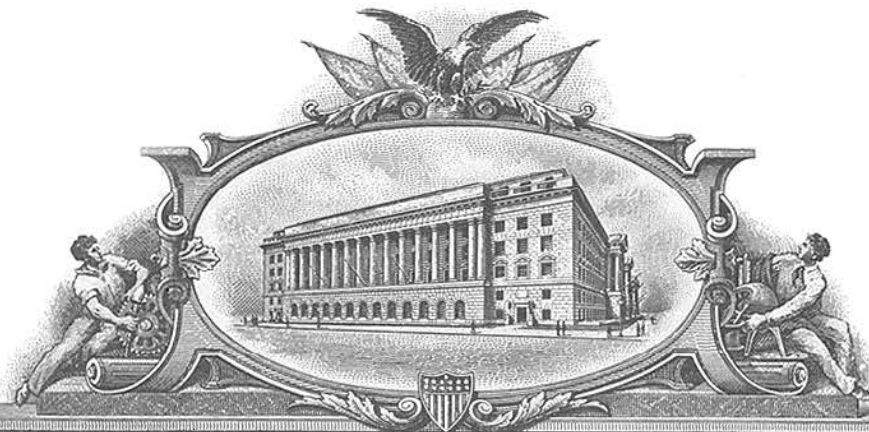


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**APPLICATION NUMBER: 10/712,764
FILING DATE: November 13, 2003
PATENT NUMBER: 7021415
ISSUE DATE: April 04, 2006**



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UTILITY PATENT APPLICATION TRANSMITTAL (Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
PCB110

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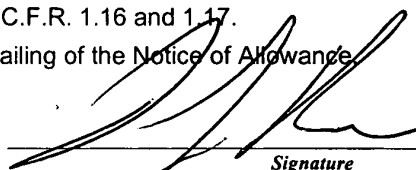
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Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	28	- 20 =	8	x \$18.00	\$144.00
Indep. Claims	4	- 3 =	1	x \$86.00	\$86.00
Multiple Dependent Claims (check if applicable) ☐					\$0.00
BASIC FEE					\$770.00
OTHER FEE (specify purpose) _____					\$0.00
TOTAL FILING FEE					\$1,000.00

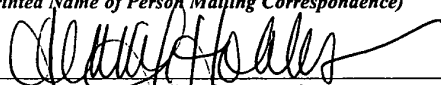
- ☐ A check in the amount of _____ to cover the filing fee is enclosed.
- ☐ The Director is hereby authorized to charge and credit Deposit Account No. _____ as described below.
- ☐ Charge the amount of _____ as filing fee.
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 - ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance pursuant to 37 C.F.R. 1.311(b).


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Dated: November 13, 2003

cc:

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10) Applicant(s): Farmer et al			Docket No. PCB110P
Serial No.	Filing Date November 13, 2003	Examiner	Group Art Unit
Invention: ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE			
I hereby certify that the following correspondence: U.S. PATENT APPLICATION <i>(Identify type of correspondence)</i> is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on <u>NOVEMBER 13, 2003</u> <i>(Date)</i> <u>JENNIFER L. HOBBS</u> <i>(Typed or Printed Name of Person Mailing Correspondence)</i>  <i>(Signature of Person Mailing Correspondence)</i> <u>EV341043131US</u> <i>("Express Mail" Mailing Label Number)</i>			
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UTILITY PATENT APPLICATION TRANSMITTAL
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TO THE COMMISSIONER FOR PATENTSMail Stop Patent Application
P.O. Box 1450
Alexandria, VA 22313-1450

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE

and invented by:

William Farmer
Gary Kinnear
Thomas P. Schregardus
Yuly YanishevskyIf a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:☐ Continuation ☐ Divisional ☒ Continuation-in-part (CIP) of prior application No.: 10/061,940

Which is a:

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Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Enclosed are:

Application Elements

1. ☐ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 19 pages and including the following:
 - a. ☒ Descriptive Title of the Invention
 - b. ☒ Cross References to Related Applications *(if applicable)*
 - c. ☐ Statement Regarding Federally-sponsored Research/Development *(if applicable)*
 - d. ☐ Reference to Sequence Listing, a Table, or a Computer Program Listing Appendix
 - e. ☒ Background of the Invention
 - f. ☒ Brief Summary of the Invention
 - g. ☒ Brief Description of the Drawings *(if filed)*
 - h. ☒ Detailed Description
 - i. ☒ Claim(s) as Classified Below
 - j. ☒ Abstract of the Disclosure

UTILITY PATENT APPLICATION TRANSMITTAL
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Docket No.
PCB110

Total Pages in this Submission

Application Elements (Continued)

3. ☒ Drawing(s) *(when necessary as prescribed by 35 USC 113)*
- a. ☐ Formal Number of Sheets _____
- b. ☒ Informal Number of Sheets 7
4. ☐ Oath or Declaration
- a. ☐ Newly executed *(original or copy)* ☐ Unexecuted
- b. ☐ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*
- c. ☐ With Power of Attorney ☐ Without Power of Attorney
- d. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application,
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference *(usable if Box 4b is checked)*
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under
Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby
incorporated by reference therein.
6. ☐ CD ROM or CD-R in duplicate, large table or Computer Program (Appendix)
7. ☐ Application Data Sheet (See 37 CFR 1.76)
8. ☐ Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all must be included)*
- a. ☐ Computer Readable Form (CRF)
- b. ☐ Specification Sequence Listing on:
- i. ☐ CD-ROM or CD-R (2 copies); or
- ii. ☐ Paper
- c. ☐ Statement(s) Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

9. ☐ Assignment Papers *(cover sheet & document(s))*
10. ☐ 37 CFR 3.73(B) Statement *(when there is an assignee)*
11. ☐ English Translation Document *(if applicable)*
12. ☐ Information Disclosure Statement/PTO-1449 ☐ Copies of IDS Citations
13. ☐ Preliminary Amendment
14. ☒ Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
15. ☐ Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
16. ☒ Certificate of Mailing
- ☐ First Class ☒ Express Mail *(Specify Label No.):* EV341043131US

**UTILITY PATENT APPLICATION TRANSMITTAL
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Total Pages in this Submission

Accompanying Application Parts (Continued)

17. ☐ Additional Enclosures *(please identify below):*

Request That Application Not Be Published Pursuant To 35 U.S.C. 122(b)(2)

18. ☐ Pursuant to 35 U.S.C. 122(b)(2), Applicant hereby requests that this patent application not be published pursuant to 35 U.S.C. 122(b)(1). Applicant hereby certifies that the invention disclosed in this application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing of the application.

Warning

An applicant who makes a request not to publish, but who subsequently files in a foreign country or under a multilateral international agreement specified in 35 U.S.C. 122(b)(2)(B)(i), must notify the Director of such filing not later than 45 days after the date of the filing of such foreign or international application. A failure of the applicant to provide such notice within the prescribed period shall result in the application being regarded as abandoned, unless it is shown to the satisfaction of the Director that the delay in submitting the notice was unintentional.

ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This application is a continuation-in-part of U.S. patent application Serial No. 10/061,940, filed February 1, 2002, and claims the benefit of U.S. provisional patent application Serial No. 60/426,044, filed November 13, 2002 and also claims the benefit of U.S. provisional patent application Serial No. 60/467,993, filed May 5, 2003, the entire disclosure of which applications are incorporated herein by reference.

FIELD OF THE INVENTION

10 The present invention relates generally to electrically actuated parking brake systems for passenger vehicles, and, in particular, to an actuator assembly for controlling the parking brake function within passenger vehicles.

BACKGROUND OF THE INVENTION

15 Electric parking brake systems have been provided in vehicles to allow the application and release of the parking brake via electrical signal, eliminating the current mechanical connection, i.e. cable and lever. These systems typically include an electro-
20 mechanical actuator connected to the brake caliper either by a cable, as in the drum in head, or directly attached to the brake caliper. The actuator converts electrical power to rotational mechanical output power for moving the cable or drive screw and applying the brakes.

25 In addition, audible noise is a significant feature differentiating actuators in parking brake systems and many other actuation applications. In some applications, a loud system is desirable to alert an operator that the actuator is being cycled. In other applications, a quiet system is desirable to keep in-cabin noise to a minimum.

 There is therefore a need for an efficient, reliable and cost-effective actuator design for a vehicle parking brake system that overcomes the deficiencies of the prior

art. There is a further need for a method of tuning the actuator for audible noise performance.

SUMMARY OF THE INVENTION

5 According to one aspect of the invention, there is provided an actuator including a motor having a drive shaft, and a gear train coupled to the drive shaft, via either a flexible belt or a continuation of the gear train wherein the gear train provides a mechanical output from the actuator. The gear train may be provided in a variety of configurations, and may include a worm gear and worm wheel configuration for
10 reducing audible noise.

 According to another aspect of the invention, there is provided an actuator including an isolator having an effective spring constant and damping constant. The isolator is coupled to at least one component, e.g. a motor, of the actuator for isolating the component from a remainder of the actuator to provide a desired affect to audible
15 noise. Tailoring of the spring and damping constants of the isolator allows audible noise tuning. According to another aspect of the invention, an isolator may be coupled to a sub-frame for isolating the sub-frame from a housing of the actuator, wherein the sub-frame is configured to enclose a plurality of components of the actuator.

 According to yet another aspect of the invention, there is provided an actuator
20 including a component isolator having an effective first spring constant and first damping constant, the component isolator coupled to at least one component of the actuator for isolating the component from a remainder of the actuator; and a sub-frame isolator having an effective second spring constant and second damping constant, the sub-frame isolator coupling a sub-frame to a housing of the actuator. The sub-frame
25 may enclose at least a portion of at least one component.

 According to still another aspect, there is provided an actuator having a central mounting plate. The central mounting plate may allow for tight dimensional control of all of the component mounting features. The central mounting plate may further enable the construction of the actuator components as a separate subassembly that can be

tested before insertion into the housing. The central mounting plate may be provided as a sub-frame. Accordingly, the central mounting plate may include an isolator having an effective spring constant and damping constant, wherein the isolator couples the mounting plate to an actuator housing.

5

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention, together with other objects, features and advantages, reference should be made to the following detailed description which should be read in conjunction with the following figures wherein like
10 numerals represent like parts:

FIG. 1 is a simplified block diagram of an exemplary electrically actuated park brake system (EPBA) consistent with the invention;

FIG. 2 is a simplified block diagram of the internal components of the actuator of FIG. 1;

15 FIG. 3 is a top perspective view of an exemplary EPBA consistent with the invention mounted on a brake caliper;

FIG. 4 is a perspective view of an exemplary actuator consistent with the invention with a top housing cover removed;

FIG. 5 is a perspective view of the actuator shown in FIG. 3 with the top housing
20 cover installed;

FIG. 6 is a perspective view of another exemplary actuator consistent with the invention with the housing removed;

FIG. 7 is an exploded view of an exemplary actuator consistent with the invention;

25 FIG. 8 is a perspective view of an actuator consistent with the invention having a worm gear and worm wheel for noise reduction benefits;

FIG. 9 is a block diagram illustrating the benefits of isolating a motor in an actuator consistent with the present invention; and

FIG. 10 is a block diagram illustrating the benefits of isolating a motor and a sub-frame within an actuator consistent with the present invention.

DETAILED DESCRIPTION

5 FIG. 1 is a simplified block diagram of an exemplary electronic parking brake actuator (EPBA) system 100 consistent with the present invention. Advantageously, the EPBA may include an actuator 102 that receives electrical power from a vehicle power source 104, e.g., a vehicle battery. The actuator may convert electrical energy to mechanical energy to drive a variety of devices. In the illustrated exemplary parking
10 brake actuator system 100, the actuator 102 may drive a brake caliper 106 associated, for example, with an emergency brake system.

Those skilled in the art will recognize a variety of ways that the actuator 102 may be coupled to a brake caliper 106 for applying the brakes. For example, the actuator 102 may be coupled to the brake caliper 106 via a push-rod for actuating the brake.
15 Similarly, a cam mechanism may produce braking action at the brake caliper 106 in response to the rotational output of the actuator 102. Alternatively, the actuator 102 may be adapted to provide a linear output that may be coupled to the brake caliper 106.

In the illustrated embodiment of FIG. 3, the actuator 102 may be mounted directly to a brake caliper 106. Those having skill in the art, however, will recognize
20 that the actuator 102 may be mounted to any suitable portion of a vehicle, including frame, body, and trim components. It will be understood that depending upon the particular mounting location and techniques, i.e. hard mounted versus soft mounting through an elastic member, operation of the actuator may cause a variety of audible noises. As later detailed herein, an actuator consistent with the present invention may
25 be configured for tailoring the audible noise of the actuator to a desired level.

The emergency brake caliper 106 may thus be selectively engaged from, e.g., a vehicle cockpit by a vehicle driver. The emergency brake may be engaged by the manual operation of a switch, in a similar manner as the manual engagement of a hand brake or pedal operated emergency brake. The system 100 of the present invention may

also be engaged in response to inputs from various sensors. For example, a sensor may be provided on an automatic transmission to engage the emergency brake when the “park” position is selected. Consistent with another embodiment, a sensor may be provided to detect motion of the vehicle when the engine is turned off. The emergency
5 brake system may be configured to actuate the brake caliper 106 if rolling motion of the vehicle is detected while the engine is turned off.

Turning to FIG. 2, a simplified block diagram of the internal components of an actuator 102 consistent with the present invention is illustrated. These components include a motor 200 (or a plurality of motors) for converting electrical energy from the
10 power source to mechanical energy. The output shaft of the motor 200 may be coupled to a drive gear 202, e.g., a pinion gear, a worm gear, or the like. The drive gear 202 may be coupled to a driven gear 204, e.g., a spur gear, a worm wheel, or the like. The driven gear 204 may be in meshing engagement with a single or multiple stage planetary gear set 206. The output shaft 208 may then provide one mechanical output through an
15 associated output port. Advantageously, the gear train may have an overall efficiency in the range of 60% and greater. However, lower efficiency gear trains may also be suitable for various applications.

In the embodiment of the actuator 102 shown in FIG. 2, the drive gear 202, may be coupled to the driven gear 204 via a drive belt 203, for example a toothed drive belt
20 such as a synchronous timing belt. Accordingly, the drive gear 202 may be a drive pulley, and similarly the driven gear 204 may be a driven pulley. The driven pulley 204 may be in meshing engagement with the single or multiple stage planetary gear set 206. The output shaft 208 may then provide one mechanical output through the associated output port. However, the drive gear 202 may alternatively be in meshing engagement
25 with the driven gear 204.

An electrical energy source (not shown), e.g. the vehicle battery, may be connected to the actuator 102 along with other control inputs, via connector pins in an integral connector assembly, which may be formed on a cover portion of the actuator housing. The connector pins may provide electrical connections to a PCB, which may

include motor control and position sensing electronics for driving the motor. A bottom portion of the housing may include integral locating features for the actuator components as well as mechanical attachment points for securing the actuator to a fixed location.

5 Referring next to FIGS. 4 through 7, one exemplary actuator 102 consistent with the present invention is illustrated in various views. FIG. 4 is a top-end view of the actuator 102. As shown, the actuator 102 may include an actuator housing 301 having a top cover 305, shown removed in FIG. 4. With the housing top portion, or cover, 305 removed, a drive pulley 302 may be seen coupled to a driven pulley 304 via a drive belt
10 303. The motor and planetary gear set, not visible in FIGS. 4 and 5, may be contained in housing 301. As shown in FIG. 5, an output 308 of the actuator 102 may be provided extending from the bottom-end of the actuator housing 301 adjacent the motor. Those having skill in the art will appreciate that the output 308 may be provided at other locations on the housing 301 by utilizing different gear arrangements that will be
15 readily understood.

Turning to FIGS. 6 and 7, the mechanical assembly of the exemplary actuator 102 of FIGS. 4 and 5 is most clearly shown. Advantageously, the illustrated exemplary embodiment 102 provides an actuator output in a compact configuration useful in the limited space available in automotive applications, such as in an electrically actuated
20 parking brake. As previously described, the actuator 102 may include a motor 300 mounted to a sub-frame 312, e.g. a mid plate. As shown in the preceding figures, the motor shaft may carry a drive pulley 302, disposed on the opposed side of the sub-frame 312 that drives a driven pulley 304 via a drive belt 303. In the illustrated embodiment, the driven pulley 304 in turn drives a double planetary gear set 306. The
25 driven pulley 304 may drive the planetary gear set 306 via a shaft extending through the sub-frame 312 and coupled to the a gear in meshing engagement with the planetary gear set 306. Alternatively, the driven pulley 304 may be configured as a compound gear. That is, the driven pulley 304 may include a pulley portion engaged with the

drive belt 303 and a geared portion that extends through the sub-frame and is in meshing engagement with the planetary gear set 306.

As mentioned, the motor 300 and drive train of the actuator 102 may be mounted on the sub-frame 312. This configuration may facilitate assembly of the actuator 102.

5 By mounting the components to the sub-frame 312 outside of the actuator housing 301 much greater access is provided to the components and ease of handling is improved. Furthermore, once the components have been mounted to the sub-frame 312, as shown in FIG. 6, performance of the actuator 102 may be tested prior to final assembly. Accordingly, detected problems may be resolved at an earlier stage in the assembly
10 process.

With particular reference to FIG. 7, the actuator 102 may include a housing top portion 305 that may be positioned on the actuator housing 301, thereby substantially enclosing the actuator. The top portion 305 may include a connector fitting 307 for receiving terminals 313 that are coupled to the motor 300, e.g. for providing power to
15 the motor and/or control signals. The connector fitting 307 may be formed as a protruding feature, as illustrated. Alternatively, the top portion 305 may merely be formed having openings to accept wiring therethrough.

The illustrated exemplary actuator 102 also includes a sub-frame top portion 314 that may be disposed on the sub-frame, or mid-plate, 312 and may cover at least a
20 portion of the drive gear 302, driven gear 304 and drive belt 303. Various means of securing the sub-frame top portion 314 to the sub-frame 312 will be understood by those having skill in the art.

In one exemplary embodiment, the terminals 313 may be secured to the top portion of the sub-frame 314, thereby orienting the terminals 313 to be received in the
25 connector fitting 307 as well as orienting the terminals 313 to be coupled to the motor 300. Additionally, mounting the terminals to the top portion 314 may allow the terminals to better resist push-pull forces. Consistent with this embodiment wherein the terminals are secured to the top portion of the sub-frame 314, it may be desirable to

form the top portion 314 from a polymer material to effectively retain and insulate the terminals.

Those having skill in the art will appreciate that numerous different materials may suitably be used for the various components of the actuator 102. For example, the housing 301 and the top portion 305 may be formed from a polymeric material. Increased strength and durability may further be achieved by using a reinforced polymeric material, such as glass filled Nylon. Similarly, the drive and driven pulley may be formed from a polymeric material, including a reinforced polymeric material such as glass filled Nylon.

The planetary gear set, including the planet gears, carriers, and the ring gear may also be formed from a variety of different materials, including both polymeric materials and metallic materials. Advantageously, the planetary gear assembly may be formed from powder metal, thereby providing strong components. Gear sets formed from powder metal may be further strengthened by heat treating.

Consistent with one aspect of the invention herein, it may be desirable to control the audible noise of the electro-mechanical actuator. Audible noise has become a significant attribute of electro-mechanically actuated systems in passenger vehicles. Typically it is desirable to reduce the audible noise in the cabin of a passenger vehicle. One exemplary manner of reducing audible noise consistent with the invention is by gear train selection. Referring to FIG. 8, by replacing the motor pinion drive gear and driven gear with a worm gear 202b and worm wheel 204b, as illustrated, a significant reduction in audible noise can be achieved.

Another method of reducing audible noise consistent with the invention includes isolation of various components and sub-components of an actuator. FIG. 9 is a block diagram illustrating motor isolation consistent with the invention. A motor 900 having a certain mass 902 and energy, i.e. generating motor inertia 904, may be coupled to an isolator, e.g., a pair of isolation bushings on either side of the motor. The isolator has an effective spring constant 906 and damping constant 908, both of which may be varied depending on the type of material and geometry chosen for the isolator. The isolator

thus mechanically isolates the motor from the mass of the actuator housing 910, thereby reducing air born audible noise associated with motor vibration.

Referring back to FIG. 7, the illustrated exemplary embodiment includes a motor isolation assembly in an actuator 102 consistent with the present invention. In the
5 illustrated embodiment, first and second housing portions are configured to define a motor isolation cavity. A first portion of the cavity is defined by the main housing 301, and a cover to the cavity is provided by the sub-frame 312, which may cover the top of the isolation cavity when installed in the housing 301. Accordingly, in the assembled actuator 102, the motor 300 may be disposed in the isolation cavity, which may be
10 separate from the remainder of the actuator 102.

In addition to receiving the motor in an isolation cavity, a first isolation bushing 316 and a second isolation busing 318 may be provided at associated ends of the motor 300. The isolation bushings 316, 318 and the mating main housing 301 and sub-frame 312 portions may not only isolate the motor 300 in the motor cavity but also prevent the
15 transmission of vibrations from the motor 300 to the remainder of actuator components, thereby reducing associated audible noise. Advantageously, the audible noise may be adjusted by selection of the isolation bushing material to provide appropriate spring and damping constants.

In a further embodiment, internal actuator components may be housed in a sub-
20 frame. The sub-frame may also be isolated from the actuator housing for additional noise reduction benefits. FIG. 10 is a block diagram illustrating an exemplary sub-frame configuration consistent with the invention. Again a motor having a certain mass 1002 and energy, i.e. providing motor inertia 1004, may be coupled to a motor isolator or isolators, e.g., pair of isolation bushing on either side of the motor. The motor isolator
25 has an effective spring constant 1006 and damping constant 1008, both of which may be varied depending on the type of material and geometry chosen for the motor isolator.

In this instance, the motor is isolated from the mass of the sub-frame 1010. The mass of the sub-frame may be chosen to minimize transfer of vibration by adjusting the volume and material density. In turn, the sub-frame is coupled to the mass of the outer

shell 1016 of an actuator consistent with the invention. Similar to the motor isolator, the sub-frame isolator or isolators have an effective spring constant 1012 and damping constant 1014 isolating the sub-frame 1010 from the outer shell 1016 of the actuator. The effective spring constant 1012 and damping constant 1014 for the sub-frame isolator
5 can be tailored by selection of an appropriate material and geometry for the isolator.

In the exploded view shown in FIG. 7, the exemplary actuator 102 includes both a motor 300 and a sub-frame isolation assembly, which includes the sub-frame lower portion 312 and the sub-frame top portion 314. Mating of the sub-frame top portion 314 and lower 312 portions of the sub-frame may at least partially enclose the actuator
10 drive gear 302, driven gear 304 and drive belt 303 components, as well as isolate the motor 300 in a separate isolation cavity defined by the housing 301 and the sub-frame 312. As previously discussed, first and second isolation bushings 316, 318 may also reduce the transmission of vibrations from the motor 300. Again, the bushings 316, 318 may be formed from materials chosen to provide desired spring and damping constants
15 for reducing noise. In addition to the bushings 316, 318, the motor may also be retained to the sub-frame 312 by straps 320. As with the bushings, the straps 320 may be formed from a material chosen to provide a desired spring constant and damping constant.

The sub-frame may be constructed from a variety of materials to assist with audible noise reduction. For instance, the sub-frame top portion 314 may be a low-
20 density material, e.g., a plastic, and the sub-frame lower portion 312 may be a higher density material, e.g., metal such as steel.

Consistent with the aspect of a multi-tiered isolation scheme, the motor 300 may be contained in a motor isolation cavity defined by the main housing 301. The motor isolation cavity may be completed by the sub-frame 312 disposed over the opening of
25 the isolation cavity defined by the housing 301. Additionally, the planetary gear set 306 may also be contained in an isolation cavity defined by the main housing 301. Similar to the motor isolation scheme, the planetary gear set 306 may be isolated from the sub-frame 312 by a bushing 322. The planetary gear set isolation bushing 322 may be

formed from a material chosen to provide a desired spring constant and damping constant.

A main portion 301 and a top portion 305 of the actuator housing mate to enclose the sub-frame 312. In the embodiment, the sub-frame top portion 314 is isolated from the actuator housing top portion 305 by an isolator 326. In addition, the sub-frame lower portion 312 is isolated from the main housing portion 301 of the actuator by a plurality of isolators. The isolators may include central openings for accepting associated protrusions on the sub-frame lower portion 312 which extend into corresponding openings in the main housing portion 301 of the actuator. The isolators or grommets may, for example, be elastomeric for achieving a desired spring and damping constant.

The motor may thus be isolated from the sub-frame by bushings, and all actuator components, including the motor, may be isolated from the outer actuator housing by the sub-frame, which may be isolated from the outer actuator housing by isolators.

Advantageously, when the actuator housing is affixed to another system, such as a brake caliper or vehicle body, the actuator components are mechanically isolated in the sub-frame. This provides a benefit to vehicle manufacturers as mechanical vibration transmission to the mating assembly is minimized. Also, adjustment of the spring and damping constants associated with the bushings and isolators, and adjustment of the sub-frame and actuator housing materials, allows for tuning of the audible noise associated with the actuator for a particular application.

In an alternative embodiment, the sub-frame may include a housing that at least partially encloses or surrounds the motor as well as at least a portion of the gear train. According to such an embodiment, the motor may be attached to the sub-frame in an isolated configuration. Such a configuration may eliminate the need to provide isolators or bushings between the motor and the housing. The motor may be contained by the sub-frame such that it is not necessary to additionally support the motor on the housing. This last aspect, however, may also be achieved by securely associating the

motor with a mid-plate type sub-frame, wherein the motor is completely supported on the sub-frame without the sub-frame at least partially enclosing the motor.

An electronic parking brake actuator including isolation features consistent with the present invention may realize reduced audible noise as compared to an actuator not using isolation features. For example, the audible noise of an actuator consistent with the present invention may be decreased to at least around 19.9 sones during application of the brake and 21.9 sones during the release of the brake, as compared to 30.5 sones and 27.4 sones for a conventional actuator. These observed sound levels were recorded by a microphone positioned 150 mm from the actuator and positioned at a right angle thereto.

While the preceding description has been directed at reducing audible noise or vibration, it should be appreciated that rather than simply reducing or eliminating the audible noise in a vehicle cabin the actuator isolation system herein is actually directed at controlling the audible noise. Controlling the audible noise may include reducing or eliminating the audible noise in the vehicle cabin. Additionally, controlling the audible noise may include transmitting at least a portion of the audible noise from the actuator to the vehicle cabin. For example, in the application as an emergency brake actuator it may be desirable for a vehicle operator to hear the actuator operating, thereby providing an audible indication that the emergency brake is being engaged.

Accordingly, the bushings, isolators, and isolation cavity may be selected to pass a desired level or frequency to the vehicle cabin. Similarly, controlling the audible noise from the actuator may include passing certain frequencies of sound, e.g. low frequency sound, to the cabin while eliminating other frequencies.

As discussed above, the use of a sub-frame or mid-plate may improve the manufacturability of an actuator. Consistent with the present invention, an actuator may be manufactured by first greasing and assembling a ring gear of a planetary gear set. A bushing for the motor may then be pressed into the mid-plate and a washer associated with the planetary gear set may be pressed into the ring gear. Next, a motor may be assembled to the mid-plate using a retention strap. With the motor retained to

the mid-plate, a drive pulley may be pressed onto the output shaft of the motor. A driven pulley and a drive belt may then be loaded onto the assembly, and the belt may be fully engaged with the drive pulley and the driven pulley.

At this stage, with the components assembled to the mid-plate outside of an
5 actuator housing, electrical terminals may be assembled to a top portion of the mid-plate, for example by ultrasonically welding the terminals to the top portion of the mid-plate. The top portion of the mid-plate may then be joined to the mid-plate and the ring gear and the isolators may be loaded onto the mid-plate and the top portion of the mid-plate. The terminals may then be spot welded to the motor. At this point, operation of
10 the actuator may be tested by providing power to the motor.

The actuator components may next be installed in the actuator housing. The main housing and housing top portion may be perimeter welded. If the main housing and/or the top portion of the housing are formed from glass filled plastic, e.g., glass filled nylon, weld quality may be improved by providing reduced glass content in the
15 top portion of the housing.

Thus, the embodiments that have been described herein are but some of the several which utilize this invention and are set forth here by way of illustration but not of limitation. It is obvious that many other embodiments, which will be readily apparent to those skilled in the art, may be made without departing materially from the
20 spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. An electrically actuated parking brake system comprising:
a vehicle power source;
an electromechanical actuator comprising a motor having a drive shaft, a drive gear coupled to said drive shaft, a driven gear coupled to said drive gear, and at least one planetary gear set coupled to said driven gear for driving an actuator output; and
a brake caliper coupled to said actuator output, said actuator output being configured for driving said brake caliper between an engaged position and a released position.
2. The system according to claim 1, wherein said drive gear and said driven gear comprise a worm gear and a worm wheel in meshing engagement.
3. The system according to claim 1, wherein said drive gear and said driven gear are coupled via a drive belt.
4. The system according to claim 1, said actuator further comprising a component isolator having a spring constant and a damping constant, said isolator coupled between said motor and a remainder of said actuator.
5. The system according to claim 4, wherein said component isolator comprises a first portion coupled to a first end of said motor and a second portion coupled to a second end of said motor.
6. The system according to claim 1, said actuator further comprising a sub-frame, said motor being mounted on said sub-frame.

7. The system according to claim 6, further comprising a component isolator having a spring constant and a damping constant, said isolator coupled between said motor and said sub-frame.

8. The system according to claim 6, wherein said at least one planetary gear set is mounted on said sub-frame.

9. The system according to claim 8, further comprising a component isolator having a spring constant and a damping constant, said isolator coupled between said at least one planetary gear set and said sub-frame.

10. The system according to claim 6, further comprising a sub-frame isolator having a spring constant and a damping constant, said isolator coupled between said sub-frame and a remainder of said actuator.

11. The system according to claim 1, further comprising an actuator housing defining a motor cavity receiving at least a portion of said motor and a covering member disposed adjacent said motor cavity, thereby separating said motor from a remainder of said actuator.

12. The system according to claim 11, wherein said covering member comprises a sub-frame.

13. An electro-mechanical actuator comprising:
a motor having a drive shaft;
a gear train coupled to said drive shaft for driving an output of said actuator; and
a sub-frame, said motor and at least a portion of said drive train being mounted on said sub-frame.

14. An actuator according to claim 13, wherein said gear train comprises a driven gear coupled to a planetary gear set, and wherein at least one of said driven gear and said planetary gear set are mounted on said sub-frame.

15. The electromechanical actuator according to claim 14, further comprising an actuator housing defining a planetary gear set cavity receiving at least a portion of said planetary gear set, wherein cooperation between said housing and said sub-frame separating said planetary gear set from a remainder of said actuator.

16. The electro-mechanical actuator according to claim 13, further comprising an actuator housing, said housing defining a motor cavity receiving at least a portion of said motor, wherein cooperation between said housing and said sub-frame separate said motor from a remainder of said actuator.

17. The electromechanical actuator according to claim 16, further comprising a first motor isolator having a spring constant and a damping constant, said isolator disposed between said sub-frame and said motor.

18. The electromechanical actuator according to claim 17, further comprising a second motor isolator having a spring constant and a damping constant, said isolator disposed between said motor and said housing.

19. The electromechanical actuator according to claim 13, further comprising a sub-frame isolator having a spring constant and a damping constant, said isolator disposed between said sub-frame and an actuator housing.

20. An electrically actuated parking brake system comprising:
a vehicle power source;

an actuator comprising a motor having a drive shaft coupled to a drive pulley, a driven pulley coupled to said drive pulley via a drive belt, and a planetary gear set coupled to said driven pulley for driving an output of said actuator, at least said motor and planetary gear set mounted on a sub-frame, and a component isolator having a spring constant and a damping constant disposed between said sub-frame and an actuator housing; and

a brake caliper coupled to said actuator output, said actuator output being configured for driving said brake caliper between an engaged position and a released position.

21. The system according to claim 20, said actuator housing comprising a motor isolation cavity receiving at least a portion of said motor, wherein said sub-frame cooperates with said housing to separate said motor from at least one of said drive gear, driven gear and said planetary gear set.

22. The system according to claim 20, further comprising a motor isolator having a spring constant and a damping constant, said motor isolator disposed between said motor and said mounted plate.

23. A method of assembling an actuator comprising
mounting a motor and a gear train to a sub-frame;
coupling said sub-frame to a portion of an actuator housing to at least partially enclose said motor in a motor isolation cavity defined by said portion of said actuator housing and said sub-frame.

24. A method according to claim 23, said method further comprising:
coupling a second sub-frame to said sub-frame to enclose at least a portion of said gear train in a cavity defined by said sub-frame and said second sub-frame.

25. A method according to claim 24, said method further comprising:
coupling a second portion of said actuator housing to said portion of said actuator housing to enclose said sub-frame and said second sub-frame at least partially within said actuator housing.

26. A method according to claim 23, said method further comprising:
providing at least one motor isolation bushing between said portion of said actuator housing and said motor.

27. A method according to claim 23, said method further comprising:
providing a first motor isolation bushing between said portion of said actuator housing and said motor; and
providing a second motor isolation bushing between said sub-frame and said motor.

28. A method according to claim 23, said method further comprising:
providing at least one isolation bushing between said portion of said actuator housing and said sub-frame.

ABSTRACT

An electrically actuated parking brake system and actuator therefor. The actuator includes a motor having a drive shaft, and a gear train coupled to the drive shaft, wherein the gear train provides at least one mechanical output from the actuator. The gear train may include a drive gear coupled to the drive shaft, a driven gear coupled to the drive gear, and a planetary gear set coupled to the driven gear. Various configurations are provided for isolating actuator components for controlling audible noise, including sub-frame isolation configurations, motor isolation configurations, and gear train isolation configurations.

