



COMPLETE SPECIFICATION.

Improvements in Tubes for Cycle and like Frames.

I, LOUIS VALAT, a citizen of the French Republic, of 36, rue Voltaire, Saint-Etienne, France, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The progress made in the manufacture of cycles during recent years has been considerable. With equal, if not greater, strength, the better quality of manufactured materials has permitted in particular reduced thicknesses thus ensuring a lighter weight machine.

Nevertheless on bad roads and at high speed certain parts act under abnormal loading, particularly with sudden efforts, and most often in shear. Fractures still occur at certain delicate points, causing more or less serious accidents and damage to the machine.

It has already been proposed to provide drawn seamless tubes with internal helical ribs of long pitch, the ribs being produced in the drawing process by means of the dies used. It has also been proposed to produce tapered tubes from parallel tubes by flattening portions of the sides of the tubes, then forcing the flats into V section gutters by means of press tools and finally pressing the tube so that the V sections are closed and form internal ribs. This leaves the external surface apparently continuous but actually discontinuous.

According to the present invention the tubes are provided with solid internal ribs or reinforcements by the swaging process so that a continuous external surface is produced, and such reinforcements preferably follow helices of long pitch. They may be provided over the whole length of the tube, or confined to those parts which are subjected to shear when in use.

Among the parts of a bicycle, motor assisted cycle, or motor cycle most dangerously loaded the steering tube may be cited, particularly on its perimeter at entry to the fork bridge. It is frequently in this region that fractures commence, which are rapidly transferred into complete failures.

For this reason the drawings accompanying the present Specification show

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more particularly this steering tube. But it should be clearly understood that the new tubes can be used in any part without exception.

Figure 1 shows an axial section of the tube before the reinforcements are formed and showing two of them in dotted lines.

Figure 2 shows the finished tube mounted on a fork bridge, with helical reinforcements of long pitch.

Finally Figures 3, 4 and 5 show cross sections of tubes with various arrangements of reinforcement. It is evident that the number of combinations may be indefinite without the principle of the invention being in any way affected.

Considering more particularly the steering tube shewn by way of example it should be mentioned that this tube which has the same external diameter over its whole length and is screw threaded at its upper end, generally has a greater thickness *a* at its lower end, where the loads are greatest, than in the upper part *b*. The junction is formed by a slight taper *c*.

The present invention in this embodiment consists in giving this tube in its lowest part interior reinforcements such as *d e f g* which can be straight and parallel with the axis of the tube, or better directed along a helix of very long pitch and having the same axis as the tube itself. These reinforcements die away towards the change in internal diameter since from here on the tube has no further need of an addition in solidity and rigidity.

It should be understood that these reinforcements can be provided in any number, of larger or smaller section either projecting into the interior of the tube or bounded by chords across its internal perimeter.

These reinforcements according to the invention are formed by the swaging process, for example by the swaging machine by the aid of a suitable mandrel having grooves of the form of the reinforcements desired. As shown in Figure 1 for example a tube is chosen of greater external diameter in the part 1 where the reinforcements 2 are to be formed. Under the action of the swaging machine and the

mandrel there will be internal swellings into the grooves provided in the mandrel. These swellings in relief constitute the reinforcements.

6 As stated above any form and disposition of the reinforcements, as well as any number, can be provided.

10 In Figure 3 the reinforcements are bounded by the perpendiculars to the diagonals of a square at m, m^I, m^{II}, m^{III} .

In Figure 4 they are bounded by perpendiculars to the bisectors of the angles of a regular hexagon at $n, n^I \dots$

15 Finally, in Figure 5 these reinforcements are bounded by the sides of a regular octagon $p, p^I \dots$

20 Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A tube for cycle and motor cycle

frames provided on its interior with reinforcements extending substantially in the longitudinal direction of the tube, in which the reinforcements are solid and are formed by a swaging process, so that the exterior surface of the tube is continuous. 25

