込み、車体に設けられた受信装置側で、各空気圧検出装置からの送信電波に基づき各タイヤの状態を監視し、タイヤに異常が発生したときには警報を発するようにしたタイヤ状態監視システムである。そして、このタイヤ状態監視システムには、各タイヤ毎に個々に動作モード設定用データを送信できるようにするために、動作モード設定装置を各タイヤ毎に設け、受信装置が、各動作モード設定装置を介して、各タイヤ内の空気圧検出装置の動作モードを個々に設定するようにされている。

【0020】このため、この請求項5に記載のタイヤ状態監視システムによれば、受信装置側で、例えば、車両の原動源（エンジン等）が始動された際に、各タイヤの空気圧検出装置を通常モードに設定し、車両の原動源が停止された際に、空気圧検出装置を停止モードに設定する、といったことができる。

【0021】また、受信装置側で、例えば、各動作モード設定装置を順に動作させて、それに対応した空気圧検出装置から予め設定された識別コードを送信させることにより、その識別コードを送信してきた空気圧検出装置が車両のどこのタイヤに組み込まれているかを判定する、といったこともできる。そして、この場合には、各空気圧検出装置からの送信電波を受信・復調することにより得られる復調データから、タイヤ空気圧の異常を判定した際に、そのタイヤを特定することができ、車両に対しては、タイヤの異常をその位置を表す情報を付与して報知することが可能となる。

【0022】

【発明の実施の形態】以下に本発明の実施の形態について説明する。図1は本発明が適用された実施例のタイヤ状態監視システム（以下単に監視システムという）全体の構成を表す説明図であり、（a）は、監視システムを搭載した車両（自動車）2を左側から見た構成要素の配置図、（b）は同じく車両2を上方より見た構成要素の配置図、（c）はタイヤ4の断面図である。

【0023】図1に示す如く、本実施例の監視システムは、車両2の前後左右の車輪（左前輪：FL、右前輪：FR、左後輪：RL、右後輪：RR）を構成する空気注入タイプのチューブレスタイヤ（以下単にタイヤという）4FL、4FR、4RL、4RRの内部に組み込まれた空気圧検出装置（以下単に検出装置という）10FL、10FR、10RL、10RRを備える。

【0024】各検出装置10（詳しくは10FL～10RR）は、各タイヤ4（詳しくは4FL～4RR）内の空気圧を検出して、その検出結果を無線にて車体側の受信装置30に送信するものであり、図1（c）に示すように、タイヤ4への空気注入用のバルブ部4bと共に、タイヤ4のリム4aに固定されている。

【0025】また、車体側で各タイヤ4の近傍には、タイヤ4内の検出装置10から送信されてくる所定周波数帯（本実施例ではMHz帯；例えば314MHz）の電波を受信する受信用のアンテナ6FL、6FR、6RL、6RRが設けられている。そして、受信装置30は、これら各アンテナ6（詳しくは6FL～6RR）を介して各検出装置10からの送信電波を受信し、その受信信号を復調することにより、各タイヤ4の空気圧状態を監視し、タイヤ4の空気圧が設定範囲を外れると、そのタイヤ4に異常が生じたものとして、運転席近傍に設けられた報知装置8（例えば、ブザー、スピーカ等の音声発生手段、或いは、LED等の警報ランプや液晶ディスプレイ等の表示装置）を駆動することにより警報を発生し、タイヤ4に異常が生じた旨を乗員に報知する。

【0026】次に、検出装置10及び受信装置30は、夫々、図2に示す如く構成されている。尚、図2には、右前輪のタイヤ4FR内に設けられた検出装置10FRが記載されているが、他の車輪の検出装置10FL、10RL、10RRもこれと全く同様に構成されている。

【0027】図2に示すように、検出装置10は、タイヤ4内の空気圧の状態を表す検出データにてMHz帯の搬送波を変調（例えばFM変調）することにより、送信用のアンテナ12を介して、検出データを受信装置30側に無線にて送信するための高周波回路14と、この高周波回路14を駆動して検出データを送信させる処理回路20と、これら各回路に電源供給を行う電池18とを備える。

【0028】処理回路20には、タイヤ4内の空気圧を検出する圧力センサ26に加えて、タイヤ4内の温度を検出する温度センサ24、電池18から供給される電源電圧を検出する電圧センサ22が接続されており、処理回路20は、これら各センサからの検出信号に基づきタイヤ4内の空気圧状態や電池の状態を表す検出データを生成し、これを高周波回路14から出力させる。

【0029】また、処理回路20は、周知のマイクロコンピュータを中心に構成されており、高周波回路14から検出データを送信させる際には、メモリ28から検出装置固有の識別情報（以下単にIDという）を読み取り、読み取ったIDを検出データに付与して、高周波回路14に出力する。また、メモリ28には、上記IDに加えて、検出データの送信間隔（周期）が記憶されており、処理回路20は、その記憶された送信間隔に従って、高周波回路14から周期的に検出データを送信させる。

【0030】また次に、処理回路20には、外部の動作

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モード設定装置（以下単に設定装置という）５０から送信されてくる所定周波数帯（本実施例ではｋＨｚ帯；例えばｋＨｚ）の電波を受信するためのアンテナ１６が接続されている。そして、処理回路２０は、このアンテナ１６にて設定装置５０からの送信電波が受信されると、その受信信号を復調することにより、設定装置５０が送信してきた動作モード設定用データ（以下単に設定データという）を復調し、この設定データに基づき、自己の動作モードを設定する。

【００３１】尚、処理回路２０は、自己の動作モードを、上記各センサを動作させて検出信号を取り込み、送信用の検出データを生成して、高周波回路１４から送信させる通常動作（検出・送信動作）を行う通常モードと、通常モード時に行う検出・送信動作を停止する停止モードとの何れかに設定できるようにされており、また、メモリ２８に記憶された送信間隔（周期）やＩＤについても更新できるようにされている。また、処理回路２０，電圧センサ２２，温度センサ３４，圧力センサ２６，及びメモリ２８は、１チップのカスタムＩＣとして一体化されている。

【００３２】次に、受信装置３０には、各タイヤ４の近傍に設けられた受信用アンテナ６からの受信信号を合成する合成回路３２、及び、この合成回路３２を介して受信信号を取り込み、各タイヤ４内の検出装置１０が送信してきた検出データを復調する受信回路４０が備えられている。

【００３３】受信回路４０は、合成回路３２にて合成された受信信号のうち、各タイヤ４側の検出装置１０が送信してくる所定周波数帯（ＭＨｚ帯）の信号のみを通過させるバンドパスフィルタ（ＢＰＦ）４１を備え、ＢＰＦ４１を通過した受信信号を、増幅回路４２で所定レベルまで増幅した後、ミキサ回路４４に入力する。ミキサ回路４４は、増幅回路４２で増幅された受信信号と発振回路４３が発生した一定周波数の高周波信号とを混合することにより、受信信号を中間周波信号に周波数変換するためのものである。そして、このミキサ回路４４にて周波数変換後された受信信号は、検波／復調回路４５に入力され、検波／復調回路４５にて、各タイヤ４側の検出装置１０が送信してきた検出データが復元される。

【００３４】また、受信回路４０（詳しくは検波／復調回路４５）で復調された検出データは、制御回路３４に入力される。すると、制御回路３４は、受信回路４０から入力された検出データに基づき、各タイヤ４内の空気圧や電池電圧は予め設定された設定範囲内にあるか否かを判断し、空気圧が設定範囲から外れていたり、或いは電池電圧が設定範囲よりも低下していると、その旨を表す警報信号を出力回路３６に出力することにより、出力回路３６を介して、外部の報知装置８を動作させる。

【００３５】次に、検出装置１０（詳しくは処理回路２０）の動作モードを設定するための設定装置５０は、車両２やタイヤ４とは別体で構成されており、例えば、検出装置１０，タイヤ４，若しくは車両２の製造工場や、その車両２を販売する販売会社等で使用されるものである。

【００３６】そして、設定装置５０は、使用者による外部操作若しくは外部情報機器から入力される指令信号に基づき、対象となる検出装置１０に対する設定データを生成する設定回路５２と、設定回路５２にて生成された設定データにより送信用の搬送波（周波数：ｋＨｚ帯）を変調（本実施例ではＡＭ変調；所謂ＡＳＫ）することによりｋＨｚ帯の送信信号を生成する処理回路５４と、この処理回路５４から出力される送信信号を増幅する増幅回路５６と、増幅回路５６にて増幅された送信信号を放射する送信用のアンテナ５８とから構成されている。

【００３７】ここで、設定装置５０（詳しくは設定回路５２）で生成される設定データは、図３（ａ）に示すように、「スタート」、「コマンド種類」、「コマンド」といった情報を組み合わせたものであり、設定データの送信時、設定回路５２は、まず、「スタート」情報として一定時間（例えば５ｍｓｅｃ．）Ｈｉｇｈレベルとなる信号を出力し、その後「スタート」情報の送信時間よりも短い一定のブランク時間が経過した後、所定ビット（本実施例では３ビット）の「コマンド種類」情報、及び、所定ビット（本実施例では４ビット又は８ビット）の「コマンド」情報を、一定周期で順に出力する。

【００３８】尚、「スタート」情報は、検出装置１０に設定データの送信開始を知らせるためのものであり、「コマンド種類」情報は、設定しようとする動作モードの種別を指定するためのものである。また、「コマンド」情報は、「コマンド種類」が設定内容を詳細に指定する必要のあるものである場合に、その内容を指令するためのものである。

【００３９】そして、本実施例では、図３（ｂ）に示すように、例えば、検出装置１０の動作モードを通常モードに設定する際の「コマンド種類」情報は「０００」、停止モードに設定する際の「コマンド種類」情報は「１１１」、検出装置１０のＩＤを設定する際の「コマンド種類」情報は「１１０」、検出装置１０からの検出データの送信間隔を設定する際の「コマンド種類」情報は「００１」、というように、予め設定されている。

【００４０】また、ＩＤや送信間隔を設定する際には、その設定内容を指令する必要があるため、「コマンド種類」情報が「００１」又は「１１０」である場合には、「コマンド」情報が付与されることになるが、この「コマンド」情報としては、送信間隔設定時には４ビットの２値データが使用され、ＩＤ登録時には８ビットの２値データが使用される。従って、本実施例では、各検出装置１０の送信間隔を１６種類の何れかに設定でき、各検出装置１０のＩＤを２５６種類の何れかに設定できることになる。

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【００４１】因みに、図３（ｂ）では、右前輪の検出装置１０FRの送信間隔を例えば７０sec.に設定するための「コマンド」情報として「０００」を使用し、左前輪の検出装置１０FLの送信間隔を例えば７１sec.に設定するための「コマンド」情報として「０００１」を使用し、右後輪の検出装置１０RRの送信間隔を例えば７２sec.に設定するための「コマンド」情報として「００１０」を使用し、左後輪の検出装置１０RLの送信間隔を例えば７３sec.に設定するための「コマンド」情報として「００１１」を使用することを表している。

【００４２】また、本実施例では、送信間隔設定用の設定データは、検出装置１０から新たに設定した送信間隔で複数回ＩＤを送信させる指令も兼ねており、この設定データを受信した検出装置１０は、設定データに従いメモリ２８内の送信間隔を更新した後、その送信間隔で自己のＩＤを複数回送信する。

【００４３】このため、本実施例の監視システムによれば、例えば、検出装置１０（換言すればタイヤ４）を車両に組み付けた後、設定装置５０を用いて、各車輪毎に検出装置１０の送信間隔を設定して、各検出装置１０から順にＩＤを送信させ、そのとき、車体側の受信装置３０を動作させて、ＩＤを送信している検出装置１０が車両のどの車輪位置であるかを指定するようにすれば、受信装置３０側で、検出データに付与されたＩＤと車輪位置との対応を認識できるようになり、その後、受信装置３０が、各検出装置１０から送信されてきた検出データに基づきタイヤ4の異常を判定した際に、異常が発生したタイヤ4を特定して、その旨を報知することができるようになる。

【００４４】一方、上記のように、本実施例では、設定装置５０から設定データを送信することによって各検出装置１０の動作モードを個々に設定できるようにしているため、各検出装置１０には、本発明の受信手段として、上述したアンテナ１６に加えて、アンテナ１６からの受信信号を検波・復調することにより設定データを復元する受信回路が備えられている。

【００４５】図４（ａ）に示すように、受信回路は、受信アンテナ１６からの受信信号を検波する検波回路２０ａと、検波後の受信信号を増幅する増幅回路２０ｂと、増幅後の受信信号が矩形波（２値信号）となるように波形整形する波形整形回路２０ｃとから構成されており、マイクロコンピュータを含む他の信号処理用回路と共に処理回路２０内に組み込まれている。そして、この受信回路は、波形整形後の受信信号（２値信号）をマイクロコンピュータに入力する。

【００４６】尚、検波回路２０ａは、受信信号の入力経路に設けられた検波用のダイオードＤ１と、ダイオードＤ１の出力（カソード）とグランドラインとの間に設けられたコンデンサＣ２及び抵抗Ｒ１の並列回路とから成り、受信信号を包絡線検波する。周知の包絡線検波回路にて構成されている。

【００４７】また、増幅回路２０ｂは、反転入力端子が抵抗Ｒ２を介して検波回路２０ａの出力に接続され、反転入力端子と出力端子とが抵抗Ｒ３を介して接続され、非反転入力端子がグランドラインに接置されたオペアンプＯＰ１からなる、周知の反転増幅回路にて構成されている。

【００４８】また、波形整形回路２０ｃは、増幅回路２０ｂからの出力を反転入力端子に受け、非反転入力端子に、電源電圧Ｖｃｃを分圧する可変抵抗ＶＲからの分圧電圧を基準信号Ｖｔｈとして受けることにより、増幅回路２０ｂからの出力（受信信号）と基準信号Ｖｔｈとを大小比較する、周知のコンパレータＣＭＰ１にて構成されている。

【００４９】また、設定装置５０からの送信電波を受信してその受信信号を受信回路に入力するアンテナ１６は、検出装置１０から送信されてくるｋＨｚ帯の電波を受信できればよいため、本実施例では、コイルＬ１とコンデンサＣ１とからなる共振アンテナが使用されている（設定装置５０側の送信用のアンテナ５８も同様である）。

【００５０】このように構成された検出装置１０においては、図４（ｂ）に示すように、設定装置５０から、Ｈｉ or Ｌｏ の２値信号である設定データにてＡＭ変調されたｋＨｚ帯の電波が送信され、アンテナ１６周囲の磁界強度がその電波に応じて変化すると、アンテナ１６を構成するコイル（アンテナコイル）Ｌ１に、送信電波に応じた誘導電圧が発生し、この誘導電圧が、受信信号として、処理回路２０内の受信回路に入力される。すると、受信回路では、その受信信号が、検波回路２０ａにて包絡線検波された後、増幅回路２０ｂにて所定レベルまで増幅され、その後、波形整形回路２０ｃにて、受信信号と基準信号Ｖｔｈとが大小比較されることにより、設定装置５０にて生成された設定データと略同じ２値信号が復元される。

【００５１】従って、処理回路２０内のマイクロコンピュータには、設定装置５０が送信してきた設定データと略同じ信号が入力されることになり、マイクロコンピュータ側では、この信号をサンプリングすることにより、設定データを読み取ることができる。

【００５２】次に処理回路２０内のマイクロコンピュータは、動作モードとして通常モードが設定されているときに、上述した空気圧、温度、電池電圧の検出及び検出結果の送信を行う検出・送信処理を実行する他、上述した受信回路からの設定データの入力状態を監視し、設定データが入力されると、その設定データに従い、検出装置１０の動作モードを設定する、動作モード設定手段としての処理（動作モード設定処理）を実行する。以下、この処理を図５に示すフローチャートに沿って詳しく説明する。

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【００５３】図５に示す如く、動作モード設定処理は、処理回路２０内のマイクロコンピュータにおいて繰り返し実行される処理であり、処理が開始されると、まずステップ１１０（以下、ステップをＳと記載する）にて、上述の受信回路からの入力が所定時間以上Ｈｉｇｈレベルになったか否か（換言すれば、設定データを構成する「スタート」情報が受信されたか否か）を判断することにより、外部の設定装置５０から設定データが送信されてくるのを待つ。そして、Ｓ１１０にて、設定データが送信されてきたと判断されると、続くＳ１２０にて、その設定データを構成する「コマンド種別」情報を読み取り、その内容を識別する。

【００５４】次に、Ｓ１３０では、Ｓ１２０による識別結果に基づき、今回受信した設定データは通常モード設定用であるか否かを判断する。そして、設定データが通常モード設定用であれば、Ｓ１４０に移行して、空気圧状態の検出及び送信を行う検出・送信処理を起動することにより、当該検出装置１０の動作モードを「通常モード」に設定した後、再度Ｓ１１０に移行し、そうでなければＳ１５０に移行する。

【００５５】Ｓ１５０では、Ｓ１２０による識別結果に基づき、今回受信した設定データは停止モード設定用であるか否かを判断する。そして、設定データが停止モード設定用であれば、Ｓ１５０に移行して、通常モード時に実行する検出・送信処理を停止させることにより、当該検出装置１０の動作モードを「停止モード」に設定した後、再度Ｓ１１０に移行し、そうでなければ、続くＳ１７０に移行する。尚、Ｓ１３０及びＳ１５０の判定処理、並びに、Ｓ１４０及びＳ１６０による検出・送信処理の起動及び停止動作は、本実施例において請求項３に記載の発明を実現するものである。

【００５６】次に、Ｓ１７０では、Ｓ１２０による識別結果に基づき、今回受信した設定データは送信間隔設定用であるか否かを判断する。そして、設定データが送信間隔設定用であれば、上述した送信間隔設定及びＩＤ送信のための処理（Ｓ１８０～Ｓ２１０）を実行した後、再度Ｓ１１０に移行し、そうでなければ、Ｓ２３０に移行する。

【００５７】また、Ｓ２２０では、今回受信した設定データはＩＤ設定用であるか否かを判断し、設定データがＩＤ設定用であれば、ＩＤ設定のための処理（Ｓ２３０，Ｓ２４０）を実行した後、再度Ｓ１１０に移行し、そうでなければ、そのままＳ１１０に移行する。

【００５８】尚、Ｓ１７０にて、今回受信した設定データが送信間隔設定用であると判断された場合に実行されるＳ１８０～Ｓ２１０の処理では、まず、設定データに付与された「コマンド」情報を読み取り（Ｓ１８０）、その読み取った「コマンド」情報から、予め設定されたマップ等を参照することにより、送信間隔を算出し（Ｓ１９０）、その算出した送信間隔を今後通常モード時に検出データを送信する際の送信間隔として、メモリ２８内の送信間隔を更新し（２００）、最後に、メモリ２８から自己のＩＤを読み取り、高周波回路１４に出力することにより、高周波回路１４から、更新後の新たな送信間隔にて複数回ＩＤを送信させる（Ｓ２１０）、といった手順で、送信間隔の設定及びＩＤ送信がなされる。

【００５９】また、Ｓ２３０にて今回受信した設定データがＩＤ設定用であると判断された場合に実行されるＳ２３０及びＳ２４０の処理では、まず、設定データに付与された「コマンド」情報を読み取り（Ｓ２３０）、その読み取った「コマンド」情報（本実施例ではｎビットの２値データ）を、自己のＩＤとして、メモリ２８内のＩＤを更新する（２４０）、といった手順でＩＤ設定のための処理がなされる。

【００６０】そして、上記のように送信間隔の設定のために実行されるＳ１７０の判定処理及びＳ１８０～Ｓ２１０の処理は、本実施例において請求項４に記載の発明を実現するものである。以上説明したように、本実施例の監視システムにおいては、タイヤ４の状態（空気圧・温度）及びタイヤ４に組み込まれた電池１８の状態を検出して、その検出結果を無線にて送信する検出装置１０が、外部の設定装置５０からｋＨｚ帯の電波に乗せて送信されてくる設定用データを受信・復調し、その設定データに従い、自己の動作モードを自動で切り替えるようにされている。

【００６１】また、設定データにて切り替え可能な動作モードには、予め、空気圧等の検出及び検出結果の送信を行う通常動作を実行する通常モードと、通常動作を停止する停止モードと、通常モード時に検出結果を送信する送信間隔を設定して設定後の送信間隔でＩＤを複数回送信する送信間隔設定モードと、通常モード時に検出結果を送信する際に付与するＩＤを更新するＩＤ設定モードとが設定されている。

【００６２】このため、本実施例の監視システムによれば、検出装置１０の通常動作が不要なときに、その動作を停止させて、電池１８の寿命を延ばすとか、タイヤ４を車両に組み付けた後、各タイヤ４内の検出装置１０のＩＤを、受信装置３０側でタイヤ位置を識別可能な所望のＩＤに設定するとか、或いは、検出装置１０が検出データを送信する際の送信間隔をタイヤ４毎に異なる値に設定することにより、各検出装置１０からの送信電波が衝突するのを防止する（詳しくは衝突の確率を低下させる）、といったことを極めて簡単に行うことができる。

【００６３】またこのように検出装置１０の動作モードをいつでも変更できることから、検出装置１０や、これを組み付けたタイヤ４、或いは、このタイヤ４が組み付けられる車両２の製造時に、検出装置１０毎に設定されるＩＤや検出データの送信間隔等を管理する必要がなく、これらの生産性を向上することもできる。

【００６４】また特に、本実施例では、請求項２に記載

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の発明を適用することにより，検出装置１０の動作モードを設定するのに使用する搬送波の周波数をｋＨｚ帯に設定していることから、検出装置１０に設ける受信回路を、図４に示したような検波回路２０ａ，増幅回路２０ｂ，波形整形回路２０ｃ等からなる極めて簡単な回路構成とすることができる。そして、この受信回路は、受信装置３０側でＭＨｚ帯の電波を受信・復調する受信回路４０のように，受信信号を周波数変換する必要がないので、受信回路での消費電力を抑えることができ，延いては、電池１８の寿命が短くなるのを防止できる。

【００６５】以上、本発明の一実施例について説明したが，本発明は、上記実施例に限定されるものではなく、種々の態様を採ることができる。例えば、上記実施例では、設定装置５０は、車両２とは別体で構成されているものとして説明したが、上記実施例の監視システムに請求項４記載の発明を適用することにより、車両の各タイヤ４の近傍に、検出データ受信用のアンテナ６だけでなく，設定装置５０（設定装置５０の送信用アンテナ５８だけでもよい）を配置し、各設定装置５０（又はアンテナ５８）と受信装置３０とを接続して、受信装置３０側から各タイヤ４に対応した設定装置５０（又はアンテナ５８）に動作モード設定用の信号を出力することにより，受信装置３０側で各検出装置１０の動作モードを設定できるようにしてもよい。

【００６６】そしてこの場合、例えば、受信装置３０側で、図６に示すフローチャートに沿って各検出装置１０の動作モードを制御するようにすれば，検出装置１０側での電力消費をより良好に低減することが可能となる。即ち、図６に示すように、受信装置３０側では、Ｓ３１０にて、車両のエンジンを始動するために運転者がイグニッションスイッチＩＧをオフからオンに切り替えたか否かを判断することにより，イグニッションスイッチＩＧがオンされるのを待ち，イグニッションスイッチＩＧがオンされると、各タイヤ４の近傍に夫々配置された設定装置５０（５０ＦＲ，５０ＦＬ，５０ＲＲ，５０ＲＬ）から、右前輪ＦＲ、左前輪ＦＬ、右後輪ＲＲ、左後輪ＲＬの順に、対応する検出装置１０（詳しくは、１０ＦＲ～１０ＲＬ）に対して、その動作モードを「停止モード」から「通常モード」に切り替えるための起動コマンド（例えば，図３（ｂ）に示したコマンド種別「０００」の設定データ）を送信させる（Ｓ３２０，Ｓ３５０，Ｓ３８０，Ｓ４１０）。