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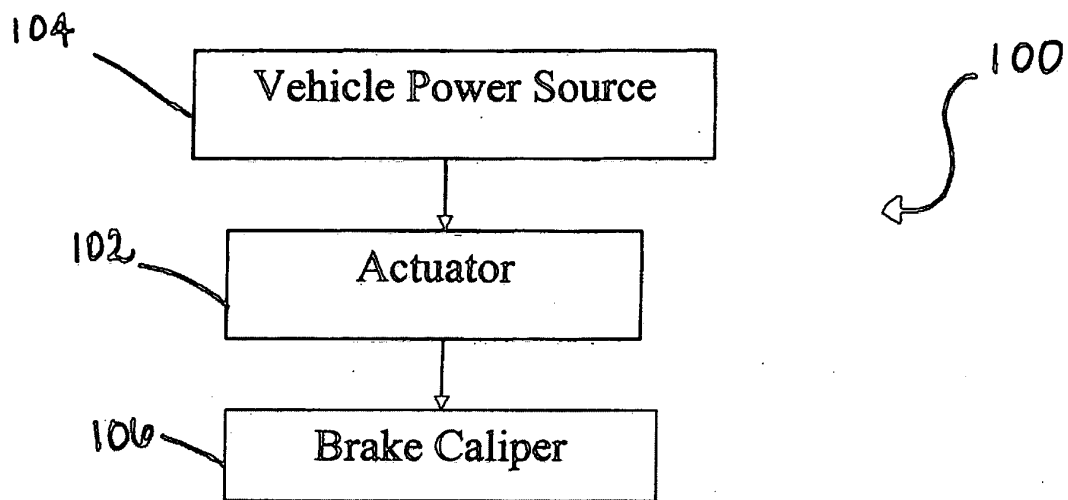


FIG 1

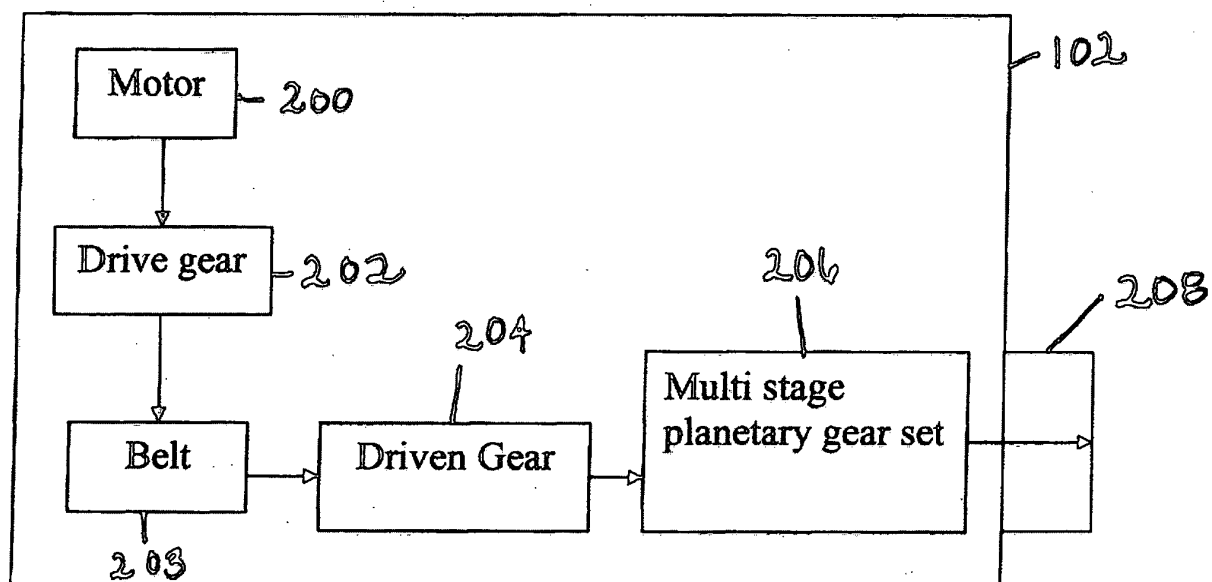


FIG 2

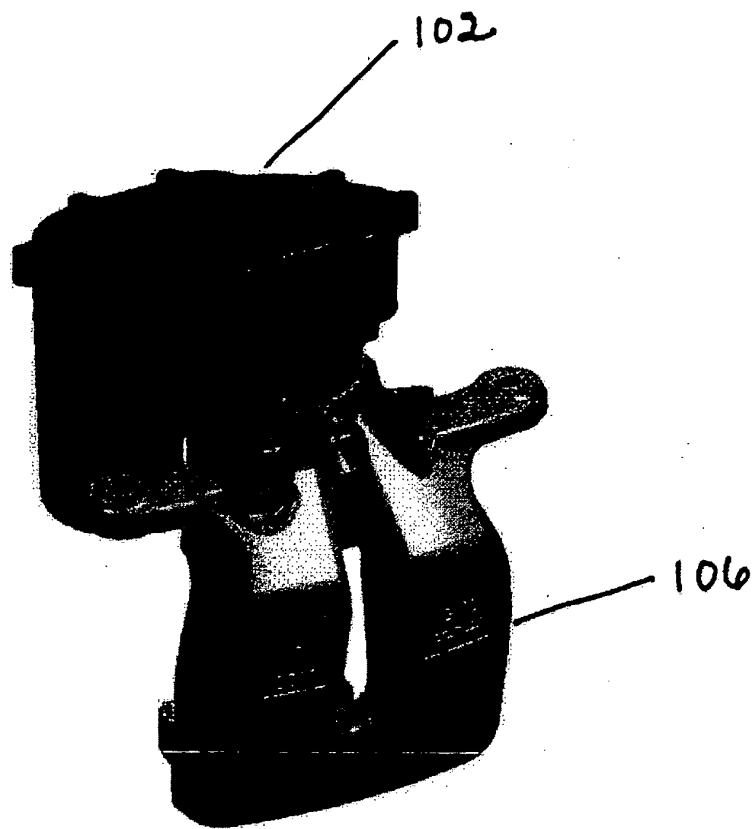


FIG 3

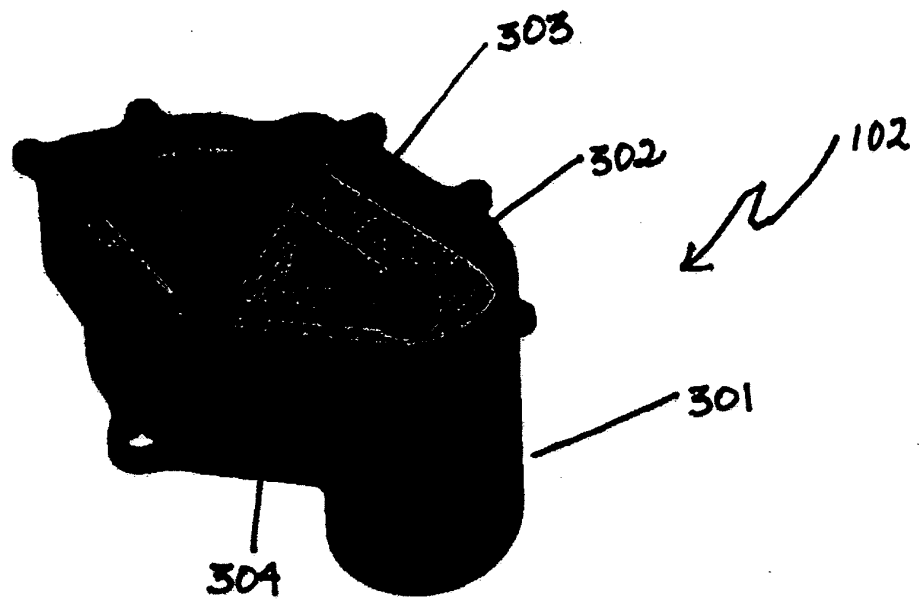


FIG 4

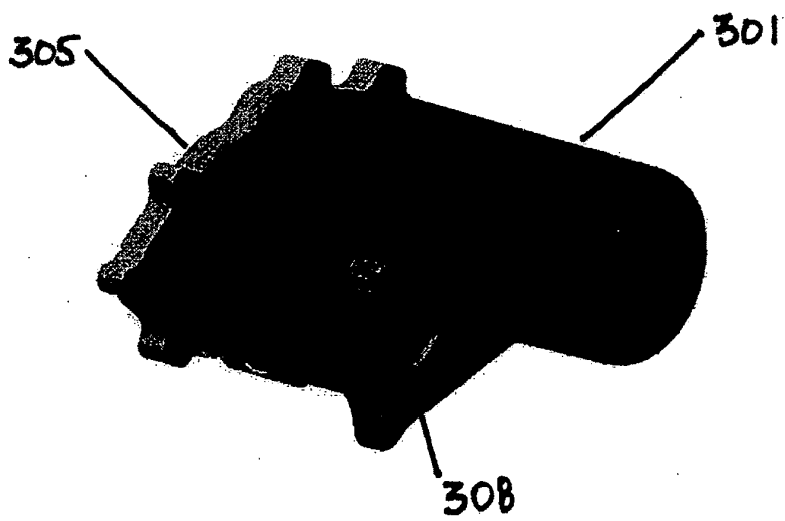


FIG 5

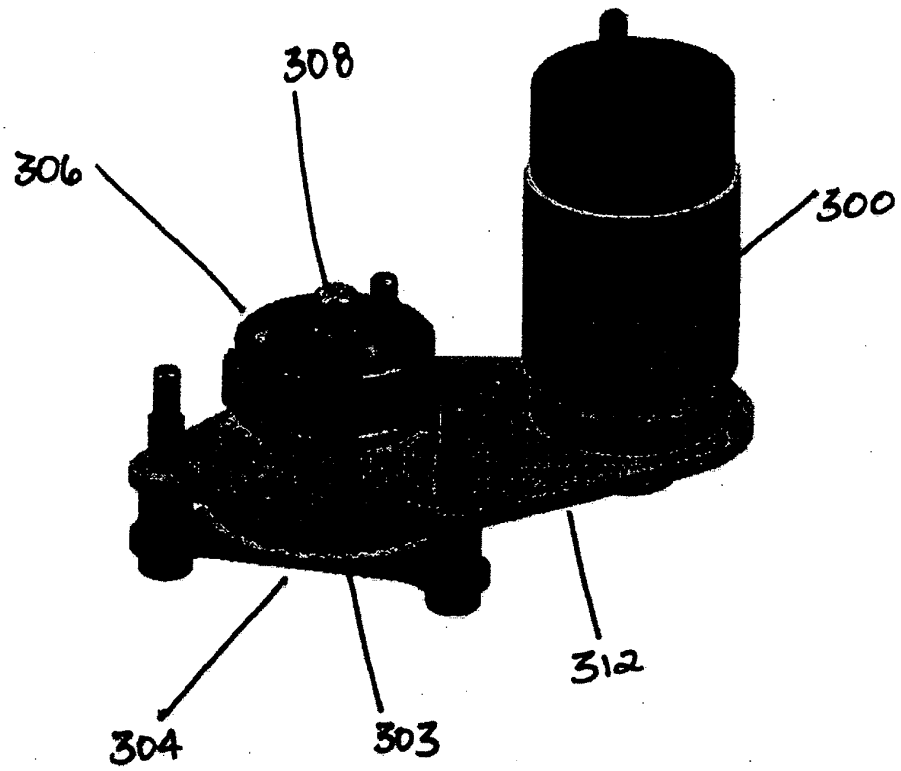


FIG 6

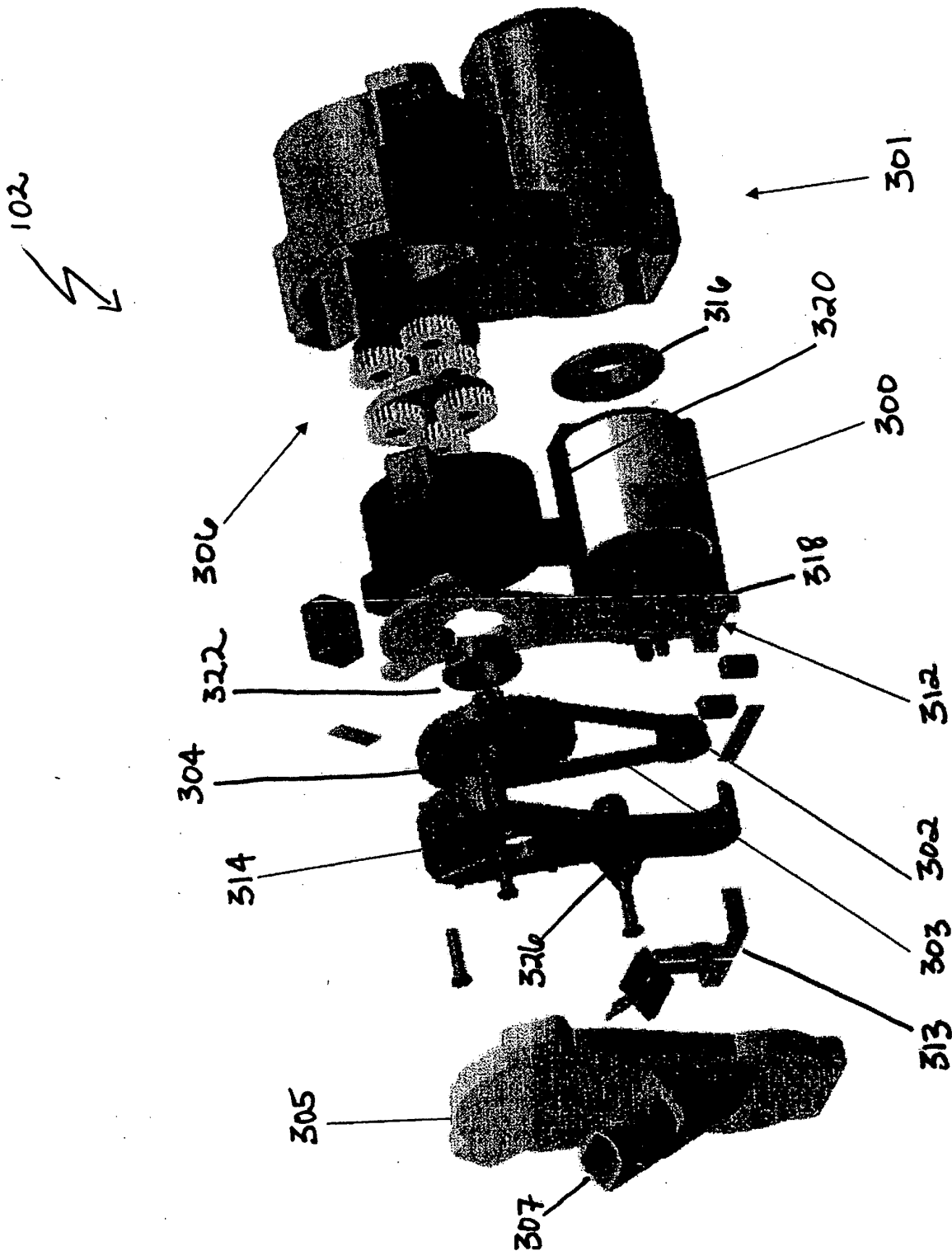


FIG 7

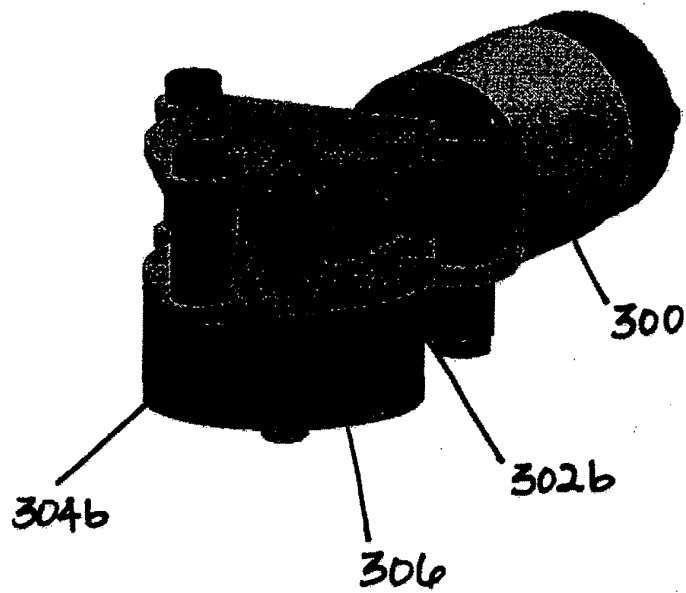


FIG 8

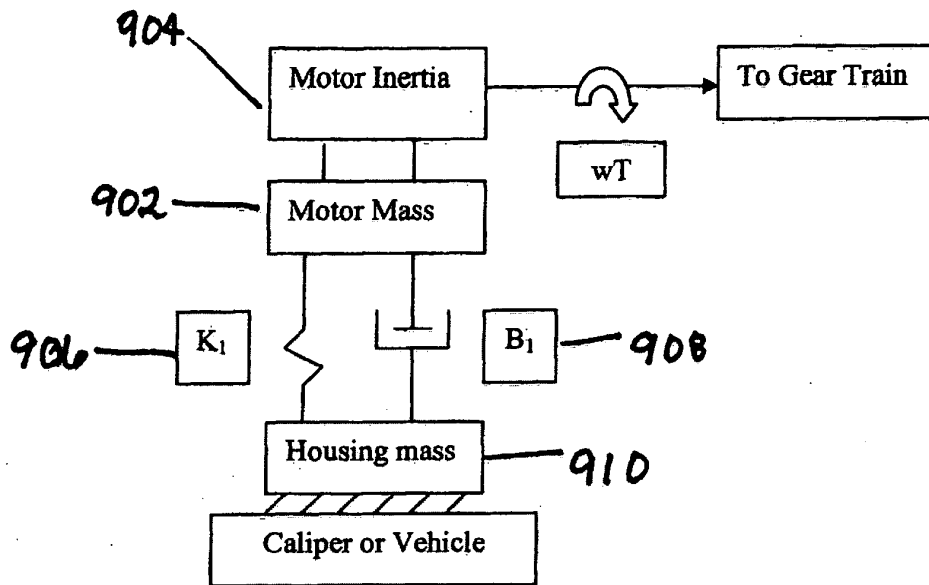


FIG 9

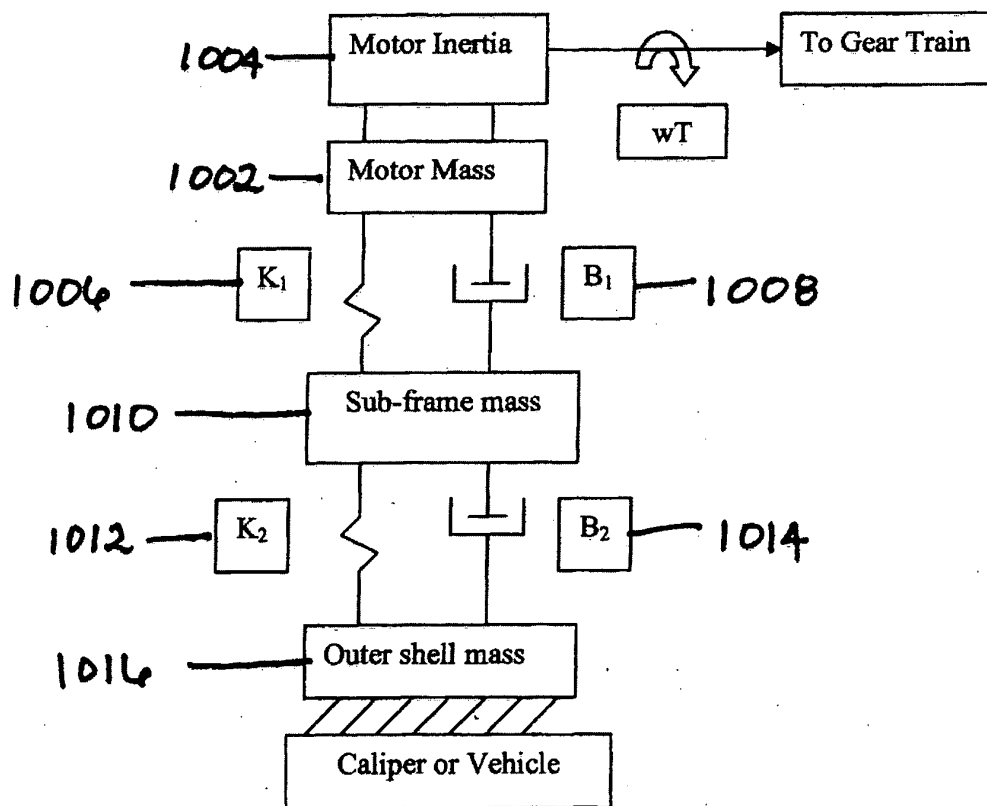


FIG 10



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/712,764	11/13/2003	William Farmer	PCB110

Grossman, Tucker, Perreault & Pfleger, PLLC
55 South Commercial Street
Manchester, NH 03101

CONFIRMATION NO. 7399

FORMALITIES LETTER



OC000000011873496

Date Mailed: 02/10/2004

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 770 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Additional claim fees of **\$230** as a non-small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$1130** for a Large Entity

- **\$770** Statutory basic filing fee.
- **\$130** Late oath or declaration Surcharge.
- Total additional claim fee(s) for this application is **\$230**

- \$86 for 1 independent claims over 3.
- \$144 for 8 total claims over 20.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

A copy of this notice MUST be returned with the reply.

T. Kotsola

Customer Service Center

Initial Patent Examination Division (703) 308-1202

PART 3 - OFFICE COPY

PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2003

Application or Docket Number

10712764

CLAIMS AS FILED - PART I

(Column 1)

(Column 2)

TOTAL CLAIMS	28	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	28 minus 20 =	* 8
INDEPENDENT CLAIMS	4 minus 3 =	* 1
MULTIPLE DEPENDENT CLAIM PRESENT ☐		

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

(Column 1)

(Column 2)

(Column 3)

AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐				

SMALL ENTITY TYPE ☐

OR

OTHER THAN SMALL ENTITY

RATE	FEE
BASIC FEE	385.00
XS 9=	
X43=	
+145=	
TOTAL	

RATE	FEE
BASIC FEE	770.00
XS18=	144
X86=	86
+290=	
TOTAL	1000

SMALL ENTITY OR

OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE
XS 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
XS18=	
X86=	
+290=	
TOTAL ADDIT. FEE	

(Column 1)

(Column 2)

(Column 3)

AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐				

RATE	ADDITIONAL FEE
XS 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
XS18=	
X86=	
+290=	
TOTAL ADDIT. FEE	

(Column 1)

(Column 2)

(Column 3)

AMENDMENT C		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐				

RATE	ADDITIONAL FEE
XS 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
XS18=	
X86=	
+290=	
TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.



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- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Additional claim fees of \$230 as a non-small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.

05/13/2004 MBERHE 00000144 10712764

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is \$1130 for a Large Entity

01 FC:1001	770.00 OP
02 FC:1051	130.00 OP
03 FC:1201	86.00 OP
04 FC:1202	144.00 OP

- \$770 Statutory basic filing fee.
- \$130 Late oath or declaration Surcharge.
- Total additional claim fee(s) for this application is \$230

- \$86 for 1 independent claims over 3.
- \$144 for 8 total claims over 20.

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*A copy of this notice **MUST** be returned with the reply.*

T. Ketsel
Customer Service Center
Initial Patent Examination Division (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE

**Response To Notice To File Missing Parts Of Application
Filing Date Granted (PTO-1533)(Large Entity)**

Docket No.
PCB110

In Re Application Of:
FARMER et al



Serial No.
10/712,764

Filing Date
11/13/2003

Examiner

Group Art Unit
3616

Invention:

ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE

Mail Stop Missing Parts

TO THE COMMISSIONER FOR PATENTS:

This is a response to the Notice to File Missing Parts of Application - Filing Date Granted (PTO-1533) mailed on
February 10, 2004
Date

Enclosed herewith for filing are the following:

- ☒ A copy of the Notice to File Missing Parts of Application - Filing Date Granted (PTO-1533). **(REQUIRED)**
- ☒ An oath or declaration in compliance with 37 CFR 1.63, including residence information and identifying the application by the above Application Number and Filing Date.
- ☐ A properly signed oath or declaration in compliance with 37 CFR 1.63.
- ☐ An oath or declaration in compliance with 37 CFR 1.63 listing the names of all inventors and signed by the omitted inventor(s), identifying this application by the above Application Number and Filing Date.
- ☐ A verified English translation of the non-English language application papers as originally filed. It is requested that this translation be used as the copy for examination purposes in the United States Patent and Trademark Office.
- ☒ Other (list):

**Recordation Form Cover Sheet; Assignment and \$40.00 assignment fee
Transmittal of Formal Drawings and 6 sheets of drawings (Figs. 1-10)**

05/13/2004 MBERHE 00000144 10712764

05 FC:1251

110.00 DP

**Response To Notice To File Missing Parts Of Application
Filing Date Granted (PTO-1533) (Large Entity)**

Docket No.
PCB110

In Re Application of
FARMER et al

Serial No.
10/712,764

Filing Date
11/13/2003

Examiner

Group Art Unit
3616

Invention:

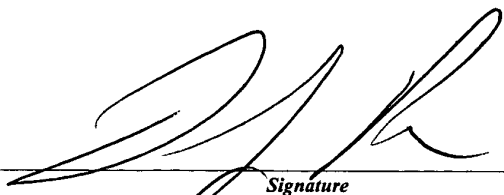
ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE

TO THE COMMISSIONER FOR PATENTS:

Mail Stop Missing Parts

The fee of **\$1,280.00** is to be paid as follows:

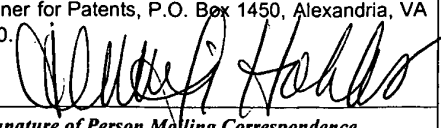
- ☒ A check in the amount of the fee is enclosed.
- ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account No. **50-2121**
- ☒ If an additional extension of time is required, please consider this a petition therefor and charge any additional fees which may be required to Deposit Account No. **50-2121**


Signature

Donald J. Perreault
Attorney for Applicant
Reg. No. 40,126
Grossman, Tucker, Perreault & Pflieger, PLLC
55 South Commercial Street
Manchester, NH 03101
CUSTOMER NO. 32047

Dated: **May 10, 2004**

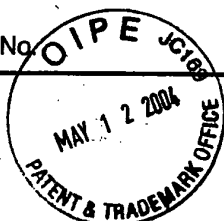
I certify that this document and fee is being deposited
on **May 10, 2004** with the U.S. Postal Service as
first class mail under 37 C.F.R. 1.8 and is addressed to the
Commissioner for Patents, P.O. Box 1450, Alexandria, VA
22313-1450.


Signature of Person Mailing Correspondence

Jennifer L. Hobbs

Typed or Printed Name of Person Mailing Correspondence

cc:

Docket No.
PCB110

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE

the specification of which

(check one)

☐ is attached hereto.

☒ was filed on November 13, 2003 as United States Application No. or PCT International Application Number 10/712,764 and was amended on _____

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, or plant breeder's rights certificate(s), or 365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

(Number)

(Country)

(Day/Month/Year Filed)

☐

(Number)

(Country)

(Day/Month/Year Filed)

☐

(Number)

(Country)

(Day/Month/Year Filed)

☐

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

60/426,044

(Application Serial No.)

11/13/2002

(Filing Date)

60/467,993

(Application Serial No.)

05/05/2003

(Filing Date)

(Application Serial No.)

(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

10/061,940

(Application Serial No.)

02/01/2002

(Filing Date)

Pending

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

Steven J. Grossman	Reg. No. 35,001
Donald J. Perreault	Reg. No. 40,126
Edmund P. Pfleger	Reg. No. 41,252
Scott R. Faber	Reg. No. 48,380
Jeffrey T. Placker	Reg. No. 47,862

Send Correspondence to: Donald J. Perreault
Grossman, Tucker, Perreault & Pfleger, PLLC
55 South Commercial Street
Manchester, NH 03101

Direct Telephone Calls to: *(name and telephone number)*
Donald J. Perreault at 603.668.6560

Full name of sole or first inventor William FARMER	
Sole or first inventor's signature <i>William J. Farmer</i>	Date 09 APR 04
Residence 401 GREAT ROAD, UNIT 3 ACTON MA 01720	
Citizenship USA	
Post Office Address same as residence	

Full name of second inventor, if any Gary KINNEAR	
Second inventor's signature <i>Gary Kinear</i>	Date 09 APR 04
Residence 60 IRON HILL ST Weymouth MA 02189	
Citizenship USA	
Post Office Address same as residence	

Full name of third inventor, if any Thomas P. SCHREGARDUS	
Third inventor's signature <i>Thomas P. Schregardus</i>	Date <i>4/9/04</i>
Residence 25 Fairmont Avenue, Somerville, MA 02144	
Citizenship United States	
Post Office Address same as residence	

Full name of fourth inventor, if any Yuly YANISHEVSKY	
Fourth inventor's signature <i>Y. Yanishev</i>	Date <i>04/13/04</i>
Residence 11 GLENDALE ROAD, MARBLEHEAD, MA 01945	
Citizenship USA	
Post Office Address same as residence	

Full name of fifth inventor, if any	
Fifth inventor's signature	Date
Residence	
Citizenship	
Post Office Address	

Full name of sixth inventor, if any	
Sixth inventor's signature	Date
Residence	
Citizenship	
Post Office Address	

MAY 12 2004
PATENT & TRADEMARK OFFICE

TRANSMITTAL OF FORMAL DRAWINGS

Docket No.
PCB110

In Re Application Of: **FARMER et al**

Serial No.	Filing Date	Confirmation No.	Examiner	Art Unit
10/712,764	11/13/2003			3616

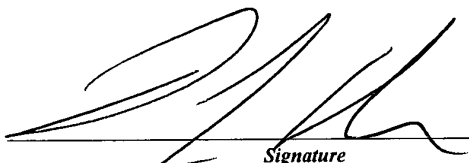
Invention: **ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE**

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

Transmitted herewith are:

6 sheets of formal drawing(s) for this application.

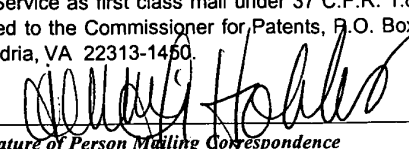
☐ Each sheet of drawing indicates the identifying indicia suggested in 37 CFR Section 1.84(c).


Signature

**Donald J. Perreault
Attorney for Applicant
Reg. No. 40,126
Grossman, Tucker, Perreault & Pfleger, PLLC
55 South Commercial Street
Manchester, NH 03101
CUSTOMER NO. 32047**

Dated: **May 10, 2004**

I certify that this document and attached formal drawings are being deposited on **May 10, 2004** with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.