2. A tube according to Claim 1 in which the reinforcements follow helices of long pitch. 30

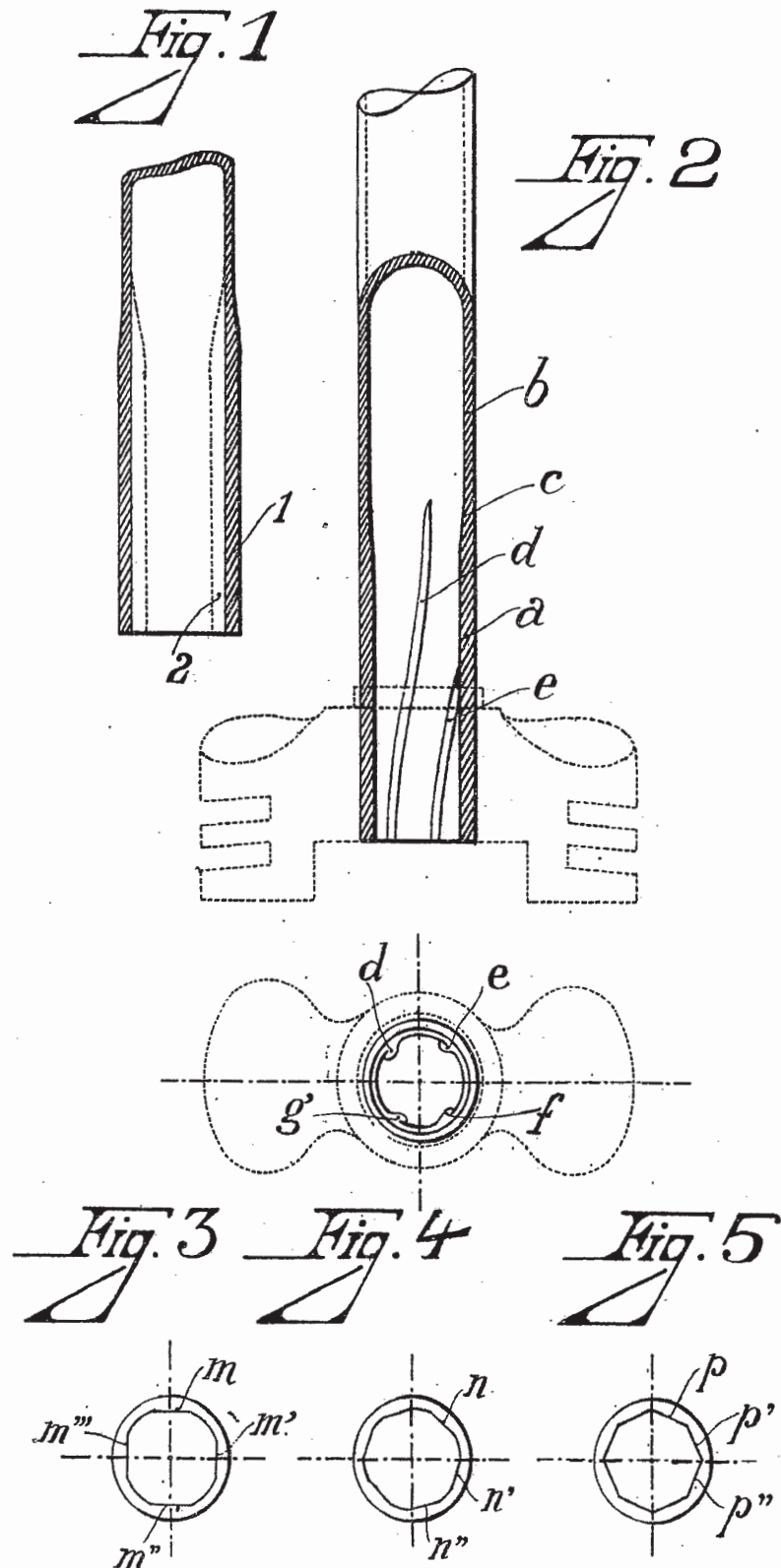
3. A tube according to Claim 1 or 2 in which the reinforcements extend on that part of the tube subjected to shear. 35

4. Tubes substantially as described with reference to the accompanying drawings.

Dated this 13th day of March, 1928.
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285, High Holborn, London, W.C. 1,
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[This Drawing is a reproduction of the Original on a reduced scale.]



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