【００６７】また，各検出装置１０は、通常モード時には，自己のＩＤを付与した検出データを送信してくるので，上記各ステップにて起動コマンドを送信した後は、起動コマンドを送信した検出装置１０からのＩＤが受信回路４０で受信されるのを待ち（Ｓ３３０，Ｓ３６０，Ｓ３９０，Ｓ４２０），ＩＤが受信されると、その受信ＩＤを、今回起動コマンドを送信させた設定装置５０の配置位置（ＦＲ，ＦＬ，ＲＲ，ＲＬ）を表す情報として、図示しないメモリに登録する（Ｓ３４０，Ｓ３７０，Ｓ４００，Ｓ４３０）。

【００６８】つまり、イグニッションスイッチＩＧがオンされた直後には、各タイヤ４毎に、設定装置５０から順に起動コマンドを送信させることにより，各タイヤ４内の検出装置１０を「通常モード」に起動させ，その起動直後に送信されるＩＤを受信することにより，各タイヤ４内の検出装置１０が送信してくるＩＤとその検出装置１０が組み込まれたタイヤ４の位置とを対応付けるのである。

【００６９】そして，このように各タイヤ４内の検出装置１０を起動すると，今度は，Ｓ４４０に移行して，各タイヤ４の検出装置１０から互いに異なる周期で定期的に送信されてくる検出データを受信し，その検出データからタイヤ４の空気圧状態及び電池１８の消耗状態を監視し，異常時には，その旨を乗員に報知するデータ受信処理を開始する。

【００７０】また，Ｓ４４０でのデータ受信処理の実行中には，イグニッションスイッチＩＧがオンからオフに切り替えられたか否かを判断することにより，車両のエンジンが停止したどうかを監視する判定処理（Ｓ４５０）を実行する。そして，この判定処理にて，エンジンが停止した（換言すれば車両が停車状態になった）と判断されると，データ受信処理を終了し，続くＳ４６０にて，各タイヤ４毎に設けられた設定装置５０から一斉に停止コマンド（例えば，図３（ｂ）に示したコマンド種別「１１１」の設定データ）を送信させることにより，各タイヤ４内の検出装置１０の動作モードを「停止モード」に切り替え、当該処理を終了する。

【００７１】このように，受信装置３０が，車両に搭載された設定装置５０を使って，各タイヤ４内の検出装置１０の動作モードを切り替えるようにすれば，検出装置１０は，車両に搭載されたエンジンの運転中にだけ通常動作（検出・送信処理）を実行し，それ以外のときは，通常動作を停止することになるので，タイヤ４内の電池１８の消耗をより良好に抑制できることになる。

【００７２】また，図６に示したフローチャートでは，エンジンの始動と共に各検出装置１０を通常モードに起動させるだけでなく，起動後に各検出装置１０が送信してくるＩＤを読み込み，これを各検出装置１０の配置位置と関連づけて記憶するため，例えば，タイヤ４が交換されたとしても，受信装置３０側では，そのタイヤ４内に組み込まれた検出装置１０が送信してくるＩＤとタイヤ位置との対応を把握することができる。よって，Ｓ４４０のデータ受信処理では，タイヤ４若しくは電池１８の異常を判定した際に，メモリに記憶した受信ＩＤから異常が発生したタイヤの位置を識別して，そのタイヤ位置を表す情報を付与した警報を発することができるようになり，タイヤ４の異常警報装置としての機能を向上できる。

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【００７３】一方、上記実施例では、各検出装置１０からの送信電波を受信するアンテナ６は、各検出装置１０が組み付けられたタイヤ４の近傍に夫々設けるものとして説明したが、このアンテナ６は、受信装置３０近傍に１個だけ設け、各検出装置１０からの送信電波を１個のアンテナ６を使って受信するようにしてもよい。但しこの場合は、タイヤ４毎にアンテナ６を設ける場合に比べて、受信感度の高いアンテナ６を使用する必要はある。

【００７４】また、上記実施例では、各検出装置は、検出結果をそのまま送信するものとして説明したが、検出装置は、タイヤ４の空気圧状態を表す情報を送信できればよいため、例えば、空気圧と温度とから空気圧の異常を判定し、その判定結果を検出データとして送信するように構成してもよい。そしてこの場合には、受信装置側で各タイヤ４の異常を判定する必要がないので、受信装置側の処理の負担を軽減できる。

【図面の簡単な説明】

【図１】　実施例の監視システム全体の構成を表す説明図である。

【図２】　検出装置、受信装置、及び設定装置の構成を表すブロック図である。

【図３】　設定装置が検出装置に送信する動作モード設定用データの構成及びその種類を説明する説明図である。

【図４】　検出装置側で動作モード設定用の電波を受信する受信回路の構成及びその動作を説明する説明図である。

【図５】　検出装置にて実行される動作モード設定処理を表すフローチャートである。

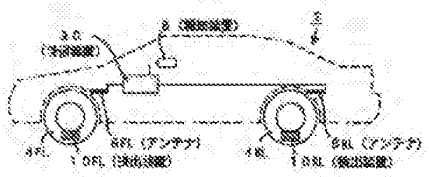
【図６】　受信装置が設定装置を介して検出装置の動作モードを設定する場合の処理手順の一例を表すフローチャートである。

【符号の説明】

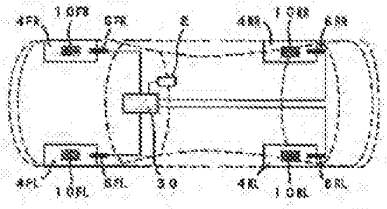
４…タイヤ、８…報知装置、１０…検出装置（空気圧検出装置）、１２…アンテナ（送信用）、１４…高周波回路（送信用）、１６…アンテナ（受信用）、１８…電池、２０…処理回路、２０ａ…検波回路、２０ｂ…増幅回路、２０ｃ…波形整形回路、２２…電圧センサ、２４…温度センサ、２６…圧力センサ、２８…メモリ、３０…受信装置、３４…制御回路、３６…出力回路、４０…受信回路、５０…設定装置（動作モード設定装置）、５２…設定回路、５４…処理回路、５６…増幅回路。

【図１】

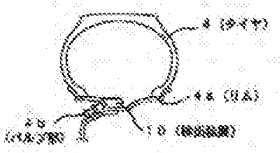
（ａ）



（ｂ）

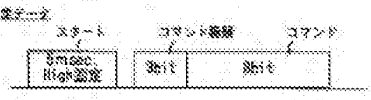


（ｃ）

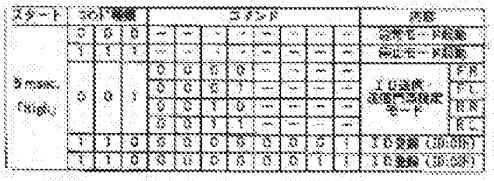


【図３】

（ａ）

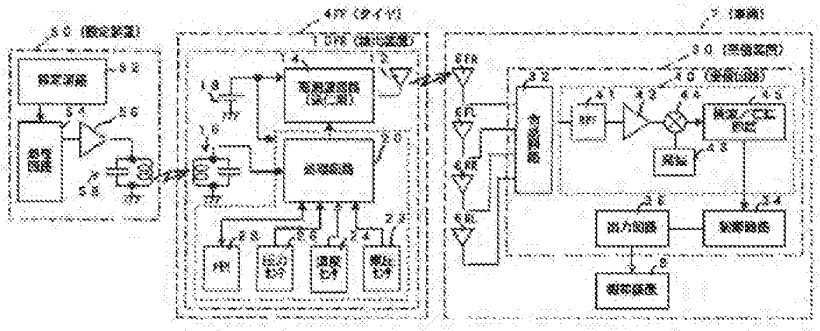


（ｂ）

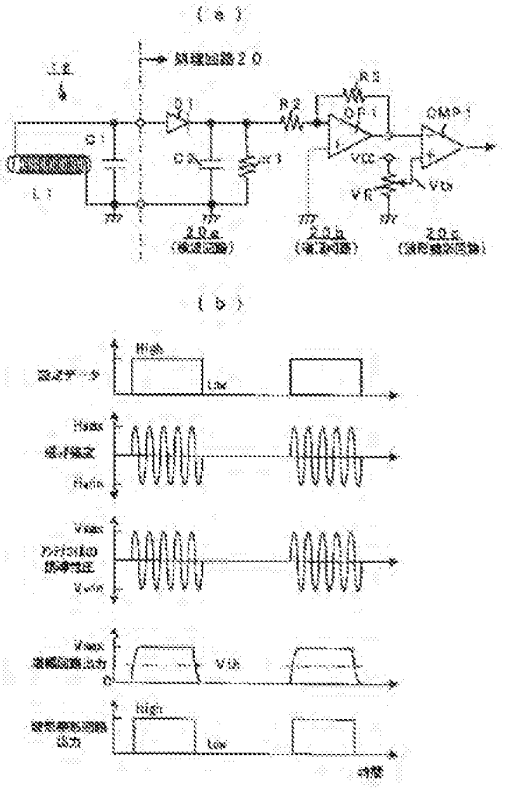


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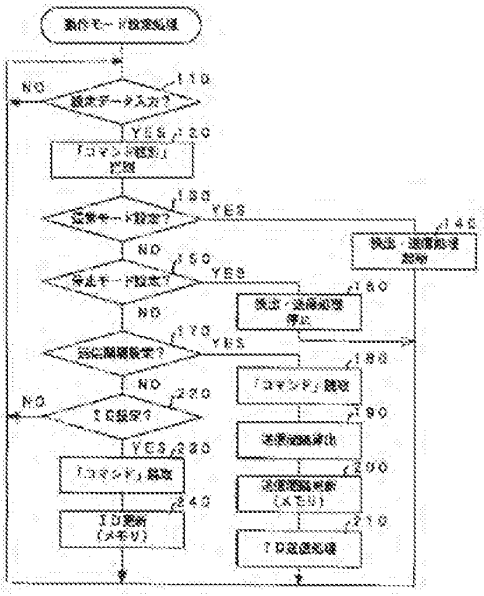
【図2】



【図4】

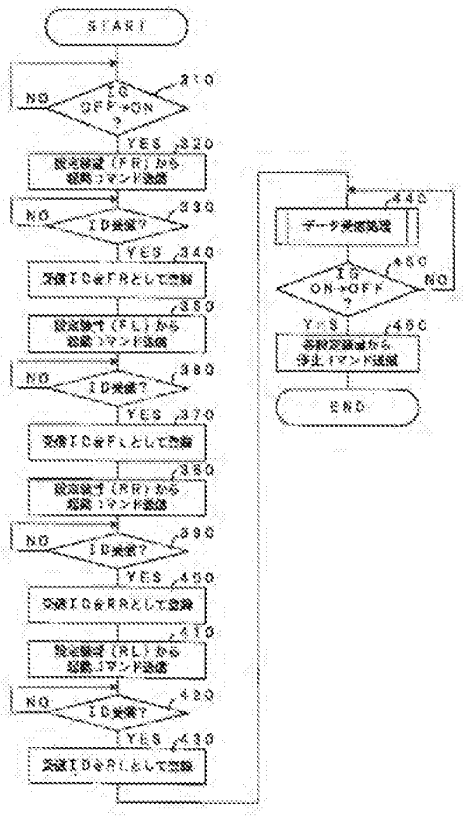


【図5】



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【図6】



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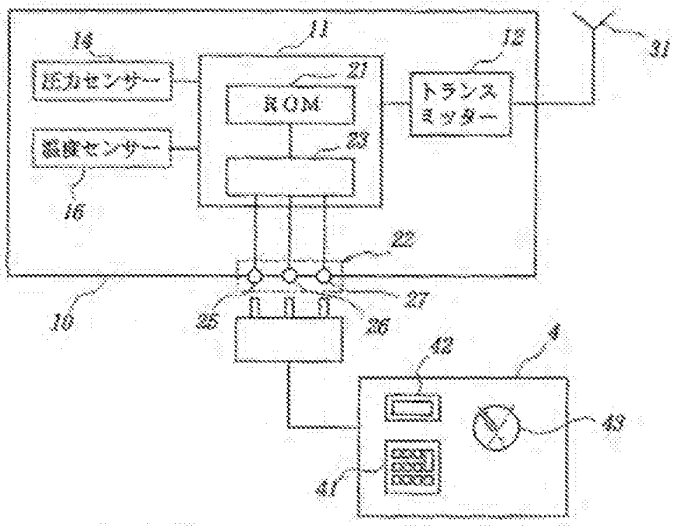
(74) 代理人: 杉村 興作 、外(SUGIMURA,Kosaku et al.); 〒100-0013 東京都 千代田区 霞が関３丁目２番４号 霞山ビルディング Tokyo (JP).

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[続葉有]

(54) Title: TIRE AIR PRESSURE SENSOR UNIT, TIRE AIR PRESSURE MONITORING SYSTEM, AND METHOD OF RECORDING SELF-IDENTIFICATION CODES FOR TIRE AIR PRESSURE SENSOR UNIT

(54) 発明の名称: タイヤ空気圧センサーユニットおよびタイヤ空気圧監視システムならびにタイヤ空気圧センサーユニットの自己識別コードの登録方法



12...TRANSMITTER
14...PRESSURE SENSOR
16...TEMPERATURE SENSOR

(57) Abstract: The sensor unit main body (10) of a tire air pressure sensor unit (1) is provided with an external signal capture terminal (22) for reading data stored in a ROM (23) therefor about self-identification codes. When tire wheels are exchanged because of a trouble in the sensor unit or for an exchange between summer tires and winter tires, the self-identification codes in the sensor unit (1) after exchange are revised so that they are the same as the self-identification codes in the sensor unit (1) before exchange, thereby eliminating the troublesome operation of associating

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(84) 指定国（広域）: ARIPO特許 (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), ユーラシア特許 (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), ヨーロッパ特許 (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI特許 (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

添付公開書類:
— 国際調査報告書

2文字コード及び他の略語については、定期発行される各PCTガゼットの巻頭に掲載されている「コードと略語のガイダンスノート」を参照。

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the self-identification codes in the sensor unit with their vehicle-mounted positions.

(57) 要約:

タイヤ空気圧センサーユニット１のセンサーユニット本体１０に、そのＲＯＭ２１の自己識別コードのデータを書き換えるための外部信号取り込み端子２２を具えさせ、センサーユニットの故障や、サマータイヤとウィンタータイヤとの交換のためタイヤホイールを取り替える際、取り替え後のセンサーユニット１の自己識別コードを取り替え前のセンサーユニット１の自己識別コードと同じものに書き換えることにより、センサーユニットの自己識別コードとその車両装着位置とを対応付けるわずらわしい作業をなくす。

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明　細　書

タイヤ空気圧センサーユニットおよびタイヤ空気圧監視システムならびにタイヤ空気圧センサーユニットの自己識別コードの登録方法

技術分野

この発明は、車両におけるタイヤ空気圧の状態を監視して、異常を運転者に通知するためのタイヤ空気圧センサーユニット（以下単に「センサーユニット」という）、これを用いたタイヤ空気圧監視システムおよびセンサーユニットの自己識別コードの登録方法に関するものである。

背景技術

従来から、車体側に設けられ空気圧の異常を運転者に知らせる空気圧モニターと、車両のタイヤホイールに取り付けられ、タイヤの空気圧を検出し、検出した空気圧に関する情報を電波により空気圧モニターに送信するセンサーユニットとを具えたタイヤ空気圧監視システムが知られている。

そして、空気圧の異常が検出された際、空気圧に関する情報の他、車両のどの車両装着位置のタイヤに異常が検出されたセンサユニットの車両装着位置、例えば車両の右前輪等、に関する情報もこれを運転者に知らせるために、各車両装着位置のセンサーユニットの固定メモリーにこのセンサーユニット固有の自己識別コードを記憶させておくとともに、予め、各センサーユニットの車両装着位置とこのセンサーユニットの自己識別コードとの対応関係を、空気圧モニターに設定して記憶させておき、センサーユニットが異常を検出した時、このセンサーユニットに空気圧に関する情報のほか自己識別コードも空気圧モニターに送信させ、一方、空気圧モニターに、送信された自己識別コードを基にこれに対応する車両装着位置を特定させてこれを運転者に教えるシステムも提案されている。

この従来の方法においては、通常、センサーユニットの自己識別コードは、こ

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のセンサーユニットの製造時に、その固定メモリーに書き込まれ、出荷後はこれを書き換えることはできないように構成されていて、誤動作等によりデータが書き換わることを防止している。

また、前述の、自己識別コードとそのセンサーユニットの車両装着位置との対応関係を設定する作業は、通常、車両の製造段階で、車両の出荷前に行われ、これは、例えば、それぞれのタイヤの空気圧を実際に下げて異常を模擬的に発生させたあと空気圧を元に戻し、その時に送信される自己識別コードをこのタイヤの車両装着位置に対応付けて、これを空気圧モニターに記憶させることを順に繰り返すことにより行われるが、この作業は大変わずらわしいものである。

そして、このような従来のセンサーユニットにあっては、次のような問題点がある。すなわち、車両のそれぞれの車両装着位置にあるセンサーユニットのうちいずれかのセンサーユニットを故障等により取り替える場合、取り替え後のセンサーユニットには取替え前に取り付けられていたセンサーユニットとは異なる自己識別コードが付されているので、この新しい自己識別コードとそのセンサーユニットの車両装着位置との対応関係を設定する作業を、あらためて行う必要があるが、この作業は前述の通り、大変わずらわしく、しかも、手間のかかるものであった。

また、サマータイヤとウィンタータイヤとを交換する際にも、通常これらのタイヤは、リム組された状態のまま保管され、また交換されるので、車両の、ある車両装着位置に装着されるサマータイヤとウィンタータイヤとは異なる自己識別コードを保有することになり、したがって、サマータイヤとウィンタータイヤの交換の度に、自己識別コードとそのセンサーユニットの車両装着位置との対応付け作業が必要となる。この手間のかかる作業が必要なゆえに、異常が判定されたタイヤの車両装着位置を運転者に通知するタイヤ空気圧監視システムはいまだ実用化されていないのが実情である。

この発明は、このような問題に鑑みてなされたものであり、その目的とするとこ

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ろは、タイヤホイールを交換する際、センサーユニットの自己識別番号とこのセンサーユニットが取り付けられたタイヤホイールとの対応付け作業を不要なものとし、タイヤホイールの交換作業を容易にすることのできるセンサーユニットを提供することにある。

発明の開示

上記目的を達成するため、この発明はなされたものであり、その要旨構成ならびに作用を以下に示す。

（1）

本発明のセンサーユニットは、車両のタイヤホイールに組み付けられそのタイヤホイールのタイヤ空気圧を検出する圧力センサーと、少なくとも空気圧に関する情報を車両に設けた空気圧モニターに送信するトランスミッターと、センサーユニット固有の自己識別コードのデータを含むデータを記憶する固定メモリーとを具えるセンサーユニットにおいて、

外部からの信号を取り込むインターフェースを具えるとともに、固定メモリーを、インターフェースから取り込んだ外部信号によってデータの書き換えが可能なよう構成してなるものである。

このセンサーユニットによれば、その固定メモリーはデータの書き換えが可能なよう構成され、このデータを書き換える外部信号を取り込むためのインターフェースを具えているので、タイヤホイールの取り替えの際、このインターフェースを通して、取り替え前にタイヤホイールに取り付けられていたセンサーユニットの自己識別コードと同じコードを、取替え後のセンサーユニットに書き込むことができる。このことによって、空気圧に異常が発生した場合、取替え後のセンサーユニットに対しても、取替え前と同じ自己識別コードを使って、空気圧の異常が発生したセンサーユニットの車両装着位置を特定できるので、前述の、センサーユニットの自己識別コードと車両装着位置との新たな対応付けの作業を必要としない。

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同様に、サマータイヤに代えて、ウィンタータイヤを使用する場合、ウィンタータイヤが装着される車両装着位置のセンサーユニットの自己識別コードを、それぞれの車両装着位置に装着されていたサマータイヤに対応するセンサーユニットと同じコードを登録することにより、ウィンタータイヤに対しても、サマータイヤ装着時と同じ自己識別コードを使って、それぞれの車両装着位置に対応させることができ、前述の自己識別コードと車両装着位置とのわずらわしい対応付け作業を必要としない。そして、この方法により、いったん、ウィンタータイヤの自己識別コードを登録してしまえば、以降の、サマータイヤとウィンタータイヤとの交換に際しては、自己識別コードと車両装着位置のわずらわしい対応付け作業も、自己識別コードの再登録の作業も必要としないので、非常に簡易にタイヤを交換することができる。

このセンサーユニットは、センサーユニットの製造後に、その固定メモリーに対してデータの書き換えたり追加したりすることができるので、自己識別コード以外のデータに対しても、書き換えや追加が可能である。この使い方の例として、センサーユニットの固定メモリーに書き込まれた空気圧下限設定値を、タイヤ空気圧監視システムの異常発生の判定値として利用しようとする場合、取替え用に供給されるセンサーユニットは、適正空気圧の異なる、幅広いサイズのタイヤに対応できることが望ましいが、この際、センサーユニットと組み合わせられるタイヤが決まった後、この空気圧下限設定値を書き込むことになる。本発明のセンサーユニットは、製造後でも、固定メモリーのデータを書き換えることができるので、このニーズに対応することができ、センサーユニットの新しい利用の方法を提供することができる。

（2）

本発明のセンサーユニットは、（1）に記載された発明において、インターフェースを、外部の装置と配線で接続できる外部信号取り込み端子により構成してなるものである。

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このセンサーユニットは、外部信号取り込み端子を通して、外部信号を取り込むことができるので、前述の作用のほか、電波や磁気による他の方法に比べて、信頼性の高いデータを書き込むことができる。同時に、誤動作や誤操作により、意図せずデータが書き換わってしまうことを防止できる。

また、データの書き換えに用いる外部の装置として、専用の書き換え装置が必要となるが、この書き込み作業はリム組作業に伴って発生する作業なので、リム組作業を通常行うタイヤショップやカーリペアショップ等にて専用の書き換え装置を保有して書き換え作業を行えば、これを安価に行うことができ、実用化は容易である。

（3）

本発明のセンサーユニットは、（1）もしくは（2）に記載された発明において、少なくとも空気圧に関する情報を、電波により、空気圧モニターに送信するものである。

このセンサーユニットでは、空気圧に関する情報を含む情報を、電波によって空気圧モニターに送信するので、前述の作用のほか、互いに離隔した位置にある複数のセンサーユニットからの情報を、簡易に、空気圧モニターに集めることができる。

一方、ハードワイヤを用いて信号を送信する方法は、配線がわずらわしい反面、センサーユニットの車両装着位置毎に配線が別々なので、その車両装着位置を特定することが容易である。これに比較して、この電波による信号の送信方法は、それぞれのセンサーユニットの車両装着位置を特定することはむつかしい。

しかし、この発明に係るセンサーユニットでは、車両装着位置に対応した自己識別コードを登録することができるので、センサーユニットの車両装着位置を特定することができ、電波による信号の送信方法の欠点を解消し、なおかつ、電波による送信の利便性を活用することができる。

（4）

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本発明のセンサーユニットは、（1）～（3）のいずれかに記載された発明において、温度センサーを具えてなるものである。

このタイヤ空気圧センサーユニットによれば、タイヤ空気圧のほか、空気の温度に関する情報についても、空気圧モニターに送信することができるので、前述の作用のほか、よりきめこまかなタイヤ空気圧の状態を把握することができ、タイヤ空気圧監視システムの信頼性を向上させることができる。

（5）

本発明のタイヤ空気圧監視システムは、（1）～（4）のいずれかに記載されたセンサーユニットを車両の複数のタイヤホイールに取り付けるとともに、このセンサーユニットからの情報を受信して、運転者に空気圧に関する情報を伝達する空気圧モニターを具えてなるものである。

このタイヤ空気圧監視システムにおいては、このシステムを構成しているセンサーユニットの製造後にも、その固定メモリーに記憶するデータを書き換えることができるので、センサーユニットが故障した際、あるいは、サマータイヤとウィンタータイヤを取り替える際などに、前述の通り、センサーユニットの自己識別コードとその車両装着位置との対応付けの作業をなくすことができる。

（6）

本発明のセンサーユニットの自己識別コードの登録方法は、タイヤもしくはセンサーユニットを交換して、タイヤをリム組みするに際して、（1）～（4）のいずれかに記載されたセンサーユニットに、このセンサーユニットが取り付けられる車両装着位置に交換前に取り付けられていたセンサーユニットと同じ自己識別コードを登録するものである。