Signature of Person Mailing Correspondence

Jennifer L. Hobbs

Typed or Printed Name of Person Mailing Correspondence

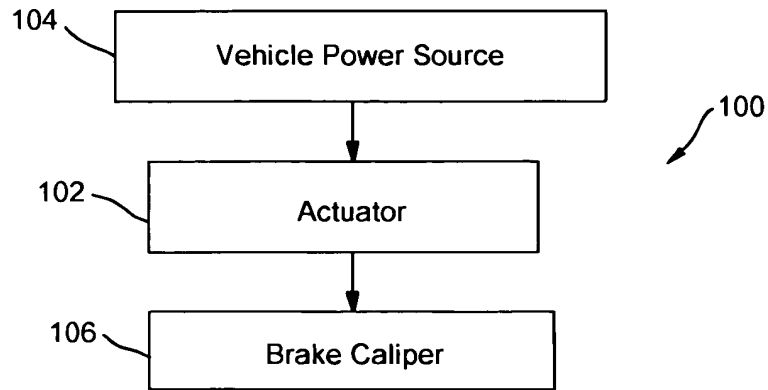


FIG. 1

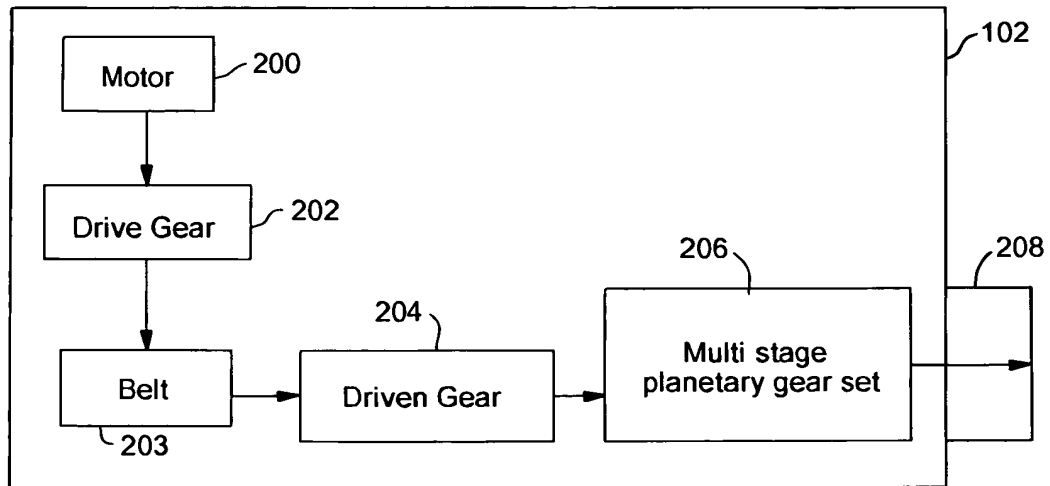


FIG. 2

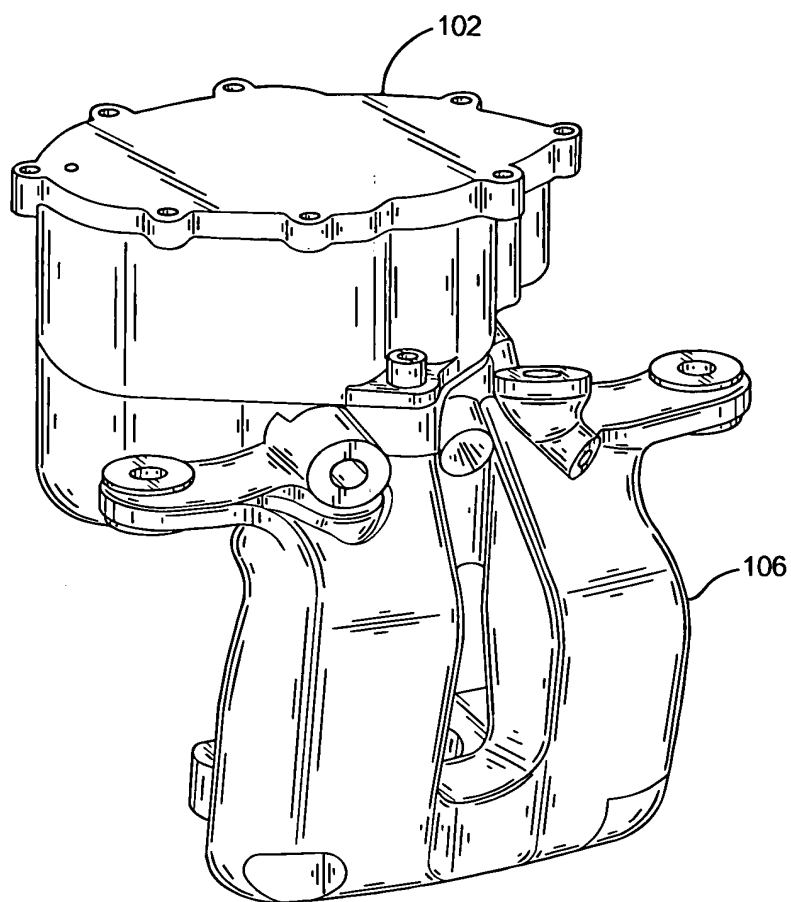


FIG. 3

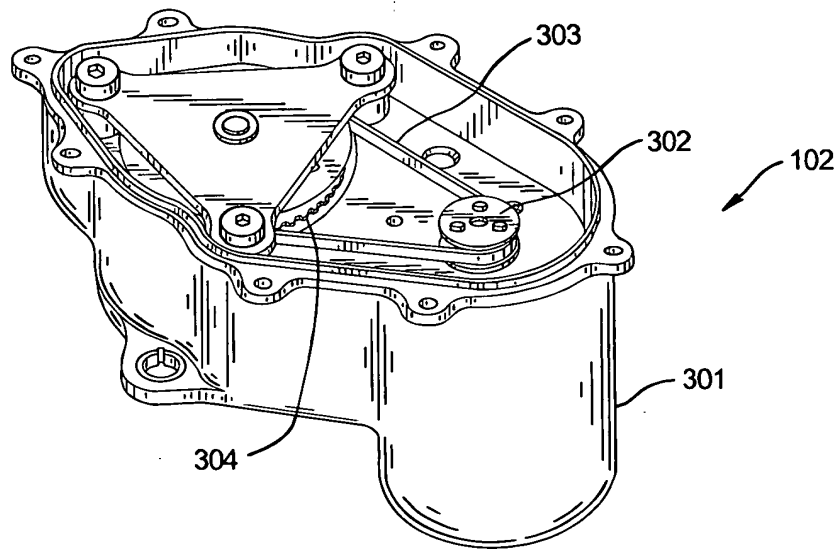


FIG. 4

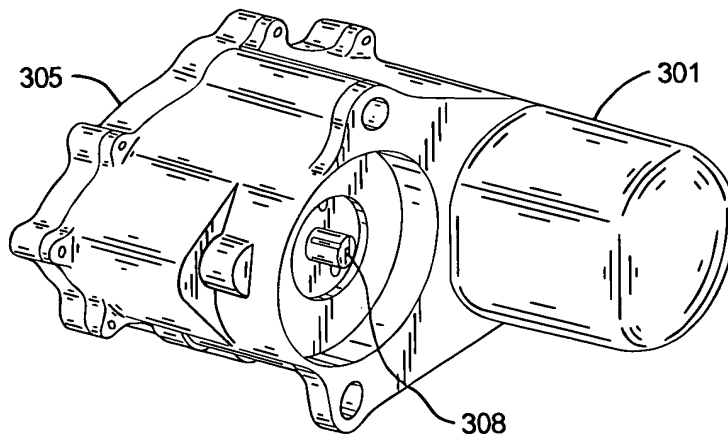


FIG. 5

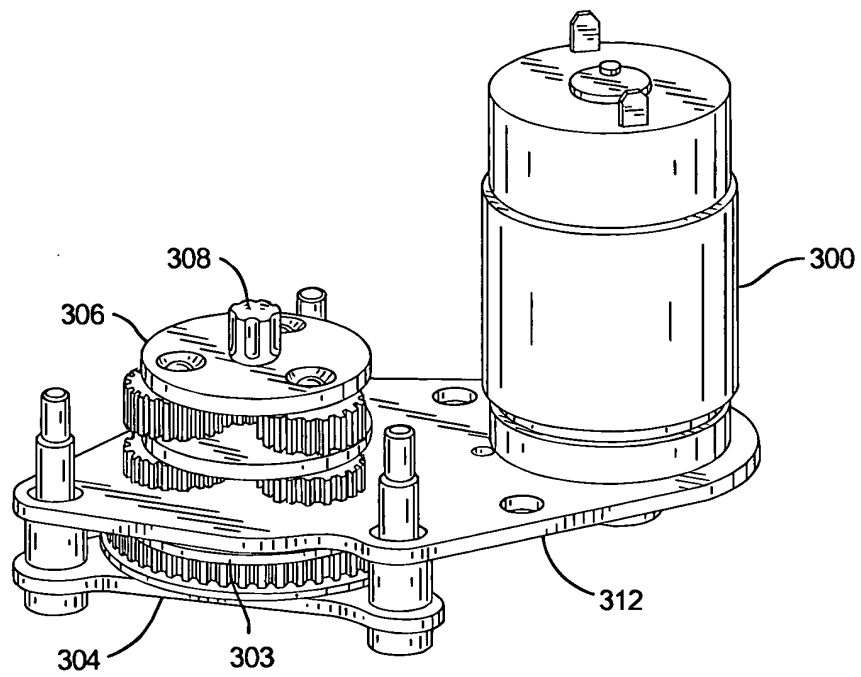


FIG. 6

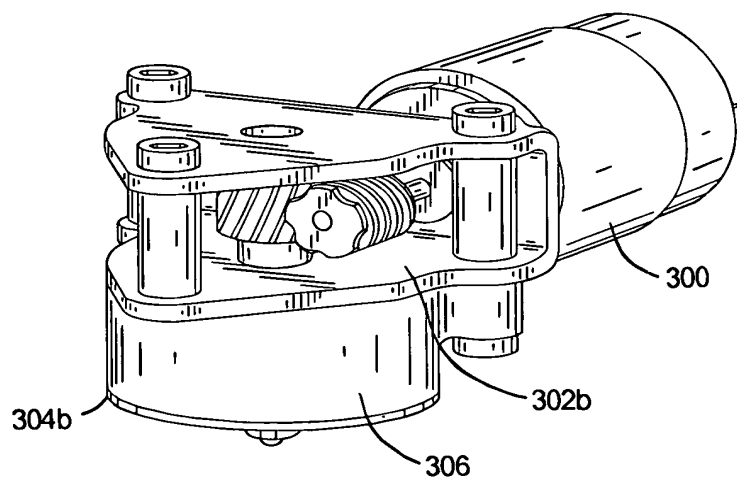


FIG. 8

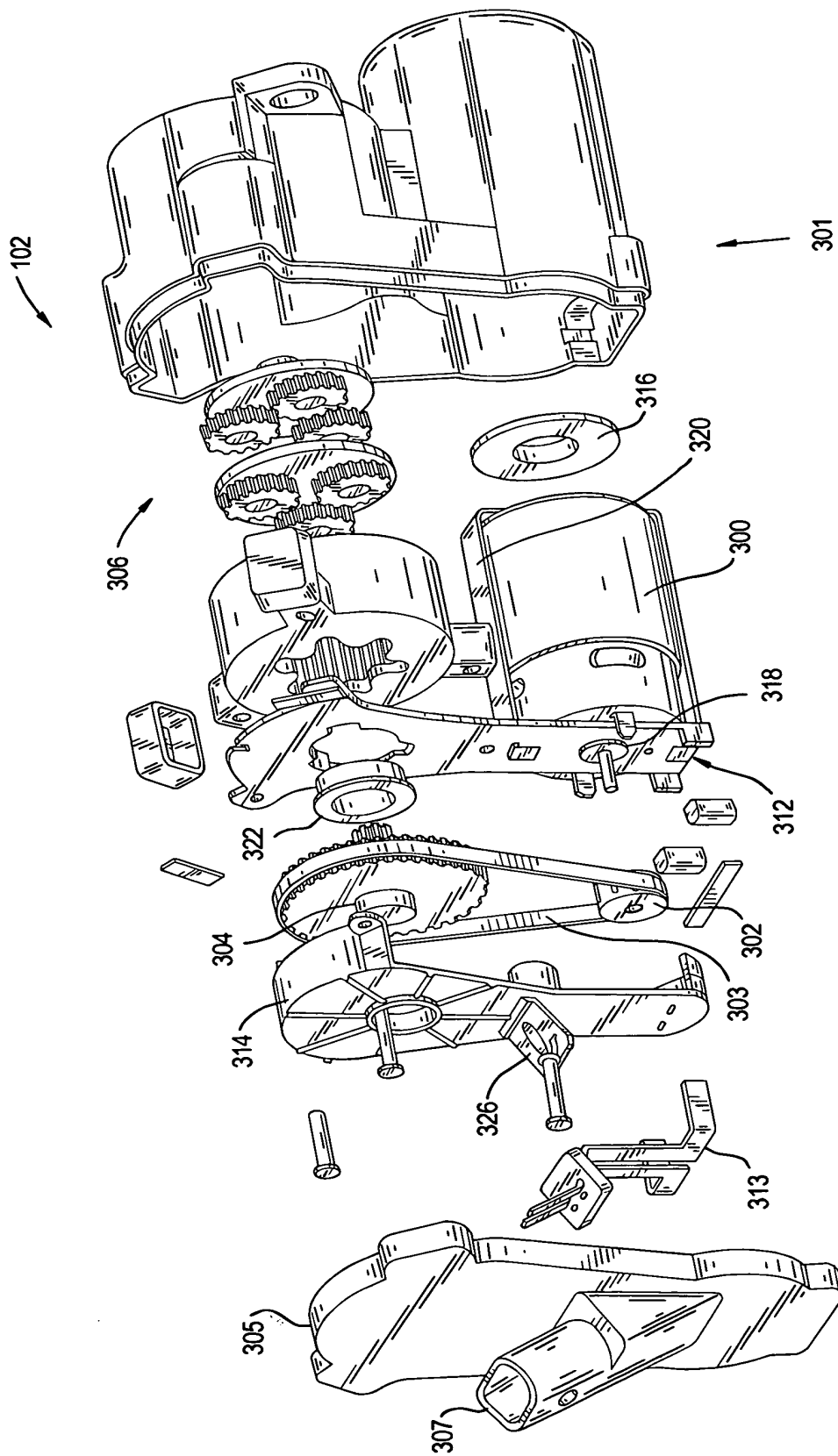


FIG. 7

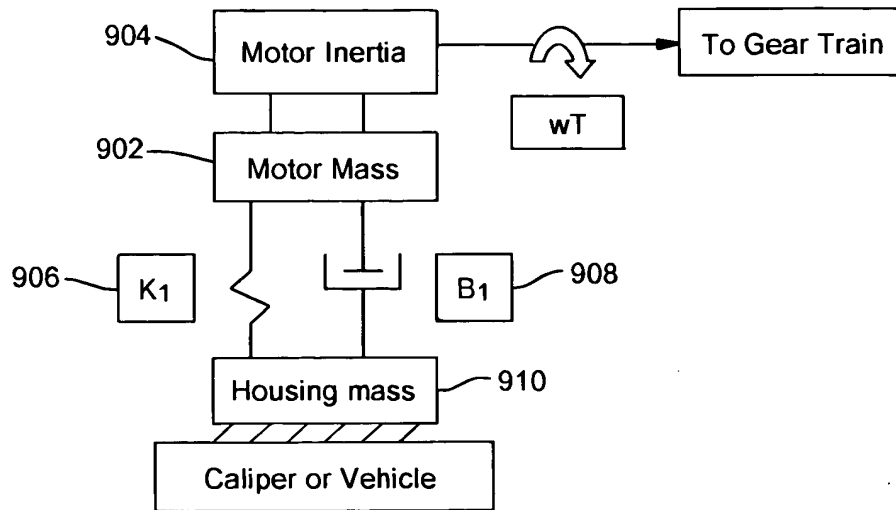


FIG. 9

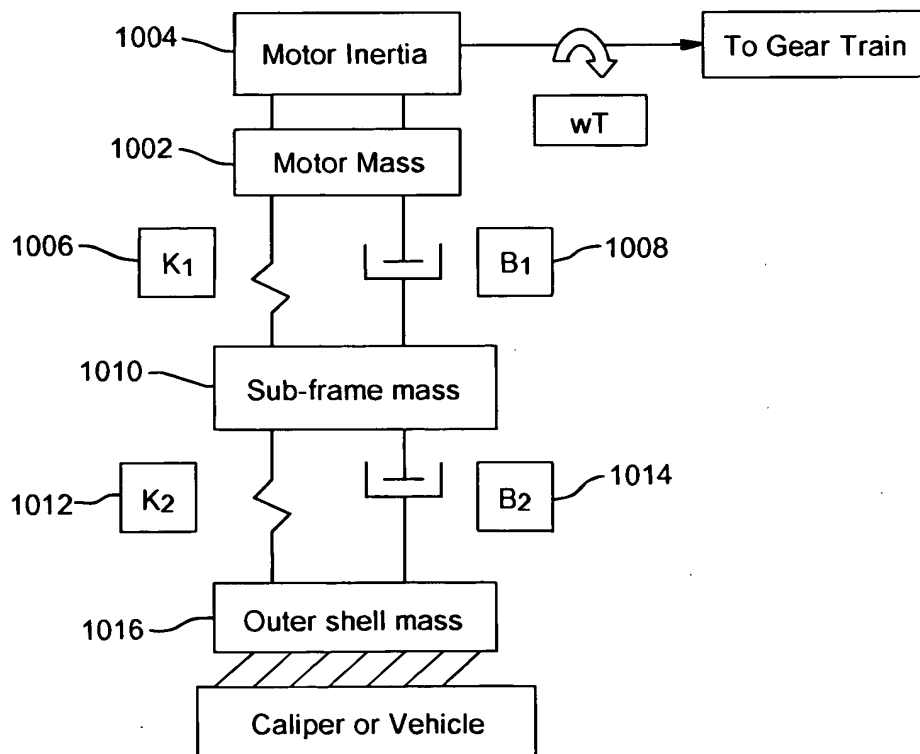


FIG. 10



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	ATTORNEY DOCKET NUMBER
10/712,764	11/13/2003	William Farmer	PCB110

Grossman, Tucker, Perreault & Pfleger, PLLC
55 South Commercial Street
Manchester, NH 03101

CONFIRMATION NO. 7399

FORMALITIES LETTER



OC000000011873496

Date Mailed: 02/10/2004

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 770 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Additional claim fees of **\$230** as a non-small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.

05/13/2004 MBERHE 00000144 10712764

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$1130** for a Large Entity

01 FC:1001	770.00 OP
02 FC:1051	130.00 OP
03 FC:1201	86.00 OP
04 FC:1202	144.00 OP

- **\$770** Statutory basic filing fee.
- **\$130** Late oath or declaration Surcharge.
- Total additional claim fee(s) for this application is **\$230**

- \$86 for 1 independent claims over 3.
- \$144 for 8 total claims over 20.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

*A copy of this notice **MUST** be returned with the reply.*

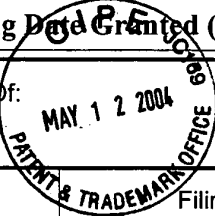
T. Ketsel
Customer Service Center
Initial Patent Examination Division (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE

**Response To Notice To File Missing Parts Of Application
Filing Date Granted (PTO-1533)(Large Entity)**

Docket No.
PCB110

In Re Application Of:
FARMER et al



Serial No.
10/712,764

Filing Date
11/13/2003

Examiner

Group Art Unit
3616

Invention:

ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE

Mail Stop Missing Parts

TO THE COMMISSIONER FOR PATENTS:

This is a response to the Notice to File Missing Parts of Application - Filing Date Granted (PTO-1533) mailed on
February 10, 2004
Date

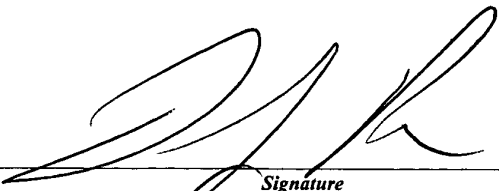
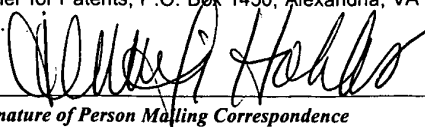
Enclosed herewith for filing are the following:

- ☒ A copy of the Notice to File Missing Parts of Application - Filing Date Granted (PTO-1533). **(REQUIRED)**
- ☒ An oath or declaration in compliance with 37 CFR 1.63, including residence information and identifying the application by the above Application Number and Filing Date.
- ☐ A properly signed oath or declaration in compliance with 37 CFR 1.63.
- ☐ An oath or declaration in compliance with 37 CFR 1.63 listing the names of all inventors and signed by the omitted inventor(s), identifying this application by the above Application Number and Filing Date.
- ☐ A verified English translation of the non-English language application papers as originally filed. It is requested that this translation be used as the copy for examination purposes in the United States Patent and Trademark Office.
- ☒ Other (list):

**Recordation Form Cover Sheet; Assignment and \$40.00 assignment fee
Transmittal of Formal Drawings and 6 sheets of drawings (Figs. 1-10)**

05/13/2004 MBERHE 00000144 10712764

05 FC:1251 110.00 DP

Response To Notice To File Missing Parts Of Application Filing Date Granted (PTO-1533) (Large Entity)			Docket No. PCB110	
In Re Application of FARMER et al				
Serial No. 10/712,764	Filing Date 11/13/2003	Examiner	Group Art Unit 3616	
Invention: ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE				
<u>TO THE COMMISSIONER FOR PATENTS:</u> <u>Mail Stop Missing Parts</u>				
The fee of \$1,280.00 is to be paid as follows: ☒ A check in the amount of the fee is enclosed. ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account No. 50-2121 ☒ If an additional extension of time is required, please consider this a petition therefor and charge any additional fees which may be required to Deposit Account No. 50-2121				
 Signature		Dated: May 10, 2004		
Donald J. Perreault Attorney for Applicant Reg. No. 40,126 Grossman, Tucker, Perreault & Pflieger, PLLC 55 South Commercial Street Manchester, NH 03101 CUSTOMER NO. 32047		I certify that this document and fee is being deposited on May 10, 2004 with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.  Signature of Person Mailing Correspondence Jennifer L. Hobbs Typed or Printed Name of Person Mailing Correspondence		
cc:				



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,764	11/13/2003	William Farmer	PCB110	7399
32047	7590	12/14/2004	EXAMINER	
GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC 55 SOUTH COMMERCIAL STREET MANCHESTER, NH 03101			CULBRETH, ERIC D	
			ART UNIT	PAPER NUMBER
			3616	

DATE MAILED: 12/14/2004

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

Office Action Summary	Application No.	Applicant(s)	
	10/712,764	FARMER ET AL.	
	Examiner	Art Unit	
	Eric D Culbreth	3616	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on ____.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance 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.

Disposition of Claims

4) ☒ Claim(s) 1-28 is/are pending in the application.

4a) Of the above claim(s) ____ is/are withdrawn from consideration.

5) ☒ Claim(s) 23-28 is/are allowed.

6) ☒ Claim(s) 1,5-7,9,13,15-18 and 20-22 is/are rejected.

7) ☒ Claim(s) 2-4,8,10-12,14 and 19 is/are objected to.

8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 13 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. ____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: ____.

DETAILED ACTION

Drawings

1. The drawings are objected to because of the following informalities. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

- a. Figure 7 is an exploded view, but there are no phantom lines showing how the parts go together.
- b. Reference numerals 202b and 204b (page 8, line 21) are not on the drawings.
- c. Reference numeral 900 (page 8, line 25) is not on the drawings.
- d. Figure 7 is confusing because it is turned sideways to the view in Figure 3; similarly, Figure 6 is confusing because it is turned upside to Figure 3.

Specification

2. The disclosure is objected to because of the following informalities:
 - a. Page 1, line 6 should be updated to state that the application 10/061,940 is now US Patent No. 6,736,233.
 - b. On page 3, line 12 and the remainder of the specification, it is not clear what “EPBA” stands for.
 - c. On page 5, line 29 it is not clear what “PCB” is.
Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 5, 7, 9, 15-18 and 20-22 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
 - a. In claim 5, “a first portion” and “a second portion” are not clear (a first and second portion of what).
 - b. In claims 7 and 9 “a component isolator” is unclear (what is the component).
 - c. Claim 15 is unclear because it is an incomplete sentence (apparently, in line 4 “separating” should be “separate”).

- d. Also in claims 15 and 16, it is not clear what is meant by “cooperation between said housing and said sub-frame separate said motor from a remainder of said actuator”.
- e. In claim 17, it is not clear what part of the invention as disclosed is the “first motor isolator”.
- f. In claim 20, line 6, it is not clear what is meant by “component isolator” as above.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 6 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Drennen et al (US006412610B).

Drennen et al discloses a brake system comprising a vehicle power source (for running the vehicle and motor 28), and an actuator comprising motor 28 with a drive shaft 110, drive gear 30 coupled to the drive shaft driven gear 36 coupled to the drive gear, and at least one planetary gear set 42 coupled to the driven gear for driving an actuator output at 46, and brake caliper 22, 24 coupled to the output, the output configured for driving the caliper between an engaged and released position. The recitation in the preamble of claim 1 of a parking brake system is a functional statement of intended use, as no structure specific to a parking brake is recited in the body of the claim. The actuator comprises motor 28 mounted on sub-frame or housing 10 (claim 6). Gears 32 are a gear train coupled to the drive shaft for driving an output of

Art Unit: 3616

the actuator as broadly recited, and the motor 28 and at least a portion of gear train 32 are mounted on sub-frame 10 (claim 13).

Allowable Subject Matter

7. Claims 23-28 are allowed.
8. Claims 2-4, 8, 10-12, 14, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
9. Claim 20 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.
10. Claims 5, 7, 9, 15-18, and 20-22 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tamasho et al (US006397981B1) and Hanley et al (US005986369A) show electric braking systems.

Art Unit: 3616

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric D Culbreth whose telephone number is 703/308-0360. The examiner can normally be reached on Monday-Thursday, 9:30-7:00 alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Dickson can be reached on 703-308-2089. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eric D Culbreth
Primary Examiner
Art Unit 3616



ec

Notice of References Cited	Application/Control No. 10/712,764	Applicant(s)/Patent Under Reexamination FARMER ET AL.	
	Examiner Eric D Culbreth	Art Unit 3616	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-6,412,610 B1	07-2002	Drennen et al.	188/156
	B	US-6,397,981 B1	06-2002	Tamasho et al.	188/71.9
	C	US-5,986,369 A	11-1999	Hanley et al.	310/77
	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.

Index of Claims 	Application No.		Applicant(s)	
	10/712,764		FARMER ET AL.	
	Examiner		Art Unit	
	Eric D Culbreth		3616	

√	Rejected
=	Allowed

-	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claim		Date						
Final	Original	12/9/04						
	1	x						
	2	o						
	3	o						
	4	o						
	5	x						
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10/712,764

Eric D Culbreth

FARMER ET AL.

3616

[illegible]

Class	Subclass	Date	Examiner

[illegible]



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 Alexandria, Virginia 22313-1450
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BIBDATASHEET

CONFIRMATION NO. 7399

Bib Data Sheet

SERIAL NUMBER 10/712,764	FILING DATE 11/13/2003 RULE	CLASS 180	GROUP ART UNIT 3616	ATTORNEY DOCKET NO. PCB110
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APPLICANTS

William Farmer, Acton, MA;
 Gary Kinnear, Weymouth, MA;
 Thomas P. Schregardus, Somerville, MA; Yuly Yanishevsky, Marblehead, MA;

EC 12/8/04

** CONTINUING DATA *****

This application is a CIP of 10/061,940 02/01/2002 PAT 6,736,233
 and claims benefit of 60/426,044 11/13/2002
 and claims benefit of 60/467,993 05/05/2003

None EC 12/8/04

** FOREIGN APPLICATIONS *****

IF REQUIRED, FOREIGN FILING LICENSE GRANTED
 ** 02/10/2004

Foreign Priority claimed ☐ yes ☒ no 35 USC 119 (a-d) conditions ☐ yes ☒ no ☐ Met after met Verified and Acknowledged <i>EC</i> Examiner's Signature Initials	STATE OR COUNTRY MA	SHEETS DRAWING 7	TOTAL CLAIMS 28	INDEPENDENT CLAIMS 4
---	---------------------------	------------------------	-----------------------	----------------------------

ADDRESS
 32047
 GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC
 55 SOUTH COMMERICAL STREET
 MANCHESTER, NH
 03101

TITLE
 Electro-mechanical actuator for an electrically actuated parking brake

FILING FEE	FEES: Authority has been given in Paper	☐ All Fees ☐ 1.16 Fees (Filing)
------------	---	--

272

TRANSMITTAL OF INFORMATION DISCLOSURE STATEMENT (Under 37 CFR 1.97(b) or 1.97(c))					Docket No. PCB110	
In Re Application Of: Farmer, et al.						
Application No. 10/712,764	Filing Date November 13, 2003	Examiner	Customer No. 32047	Group Art Unit 3616	Confirmation No. 7399	
Title: ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE						
Address to: Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450 37 CFR 1.97(b) 1. ☒ The Information Disclosure Statement submitted herewith is being filed within three months of the filing of a national application other than a continued prosecution application under 37 CFR 1.53(d); within three months of the date of entry of the national stage as set forth in 37 CFR 1.491 in an international application; before the mailing of a first Office Action on the merits, or before the mailing of a first Office Action after the filing of a request for continued examination under 37 CFR 1.114. 37 CFR 1.97(c) 2. ☐ The Information Disclosure Statement submitted herewith is being filed after the period specified in 37 CFR 1.97(b), provided that the Information Disclosure Statement is filed before the mailing date of a Final Action under 37 CFR 1.113, a Notice of Allowance under 37 CFR 1.311, or an Action that otherwise closes prosecution in the application, and is accompanied by one of: ☐ the statement specified in 37 CFR 1.97(e); OR ☐ the fee set forth in 37 CFR 1.17(p).						

TRANSMITTAL OF INFORMATION DISCLOSURE STATEMENT (Under 37 CFR 1.97(b) or 1.97(c))	Docket No. PCB110
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In Re Application: **Farmer, et al.**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/712,764	November 13, 2003		32047	3616	7399

Title: **ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE**

Payment of Fee

(Only complete if Applicant elects to pay the fee set forth in 37 CFR 1.17(p))

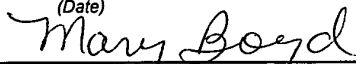
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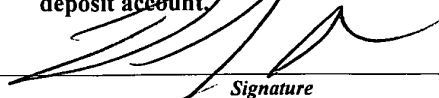
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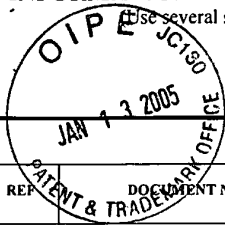
Dated: **January 11, 2005**

Donald J. Perreault
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55 South Commercial Street
Manchester, NH 03101
603-668-6560

CC:

INFORMATION DISCLOSURE CITATION

(Use several sheets if necessary)



Docket Number (optional)

PCB110

Application No.

10/712,764

Applicants(s)

Farmer, et al.

Filing Date

November 13, 2003

Group Art Unit

3616

U.S. PATENT DOCUMENTS

*Examiner Initial	REF	DOCUMENT NUMBER	DATE	NAME	CLASS/SUBCLASS	FILING DATE IF APPROPRIATE
	1	6,189,409	02-20-2001	Neag, et al.	74/512	
	2	5,605,072	02-25-1997	Schmidt, et al.	74/435	

FOREIGN PATENT DOCUMENTS

REF	DOCUMENT NUMBER	DATE	COUNTRY	CLASS/SUBCLASS	TRANSLATION	
					YES	NO
3	2,184,487	06-1987	United Kingdom	74/513		
4	3,331,597	03-1985	Germany	74/513		
5	2-116911	05-1990	Japan	74/594.3		
6	1,283,644	12-1961	France	74/84		
7	916,106	01-1963	United Kingdom	F06h		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER

DATE CONSIDERED

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

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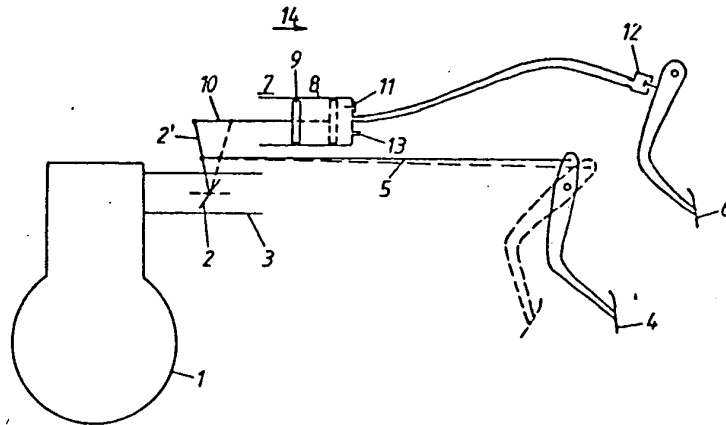
BAYM ★ Q13 85-075240/13 ★ DE 3331-597-A
Vehicle engine deceleration effect reduction - has damper acting
on throttle linkage when accelerator pedal released but
inactivated by depressing clutch and/or brake
BAYERISCHE MOTOREN WERKE 01.09.83-DE-331597
Q52 (21.03.85) B60k-26 F02d-09/02

01.09.83 as 331597 (1190RW)

The mechanism is intended for reducing the engine brake action of a motor vehicle engine (1) when releasing the accelerator pedal (4) by a damper (7) which acts on the pedal throttle linkage (2'). This damper is operative whilst the engine is still coupled to the drive wheels but is inactivated when the clutch pedal (6) and/or the brake pedal is depressed.

The damper may contain a damping fluid (air) which enters via a throttle (13) when the accelerator pedal is released. The air enters without resistance via a valve (12) opened by depressing the clutch and/or the brake pedal.

ADVANTAGE - Engine torque is reduced in a predetermined way irrespective of the drive connection between engine and drive wheels. (9pp Dwg.No.1/1)
 N85-056298



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①9 BUNDESREPUBLIK
DEUTSCHLAND



DEUTSCHES
PATENTAMT

⑫ **Offenlegungsschrift**
⑪ **DE 3331597 A1**

⑤① Int. Cl. 3:
F 02 D 9/02
B 60 K 26/00

②① Aktenzeichen: P 33 31 597.3
②② Anmeldetag: 1. 9. 83
④③ Offenlegungstag: 21. 3. 85

DE 3331597 A1

⑦① Anmelder:
Bayerische Motoren Werke AG, 8000 München, DE

⑦② Erfinder:
Dietrich, Christian, 8039 Wessling, DE

⑤⑥ Recherchenergebnisse nach § 43 Abs. 1 PatG:

DE-OS	23 57 288
DE-GM	66 09 259
US	30 92 090
US	30 53 990

Prüfungsantrag gem. § 44 PatG ist gestellt

⑤④ Vorrichtung zum Reduzieren des Bremsmomentes von Brennkraftmaschinen in Kraftfahrzeugen

Bei einer Vorrichtung zum Reduzieren des Bremsmomentes von Brennkraftmaschinen in Kraftfahrzeugen beim Schubbetrieb ist ein Dämpfer für die Rückstellung eines Leistungsregelorgans in Richtung seiner Ruhelage nur bei bestehender Antriebsverbindung zwischen der Brennkraftmaschine und den angetriebenen Rädern des Kraftfahrzeugs wirksam. Bei aufgehobener Verbindung bzw. bei betätigter Fahrzeugbremse hingegen ist der Dämpfer unwirksam, so daß das Moment der Brennkraftmaschine unverzüglich und entsprechend der Bewegung eines Beschleunigungshebels abfällt.

DE 3331597 A1

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10 Patentansprüche:

- 15 (1) Vorrichtung zum Reduzieren des Bremsmoments von Brennkraftmaschinen in Kraftfahrzeugen beim Wechsel von Zug- auf Schubbetrieb, mit einem Leistungsregelorgan, dessen Rückstellung in Richtung seiner Ruhelage durch einen Dämpfer beeinflussbar ist, dadurch gekennzeichnet, daß der Dämpfer (7) bei bestehender Antriebsverbindung zwischen Brennkraftmaschine und den angetriebenen Rädern des Kraftfahrzeugs wirksam und bei aufgehobener Verbindung (Kupplungspedal 6) und/oder bei betätigter Fahrzeugbremse unwirksam ist.
- 25 2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Dämpfer (7) auf den willkürlich betätigbaren Beschleunigungshebel (Gaspedal 4) der Brennkraftmaschine wirkt.
- 30 3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Dämpfer (7) mit einem Dämpfungsmedium befüllt ist, das bei wirksamen Dämpfer verzögert und bei unwirksamen Dämpfer ungehindert abgelassen wird.
- 35 4. Vorrichtung nach Anspruch 3, dadurch gekennzeichnet, daß der Dämpfer (7) eine Ablassöffnung (Ablassventil 12) enthält, die bei betätigtem Kupplungspedal (6) und/oder Bremspedal geöffnet ist.

- 1 5. Vorrichtung nach den Ansprüchen 3 oder 4, dadurch gekennzeichnet, daß der Dämpfer (7) eine Drosselöffnung (12) besitzt, über die das Dämpfungsmedium einströmt.
- 5 6. Vorrichtung nach einem der Ansprüche 3 bis 5, dadurch gekennzeichnet, daß der Dämpfer (7) ein Rückschlagventil (11) besitzt, das bei einer Bewegung des Beschleunigungshebels (Gaspedal 4) im Sinne einer Momenterhöhung geöffnet ist.
- 10 7. Vorrichtung nach einem der Ansprüche 3 bis 6, dadurch gekennzeichnet, daß die Drosselöffnung (12) und/oder eine dazu parallele zweite Drosselöffnung in Abhängigkeit von weiteren Einflußgrößen wie Drehzahl, Gang-
- 15 stufe, Geschwindigkeit und Kurvenbeschleunigung gesteuert ist.

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10 Vorrichtung zum Reduzieren des Bremsmoments von Brennkraftmaschinen in Kraftfahrzeugen

Die Erfindung bezieht sich auf eine Vorrichtung zum Reduzieren des Bremsmoments von Brennkraftmaschinen in Kraftfahrzeugen beim Wechsel von Zug- auf Schubbetrieb, mit
15 einem Leistungsregelorgan, dessen Rückstellung in Richtung seiner Ruhelage durch einen Dämpfer beeinflussbar ist.

Aus der DE-OS 28 44 290 ist es grundsätzlich bekannt, für
20 das Gaspedal oder die Drosselklappe einen derartigen Dämpfer zu verwenden, um die aus einer starken Änderung der zugeführten Kraftstoffmenge resultierenden Stöße, die aus entsprechend starken Änderungen des Drehmoments der Brennkraftmaschine resultieren, weitgehend auszuschließen.
25 Zu der Wirkung dieses Dämpfers wird in dieser Druckschrift jedoch ausgeführt, daß diese nur unzureichend ist. Ursache hierfür ist der Zielkonflikt, der gerade beim Abfall des Motormoments besteht. Dieses soll eingekuppelt, d.h. bei bestehender Antriebsverbindung zwischen Brennkraftmaschine
30 und den Rädern des Kraftfahrzeugs, relativ langsam abfallen, um einen Überschwinger in der Momentenkennlinie am Rad zu vermeiden und dem Fahrer ausreichend Zeit für eigene fahrdynamische Gegenmaßnahmen zur Verfügung zu stellen. Beim Betätigen der Kupplung, beispielsweise beim
35 Schalten, und beim Bremsen soll das Motormoment jedoch schnell abfallen, damit der Motor nicht aufheult oder nachschiebt.

- 1 Der Erfindung liegt die Aufgabe zugrunde, eine Vorrichtung
der eingangs genannten Art zu schaffen, bei der das Motor-
moment unabhängig vom Bestehen der Antriebsverbindung
zwischen Brennkraftmaschine und den angetriebenen Rädern
5 stets in der gewünschten Weise abfällt.

Die Erfindung löst diese Aufgabe dadurch, daß der Dämpfer
bei bestehender Antriebsverbindung zwischen Brennkraftma-
schine und den angetriebenen Rädern des Kraftfahrzeugs
10 wirksam und bei aufgehobener Verbindung und/oder bei
betätigter Fahrzeugbremse unwirksam ist.

Der Dämpfer ist nunmehr lediglich dann wirksam, wenn dies
erforderlich ist. Dies ist dann der Fall, wenn die An-
15 triebsverbindung zwischen der Brennkraftmaschine und den
angetriebenen Rädern besteht und ein schneller Abfall des
Motormoments nicht erwünscht ist bzw. möglicherweise sogar
die genannten fahrdynamischen Probleme zur Folge hat. Ist
der Motor jedoch ohne Wirkung auf die Antriebsräder des
20 Kraftfahrzeugs, so läßt der dann wirkungslose Dämpfer
einen schnellen Abfall des Motormoments zu.

Die Ermittlung, ob der Dämpfer wirksam zu schalten ist,
kann beispielsweise auf elektronischem Wege aus dem Ände-
25 rungen der Drehzahlen eines nicht angetriebenen Rades,
ggf. unter Berücksichtigung weiterer Kriterien wie bei-
spielsweise Neigung der Fahrbahnoberfläche, erfolgen. Auf
diese Weise läßt sich ohne zusätzliche konstruktive Hilfs-
mittel feststellen, ob bei einer Rücknahme des willkürlich
30 betätigbaren Beschleunigungshebels gleichzeitig das Kupp-
lungs- und/oder das Bremspedal des Kraftfahrzeugs betätigt
ist. Demgegenüber ergibt sich eine einfache konstruktive
Realisierung der Erfindung in Form von Betätigungsglie-
dern, die durch die in Frage stehenden Bedienungselemente
35 der Brennkraftmaschine bzw. des Kraftfahrzeugs, nämlich
Beschleunigungshebel (Gaspedal), Kupplungs- und/oder
Bremspedal betätigt sind. Diese Betätigungselemente können mechanisch
elektrischer, hydraulischer oder pneumatischer Art sein.

1 Letzteres bietet in Verbindung mit einem Dämpfer, der auf
den willkürlich betätigbaren Beschleunigungshebel der
Brennkraftmaschine wirkt, die Möglichkeit einer besonders
einfachen konstruktiven Ausführung der Erfindung hierzu
5 kann der Dämpfer einen Körper mit einem Dämpfungsmedium
umfassen, das bei wirksamen Dämpfer verzögert und bei
unwirksamen Dämpfer ungehindert ein- bzw. abgelassen wird
und das bei Bewegen des Beschleunigungshebels im Sinne
einer Momentzunahme der Brennkraftmaschine ungehindert die
10 umgekehrte Bewegung durchführt.

Der Übersichtlichkeit halber sei im folgenden der Fall
betrachtet, daß das Dämpfungsmedium bei einer Bewegung des
Beschleunigungshebels im Sinne einer Momentverringerung
15 und wirksamen Dämpfer verzögert abgelassen wird. Dies kann
mit Hilfe einer Drosselöffnung erfolgen. Unwirksam kann
ein derartiger Dämpfer durch eine Ablassöffnung werden, die
durch den Bremshebel und/oder den Kupplungshebel geöffnet
ist. Die vorteilhafterweise ungedämpfte Befüllung des
20 Körpers mit dem Dämpfungsmedium bei einer Verstellung des
Beschleunigungshebels im Sinne einer Momentzunahme der
Brennkraftmaschine kann dabei mit Hilfe eines Rückschlag-
ventils erfolgen, das bei einer derartigen Bewegung des
Beschleunigungshebels geöffnet ist.

25 Neben dieser "Grundaussführung" des Dämpfers mit Ablass-
öffnung, Drosselöffnung und Rückschlagventil können aber
auch noch zusätzliche Drosselöffnungen vorgesehen sein
bzw. alternativ dazu kann die Bewegung der erstgenannten
30 drei Elemente gesteuert erfolgen, um den Zusammenhang des
maximal zulässigen Bremsmoments bzw. umgekehrt auch des
maximal zulässigen Antriebsmoments und weiterer Einfluß-
größen, wie Drehzahl, Gangstufe, Geschwindigkeit und
Kurvenbeschleunigung zu berücksichtigen.

35 In der Zeichnung ist ein Ausführungsbeispiel der Erfindung
dargestellt.

- 1 Eine Brennkraftmaschine 1 mit gesteuertem Bremsmoment besitzt ein Leistungsregelorgan in Form einer Drosselklappe 2, die in einem Ansaugkanal 3 angeordnet ist. Die Drosselklappe 2 ist durch einen Beschleunigungshebel in
5 Form eines Gaspedals 4 über eine Übertragungskinematik 5 betätigbar.

Das Bremsmoment der Brennkraftmaschine soll bei bestehender Antriebsverbindung mit den angetriebenen Rädern des Kraftfahrzeugs (nicht dargestellt) verzögert, bei Betätigung eines Kupplungspedals 6 bzw. eines ebenfalls nicht dargestellten Bremspedals unverzüglich bis zum Maximum abfallen. Hierzu dient ein Dämpfer 7, der parallel zur Übertragungskinematik 5 angeordnet ist und ebenfalls auf
15 die Drosselklappe 2 wirkt. Der Dämpfer 7 besteht im wesentlichen aus einem Kolben 9, der in einem Gehäuse 8 beweglich ist und dessen Kolbenstange 10 an einem Verstellhebel 2' für die Drosselklappe 2 zusammen mit der Übertragungskinematik 5 angelenkt ist. Im Gehäuse 8 ist
20 ferner ein Rückschlagventil 11, ein durch das Kupplungspedal 6 betätigtes Ablaßventil 12 und eine Drossel 13 angeordnet.

Bei einer Bewegung des Gaspedals 4 im Sinne einer Moment-
25 erhöhung der Brennkraftmaschine 1 folgt die Drosselklappe 2 dieser Bewegung unmittelbar. Der Dämpfer 7 ist dabei aufgrund der Wirkung des Rückschlagventils 11 nicht wirksam. Dieses ist geöffnet, so daß die Bewegung des Kolbens 9 in Richtung des eingezeichneten Teils 14 ungehindert
30 erfolgen kann. Dieser Vorgang ist schematisch durch Einzeichnen des Kolbens 9 bei vollständig gehöffneter Drosselklappe 2 jeweils strichliert dargestellt.

Wird nunmehr das Gaspedal entlastet, d.h. soll das Moment
35 der Brennkraftmaschine verringert werden, so ist der Dämpfer 7 dann wirksam, wenn das Kupplungspedal 6 nicht betätigt ist. Über die Drossel 13 strömt dabei Luft nur relativ langsam in den Zylinderraum ein und bewirkt eine verzögerte Bewegung des Kolbens 9 entgegen des Pfeils 14.

1 Damit verschließt die Drosselklappe 2 ebenfalls nur verzögert die Ansaugöffnung 3. Diese Dämpfung der Momentrücknahme der Brennkraftmaschine hat zur Folge, daß fahrdynamisch problematische Momentenerhöhungen durch Dreh-
5 schwingungen und dadurch Schlupf am Rad sicher vermieden werden können.

Ist hingegen das Kupplungspedal 6 bzw. ergänzend oder alternativ hierzu das nicht gezeigte Bremspedal betätigt,
10 so fällt das Moment der Brennkraftmaschine schnell und entsprechend der Bewegung des Gaspedals 4 ab. Der Dämpfer 7 ist dabei nicht wirksam. Dies wird erreicht mit Hilfe des Ablassventils 12, das bei Betätigen des Kupplungspedals 6 bzw. entsprechend bei Betätigen des Bremspedals dann
15 geöffnet ist und eine direkte Befüllung des Zylinderraums entsprechend der jeweiligen Stellung des Kolbens 9 ermöglicht. Damit ergibt sich in diesem Fall die erwünschte schnelle Momentabnahme der Brennkraftmaschine 1.

20 Zusammenfassend ergibt sich, daß der Dämpfer 7 nur wirksam ist, wenn bei bestehender Antriebsverbindung zwischen Brennkraftmaschine und den angetriebenen Rädern das ohne diesen Dämpfer bestehende hohe Bremsmoment zu fahrdynamischen Problemen führt bzw. führen könnte. Der Dämpfer 7
25 ist jedoch nicht wirksam bei einer erwünschten Vergrößerung des Motormoments bzw. auch bei Verringerungen des Motormoments in Verbindung mit dem Betätigen von Kupplung und/oder Bremspedal. Dabei ist die Antriebsverbindung zwischen Brennkraftmaschine und den angetriebenen Rädern
30 unterbrochen und die Gefahr eines "Durchrutschens" dieser Räder beseitigt bzw. das Bremsmoment in der gleichen Richtung wirksam wie die Betriebsbremse des Kraftfahrzeugs.

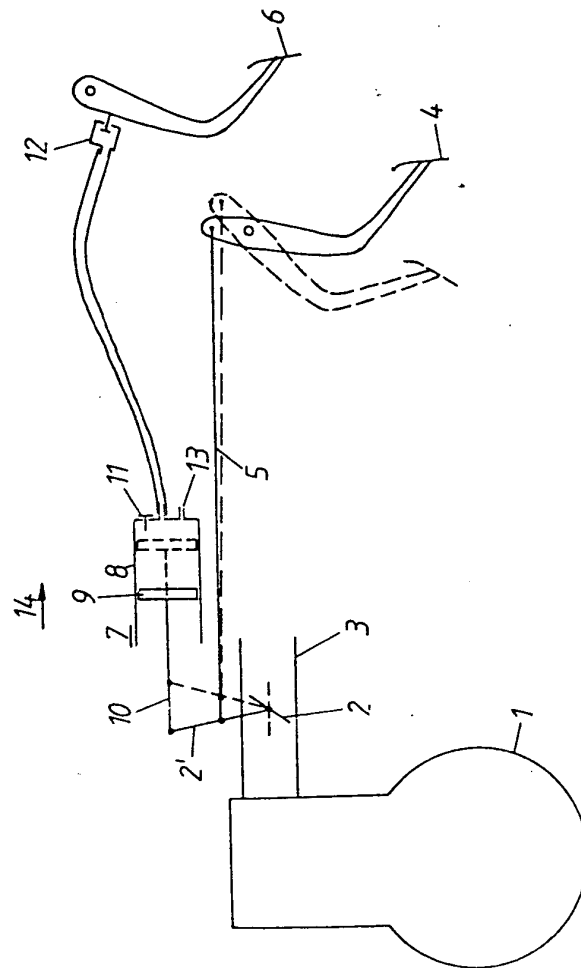
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1. September 1983
21. März 1985

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G6 002184487 A
JUN 1987

(12) UK Patent Application (19) GB (11) 2 184 487 (13) A

(43) Application published 24 Jun 1987

(21) Application No 8630801

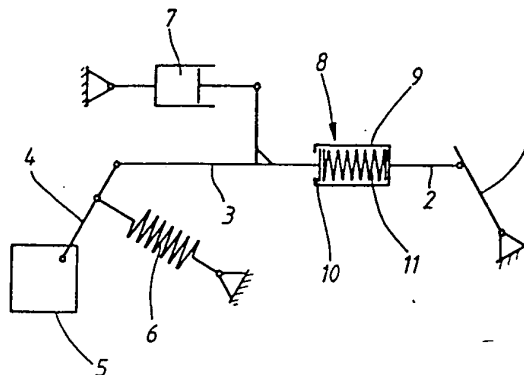
(22) Date of filing 23 Dec 1986

(30) Priority data

(31) 3545939 (32) 23 Dec 1985 (33) DE

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London WC1V 6HG(51) INT CL⁴
F02D 11/04(52) Domestic classification (Edition I)
F1B B100 B214 BC(56) Documents cited
GB A 2065771 GB 0475477
GB 0707720 EP A1 600369B
GB 0683725 US 4210110(58) Field of search
F1B
Selected US specifications from IPC sub-class F02D(54) Accelerator mechanism for a motor
vehicle i.c. engine(57) The transmission between the
accelerator pedal 1 and the power
output control, e.g. an injection pump
control lever 4, includes a damper 7 and
a preloaded spring 11 which is
compressed when the pedal is
depressed rapidly but provides a rigid
connection when the pedal is depressed
slowly.

Fig. 1



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Fig. 1

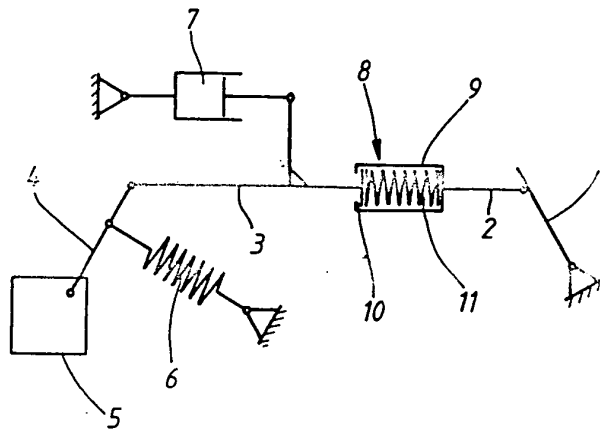
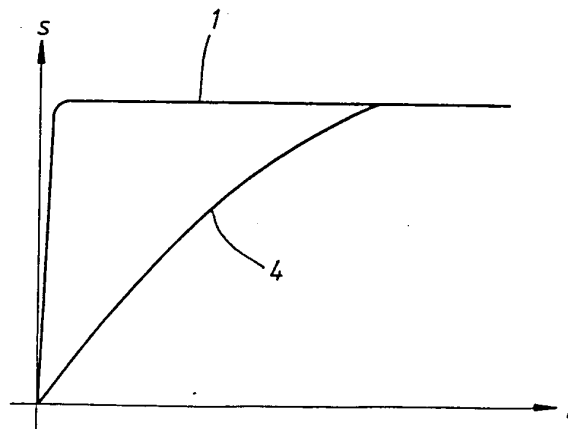


Fig. 2



SPECIFICATION

Device for regulating an internal combustion engine in a motor vehicle

5 The invention relates to a device for regulating an internal combustion engine, particularly but not exclusively an air compressing internal combustion engine, in a motor vehicle, comprising a means of
10 transmitting a regulating movement between an accelerator pedal and a power output stage, such as a control rod of an injection pump, a spring which is inserted in the transmitting means and a damper which engages on the transmitting means between
15 the spring and power output stage and which exerts a resistance to counteract an actuating movement of the device in the full-load direction.

A device of this type is known and is used in standard production vehicles. With this device the
20 movement of the power actuator is intended to be independent of the movement of the accelerator pedal in order to prevent too rapid adjustment of the power actuator and the rapid increase in torque in the internal combustion engine produced as a result
25 of this adjustment, which increased torque can cause unpleasant and dangerous longitudinal oscillations during travel in which the vehicle mass vibrates against the rotating mass of the engine by way of the elasticity and backlash of the drive train.

30 In the known device the spring consists of rubber-elastic elements which are not compatible with the damper. By means of a rapid and vigorous operation of the accelerator, however, the effect of the damper can be largely eliminated because of the
35 restricted spring deflection of the rubber-elastic elements so that a rapid adjustment of the power actuator is possible, together with its negative consequences.

On the other hand, the rubber-elastic elements are
40 also flexible in the event of slow operation of the accelerator pedal when there is no danger of longitudinal oscillations being caused during travel so that the relation between the accelerator position and power actuator position is undetermined and
45 not precisely recognisable to the vehicle driver.

The present invention seeks to provide an engine regulating device able to operate in such a manner that a slow movement by the power actuator which prevents longitudinal oscillations during travel is
50 ensured by rapid operation of the accelerator, and a rigid coupling between the accelerator and power actuator is ensured upon slow operation of the accelerator which is less critical for causing longitudinal oscillations.

55 According to the invention, there is provided a device for regulating an internal combustion engine in a motor vehicle, comprising a means of transmitting a regulating movement between an accelerator pedal and a power output stage, such as
60 a control rod of an injection pump, a spring which is inserted in the transmitting means and a damper which engages on the transmitting means between the spring and power output stage and which exerts a resistance to counteract an actuating movement of
65 the device in the full-load direction, wherein the

spring is pretensioned in a spring element against a stop, and the degree of pretensioning of the spring is such that it is excessively compressible when the accelerator pedal is operated rapidly or abruptly, the
70 spring element acting as a rigid connection when the accelerator pedal is operated slowly.

In the device designed in accordance with the invention the damping force which is generated in the damper upon slow, less critical operation of the
75 accelerator is so small that the pretensioning of the spring is not overcome so that the spring element acts as a rigid transmitting element and the position of the power actuator always corresponds to the position of the accelerator pedal. On the other hand,
80 when the accelerator pedal is operated rapidly or abruptly, the damping force of the damper is greater than the spring pretensioning so that the spring is compressed and only then, within a specified period of time, moves the power actuator slowly to counter
85 the resistance of the damper into a position which corresponds to the position of the accelerator pedal.

An embodiment of the invention will now be described by way of an example and with reference to the accompanying drawings, in which:-

90 *Figure 1* shows the device according to the invention in side view, and

Figure 2 shows, in graphical form, a diagram of the time dependence of the regulating distance of the power actuator on the regulating distance of the
95 accelerator pedal.

As shown diagrammatically in *Figure 1*, a floating lever 4 of an injection pump 5 connecting to an internal combustion engine (not shown in further detail), acting as a transmitting means, is operated
100 by an accelerator pedal 1 via rods 2, 3, the position of a control rod which is connected to the floating lever 4 and acts as the power actuator in this injection pump determining the quantity of fuel injected. A conventional return spring 6 engages on the floating
105 lever 4 and engaging on the rod 3 is a fluid damper 7 which offers a resistance, dependent on the regulating speed to a regulating movement of the floating lever 4 in the full-load direction.

A spring element 8 consisting of a spring 11
110 pretensioned against a stop 10 in a housing 9 is fitted between the rods 2 and 3. The spring 11 is connected to the floating lever 4 via the rod 3 and the housing 9 is connected to the accelerator pedal via the rod 2.

The pretensioning and spring characteristic of the
115 spring 11 and the damping characteristic of the damper 7 are determined in such a way that - taking the spring characteristic of the return spring 6 into account - the damping force of the damper 7 is less than the pretensioning of the spring 11 when the accelerator pedal 1 is operated slowly. In this case
120 the spring 11 is not compressed, and the spring element 8 acts as a rigid element so that the accelerator pedal 1 and floating lever 4 are adjusted uniformly. The vehicle driver is informed at all times
125 about the position of the power actuator.

Upon rapid operation of the accelerator pedal 1 when there is a danger of longitudinal oscillations being caused during travel, the damping force of the damper 7 is greater than the pretensioning of the
130 spring 11 so that the latter is compressed and the

floating lever 4 has a lower regulating speed than the accelerator 1. In the subsequent period of time the floating lever 4 is adjusted slowly by the tension release in the spring 11 until the spring 11 bears against the stop 10 and consequently the accelerator 1 and floating lever 4 again occupy the same positions. In this case the adjustment of the floating lever 4 is separate from the regulating movement of the accelerator pedal 1 and only dependent on the spring 11 and damper 7 whereby a slow adjustment of the floating lever 4 is ensured even when the accelerator pedal 1 is operated rapidly.

The described processes are shown in the diagram in Figure 2 in which the regulating distances of the accelerator pedal 1 and floating lever 4 is plotted against time t .

Following abrupt operation of the accelerator pedal 1 the floating lever 4 reaches the position corresponding to the position of the accelerator 1 after a specific period of time and at a relatively low regulating speed. This period is advantageously of the order of approximately half a second.

CLAIMS

1. A device for regulating an internal combustion engine in a motor vehicle, comprising a means of transmitting a regulating movement between an accelerator pedal and a power output stage, such as a control rod of an injection pump, a spring which is inserted in the transmitting means and a damper which engages on the transmitting means between the spring and power output stage and which exerts a resistance to counteract an actuating movement of the device in the full-load direction, wherein the spring is pretensioned in a spring element against a stop, and the degree of pretensioning of the spring is such that it is excessively compressible when the accelerator pedal is operated rapidly or abruptly, the spring element acting as a rigid connection when the accelerator pedal is operated slowly.

2. A device for regulating an internal combustion engine, substantially as hereinbefore described and with reference to the accompanying drawings.

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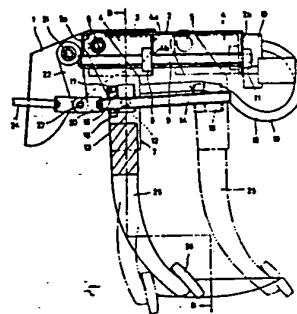
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MAY 1990

(54) FORWARD/BACKWARD ADJUSTABLE STEPPING TYPE PEDAL

(11) 2-116911 (A) (43) 1.5.1990 (19) JP
(21) Appl. No. 63-270424 (22) 26.10.1988
(71) FUJI KIKO CO LTD (72) YASUSHI ASANO(1)
(51) Int. Cl.³ G05G1/14, B60K23/02, B60K26/02, B60T7/06

PURPOSE: To safely execute the operation irrespective of individual difference of a person's height by supporting axially a pedal arm so as to be rotatable to a slider which is engaged to a guide rail and slidable, and also, moving the slider along the guide rail.

CONSTITUTION: When a driving means 10 is started in the forward rotational direction in order to bring a position of a pedal pad 26 to moving adjustment, a first screw bolt 9 rotates through a nut 8, and a first slide block 4 moves backward along a guide rail 2 through a slider 3. Simultaneously, rotating force of the means 10 is transferred to a worm 17, a nut 15 rotates, a second slide block 13 moves backward along a second screw bolt 14, and a lever 7 moves backward as one body with a pedal arm 25. Also, a position of an axis 23 to which an operating lever 24 is connected is not varied and stepping force of the pedal becomes constant. In such a way, in accordance with a crew member's height, the pedal is brought to moving adjustment to a correct position.



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⑨ 日本国特許庁(J P)

⑩ 特許出願公開

⑫ 公開特許公報(A) 平2-116911

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⑮ 発明の名称 前後調節可能な足踏み式ペダル

⑯ 特 願 昭63-270424

⑰ 出 願 昭63(1988)10月26日

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明 細 書

1. 発明の名称

前後調節可能な足踏み式ペダル

2. 特許請求の範囲

(1) 車体に固定するブラケットにガイドレールを設け、そのガイドレールに係合して揺動可能なスライダを設け、該スライダにペダルアームを回転可能に軸支するとともに、スライダをガイドレールに沿って移動させる駆動手段を設けてなることを特徴とする前後調節可能な足踏み式ペダル。

3. 発明の詳細な説明

〔産業上の利用分野〕

この発明は車両におけるアクセル、ブレーキ、クラッチ等の操作をするための前後調節可能な足踏み式ペダルに関するものである。

〔従来の技術〕

一般に、自動車のアクセル、ブレーキ、クラッチ等の操作は足踏み式ペダルにより行う。従来、この足踏み式ペダルは、車両のダッシュパネルに

固定されたブラケットにアームが回転可能に軸支され、そのアームの一端部近傍にはアクセル、ブレーキ若しくはクラッチに連結するロッド若しくはワイヤが連結され、他端部にはペダルパッドが取り付けられ、そのペダルパッドを操縦者が足で押すとロッド若しくはワイヤが押され、若しくは引かれてアクセル、ブレーキ若しくはクラッチが作動する。

ところで、操縦者の身長には個人差があるから、このペダルパッドに足が届かないことがあり、そのような場合には、座席を前方へスライドさせて調節ができるようにしている。また、身長が標準以上の場合には、座席を後方へスライドさせなければならない。座席を後方へスライドさせると、後部座席に着座した者のレッグスペースを狭くして、若座席を悪くする。また、座席をこのようにスライドさせると、操縦者のビュウポイント(視点が当然に変化するから、身長の人差によるビュウポイントはまちまちとなる。同一の車両において、操縦者が代わる毎にビュウポイントが変

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化するの、視角が変化し、視野の広狭が生じることになり、本来、好ましくない。

そこで、座席をスライドさせることなく、逆にペダルの位置を変化させるべく、ペダルを前後調節可能にした構成が知られている(例えば、特公昭50-6694号、同50-34814号、その他米国特許第3,151,499号、同第3,563,111号等参照)。

〔発明が解決しようとする課題〕

しかしながら、上記従来例によれば、構成が複雑となる傾向にあり、コスト高を招来するほか、メンテナンスに問題が生じ、また簡単な構成もあるにはあるが、理論的にはともかく、実使用に際して安全性を十分に確保できるか否か疑わしい面があり、かくして、現実の使用が可能となるまでに完成されていないといえる。

しかして、自動車の発達した今日、座席のスライドにより身長の人差を修正して、ペダルの操作をすることは、前記の事情により、最も好ましいとはいえない現実にあるといえる。

〔実施例〕

次に、この発明の実施例を図面に基き説明する。第1図および第2図はブレーキペダルに適用した例を示すもので、ダッシュパネルなどの車体に固定する縦断面が逆U字形のブラケット1の内側壁に、縦断面がコ字形の一对のガイドレール2、2を水平方向へ所定長さで相対向して固定し、そのガイドレール2、2に嵌合するスライダ3、3を側方へ張り出し形成した第1のスライドブロック4を滑動可能に係合させる。スライドブロック4は四角を開心箱形の枠体からなり、その一側から他側へ貫通するヒンジボルト5が設けられ、そのヒンジボルト5に挿通したカラー6にレバー7が回動自在に軸支されている。さらに、スライドブロック4は、その後側壁4aに穿設した通孔4bに面してナット8が固定され、その通孔4bとナット8を貫通する第1のスクリュウボルト9が、前記ガイドレール2、2の前端部及び後端部をそれぞれ連結する側板2a、2bに、軸中心で回転可能に軸支されている。側板2bには駆動手段10が

そこで、この発明は上記事情に鑑みて、現実使用可能であって前後調節可能な足踏み式ペダルを提供することを目的としてなされた。

〔課題を解決するための手段〕

この発明は上記課題を解決するため、車体に固定するブラケットにガイドレールを設け、そのガイドレールに係合して滑動可能なスライダを設け、該スライダにペダルアームを回動可能に軸支するとともに、スライダをガイドレールに沿って移動させる駆動手段を設けてなる前後調節可能な足踏み式ペダルを構成した。

〔作用〕

この発明の上記構成によれば、ペダルパッドの位置を、身長の人差を有する操縦者にそれぞれ適正な配置となすべく、駆動手段を操作するとガイドレールに沿ってスライダが移動し、ペダルアームを前後所望の位置に移動調節できる。しかも、ペダルパッドおよびそれを支持するペダルアームは、平行移動をしてペダルパッドの位置が常に一定の高さに保持される。

固定され、その駆動手段10はスクリュウボルト9に軸着したギヤ11と噛合する出力ギヤを備えた電動モーターユニットからなり、乗員が操作するスイッチで正逆回転始動できる。一方、前記レバー7は一对の板部材7a、7bと、その板部材7a、7bにそれぞれ軸12、12を介して回動可能に固定された第2のスライドブロック13とからなる。スライドブロック13は、前記ガイドレール2と略平行に第2のスクリュウボルト14が貫通し、そのスクリュウボルト14に螺合するナット15を仕切り板16で隔離して遊動可能に収納した中空箱体であり、ナット15は箱体の外周面に歯部を形成したウォームホイールとし、そのウォームホイールに係合するウォーム17を回転可能に支承している。ウォーム17はその軸にトルクワイヤ18が連結され、そのトルクワイヤ18は前記駆動手段10に連結され、駆動手段10の駆動の回転力をウォーム17に伝達する。トルクワイヤ18は、可撓性のチューブ19にコイル状のワイヤを回転可能に挿入したものであって、変形が

自在である。なお、スクリュウボルト14の前端部にヨーク形の連結具20が固着され、その連結具20は、ブラケット1に軸21で回転可能に軸支されたレバー22の端部に軸23を介して連結されている。レバー22の軸23にはプッシュロッドなどの操作杆24が連結されている。また、レバー7にはベダルアーム25が連結され、そのベダルアーム25の下端部にはベダルパッド26が固定されている。

上記実施例の作用について説明すると、ベダルパッド26の位置を移動調節するため、駆動手段10を正回転方向へ始動させると、第1のスクリュウボルト9がその軸中心で回転し、そのスクリュウボルト9に螺合するナット8を介して第1のスライドブロック4がスライダ3,3を介しガイドレール2,2に沿って後方(第1図の右方)へ移動するとともに、トルクワイヤ18を介して駆動手段10の回転力がウォーム17に伝達され、それと係合するウォームホイールによりナット15が回転し、第2のスライドブロック13が第2の

スクリュウボルト14に沿って後方へ移動するから、レバー7はベダルアーム25と一体で後方へ移動する。したがって、第1図中仮想線で示したように、ベダルアーム25は第1および第2のスクリュウボルト9,14の一端部近傍から他端部近傍まで平行移動することができ、しかも、操作杆24を連結した軸23の位置は変化しないために、ベダルの部材は変化せず一定となる。そして、仮想線で示した状態から実線で示した状態にするには、駆動手段10を逆回転始動してレバー7を前方(図の左方)へ移動させればよい。

なお、第2のスライドブロック13を駆動させるウォーム17とそれに係合するウォームホイールをヨーク20側のスクリュウボルト14の端部に設けてもよい。その場合、ナット15は適型を形成しない通常のナットとして第2のスライドブロック13に仕切り板16間で介在させる。このように構成すると、チューブ19がスライドブロック13の移動に伴い従動する煩わしさがなく、一定の長さで固定した状態になる。

次に、この発明をアクセルベダルに適用した第2の実施例を説明する。第3図及び第4図に示したように、車体に固定するブラケット29の内側壁に相対向してそれぞれ所定長さのガイドレール30,30を固定するとともに、そのガイドレール30,30にそれぞれ嵌合するスライダ31,31を張り出し形成したスライドブロック32を設け、そのスライドブロック32を前後方向(図面の左右)へ移動させるスクリュウボルト33をブラケット29の前端部に固定される後述の駆動手段36と、ガイドレール30,30の後端部を結ぶ連結部材34aに回転可能に軸支する。スライドブロック32にはスクリュウボルト33と螺合するナット35が装着されている。ブラケット29の前端部を結ぶ連結部材34には、駆動手段36を固定し、その駆動手段36でスクリュウボルト33を正逆回転可能に連結する。駆動手段36は乗員が操作するスイッチを介して正逆回転始動する電動モーターである。また、スライドブロック32にベダルアーム37を軸38で回転可能に