このセンサーユニットの自己識別コードの登録方法は、センサーユニットが故障した際、あるいは、サマータイヤとウィンタータイヤを取り替える際などに、前述の通り、センサーユニットの自己識別コードとその車両装着位置との対応付けの作業をなくすことができる。

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図面の簡単な説明

図１は、センサーユニットの取り付け状態を示す略線図である。

図２は、本発明に係るセンサーユニットを示す外形図である。

図３は、センサーユニット本体の電気回路装置を示す概略ブロック図である。

図４は、自己識別コードの書き換え手順を示す波形図である。

図５は、センサーユニットを用いたタイヤ空気圧監視システムを示す概略ブロック図である。

発明を実施するための最良の形態

以下に、この発明に係る発明の実施の形態を図１～図５に示すところに基づき説明する。図１は、センサーユニット１をタイヤホイール２に取り付けた状態を示す略線図である。センサーユニット１は、タイヤに空気を注入するための円筒状のバルブ装置５と一体となってホイールリム６に取り付けられている。そしてホイールリム６とタイヤ７はタイヤ空気圧部８を形成するとともにタイヤホイール２を構成している。

図２はセンサーユニットの外形を示す外形図である。センサーユニット１は、外部からの信号を取り込むためのための外部信号取り込み端子２２を具えたセンサーユニット本体１０、リム取り付け部３０およびアンテナ部３１より構成されるとともに、バルブ装置５と一体となってホイールリム６に取り付けられている。

センサーユニット本体１０は、図３に概略ブロック図で示す電気回路装置を内蔵している。この電気回路装置は、タイヤ空気圧を検出する圧力センサー１４、タイヤ空気圧部８の温度を検出する温度センサー１６、コントローラ１１、コントローラよりの信号をアンテナ３１からの送信信号に変換するトランスミッター１２より構成されている。

コントローラ１１は、圧力センサー１４および温度センサー１６によりそれぞれ検出された圧力データおよび温度データを取り込むとともに、固定メモリーであるＲＯＭ２１に記憶されている、自己識別コードならびに空気圧下限値データ

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を、圧力データ、温度データと合わせて、所定のタイミングでトランスミッター１２に出力する。なお、温度センサー１６は、タイヤの空気圧部の状態をより詳しく運転者に警報するために設けるものであり、好適ではあるが、必ずしも不可欠なものではない。

また、コントローラ１１には、ＲＯＭ２１と外部入力信号制御部２３とが設けられていて、外部信号取り込み端子２２より取り込んだ信号を、外部入力信号制御部２３を介して、ＲＯＭ２１に書き込むことができる。外部信号取り込み端子２２は、アース端子２５、データ信号端子２６およびデータ入出力制御信号端子２７を持っている。

この外部信号取り込み端子２２に専用書き込み装置４を接続して、専用書き込み装置４からデータを書き込むことができる。専用書き込み装置４はデータ入力部４１、データ表示部４２および「入力モード」の操作と「書換モード」の操作とを切り替える操作切替レバー４３を具えていて、これらの部分を介してデータを書き込めるようになっている。

図４は自己識別コードの書き込む際の信号の波形図を示すが、この図の示すところにしたがって、データを書き込む手順を説明する。図４において、信号Ａはデータ入出力制御信号端子２７に入力されるデータ入出力制御信号、信号Ｂはデータ信号端子２６に対して入出力されるデータ信号である。

初期状態においては、信号Ａおよび信号Ｂはともに、ローレベルになっている。この状態から、専用書き込み装置４をセンサーユニット本体１０の外部信号取り込み端子２２に接続し、専用書き込み装置４の操作切替レバー４３を「入力モード」側にして、書き換えたい新しい自己識別コードを専用書き込み装置４のデータ入力部４１に入力したあと、操作切替レバー４３を「書換モード」側にすると、信号Ａがハイレベルになり、この信号Ａの変化に応答して、外部入力信号制御部２３は、データ信号を取り込む準備のための制御を行う。信号Ａがハイレベルに移行してから準備時間Ｃを経過した後に、専用書き込み装置４は、データ入力部４

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１に格納された自己識別コードを信号ＢのＷ部分として外部入力信号制御部２３に出力すると、外部入力信号制御部２３はデータを取り込む準備が完了しているので、ＲＯＭ２１にデータを書き込むことができる。

データの外部入力信号制御部２３への出力が終了すると、専用書き込み装置４から信号Ａをローレベルにする信号が出され、これによって、外部入力信号制御部２３は入力の完了を確認し、そして、照合のため、取り込んだ自己識別コードを信号ＢのＲ部分として専用書き込み装置４に出力する。専用書き込み装置４はこれを自動照合し、ＯＫであれば書き込み完了の表示をデータ表示部４２に表示する。

この書き込み作業はリム組作業に伴って発生する作業なので、リム組作業を通常行うタイヤショップやカーリペアショップ等にて専用書き込み装置４を保有し、これらのショップにて、上述の書き換え手順にしたがって書き換えするのがよい。

このセンサーユニット１を用いたタイヤ空気圧監視システム９の例を図５に概略ブロック線図で示す。タイヤ空気圧監視システム９は、それぞれのタイヤホイール６に取り付けられたセンサーユニット１と、センサーユニット１のアンテナ部３１より送信されるデータを受信して運転者にタイヤの空気圧の状態を警報する空気圧モニター３とにより構成されている。また、このシステムにおいて、センサーユニット１に外部信号取り込み端子２２を設けていて、専用書き込み装置４により、センサーユニット１のＲＯＭ２１の記憶データを書き換えることができる。

次に、この発明に係る、センサーユニットの自己識別コードの登録方法について例示する。例えば、右前の車両装着位置にあるセンサーユニットが故障してこれを取り替える場合，交換後の新しいセンサーユニットに対して、出荷時に登録された固有の自己識別コードをそのまま使うと、厄介な対応付け作業が必要となることは前述の通りである。そこで、故障したセンサーユニットの自己識別コードは既に分かっているので、これと同じ自己識別コードを取替え後の新しいセン

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サーユニットに登録することにより、交換後も、交換前と同じ自己識別コードと車両装着位置の対応関係を維持することができ、これにより新たな対応付けの厄介な作業を不要なものとして、センサーユニットの交換作業の生産性を上げることができる。

産業上の利用可能性

以上述べたところから明らかなように、この発明によれば、センサーユニットに、その固定メモリーに対して外部からデータを書き換えることのできるインターフェースを設けているので、センサーユニットが故障してこれを取り替える際や、サマータイヤとウィンタータイヤとを交換するに際して、交換後のセンサーユニットの自己識別コードとして、交換前と同じコードを登録することにより、交換の度に、センサーユニットの自己識別コードとその車両装着位置とを対応付けする作業を省くことができる。

加えて、自己識別コード以外の情報についても、製造後のセンサーユニットの装着状況に応じて、例えば、空気圧下限設定値などの情報を、新たに固定メモリーに書き込んだり、書き換えたりすることができるので、センサーユニットの汎用性やその利用範囲を広げることができる。

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請 求 の 範 囲

1． 本発明のセンサーユニットは、車両のタイヤホイールに組み付けられそのタイヤホイールのタイヤ空気圧を検出する圧力センサーと，少なくとも空気圧に関する情報を車両に設けた空気圧モニターに送信するトランスミッターと、センサーユニット固有の自己識別コードのデータを含むデータを記憶する固定メモリーとを具えるセンサーユニットにおいて、

外部からの信号を取り込むインターフェースを具えるとともに、固定メモリーを、インターフェースから取り込んだ外部信号によってデータの書き換えが可能なよう構成してなるタイヤ空気圧センサーユニット。

2．インターフェースを、外部の装置と配線で接続できる外部信号取り込み端子により構成してなる請求の範囲第1項に記載のタイヤ空気圧センサーユニット。

3．少なくとも空気圧に関する情報を、電波により、空気圧モニターに送信する請求の範囲第1項もしくは第2項に記載のタイヤ空気圧センサーユニット。

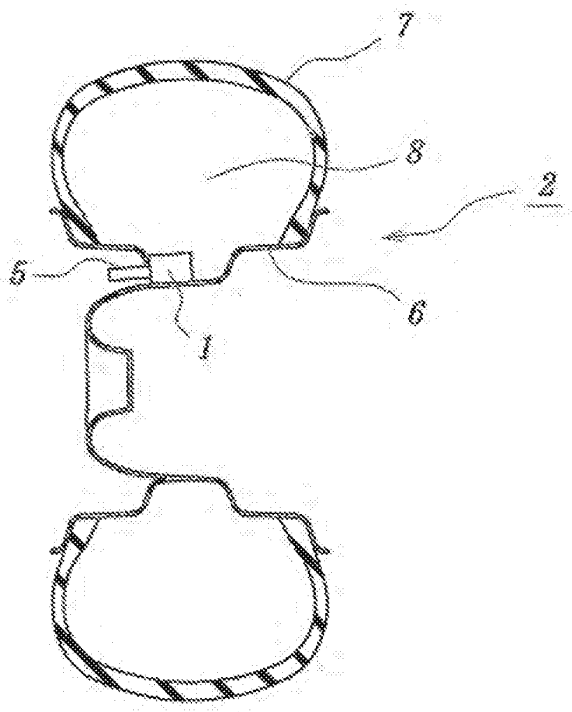
4．温度センサーを具えてなる請求の範囲第1項～第3項のいずれかに記載のタイヤ空気圧センサーユニット。

5．請求の範囲第1項～第4項のいずれかに記載のタイヤ空気圧センサーユニットを車両の複数のタイヤホイールに取り付けるとともに、このタイヤ空気圧センサーユニットからの情報を受信して、運転者に空気圧に関する情報を伝達する空気圧モニターを具えてなるタイヤ空気圧監視システム。

6・タイヤもしくはタイヤ空気圧センサーユニットを交換して、タイヤをリム組みするに際して、請求の範囲第1項～第4項のいずれかに記載のタイヤ空気圧センサーユニットに、このセンサーユニットが取り付けられる車両装着位置に交換前に取り付けられていたセンサーユニットと同じ自己識別コードを登録する、タイヤ空気圧センサーユニットの自己識別コードの登録方法。

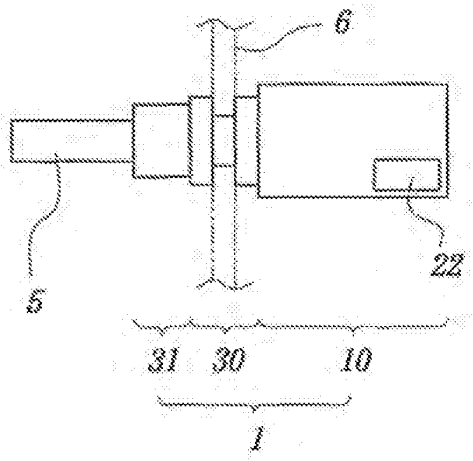
Orange Exhibit No. 2004
IPR2024-00744

FIG. 1



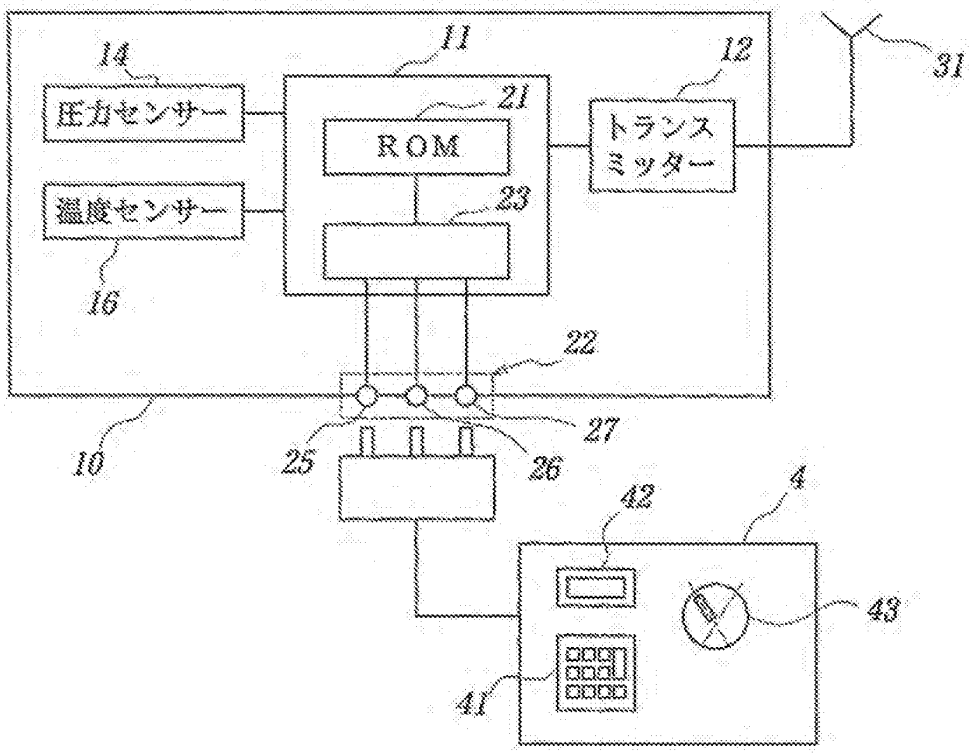
Orange Exhibit No. 2004
IPR2024-00744

FIG. 2



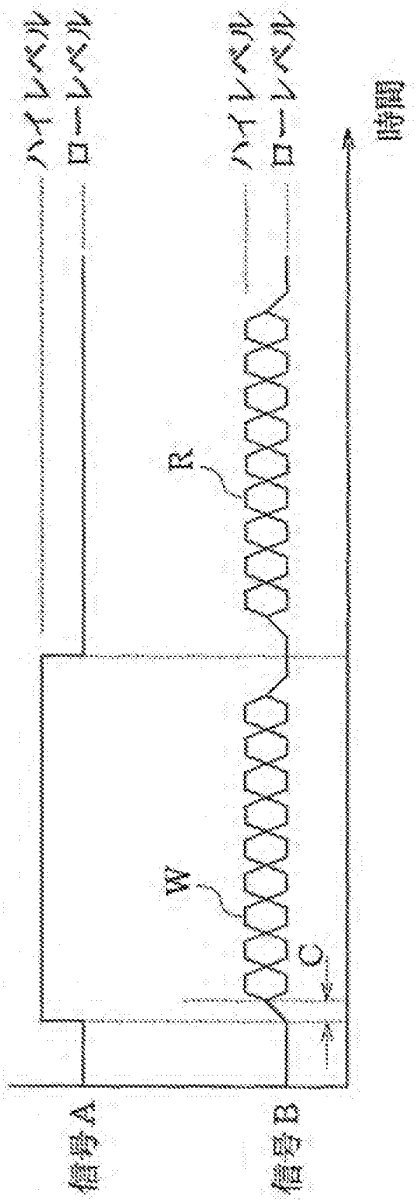
Orange Exhibit No. 2004
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FIG. 3



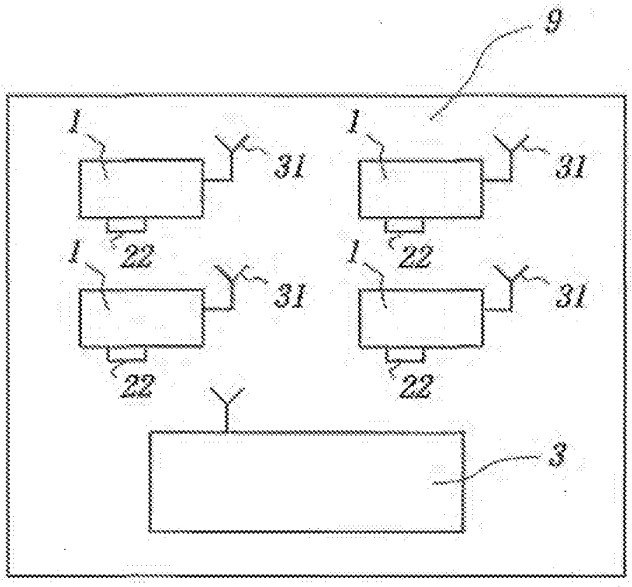
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FIG. 4



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FIG. 5



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP02/04363

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[7] B60R23/04, B60C23/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[7] B60R23/00-23/20, G01L17/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1926-1996	Toroku Jitsuyo Shinan Koho	1994-2002
Kokai Jitsuyo Shinan Koho	1971-2002	Jitsuyo Shinan Toroku Koho	1996-2002

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 11-211598 A (Oki Electric Industry Co., Ltd.), 06 August, 1999 (06.08.99), Par. Nos. [0002] to [0005]; Fig. 11 (Family: none)	1-5 6
Y A	JP 10-19710 A (The Yokohama Rubber Co., Ltd.), 23 January, 1998 (23.01.98), Par. Nos. [0057] to [0068]; Fig. 10 (Family: none)	1-5 6
Y A	JP 2000-142044 A (Toyota Motor Corp.), 23 May, 2000 (23.05.00), Par. Nos. [0016] to [0018], [0028] to [0030]; Figs. 1, 5 (Family: none)	2,3,5 6

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05 August, 2002 (05.08.02)	20 August, 2002 (20.08.02)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1998)

Orange Exhibit No. 2004
IPR2024-00744

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP02/04363

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2000-108620 A (The Yokohama Rubber Co., Ltd.), 18 April, 2000 (18.04.00), Full text; Figs. 1 to 2 (Family: none)	1-6
A	US 5612671 A1 (Delco Electronics Corp.), 18 March, 1997 (18.03.97), Full text; Figs. 1 to 7 & JP 9-210827 A & EP 769385 A1	1-6

Form PCT/ISA/210 (continuation of second sheet) (July 1998)

Orange Exhibit No. 2004
IPR2024-00744

国際調査報告

国際出願番号 PCT/JP02/04353

A. 発明の属する分野の分類（国際特許分類（IPC））
Int. Cl.[7] B60R23/04, B60C23/20

B. 調査を行った分野
調査を行った最小限資料（国際特許分類（IPC））
Int. Cl.[7] B60R23/00-23/20, G01L17/00

最小限資料以外の資料で調査を行った分野に含まれるもの
日本国実用新案公報 1926-1996年
日本国公開実用新案公報 1971-2002年
日本国登録実用新案公報 1994-2002年
日本国実用新案登録公報 1996-2002年

国際調査で使用した電子データベース（データベースの名称、調査に使用した用語）

C. 関連すると認められる文献

引用文献のカテゴリー*	引用文献名 及び一部の箇所が関連するときは、その関連する箇所の表示	関連する請求の範囲の番号
Y	JP 11-211598 A (沖電気工業株式会社) 1999.	1-5
A	08.06, 段落番号【0002】-【0005】, 第11図 (ファミリーなし)	6
Y	JP 10-19710 A (横浜ゴム株式会社) 1998.0	1-5
A	1.23, 段落番号【0057】-【0068】, 第10図 (ファミリーなし)	6
Y	JP 2000-142044 A (トヨタ自動車株式会社) 20	2, 3, 5
A	00.05.23, 段落番号【0016】-【0018】, 【0028】-【0030】, 第1, 5図 (ファミリーなし)	6
A	JP 2000-108620 A (横浜ゴム株式会社) 200	1-6

☒ C欄の続きにも文献が列挙されている。 ☐ パテントファミリーに関する別紙を参照。

* 引用文献のカテゴリー
「A」特に関連のある文献ではなく、一般的技術水準を示すもの
「E」国際出願日前の出願または特許であるが、国際出願日以後に公表されたもの
「L」優先権主張に疑義を提起する文献又は他の文献の発行日若しくは他の特別な理由を確立するために引用する文献（理由を付す）
「O」口頭による開示、使用、展示等に言及する文献
「P」国際出願日前で、かつ優先権の主張の基礎となる出願の日の後に公表された文献
「T」国際出願日又は優先日後に公表された文献であって出願と矛盾するものではなく、発明の原理又は理論の理解のために引用するもの
「X」特に関連のある文献であって、当該文献のみで発明の新規性又は進歩性がないと考えられるもの
「Y」特に関連のある文献であって、当該文献と他の1以上の文献との、当業者にとって自明である組合せによって進歩性がないと考えられるもの
「&」同一パテントファミリー文献

国際調査を完了した日	国際調査報告の発送日
05.08.02	20.08.02

国際調査機関の名称及びあて先	特許庁審査官（権限のある職員）	3Q	3025
日本国特許庁（ISA/JP） 郵便番号100-8915 東京都千代田区霞が関三丁目4番3号	大谷謙仁		
	電話番号 03-3581-1101 内線 3381		

様式PCT/ISA/210（第2ページ）（1998年7月）

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IPR2024-00744

C（続き）．関連すると認められる文献

引用文献のカテゴリー*	引用文献名 及び一部の箇所が関連するときは、その関連する箇所の表示	関連する請求の範囲の番号
A	0．04．18，全文，第1－2図（ファミリーなし） US 5612671 A1 (Delco Electronics Corp.) 1997．03．18，全文，第1－7図 & JP 9-210827 A & EP 769395 A1	1－6

様式PCT/ISA/210（第2ページの続き）（1998年7月）

Orange Exhibit No. 2004
IPR2024-00744

Espacenet

Bibliographic data: JP2004009859 (A) — 2004-01-15

METHOD AND APPARATUS FOR ID REGISTRATION OF TIRE PRESSURE SENSOR, ID REGISTRATION TOOL FOR TIRE PRESSURE MONITORING SYSTEM, AND TIRE WITH TIRE PRESSURE SENSOR

Inventor(s): ITO SHINTARO ± (ITO SHINTARO)

Applicant(s): DENSO CORP ± (DENSO CORP)

Classification: - international: ***B60C19/00; B60C23/02; B60C23/04; G01L17/00;*** (IPC1-7): B60C19/00; B60C23/02; G01L17/00

- European:

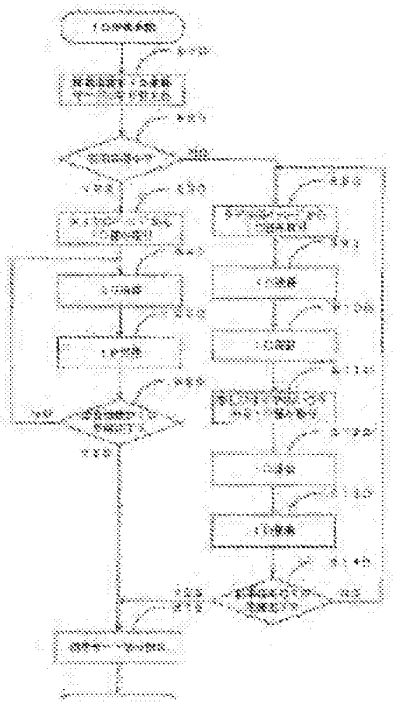
Application number: JP20020164985 20020605

Priority number(s): JP20020164985 20020605

Also published as: JP3589234 (B2)

Abstract of JP2004009859 (A)

PROBLEM TO BE SOLVED: To prevent incorrect ID registration caused by interference in a tire pressure monitoring system. ; SOLUTION: A monitor 50 is switched to an ID registration mode, and the ID is read from a bar code 5 or the like and transmitted to the tire pressure monitor 50 (S20-30). The tire pressure monitor 50 registers the received ID in a memory 55 (S40, S50). When the registration of the required number of IDs is completed, the monitor 50 is switched to a normal mode to terminate ID registration work (S60, S70). In tire replacement, an ID registration tool 60 is used, and the ID is read from a bar code stuck to the removed tire and transmitted to the tire pressure monitor 50 from the ID registration tool 60 (S80, S90). The monitor 50 deletes an ID corresponding to this ID, from the memory 55 (S100). The ID registration tool 60 is used to read the ID



from the bar code stuck to the newly mounted tire. The ID is transmitted to the monitor 50 and registered (S110-S130). ; COPYRIGHT: (C)2004,JPO

Last updated: 04.12.2012 Worldwide Database 5.7.44.6.92b

(19)日本国特許庁(JP)　(12)公開特許公報(A)　(11)特許出願公開番号
特開2004-9859
(P2004-9859)
(43)公開日　平成16年1月15日(2004.1.15)