軸支し、その軸38に戻せばね39を捲回してその一端部をベダルアーム37に掛けるとともに他端部をスライドブロック32に掛け、ベダルアーム37を図示反時計方向へ回転付勢する。ベダルアーム37の上端部はヨーク40が形成されてワイヤからなる操作索41が係合し、その操作索41は、所定長さの可撓性のチューブ42を貫通し、スライドブロック32から突出するステア43に穿設した透孔44を貫通し、ガイドレール30,30の後端部を結ぶ連結部材34aから突出するステア45に穿設した透孔46を貫通し、端部にはボールエンド47が止着されている。チューブ42は、ヨーク40とステア43に端部がそれぞれ当接してそれら間にのみ介在し、かつ、所定の長さがループして曲げられている。そして、スライドブロック32には、ベダルアーム37の回転ストッパ48が設けられている。ベダルアーム37の下端部には、ベダルパッド49が装着されている。

次に第2実施例の作用について説明する。ベダ

ルアーム37の位置を前後移動調節するには、駆動手段36のスイッチを操作して正回転始動させると、スクリュウボルト33が軸中心で回転し、そのスクリュウボルト33に螺合するナット35を介してスライドブロック32がスライダ-31、31を介し、ガイドレール30、30に沿って後方(第3図の右方)へ移動し、第3図中仮想線で示したように、スクリュウボルト33の一端部近傍から他端部近傍まで平行移動する。この移動によりステ-43、45間の距離は変化するが、操作索41が貫通するチューブ42の長さは一定であるから、ペダルアーム37とステ-43間の操作索41の長さは一定に保たれる。そこで、ペダルパッド49に足を載せて踏み込むと、ペダルアーム37の上端部が軸38を中心として時計方向へ回転し、操作索41を図の左方へ引き、スロットル開度を変化させる。かくして、ペダルアーム37がスライドブロック32を介してどの位置にあっても、チューブ42の長ささとそれに挿通された操作索の長さは一定であるので、ペダルの踏み込み

角度とスロットル開度は比例するのである。

[発明の効果]

以上説明したこの発明によれば、車体に固定するブラケットにガイドレールを設け、そのガイドレールに係合して揺動可能なスライダ-を設け、該スライダ-にペダルアームを回動可能に軸支するとともに、スライダ-をガイドレールに沿って移動させる駆動手段を設けてなる前後調節可能な足踏み式ペダルであるから、乗員の身長に応じて適正な位置にペダルを移動調節することができるので、身長の人差に関係なく車両の安全、かつ、快適な運転ができる。

4. 図面の簡単な説明

第1図はこの発明の第1実施例を示す第2図A-A線断面図、第2図は第1図B-B線断面図、第3図はこの発明の第2実施例を示す中央線断面図、第4図は第3図C-C線断面図である。

1、2、9…ブラケット、2、30…ガイドレール、3、31…スライダ-、4、13、32…スライドブロック、5…ヒンジボルト、8、15、35…ナット

ト、9、14、33…スクリュウボルト、10、36…駆動手段、24…操作杆、25、37…ペダルアーム、26、49…ペダルパッド、41…操作索

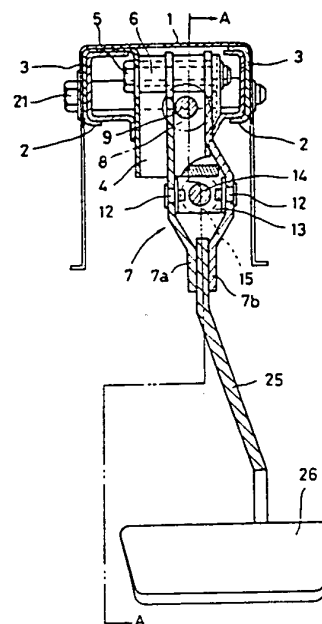
代理人

志賀富士弥

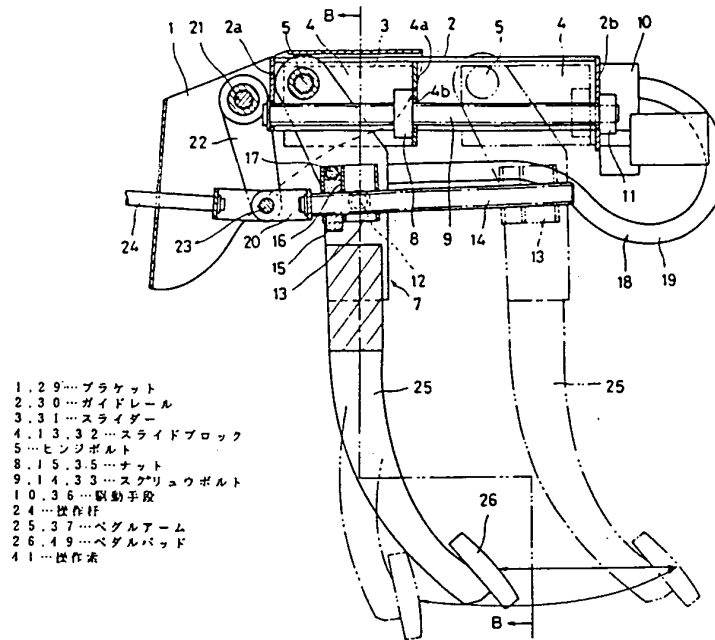
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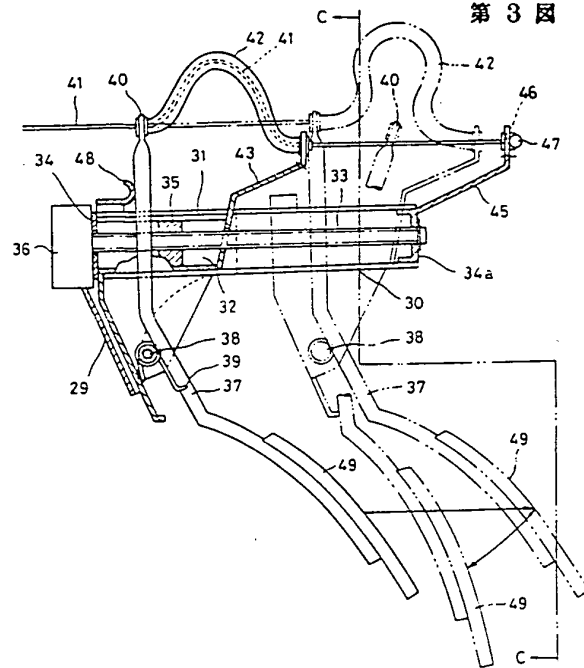
第2図



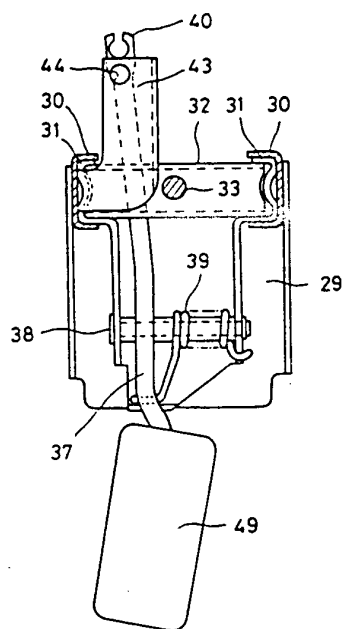
第1図



第3図



第 4 図



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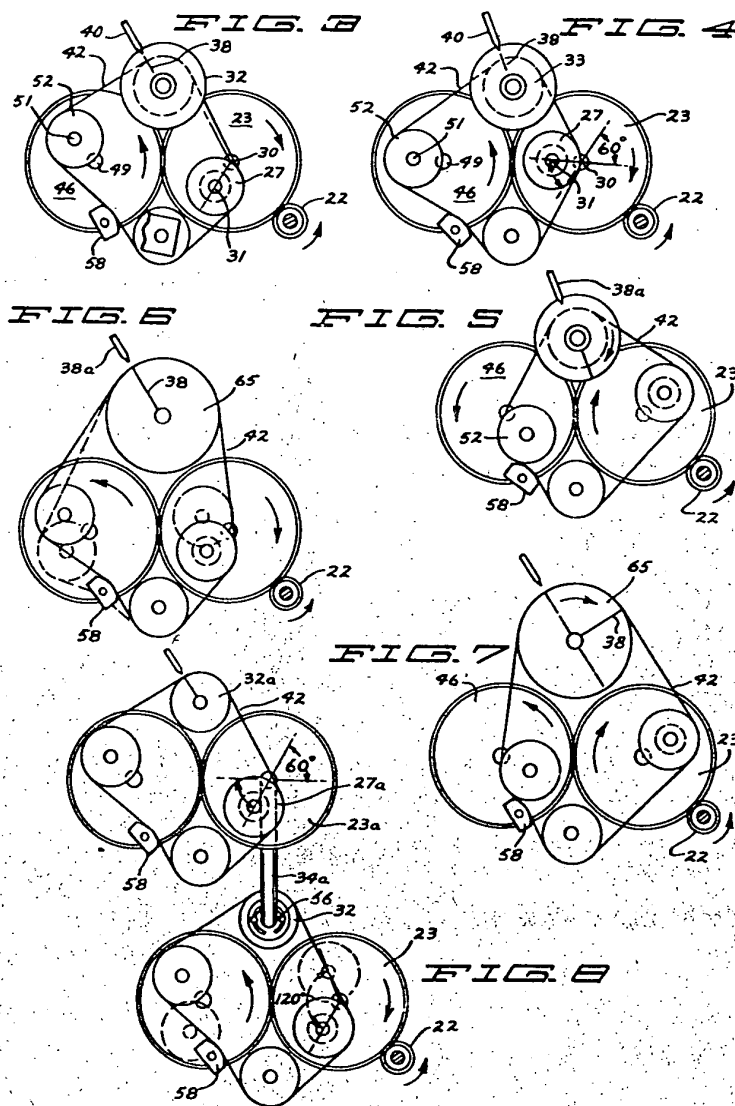
N. 1.283.644

Société dite :
Remmele Engineering, Inc.

2 planches. - Pl. 1.



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MINISTÈRE DE L'INDUSTRIE

SERVICE

de la PROPRIÉTÉ INDUSTRIELLE

BREVET D'INVENTION

P.V. n° 855.490

N° 1.283.644

Classification internationale :

F 06 h

Dispositif d'entraînement intermittent.

Société dite : REMMELE ENGINEERING, INC. résidant aux États-Unis d'Amérique.

Demandé le 13 mars 1961, à 17 heures, à Paris.

Délivré par arrêté du 26 décembre 1961.

(Bulletin officiel de la Propriété industrielle, n° 5 de 1962.)

(Demande de brevet déposée aux États-Unis d'Amérique le 14 mars 1960, sous le n° 14.654, au nom de M. James William TOENSING.)

L'invention a pour objet un dispositif de transmission intermittente perfectionné présentant d'importants avantages mécaniques par rapport aux dispositifs connus dans un but analogue, notamment en ce qui concerne l'uniformité des mouvements mis en jeu, d'où résulte un bon équilibrage, la douceur de fonctionnement et l'absence de vibrations permettant le fonctionnement aux grandes vitesses. De plus ce dispositif est facile et économique à fabriquer à partir de pièces simples et usuelles, et est peu encombrant.

Il présente en outre une grande souplesse d'utilisation en ce qui concerne le choix de la périodicité et de l'étendue des phases d'immobilité et de mouvement; plusieurs dispositifs sont susceptibles d'être associés en cascade pour augmenter la variété des lois de mouvement obtenus.

Le dispositif d'entraînement intermittent objet de l'invention est remarquable essentiellement en ce qu'il comprend une roue à chaîne fixée en position excentrée sur un plateau d'entrée (ou autre élément d'entrée) entraîné en rotation uniforme autour d'un axe que recoupe le cercle primitif de ladite roue à chaîne, une deuxième roue à chaîne solidaire de l'organe auquel il s'agit de communiquer le mouvement intermittent, les deux roues étant reliées par une chaîne de transmission de longueur suffisante pour permettre le débattement de la première roue lors de sa rotation excentrique, et un ensemble agencé pour maintenir la tension de la chaîne pendant toute la durée de chaque tour de l'élément d'entrée.

Cet ensemble de maintien de la tension de la chaîne comprend notamment, selon le mode de réalisation préféré, une troisième roue à chaîne engrenant avec la chaîne de transmission et montée folle sur un plateau d'excentrique entraîné par le plateau d'entrée, notamment par engrenement direct de ces deux plateaux avec un rapport de transmis-

sion unité, de manière à assurer le maintien de la tension de la chaîne par la troisième roue.

On va maintenant décrire quelques exemples de réalisation non limitatifs en regard du dessin annexé sur lequel :

Fig. 1 est une vue en plan par-dessus du dispositif objet de l'invention;

Fig. 2 en est une élévation latérale;

Fig. 3 est un schéma du dispositif des fig. 1-2, montrant la position relative des organes au début d'une phase d'immobilité;

Fig. 4 est une vue analogue à la fig. 3 mais relative à la fin de la phase d'immobilité;

Fig. 5 est analogue à la fig. 3 mais montre la position relative des organes à un instant intermédiaire entre le début et la fin du cycle de commande;

Fig. 6 est un schéma analogue relatif à une variante de l'invention selon laquelle le diamètre de l'élément de sortie est doublé; cette figure montre, en traits pleins et en pointillés respectivement le début et la fin de la phase d'immobilité;

Fig. 7 est une vue relative à la variante de la fig. 6 à un instant intermédiaire entre le début et la fin du cycle de commande;

Fig. 8 enfin montre une variante de l'invention dans laquelle deux dispositifs selon les fig. 1-5 sont associés en cascade pour étendre les possibilités d'applications du dispositif résultant.

Dans le mode de réalisation représenté aux figures 1 et 2, le dispositif comprend un bâti 10 composé d'une plaque de base 11 et d'un montant 12 fixé à la plaque par un boulon 13.

Le montant 12 porte un bloc moteur 14 constitué, dans l'exemple, par un moteur électrique 15 et un engrenage réducteur 16. L'embase 17 du moteur 15 est fixé au montant 12 par des vis 18. Un câble 19 et un interrupteur 20 permettent la commande du moteur. Le réducteur 16, qui avantageusement

fait corps avec le moteur selon une disposition courante, porte un pignon 22 sur son arbre de sortie 21.

Avec le pignon de commande 22 engrène une roue dentée 23 constituant l'élément d'entrée du dispositif objet de l'invention, et faisant corps dans l'exemple avec un bout d'arbre 24 monté dans un palier 25, fixé sur la plaque 11 au moyen de boulons 26. Avec la face supérieure de la roue 23 est solidarisée, par des boulons 28, une roue à chaîne 27 dont le plan général se trouve un peu au-dessus du plan de la roue 23. La circonférence primitive de la roue à chaîne 27, figurée en 29, coupe exactement le prolongement de l'axe géométrique 30 de l'arbre 24 portant la roue dentée 23. Ainsi l'axe 31 de la roue à chaîne 29 est excentré par rapport à l'axe géométrique 30 de la roue 23 et tourne avec celle-ci autour dudit axe 30, qui est fixe par rapport au bâti 10.

Un contrepoids 23a est avantageusement fixé à la face inférieure de la roue 23 pour l'équilibrage dynamique de l'ensemble tournant.

Le dispositif comprend d'autre part un organe de sortie 32 composé d'une roue à chaîne 33 munie d'un bout d'arbre 34 monté dans un palier 35 fixé à la plaque 11 de sorte que l'axe géométrique 36 de l'arbre 34 se trouve en position fixe, parallèle à l'axe 30 de la roue 23. La roue à chaîne 33 se trouve dans le même plan que la roue 27 et, dans l'exemple, est solidaire en rotation de l'arbre 34.

L'arbre 34 porte d'autre part un plateau indicateur 37 portant, dans cet exemple, un repère radial 38 destiné à faire apparaître le comportement de l'organe de sortie 32 dans chaque cycle opératoire. Un index 40 fixé à la plaque 11 indique la position relative du plateau 37 avec son repère radial 38 par rapport au bâti. l'index est formé par un montant 39 auquel un bras 40 est fixé au moyen d'un écrou 41. Le plateau indicateur 37 est représenté à titre d'exemple : il doit être bien entendu à cet égard que l'organe de sortie pourrait comprendre un ou plusieurs dispositifs destinés à être entraînés en rotation intermittente, et qui pourraient être montés sur l'arbre 34 ou être entraînés à partir de cet arbre.

L'organe intermédiaire assurant la transmission du mouvement intermittent à l'organe de sortie 32 est constitué par une chaîne sans fin 42 qui peut être composée de la manière connue par des maillons 43 et des galets 44. Les maillons doivent permettre une variation importante de la tension dans la partie de la chaîne, comme on le verra, au-delà des roues 37 et 27. Le dispositif 45 servant à maintenir la tension de la chaîne au cours de chaque cycle de rotation de la roue dentée 23 comprend une roue dentée compensatrice 46 et un tendeur décrit plus loin et destiné à absorber l'usure de la chaîne avec le temps. La roue 46 engrène avec la roue 23 et

présente avantageusement le même diamètre que celle-ci pour donner un rapport 1/1 mais tourne bien entendu en sens inverse. La roue 46 est portée par un arbre court 47 tournant dans un palier 48 fixé à la plaque 11 par des boulons 26. L'axe géométrique 49 de la roue 46, fixe par rapport au bâti 10, est parallèle aux axes 30 et 36 des organes d'entrée 23 et de sortie 32. La roue 46 porte un maneton excentré 50 d'axe géométrique 51 dont la distance au centre de la roue 46 peut avantageusement être égale à celle de l'axe 31 au centre de l'organe d'entrée 23. Une roue à chaîne 52, dans le même plan que les roues 27 et 33, tourne librement sur le maneton 50. Un contrepoids 46a fixé à la face inférieure de la roue dentée 46 assure l'équilibrage dynamique de l'équipage tournant 46-52.

Un galet fou 53, dans le même plan que les roues 27, 33, 52, est porté par un arbre court 54 auquel est fixé un bras radial 55 oscillant dans un palier 56 fixé au bâti au moyen de boulons 26. Le galet 55 pouvant tourner indépendamment de l'arbre 54, le bras 55 est en mesure de prendre une orientation tandis que le galet 53 est maintenu en contact libre avec la chaîne 42. L'axe géométrique 57 du galet 53 est fixe par rapport au bâti 10.

De l'ensemble 45 fait également partie un sabot 58 compensateur d'usure, présentant une surface de glissement 59 en contact avec la périphérie extérieure de la chaîne 42. Le sabot 58 pivote en 60 sur le bras 55, et le pivot 60 est muni d'un prolongement supérieur 61 auquel est attachée l'extrémité 62 d'un ressort 63, ancré d'autre part en 64 au montant 39 de l'index 38.

Le fonctionnement est le suivant :

Le moteur 14 imprime par le pignon 22 une rotation uniforme à l'organe d'entrée 23 qui est entraîné dans le sens *dextrorsum* suivant la figure 1. On se réfère maintenant aux vues schématiques des figures 3, 4 et 5. L'organe d'entrée 23 entraîne en rotation la roue à chaîne 27 excentriquement par rapport à l'axe 30, et comme cette roue 27 est solidaire de la roue dentée 23, la roue 27 fait un tour par tour de la roue 23. Dans la position représentée en traits pleins sur la figure 3, la roue à chaîne 27 commence une période d'immobilité dans laquelle un galet 44 de la chaîne vient s'aligner sur l'axe 30. Le galet ainsi aligné demeure dans cette position d'alignement axial pendant le temps que met la roue à chaîne 27 à engrener avec le galet 44 suivant de la chaîne, après quoi la chaîne est écartée de toute position pour laquelle un de ses galets 44 puisse de nouveau coïncider avec l'axe 30 de la roue dentée 23 jusqu'à ce que celle-ci ait fait un tour complet. Ainsi le brin de la chaîne 42 compris entre l'organe de sortie 32 et la roue à chaîne d'entrée 27, demeure immobile jusqu'à ce que celle-ci ait décrit un arc d'environ 60° dans cet exemple. Si l'on désire maintenir la chaîne 42 et l'organe de sortie 32 abso-

lument immobiles, il convient d'utiliser un arc actif un peu plus faible, en se rappelant que le galet 44 en position d'alignement axial commence à s'écarter de l'axe 30 à l'instant où la roue à chaîne 27 atteint la position de la figure 4. Le repère radial 38 reste en alignement avec l'index 40 pendant la phase d'immobilité, mais lorsque la roue 23 continue de tourner pour passer de la position de la figure 4 à celle de la figure 5, la chaîne 42 avance à une vitesse accélérée et atteint sa vitesse maximale environ à la position de la figure 5. La chaîne 42 décélère alors jusqu'à ce que la roue 27 soit revenue au début de sa position d'immobilité (fig. 3). Une particularité de ce dispositif d'entraînement intermittent est l'absence de tout choc au départ et à l'arrêt, contrairement à beaucoup d'autres genres de dispositifs à but analogue, tels que ceux, bien connus, à croix de Malte.

Comme la roue dentée compensatrice 46 engrène avec la roue 23 dans le rapport 1/1, la roue à chaîne 52 accomplit elle aussi un tour pour chaque tour de la roue 27. Mais comme le sens de la rotation de la roue compensatrice 46 est inverse de celui de la roue 23, la roue à chaîne 52 se trouve à sa position supérieure pendant que la roue 27 occupe sa position la plus basse selon la figure 3. Pendant la phase d'immobilité, les axes 51 et 31 sont à peu près alignés avec les axes 49 et 30 des roues 46 et 23. Cet agencement réduit au minimum les allongements et contractions subis par la chaîne 42 et réduit la course que doit exécuter le sabot tendeur 38 transversalement au plan des axes 51 et 57 de la roue compensatrice 52 et du galet fou 56 respectivement. Une amplification d'effort importante étant réalisée grâce à l'application de la pression au brin de chaîne 42 compris entre le galet fou 53 et la roue à chaîne 52, le ressort peut être relativement faible tout en assurant la tension correcte de la chaîne.

Dans la variante schématisée figure 6, la disposition générale est la même; seul le diamètre de la roue à chaîne de sortie est changé. Cette roue 65 a en effet ici un diamètre double de celui de la roue correspondante 33 du premier mode de réalisation. Avec cette disposition la roue de sortie 65 présente deux positions d'immobilité diamétralement opposées, l'une étant celle de la figure 6; pour les deux positions, le repère 38 occupe les deux positions représentées en pointillés sur la figure 7. De même, il y a deux positions de vitesse maximale à chaque cycle, l'une indiquée sur la figure 7, l'autre en principe diamétralement opposée, au moment où la roue 65 a tourné d'environ 180°. On remarquera que chaque cycle complet de la roue de sortie 65 comprend ainsi deux phases d'immobilité et deux phases de mouvement.

Selon la variante de la figure 8, on confère au dispositif d'entraînement intermittent une plus grande souplesse d'utilisation en se servant de l'arbre de

sortie 34 pour entraîner un second dispositif d'entraînement intermittent identique dont la roue dentée d'entrée est désignée par 23a, la roue à chaîne d'entrée par 27a et celle de sortie par 32a. L'orientation de l'arbre de sortie 34a du premier dispositif peut être modifiée par rapport à la roue 32 au moyen d'un organe de réglage 66; avec cette disposition on peut faire en sorte que l'arc d'immobilité de la roue 23a s'ajoute à celui de la roue 23a, ce qui permet de maintenir l'organe de sortie 32a immobilisé sur un arc d'environ 120° de chaque tour de la roue d'entrée 23. Il est par ailleurs évident qu'on pourrait réaliser toutes combinaisons voulues en ce qui concerne le départ, l'arrêt, l'accélération et la décélération des organes de sortie, en réglant la position relative de l'arbre 34a par rapport à la roue 32.

On remarquera que la transmission intermittente objet de l'invention n'utilise que des éléments en rotation uniforme à l'exception du mécanisme compensateur; mais l'agencement est tel que le mouvement alternatif du bloc compensateur est de faible amplitude, et que la masse des pièces qui en font partie est assez légère, contrairement aux dispositifs courants qui comportent des masses importantes en mouvement alternatif, tels que vilebrequins, etc. Grâce à ce mode de fonctionnement continu et uniforme le dispositif peut fonctionner à grande vitesse sans vibrations. En outre, l'agencement des organes est tel qu'il ne s'y développe nulle part d'efforts élevés, ce qui réduit l'usure et le risque de casse.

On pourra bien entendu apporter de nombreuses modifications aux exemples de réalisation décrits sans s'écarter de l'esprit de l'invention.

RÉSUMÉ

L'invention a pour objet un dispositif d'entraînement intermittent remarquable en ce qu'il comprend une roue à chaîne fixée en position excentrée sur un plateau d'entrée (ou élément équivalent) entraîné en rotation uniforme autour d'un axe que recoupe le cercle primitif de ladite roue à chaîne, une deuxième roue à chaîne solidaire de l'organe auquel il s'agit de communiquer un mouvement intermittent, les deux roues étant reliées par une chaîne de transmission de longueur suffisante pour permettre le débattement de la première roue lors de sa rotation excentrique, et un ensemble agencé pour maintenir la tension de la chaîne pendant toute la durée de chaque tour du plateau d'entrée.

Ce dispositif peut présenter en outre les particularités suivantes isolément ou en toute combinaison opérante :

a. Le dispositif comprend une troisième roue à chaîne engrenant avec la chaîne de transmission et montée folle sur un plateau excentrique entraîné à

[1.283.644]

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la vitesse voulue pour assurer le maintien de la tension de la chaîne par la troisième roue;

b. Le plateau excentrique portant la troisième roue à chaîne selon *a* engrène avec le plateau d'entrée;

c. Le rapport de transmission entre les deux plateaux selon *b* est l'unité;

d. Les axes des plateaux et des roues sont parallèles;

e. L'ensemble du dispositif est monté sur un bâti qui porte également un moteur entraînant le plateau d'entrée;

f. Les axes des deux plateaux excentriques et des roues qu'ils portent s'alignent à chaque période d'immobilité du plateau de sortie;

g. Le dispositif comporte en outre un sabot tendeur auxiliaire maintenu élastiquement au contact de la chaîne pour absorber le jeu résiduel;

h. Deux dispositifs d'entraînement intermittent du type précité, ou davantage, sont associés en cas-

cade, le plateau de sortie de l'un constituant, ou entraînant, le plateau d'entrée de l'autre;

i. Le calage relatif entre le plateau de sortie d'un premier des dispositifs selon *h* et le plateau d'entrée du second dispositif entraîné par lui, est réglable;

j. La chaîne de transmission étant du type de celles dont les maillons sont reliés par des galets, un galet de la chaîne parvient en alignement axial avec l'axe du plateau d'entrée pour déterminer chaque phase d'immobilité du plateau de sortie;

k. Le rapport des rayons des roues peut être choisi de manière à assurer plus d'une période d'immobilité du plateau de sortie par tour du plateau d'entrée, et notamment deux périodes d'immobilité en positions diamétralement opposées.

Société dite : REMMELE ENGINEERING, INC.

Par procuration :

HARLÉ & LÉCHOPIEZ

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PATENT SPECIFICATION



DRAWINGS ATTACHED

916,106

Date of Application and filing Complete
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No. 7134/61.

Application made in United States of America (No. 14654) on March 14, 1960.

Complete Specification Published: Jan. 23, 1963.

Index at Acceptance:—Class 80(1), A1(A2 : D).

International Classification:—F06h.

COMPLETE SPECIFICATION

Drive Mechanism with Continuous Input and Intermittent Output

We, REMMELE ENGINEERING, INC., a Corporation organized and existing under the Laws of the State of Minnesota, of 515 University Avenue, Saint Paul, Minnesota, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The invention relates to the transmission of motion, and more particularly to a drive mechanism having a continuous input motion and an intermittent output motion.

It is among the objects of the invention to provide a drive which can be driven at a variety of speeds to produce cyclic intermittent output motion with a portion of each cycle constituting a dwell period.

A still further object of the invention is to provide an intermittent endless roller chain drive which has a positively driven compensating member to take up automatically the greater portion of the variation in length of the roller chain drive so as to minimize the amount of slack take up required during each cycle of operation.

Mechanism according to the invention for producing intermittent rotary motion includes a constant speed drive element mounted for rotation upon a fixed axis, a sprocket rigidly secured in parallel relation to said input drive element and having its effective circumference precisely intersecting the projected axis of said input drive element, an intermittently rotated output member having a sprocket mounted for rotation upon a fixed axis lying in spaced parallel relation to that of said input drive element, a flexible endless driving chain trained about said sprockets, and means in engagement with said flexible endless drive chain for maintaining the latter in taut condition.

The invention is diagrammatically illustrated by way of example in the accompanying drawings in which:—

Figure 1 is a top plan view of the intermittent drive mechanism of the invention;

Figure 2 is a corresponding side elevation;

Figure 3 shows the relationship of the gears, sprockets and roller chain taken at the beginning of a dwell period;

Figure 4 is a corresponding view showing the position of the elements at the end of a dwell period;

Figure 5 is a corresponding view showing the position of the elements intermediate the beginning and end of the drive cycle;

Figure 6 is a diagrammatic representation of an alternate form of the invention in which the intermediate output drive diameter has been doubled, the position shown in full line being the beginning of the dwell period and the dotted line position representing the end of the dwell period;

Figure 7 is a corresponding view showing the position of the elements intermediate the beginning and end of the drive cycle, the dotted line radii indicating two dwell positions for a single output cycle; and

Figure 8 is a diagrammatic representation of a further modification in which the intermittent output is coupled with a second mechanism to gain further flexibility at the intermittent output drive.

Referring to the drawings, and particularly to Figures 1 and 2, there is provided a mounting structure 10 which has a base plate 11 and a standard 12 for positioning the elements of the drive as hereinafter described. In the form shown, the standard 12 is conveniently secured to the base plates 11 by such means as a bolt 13.

Secured to the standard 12 is a prime mover 14 which, in turn, may utilize an electric motor 15 with gear box 16 as shown. Motor 15 is secured to standard 12 at its base 17 by means of threaded fasteners 18. The motor 15 may be energized through electrical cord 19 and switch 20. The gear box 16 may be formed integrally with motor 15 as is common in the art and provided with shaft 21 to which

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a pinion gear 22 is secured.

An input drive element such as the gear 23 lies in intermeshed engagement with the pinion 22 and may be provided with a stub shaft 24 journalled in the bearing 25 as shown in Figures 1 and 2. Bearing 25 is secured to base plate 11 by means such as bolts 26 so that the axis of shaft 24 will be fixed with respect to the base and mounting structure 10.

A sprocket 27 is rigidly secured to the face of gear 23 by such means as bolts 28 in such manner that the plane of the sprocket lies slightly above and in parallel relation to the face of gear 23. The effective circumference of sprocket 27 is shown at 29 and precisely intersects the projected axis 30 of the stub shaft 24 centrally of gear 23. A counterweight 23a may be conveniently secured to the underside of gear 23 so as to assist in dynamically balancing the input gear member.

An output member 32 is formed by a sprocket 33 having a stub shaft 34 which, in turn, is journalled in bearing 35 secured to base plate 11, so that the axis 36 of shaft 34 will lie in fixed and spaced parallel relation with the axis 30 of the gear 23. Sprocket 33 lies in the same plane as that of sprocket 27 and may be secured to shaft 34 so that sprocket 33 rotates with the sprocket 27.

An indicating disc 37 may also be secured to shaft 34 and provided with radial marking means 38 to demonstrate the behaviour of the output member 32 during each cycle of operation. A pointer element 39 may be fixedly secured to base 11 to demonstrate the relative position of the disc 37 and its radial mark 38.

The pointer element includes a standard to which a pointer arm 40 is secured by a threaded fastener 41, as shown in Figures 1 and 2. While the disc 37 is shown for illustrative purposes, the output member can include any of a multiplicity of devices which are intended to be intermittently driven whether mounted upon shaft 34 or driven indirectly therethrough.

The element through which intermittent motion is transmitted to the output member 32 includes a flexible endless driving belt or chain 42 which may be provided with conventional links 43 and roller elements 44, as shown in Figures 1 and 2. The links of the flexible roller chain are such as to permit give and take in slack existing in a portion extending beyond sprockets 33 and 27. A means for keeping the roller chain taut is indicated generally at 45 and includes a compensator gear 46 and a slack take-up which will be subsequently described, the means 45 cooperatively maintaining the roller chain 42 in taut condition irrespective of wear which may take place in the roller chain over a length of time. The gear 46 is intermeshed with gear 23 and may be conveniently of the same diameter so as to produce a 1:1 gear ratio with gear 46 rotating in the opposite direction

from gear 23. Gear 46 has a stub shaft 47 secured centrally thereof, which shaft is rotatively received in bearing 48, which, in turn, may be secured to base plate 11 by such means as the bolts 26. The axis 49 of gear 46 is fixed with respect to the mounting structure 10 and lies in spaced relation with the axis 36 of output member 32 and axis 30 of the input drive element 23. Secured eccentrically to gear 46 is a stub shaft 50 having an axis 51 in spaced parallel relation to the axis 49. Axis 51 may be conveniently spaced the same radial distance outwardly on gear 46 as axis 31 of sprocket 27 is spaced outwardly of the axis of input drive element 23. A sprocket 52 lies in the same plane as sprocket 27 and sprocket 33 and is freely rotatable upon the stub shaft 50. A counterweight 46a may be secured to the underside of gear 46 to assist in dynamically balancing the gear 46 and its associated sprocket 52.