(51)Int.Cl.⁷	F I		テーマコード（参考）
B60C 23/02	B60C 23/02	B	2F055
B60C 19/00	B60C 19/00	B	
G01L 17/00	G01L 17/00	301S	

審査請求 未請求　請求項の数 18　OL　（全 35 頁）

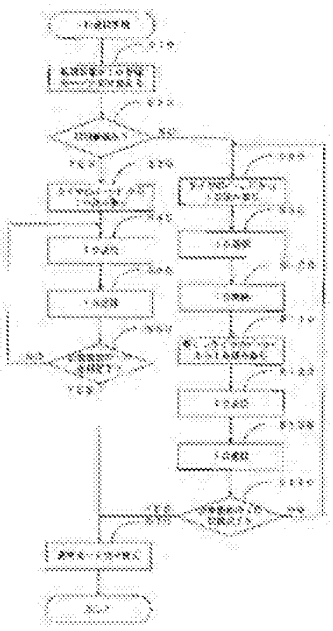
(21)出願番号　特願2002-164985(P2002-164985)
(22)出願日　平成14年6月5日(2002.6.5)

(71)出願人　000004260
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(72)発明者　伊藤　康左郎
愛知県刈谷市昭和町１丁目１番地　株式会社デンソー内

Fターム(参考)　2F055 AA12　BB20　CC00　DD03　EE40
FF31　FF34　GG45

(54)【発明の名称】タイヤ空気圧センサのＩＤ登録方法及びＩＤ登録装置と、タイヤ空気圧監視システム用ＩＤ登録ツール及び空気圧センサ付きタイヤ

(57)【要約】
【課題】タイヤ空気圧監視システムで、通信によるＩＤの誤登録を防止する。
【解決手段】監視装置５０をＩＤ登録モードに切り替え、バーコード５等からＩＤを読み取り、タイヤ空気圧監視装置５０へと送信する（Ｓ２０～８０）。タイヤ空気圧監視装置５０は、受信したＩＤをメモリ５５へと登録する（Ｓ４０、Ｓ５０）。必要個数のＩＤ登録が完了したら、監視装置５０を通常モードに切り替えてＩＤ登録作業を終了する（Ｓ６０、Ｓ７０）。一方、タイヤを交換では、ＩＤ登録ツール８０を用いて、取り外したタイヤに貼り付けられているバーコードからＩＤを読み取り、ＩＤ登録ツール８０からタイヤ空気圧監視装置５０へと送信する（Ｓ８０、Ｓ９０）。監視装置５０では、このＩＤに対応するＩＤをメモリ５５から削除し（Ｓ１００）、ＩＤ登録ツール８０を用いて新たに取り付けるタイヤに貼り付けられているバーコードからＩＤを読み取り、このＩＤを監視装置５０へと送信し、登録させる（Ｓ１１０～Ｓ１３０）。
【選択図】　図３



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【特許請求の範囲】
【請求項１】
車両に装着されている各タイヤの空気圧センサから各センサのＩＤと共に送信される空気圧信号を車両本体に備えられているタイヤ空気圧監視装置で受信し、当該車両に装着されている各タイヤの空気圧を監視する様にしたタイヤ空気圧監視システムにおけるタイヤ空気圧センサのＩＤ登録方法において、
可読情報として提供されるＩＤを読み取って、前記各空気圧センサのＩＤ記憶部及び前記タイヤ空気圧監視装置のＩＤ記憶部に対して書き込む様にしたことを特徴とするタイヤ空気圧センサのＩＤ登録方法。
【請求項２】
車両に装着されている各タイヤの空気圧センサから各センサのＩＤと共に送信される空気圧信号を車両本体に備えられているタイヤ空気圧監視装置で受信し、当該車両に装着されている各タイヤの空気圧を監視する様にしたタイヤ空気圧監視システムにおけるタイヤ空気圧センサのＩＤ登録方法において、
前記各空気圧センサ、前記各タイヤ、前記各タイヤのホイール又は前記各タイヤのホイールカバーに可読情報としてセンサのＩＤを表示しておき、この可読情報からＩＤを読み取り、読み取った結果を前記タイヤ空気圧監視装置のＩＤ記憶部に書き込む様にしたことを特徴とするタイヤ空気圧センサのＩＤ登録方法。
【請求項３】
請求項１又は請求項２記載のタイヤ空気圧センサのＩＤ登録方法において、
前記可読情報からＩＤを読み取り、該読み取ったＩＤを前記タイヤ空気圧監視装置に入力し、該タイヤ空気圧監視装置のＩＤ記憶部に既に書き込まれているＩＤの中から今回入力したＩＤを削除させることを特徴とするタイヤ空気圧センサのＩＤ登録方法。
【請求項４】
請求項１～請求項３のいずれか記載のタイヤ空気圧センサのＩＤ登録方法において、
前記可読情報として、バーコード、データコード、ＱＲコード、マキシコード、ＣＰコード、ＰＤＦ４１７、コード４９、コード１６Ｋ又はコーデブロック等の光学的可読情報を用い、前記ＩＤの読み取りには光学的情報読み取り装置を用い、この光学的情報読み取り装置で読み取ったＩＤを所定の装置を用いて書き込み対象のＩＤ記憶部に書き込む様にしたこと
を特徴とするタイヤ空気圧センサのＩＤ登録方法。
【請求項５】
請求項１～請求項４のいずれか記載のタイヤ空気圧センサのＩＤ登録方法において、
前記光学的情報読み取り装置と前記タイヤ空気圧監視装置とを信号線で接続し、該光学的情報読み取り装置から前記タイヤ空気圧監視装置に対して前記信号線を介して前記読み取ったＩＤを送信する様にしたこと
を特徴とするタイヤ空気圧センサのＩＤ登録方法。
【請求項６】
車両に装着されている各タイヤの空気圧センサから各センサのＩＤと共に送信される空気圧信号を車両本体に備えられているタイヤ空気圧監視装置で受信し、当該車両に装着されている各タイヤの空気圧を監視する様にしたタイヤ空気圧監視システムにおけるタイヤ空気圧センサのＩＤ登録装置において、
ＩＤを含む可読情報を提示するＩＤ提示器と、
該ＩＤ提示器に提示された可読情報からＩＤを読み取る読み取り装置と、
該読み取り装置で読み取ったＩＤを前記各空気圧センサのＩＤ記憶部及び前記タイヤ空気圧監視装置のＩＤ記憶部に対して書き込むＩＤ書き込み装置と
を備えていることを特徴とするタイヤ空気圧センサのＩＤ登録装置。
【請求項７】
車両に装着されている各タイヤの空気圧センサから各センサのＩＤと共に送信される空気圧信号を車両本体に備えられているタイヤ空気圧監視装置で受信し、当該車両に装着され

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ている各タイヤの空気圧を監視する様にしたタイヤ空気圧監視システムにおけるタイヤ空気圧センサのＩＤ登録装置において、
前記各空気圧センサ、前記各タイヤ、前記各タイヤのホイール又は前記各タイヤのホイールカバーに貼り付けられたセンサのＩＤを含む可読機械表示ラベルと、
該可読機械表示ラベルからＩＤを読み取る読み取り装置と、
該読み取り装置で読み取ったＩＤを前記タイヤ空気圧監視装置のＩＤ記憶部に対して書き込むＩＤ書き込み装置と
を備えていることを特徴とするタイヤ空気圧センサのＩＤ登録装置。
【請求項８】
請求項６又は請求項７記載のタイヤ空気圧センサのＩＤ登録装置において、
前記読み取り装置で読み取ったＩＤを前記タイヤ空気圧監視装置に入力し、該タイヤ空気圧監視装置のＩＤ記憶部に既に書き込まれているＩＤの中から今回入力したＩＤを削除するＩＤ削除装置を備えていること
を特徴とするタイヤ空気圧センサのＩＤ登録装置。
【請求項９】
請求項６～請求項８のいずれか記載のタイヤ空気圧センサのＩＤ登録装置において、
前記可読機械として、バーコード、データコード、ＱＲコード、マキシコード、ＣＰコード、ＰＤＦ４１７、コード４９、コード１６Ｋ又はコーデブロック等の光学的可読機械を用い、前記ＩＤの読み取りには光学的機械読み取り装置を用い、この光学的機械読み取り装置で読み取ったＩＤを前記ＩＤ書き込み装置を用いて書き込み対象のＩＤ記憶部に書き込む様にしたこと
を特徴とするタイヤ空気圧センサのＩＤ登録装置。
【請求項１０】
請求項６～請求項９のいずれか記載のタイヤ空気圧センサのＩＤ登録装置において、
前記ＩＤ書き込み装置は、前記タイヤ空気圧監視装置との間を信号線で連結し、前記タイヤ空気圧監視装置に記憶させるべきＩＤを該信号線を介して送信する様に構成されていること
を特徴とするタイヤ空気圧センサのＩＤ登録装置。
【請求項１１】
車両に装着されている各タイヤの空気圧センサから各センサのＩＤと共に送信される空気圧信号を車両本体に備えられているタイヤ空気圧監視装置で受信し、当該車両に装着されている各タイヤの空気圧を監視する様にしたタイヤ空気圧監視システム用ＩＤ登録ツールであって、
前記各空気圧センサ、前記各タイヤ、前記各タイヤのホイール又は前記各タイヤのホイールカバーに貼り付けられたセンサのＩＤを含む可読機械表示ラベルからＩＤを読み取る読み取り部と、
該読み取り部で読み取ったＩＤを前記タイヤ空気圧監視装置に対して送信するＩＤ送信部と、
該ＩＤ送信部から送信したＩＤの登録又は削除を指示する記憶状態指示部と
を備えていることを特徴とするタイヤ空気圧監視システム用ＩＤ登録ツール。
【請求項１２】
請求項１１記載のタイヤ空気圧監視システム用ＩＤ登録ツールにおいて、
前記読み取り部が、バーコード、データコード、ＱＲコード、マキシコード、ＣＰコード、ＰＤＦ４１７、コード４９、コード１６Ｋ又はコーデブロック等の光学的可読機械を光学的に読み取る光学的機械読み取り部であることを特徴とするタイヤ空気圧監視システム用ＩＤ登録ツール。
【請求項１３】
請求項１１又は請求項１２記載のタイヤ空気圧監視システム用ＩＤ登録ツールにおいて、
当該ＩＤ登録ツールは、前記タイヤ空気圧監視装置との間を連結するための信号線自体又は当該信号線を接続するためのコネクタを備えていること

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を特徴とするタイヤ空気圧監視システム用ＩＤ登録ツール。
【請求項１４】
請求項１１～請求項１３のいずれか記載のタイヤ空気圧監視システム用ＩＤ登録ツールにおいて、
前記タイヤ空気圧監視装置に対して、ＩＤ登録モードとするためのトリガ信号を送信するトリガ信号送信部を備えていること
を特徴とするタイヤ空気圧監視システム用ＩＤ登録ツール。
【請求項１５】
空気圧センサを備えているタイヤであって、
前記空気圧センサのＩＤを含む情報を表示する光学的可読情報ラベルを、空気圧センサ、タイヤ自体、ホイール又はホイールカバーに貼り付けられていること
を特徴とする空気圧センサ付きタイヤ。
【請求項１６】
請求項１５記載の空気圧センサ付きタイヤにおいて、
前記光学的可読情報ラベルが、バーコードラベル、データコードラベル、ＱＲコードラベル、マキシコードラベル、ＣＰコードラベル、ＰＤＦ４１７ラベル、コード４９ラベル、コード１６Ｋラベル又はコードブロックラベルであること
を特徴とする空気圧センサ付きタイヤ。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】
本発明は、タイヤ空気圧センサのＩＤ登録方法に係り、さらにこの方法を実施するための
ＩＤ登録装置、タイヤ空気圧監視システム用ＩＤ登録ツール及び空気圧センサ付きタイヤに関するものである。
【０００２】
【従来の技術】
従来、タイヤ空気圧監視システムとして、特許第３２１２３１１号が知られている。
【０００３】
この種の従来のタイヤ空気圧監視システムでは、各タイヤに送信機付きの空気圧センサを装着しておき、この空気圧センサから各センサのＩＤと共に空気圧検出信号を送信し、車両本体側に備えられているタイヤ空気圧監視装置で受信し、少なくとも空気圧の異常なタイヤがあるときはインジケータに表示して警告する様に構成されている。
【０００４】
ここで、各センサのＩＤは、タイヤ空気圧監視装置にも登録されており、このＩＤをチェックすることにより、自車両のタイヤの空気圧センサからの信号であるのか否かを判断できる様になっている。
【０００５】
このセンサＩＤは、従来のシステムにおいては、センサメーカーからセンサが出荷される段階で各センサに付与されており、これを自動車メーカーで車両を組み立てる際に、車両本体のタイヤ空気圧監視装置をＩＤ登録モードにして、各センサから送信されてくるＩＤを受信してタイヤ空気圧監視装置に登録する様に構成されている。
【０００６】
より具体的には、図８３のブロック図に示す様に、従来のタイヤ空気圧監視システムは、各タイヤに装着される空気圧センサ１１０、１２０、１３０、１４０と、車両本体に備えられるタイヤ空気圧監視装置１５０とから構成されている。空気圧センサ１１０には、タイヤ内の空気圧を検出するための圧力センサ１１１と、予めセンサＩＤを記憶してあるＩＤメモリ１１２と、送信回路１１３と、電源電池１１４と、制御装置１１５と、送信用のアンテナ１１６とが備えられている。他の空気圧センサ１２０、１３０、１４０も同様の構成となっている。一方、タイヤ空気圧監視装置１５０は、受信回路１５１と、受信用のアンテナ１５２と、電源回路１６３と、制御装置１６４と、メモリ１５５と、インジケー

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ランプ等の表示器１８０へ表示データを送信するための通信回路１５６などが備えられている。また、このタイヤ空気圧監視装置１５０への電源は、車載バッテリ１７０から供給される様になっており、各種スイッチ類として、特に、制御装置１５４に対して通常の動作モードとＩＤ登録モードとで切り替えるためのモード切替スイッチ１８０が接続されている。

【０００７】

車両製造ライン等においてＩＤ登録を行う場合には、図３４のフローチャートに示す様な手順で処理が実行される。まず最初に、タイヤ空気圧監視装置１５０をＩＤ登録モードに切り替える（Ｓ５１１０）。続いて、各空気圧センサ１１０等を作動させてＩＤメモリ１１２等に記憶されている各空気圧センサ１１０等のセンサＩＤとを送信させる（Ｓ５１２０）。すると、タイヤ空気圧監視装置１５０は、受信用アンテナ１５２を介して電波を受信する（Ｓ５１３０）。そして、タイヤ空気圧監視装置１５０の制御装置１５４は、受信した信号レベルが判定レベル以上か否かを判定し（Ｓ５１４０）、信号レベルが判定レベル以上の場合には（Ｓ５１４０：ＹＥＳ）、受信した信号中に含まれているセンサＩＤをタイヤ空気圧監視装置１５０内のメモリ１５５に登録する（Ｓ５１５０）。そして、制御装置１５４は、４つのセンサ１１０、１２０、１３０、１４０のＩＤを全て登録したか否かを判定し（Ｓ５１６０）、４つのセンサ１１０、１２０、１３０、１４０のＩＤ登録が完了している場合には（Ｓ５１６０：ＹＥＳ）、モード切替スイッチ１８０を動作モードに切り替えて本処理を終了する（Ｓ５１７０）。

【０００８】

この様にして、従来のシステムでは、車両の各タイヤに実際に装着されている空気圧センサのＩＤを監視装置側に登録し、動作モードにおいて受信アンテナ１５２を介して受信する信号中に含まれているＩＤがメモリ１５５に登録してあるＩＤと一致するか否かを判別し、一致する場合には、このＩＤと共に受信した圧力信号に基づいてタイヤの空気圧の状態を判定し、判定結果に基づいて表示器１８０への表示を実行する様になっているのである。そして、ＩＤを登録しておくことで、近くを走行する車両のタイヤの空気圧センサからの信号に基づいた誤った表示を行わない様になっているのである。

【０００９】

【発明が解決しようとする課題】

しかし、車両の組立工程では、何台もの車両がラインを流れている状態でこの空気圧センサのＩＤ登録作業が行われるため、他の車両の空気圧センサからのＩＤ信号を受信して誤った登録をしてしまうといった混信の問題が生じ得る。これは車両の組立段階だけでなく、修理工場などにおいてセンサＩＤを再登録しようとする場合にも同様である。

【００１０】

そこで、本発明は、タイヤ空気圧監視システムにおいて、ＩＤの誤登録を防止することを目的とする。

【００１１】

【課題を解決するための手段及び発明の効果】

上記目的を達成しようとしてなされた本発明のタイヤ空気圧センサのＩＤ登録方法は、可読標識として提供されるＩＤを、何らかの装置又は人の目によって読み取って、各空気圧センサのＩＤ記憶部及びタイヤ空気圧監視装置のＩＤ記憶部に対して書き込む様にしたことを特徴とする。

【００１２】

より具体的には、例えば、バーコードによってＩＤを表し、このバーコードによって表されるＩＤを読み取り、これを各空気圧センサ及びタイヤ空気圧監視装置の各ＩＤ記憶部に対して書き込む様にして本発明を実施することができる。この具体的方法によれば、バーコードに基づいてタイヤ空気圧監視装置に空気圧センサのＩＤが記憶されるので、従来技術におけるような通信による誤登録といった問題は発生しない。

【００１３】

なお、バーコード以外に、データコード、ＱＲコード、マキシコード、ＣＰコード、ＰＤ

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ＰＤＦ４１７、コード４９、コード１６Ｋ又はコードアロック等の各種の光学的可読情報を用いることができる。バーコード等の光学的可読情報を用いる場合には、ＩＤの読み取りにはバーコードリーダ等の光学的情報読み取り装置を用いればよい。

【００１４】

また、バーコードであれば、コード情報が数字によって付記されているので、この数字を作業者が読み取って、これを何らかのツールに手入力し、この手入力したデータを空気圧センサ及びタイヤ空気圧監視装置に無線又は有線で送信してそれぞれのＩＤ記憶部に書き込む様にしてもよい。バーコードリーダを用いる場合は、バーコードリーダと空気圧センサ及びタイヤ空気圧監視装置との間を信号線で接続し、バーコードから読み取ったＩＤをバーコードリーダから空気圧センサ及びタイヤ空気圧監視装置に送信し、それぞれのＩＤ記憶部に書き込む様にすることができる。この様に、有線でＩＤを書き込む様にした場合には、混信の問題は全くなくなる。

【００１５】

さらに、電波を用いる従来の方法では、例えば航空無線の様な他の電波の方が強くて、ＩＤ登録のための空気圧センサからの電波を受信できなくてＩＤ登録不能となる場合も考えられたが、この様な問題も信号線でツールと空気圧センサ及び監視装置を接続してＩＤ登録を行うことによって一挙に解決する。

【００１６】

また、この様なツールでバーコード等から読み取ったＩＤを信号線で接続したいずれかのタイヤの空気圧センサに書き込むと共に、同じく信号線で接続したタイヤ空気圧監視装置に対して書き込む際に、タイヤ空気圧センサの位置に関する情報もタイヤ空気圧監視装置に書き込む様にしてやれば、単に、車両に装備されている空気圧センサのＩＤをタイヤ空気圧監視装置に登録するだけでなく、その位置までも登録することができる。

【００１７】

また、バーコード等から読み取ったＩＤを空気圧センサに書き込むに当たって、例えば４輪車であれば、右前、右後、左後、左前の順番に各センサにＩＤを書き込むことと定めておき、この順番で空気圧監視装置にもＩＤを書き込む様にしておけば、これによってもセンサのＩＤをタイヤの位置の情報と共に監視装置側に登録することができる。

【００１８】

なお、こうした位置も特定したＩＤの登録は、有線でなくて無線でＩＤ登録を行う場合にも可能である。例えば、各タイヤの空気圧センサにバーコードリーダ等からＩＤを登録する際に電波を用いる場合であれば、その電波の指向性を絞めてやるなどの工夫で十分に達成可能である。なお、無線でＩＤ登録を行う際の情報伝送媒体としては、電波以外にも、赤外線や超音波などを用いる様にしても構わない。

【００１９】

ここで、現在実用化されている車両において、監視装置側の受信アンテナを４個にして４輪それぞれの近くに備えておくことにより、タイヤ位置を特定した形でのＩＤ登録及びタイヤ空気圧の監視を可能にしたものがある。これに対し、本発明方法を用いれば、上述の様に、４輪のいずれであるかを特定した形でのＩＤ登録が監視装置側の受信アンテナの数を増加することなく可能であり、かつ、各タイヤの空気圧センサは固有のＩＤを持つ様にすることができるから、空気圧を監視する際には、受信アンテナが１箇所にあるだけでも、どのタイヤの空気圧がどの様な状態であるかを容易に判別することができる。よって、本発明方法によれば、タイヤ位置をも特定した形での空気圧の監視を、現在実用化されているシステムよりも簡単な装置構成で達成することができるという効果も発揮される。

【００２０】

また、本発明方法によれば、次の様な効果も発揮される。例えば、いずれかのタイヤの空気圧センサの送信部が壊れてしまったとする。この様な場合、ディーラーや修理工場では、当該タイヤの空気圧センサを新しいものと取り換える。このとき、新たなバーコードをバーコードリーダで読み取り、この読み取ったバーコードによって表される新たなＩＤを新たに取り付ける空気圧センサのＩＤ記憶部に書き込む。これと共に、監視装置に対して

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も、このＩＤを書き込む。この様にすることで、更新したセンサに関する登録手続だけでＩＤ登録を終えることができ、センサ更新に伴うＩＤ再登録の作業性が向上するという効果が受得される。

【００２１】

なお、どのセンサが壊れているかを判別する方法としては、車両運転中に一定期間以上空気圧検出信号を受信できなかったセンサのＩＤをタイヤ空気圧監視装置側のソフトウェアなどによって特定できる様にすることができる。従って、こうして特定したセンサのＩＤについては、更新作業の際に、監視装置のＩＤ記憶部から削除する様にすることもできる。なお、この壊れたセンサのＩＤは削除しないでおいてもよい。これは、結局、この壊れたセンサのＩＤを伴う空気圧信号は受信することがなく、空気圧を検出する４輪分のセンサのＩＤは再登録作業によって正しく登録されるのであるから、タイヤ空気圧の監視における不具合は生じないからである。

【００２２】

この様に、本発明方法によれば、空気圧センサが壊れた場合、更新したセンサへのＩＤ登録作業と、更新したセンサに関するＩＤを監視装置へ登録する作業とだけで足りるので、作業性が大幅に向上するという効果も期待できる。この様な効果に価値があるのは、従来の方法では、いずれかのタイヤの空気圧センサを取り換えた場合、監視装置をＩＤ登録モードにして当該装置のＩＤ登録内容をリセットし、全てのタイヤの空気圧センサから送信されてくるＩＤを再度受信して監視装置側に登録をしなければならなかったからである。

【００２３】

また、いずれかのセンサが壊れてこれを取り換えた場合や、タイヤがパンクしてタイヤごと取り換えることによりセンサが変わるといったケースにおいて、本発明方法によれば、修理工場や、バーコードリーダ等のＩＤ登録ツールを用いて、全てのタイヤの空気圧センサ及び車両本体側のタイヤ空気圧監視装置へのＩＤ再登録を実行する様にすることもできる。この場合、再登録時には、これが再登録である旨の情報を含んだＩＤ登録を行う様にすれば、後に、当該車両においてセンサ故障やタイヤのパンクによるセンサ又はタイヤの交換があったか否かを容易に判断することができ、車両のタイヤの履歴管理に利用することもできる。

【００２４】

上述した様なセンサの故障の場合ではなく、タイヤのパンクの場合にこれを利用して、パンクによって交換することとなったタイヤについては、ＩＤとその旨の情報を含んだバーコード等に基づいてセンサ及び監視装置へのＩＤの再登録を実行する様にしておくとより効果的である。これにより、タイヤの履歴管理といったことも、タイヤ空気圧監視装置や空気圧センサに登録されているＩＤを読み出すことによって可能となるからである。