An idler wheel or roller 53 also lies in the same plane as the previously mentioned sprockets 27, 33 and 52 and is rotatively secured to stub shaft 54 which, in turn, is secured to a rocker arm 55 extending radially outward from shaft 54. The shaft 54 is journalled for oscillation in the bearing 56, the bearing 56 being secured to the mounting structure by bolts 26. Since the idler roller 53 can rotate independently of shaft 54, rocker arm 55 can seek any radial position while the roller 53 lies in idling contact with the roller chain 42. Idler roller 53 rotates about an axis 57 which is fixed with respect to the mounting structure 10.

Also forming a part of the means for keeping chain 42 taut is a slack take-up block 58 having a slide surface 59 lying in contact with the outer periphery of chain 42. Block 58 is pivotally mounted at 60 to the rocker arm 55, and pivot 60 has a portion 61 extending above the rocker arm 55 to which an end 62 of spring 63 is secured. The other end 64 of spring 63 is attached to the standard 39 which holds the pointer 38 as previously described.

In the operation of the intermittent motion device, the prime mover 14 transmits a constant rotary motion through pinion 22 to the input drive element 23 causing it to rotate in a clockwise direction as viewed in Figure 1. Referring now to the diagrammatic representations of Figures 3, 4 and 5, the input drive element 23 causes the sprocket 27 to rotate eccentrically with respect to the axis 30 and since sprocket 27 is rigidly secured to the gear 23, it will make one revolution for each revolution of the gear 23. At the full line position of Figure 3, the sprocket 27 is just beginning a dwell period in which a chain roller 44 becomes aligned with axis 30. This aligned roller 44 remains at the axially aligned position for the length of time that it takes the sprocket 27 to engage the next roller 44 of chain 42, following which the roller chain 42 is moved from any position

where a roller 44 can again coincide with axis 30 of gear 23 until a complete revolution of the gear has been effected. Thus, the roller chain 42 remains motionless at that portion of its stretch which lies between the output member 32 and the input sprocket 27 until the gear 27 has traversed an arc of approximately 60° in the instant case. Where it is desired to hold chain 42 and output member 32 absolutely motionless, a somewhat smaller effective arc is employed, bearing in mind that the axially aligned roller 44 will begin to move away from axis 30 when the sprocket 27 reaches the position shown in Figure 4. Radial mark 38 remains in alignment with the pointer 40 during the dwell period but as the gear 23 continues to rotate from the position of Figure 4 to that of Figure 5, chain 42 will be caused to advance in accelerated manner and will reach a maximum speed at approximately the position shown in Figure 5. Roller chain 42 then decelerates until the sprocket 27 again reaches the beginning of its dwell period as shown in Figure 3. A characteristic of the intermittent drive is the lack of shock starting and stopping which is characteristic of many types of intermittent drives such as that employing the well known "Geneva" drive.

Since the compensator gear 46 is intermeshed with gear 23 and has a 1 : 1 ratio therewith, the sprocket 52 will also make one revolution while sprocket 27 makes its revolution. However, since the direction of rotation of the compensator gear 46 is opposite that of gear 23, the sprocket 52 will be in its uppermost position while the sprocket 27 is in its lowermost position as viewed in Figure 3. During the dwell period, axis 51 and axis 31 will be approximately aligned with the respective axes 49 and 30 of gears 46 and 23. This arrangement minimizes the elongation and shortening of roller chain 42 and, as a consequence, the take-up slack block 58 need move only a short distance toward and away from a line intersecting axis 51 and axis 57 of the respective compensator sprocket 52 and idler roller 53. Since considerable mechanical advantage is gained through pressure against the stretch of roller chain 42 lying between idler roller 53 and sprocket 52, the spring is comparatively weak and yet can effectively maintain the roller chain 42 in precise taut condition.

Referring now to Figure 6, the same general relationship of elements is there disclosed excepting the size of the output sprocket 33. As shown in Figure 6, the output sprocket 65 has twice the diameter of the output sprocket 33 as shown in Figures 1 to 5. The larger output sprocket 65 causes mark 38 to indicate a dwell period with pointer 40 both in the position shown in Figure 6 and in the diametrically opposed position illustrated in dotted line in Figure 7. Also, two maximum speed positions will occur during each cycle, one

of them being indicated by the position of the output sprocket 65 in Figure 7 and the other being in approximately opposed relation when the output sprocket 65 has rotated approximately 180°. It will be noted that each complete cycle of the output sprocket 65 includes two dwell periods and two motion periods.

Referring now to Figure 8, additional versatility may be gained in the intermittent motion mechanism by utilizing the output shaft 34 as the initial drive for a second duplicate drive in which the input gear is designated 23a, input sprocket 27a, output sprocket 33a. The output shaft 34a may be rotatably fixed with respect to the output member 32 by means of adjustment member 66 and with this arrangement the natural dwell arc of the input drive 23a can be added to that of the input drive 23 so that output member 32a can be maintained in stopped condition through approximately 120° of dwell in the rotation of the input gear 23. It will be obvious that other combinations of starting, stopping, accelerating and decelerating can be obtained by adjusting the relative position of output shaft 34a with respect to output shaft 32.

It will be observed that the mechanism for producing intermittent motion employs parts which rotate smoothly with respect to associated axes with the exception of the take-up mechanism. However, the arrangement is such that the reciprocation of the take-up block is slight and the mass of the parts associated therewith is comparatively light as opposed to the large mass of reciprocating cranks and similar mechanisms commonly employed heretofore in producing intermittent motion. Because of the smooth running characteristics of the intermittent motion mechanism the apparatus can operate at high speeds without vibration. Further, the parts are so interrelated as not to produce high stresses at any particular location, and hence wear and breakage is reduced to a minimum.

It will be understood that various changes may be made in the form, details, arrangements and proportions of the parts without departing from the scope of the invention as set forth in the appended claims.

WHAT WE CLAIM IS:—

1. Mechanism for producing intermittent rotary motion including a constant speed input drive element mounted for rotation upon a fixed axis, a sprocket rigidly secured in parallel relation to said input drive element and having its effective circumference precisely intersecting the projected axis of said input drive element, an intermittently rotated output member having a sprocket mounted for rotation upon a fixed axis lying in spaced parallel relation to that of said input drive element, a flexible endless driving chain trained about said sprockets, and means in engagement with said flexible endless drive chain for maintaining the latter in taut condition.

2. Mechanism according to claim 1, including a sprocket rotatable on its own axis and driven by said flexible endless driving chain eccentrically rotatable with respect to a fixed axis lying in spaced parallel relation with the axes of both said input drive element and said output member.

3. Mechanism according to claim 1 or claim 2 including a compensator gear rotatable upon a fixed axis and lying in spaced parallel relation with the axes of both of said input drive element and said output member, and a sprocket rotatably mounted on said compensator gear and having said flexible endless drive chain trained thereabout in timed relation with the first mentioned sprockets.

4. Mechanism according to Claim 5, in which the compensator gear is driven by said input drive element and has a 1 : 1 gear ratio therewith, and in which a sprocket is rotatably mounted upon said compensator gear eccentrically with respect to the axis thereof and having said flexible endless driving chain trained thereabout in timed relation with the sprockets associated with said input drive element and said output member.

5. Mechanism according to claim 1, for producing non-uniform motion which comprises, a mounting structure, an input drive gear rotatably mounted on an axis fixed with respect to said mounting structure, a prime mover in driving engagement with said drive gear, a compensator gear intermeshed with said drive gear, a sprocket rigidly secured in eccentric relation to said drive gear, a sprocket rotatably mounted on an axis fixed with respect to said compensator gear and lying in the same plane as the rigidly secured sprocket, an intermittent output sprocket rotatably mounted on an axis fixed with respect to said mounting structure, and an endless flexible drive chain trained about all of said sprockets, whereby upon imparting uniform rotation from the prime mover to said drive gear, compensated non-uniform rotary motion will be imparted to said output sprocket.

6. Mechanism for producing an intermittent motion output from a constant motion input according to any of the preceding claims, in which the compensator gear has a 1 : 1 gear ratio with said drive gear, and in which is a sprocket rigidly secured to said drive gear and has a toothed circumference lying in a plane parallel to that of said drive gear and effectively intersecting the projected axis of said drive gear, and including a sprocket rotatably mounted on an axis eccentric with respect to that of said compensator gear and having the same diameter as the sprocket associated with said input drive gear, an intermittent output sprocket rotatably mounted on an axis fixed

with respect to said mounting structure, and an endless flexible drive chain trained about all of said sprockets, the axes of the input drive gear, the compensator gear and each of the sprockets associated therewith all coming substantially into the same plane during the dwell period of the intermittent output sprocket.

7. Mechanism according to claim 6, in which a sprocket is rotatably mounted on an axis fixed with respect to said compensator gear and lying in the same plane as the rigidly secured sprocket and in which a slack take-up block is provided resiliently in engagement with said flexible drive chain for taking up the residual slack not fully compensated for by said compensator gear and sprocket, whereby upon imparting constant rotation from the prime mover to said drive gear, an intermittent rotary motion will be imparted to said output sprocket.

8. Mechanism according to claim 1, including a second drive element mounted upon said output shaft and having a sprocket rigidly secured thereto in parallel relation therewith and having its effective circumference precisely intersecting the projected axis of said second drive element, a second intermittently rotated output member having a sprocket mounted for rotation upon a fixed axis lying in spaced parallel relation to that of said second drive element, a second flexible endless driving chain trained about the sprockets associated with said second drive element and said second output member, and means in engagement with said second flexible drive chain for maintaining the second flexible drive chain in taut condition.

9. Mechanism set forth in claim 8, have means adjustably fixing the relative rotary position of said second drive element with respect to said output shaft.

10. Mechanism according to claim 8 or claim 9, including a flexible endless roller chain trained about said sprockets, said sprocket secured to said input drive element being so constructed and arranged as to cause a roller of said roller chain to come into axial alignment with said input drive element for a portion of each revolution of the input drive element to define an absolute dwell period therein, and means in engagement with said roller chain for maintaining the roller chain in taut condition.

11. Mechanism with continuous input and intermittent output, substantially as hereinbefore described and illustrated with reference to the accompanying drawings.

EDWARD EVANS & CO.,
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Agents for the Applicants.

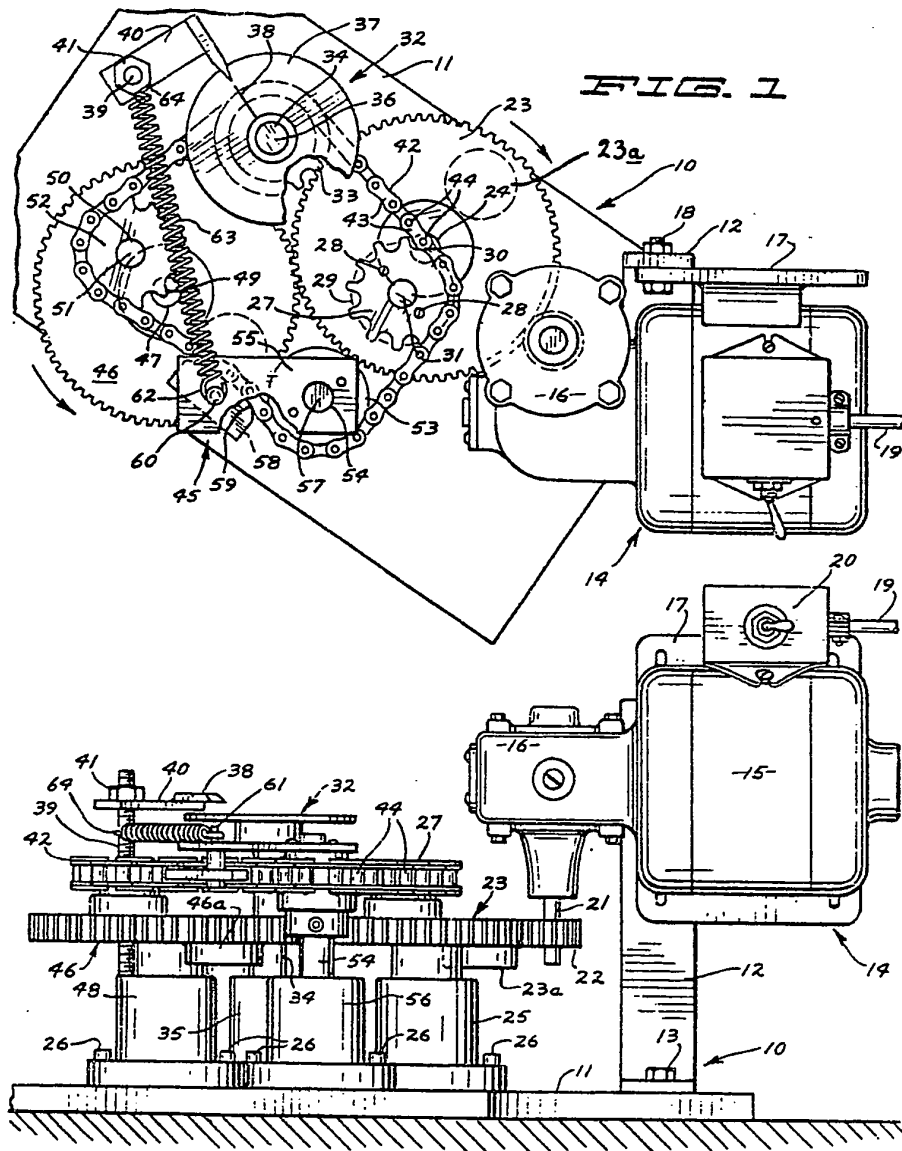
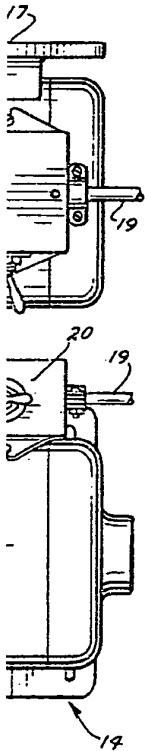
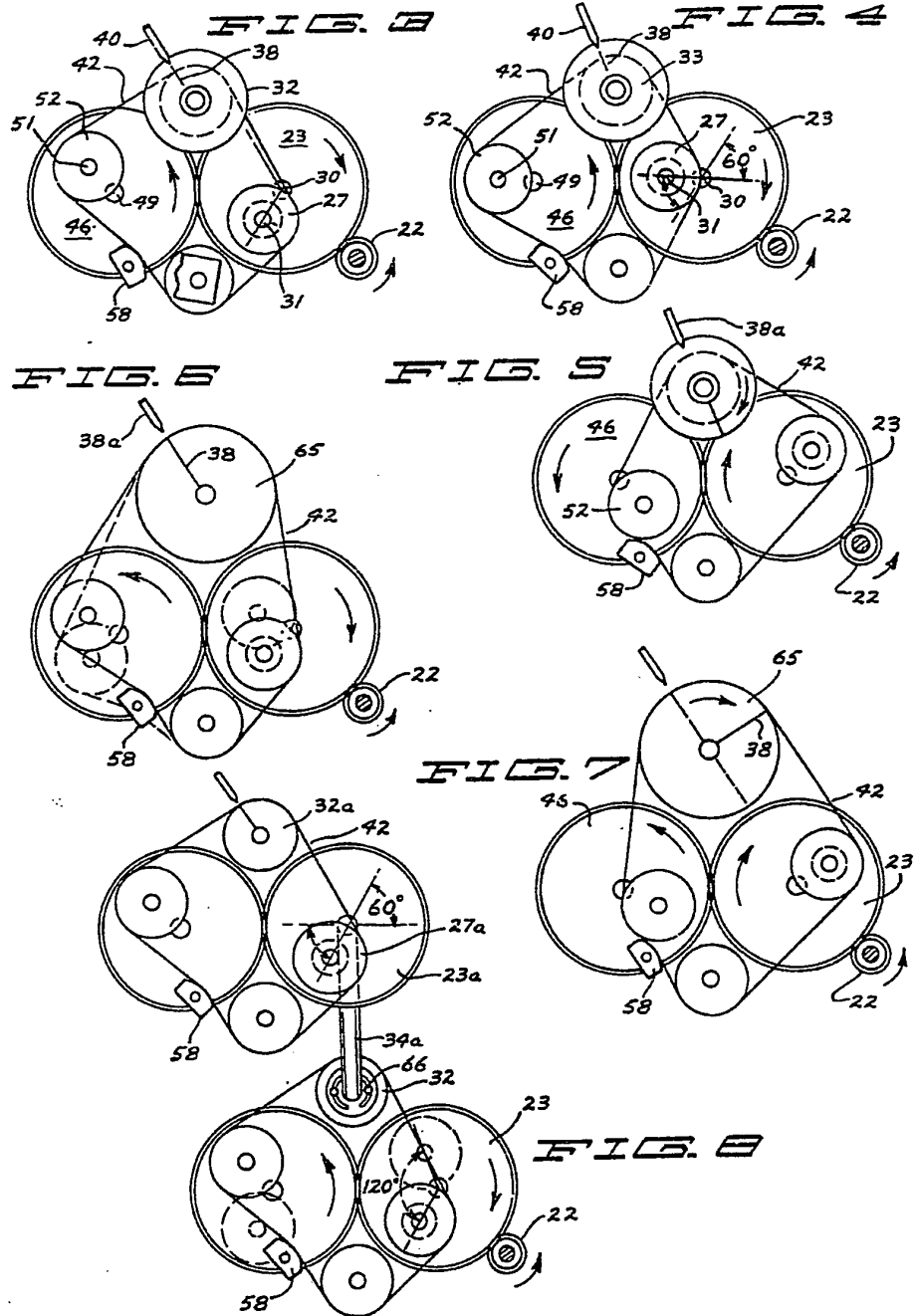
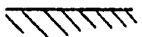


FIG. 2

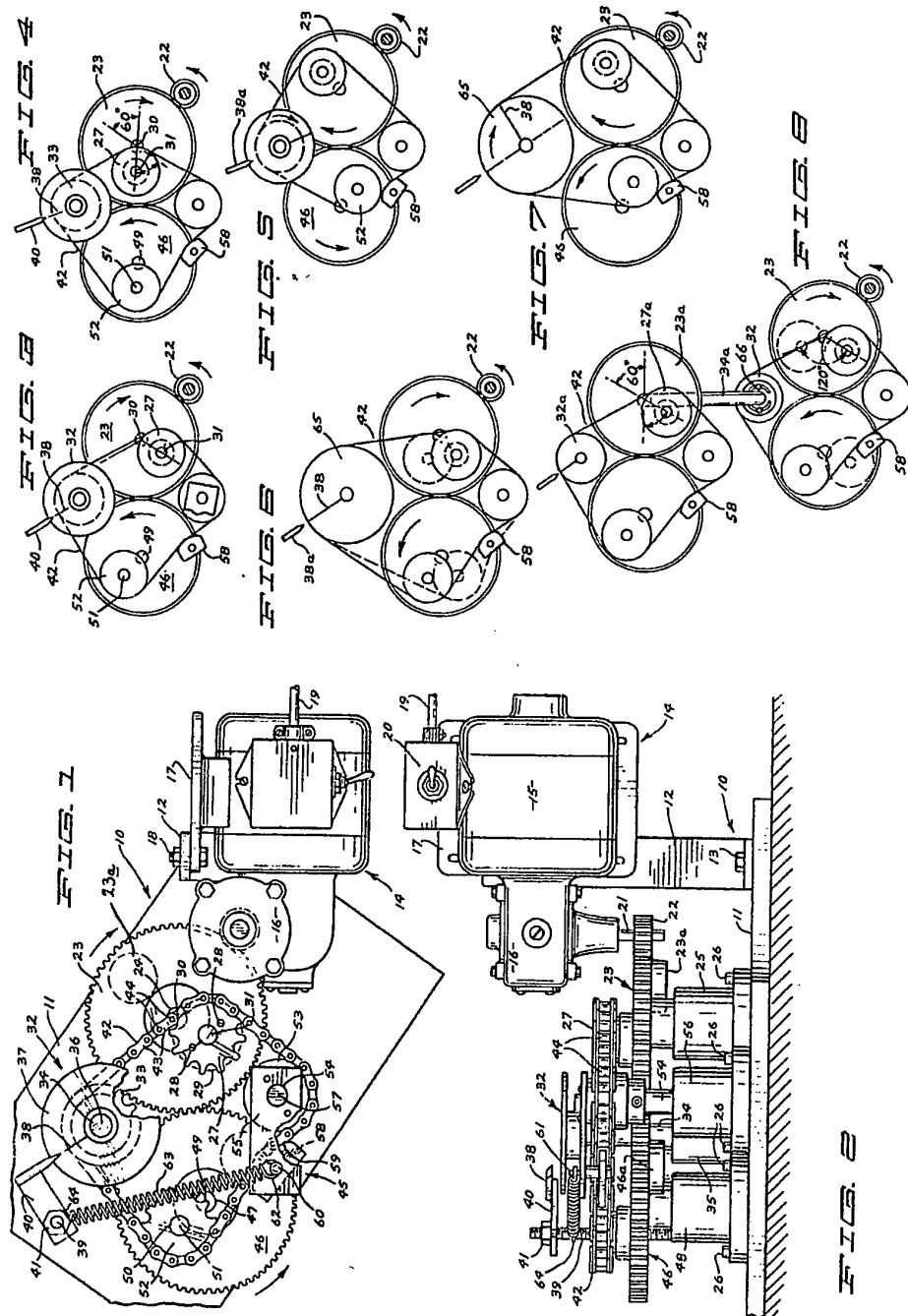
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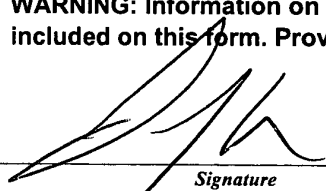
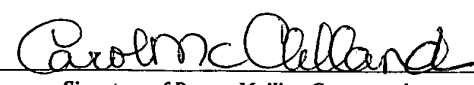
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AMENDMENT TRANSMITTAL LETTER (Large Entity)					Docket No. PCB110	
Applicant(s): William Farmer, et al						
Application No. 10/712,764	Filing Date November 13, 2003	Examiner Eric D. Culbreth	Customer No. 32047	Group Art Unit 3616	Confirmation No. 7399	
Inventor: Electro-Mechanical Actuator for An Electrically Actuated Parking Brake MAR 16 2005 UNITED STATES PATENT & TRADEMARK OFFICE						
COMMISSIONER FOR PATENTS: Transmitted herewith is an amendment in the above-identified application. The fee has been calculated and is transmitted as shown below.						
CLAIMS AS AMENDED						
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST # PREV. PAID FOR	NUMBER EXTRA CLAIMS PRESENT	RATE	ADDITIONAL FEE	
TOTAL CLAIMS	25 -	28 =	0	x \$50.00	\$0.00	
INDEP. CLAIMS	12 -	4 =	8	x \$200.00	\$1,600.00	
Multiple Dependent Claims (check if applicable) ☐					\$0.00	
TOTAL ADDITIONAL FEE FOR THIS AMENDMENT					\$1,600.00	
☐ No additional fee is required for amendment. ☐ Please charge Deposit Account No. _____ in the amount of _____ ☐ A check in the amount of _____ to cover the filing fee is enclosed. ☒ The Director is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account 50-2121 ☒ Any additional filing fees required under 37 C.F.R. 1.16. ☒ Any patent application processing fees under 37 CFR 1.17. ☒ Payment by credit card. Form PTO-2038. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.						
 Signature Donald J. Perreault Attorney for Applicants Reg. No. 40,126 Customer No. 32047 Grossman, Tucker, Perreault & Pfleger, PLLC 55 South Commercial Street Manchester, New Hampshire 03101 Tele: 603.668.6560			Dated: March 14, 2005			
cc:			I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on March 14, 2005 (Date)  Signature of Person Mailing Correspondence Carol McClelland Typed or Printed Name of Person Mailing Correspondence			



THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appln. No. : 10/712,764
For : Electro-Mechanical Actuator For An Electrically Actuated
Parking Brake
Applicant : William Farmer et al.
Filed : November 13, 2003
Art Unit : 3616
Examiner : Eric D Culbreth
Confirmation No. : 7399
Docket : PCB110
Customer No. : 32047

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

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on March 14, 2005, at Manchester, New Hampshire.

By Carol McClelland
Carol McClelland

AMENDMENT A

Sir:

This Amendment is in response to the Office Action mailed December 14, 2004. As this response is being filed within the three-month shortened statutory period of reply no extension of time is believed necessary. However, Applicant conditionally petitions for an extension of time to provide for the possibility that the need for an extension has inadvertently been overlooked. Please charge Deposit Account No. 50-2121 for any necessary extension fees. Please amend the above-identified application as follows:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims that begins on page 4 of this paper.

Amendments to the Drawings begin on page 13 of this paper and includes an attached replacement sheet.

Remarks/Arguments begin on page 14 of this paper.

An **Appendix** including amended drawing figures is attached following page 21 of this paper.

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AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph beginning on page 1, line 5 with the following amended paragraph:

This application is a continuation-in-part of U.S. patent application Serial No. 10/061,940, filed February 1, 2002, now U.S. Patent Number 6,736,233, and claims the benefit of U.S. provisional patent application Serial No. 60/426,044, filed November 13, 2002 and also claims the benefit of U.S. provisional patent application Serial No. 60/467,993, filed May 5, 2003, the entire disclosure of which applications are incorporated herein by reference.

Please replace the paragraph beginning on page 3, line 11 with the following amended paragraph:

FIG. 1 is a simplified block diagram of an exemplary ~~electrically actuated park brake system~~ electronic parking brake actuator (EPBA) system consistent with the invention;

Please replace the paragraph beginning on page 5, line 26 with the following amended paragraph:

An electrical energy source (not shown), e.g. the vehicle battery, may be connected to the actuator 102 along with other control inputs, via connector pins in an integral connector assembly, which may be formed on a cover portion of the actuator housing. The connector pins may provide electrical connections to a ~~PCB~~ printed circuit board (PCB), which may include motor control and position sensing electronics for driving the motor. A bottom portion of the housing may include integral locating features for the actuator components as well as mechanical attachment points for securing the actuator to a fixed location.

Please replace the paragraph beginning on page 8, line 15 with the following amended paragraph:

Consistent with one aspect of the invention herein, it may be desirable to control the audible noise of the electro-mechanical actuator. Audible noise has become a significant attribute of electro-mechanically actuated systems in passenger vehicles. Typically it is desirable to reduce the audible noise in the cabin of a passenger vehicle. One exemplary manner of reducing audible noise consistent with the invention is by gear train selection. Referring to FIG. 8, by replacing the motor pinion drive gear and driven gear with a worm gear ~~202b~~ 302b and worm wheel ~~204b~~ 304b, as illustrated, a significant reduction in audible noise can be achieved.

Please replace the paragraph beginning on page 8, line 23 with the following amended paragraph:

Another method of reducing audible noise consistent with the invention includes isolation of various components and sub-components of an actuator. FIG. 9 is a block diagram illustrating motor isolation consistent with the invention. A motor ~~900~~ having a certain mass 902 and energy, i.e. generating motor inertia 904, may be coupled to an isolator, e.g., a pair of isolation bushings on either side of the motor. The isolator has an effective spring constant 906 and damping constant 908, both of which may be varied depending on the type of material and geometry chosen for the isolator. The isolator thus mechanically isolates the motor from the mass of the actuator housing 910, thereby reducing air born audible noise associated with motor vibration.

AMENDMENTS TO THE CLAIMS

The following listing of claims shall replace all prior listings, and versions, of claims in this application.

Listing of Claims:

Claim 1 (currently amended) An electrically actuated parking brake system comprising:
a vehicle power source;

an electromechanical actuator comprising a motor having a drive shaft, a drive gear coupled to said drive shaft, a driven gear coupled to said drive gear, said drive gear and said driven gear comprising a worm gear and a worm wheel in meshing engagement, and at least one planetary gear set coupled to said driven gear for driving an actuator output; and

a brake caliper coupled to said actuator output, said actuator output being configured for driving said brake caliper between an engaged position and a released position.

Claim 2 (canceled)

Claim 3 (currently amended) ~~The system according to claim 1,~~ An electrically actuated parking brake system comprising:

a vehicle power source;

an electromechanical actuator comprising a motor having a drive shaft, a drive gear coupled to said drive shaft, a driven gear coupled to said drive gear, wherein said drive gear and said driven gear are coupled via a drive belt, and at least one planetary gear set coupled to said driven gear for driving an actuator output; and

a brake caliper coupled to said actuator output, said actuator output being configured for driving said brake caliper between an engaged position and a released position.

Claim 4 (currently amended) ~~The system according to claim 1,~~ An electrically actuated parking brake system comprising:

a vehicle power source;

an electromechanical actuator comprising a motor having a drive shaft, a drive gear coupled to said drive shaft, a driven gear coupled to said drive gear, and at least one planetary gear set coupled to said driven gear for driving an actuator output said actuator further comprising a component isolator having a spring constant and a damping constant, said isolator coupled between said motor and a remainder of said actuator; and

a brake caliper coupled to said actuator output, said actuator output being configured for driving said brake caliper between an engaged position and a released position.

Claim 5 (currently amended) The system according to claim 4, wherein said component isolator comprises a first portion and a second portion, and said first portion is coupled to a first end of said motor and a said second portion is coupled to a second end of said motor.

Claim 6 (canceled)

Claim 7 (currently amended) ~~The system according to claim 6,~~ An electrically actuated parking brake system comprising:

a vehicle power source;

an electromechanical actuator comprising a motor having a drive shaft, a drive gear coupled to said drive shaft, a driven gear coupled to said drive gear, at least one planetary gear set coupled to said driven gear for driving an actuator output, and a sub-frame, said motor being mounted on said sub-frame, said actuator further comprising a component isolator having a spring constant and a damping constant, said isolator coupled between said motor and said sub-frame; and

a brake caliper coupled to said actuator output, said actuator output being configured for driving said brake caliper between an engaged position and a released position.

Claim 8 (currently amended) ~~The system according to claim 6,~~ An electrically actuated parking brake system comprising:

a vehicle power source;

an electromechanical actuator comprising a motor having a drive shaft, a drive gear coupled to said drive shaft, a driven gear coupled to said drive gear, and at least one planetary gear set coupled to said driven gear for driving an actuator output, and a sub-frame, said motor being mounted on said sub-frame and ~~wherein~~ said at least one planetary gear set is mounted on said sub-frame; and

a brake caliper coupled to said actuator output, said actuator output being configured for driving said brake caliper between an engaged position and a released position.

Claim 9 (original) The system according to claim 8, further comprising a component isolator having a spring constant and a damping constant, said isolator coupled between said at least one planetary gear set and said sub-frame.

Claim 10 (currently amended) ~~The system according to claim 6,~~ An electrically actuated parking brake system comprising:
a vehicle power source;
an electromechanical actuator comprising a motor having a drive shaft, a drive gear coupled to said drive shaft, a driven gear coupled to said drive gear, at least one planetary gear set coupled to said driven gear for driving an actuator output, and a sub-frame, said motor being mounted on said sub-frame, said actuator further comprising a sub-frame isolator having a spring constant and a damping constant, said isolator coupled between said sub-frame and a remainder of said actuator; and
a brake caliper coupled to said actuator output, said actuator output being configured for driving said brake caliper between an engaged position and a released position.

Claim 11 (currently amended) ~~The system according to claim 1,~~ An electrically actuated parking brake system comprising:
a vehicle power source;
an electromechanical actuator comprising a motor having a drive shaft, a drive gear coupled to said drive shaft, a driven gear coupled to said drive gear, and at least one planetary gear set coupled to said driven gear for driving an actuator output, and further comprising an actuator housing defining a motor cavity receiving at least a portion of said motor and a covering

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member disposed adjacent said motor cavity, thereby separating said motor from a remainder of said actuator; and

a brake caliper coupled to said actuator output, said actuator output being configured for driving said brake caliper between an engaged position and a released position.

Claim 12 (original) The system according to claim 11, wherein said covering member comprises a sub-frame.

Claim 13 (currently amended) An electro-mechanical actuator comprising:

a motor having a drive shaft;

a gear train coupled to said drive shaft for driving an output of said actuator, said gear train comprising a driven gear coupled to a planetary gear set; and

a sub-frame, said motor and ~~at least a portion of said drive train~~ at least one of said driven gear and said planetary gear set being mounted on said sub-frame.

Claim 14 (canceled)

Claim 15 (currently amended) The electromechanical actuator according to ~~claim~~ claim 13, further comprising an actuator housing defining a planetary gear set cavity receiving at least a portion of said planetary gear set, wherein cooperation between said housing and said sub-frame ~~separating~~ separate said planetary gear set from a remainder of said actuator.

Claim 16 (currently amended) ~~The electro-mechanical actuator according to claim~~

~~13,~~ An electro-mechanical actuator comprising:

a motor having a drive shaft;

a gear train coupled to said drive shaft for driving an output of said actuator;

a sub-frame, said motor and at least a portion of said drive train being mounted on said sub-frame; and

~~further comprising~~ an actuator housing, said housing defining a motor cavity receiving at least a portion of said motor, wherein cooperation between said housing and said sub-frame separate said motor from a remainder of said actuator.

Claim 17 (original) The electromechanical actuator according to claim 16, further comprising a first motor isolator having a spring constant and a damping constant, said isolator disposed between said sub-frame and said motor.

Claim 18 (original) The electromechanical actuator according to claim 17, further comprising a second motor isolator having a spring constant and a damping constant, said isolator disposed between said motor and said housing.