【００２５】

また、上記目的を達成するためになされた本発明の第２のタイヤ空気圧センサのＩＤ登録方法は、各空気圧センサ、各タイヤ、各タイヤのホイール又は各タイヤのホイールカバーに可読情報としてセンサのＩＤを表示しておき、この可読情報からＩＤを読み取り、読み取った結果をタイヤ空気圧監視装置のＩＤ記憶部に書き込む様にしたことを特徴とする。

【００２６】

より具体的には、例えば、センサに登録したＩＤを表すバーコードをセンサ自体、タイヤ、ホイール又はホイールカバーに貼付しておき、このバーコードをバーコードリーダで読み取り、この読み取った情報をタイヤ空気圧監視装置のＩＤ記憶部に対して書き込む様にして本発明を実施することができる。この具体的方法によれば、空気圧センサに記憶されているＩＤを空気圧センサから送信するのではなく、バーコードに基づいてタイヤ空気圧監視装置に空気圧センサのＩＤが記憶されるので、従来技術にある様な混信による誤登録といった問題は発生しない。

【００２７】

また、この方法では、バーコードに、ＩＤに加えて、センサの製造工場や製造時期を表す情報も含ませておくことができる。こうした情報も含ませておき、この情報も併せて監視

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装置に記憶させる。そして、空気圧の監視に当たっては、ＩＤの部分だけに基づいてセンサの照合を行う。一方、センサが故障したりした場合には、監視装置側の情報を読み出すことにより、どのロットのセンサに故障が多いかといった情報を取り出すこともできる。これにより、自動車メーカーでは、自社で製造した車両の管理にも有効な情報を得ることができるという効果も発揮される。

【００２８】

この方法においても、バーコード以外に、データコード、ＱＲコード、マキシコード、ＣＰコード、ＰＤＦ４１７、コード４９、コードＥＣ又はコーダブロック等の各種の光学的可読情報を用いることができ、読み取りにはそれぞれの光学的可読情報に対応した光学的情報読み取り装置を用いることができる。

【００２９】

また、この方法においても、バーコードであれば、コード情報が数字によって付記されているので、この数字を作業者が読み取って、これを何らかのツールに手入力し、この手入力したデータをタイヤ空気圧監視装置に無線又は有線で送信してそれぞれのＩＤ記憶部に書き込む様にしてもよい。バーコードリーダを用いる場合は、バーコードリーダとタイヤ空気圧監視装置との間を信号線で接続し、バーコードから読み取ったＩＤをバーコードリーダからタイヤ空気圧監視装置に送信し、そのＩＤ記憶部に書き込む様にすることができる。この様に、有線でＩＤを書き込む様にした場合には、送信の問題は全くなくなる。

【００３０】

さらに、電波を用いる従来の方法では、例えば航空無線の様な他の電波の方が強くてＩＤ登録のためのセンサからの電波を受信できなくてＩＤ登録不能となる場合も考えられたが、この様な問題も信号線でツールと監視装置を接続してＩＤ登録を行うことによって一挙に解決する。

【００３１】

また、この様なツールでバーコード等から読み取ったＩＤを信号線で接続したタイヤ空気圧監視装置に対して書き込む際に、タイヤ空気圧センサの位置に関する情報もタイヤ空気圧監視装置に書き込む様にしてやれば、単に、車両に装備されている空気圧センサのＩＤをタイヤ空気圧監視装置に登録するだけでなく、その位置までも登録することができる。

【００３２】

また、バーコードからＩＤを読み取るに当たって、例えば４輪車であれば、右前、右後、左後、左前の順番にバーコードを読み取ることと定めておき、この順番でセンサ、タイヤ、ホイール又はホイールカバーに貼り付けられたバーコードを読み取る様にしておけば、これによってもセンサのＩＤをタイヤの位置の情報と共に監視装置側に登録することができる。

【００３３】

ここで、現在実用化されている車両では、タイヤ位置を特定したＩＤ登録を行うためには４個のアンテナが必要とされているが、本発明の方法によれば、４輪のいずれであるかを特定した形でのＩＤ登録が監視装置側の受信アンテナの数を増加することなく可能であり、かつ、各タイヤの空気圧センサは固有のＩＤを持つ様にすることができるから、受信アンテナが１箇所にあるだけでも、どのタイヤの空気圧がどの様な状態であるかを容易に判別することができる。よって、本発明方法によれば、タイヤ位置をも特定した形での空気圧の監視を、現在実用化されているシステムよりも簡単な装置構成で達成することができるという効果も発揮される。

【００３４】

この方法において、前記可読情報からＩＤを読み取り、該読み取ったＩＤを前記タイヤ空気圧監視装置に入力し、該タイヤ空気圧監視装置のＩＤ記憶部に既に書き込まれているＩＤの中から今回入力したＩＤを削除させる様にすることができる。

【００３５】

これは、センサ又はタイヤを交換した場合に有効である。即ち、取り外したセンサ又はタイヤに貼り付けられているバーコード等の可読情報のＩＤを読み取り、このＩＤをタイヤ

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空気圧監視装置のＩＤ記憶部から削除することで、無意味な情報を監視装置のＩＤ記憶部に登録したままとしなくてよいからである。

【００３６】

また、上記目的を達成するために成された本発明のタイヤ空気圧センサのＩＤ登録装置は、ＩＤを含む可読情報を提示するＩＤ提示器と、このＩＤ提示器に提示された可読情報からＩＤを読み取る読み取り装置と、この読み取り装置で読み取ったＩＤを各空気圧センサのＩＤ記憶部及びタイヤ空気圧監視装置のＩＤ記憶部に対して書き込むＩＤ書き込み装置とを備えていることを特徴とする。このＩＤ登録装置によれば、最初に説明した本発明の方法を容易に実行することができる。

【００３７】

ここで、ＩＤ提示器としては、車両毎に、その４輪のセンサに登録すべきＩＤを表示したバーコードを作成しておき、これを車両毎、より望ましくはそのタイヤ毎に整理して貼り付けた製造指示書の様なものをあげることができる。この場合、読み取り装置としてはバーコードリーダを用いることができる。ハンディタイプのものがより有効である。また、書き込み装置としては、この ハンディタイプのバーコードリーダに接続される製造管理用のコンピュータなどとしてもよいし、バーコードリーダ自体を書き込み装置としてもよい。

【００３８】

また、上記目的を達成するために成された本発明の第２のＩＤ登録装置は、各空気圧センサ、各タイヤ、各タイヤのホイール又は各タイヤのホイールカバーに貼り付けられたセンサのＩＤを含む可読情報表示ラベルと、この可読情報表示ラベルからＩＤを読み取る読み取り装置と、この読み取り装置で読み取ったＩＤを前記タイヤ空気圧監視装置のＩＤ記憶部に対して書き込むＩＤ書き込み装置とを備えていることを特徴とする。

【００３９】

このＩＤ登録装置によれば、予め、各空気圧センサ、各タイヤ、各タイヤのホイール又は各タイヤのホイールカバーに、センサのＩＤを含む可読情報表示ラベルを貼り付けておき、読み取り装置でこの可読情報表示ラベルからＩＤを読み取り、ＩＤ書き込み装置で、こうして読み取ったＩＤをタイヤ空気圧監視装置のＩＤ記憶部に対して書き込むといった用い方をすることで、上述した本発明の第２の方法を実行することができる。

【００４０】

この第２のＩＤ登録装置においては、読み取り装置で読み取ったＩＤをタイヤ空気圧監視装置に入力し、このタイヤ空気圧監視装置のＩＤ記憶部に既に書き込まれているＩＤの中から今回入力したＩＤを削除させるＩＤ削除装置を備えさせることができる。

【００４１】

この様にすることで、タイヤを交換する様なときには、ＩＤ削除装置にて、取り外すタイヤに貼り付けられているバーコードを読み取り、このバーコードによって示されるＩＤをタイヤ空気圧監視装置に入力し、このタイヤ空気圧監視装置のＩＤ記憶部に既に書き込まれているＩＤの中から今回入力したＩＤを削除させれば、取り外したタイヤに装着されていたセンサのＩＤを削除することができる。

【００４２】

なお、本発明のＩＤ登録装置において用いることのできる可読情報を例示すると、バーコード、データコード、ＱＲコード、マキシコード、ＣＰコード、ＰＤＦ４１７、コード４９、コード１６Ｋ又はコーダブロック等の光学的可読情報をあげることができる。これらの光学的可読情報を用いる場合には、ＩＤの読み取りには光学的情報読み取り装置を用いることができる。

【００４３】

また、本発明のＩＤ登録装置においては、ＩＤ書き込み装置は、タイヤ空気圧監視装置との間を信号線で連結し、タイヤ空気圧監視装置に記憶させるべきＩＤを該信号線を介して送信する様に構成しておくことができる。有線による効果は既に述べた通りである。

【００４４】

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また、上記目的を達成するためになされた本発明のタイヤ空気圧監視システム用ＩＤ登録ツールは、各空気圧センサ、各タイヤ、各タイヤのホイール又は各タイヤのホイールカバーに貼り付けられたセンサのＩＤを含む可読情報表示ラベルからＩＤを読み取る読み取り部と、この読み取り部で読み取ったＩＤをタイヤ空気圧監視装置に対して送信するＩＤ送信部と、このＩＤ送信部から送信したＩＤの登録又は削除を指示する記憶状態指示部とを備えていることを特徴とする。

【００４５】

この本発明のＩＤ登録ツールによれば、ＩＤ登録の際には、読み取り部で、車両に取り付けられている各空気圧センサ、各タイヤ、各タイヤのホイール又は各タイヤのホイールカバーに貼り付けられたセンサのＩＤを含む可読情報表示ラベルからＩＤを読み取り、この読み取り部で読み取ったＩＤを、ＩＤ送信部によってタイヤ空気圧監視装置に対して送信すると共に、記憶状態指示部にて、このＩＤ送信部から送信したＩＤの登録又は削除を指示する。これにより、車載監視装置には、当該装置が搭載された車両に装着される各タイヤの空気圧センサのＩＤが正しく書き込まれる。

【００４６】

ここで、読み取り部は、バーコード、データコード、ＱＲコード、マキシコード、ＣＰコード、ＰＤＦ４１７、コード４９、コード１６Ｋ又はコーデブロック等の光学的可読情報を光学的に読み取る光学的情報読み取り部としておくことができる。

【００４７】

また、このタイヤ空気圧監視システム用ＩＤ登録ツールにおいて、当該ＩＤ登録ツールは、前記タイヤ空気圧監視装置との間を連絡するための信号線自体又は当該信号線を接続するためのコネクタを備えたものとすることができる。この様に有線でＩＤの送信を行う様にすれば、混信の問題は一切ないし、さらに、電波障害による登録不能状態を招くこともない。

【００４８】

さらに、本発明のタイヤ空気圧監視システム用ＩＤ登録ツールにおいて、前記タイヤ空気圧監視装置に対して、ＩＤ登録モードとするためのトリガ信号を送信するトリガ信号送信部を備えたものとすることができる。この様にトリガ信号送信部を備えさせることで、ＩＤ登録を実行する際に、最初に、トリガ信号を送信してタイヤ空気圧監視装置をＩＤ登録モードとしてやり、その後、読み取り部で読み取ったＩＤを送信してやれば、スムーズにＩＤの登録を実行できる。

【００４９】

また、上記目的を達成するためになされた本発明の空気圧センサ付きタイヤは、空気圧センサのＩＤを含む情報を表示する光学的可読情報ラベルを、空気圧センサ、タイヤ自体、ホイール又はホイールカバーに貼り付けられたものである。ここで、光学的可読情報ラベルとしては、バーコードラベル、データコードラベル、ＱＲコードラベル、マキシコードラベル、ＣＰコードラベル、ＰＤＦ４１７ラベル、コード４９ラベル、コード１６Ｋラベル又はコーデブロックラベルをあげることができる。

【００５０】

【発明の実施の形態】

次に、本発明の実施の形態を図面と共に説明する。図１は、本実施の形態の概略構成を表すブロック図である。図示の様に、本実施の形態のタイヤ空気圧監視システムは、各タイヤに装着される空気圧センサ１０、２０、３０、４０と、車両本体に備えられるタイヤ空気圧監視装置５０とから構成されている。空気圧センサ１０には、タイヤ内の空気圧を検出するための圧力センサ１１と、予めセンサＩＤを記憶してあるＩＤメモリ１２と、送信回路１３と、電源電池１４と、制御装置１５と、送信用のアンテナ１６とが備えられている。他の空気圧センサ２０、３０、４０も同様の構成となっている。

【００５１】

一方、タイヤ空気圧監視装置５０は、受信回路５１と、受信用のアンテナ５２と、電源回路５３と、制御装置５４と、メモリ５５と、インジケータやＬＥＤ等の表示器６１へ表示

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データを送信するための通信回路５６とが備えられている。この通信回路５６は、表示器８１から、その表示状態等を示す信号を受信することもできる様に構成されている。また、このタイヤ空気圧監視装置５０への電源は、車載バッテリ８２から供給される様になっている。

【００５２】

各空気圧センサ１０、２０、３０、４０のＩＤメモリ１２、２２、３２、４２には、それぞれのＩＤ（１２３４５５、２３４５６７、３４５６７８、４５６７８９）が記憶されている。本実施の形態のタイヤ空気圧監視システムでは、この各空気圧センサのＩＤをタイヤ空気圧監視装置５０のメモリ５５に登録する必要がある。このため、図２に示す様に、各タイヤ１、２、３、４のホイール１ａ、２ａ、３ａ、４ａには、それぞれ、空気圧センサ１０、２０、３０、４０のＩＤを表すバーコード５、６、７、８が取り付けられている。本実施の形態では、このバーコード５、６、７、８からＩＤを読み取ってタイヤ空気圧監視装置５０に書き込むためのＩＤ登録ツール６０が使用される。

【００５３】

ＩＤ登録ツール６０は、バーコード読み取り部６１と、バーコード読み取り部６１で読み取ったＩＤを、タイヤ空気圧監視装置５０に送信するＩＤ送信部６２とを備えている。また、ＩＤ登録ツール６０は、タイヤ空気圧監視装置５０との間で通信するための信号線６３を接続するためのコネクタ６４を備えている。なお、信号線６３は、先端をワニ口クリップとされており、このワニ口クリップにてタイヤ空気圧監視装置５０の通信回路５６から表示器８１へ伸びる信号線５７に接続できる様になっている。

【００５４】

また、ＩＤ登録ツール６０には、制御装置６５、メモリ６６、電源電池６７、操作パネル６８及びディスプレイ６９も備えられている。制御装置６５は、このＩＤ登録ツール６０を用いて実行する各種処理のための制御を行う部分で、ＣＰＵ、ＲＯＭ、ＲＡＭ等を有するマイクロコンピュータによって構成されている。メモリ６６は、書き換えが可能なＥＥＰＲＯＭやフラッシュメモリ、ＤＲＡＭなどで構成されている。電源電池６７としては、乾電池、ボタン電池等が使用される。操作パネル６８は、このＩＤ登録ツール６０を用いて実行する処理の内容を指示したりするための操作キーを備えたものである。ディスプレイ６９は、バーコード読み取り部６１で読み取ったバーコードの数値を表示したり、このＩＤ登録ツール６０の操作モードを表示したりするためのものであり、例えば、ＬＣＤによって構成される。

【００５６】

次に、本実施の形態において、空気圧センサ１０、２０、３０、４０のＩＤを、タイヤ空気圧監視装置５０に登録する方法について説明する。この方法を実施するに当たっては、ＩＤ登録ツール６０の信号線６３をコネクタ６４に接続すると共に、信号線６３の先端のワニ口クリップをタイヤ空気圧監視装置５０の通信回路５６から表示器８１へ伸びる信号線５７に接続する。そして、以下に説明する様な手順で登録作業を実行する。

【００５８】

登録作業では、図２のフローチャートに示す様に、まず最初に、監視装置５０をＩＤ登録モードに切り替える（Ｓ１０）。そして、初回登録かどうかを判断する（Ｓ２０）。初回登録である場合には（Ｓ２０：ＹＥＳ）、ＩＤ登録ツール６０を用いてバーコード５、６、７、８からＩＤを読み取り（Ｓ３０）、このＩＤをＩＤ登録ツール６０からタイヤ空気圧監視装置５０へと送信する（Ｓ４０）。タイヤ空気圧監視装置５０は、受信したＩＤをメモリ５５へと登録する（Ｓ５０）。そして、タイヤ空気圧監視装置５０のメモリ５５に必要個数のＩＤを登録したかどうかを判断する（Ｓ６０）。必要個数のＩＤ登録が完了していない場合は（Ｓ６０：ＮＯ）、Ｓ４０以下の手順を繰り返し実行する。必要個数のＩＤ登録が完了した場合は（Ｓ６０：ＹＥＳ）、監視装置５０を通常モードに切り替えてＩＤ登録作業を終了する（Ｓ７０）。

【００５７】

一方、初回登録ではない場合、即ち、修理工場等においてタイヤを交換する様な場合であ

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るまでは（Ｓ２０：ＮＯ），ＩＤ登録ツール６０を用いて取り外したタイヤに貼り付けられているバーコードからＩＤを読み取る（Ｓ３０）。そして，このＩＤをＩＤ登録ツール６０からタイヤ空気圧監視装置５０へと送信する（Ｓ４０）。このＩＤを受信したタイヤ空気圧監視装置５０では，このＩＤに対応するＩＤをメモリ５５から削除する（Ｓ１００）。次に，ＩＤ登録ツール６０を用いて新たに取り付けるタイヤに貼り付けられているバーコードからＩＤを読み取る（Ｓ１１０）。そして，このＩＤをＩＤ登録ツール６０からタイヤ空気圧監視装置５０へと送信する（Ｓ１２０）。タイヤ空気圧監視装置５０は，受信したＩＤをメモリ５５へと登録する（Ｓ１３０）。その後，タイヤ空気圧監視装置５０へのＩＤ再登録が完了したか否かを判断する（Ｓ１４０）。ＩＤ再登録が完了していない場合は（Ｓ１４０：ＮＯ），Ｓ１３０以下の手順を繰り返し実行する。一方，必要個数のＩＤ登録が完了した場合は（Ｓ１４０：ＹＥＳ），監視装置５０を通常モードに切り替えてＩＤ登録作業を終了する（Ｓ１５０）。

【００５８】

次に，以上の様な登録作業を実行するためにＩＤ登録ツール６０にインストールされているプログラムの内容を図４～図６のフローチャートに従って説明する。ＩＤ登録ツール６０の操作パネル６８の所定のボタンを押下すると以下のプログラムが開始される。このプログラムでは，まず最初に，タイヤ空気圧監視装置５０をＩＤ登録モードにするためのトリガ信号を送信する（Ｓ２１０）。次に，操作パネル６８の操作を待って，タイヤ空気圧監視装置５０に対する初回登録か否かを判定する（Ｓ２２０）。

【００５９】

初回登録である場合は（Ｓ２２０：ＮＯ），ディスプレイ６９に，車両の左前のタイヤのバーコードの読み取り指示メッセージを表示する（Ｓ２３０）。そして，読み取りが完了したか否かを判定する（Ｓ２４０）。読み取りが完了したと判定された場合は（Ｓ２４０：ＹＥＳ），読み取り結果をメモリ６６内に，タイヤの位置（左前）と対応づけて記憶する（Ｓ２５０）。次に，左後のタイヤのバーコードの読み取り指示メッセージを表示する（Ｓ２８０）。そして，読み取りが完了したか否かを判定する（Ｓ２７０）。読み取りが完了したと判定された場合は（Ｓ２７０：ＹＥＳ），読み取り結果をメモリ６６内に，タイヤの位置（左後）と対応づけて記憶する（Ｓ２６０）。次に，右後のタイヤのバーコードの読み取り指示メッセージを表示する（Ｓ２９０）。そして，読み取りが完了したか否かを判定する（Ｓ３００）。読み取りが完了したと判定された場合は（Ｓ３００：ＹＥＳ），読み取り結果をメモリ６６内に，タイヤの位置（右後）と対応づけて記憶する（Ｓ３１０）。次に，右前のタイヤのバーコードの読み取り指示メッセージを表示する（Ｓ３２０）。そして，読み取りが完了したか否かを判定する（Ｓ３３０）。読み取りが完了したと判定された場合は（Ｓ３３０：ＹＥＳ），読み取り結果をメモリ６６内に，タイヤの位置（右前）と対応づけて記憶する（Ｓ３４０）。

【００６０】

次に，メモリ６６から，まず左前のタイヤの空気圧センサに対応するＩＤを読み出してこれをタイヤ空気圧監視装置５０に送信する（Ｓ３５０）。続いて，タイヤ空気圧監視装置５０に対してＩＤ登録を指示するコマンドを送信する（Ｓ３６０）。そして，タイヤ空気圧監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ３７０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ３７０：ＮＯ），Ｓ３５０へ戻る。一方，登録完了の返信が来た場合には（Ｓ３７０：ＹＥＳ），次に，メモリ６６から，左後のタイヤの空気圧センサに対応するＩＤを読み出してこれをこれをタイヤ空気圧監視装置５０に送信する（Ｓ３８０）。続いて，タイヤ空気圧監視装置５０に対してＩＤ登録の指示コマンドを送信する（Ｓ３９０）。そして，タイヤ空気圧監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ４００），所定時間以上待ってもこの返信が来ない場合は（Ｓ４００：ＮＯ），Ｓ３８０へ戻る。一方，登録完了の返信が来た場合には（Ｓ４００：ＹＥＳ），次に，メモリ６６から，右後のタイヤの空気圧センサに対応するＩＤを読み出してこれをタイヤ空気圧監視装置５０に送信する（Ｓ４１０），続いて，タイヤ空気圧監視装置５０に対してＩＤ登録の指示コマンドを送信する（Ｓ４２０），そして，タイヤ空気圧監視

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装置５０から登録完了の返信が来たか否かを判定する（Ｓ４８０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ４８０：ＮＯ）、Ｓ４１０へ戻る。一方、登録完了の返信が来た場合には（Ｓ４８０：ＹＥＳ）、次に、メモリ５８から、右前のタイヤの空気圧センサに対応するＩＤを読み出してこれをタイヤ空気圧監視装置５０に送信する（Ｓ４９０）。続いて、タイヤ空気圧監視装置５０に対してＩＤ登録の指示コマンドを送信する（Ｓ４５０）。そして、タイヤ空気圧監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ４６０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ４６０：ＮＯ）、Ｓ４４０へ戻る。一方、登録完了の返信が来た場合には（Ｓ４６０：ＹＥＳ）、タイヤ空気圧監視装置５０に対して、通常モードへの復帰を指示するトリガ信号を出力して処理を終了する（Ｓ４７０）。

【００６１】

初回登録でない場合、即ち、タイヤ交換に伴う再登録の場合は（Ｓ２２０：ＹＥＳ）、ディスプレイ６９に、取り外したタイヤのバーコードの読み取り指示メッセージを表示する（Ｓ４８０）。そして、読み取りが完了したか否かを判定する（Ｓ４９０）。読み取りが完了したと判定された場合は（Ｓ４９０：ＹＥＳ）、読み取り結果をメモリ８６内に記憶する（Ｓ５００）。次に、メモリ８６から、Ｓ５００で記憶したＩＤを読み出してこれを監視装置５０に対して送信する（Ｓ５１０）。続いて、タイヤ空気圧監視装置５０に対してＩＤ削除の指示コマンドを送信する（Ｓ５２０）。そして、タイヤ空気圧監視装置５０から削除完了の返信が来たか否かを判定する（Ｓ５３０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ５３０：ＮＯ）、Ｓ５１０へ戻る。一方、削除完了の返信が来た場合には（Ｓ５３０：ＹＥＳ）、次に、ディスプレイ６９に新しく取り付けるタイヤからバーコードを読み取るべき旨の指示メッセージを表示する（Ｓ５４０）。そして、読み取りが完了したか否かを判定する（Ｓ５５０）。読み取りが完了したと判定された場合は（Ｓ５５０：ＹＥＳ）、読み取り結果をメモリ８６内に記憶する（Ｓ５６０）。次に、メモリ８６から、Ｓ５４０で記憶したＩＤを読み出してこれをタイヤ空気圧監視装置５０へと送信する（Ｓ５７０）。続いて、タイヤ空気圧監視装置５０に対してＩＤ登録の指示コマンドを送信する（Ｓ５８０）。そして、タイヤ空気圧監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ５９０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ５９０：ＮＯ）、Ｓ５７０へ戻る。一方、登録完了の返信が来た場合には（Ｓ５９０：ＹＥＳ）、次に、ディスプレイ６９に他に再登録すべきタイヤがあるか否かの問い合わせメッセージを表示してパネル操作の結果を待つ（Ｓ６００、Ｓ６１０）。パネル操作によって他にも再登録すべきタイヤがあるとの指示入力があった場合は（Ｓ６１０：ＹＥＳ）、Ｓ４８０以下の処理を繰り返し実行する。一方、再登録が完了した旨の指示入力があった場合は（Ｓ６１０：ＮＯ）、タイヤ空気圧監視装置５０に対して、通常モードへの復帰を指示するトリガ信号を出力して処理を終了する（Ｓ６２０）。

【００６２】

次に、タイヤ空気圧監視装置５０において実行される制御処理の内容について説明する。この制御処理Ｂは、図７、図８に示す様に、まず最初に、ＩＤ登録モードへの切替を指示するトリガ信号を受信したか否かを判定する（Ｓ７００）。ＩＤ登録モードへの切替を指示するトリガ信号を受信した場合には（Ｓ７００：ＹＥＳ）、ＩＤ登録モードに切り替え（Ｓ７１０）、ＩＤを受信したか否かを判定する（Ｓ７２０）。ＩＤを受信した場合は（Ｓ７２０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ７３０）。そして、ＩＤ登録又はＩＤ削除のいずれの指示を受信したか否かを判定する（Ｓ７４０）。ＩＤ登録の指示を受信した場合は（Ｓ７４０：登録）、Ｓ７３０で一時記憶したＩＤを、メモリ５５内へ、左前のタイヤの空気圧センサのＩＤとして登録する（Ｓ７５０）。そして、ＩＤ登録完了の返信を実行する（Ｓ７６０）。続いて、ＩＤを受信したか否かを判定する（Ｓ７７０）。ＩＤを受信した場合は（Ｓ７７０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ７８０）。そして、ＩＤ登録の指示を受信したか否かを判定する（Ｓ７９０）。ＩＤ登録の指示を受信した場合は（Ｓ７９０：ＹＥＳ）、Ｓ７８０で一時記憶したＩＤを、メモリ５５内へ、左後のタイヤの空気圧センサのＩＤとして登録

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する（Ｓ８００）。そして、ＩＤ登録完了の返信を実行する（Ｓ８１０）。続いて、ＩＤを受信したか否かを判定する（Ｓ８２０）。ＩＤを受信した場合は（Ｓ８２０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ８３０）。そして、ＩＤ登録の指示を受信したか否かを判定する（Ｓ８４０）。ＩＤ登録の指示を受信した場合は（Ｓ８４０：ＹＥＳ）、Ｓ８３０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして登録する（Ｓ８５０）。そして、ＩＤ登録完了の返信を実行する（Ｓ８６０）。続いて、ＩＤを受信したか否かを判定する（Ｓ８７０）。ＩＤを受信した場合は（Ｓ８７０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ８８０）。そして、ＩＤ登録の指示を受信したか否かを判定する（Ｓ８９０）。ＩＤ登録の指示を受信した場合は（Ｓ８９０：ＹＥＳ）、Ｓ８８０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして登録する（Ｓ９００）。そして、ＩＤ登録完了の返信を実行する（Ｓ９１０）。その後、モードを通常モードへ切り替えるべき旨のトリガ信号を受信したか否かを判定する（Ｓ９２０）。通常モードへの切替を指示するトリガ信号を受信したら（Ｓ９２０：ＹＥＳ）、通常モードに切り替えて処理を終了する（Ｓ９３０）。

【００８３】

一方、Ｓ７２０でＩＤを受信してＳ７３０でＲＡＭのワークエリアに一時記憶した後、ＩＤ削除の指示を受信した場合は（Ｓ７４０：削除）、Ｓ７３０で一時記憶したＩＤと同一のＩＤをメモリ５５から削除する（Ｓ９４０）。そして、ＩＤ削除完了の返信を実行する（Ｓ９５０）。続いて、ＩＤを受信したか否かを判定する（Ｓ９６０）。ＩＤを受信した場合は（Ｓ９６０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ９７０）。そして、ＩＤ登録の指示を受信したか否かを判定する（Ｓ９８０）。ＩＤ登録の指示を受信した場合は（Ｓ９８０：ＹＥＳ）、Ｓ９７０で一時記憶したＩＤを、メモリ５５内のＳ９４０で削除したＩＤに対応する位置のタイヤの空気圧センサのＩＤとして登録する（Ｓ９９０）。そして、ＩＤ登録完了の返信を実行する（Ｓ１０００）。続いて、通常モードへの切替を指示するトリガ信号かそれとも新たなＩＤを受信したか否かを判定する（Ｓ１０１０、Ｓ１０２０）。新たなＩＤを受信した場合は（Ｓ１０１０：ＮＯ、Ｓ１０２０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ１０３０）。そして、ＩＤ削除の指示を受信したか否かを判定する（Ｓ１０４０）。ＩＤ削除の指示を受信した場合は（Ｓ１０４０：ＹＥＳ）、Ｓ９４０以下の処理へと移行する。一方、Ｓ１０１０で通常モードへの切替を指示するトリガ信号を受信した場合は、Ｓ９３０へ進み、通常モードに切り替えて処理を終了する。

【００８４】

上述したような初期処理が、ＩＤ登録ツール６０及びタイヤ空気圧監視装置５０において実行される結果、初回登録時には、左前、左後、右後、右前と、タイヤの位置と対応付けて空気圧センサのＩＤを登録することができる。そして、このとき、従来技術のような混信による誤登録や、他の電波による登録不能状態を招くといったことがない。また、タイヤ交換あるいはタイヤのローテーションの際には、上述の様な初期処理により、交換後のタイヤの位置と対応付けてセンサＩＤを登録することができる。タイヤ交換の場合は、交換するタイヤに関してだけの再登録作業だけで済み、工数の削減が達成される。また、ローテーションの場合も、位置の変更を解除したＩＤの再登録が可能である。そして、この再登録作業の際にも、混信による誤登録の問題をなくすことができる。

【００８５】

次に、第２の実施の形態について説明する。第２の実施の形態では、図９に示す様に、ＩＤ登録ツール６０を、タイヤ空気圧監視装置５０に対してだけでなく、各タイヤの空気圧センサ１０、２０、３０、４０に対しても信号線６３ａ、６３ｂ、６３ｃ、６３ｄで接続する。ＩＤ登録ツール６０には、これらの信号線６３ａ、６３ｂ、６３ｃ、６３ｄをツール本体に接続するためのコネクタ６４ａ、６４ｂ、６４ｃ、６４ｄが備えられている、また、これらの信号線６３ａ、６３ｂ、６３ｃ、６３ｄの先端もワニクリップとされており、各センサ１０、２０、３０、４０のアンテナ１８、２８、３８、４８に接続できる様

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になっている。また、各センサ１０、２０、３０は、送信だけでなく受信もできる送受信回路１３ａ、２３ａ、３３ａ、４３ａを備えたものとして構成されている。

【００６６】

この第２の実施の形態では、図１０に示す様に、車両毎の登録用のＩＤを管理シート９０として供給する。この管理シート９０には、車両毎の登録用ＩＤがバーコード９１ＦＬ、９１ＲＬ、９１ＲＲ、９１ＦＲとして表示されている。そして、以下の手順で登録作業が実行される。

【００６７】

登録作業を行う際には、各センサ１０、２０、３０、４０及び監視装置５０に対して、ＩＤ登録ツール６０の信号線６３、６３ａ、６３ｂ、６３ｃ、６３ｄを接続する。そして、図１１のフローチャートに示す様な手順で作業を実行する。まず最初に、各センサ１０、２０、３０、４０及び監視装置５０をＩＤ登録モードに切り替える（Ｓ１１１０）。次に、初回登録であるかを判断する（Ｓ１１２０）。初回登録である場合には（Ｓ１１２０：ＹＥＳ）、ＩＤ登録ツール６０を用いて管理シート９０に表示されているバーコード９１ＦＬ、９１ＲＬ、９１ＲＲ、９１ＦＲを読み取る（Ｓ１１３０）。そして、このバーコード９１ＦＬ、９１ＲＬ、９１ＲＲ、９１ＦＲから読み取ったＩＤをＩＤ登録ツール６０から各空気圧センサ１０、２０、３０、４０及びタイヤ空気圧監視装置５０へと送信する（Ｓ１１４０）。各空気圧センサ１０、２０、３０、４０及びタイヤ空気圧監視装置５０は、受信したＩＤをＩＤメモリ１２、２２、３２、４２及びメモリ５５へと登録する（Ｓ１１５０）。

【００６８】

この際、各空気圧センサ１０、２０、３０、４０に対して信号線６８ａ、６８ｂ、６８ｃ、６８ｄを正しく接続し、ＩＤ登録ツール６０でバーコード９１ＦＬ、バーコード９１ＲＬ、バーコード９１ＲＲ、バーコード９１ＦＲの順番で読み取りを実行することにより、空気圧センサ１０にはバーコード９１ＦＬにより表されるＩＤが、空気圧センサ２０にはバーコード９１ＲＬにより表されるＩＤが、空気圧センサ３０にはバーコード９１ＲＲにより表されるＩＤが、空気圧センサ４００にはバーコード９１ＦＲにより表されるＩＤがそれぞれ登録される。また、監視装置５０のメモリ５５へは、バーコード９１ＦＬにより表されるＩＤが左前のタイヤのものとして、バーコード９１ＲＬにより表されるＩＤが左後のタイヤのものとして、バーコード９１ＲＲにより表されるＩＤが右後のタイヤのものとして、バーコード９１ＦＲにより表されるＩＤが右前のタイヤのものとして登録される。

【００６９】

これで空気圧センサ１０、２０、３０、４０及び監視装置５０への初回のＩＤ登録が完了したら、空気圧センサ１０、２０、３０、４０及び監視装置５０を通常モードに切り替えてＩＤ登録作業を終了する（Ｓ１１６０）。

【００７０】

一方、初回登録ではない場合、即ち、修理工場等においてタイヤを交換する様な場合であるときは（Ｓ１１２０：ＹＥＳ）、ＩＤ登録ツール６０を用いて、図１２に示す様な再登録用管理シート９０'に表示されているバーコード９１ＦＬ'、９１ＲＬ'、９１ＲＲ'、９１ＦＲ'を読み取る（Ｓ１１７０）。そして、このバーコード９１ＦＬ'、９１ＲＬ'、９１ＲＲ'、９１ＦＲ'から読み取ったＩＤをＩＤ登録ツール６０から各空気圧センサ１０、２０、３０、４０及びタイヤ空気圧監視装置５０へと送信する（Ｓ１１８０）。

【００７１】

ここで、ローテーションの場合は、ローテーション後のタイヤの位置に応じて、ローテーション後の左前のタイヤの空気圧センサに信号線６３ａを、ローテーション後の左後のタイヤの空気圧センサに信号線６３ｂを、ローテーション後の右後のタイヤの空気圧センサに信号線６３ｃを、ローテーション後の右前のタイヤの空気圧センサに信号線６３ｄを接続しておく。また、タイヤ交換の場合は、新たに装着するタイヤの空気圧センサに対して、その装着位置に応じて、左前ならば信号線６３ａを、左後ならば信号線６３ｂを、右後

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ならば信号線８３ｃを、右前ならば信号線８３ｄを接続しておく。交換しないタイヤの空気圧センサについても、左前ならば信号線８３ａを、左後ならば信号線８３ｂを、右後ならば信号線８３ｃを、右前ならば信号線８３ｄを接続しておく。

【００７２】

各空気圧センサ１０、２０、３０、４０及びタイヤ空気圧監視装置５０は、受信したＩＤをＩＤメモリ１２、２２、３２、４２及びメモリ５５へと上書きによって再登録することでＩＤの更新を実行する（Ｓ１１９０）。

【００７３】

この場合も、ＩＤ登録ツール８０がバーコード９１ＦＬ'、バーコード９１ＲＬ'、バーコード９１ＲＲ'、バーコード９１ＦＲ'の順番で読み取りを実行することにより、ローテーション又はタイヤ交換後の左前の空気圧センサ１０にはバーコード９１ＦＬ'により表されるＩＤが、左後の空気圧センサ２０にはバーコード９１ＲＬ'により表されるＩＤが、右後の空気圧センサ３０にはバーコード９１ＲＲ'により表されるＩＤが、右前の空気圧センサ４００にはバーコード９１ＦＲ'により表されるＩＤがそれぞれ登録される。また、監視装置５０のメモリ５５へは、バーコード９１ＦＬ'により表されるＩＤが左前のタイヤのものとして、バーコード９１ＲＬ'により表されるＩＤが左後のタイヤのものとして、バーコード９１ＲＲ'により表されるＩＤが右後のタイヤのものとして、バーコード９１ＦＲ'により表されるＩＤが右前のタイヤのものとして登録される。

【００７４】

こうして空気圧センサ１０、２０、３０、４０及び監視装置５０へのＩＤの再登録が完了したら、空気圧センサ１０、２０、３０、４０及び監視装置５０を通常モードに切り替えてＩＤ登録作業を終了する（Ｓ１１６０）。

【００７５】

次に、以上の様な登録作業を実行するためにＩＤ登録ツール８０にインストールされているプログラムの内容を図１８～図１９のフローチャートに従って説明する。ＩＤ登録ツール８０の操作パネル８８の所定のボタンを押下すると以下のプログラムが開始される。このプログラムでは、まず最初に、タイヤ空気圧センサ１０、２０、３０、４０及びタイヤ空気圧監視装置５０をＩＤ登録モードにするためのトリガ信号を送信する（Ｓ１２１０）。次に、操作パネル８８の操作を待って、初回登録か否かを判定する（Ｓ１２２０）。

【００７６】

初回登録である場合は（Ｓ１２２０：ＹＥＳ）、ディスプレイ８９に、登録用シート９０のバーコード９１ＦＬの読み取り指示メッセージを表示する（Ｓ１２３０）。そして、読み取りが完了したか否かを判定する（Ｓ１２４０）。読み取りが完了したと判定された場合は（Ｓ１２４０：ＹＥＳ）、読み取り結果をメモリ８８内に、タイヤの位置（左前）と対応づけて記憶する（Ｓ１２５０）。次に、バーコード９１ＲＬの読み取り指示メッセージを表示する（Ｓ１２６０）。そして、読み取りが完了したか否かを判定する（Ｓ１２７０）。読み取りが完了したと判定された場合は（Ｓ１２７０：ＹＥＳ）、読み取り結果をメモリ８８内に、タイヤの位置（左後）と対応づけて記憶する（Ｓ１２８０）。次に、バーコード９１ＲＲの読み取り指示メッセージを表示する（Ｓ１２９０）。そして、読み取りが完了したか否かを判定する（Ｓ１３００）。読み取りが完了したと判定された場合は（Ｓ１３００：ＹＥＳ）、読み取り結果をメモリ８８内に、タイヤの位置（右後）と対応づけて記憶する（Ｓ１３１０）。次に、バーコード９１ＦＲの読み取り指示メッセージを表示する（Ｓ１３２０）。そして、読み取りが完了したか否かを判定する（Ｓ１３３０）。読み取りが完了したと判定された場合は（Ｓ１３３０：ＹＥＳ）、読み取り結果をメモリ８８内に、タイヤの位置（右前）と対応づけて記憶する（Ｓ１３４０）。

【００７７】

次に、メモリ８８から、まず左前のタイヤの空気圧センサに対応するＩＤを読み出してこれを空気圧センサ１０及びタイヤ空気圧監視装置５０へと送信する（Ｓ１３５０）。続いて、空気圧センサ１０及びタイヤ空気圧監視装置５０に対してＩＤ登録を指示するコマンドを送信する（Ｓ１３６０）。そして、空気圧センサ１０及びタイヤ空気圧監視装置５０

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から登録が完了の返信が来たか否かを判定する（Ｓ１３７０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ１３７０：ＮＯ）、Ｓ１３５０へ戻る。一方、登録完了の返信が来た場合には（Ｓ１３７０：ＹＥＳ）、次に、メモリ６６から、左後のタイヤの空気圧センサに対応するＩＤを読み出してこれを空気圧センサ２０及び監視装置５０へと送信する（Ｓ１３８０）。続いて、空気圧センサ２０及びタイヤ空気圧監視装置５０に対してＩＤ登録の指示コマンドを送信する（Ｓ１３９０）。そして、空気圧センサ２０及びタイヤ空気圧監視装置５０から登録が完了の返信が来たか否かを判定する（Ｓ１４００）。所定時間以上待ってもこの返信が来ない場合は（Ｓ１４００：ＮＯ）、Ｓ１３８０へ戻る。一方、登録完了の返信が来た場合には（Ｓ１４００：ＹＥＳ）、次に、メモリ６６から、右後のタイヤの空気圧センサに対応するＩＤを読み出してこれを空気圧センサ３０及び監視装置５０へと送信する（Ｓ１４１０）。続いて、空気圧センサ３０及びタイヤ空気圧監視装置５０に対してＩＤ登録の指示コマンドを送信する（Ｓ１４２０）。そして、空気圧センサ３０及びタイヤ空気圧監視装置５０から登録が完了の返信が来たか否かを判定する（Ｓ１４３０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ１４３０：ＮＯ）、Ｓ１４１０へ戻る。一方、登録完了の返信が来た場合には（Ｓ１４３０：ＹＥＳ）、次に、メモリ６６から、右前のタイヤの空気圧センサに対応するＩＤを読み出してこれを空気圧センサ４０及び監視装置５０へと送信する（Ｓ１４４０）。続いて、空気圧センサ４０及びタイヤ空気圧監視装置５０に対してＩＤ登録の指示コマンドを送信する（Ｓ１４５０）。そして、空気圧センサ４０及びタイヤ空気圧監視装置５０から登録が完了の返信が来たか否かを判定する（Ｓ１４６０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ１４６０：ＮＯ）、Ｓ１４４０へ戻る。一方、登録完了の返信が来た場合には（Ｓ１４６０：ＹＥＳ）、空気圧センサ１０、２０、３０、４０及びタイヤ空気圧監視装置５０に対して、通常モードへの復帰を指示するトリガ信号を出力して処理を終了する（Ｓ１４７０）。

【００７８】

初回登録でない場合、即ち、タイヤ交換に伴う再登録の場合は（Ｓ１２２０：ＹＥＳ）、ディスプレイ６９に、再登録用シート９０’に表示されているバーコード９１ＦＬ’の読み取り指示メッセージを表示する（Ｓ１５３０）。そして、読み取りが完了したか否かを判定する（Ｓ１５４０）。読み取りが完了したと判定された場合は（Ｓ１５４０：ＹＥＳ）、読み取り結果をメモリ６６内に、タイヤの位置（左前）と対応づけて記憶する（Ｓ１５５０）。次に、バーコード９１ＲＬ’の読み取り指示メッセージを表示する（Ｓ１５６０）。そして、読み取りが完了したか否かを判定する（Ｓ１５７０）。読み取りが完了したと判定された場合は（Ｓ１５７０：ＹＥＳ）、読み取り結果をメモリ６６内に、タイヤの位置（左後）と対応づけて記憶する（Ｓ１５８０）。次に、バーコード９１ＲＲ’の読み取り指示メッセージを表示する（Ｓ１５９０）。そして、読み取りが完了したか否かを判定する（Ｓ１６００）。読み取りが完了したと判定された場合は（Ｓ１６００：ＹＥＳ）、読み取り結果をメモリ６６内に、タイヤの位置（右後）と対応づけて記憶する（Ｓ１６１０）。次に、バーコード９１ＦＲ’の読み取り指示メッセージを表示する（Ｓ１６２０）。そして、読み取りが完了したか否かを判定する（Ｓ１６３０）。読み取りが完了したと判定された場合は（Ｓ１６３０：ＹＥＳ）、読み取り結果をメモリ６６内に、タイヤの位置（右前）と対応づけて記憶する（Ｓ１６４０）。

【００７９】

次に、メモリ６６から、まず左前のタイヤの空気圧センサに対応するＩＤを読み出してこれを空気圧センサ１０及びタイヤ空気圧監視装置５０へと送信する（Ｓ１６５０）。続いて、空気圧センサ１０及びタイヤ空気圧監視装置５０に対してＩＤ再登録を指示するコマンドを送信する（Ｓ１６６０）。そして、空気圧センサ１０及びタイヤ空気圧監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ１６７０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ１６７０：ＮＯ）、Ｓ１６５０へ戻る。一方、登録完了の返信が来た場合には（Ｓ１６７０：ＹＥＳ）、次に、メモリ６６から、左後のタイヤの空気圧センサに対応するＩＤを読み出してこれを空気圧センサ２０及び監視装置５０へと送信す

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る（Ｓ１６８０）。続いて、空気圧センサ２０及びタイヤ空気圧監視装置５０に対してＩＤ再登録の指示コマンドを送信する（Ｓ１６９０）。そして、空気圧センサ２０及びタイヤ空気圧監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ１７００）。所定時間以上待ってもこの返信が来ない場合は（Ｓ１７００：ＮＯ）、Ｓ１６８０へ戻る。一方、登録完了の返信が来た場合には（Ｓ１７００：ＹＥＳ）、次に、メモリ６６から、右後のタイヤの空気圧センサに対応するＩＤを読み出してこれを空気圧センサ８０及び監視装置５０へと送信する（Ｓ１７１０）。続いて、空気圧センサ３０及びタイヤ空気圧監視装置５０に対してＩＤ再登録の指示コマンドを送信する（Ｓ１７２０）。そして、空気圧センサ３０及びタイヤ空気圧監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ１７３０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ１７３０：ＮＯ）、Ｓ１７１０へ戻る。一方、登録完了の返信が来た場合には（Ｓ１７３０：ＹＥＳ）、次に、メモリ６６から、右前のタイヤの空気圧センサに対応するＩＤを読み出してこれを空気圧センサ４０及び監視装置５０へと送信する（Ｓ１７４０）。続いて、空気圧センサ４０及びタイヤ空気圧監視装置５０に対してＩＤ再登録の指示コマンドを送信する（Ｓ１７５０）。そして、空気圧センサ４０及びタイヤ空気圧監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ１７６０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ１７６０：ＮＯ）、Ｓ１７４０へ戻る。一方、登録完了の返信が来た場合には（Ｓ１７６０：ＹＥＳ）、空気圧センサ１０、２０、３０、４０及びタイヤ空気圧監視装置５０に対して、通常モードへの復帰を指示するトリガ信号を出力して処理を終了する（Ｓ１４７０）。