Claim 19 (currently amended) ~~The electromechanical actuator according to claim~~
~~13,~~ An electro-mechanical actuator comprising:

a motor having a drive shaft;

a gear train coupled to said drive shaft for driving an output of said actuator;

a sub-frame, said motor and at least a portion of said drive train being mounted on said sub-frame; and

~~further comprising~~ a sub-frame isolator having a spring constant and a damping constant, said isolator disposed between said sub-frame and an actuator housing.

Claim 20 (original) An electrically actuated parking brake system comprising:
a vehicle power source;

an actuator comprising a motor having a drive shaft coupled to a drive pulley, a driven pulley coupled to said drive pulley via a drive belt, and a planetary gear set coupled to said driven pulley for driving an output of said actuator, at least said motor and planetary gear set mounted on a sub-frame, and a component isolator having a spring constant and a damping constant disposed between said sub-frame and an actuator housing; and

a brake caliper coupled to said actuator output, said actuator output being configured for driving said brake caliper between an engaged position and a released position.

Claim 21 (original) The system according to claim 20, said actuator housing comprising a motor isolation cavity receiving at least a portion of said motor, wherein said sub-frame cooperates with said housing to separate said motor from at least one of said drive gear, driven gear and said planetary gear set.

Claim 22 (original) The system according to claim 20, further comprising a motor isolator having a spring constant and a damping constant, said motor isolator disposed between said motor and said mounted plate.

Claim 23 (original) A method of assembling an actuator comprising:
mounting a motor and a gear train to a sub-frame;
coupling said sub-frame to a portion of an actuator housing to at least partially enclose
said motor in a motor isolation cavity defined by said portion of said actuator housing and said
sub-frame.

Claim 24 (original) A method according to claim 23, said method further comprising:
coupling a second sub-frame to said sub-frame to enclose at least a portion of said gear train in a
cavity defined by said sub-frame and said second sub-frame.

Claim 25 (original) A method according to claim 24, said method further comprising:
coupling a second portion of said actuator housing to said portion of said actuator housing to
enclose said sub-frame and said second sub-frame at least partially within said actuator housing.

Claim 26 (original) A method according to claim 23, said method further comprising:
providing at least one motor isolation bushing between said portion of said actuator housing and
said motor.

Claim 27 (original) A method according to claim 23, said method further comprising:
providing a first motor isolation bushing between said portion of said actuator housing and said
motor; and
providing a second motor isolation bushing between said sub-frame and said motor.

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Amdt. dated March 14, 2005
In response to Office action mailed Dec. 14, 2004

Claim 28 (original) A method according to claim 23, said method further comprising:
providing at least one isolation bushing between said portion of said actuator housing and said
sub-frame.

Appln. No. 10/712,764
Amdt. dated March 14, 2005
In response to Office action mailed Dec. 14, 2004

AMENDMENTS TO THE DRAWINGS

The attached sheets of drawings include changes to FIG. 7 and FIG. 8. The first sheet, which includes only FIG. 7, replaces the original sheet, which also included only FIG. 7. In FIG. 7, previously omitted phantom lines, showing the assembly of the exploded view, have been added. The second sheet includes FIG. 6 and FIG. 8. In FIG. 8, the leader line from reference numeral 304 has been amended to indicate the worm wheel, referenced in the specification.

Attachment: 1 Annotated sheet showing changes to FIG. 8.
2 Replacement Sheets

REMARKS/ARGUMENTS

This amendment is being filed in response to the Office Action mailed December 14, 2004. As of the Office Action of December 14, 2004 claims 1-28 are pending with claims 23-28 being allowed, claims 1, 5-7, 9, 13, 15-18 and 20-22 standing rejected, and claims 2-4, 8, 10-12, 14 and 19 being objected to. Reexamination and reconsideration of the application as amended and in view of the remarks herein is respectfully requested.

As an initial matter, Applicants would like to thank the Examiner for recognizing the allowable subject matter of claims 2-5, 7-12, and 14-28.

Amendments to the Specification

The Cross-Reference to Related Applications, beginning on page 1, line 5, has been amended to indicate that the parent application Serial No. 10/061,940 has issued as U.S. Patent No. 6,736,233, as requested by the Examiner.

In the Brief Description of the Drawings, the description of FIG. 1, beginning on page 3, line 11, has been amended to properly recite "electronic parking brake actuator" as the basis for the acronym EPBA, as recited on page 4, lines 5-6. Accordingly, no new matter is believed entered. Applicants respectfully request that this objection be withdrawn upon reconsideration.

On page 5, the specification has been amended at line 29 to recite "printed circuit board" as the basis for the acronym PCB. PCB is the common acronym for printed circuit board and would be readily understood as such, especially in the context of the sentence, which reads, in part, "connector pins may provide electrical connections to a PCB, which may include motor control and position sensing electronics". Accordingly, no new matter is believed entered by this

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Amdt. dated March 14, 2005
In response to Office action mailed Dec. 14, 2004

amendment. Withdrawal of this objection in view of the foregoing amendment and comments is respectfully requested.

In the specification, the paragraph beginning on page 8, line 21 has been amended to replace the reference numerals 202b and 204b with the reference numerals 302b and 304b as shown in FIG. 8 of the drawings. No new matter is believed entered by this amendment.

In the specification the paragraph beginning on page 8, line 23 has been amended to remove the recital of reference numeral 900. No new matter is believed entered by this amendment.

Objections to the Drawings

FIG 7 has been amended to include phantom lines indicating the assembly of the exploded view, as requested by the Examiner. No new matter is believed entered by this amendment. In view of the amendment to the drawings, Applicants respectfully request that the objection to FIG. 7 be withdrawn upon reconsideration.

The drawings were also objected to because reference numerals 202b and 204b, recited in the specification, are not included in the drawings. The specification has been amended on page 8, line 21 to correct the minor clerical error whereby the reference numerals were misstated. Page 8, line 21 of the specification has been amended to properly recite “a worm gear 302b and worm weal 304b” as indicated in FIG. 8. No new matter is believed entered by this amendment. Applicants respectfully request that this objection to the drawings be withdrawn upon reconsideration. Furthermore, FIG. 8 has been amended to extend the leader line of reference numeral 304b to more clearly indicate the worm wheel. This aspect of the drawing was clearly shown in the originally filed informal drawings. Accordingly, no new matter is believed entered.

The drawings were also objected to because reference numeral 900, recited on page 8, line 25 of the specification is not in the drawings. The specification has been amended remove the recital of reference numeral 900 on page 8, line 25. The relevant drawing, FIG. 9, is a block diagram illustrating benefits of isolating a motor in an actuator. As such attributes of a motor, e.g., motor mass, motor inertia, etc., are described elements. The context of the drawing does not include the motor as an illustrated element. Applicants respectfully request that this object be withdrawn upon consideration of the amendment to the specification.

Finally, the drawings were objected to because FIG. 7 is turned sideways to the view in FIG. 3, and FIG. 6 is turned upside to the view of FIG. 3. Applicants respectfully submit that the orientations of the various figures have been selected to best illustrate various aspects of an actuator consistent with the disclosed subject matter. Additionally, Applicants believe that a person having ordinary skill in the art should be able to recognize the changes in orientation and appreciate the corresponding attributes of the various drawings. Applicants respectfully submit, therefore, that no changes to the drawings are necessitated by the selection of view chosen for the various figures. It is respectfully requested that this objection be withdrawn upon reconsideration by the Examiner.

Rejections Under 35 U.S.C. §112

Claim 5 was rejected as indefinite because it was unclear what “a first portion” and “a second portion” referred to. Claim 5 has been amended to recite, in part, “said component isolator comprises a first portion and a second portion”. Applicants believe that this amendment clarifies that “a first portion” and “a second portion” are first and second portions of the

Appln. No. 10/712,764
Amdt. dated March 14, 2005
In response to Office action mailed Dec. 14, 2004

component isolator. It is respectfully requested that this rejection be withdrawn upon consideration of the amendment to claim 5.

Claims 7 and 9 were rejected under 35 U.S.C. §112, second paragraph, for the stated reason that the term “component isolator” is unclear, particularly as to what the “component” is. Applicants submit that claim element “component isolator” is not a separable term. Rather a component isolator is an element “having a spring constant and a damping constant” as recited in claims 7 and 9. In the invention of claim 7 the component isolator is coupled between the motor and the sub-frame. In the invention of claim 9 the component isolator is coupled between at least one planetary gear set and the sub-frame. Applicants believe the term “component isolator” would be clear in view of the specification as filed. It is respectfully requested that the rejection of claims 7 and 9 under §112 be withdrawn upon reconsideration.

Claim 15 was rejected under 35 U.S.C. §112, second paragraph, as being an incomplete sentence. Claim 15 has been amended, in part, to replace the word “separating” with --separate--, as suggested by the Examiner. As amended, claim 15 forms a complete sentence. Applicants respectfully request that this rejection be withdrawn upon consideration of the foregoing amendment.

Claims 15 and 16 were also rejected for the asserted reason that it is unclear what is meant by “cooperation between said housing and said sub-frame separate said motor from a remainder of said actuator”. Applicants respectfully submit that claims 15 and 16 are clear in view of the common meaning of the words, e.g., the common meaning of cooperation being to work together, and in view of the specification which provides exemplary embodiments consistent with the claims.

Claim 13, upon which each of claims 15 and 16 ultimately depend, recites “an electro-mechanical actuator comprising a motor ... a gear train ... and a sub-frame”. Claim 16 further recites “an actuator housing ... defining a motor cavity receiving at least a portion of said motor” and further that “cooperation between said housing and said sub-frame separate said motor from a remainder of said actuator.” Accordingly, at least a portion of the motor is received in the cavity of the actuator housing and the housing and the sub-frame work together to separate the motor from the remainder of the actuator, i.e., from at least the gear train. For example, in the illustrative embodiment described on page 9, lines 5-10, a motor isolation cavity may be defined by a cavity defined by the main housing 301 and a cover to the cavity may be provided by the sub-frame 312, which may cover the top of the isolation cavity when installed in the housing.

In a similar manner to separation of the motor from the remainder of the actuator recited by claim 16, claim 15 recites a structure in which a planetary gear set of the actuator is separated from the remainder of the actuator. Claim 15 provides “an actuator housing defining a cavity ... receiving at least a portion of said planetary gear set”. Claim 15 further provides that “cooperation between said housing and said sub-frame separate said planetary gear set from a remainder of said actuator.” Accordingly, at least a portion of the planetary gear set is received in the cavity and the cavity and the sub-frame work together to separate the planetary gear set from the remainder of the actuator, i.e., from at least the motor.

In view of the foregoing, Applicants respectfully submit that the meaning of claims 15 and 16 are clear and understandable. Accordingly, Applicants respectfully request that the rejection of the claims under 35 U.S.C. §112, second paragraph, be withdrawn upon reconsideration.

Claim 17 was also rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Specifically, the Examiner found it unclear what part of the invention is the “first motor isolator”. As stated in claim 17, the first motor isolator is an element having a spring constant and a damping constant. In one embodiment consistent with the claimed invention, an isolator may “mechanically isolate[] the motor from the mass of the actuator housing 910, thereby reducing air born audible noise associated with motor vibration.” See, e.g., page 8, lines 23 through page 9, line 2. Accordingly consistent with the express language of the claim and the written description, the motor isolator of claim 17 is an element having a spring constant and a damping constant and is disposed between the sub-frame and the motor. Consistent with the disclosure, the isolator may reduce transmission of vibration from the motor to the remainder of actuator components. See, e.g., page 9, lines 11-18. In view of the foregoing, Applicants respectfully submit that the term “motor isolator” is clear in view of the express language of claim 17 and the written description. Withdrawal of this rejection upon further consideration is respectfully requested.

Finally, claim 20 was also rejected for the stated reason that it is not clear what is meant by component isolator. As discussed with respect to claims 7 and 9, a “component isolator” is an element “having a spring constant and a damping constant”. As indicated above, the spring constant and damping constant of the component isolator may reduce transmission of vibration from the isolated component to the remainder of actuator components. In view of the foregoing, Applicants respectfully submit that the meaning of the term “component isolator” in the context of claim 20, would be readily understood by one having skill in the art. Applicants, therefore, respectfully request that the rejection of claim 20 under 35 U.S.C. §112 be withdrawn upon reconsideration.

Claim Amendments

The claims have been amended throughout consistent with the Examiner's indication of the allowable subject matter of claims 2-4, 8, 10-12, 14, and 19. Independent claim 1 has been amended herein to incorporate the subject matter of claim 2, which the Examiner has indicated to be allowable. Independent claim 13 has been amended to incorporate the subject matter of claim 14, which the Examiner has indicated to be allowable. Claims 3, 4, 7, 8, 10, 11, 16, and 19 have all been rewritten in independent form. Accordingly, claims 1, 3, 4, 7, 8, 10, 11, 16, and 19 are all believed to be in condition for allowance. Furthermore, Applicants believe that the rejections of claims 5, 7, 9, 15-18, and 20-22 under 35 U.S.C. §112 are overcome for the reasons discussed above.

Rejections Under 35 U.S.C. §102

Claims 1, 6, and 13 were rejected under 35 U.S.C. §102(b) as being anticipated by Drennen et al. (U.S. Patent No. 6,412,610). Independent claim 1 has been amended to incorporate the subject matter of claim 2, which the Examiner has indicated to be allowable. Accordingly, claim 1, as amended, is believed to be novel over Drennen et al. Withdrawal of the rejection of claim 1 under 35 U.S.C. §102 in view of this amendment is respectfully requested.

Claim 6 been canceled herein, rendering the rejection under 35 U.S.C. §102 moot.

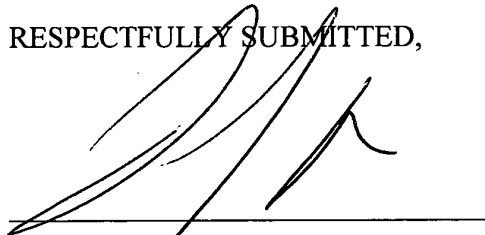
Claim 13 has been amended to incorporate the subject matter of claim 14, which that Examiner has indicated to be allowable. Accordingly, claim 13 is now believed to be novel over Drennen et al. Withdrawal of the rejection of claim 13 under 35 U.S.C. §102 in view of this amendment is respectfully requested.

Appln. No. 10/712,764
Amdt. dated March 14, 2005
In response to Office action mailed Dec. 14, 2004

Having overcome all of the outstanding rejections, it is respectfully submitted that the application is now in condition for allowance. Early and favorable action is respectfully solicited.

The Application has been amended herein to include eight (8) additional independent claims. Payment in the amount of \$1600 accompanies this response to provide for the fees associated with the additional independent claims. In the event that there are any fee deficiencies, or additional fees are payable, please charge, or credit any overpayment to, our Deposit Account No. 50-2121.

RESPECTFULLY SUBMITTED,

A handwritten signature in black ink, appearing to read 'Donald J. Perreault', is written over a horizontal line.

Donald J. Perreault, Reg. # 40,126
Attorney for Applicants
Grossman, Tucker, Perreault & Pflieger, PLLC
55 South Commercial Street
Manchester, NH 03101
Phone: (603)668-6560; Fax: (603)668-2970



Appl. No. 10/712,746
Amd. dated March 14, 2005
In response to Office action mailed Dec. 14, 2004
Annotated Sheet Showing Changes Made

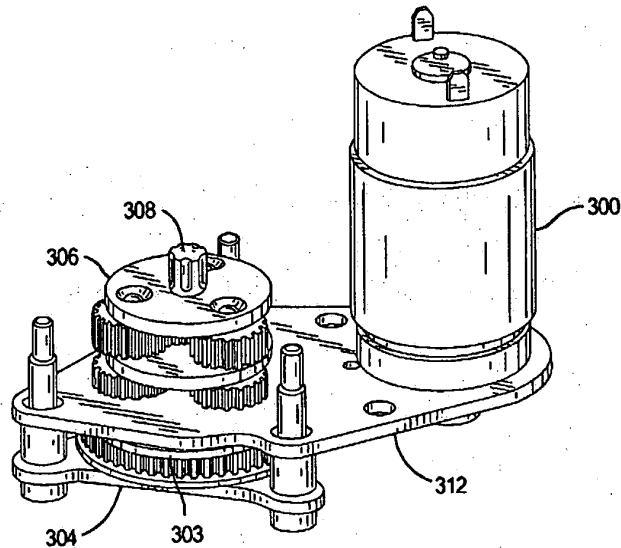


FIG. 6

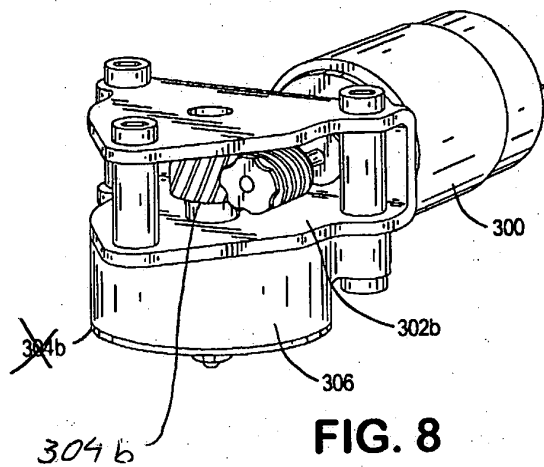
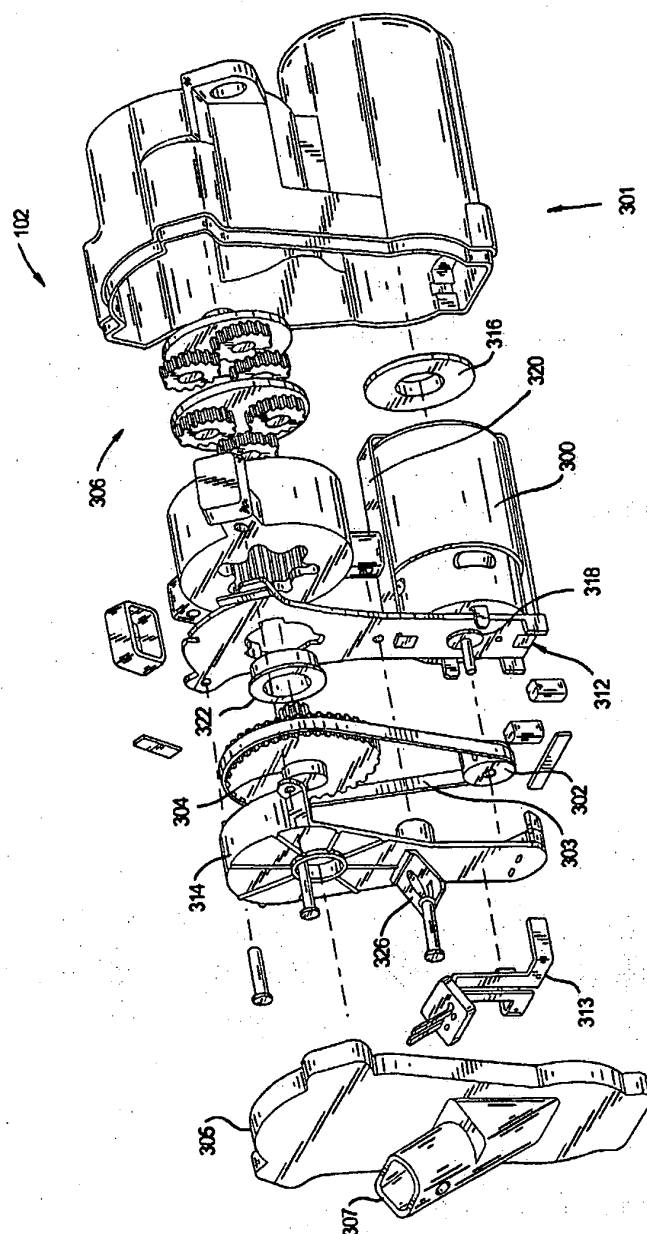


FIG. 8

FIG. 7



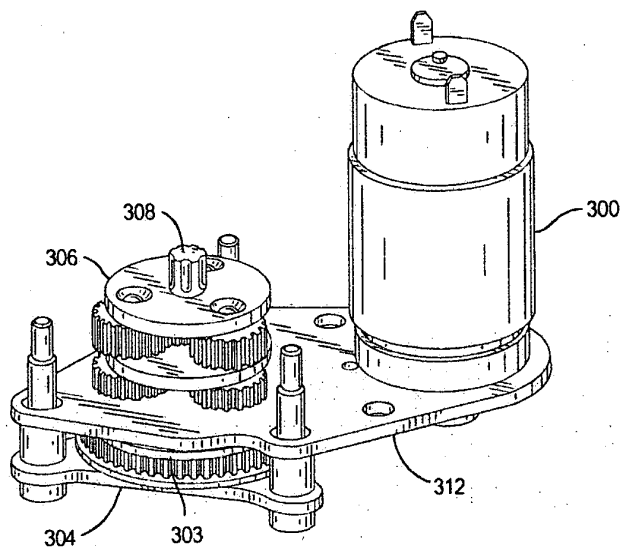


FIG. 6

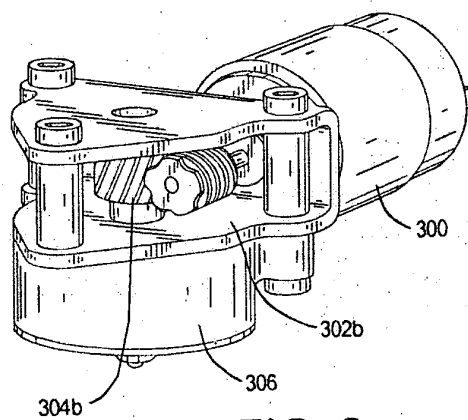


FIG. 8

TRANSMITTAL OF INFORMATION DISCLOSURE STATEMENT
(Under 37 CFR 1.97(b) or 1.97(c))

Docket No.
PCB110

In Re Application: Farmer, et al.

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/712,764	November 13, 2003		32047	3616	7399

Title: **ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE**

Payment of Fee

(Only complete if Applicant elects to pay the fee set forth in 37 CFR 1.17(p))

- ☐ A check in the amount of _____ is attached.
- ☐ The Director is hereby authorized to charge and credit Deposit Account No. 50-2121 as described below.
- ☐ Charge the amount of _____
- ☒ Credit any overpayment.
- ☒ Charge any additional fee required.
- ☐ Payment by credit card. Form PTO-2038 is attached.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

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I certify that this document and authorization to charge deposit account is being facsimile transmitted to the United States Patent and Trademark Office (Fax. No. _____)

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January 11, 2005

(Date)

Signature _____

Signature of Person Mailing Correspondence

Mary Boyd

Typed or Printed Name of Person Mailing Certificate _____

*This certificate may only be used if paying by deposit account.

Signature _____

Donald J. Perreault
Reg. No. 40,126
Grossman, Tucker, Perreault & Pfeiffer, PLLC
55 South Commercial Street
Manchester, NH 03101
603-668-6560

Dated: January 11, 2005

cc:

P10A/REV05

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2003

Application or Docket Number

10712764

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	28	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	28 minus 20 =	8
INDEPENDENT CLAIMS	4 minus 3 =	1
MULTIPLE DEPENDENT CLAIM PRESENT ☐		

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	03/16/05	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR
Total	25	Minus	** 28 =
Independent	12	Minus	*** 4 = 8
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR
Total	*	Minus	** =
Independent	*	Minus	*** =
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR
Total	*	Minus	** =
Independent	*	Minus	*** =
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐			

- * If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 - ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
 - *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
- The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SMALL ENTITY TYPE ☐

RATE	FEE
BASIC FEE	385.00
XS 9=	
X43=	
+145=	
TOTAL	

OR OTHER THAN SMALL ENTITY

RATE	FEE
BASIC FEE	770.00
XS18=	144
X86=	86
+290=	
TOTAL	1000

SMALL ENTITY TYPE ☐

RATE	ADDITIONAL FEE
XS 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

OR OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE
XS18=	
X86=	1600
+290=	
TOTAL ADDIT. FEE	1600

RATE	ADDITIONAL FEE
XS 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
XS18=	
X86=	
+290=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
XS 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
XS18=	
X86=	
+290=	
TOTAL ADDIT. FEE	

IFJ

TRANSMITTAL OF INFORMATION DISCLOSURE STATEMENT (Under 37 CFR 1.97(b) or 1.97(c))					Docket No. PCB110	
In Re Application Of: Farmer, et al.						
Application No. 10/712,764	Filing Date November 13, 2003	Examiner Eric D. Culbreth	Customer No. 32047	Group Art Unit 3616	Confirmation No. 7399	
Title: ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE						
Address to: Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450						
37 CFR 1.97(b)						
1. ☐ The Information Disclosure Statement submitted herewith is being filed within three months of the filing of a national application other than a continued prosecution application under 37 CFR 1.53(d); within three months of the date of entry of the national stage as set forth in 37 CFR 1.491 in an international application; before the mailing of a first Office Action on the merits, or before the mailing of a first Office Action after the filing of a request for continued examination under 37 CFR 1.114.						
37 CFR 1.97(c)						
2. ☒ The Information Disclosure Statement submitted herewith is being filed after the period specified in 37 CFR 1.97(b), provided that the Information Disclosure Statement is filed before the mailing date of a Final Action under 37 CFR 1.113, a Notice of Allowance under 37 CFR 1.311, or an Action that otherwise closes prosecution in the application, and is accompanied by one of:						
☒ the statement specified in 37 CFR 1.97(e);						
OR						
☐ the fee set forth in 37 CFR 1.17(p).						

TRANSMITTAL OF INFORMATION DISCLOSURE STATEMENT (Under 37 CFR 1.97(b) or 1.97(c))	Docket No. PCB110
--	-----------------------------

In Re Application: **Farmer, et al.**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/712,764	November 13, 2003	Eric D. Culbreth	32047	3616	7399

Title: **ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE**

Payment of Fee

(Only complete if Applicant elects to pay the fee set forth in 37 CFR 1.17(p))

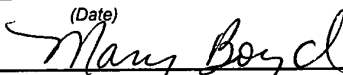
- ☐ A check in the amount of _____ is attached.
- ☒ The Director is hereby authorized to charge and credit Deposit Account No. **50-2121** as described below.
- ☐ Charge the amount of _____
☒ Credit any overpayment.
☒ Charge any additional fee required.
- ☐ Payment by credit card. Form PTO-2038 is attached.

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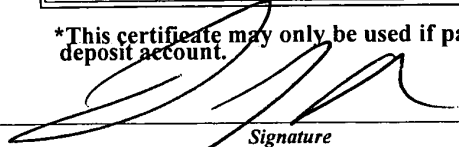
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June 6, 2005 _____ (Date)
 Signature of Person Mailing Correspondence
Mary Boyd Typed or Printed Name of Person Mailing Certificate

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Signature

Dated: June 6, 2005

Donald J. Perreault
Reg. No. 40,126
Grossman, Tucker, Perreault & Pfleger, PLLC
55 South Commercial Street
Manchester, NH 03101
603-668-6560

CC:

**STATEMENT UNDER 37 CFR 1.97(e) ACCOMPANYING
INFORMATION DISCLOSURE STATEMENT**

Docket No.
PCB110

In Re Application Of: **Farmer, et al.**

Application No.
10/712,764

Filing Date
November 13, 2003

Examiner
Eric D. Culbreth

Customer No.
32047

Group Art Unit
3616

Confirmation No.
7399

Invention: **ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE**

COMMISSIONER FOR PATENTS:

This is a statement under the provisions of 37 CFR 1.97(e) in the above-identified application.

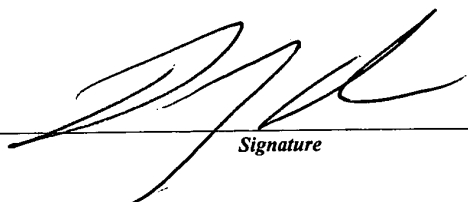
Check applicable statement herebelow:

Statement Under 37 CFR 1.97(e)(1)

- ☒ Each item of information contained in the accompanying Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the Information Disclosure Statement.

Statement Under 37 CFR 1.97(e)(2)

- ☐ No item of information contained in the accompanying Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned person, after making reasonable inquiry, no item of information contained in the accompanying 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.


Signature

Dated: **June 6, 2005**

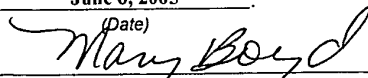
Donald J. Perreault
Reg. No. 40,126
Grossman, Tucker, Perreault & Pflieger, PLLC
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June 6, 2005

(Date)



Signature of Person Mailing Correspondence

Mary Boyd

Typed or Printed Name of Person Mailing Correspondence

cc:

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
DONALD J. PERREAULT,
GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC
55 SOUTH COMMERCIAL STREET
MANCHESTER, NH 03101

PCT

RECEIVED

MAR 07 2005

GROSSMAN, TUCKER,
PERREAULT & PFLEGER, PLLC

WRITTEN OPINION

(PCT Rule 66)

Applicant's or agent's file reference PCB110PCT		Date of Mailing (day/month/year) 04 MAR 2005
International application No. PCT/US03/36245		REPLY DUE within 2 months/days from the above date of mailing
International filing date (day/month/year) 13 November 2003 (13.11.2003)	Priority date (day/month/year) 13 November 2002 (13.11.2002)	
International Patent Classification (IPC) or both national classification and IPC IPC(7): B60K 28/10 and US Cl.: 180/275		
Applicant STONERIDGE CONTROL DEVICES, INC.		

1. This written opinion is the first (first, etc.) drawn by this International Preliminary Examining Authority.
2. This opinion contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2 (a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☒ Certain defects in the international application
 - VIII ☒ Certain observations on the international application
3. The applicant is hereby **invited to reply** to this opinion.

When? See the time limit indicated above. ~~The applicant may, before the expiration of that time limit, request this Authority to grant an extension. See rule 66.2(d).~~

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.
For an informal communication with the examiner, see Rule 66.6

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.
4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 13 March 2005 (13.03.2005)

Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703)305-3230	Authorized officer Paul Dickson <i>[Signature]</i> Telephone No. 703-308-1113
--	---

Form PCT/IPEA/408 (cover sheet)(July 1998)

WRITTEN OPINION

International application No.

PCT/US03/36245

I. Basis of the opinion

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☒ the description:
 pages 1-13, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____
- ☒ the claims:
 pages 14-18, as originally filed
 pages NONE, as amended (together with any statement) under Article 19
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____
- ☒ the drawings:
 pages 1-6, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages NONE, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/fig NONE

5. ☐ This opinion has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed."

WRITTEN OPINION

International application No.
PCT/US03/36245

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims <u>2-5, 7-12, 14-28</u>	YES
	Claims <u>1, 6, 13</u>	NO
Inventive Step (IS)	Claims <u>2-5, 7-12, 14-28</u>	YES
	Claims <u>1, 6, 13</u>	NO
Industrial Applicability (IA)	Claims <u>1-28</u>	YES
	Claims <u>NONE</u>	NO

2. CITATIONS AND EXPLANATIONS

Claims 1, 6 and 13 lack novelty under PCT Article 33(2) as being anticipated by DRENNAN et al.

DRENNAN et al disclose a brake system comprising a vehicle power source (for running the vehicle and motor 28), and an actuator comprising motor 28 with a drive shaft 110, drive gear 30 coupled to the drive shaft, driven gear 36 coupled to the drive gear, and at least one planetary gear set 42 coupled to the driven gear for driving an actuator output at 46, and brake caliper 22, 24 coupled to the output, the output configured for driving the caliper between an engaged and released position. The recitation in the preamble of claim 1 of a parking brake system is a functional statement of intended use, as no structure specific to a parking brake is recited in the body of the claim. The actuator comprises motor 28 mounted on sub-frame or housing 10 (claim 6). Gears 32 are a gear train coupled to the drive shaft for driving an output of the actuator as broadly recited, and the motor 28 and at least a portion of gear train 32 are mounted on sub-frame 10 (claim 13).

Claims 2-5, 7-12, and 14-28 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest in combination with the other elements recited (claims 2-5, 7, 10 and 20-22) the drive and driven gear comprising a worm gear and a worm wheel or being coupled via a driven belt, nor the actuator comprising a component isolator coupled between the motor and a remainder of the actuator and having a spring constant, nor (claims 8-9 and 11-12 and 16-19) at least one planetary gear mounted on the sub-frame and an actuator housing defining a motor cavity and a covering member adjacent the cavity and separating the motor from a remainder of the actuator, nor (claims 14-15 and 23-28) the gear train comprising a driven gear coupled to a planetary gear set with at least one of the driven gear and planetary gear set mounted on the sub-frame, and coupling the sub-frame to a portion of an actuator housing to at least partially enclose the motor in a motor isolation cavity defined by the portion of the actuator housing and the sub-frame.

Claims 1-28 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

----- NEW CITATIONS -----

WRITTEN OPINION

International application No.

PCT/US03/36245

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

The drawings are objected to under PCT Rule 66.2(a)(iii) as containing the following defect(s) in the form or content thereof: Reference numerals 202b and 204b (page 8, line 19) are not on the drawings. Reference numeral 900 (page 8, line 24) is not on the drawings.

The description is objected to as containing the following defect(s) under PCT Rule 66.2(a)(iii) in the form or contents thereof: On page 2, lines 14-15 "provide a desirable affect to audible noise" is unclear (it is an incomplete sentence). On page 5, line 30 it is not clear what is meant by PCB.

Form PCT/IPEA/408 (Box VII) (July 1998)

WRITTEN OPINION

International application No.

PCT/US03/36245

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the questions whether the claims are fully supported by the description, are made:

Claims 5, 7, 9, 15-18 and 20-22 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claims are indefinite for the following reason(s):

In claim 5, "a first portion" and "a second portion" are not clear (i.e., a first and second portion of what?).

In claims 7 and 9 "a component isolator" is unclear (what is the component).

Claim 15 is unclear because it is an incomplete sentence (apparently, in line 4 "separating" should be "separate").