【００８０】

次に、タイヤ空気圧監視装置５０において実行される制御処理の内容について説明する。この制御処理では、図１７、図１８に示す様に、まず最初に、ＩＤ登録モードへの切替を指示するトリガ信号を受信したか否かを判定する（Ｓ１８００）。ＩＤ登録モードへの切替を指示するトリガ信号を受信した場合には（Ｓ１８００：ＹＥＳ）、ＩＤ登録モードに切り替え（Ｓ１８１０）、ＩＤを受信したか否かを判定する（Ｓ１８２０）。ＩＤを受信した場合は（Ｓ１８２０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ１８３０）。そして、ＩＤ登録又はＩＤ再登録のいずれの指示を受信したか否かを判定する（Ｓ１８４０）。ＩＤ登録の指示を受信した場合は（Ｓ１８４０：登録）、Ｓ１８３０で一時記憶したＩＤを、メモリ５５内へ、左前のタイヤの空気圧センサのＩＤとして登録する（Ｓ１８５０）。そして、ＩＤ登録完了の返信を実行する（Ｓ１８６０）。続いて、ＩＤを受信したか否かを判定する（Ｓ１８７０）。ＩＤを受信した場合は（Ｓ１８７０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ１８８０）。そして、ＩＤ登録の指示を受信したか否かを判定する（Ｓ１８９０）。ＩＤ登録の指示を受信した場合は（Ｓ１８９０：ＹＥＳ）、Ｓ１８８０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして登録する（Ｓ１９００）。そして、ＩＤ登録完了の返信を実行する（Ｓ１９１０）。続いて、ＩＤを受信したか否かを判定する（Ｓ１９２０）、ＩＤを受信した場合は（Ｓ１９２０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ１９３０）。そして、ＩＤ登録の指示を受信したか否かを判定する（Ｓ１９４０）。ＩＤ登録の指示を受信した場合は（Ｓ１９４０：ＹＥＳ）、Ｓ１９３０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして登録する（Ｓ１９５０）。そして、ＩＤ登録完了の返信を実行する（Ｓ１９６０）。続いて、ＩＤを受信したか否かを判定する（Ｓ１９７０）。ＩＤを受信した場合は（Ｓ１９７０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ１９８０）。そして、ＩＤ登録の指示を受信したか否かを判定する（Ｓ１９９０）。ＩＤ登録の指示を受信した場合は（Ｓ１９９０：ＹＥＳ）、Ｓ１９８０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして登録する（Ｓ２０００）。そして、ＩＤ登録完了の返信を実行する（Ｓ２０１０）、その後、モードを通常モードへ切り替えるべき他のトリガ信号を受信したか否かを判定する（Ｓ２０２０）。通常モードへの切替を指示するトリガ信号を受信したら（Ｓ２０２０：ＹＥＳ）、通常モードに切り替えて処理を終了する（Ｓ

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２０８０）。
【００８１】
一方、Ｓ１８２０でＩＤを受信してＳ１８８０でＲＡＭのワークエリアに一時記憶した後、ＩＤ再登録の指示を受信した場合は（Ｓ２０４０：再登録）、Ｓ１８３０で一時記憶したＩＤを、メモリ５５内へ、左前のタイヤの空気圧センサのＩＤとして上書きにより再登録する（Ｓ２０５０）。そして、ＩＤ登録完了の返信を実行する（Ｓ２０６０）。続いて、ＩＤを受信したか否かを判定する（Ｓ２０７０）。ＩＤを受信した場合は（Ｓ２０７０：ＹＥＳ）、このＩＤをＥＡＭのワークエリアに一時記憶する（Ｓ２０８０）。そして、ＩＤ再登録の指示を受信したか否かを判定する（Ｓ２０９０）。ＩＤ再登録の指示を受信した場合は（Ｓ２０９０：ＹＥＳ）、Ｓ２０８０で一時記憶したＩＤを、メモリ５５内へ、左後のタイヤの空気圧センサのＩＤとして上書きにより再登録する（Ｓ２１００）。そして、ＩＤ登録完了の返信を実行する（Ｓ２１１０）。続いて、ＩＤを受信したか否かを判定する（Ｓ２１２０）。ＩＤを受信した場合は（Ｓ２１２０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ２１３０）。そして、ＩＤ登録の指示を受信したか否かを判定する（Ｓ２１４０）。ＩＤ登録の指示を受信した場合は（Ｓ２１４０：ＹＥＳ）、Ｓ２１３０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして上書きにより再登録する（Ｓ２１５０）。そして、ＩＤ登録完了の返信を実行する（Ｓ２１６０）。続いて、ＩＤを受信したか否かを判定する（Ｓ２１７０）。ＩＤを受信した場合は（Ｓ２１７０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（Ｓ２１８０）。そして、ＩＤ再登録の指示を受信したか否かを判定する（Ｓ２１９０）。ＩＤ再登録の指示を受信した場合は（Ｓ２１９０：ＹＥＳ）、Ｓ２１８０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして上書きにより再登録する（Ｓ２２００）。そして、ＩＤ登録完了の返信を実行する（Ｓ２２１０）。その後、モードを通常モードへ切り替えるべき旨のトリガ信号を受信したか否かを判定する（Ｓ２２２０）。通常モードへの切替を指示するトリガ信号を受信したら（Ｓ２２２０：ＹＥＳ）、通常モードに切り替えて処理を終了する（Ｓ２０３０）。
【００８２】
次に、空気圧センサ１０、２０、３０、４０において実行される制御処理の内容について説明する。この制御処理では、図１９に示す様に、まず最初に、ＩＤ登録モードへの切替を指示するトリガ信号を受信したか否かを判定する（Ｓ２３００）。ＩＤ登録モードへの切替を指示するトリガ信号を受信した場合には（Ｓ２３００：ＹＥＳ）、ＩＤ登録モードに切り替え（Ｓ２３１０）、ＩＤを受信したか否かを判定する（Ｓ２３２０）。ＩＤを受信した場合は（Ｓ２３２０：ＹＥＳ）、このＩＤをＥＡＭのワークエリアに一時記憶する（Ｓ２３３０）。そして、ＩＤ登録又はＩＤ再登録のいずれの指示を受信したか否かを判定する（Ｓ２３４０）。ＩＤ登録の指示を受信した場合は（Ｓ２３４０：登録）、Ｓ２３３０で一時記憶したＩＤを、ＩＤメモリ１２、２２、３２、４２内へ登録する（Ｓ２３５０）。そして、ＩＤ登録完了の返信を実行する（Ｓ２３６０）。その後、モードを通常モードへ切り替えるべき旨のトリガ信号を受信したか否かを判定する（Ｓ２３７０）。通常モードへの切替を指示するトリガ信号を受信したら（Ｓ２３７０：ＹＥＳ）、通常モードに切り替えて処理を終了する（Ｓ２３８０）。一方、ＩＤ再登録の指示を受信した場合は（Ｓ２３４０：再登録）、Ｓ２３３０で一時記憶したＩＤを、ＩＤメモリ１２、２２、３２、４２内へ上書きにより再登録する（Ｓ２３９０）。そして、ＩＤ登録完了の返信を実行してからＳ２３７０へ移行する（Ｓ２４００）。
【００８３】
上述したような制御処理が、ＩＤ登録ツール８０、タイヤ空気圧監視装置５０及び各空気圧センサ１０、２０、３０、４０において実行される結果、初回登録時には、左前、左後、右後、右前と、タイヤの位置と対応付けて空気圧センサのＩＤを登録することができる。そして、このとき、従来技術のような誤信による誤登録や、他の電波による登録不能状態を招くといったことがない。また、タイヤ交換あるいはタイヤのローテーションの際には、上述の様な制御処理により、交換後のタイヤの位置と対応付けてセンサＩＤを登録す

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ることができる。タイヤ交換の場合は、交換するタイヤに関してだけの再登録作業だけで済み、工数の削減が達成される。また、ローテーションの場合も、位置の変更も解消したＩＤの再登録が可能であり、そして、この再登録作業の際にも、通信による誤登録の問題をなくすことができる。

【００８４】

次に、第３の実施の形態について説明する。第３の実施の形態は第２の実施の形態と同様に、空気圧センサ１０、２０、３０、４０及び監視装置５０に対して管理シートのバーコードからＩＤを登録するものであるが、再登録の方法を変えたものである。この第３の実施の形態では、以下の手順で登録作業が実行される。

【００８５】

登録作業を行う際には、各センサ１０、２０、３０、４０及び監視装置５０に対して、ＩＤ登録ツール６０の信号線６３、６３ａ、６３ｂ、６３ｃ、６３ｄを接続する。そして、図２０のフローチャートに示す様な手順で作業を実行する。まず最初に、各センサ１０、２０、３０、４０及び監視装置５０をＩＤ登録モードに切り替える（Ｓ２５１０）。次に、初回登録ではないか否かを判断する（Ｓ２５２０）。初回登録である場合には（Ｓ２５２０：ＮＯ）、ＩＤ登録ツール６０を用いて管理シート９０に表示されているバーコード９１ＦＬ、９１ＲＬ、９１ＲＲ、９１ＦＲを読み取る（Ｓ２５３０）。そして、このバーコード９１ＦＬ、９１ＲＬ、９１ＲＲ、９１ＦＲから読み取ったＩＤをＩＤ登録ツール６０から各空気圧センサ１０、２０、３０、４０及びタイヤ空気圧監視装置５０へと送信する（Ｓ２５４０）。各空気圧センサ１０、２０、３０、４０及びタイヤ空気圧監視装置５０は、受信したＩＤをＩＤメモリ１２、２２、３２、４２及びメモリ５５へと登録する（Ｓ２５５０）。

【００８６】

この際、各空気圧センサ１０、２０、３０、４０に対して信号線６３ａ、６３ｂ、６３ｃ、６３ｄを正しく接続し、ＩＤ登録ツール６０でバーコード９１ＦＬ、バーコード９１ＲＬ、バーコード９１ＲＲ、バーコード９１ＦＲの順番で読み取りを実行することにより、空気圧センサ１０にはバーコード９１ＦＬにより表されるＩＤが、空気圧センサ２０にはバーコード９１ＲＬにより表されるＩＤが、空気圧センサ３０にはバーコード９１ＲＲにより表されるＩＤが、空気圧センサ４００にはバーコード９１ＦＲにより表されるＩＤがそれぞれ登録される。また、監視装置５０のメモリ５５へは、バーコード９１ＦＬにより表されるＩＤが左前のタイヤのものとして、バーコード９１ＲＬにより表されるＩＤが左後のタイヤのものとして、バーコード９１ＲＲにより表されるＩＤが右後のタイヤのものとして、バーコード９１ＦＲにより表されるＩＤが右前のタイヤのものとして登録される。また、初回登録に用いた管理シート９０は、この車両のマニュアルに添付される。

【００８７】

こうして空気圧センサ１０、２０、３０、４０及び監視装置５０への初回のＩＤ登録が完了したら、空気圧センサ１０、２０、３０、４０及び監視装置５０を通常モードに切り替えてＩＤ登録作業を終了する（Ｓ２５６０）。

【００８８】

一方、初回登録ではない場合、即ち、修理工場等においてタイヤを交換する様な場合であるときは（Ｓ２５２０：ＹＥＳ）、ＩＤ登録ツール６０を用いてマニュアルに添付されら初回登録時の管理シート９０に表示されているバーコードの内の今回取り外すタイヤに対応するバーコードを読み取る（Ｓ２５７０）。そして、こうして読み取ったＩＤをＩＤ登録ツール６０からタイヤ空気圧監視装置５０へと送信する（Ｓ２５８０）。タイヤ空気圧監視装置５０は、受信したＩＤをメモリ５５から削除する（Ｓ２５９０）。次に、新たに装着するタイヤに付属されているシートに表示されているバーコードをＩＤ登録ツール６０で読み取る（Ｓ２８００）。そして、こうして読み取ったＩＤをＩＤ登録ツール６０から新たに装着するタイヤの空気圧センサ及びタイヤ空気圧監視装置５０へと送信する（Ｓ２８１０）。新たに装着するタイヤの空気圧センサは、受信したＩＤをそのＩＤメモリ内に登録し、タイヤ空気圧監視装置５０は、受信したＩＤをメモリ５５内のＳ２５９０で削

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除したタイヤ位置に再登録する（Ｓ２８２０）。

【００８９】

そして、他に交換すべきタイヤがあるか否かを判定する（Ｓ２８３０）。他に交換すべきタイヤがある場合は（Ｓ２８３０：ＹＥＳ）、Ｓ２８７０以下の処理を繰り返す。一方、他に交換すべきタイヤがない場合は（Ｓ２８３０：ＮＯ）、空気圧センサ１０、２０、３０、４０及び監視装置５０を通常モードに切り替えてＩＤ登録作業を終了する（Ｓ２８４０）。

【００９０】

次に、以上の様な登録作業を実行するためにＩＤ登録ツール６０にインストールされているプログラムの内容を図２１～図２４のフローチャートに従って説明する。ＩＤ登録ツール６０の操作パネル６８の所定のボタンを押下すると以下のプログラムが開始される。このプログラムでは、まず最初に、タイヤ空気圧センサ１０、２０、３０、４０及びタイヤ空気圧監視装置５０をＩＤ登録モードにするためのトリガ信号を送信する（Ｓ２７１０）。次に、操作パネル６８の操作を待って、初回登録か否かを判定する（Ｓ２７２０）。

【００９１】

初回登録である場合は（Ｓ２７２０：ＮＯ）、ディスプレイ６９に、登録用シート９０のバーコード９１Ｆしの読み取り指示メッセージを表示する（Ｓ２７３０）。そして、読み取りが完了したか否かを判定する（Ｓ２７４０）。読み取りが完了したと判定された場合は（Ｓ２７４０：ＹＥＳ）、読み取り結果をメモリ６６内に、タイヤの位置（左前）と対応づけて記憶する（Ｓ２７５０）。次に、バーコード９１Ｒしの読み取り指示メッセージを表示する（Ｓ２７６０）。そして、読み取りが完了したか否かを判定する（Ｓ２７７０）。読み取りが完了したと判定された場合は（Ｓ２７７０：ＹＥＳ）、読み取り結果をメモリ６６内に、タイヤの位置（左後）と対応づけて記憶する（Ｓ２７８０）。次に、バーコード９１Ｒの読み取り指示メッセージを表示する（Ｓ２７９０）。そして、読み取りが完了したか否かを判定する（Ｓ２８００）。読み取りが完了したと判定された場合は（Ｓ２８００：ＹＥＳ）、読み取り結果をメモリ６６内に、タイヤの位置（右後）と対応づけて記憶する（Ｓ２８１０）。次に、バーコード９１Ｆの読み取り指示メッセージを表示する（Ｓ２８２０）。そして、読み取りが完了したか否かを判定する（Ｓ２８３０）。読み取りが完了したと判定された場合は（Ｓ２８３０：ＹＥＳ）、読み取り結果をメモリ６６内に、タイヤの位置（右前）と対応づけて記憶する（Ｓ２８４０）。

【００９２】

次に、メモリ６６から、まず左前のタイヤの空気圧センサに対応するＩＤを読み出してこれを空気圧センサ１０及びタイヤ空気圧監視装置５０へと送信する（Ｓ２８５０）。続いて、空気圧センサ１０及びタイヤ空気圧監視装置５０に対してＩＤ登録を指示するコマンドを送信する（Ｓ２８６０）。そして、空気圧センサ１０及びタイヤ空気圧監視装置５０から登録が完了の返信が来たか否かを判定する（Ｓ２８７０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ２８７０：ＮＯ）、Ｓ１３４０へ戻る。一方、登録完了の返信が来た場合には（Ｓ２８７０：ＹＥＳ）、次に、メモリ６６から、左後のタイヤの空気圧センサに対応するＩＤを読み出してこれを空気圧センサ２０及び監視装置５０へと送信する（Ｓ２８８０）。続いて、空気圧センサ２０及びタイヤ空気圧監視装置５０に対してＩＤ登録の指示コマンドを送信する（Ｓ２８９０）。そして、空気圧センサ２０及びタイヤ空気圧監視装置５０から登録が完了の返信が来たか否かを判定する（Ｓ２９００）。所定時間以上待ってもこの返信が来ない場合は（Ｓ２９００：ＮＯ）、Ｓ２８８０へ戻る。一方、登録完了の返信が来た場合には（Ｓ２９００：ＹＥＳ）、次に、メモリ６６から、右後のタイヤの空気圧センサに対応するＩＤを読み出してこれを空気圧センサ３０及び監視装置５０へと送信する（Ｓ２９１０）。続いて、空気圧センサ３０及びタイヤ空気圧監視装置５０に対してＩＤ登録の指示コマンドを送信する（Ｓ２９２０）。そして、空気圧センサ３０及びタイヤ空気圧監視装置５０から登録が完了の返信が来たか否かを判定する（Ｓ２９３０）。所定時間以上待ってもこの返信が来ない場合は（Ｓ２９３０：ＮＯ）、Ｓ２９１０へ戻る。一方、登録完了の返信が来た場合には（Ｓ２９３０：ＹＥＳ）、次に、

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メモリ６６から、当初のタイヤの空気圧センサに対応するＩＤを読み出してこれを空気圧センサ４０及び監視装置５０へと送信する（Ｓ２９４０）、続いて、空気圧センサ４０及びタイヤ空気圧監視装置５０に対してＩＤ登録の指示コマンドを送信する（Ｓ２９５０）、そして、空気圧センサ４０及びタイヤ空気圧監視装置５０から登録が完了の返信が来たか否かを判定する（Ｓ２９６０）、所定時間以上待ってもこの返信が来ない場合は（Ｓ２９８０：ＮＯ）、Ｓ２９４０へ戻る。一方、登録完了の返信が来た場合には（Ｓ２９８０：ＹＥＳ）、空気圧センサ１０、２０、３０、４０及びタイヤ空気圧監視装置６０に対して、通常モードへの復帰を指示するトリガ信号を出力して処理を終了する（Ｓ２９７０）。

【００９３】

初回登録でない場合は（Ｓ２７２０：ＹＥＳ）、マニュアル添付の管理シート９０に表示されているバーコード９１ＦＬ、９１ＲＬ、９１ＲＲ、９１ＦＲの中から読み取るべき箇のメッセージを表示する（Ｓ３０２０）、そして、読み取りが完了したか否かを判定する（Ｓ３０３０）、読み取りが完了したと判定された場合は（Ｓ３０３０：ＹＥＳ）、読み取り結果をメモリ６６内に記憶する（Ｓ３０４０）。

【００９４】

次に、メモリ６６から、Ｓ３０４０で記憶したＩＤを読み出してこれをタイヤ空気圧監視装置５０へと送信する（Ｓ３０５０）、続いて、タイヤ空気圧監視装置５０に対してＩＤ削除を指示するコマンドを送信する（Ｓ３０６０）、そして、タイヤ空気圧監視装置５０から削除完了の返信が来たか否かを判定する（Ｓ３０７０）、所定時間以上待ってもこの返信が来ない場合は（Ｓ３０７０：ＮＯ）、Ｓ３０５０へ戻る。一方、削除完了の返信が来た場合には（Ｓ３０７０：ＹＥＳ）、次に、ディスプレイ６９に、新たに装着するタイヤに添付されている再登録用シート９０′に表示されているバーコード９１′を読み取るべき箇のメッセージを表示する（Ｓ３０８０）、そして、読み取りが完了したか否かを判定する（Ｓ３０９０）、読み取りが完了したと判定された場合は（Ｓ３０９０：ＹＥＳ）、読み取り結果をメモリ６６内に記憶する（Ｓ３１００）、そして、メモリ６６からこの新たに装着するタイヤの空気圧センサのＩＤを読み出してこれを当該空気圧センサ及び監視装置５０へと送信する（Ｓ３１１０）、続いて、この空気圧センサ及びタイヤ空気圧監視装置５０に対してＩＤ再登録の指示コマンドを送信する（Ｓ３１２０）、そして、この空気圧センサ及びタイヤ空気圧監視装置５０から登録完了の返信が来たか否かを判定する（Ｓ３１３０）、所定時間以上待ってもこの返信が来ない場合は（Ｓ３１３０：ＮＯ）、Ｓ３１１０へ戻る。一方、登録完了の返信が来た場合には（Ｓ３１３０：ＹＥＳ）、全ての交換作業が完了したか否かを問い合わせるメッセージをディスプレイ６９に表示して（Ｓ３１４０）、これに対するパネル操作の結果を待つ（Ｓ３１５０）、全ての交換作業が完了している箇のパネル操作があった場合は（Ｓ３１５０：ＹＥＳ）、装着されている空気圧センサ及びタイヤ空気圧監視装置５０に対して、通常モードへの復帰を指示するトリガ信号を出力して処理を終了する（Ｓ２９７０）。一方、まだ交換作業が完了していない箇のパネル操作があった場合は（Ｓ３１５０：ＮＯ）、Ｓ３０２０へ戻る。

【００９５】

また、ローテーションの場合は（Ｓ３０１０：ローテーション）、ディスプレイ６９に、マニュアル添付の管理シート９０のバーコード９１ＦＬの読み取り指示メッセージを表示する（Ｓ３１６０）、そして、読み取りが完了したか否かを判定する（Ｓ３１７０）、読み取りが完了したと判定された場合は（Ｓ３１７０：ＹＥＳ）、読み取り結果をメモリ６６内に、タイヤの位置（左前）と対応づけて記憶する（Ｓ３１８０）、次に、バーコード９１ＥＬの読み取り指示メッセージを表示する（Ｓ３１９０）、そして、読み取りが完了したか否かを判定する（Ｓ３２００）、読み取りが完了したと判定された場合は（Ｓ３２００：ＹＥＳ）、読み取り結果をメモリ６６内に、タイヤの位置（左後）と対応づけて記

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様する（ＳＳ２１０）。次に、バーコードタイＲＲの読み取り指示メッセージを表示する（ＳＳ２２０）。そして、読み取りが完了したか否かを判定する（ＳＳ２３０）。読み取りが完了したと判定された場合は（ＳＳ２３０：ＹＥＳ）、読み取り結果をメモリ６６内に、タイヤの位置（右後）と対応づけて記憶する（ＳＳ２４０）。次に、バーコードタイＦＲの読み取り指示メッセージを表示する（ＳＳ２５０）。そして、読み取りが完了したか否かを判定する（ＳＳ２６０）。読み取りが完了したと判定された場合は（ＳＳ２６０：ＹＥＳ）、読み取り結果をメモリ６６内に、タイヤの位置（右前）と対応づけて記憶する（ＳＳ２７０）。

【００９８】

次に、メモリ６６から、まず右前のタイヤの空気圧センサに対応するＩＤを読み出してこれをローテーション後に左前に装着されるタイヤの空気圧センサへと送信する（ＳＳ２８０）。続いて、この空気圧センサに対してＩＤ再登録を指示するコマンドを送信する（ＳＳ２９０）。そして、この空気圧センサから登録完了の返信が来たか否かを判定する（ＳＳ３００）。所定時間以上待ってもこの返信が来ない場合は（ＳＳ３００：ＮＯ）、ＳＳ２８０へ戻る。一方、登録完了の返信が来た場合には（ＳＳ３００：ＹＥＳ）、次に、メモリ６６から、左後のタイヤの空気圧センサに対応するＩＤを読み出してこれをローテーション後に左後に装着されるタイヤの空気圧センサへと送信する（ＳＳ３１０）。続いて、この空気圧センサに対してＩＤ再登録の指示コマンドを送信する（ＳＳ３２０）。そして、この空気圧センサから登録完了の返信が来たか否かを判定する（ＳＳ３３０）。所定時間以上待ってもこの返信が来ない場合は（ＳＳ３３０：ＮＯ）、ＳＳ３１０へ戻る。一方、登録完了の返信が来た場合には（ＳＳ３３０：ＹＥＳ）、次に、メモリ６６から、右後のタイヤの空気圧センサに対応するＩＤを読み出してこれをローテーション後に右後に装着されるタイヤの空気圧センサへと送信する（ＳＳ３４０）。続いて、この空気圧センサに対してＩＤ再登録の指示コマンドを送信する（ＳＳ３５０）。そして、この空気圧センサから登録完了の返信が来たか否かを判定する（ＳＳ３６０）。所定時間以上待ってもこの返信が来ない場合は（ＳＳ３６０：ＮＯ）、ＳＳ３４０へ戻る。一方、登録完了の返信が来た場合には（ＳＳ３６０：ＹＥＳ）、次に、メモリ６６から、右前のタイヤの空気圧センサに対応するＩＤを読み出してこれをローテーション後に右前に装着されるタイヤの空気圧センサへと送信する（ＳＳ３７０）。続いて、この空気圧センサに対してＩＤ登録の指示コマンドを送信する（ＳＳ３８０）。そして、この空気圧センサから登録完了の返信が来たか否かを判定する（ＳＳ３９０）。所定時間以上待ってもこの返信が来ない場合は（ＳＳ３９０：ＮＯ）、ＳＳ３７０へ戻る。一方、登録完了の返信が来た場合には（ＳＳ３９０：ＹＥＳ）、接続されている空気圧センサ及びタイヤ空気圧監視装置５０に対して、通常モードへの復帰を指示するトリガ信号を出力して処理を終了する（ＳＳ４００）。

【００９９】

次に、タイヤ空気圧監視装置５０において実行される制御処理の内容について説明する。この制御処理では、図２６、図２７に示す様に、まず最初に、ＩＤ登録モードへの切替を指示するトリガ信号を受信したか否かを判定する（ＳＳ４１０）。ＩＤ登録モードへの切替を指示するトリガ信号を受信した場合には（ＳＳ４１０：ＹＥＳ）、ＩＤ登録モードに切り替え（ＳＳ４２０）、ＩＤを受信したか否かを判定する（ＳＳ４３０）。ＩＤを受信した場合は（ＳＳ４３０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（ＳＳ４４０）。そして、ＩＤ登録又はＩＤ削除のいずれの指示を受信したか否かを判定する（ＳＳ４５０）。ＩＤ登録の指示を受信した場合は（ＳＳ４５０：登録）、ＳＳ４４０で一時記憶したＩＤを、メモリ５５内へ、右前のタイヤの空気圧センサのＩＤとして登録する（ＳＳ４６０）。そして、ＩＤ登録完了の返信を実行する（ＳＳ４７０）。続いて、ＩＤを受信したか否かを判定する（ＳＳ４８０）。ＩＤを受信した場合は（ＳＳ４８０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（ＳＳ４９０）。そして、ＩＤ登録の指示を受信したか否かを判定する（ＳＳ５００）。ＩＤ登録の指示を受信した場合は（ＳＳ５００：ＹＥＳ）、ＳＳ４９０で一時記憶したＩＤを、メモリ５５内へ、左後

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のタイヤの空気圧センサのＩＤとして登録する（ＳＳ５００）。そして、ＩＤ登録完了の返信を実行する（ＳＳ５１０）。続いて、ＩＤを受信したか否かを判定する（ＳＳ５２０）。ＩＤを受信した場合は（ＳＳ５２０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（ＳＳ５３０）。そして、ＩＤ登録の指示を受信したか否かを判定する（ＳＳ５４０）。ＩＤ登録の指示を受信した場合は（ＳＳ５４０：ＹＥＳ）、ＳＳ５３０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして登録する（ＳＳ５５０）。そして、ＩＤ登録完了の返信を実行する（ＳＳ５６０）。続いて、ＩＤを受信したか否かを判定する（ＳＳ５７０）。ＩＤを受信した場合は（ＳＳ５７０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（ＳＳ５８０）。そして、ＩＤ登録の指示を受信したか否かを判定する（ＳＳ５９０）。ＩＤ登録の指示を受信した場合は（ＳＳ５９０：ＹＥＳ）、ＳＳ５８０で一時記憶したＩＤを、メモリ５５内へ、右後のタイヤの空気圧センサのＩＤとして登録する（ＳＳ６００）。そして、ＩＤ登録完了の返信を実行する（ＳＳ６１０）。その後、モードを通常モードへ切り替えるべき旨のトリガ信号を受信したか否かを判定する（ＳＳ６２０）。通常モードへの切替を指示するトリガ信号を受信したら（ＳＳ６２０：ＹＥＳ）、通常モードに切り替えて処理を終了する（ＳＳ６３０）。

【００９８】

一方、ＳＳ４２０でＩＤを受信してＳＳ４３０でＲＡＭのワークエリアに一時記憶した後、ＩＤ削除の指示を受信した場合は（ＳＳ４４０：削除）、ＳＳ４３０で一時記憶したＩＤと同一のＩＤをメモリ５５から削除する（ＳＳ７００）。そして、ＩＤ削除完了の返信を実行する（ＳＳ７１０）。続いて、ＩＤを受信したか否かを判定する（ＳＳ７２０）。ＩＤを受信した場合は（ＳＳ７２０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（ＳＳ７３０）。そして、ＩＤ登録の指示を受信したか否かを判定する（ＳＳ７４０）。ＩＤ登録の指示を受信した場合は（ＳＳ７４０：ＹＥＳ）、ＳＳ７３０で一時記憶したＩＤを、メモリ５５内のＳＳ７１０で削除したＩＤに対応する位置のタイヤの空気圧センサのＩＤとして登録する（ＳＳ７５０）。そして、ＩＤ登録完了の返信を実行する（ＳＳ７６０）。続いて、通常モードへの切替指示コマンドかそれとも新たなＩＤを受信したか否かを判定する（ＳＳ７７０）。新たなＩＤを受信した場合は（ＳＳ７７０：ＩＤ受信）、このＩＤをＲＡＭのワークエリアに一時記憶する（ＳＳ７８０）。そして、ＩＤ削除の指示を受信したか否かを判定する（ＳＳ７９０）。ＩＤ削除の指示を受信した場合は（ＳＳ７９０：ＹＥＳ）、ＳＳ７００以下の処理へと移行する。一方、ＳＳ７７０で通常モードへの切替指示コマンドを受信した場合は、ＳＳ８３０へ進み、通常モードに切り替えて処理を終了する。

【００９９】

次に、空気圧センサ１０、２０、３０、４０において実行される制御処理の内容について説明する。この制御処理では、図２８に示す様に、まず最初に、ＩＤ登録モードへの切替を指示するトリガ信号を受信したか否かを判定する（ＳＳ８００）。ＩＤ登録モードへの切替を指示するトリガ信号を受信した場合には（ＳＳ８００：ＹＥＳ）、ＩＤ登録モードに切り替え（ＳＳ８１０）、ＩＤを受信したか否かを判定する（ＳＳ８２０）。ＩＤを受信した場合は（ＳＳ８２０：ＹＥＳ）、このＩＤをＲＡＭのワークエリアに一時記憶する（ＳＳ８３０）。そして、ＩＤ登録又はＩＤ再登録のいずれの指示を受信したか否かを判定する（ＳＳ８４０）。ＩＤ登録の指示を受信した場合は（ＳＳ８４０：登録）、ＳＳ８３０で一時記憶したＩＤを、ＩＤメモリ１２、２２、３２、４２内へ登録する（ＳＳ８５０）。そして、ＩＤ登録完了の返信を実行する（ＳＳ８６０）。一方、ＩＤ再登録の指示を受信した場合は（ＳＳ８４０：再登録）、ＳＳ８３０で一時記憶したＩＤを、ＩＤメモリ１２、２２、３２、４２内へ上書きにより再登録する（ＳＳ８７０）。そして、ＩＤ登録完了の返信を実行する（ＳＳ８８０）。その後、モードを通常モードへ切り替えるべき旨のトリガ信号を受信したか否かを判定する（ＳＳ８９０）。通常モードへの切替を指示するトリガ信号を受信したら（ＳＳ８９０：ＹＥＳ）、通常モードに切り替えて処理を終了する（ＳＳ９００）。

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【０１００】
上述したような制御処理が、ＩＤ登録ツール６０、タイヤ空気圧監視装置５０及び各空気圧センサ１０、２０、３０、４０において実行される結果、初回登録時には、左前、左後、右後、右前と、タイヤの位置と対応付けて空気圧センサのＩＤを登録することができる。そして、このとき、従来技術のような混信による誤登録や、他の電波による登録不能状態を招くといったことがない。また、タイヤ交換あるいはタイヤのローテーションの際には、上述の様な制御処理により、交換後のタイヤの位置と対応付けてセンサＩＤを登録することができる。タイヤ交換の場合は、交換するタイヤに関してだけの再登録作業だけで済み、工数の削減が達成される。また、ローテーションの場合も、位置の変更を検知したＩＤの再登録が可能である。そして、この再登録作業の際にも、混信による誤登録の問題をなくすことができる。

【０１０１】
以上、本発明の実施の形態について説明したが、本発明はこの実施の形態に限られるものではなく、その要旨を逸脱しない範囲内においてさらに種々の形態を採用することができることはもちろんである。

【０１０２】
例えば、光学的可読情報としては、図２９に示す様なデータコード、ＱＲコード、マキシコード、ＣＰコードといったマトリックス型バーコードや、図３０に示す様な２次元バーコード、図３１に示す様なＰＤＦ４１７、コード４９、コード１６Ｋ、コードアロックといったスタック型バーコード、図３２に示す様な１次元バーコードなど、各種の情報を使用することができる。

【０１０３】
また、バーコードは、タイヤのホイールではなく、センサ自体に貼り付けられていてもよい。あるいは、センサに登録したＩＤに対応するバーコードラベルをセンサと対にして供給する様にしておき、自動車製造ラインにおいてセンサをタイヤに取り付ける際に、タイヤのホイール又はホイールカバーにこのラベルを貼り付ける様にしておいてもよい。

【図面の簡単な説明】
【図１】実施の形態のタイヤ空気圧監視システムの構成を示すブロック図である。
【図２】実施の形態におけるＩＤ登録のための装置構成を示す模式図である、
【図３】実施の形態におけるＩＤ登録手順を示すフローチャートである。
【図４】図３に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図５】図３に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図６】図３に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図７】図３に示したＩＤ登録手順を実現するためのタイヤ空気圧監視装置における制御処理の内容を示すフローチャートである。
【図８】図３に示したＩＤ登録手順を実現するためのタイヤ空気圧監視装置における制御処理の内容を示すフローチャートである。
【図９】第２の実施の形態におけるＩＤ登録のための装置構成を示す模式図である。
【図１０】第２の実施の形態において使用する管理シートを示す平面図である。
【図１１】第２の実施の形態におけるＩＤ登録手順を示すフローチャートである。
【図１２】第２の実施の形態において使用する再登録用管理シートを示す平面図である。
【図１３】図１１に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図１４】図１１に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図１５】図１１に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。

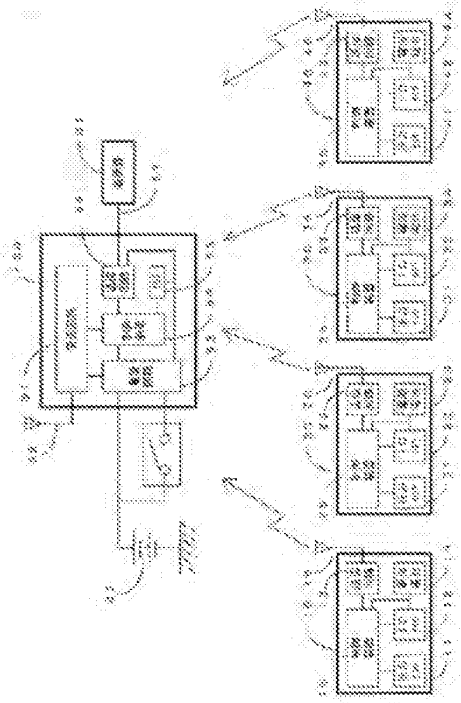
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【図１６】図１１に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図１７】図１１に示したＩＤ登録手順を実現するためのタイヤ空気圧監視装置における制御処理の内容を示すフローチャートである。
【図１８】図１１に示したＩＤ登録手順を実現するためのタイヤ空気圧監視装置における制御処理の内容を示すフローチャートである。
【図１９】図１１に示したＩＤ登録手順を実現するための空気圧センサにおける制御処理の内容を示すフローチャートである。
【図２０】第３の実施の形態におけるＩＤ登録手順を示すフローチャートである。
【図２１】図２０に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図２２】図２０に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図２３】図２０に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図２４】図２０に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図２５】図２０に示したＩＤ登録手順を実現するためのＩＤ登録ツールの制御処理の内容を示すフローチャートである。
【図２６】図２０に示したＩＤ登録手順を実現するためのタイヤ空気圧監視装置における制御処理の内容を示すフローチャートである。
【図２７】図２０に示したＩＤ登録手順を実現するためのタイヤ空気圧監視装置における制御処理の内容を示すフローチャートである。
【図２８】図２０に示したＩＤ登録手順を実現するための空気圧センサにおける制御処理の内容を示すフローチャートである。
【図２９】光学的可読媒体を例示する平面図である。
【図３０】光学的可読媒体を例示する平面図である。
【図３１】光学的可読媒体を例示する平面図である。
【図３２】光学的可読媒体を例示する平面図である。
【図３３】従来のタイヤ空気圧監視システムの構成を示すブロック図である。
【図３４】従来のシステムにおけるＩＤ登録手順を示すフローチャートである。
【符号の説明】
１、２、３、４・・・タイヤ
１ａ、２ａ、３ａ、４ａ・・・ホイール
５、６、７、８・・・バーコード
１０、２０、３０、４０・・・空気圧センサ
１１、２１、３１、４１・・・圧力センサ
１２、２２、３２、４２・・・ＩＤメモリ
１３、２３、３３、４３・・・送信回路
１３ａ、２３ａ、３３ａ、４３ａ・・・送受信回路
１４、２４、３４、４４・・・電源電池
１５、２５、３５、４５・・・制御装置
１６、２６、３６、４６・・・アンテナ
５０・・・タイヤ空気圧監視装置
５１・・・受信回路
５２・・・アンテナ
５３・・・電源回路
５４・・・制御装置
５５・・・メモリ
５８・・・通信回路

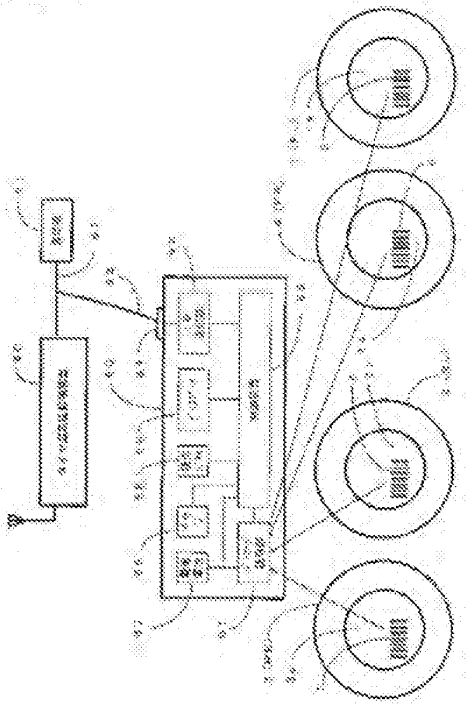
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５７・・・信号線
６０・・・ＩＤ登録ツール
６１・・・バーコード読み取り部
６２・・・ＩＤ送信部
６３，６３ａ，６３ｂ，６３ｃ，６３ｄ・・・信号線
６４，６４ａ，６４ｂ，６４ｃ，６４ｄ・・・コネクタ
６５・・・制御装置
６６・・・メモリ
６７・・・電源電池
６８・・・操作パネル
６９・・・ディスプレイ
８１・・・表示器
８２・・・車載バッテリ
９０・・・管理シート
９０'・・・再登録用管理シート
９１ＦＬ，９１ＲＬ，９１ＲＲ，９１ＦＲ・・・バーコード

【図１】

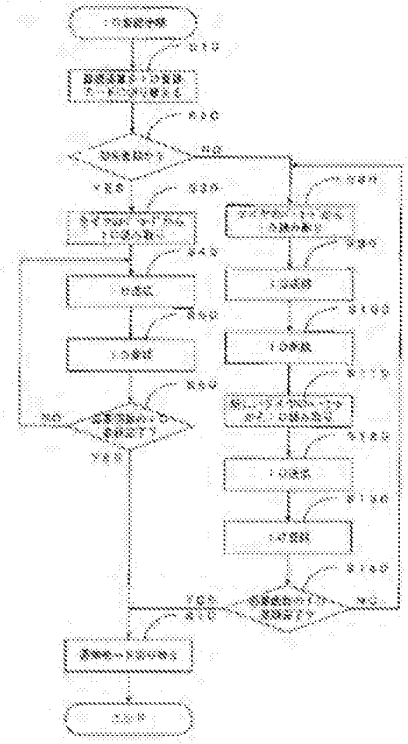


【図２】

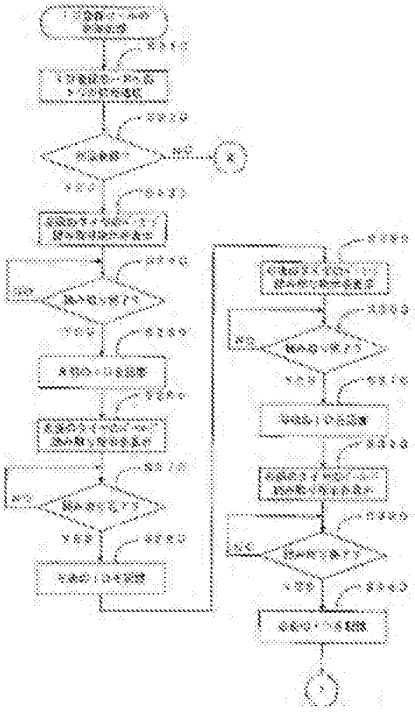


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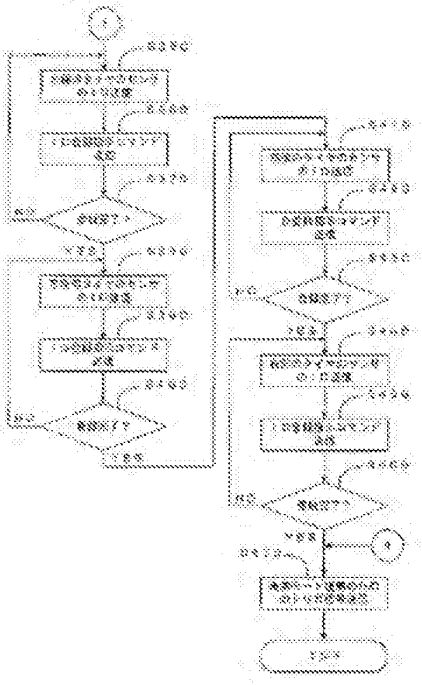
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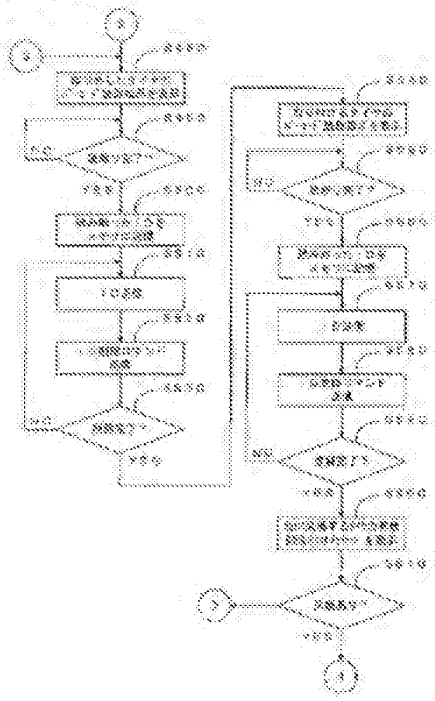
【図４】



【図５】

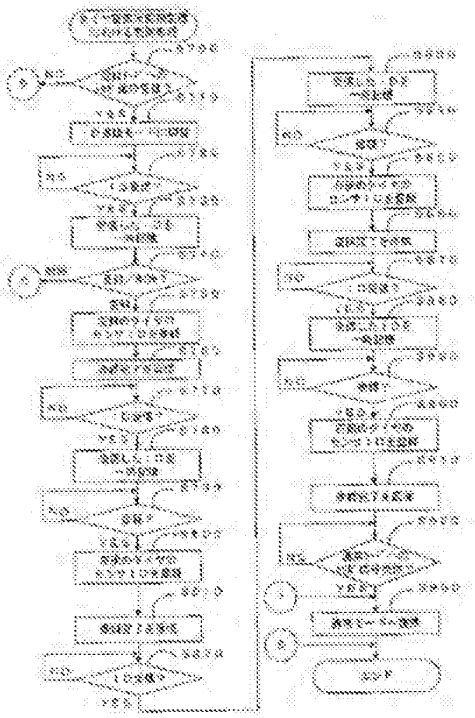


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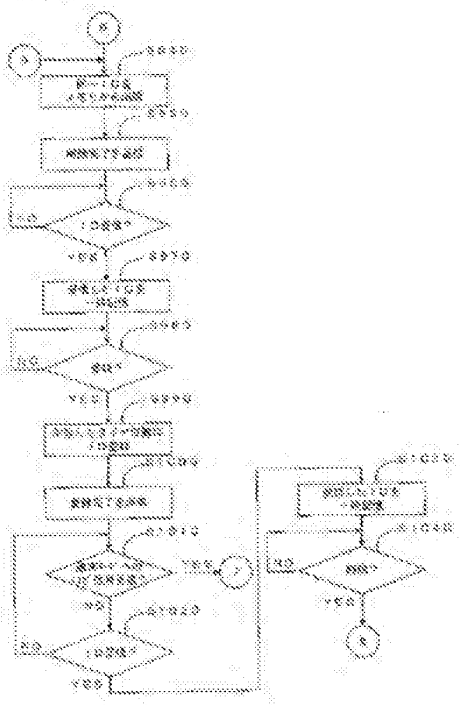


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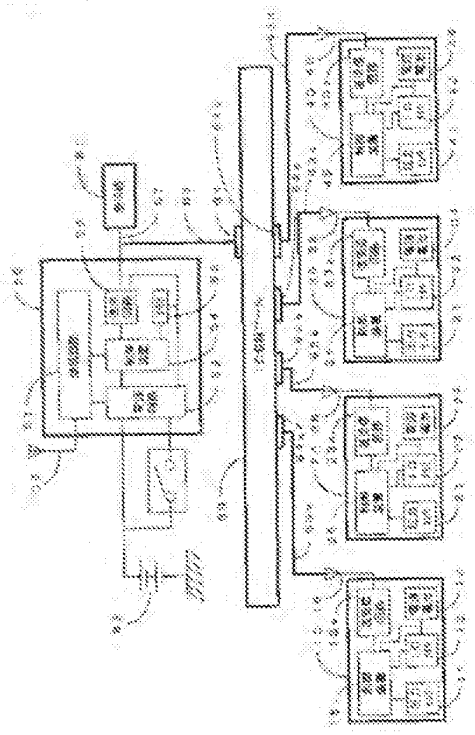
【図７】



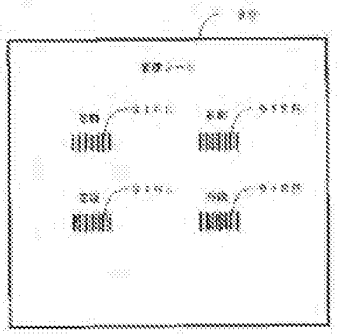
【図８】



【図９】

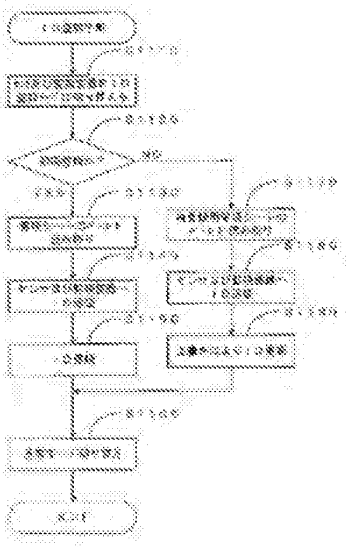


【図１０】

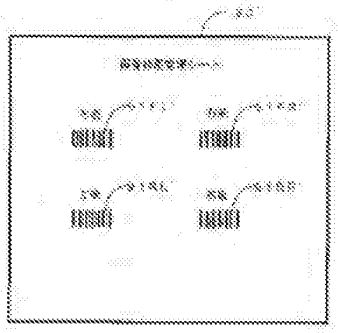


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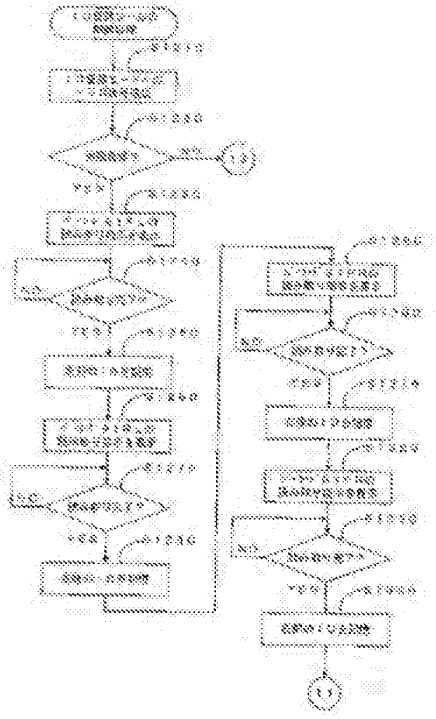
【図１１】



【図１２】



【図１３】



【図１４】