Also in claims 15 and 16, it is not clear what is meant by "cooperation between said housing and said sub-frame separate said motor from a remainder of said actuator".

In claim 17, it is not clear what part of the invention as disclosed is the "first motor isolator".

In claim 20, line 6, it is not clear what is meant by "component isolator" as above.

WRITTEN OPINION

International application No.
PCT/US03/36245

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

TIME LIMIT:

The time limit set for response to a Written Opinion may not be extended. 37 CFR 1.484(d). Any response received after the expiration of the time limit set in the Written Opinion will not be considered in preparing the International Preliminary Examination Report.

PATENT COOPERATION TREATY

M

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
DONALD J. PERREAULT,
GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC
55 SOUTH COMMERCIAL STREET
MANCHESTER, NH 03101

RECEIVED

MAY 23 2005

GROSSMAN, TUCKER,
PERREAULT & PFLEGER, PLLC

PCT

NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing
(day/month/year)

18 MAY 2005



Applicant's or agent's file reference

PCB110PCT

IMPORTANT NOTIFICATION

International application No.

International filing date (day/month/year)

Priority date (day/month/year)

PCT/US03/36245

13 November 2003 (13.11.2003)

13 November 2002 (13.11.2002)

Applicant

STONERIDGE CONTROL DEVICES, INC.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/ US

Mail Stop PCT, Attn: IPEA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
Facsimile No. (703) 305-3230

Authorized officer

Paul Dickson

Telephone No. 571/272-3600

[Signature]

Form PCT/IPEA/416 (January 2004)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCB110PCT	FOR FURTHER ACTION See Form PCT/IPEA/416																									
International application No. PCT/US03/36245	International filing date (<i>day/month/year</i>) 13 November 2003 (13.11.2003)	Priority date (<i>day/month/year</i>) 13 November 2002 (13.11.2002)																								
International Patent Classification (IPC) or national classification and IPC IPC(7): B60K 28/10 and US Cl.: 180/275																										
Applicant STONERIDGE CONTROL DEVICES, INC.																										
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☐ (<i>sent to the applicant and to the International Bureau</i>) a total of <u> </u> sheets, as follows: ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. b. ☐ (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) <u> </u>, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions). 4. This report contains indications relating to the following items: <table style="width: 100%; border: none;"> <tr> <td style="width: 10%;">☒</td> <td style="width: 20%;">Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td>☐</td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td>☐</td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td>☐</td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td>☒</td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td>☐</td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td>☒</td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td>☒</td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>			☒	Box No. I	Basis of the report	☐	Box No. II	Priority	☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	☐	Box No. IV	Lack of unity of invention	☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	☐	Box No. VI	Certain documents cited	☒	Box No. VII	Certain defects in the international application	☒	Box No. VIII	Certain observations on the international application
☒	Box No. I	Basis of the report																								
☐	Box No. II	Priority																								
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability																								
☐	Box No. IV	Lack of unity of invention																								
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement																								
☐	Box No. VI	Certain documents cited																								
☒	Box No. VII	Certain defects in the international application																								
☒	Box No. VIII	Certain observations on the international application																								
Date of submission of the demand 10 June 2004 (10.06.2004)	Date of completion of this report 11 May 2005 (11.05.2005)																									
Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Paul Dickson <i>[Signature]</i> Telephone No. 571/272-3600																									

Form PCT/IPEA/409 (cover sheet)(January 2004)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US03/36245

Box No. 1 Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☒ the international application as originally filed/furnished
- ☒ the description:
pages 1-13 as originally filed/furnished
pages* NONE received by this Authority on _____
pages* NONE received by this Authority on _____
- ☒ the claims:
pages 14-18 as originally filed/furnished
pages* NONE as amended (together with any statement) under Article 19
pages* NONE received by this Authority on _____
pages* NONE received by this Authority on _____
- ☒ the drawings:
pages 1-6 as originally filed/furnished
pages* NONE received by this Authority on _____
pages* NONE received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

Form PCT/IPEA/409 (Box No. 1) (January 2004)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US03/36245**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims <u>2-5, 7-12, 14-28</u>	YES
	Claims <u>1, 6, 13</u>	NO
Inventive Step (IS)	Claims <u>2-5, 7-12, 14-28</u>	YES
	Claims <u>1, 6, 13</u>	NO
Industrial Applicability (IA)	Claims <u>1-28</u>	YES
	Claims <u>NONE</u>	NO

2. Citations and Explanations (Rule 70.7)

Claims 1, 6, and 13 lack novelty under PCT Article 33(2) as being anticipated by DRENNAN et al.

DRENNAN et al disclose a brake system comprising a vehicle power source (for running the vehicle and motor 28), and an actuator comprising motor 28 with a drive shaft 110, drive gear 30 coupled to the drive shaft, driven gear 36 coupled to the drive gear, and at least one planetary gear set 42 coupled to the driven gear for driving an actuator output at 46, and brake caliper 22, 24 coupled to the output, the output configured for driving the caliper between an engaged and released position. The recitation in the preamble of claim 1 of a parking brake system is a functional statement of intended use, as no structure specific to a parking brake is recited in the body of the claim. The actuator comprises motor 28 mounted on sub-frame or housing 10 (claim 6). Gears 32 are a gear train coupled to the drive shaft for driving an output of the actuator as broadly recited, and the motor 28 and at least a portion of gear train 32 are mounted on sub-frame 10 (claim 13).

Claims 2-5, 7-12 and 14-28 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest in combination with the other elements recited (claims 2-5, 7, 10 and 20-22) the drive and driven gear comprising a worm gear and a worm wheel or being coupled via a driven belt, nor the actuator comprising a component isolator coupled between the motor and a remainder of the actuator and having a spring constant, nor (claims 8-9 and 11-12 and 16-19) at least one planetary gear mounted on the sub-frame and an actuator housing defining a motor cavity and a covering member adjacent the cavity and separating the motor from a remainder of the actuator, nor (claims 14-15 and 23-28) the gear train comprising a driven gear coupled to a planetary gear set with at least one of the driven and planetary gear set mounted on the sub-frame, and coupling the sub-frame to a portion of an actuator housing to at least partially enclose the motor in a motor isolation cavity defined by the portion of the actuator housing and the sub-frame.

Claims 1-28 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

----- NEW CITATIONS -----

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US03/36245

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

The drawings are objected to under PCT Rule 66.2(a)(iii) as containing the following defect(s) in the form or content thereof:

Reference numerals 202b and 204b (page 8, line 19) are not on the drawings.

Reference numeral 900 (page 8, line 24) is not on the drawings.

The description is objected to as containing the following defect(s) under PCT Rule 66.2(a)(iii) in the form or contents thereof: On page 2, lines 14-15 "provide a desirable affect to audible noise" is unclear (it is an incomplete sentence).

On page 5, line 30 it is not clear what is meant by PCB.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US03/36245

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 5, 7, 9, 15-18 and 20-22 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claims 5, 7, 9, 15-18 and 20-22 are indefinite for the following reason(s):

In claim 5, "a first portion" and "a second portion" are not clear (i.e., a first and second portion of what?).

In claims 7 and 9 "a component isolator" is unclear (what is the component).

Claim 15 is unclear because it is an incomplete sentence (apparently, in line 4 "separating" should be "separate").

Also in claims 15 and 16, it is not clear what is meant by "cooperation between said housing and said sub-frame separate said motor from a remainder of said actuator".

In claim 17, it is not clear what part of the invention as disclosed is the "first motor isolator".

In claim 20, line 6, it is not clear what is meant by "component isolator" as above.



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

NOTICE OF ALLOWANCE AND FEE(S) DUE

32047 7590 06/24/2005

GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC
55 SOUTH COMMERICAL STREET
MANCHESTER, NH 03101

EXAMINER

CULBRETH, ERIC D

ART UNIT

PAPER NUMBER

3616

DATE MAILED: 06/24/2005

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,764	11/13/2003	William Farmer	PCB110	7399

TITLE OF INVENTION: ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$300	\$1700	09/26/2005

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHT. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPO PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THE STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee Transmittal and pay the PUBLICATION FEE (if required) and 1 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issued on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is the patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail**

**Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
(703) 746-4000**

or **Fax**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

32047 7590 06/24/2005

**GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC
55 SOUTH COMMERICAL STREET
MANCHESTER, NH 03101**

Note: A certificate of mailing can only be used for domestic mailings of Fee(s) Transmittal. This certificate cannot be used for any other accompany papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (703) 746-4000, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,764	11/13/2003	William Farmer	PCB110	7399

TITLE OF INVENTION: ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$300	\$1700	09/26/2005

EXAMINER	ART UNIT	CLASS-SUBCLASS
CULBRETH, ERIC D	3616	180-334000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

- ☐ A check in the amount of the fee(s) is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above. NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other part interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. 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 12 minutes to complete, including gathering, preparing, 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 14 Alexandria, Virginia 22313-1450.

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.



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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.
10/712,764	11/13/2003	William Farmer	PCB110	7399
32047	7590	06/24/2005	EXAMINER	
GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC 55 SOUTH COMMERCIAL STREET MANCHESTER, NH 03101			CULBRETH, ERIC D	
			ART UNIT	PAPER NUMBER
			3616	

DATE MAILED: 06/24/2005

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office Patent Legal Administration at (571) 272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

Notice of Allowability	Application No.	Applicant(s)	
	10/712,764	FARMER ET AL.	
	Examiner	Art Unit	
	Eric D. Culbreth	3616	

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3/14/05 amendment.
2. ☒ The allowed claim(s) is/are 1,3-5,7-13 and 15-28.
3. ☒ The drawings filed on 14 March 2005 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. ☐ Notice of References Cited (PTO-892) | 5. ☐ Notice of Informal Patent Application (PTO-152) |
| 2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date <u>1/13/05</u> | 7. ☒ Examiner's Amendment/Comment |
| 4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. ☒ Examiner's Statement of Reasons for Allowance |
| | 9. ☒ Other <u>Approved Drawing Correction</u> . |

AS

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The application has been amended as follows:

- a. In claim 4, line 6, a comma was inserted after "output" for grammatical clarity.
 - b. In claim 8, line 7 "is" was changed to: --being--, for grammatical clarity.
2. The following changes to the drawings have been approved by the examiner and agreed upon by applicant: In the replacement sheet filed 3/14/05, the lead line of reference numeral 302b in Figure 8 was extended to touch the worm gear as shown in the attached figures. In order to avoid abandonment of the application, applicant must make these above agreed upon drawing changes.
3. The following is an examiner's statement of reasons for allowance: Regarding the 112 rejections of "motor isolator" and "component isolator" in the first Office Action, upon reconsideration and in view of applicant's remarks filed 3/14/05, the terms meet the requirements of 35 USC 112.

Art Unit: 3616

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric D. Culbreth whose telephone number is 571/272-6668. The examiner can normally be reached on Monday-Thursday, 9:30-7:00 alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Dickson can be reached on 571/272-6669. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Eric D Culbreth
Primary Examiner
Art Unit 3616

ec

Approved
EC
6/6/05

Appl. No. 10/712,764
Amd. dated March 14, 2005
In response to Office action mailed Dec. 14, 2004
Replacement Sheet

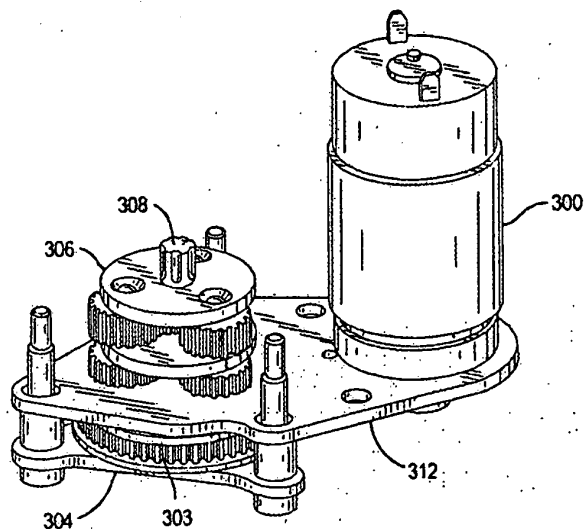


FIG. 6

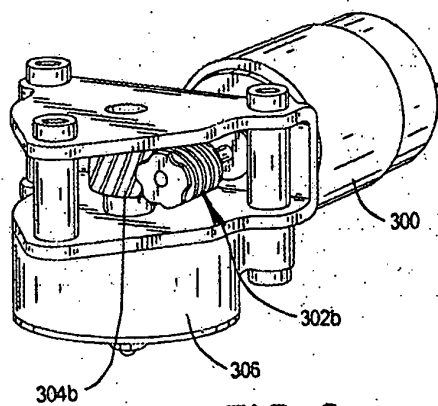
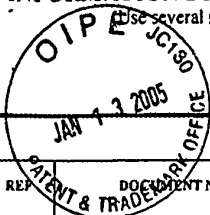


FIG. 8

INFORMATION DISCLOSURE CITATION

(Use several sheets if necessary)



Docket Number (optional)

PCB110

Application No.

10/712,764

Applicants(s)

Farmer, et al.

Filing Date

November 13, 2003

Group Art Unit

3616

U.S. PATENT DOCUMENTS

*Examiner Initial	REF	DOCUMENT NUMBER	DATE	NAME	CLASS/SUBCLASS	FILING DATE IF APPROPRIATE
EC	1	6,189,409 ✓	02-20-2001	Neag, et al.	74/512	
EC	2	5,605,072 ✓	02-25-1997	Schmidt, et al.	74/435	

FOREIGN PATENT DOCUMENTS

	REF	DOCUMENT NUMBER	DATE	COUNTRY	CLASS/SUBCLASS	TRANSLATION	
						YES	NO
EC	3	2,184,487 ✓	06-1987	United Kingdom	74/513		
EC	4	3,331,597 ✓	03-1985	Germany	74/513		
EC	5	2-116911 ✓	05-1990	Japan	74/594.3		
EC	6	1,283,644 ✓	12-1961	France	74/84		
EC	7	916,106 ✓	01-1963	United Kingdom	F06h		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER

Eric Culbreth

DATE CONSIDERED

6/6/05

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

Search Notes

Application/Control No.

10/712,764

Examiner

Eric D. Culbreth

Applicant(s)/Patent under
Reexamination

FARMER ET AL.

Art Unit

3616

SEARCHED

Class	Subclass	Date	Examiner
180	275	6/6/2005	EC
188	72.1,158		
188	162		

INTERFERENCE SEARCHED

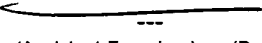
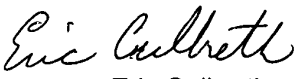
Class	Subclass	Date	Examiner
180	275	6/6/2005	EC
188	72.1,158		
188	162		

**SEARCH NOTES
(INCLUDING SEARCH STRATEGY)**

	DATE	EXMR

Issue Classification 	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/712,764	FARMER ET AL.	
	Examiner	Art Unit	
	Eric D. Culbreth	3616	

ISSUE CLASSIFICATION									
ORIGINAL			CROSS REFERENCE(S)						
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)						
180	275	188	162						
INTERNATIONAL CLASSIFICATION									
B	6 0 T	7/02							
		/							
		/							
		/							
		/							

 (Assistant Examiner) (Date)		 Eric Culbreth (Primary Examiner)		Total Claims Allowed: 25	
 (Legal Instruments Examiner) (Date)		6/6/05 (Date)		O.G. Print Claim(s) 1	O.G. Print Fig. 4,6

☐ Claims renumbered in the same order as presented by applicant										☐ CPA		☐ T.D.		☐ R.1.47	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		31		61		91		121		151		181		
	2		32		62		92		122		152		182		
2	3		33		63		93		123		153		183		
3	4		34		64		94		124		154		184		
4	5		35		65		95		125		155		185		
	6		36		66		96		126		156		186		
5	7		37		67		97		127		157		187		
6	8		38		68		98		128		158		188		
7	9		39		69		99		129		159		189		
8	10		40		70		100		130		160		190		
9	11		41		71		101		131		161		191		
10	12		42		72		102		132		162		192		
11	13		43		73		103		133		163		193		
	14		44		74		104		134		164		194		
12	15		45		75		105		135		165		195		
13	16		46		76		106		136		166		196		
14	17		47		77		107		137		167		197		
15	18		48		78		108		138		168		198		
16	19		49		79		109		139		169		199		
17	20		50		80		110		140		170		200		
18	21		51		81		111		141		171		201		
19	22		52		82		112		142		172		202		
20	23		53		83		113		143		173		203		
21	24		54		84		114		144		174		204		
22	25		55		85		115		145		175		205		
23	26		56		86		116		146		176		206		
24	27		57		87		117		147		177		207		
25	28		58		88		118		148		178		208		
	29		59		89		119		149		179		209		
	30		60		90		120		150		180		210		



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BIBDATASHEET

CONFIRMATION NO. 7399

Bib Data Sheet

SERIAL NUMBER 10/712,764	FILING DATE 11/13/2003 RULE	CLASS 180	GROUP ART UNIT 3616	ATTORNEY DOCKET NO. PCB110
-----------------------------	---------------------------------------	--------------	------------------------	----------------------------------

APPLICANTS

William Farmer, Acton, MA;
 Gary Kinnear, Weymouth, MA;
 Thomas P. Schregardus, Somerville, MA; Yuly Yanishevsky, Marblehead, MA;

EC 12/8/04

** CONTINUING DATA *****

This application is a CIP of 10/061,940 02/01/2002 PAT 6,736,233
 and claims benefit of 60/426,044 11/13/2002
 and claims benefit of 60/467,993 05/05/2003

None EC 12/8/04

** FOREIGN APPLICATIONS *****

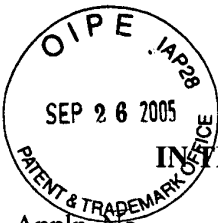
IF REQUIRED, FOREIGN FILING LICENSE GRANTED
 ** 02/10/2004

Foreign Priority claimed ☐ yes ☒ no	STATE OR COUNTRY MA	SHEETS DRAWING 7	TOTAL CLAIMS 28	INDEPENDENT CLAIMS 4
35 USC 119 (a-d) conditions met ☐ yes ☒ no ☐ Met after Allowance <i>EC</i>				
Verified and Acknowledged Examiner's Signature <i>Eric G. Galt</i> Initials <i>EC</i>				

ADDRESS
 32047
 GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC
 55 SOUTH COMMERCIAL STREET
 MANCHESTER, NH
 03101

TITLE
 Electro-mechanical actuator for an electrically actuated parking brake

FILING FEE	FEES: Authority has been given in Paper	☐ All Fees
		☐ 1.16 Fees (Filing)



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appln. No. : 10/712,764
For : Electro-Mechanical Actuator For An Electrically Actuated
Parking Brake
Applicant : William Farmer et al.
Filed : November 13, 2003
Art Unit : 3616
Examiner : Eric D Culbreth
Confirmation No. : 7399
Docket : PCB110
Customer No. : 32047

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on September 22, 2005, at Manchester, New Hampshire.

By

April Davis

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AFTER ALLOWANCE
PURSUANT TO 37 CFR 1.312

Sir:

This Amendment is in response to the Examiner's Amendment and Notice of Allowance mailed June 24, 2005, and is being filed along with payment of the issue fee. Please amend the above-identified application as follows:

Amendments to the Drawings begin on page 2 of this paper and includes an attached replacement sheet.

Remarks begin of page 3 of this paper.

An **Appendix** including an annotated drawing sheet and amended drawing figures is attached following page 3 of this paper.

Appln. No. 10/712,764

Amdt. Under 37 CFR 1.312 dated September 22, 2005

In response to Notice of Allowance mailed June 24, 2005

AMENDMENTS TO THE DRAWINGS

The attached sheets of drawings include changes to FIG. 8. In FIG. 8, the leader line from reference numeral 302b has been extended to indicate the worm gear, referenced in the specification

Attachment: 1 Annotated sheet showing changes to FIG. 8.
2 Replacement Sheet including FIGS. 6 and 8.

Appln. No. 10/712,764

Amdt. Under 37 CFR 1.312 dated September 22, 2005

In response to Notice of Allowance mailed June 24, 2005

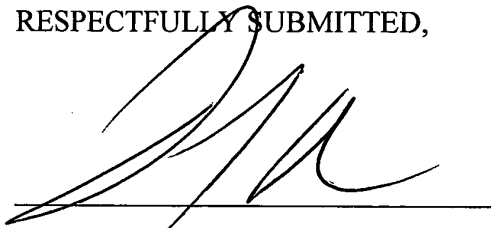
REMARKS

The Examiner's Amendment of June 24, 2005 has been carefully considered. Applicants note, with appreciation, the Examiner's correction of the grammatical errors in claims 4 and 6. FIG. 8 has been amended, as required by the Examiner, to extend the leader line of reference 302b to touch the worm gear. This amendment is reflected in the Annotated Sheet, as well as in the Replacement Sheet, accompanying this paper. No new matter has been added.

The Amendments made herein involve formalities and do not change the scope of the claims. Entry of the present amendment is, therefore, respectfully requested.

In the event the Examiner desires personal contact for further disposition of this case, the Examiner is invited to call the undersigned attorney at 603-668-6560.

RESPECTFULLY SUBMITTED,

A handwritten signature in black ink, appearing to read 'D. Perreault', is written over a horizontal line.

Donald J. Perreault, Reg. # 40,126

Attorney for Applicants

Grossman, Tucker, Perreault & Pfleger, PLLC

55 South Commercial Street

Manchester, NH 03101

Phone: (603)668-6560; Fax: (603)668-2970



Appln. No. 10/712,764
Amd. Under 37 CFR 1.312 dated August 23, 2005
In response to Notice of allowance mailed June 24, 2005

Annotated Sheet Showing Changes Made

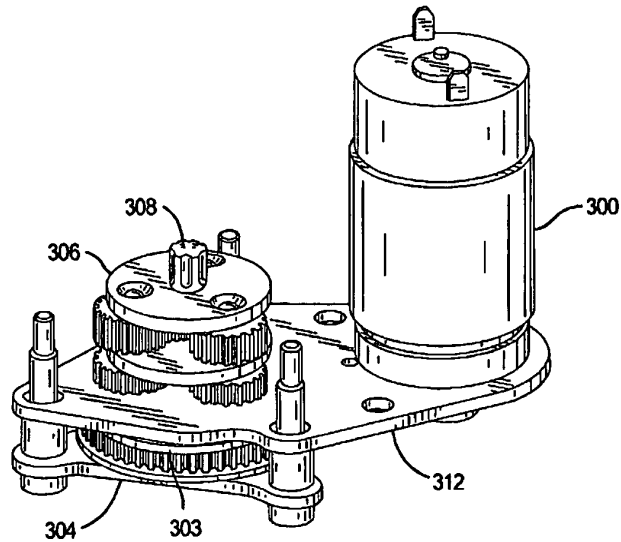


FIG. 6

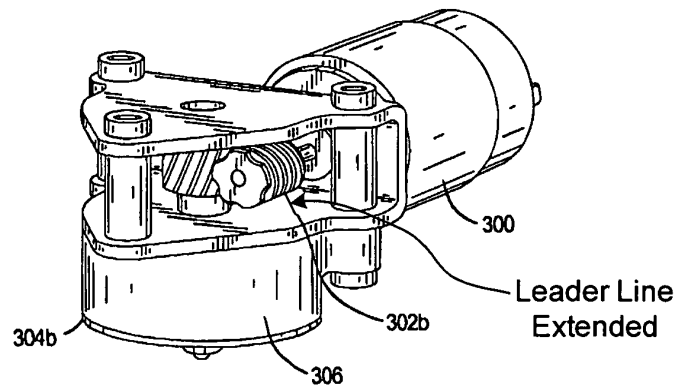


FIG. 8



Appln. No. 10/712,764
Amd. Under 37 CFR 1.312 dated August 23, 2005
In response to Notice of allowance mailed June 24, 2005

Replacement Sheet

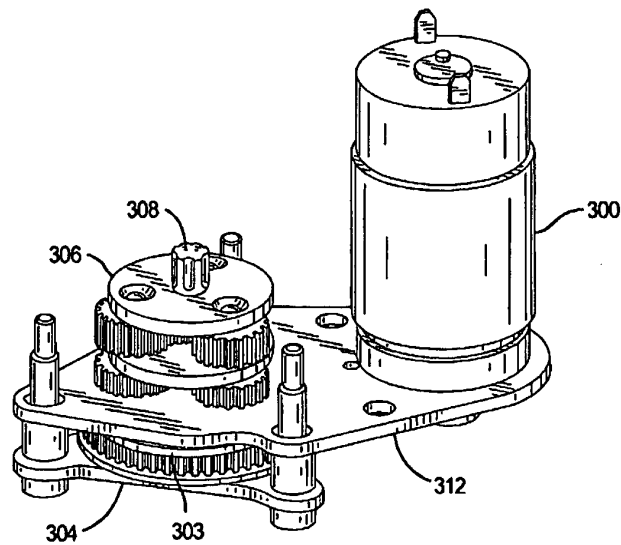


FIG. 6

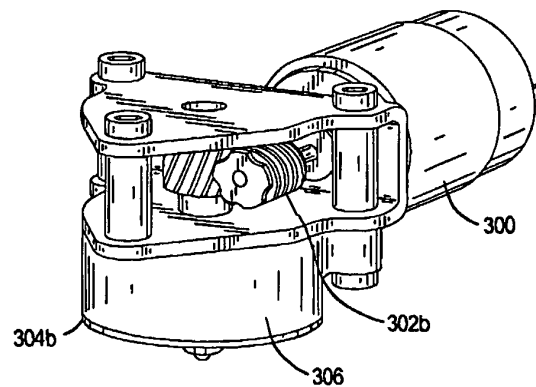


FIG. 8

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: MailMail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

or Fax (703) 746-4000

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address indicated on the form below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

32047 7590 06/24/2005

GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC
55 SOUTH COMMERICAL STREET
MANCHESTER, NH 03101

09/27/2005 HDESTA2 00000036 10712764

01 FC:1501 1400.00 OP
02 FC:1504 300.00 OP

Note: A certificate of mailing can only be used for domestic mailings of Fee(s) Transmittal. This certificate cannot be used for any other accompany papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (703) 746-4000, on the date indicated below.

<u>April Davis</u>	(Depositor's name)
<u>April Davis</u>	(Signature)
<u>September 22, 2005</u>	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,764	11/13/2003	William Farmer	PCB110	7399

TITLE OF INVENTION: ELECTRO-MECHANICAL ACTUATOR FOR AN ELECTRICALLY ACTUATED PARKING BRAKE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$300	\$1700	09/26/2005

EXAMINER	ART UNIT	CLASS-SUBCLASS
CULBRETH, ERIC D	3616	180-334000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Grossman, Tucker,
2 Perreault & Pfleger, PLLC
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Stoneridge Control Devices, Inc. Canton, MA

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:

- ☒ Issue Fee
- ☒ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

- ☐ A check in the amount of the fee(s) is enclosed.
- ☒ Payment by credit card. Form PTO-2038 is attached.
- ☒ The Director is hereby authorized by charge the required fee(s), or credit any overpayment Deposit Account Number 50-2121 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above. NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other part interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature

Date September 22, 2005

Typed or printed name

Donald J. PerreaultRegistration No. 40,126

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● PRINTER RUSH ●

(PTO ASSISTANCE)

Application : <u>10712764</u>	Examiner : <u>Culbreth</u>	GAU : <u>3616</u>
From: <u>NWO</u>	Location: <u>IDC</u> FMF FDC	Date: <u>10/19/05</u>
Tracking #: <u>EDM-10712764</u>		Week Date: <u>6/27/05</u>

DOC CODE	DOC DATE	MISCELLANEOUS
☐ 1449	<u>6-9-05</u>	☐ Continuing Data
☒ IDS		☐ Foreign Priority
☐ CLM		☐ Document Legibility
☐ IIFW		☐ Fees
☐ SRFW		☐ Other
☐ DRW		
☐ OATH		
☐ 312		
☐ SPEC		

[RUSH] MESSAGE: _____

⑩ Please initial / line through categories.

Thanks

[XRUSH] RESPONSE: _____

INITIALS: _____

NOTE: This form will be included as part of the official USPTO record, with the Response document coded as XRUSH.
REV 10/04

● PRINTER RUSH ●

(PTO ASSISTANCE)

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☐ SRFW		☐ Other
☐ DRW		
☐ OATH		
☐ 312		
☐ SPEC		

[RUSH] MESSAGE: _____

① Please initial / line through citations.

Thanks

[XRUSH] RESPONSE: Initiated 105

INITIALS: EC

NOTE: This form will be included as part of the official USPTO record, with the Response document coded as XRUSH.
REV 10/04

● PRINTER RUSH ●

(PTO ASSISTANCE)

2nd Request

Application : <u>10/712764</u>	Examiner : <u>Culbreth</u>	GAU : <u>3616</u>
From: <u>PAP</u>	Location: <u>IDC</u> FMF FDC	Date: <u>1/18/06</u>

Tracking #: EPM 10/712764 Week Date: 6/27/05

DOC CODE	DOC DATE	MISCELLANEOUS
☐ 1449		☐ Continuing Data
☒ IDS	<u>6/9/05</u>	☐ Foreign Priority
☐ CLM		☐ Document Legibility
☐ IIFW		☐ Fees
☐ SRFW		☐ Other
☐ DRW		
☐ OATH		
☐ 312		
☐ SPEC		

[RUSH] MESSAGE: Initial line through citations on IDS of 6/9/05.

Thank you

[XRUSH] RESPONSE: _____

INITIALS:

NOTE: This form will be included as part of the official USPTO record, with the Response document coded as XRUSH.
REV 10/04

● PRINTER RUSH ●

(PTO ASSISTANCE)

2nd Request

Application : <u>10/712764</u>	Examiner : <u>Culbreth</u>	GAU : <u>3616</u>
From : <u>PAP</u>	Location : <u>IDC</u> FMF FDC	Date : <u>1/18/06</u>

Tracking #: EPM 10/712764 Week Date: 6/27/05

DOC CODE	DOC DATE	MISCELLANEOUS
☐ 1449		☐ Continuing Data
☒ IDS	<u>6/9/05</u>	☐ Foreign Priority
☐ CLM		☐ Document Legibility
☐ IIFW		☐ Fees
☐ SRFW		☐ Other
☐ DRW		
☐ OATH		
☐ 312		
☐ SPEC		

[RUSH] MESSAGE: Initial line through citations on IDS of 6/9/05.

Thank you

[XRUSH] RESPONSE: Initiated IDS

INITIALS: EC

NOTE: This form will be included as part of the official USPTO record, with the Response document coded as XRUSH.
REV 10/04

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN

Stoneridge Control Devices, Inc.

Plaintiff(s),

Case No. 2:22-cv-10289-PDB-Cl

v.

Judge Paul D. Borman

ZF North America, Inc. et al.

Magistrate Judge Curtis Ivy, Jr

Defendant(s).

REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court, Eastern District of Michigan, on the following ☒ Patents or ☐ Trademarks

PATENT OR TRADEMARK NO.		DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7,021,415	04/04/2006	Stoneridge Control Devices, Inc.
2			
3			
4			
5			
6			
7			
8			
9			
10			

To list additional patent/trademark numbers, please attach another page with the number, date and holder.

Date: February 11, 2022

/s/ Steven Susser

Steven Susser (P52940)
Carlson, Gaskey & Olds, P.c.
400 West Maple Suite 350
Birmingham, MI 48009
(248) 988-8360
ssusser@cgolaw.com

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN

Stoneridge, Inc.

Plaintiff(s),

Case No. 2:22-cv-10207

v.

Judge Terrence G. Berg

ZF North America, Inc., et al.

Magistrate Judge Elizabeth A. Stafford

Defendant(s).

REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

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PATENT OR TRADEMARK NO.		DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 7,021,415	4/4/2006	Stoneridge, Inc.
2			
3			
4			
5			
6			
7			
8			
9			
10			

To list additional patent/trademark numbers, please attach another page with the number, date and holder.

Date: February 1, 2022

/s/ Steven Susser

P52940

Carlson, Gaskey & Olds, P.C.

400 West Maple Road

Suite 350

Birmingham, MI 48009

(248) 988-8360

ssusser@cgoilaw.com

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been
filed in the U.S. District Court Eastern District of Michigan on the following

☒ Trademarks or ☐ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 22-10207	DATE FILED 2/1/2022	U.S. DISTRICT COURT Eastern District of Michigan
PLAINTIFF Stoneridge, Inc.		DEFENDANT ZF North America, Inc. et a
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		see attached
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT 2/17/2022 ORDER DISMISSING CASE

CLERK Kinikia Essix	(BY) DEPUTY CLERK S. Schoenherr	DATE 4/21/2022
------------------------	------------------------------------	-------------------

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN

Stoneridge, Inc.

Plaintiff(s),

Case No. 2:22-cv-10207

v.

Judge Terrence G. Berg

ZF North America, Inc., et al.

Magistrate Judge Elizabeth A. Stafford

Defendant(s).

REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

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To list additional patent/trademark numbers, please attach another page with the number, date and holder.

Date: February 1, 2022

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Carlson, Gaskey & Olds, P.C.

400 West Maple Road

Suite 350

Birmingham, MI 48009

(248) 988-8360

ssusser@cgoilaw.com

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

STONERIDGE, INC., Plaintiff, vs. ZF NORTH AMERICA, INC., ET AL., Defendants.	2:22-CV-10207-TGB ORDER DISMISSING CASE HONORABLE TERRENCE G. BERG
---	---

Pursuant to the Notice of Voluntary Dismissal by Plaintiffs, this case is DISMISSED without prejudice.

IT IS SO ORDERED.

DATED this 17th day of February, 2022.

BY THE COURT:

/s/Terrence G. Berg
TERRENCE G. BERG
United States District Judge