E. WILSON.

BELL RINGER.

APPLICATION FILED MAY 12, 1908.

931,108.

Patented Aug. 17, 1909.

2 SHEETS—SHEET 1.

Fig. 2.

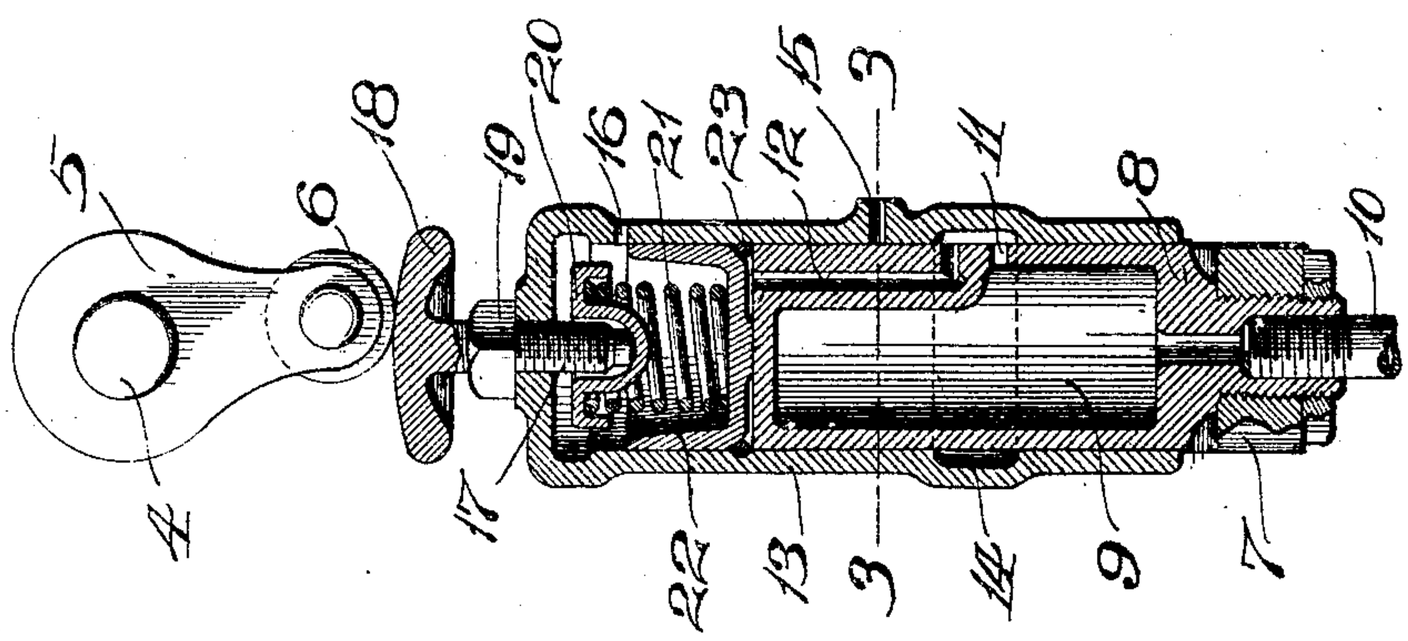

Fig. 3.

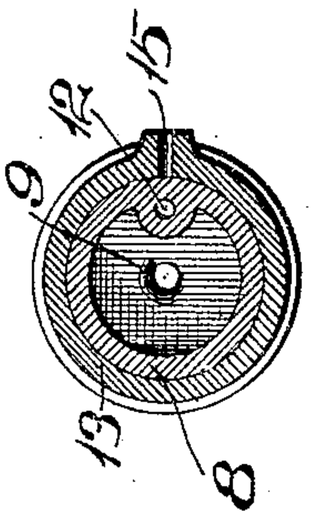

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 6.

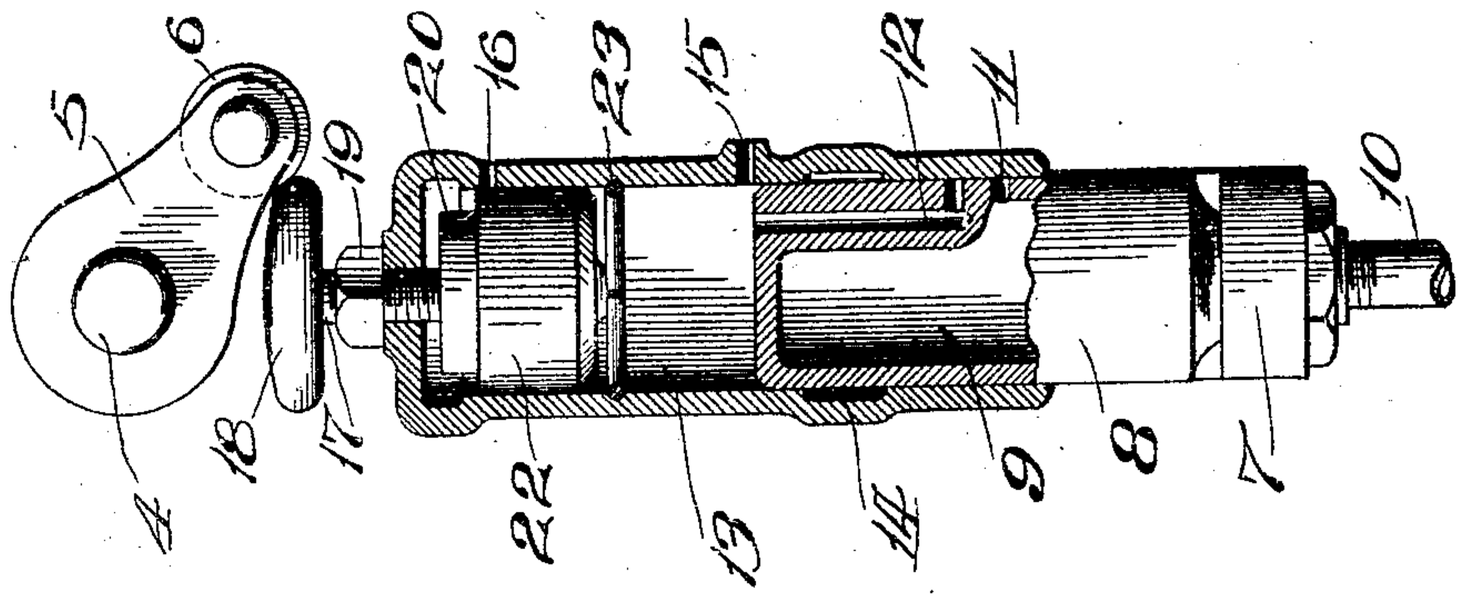


Fig. 5.

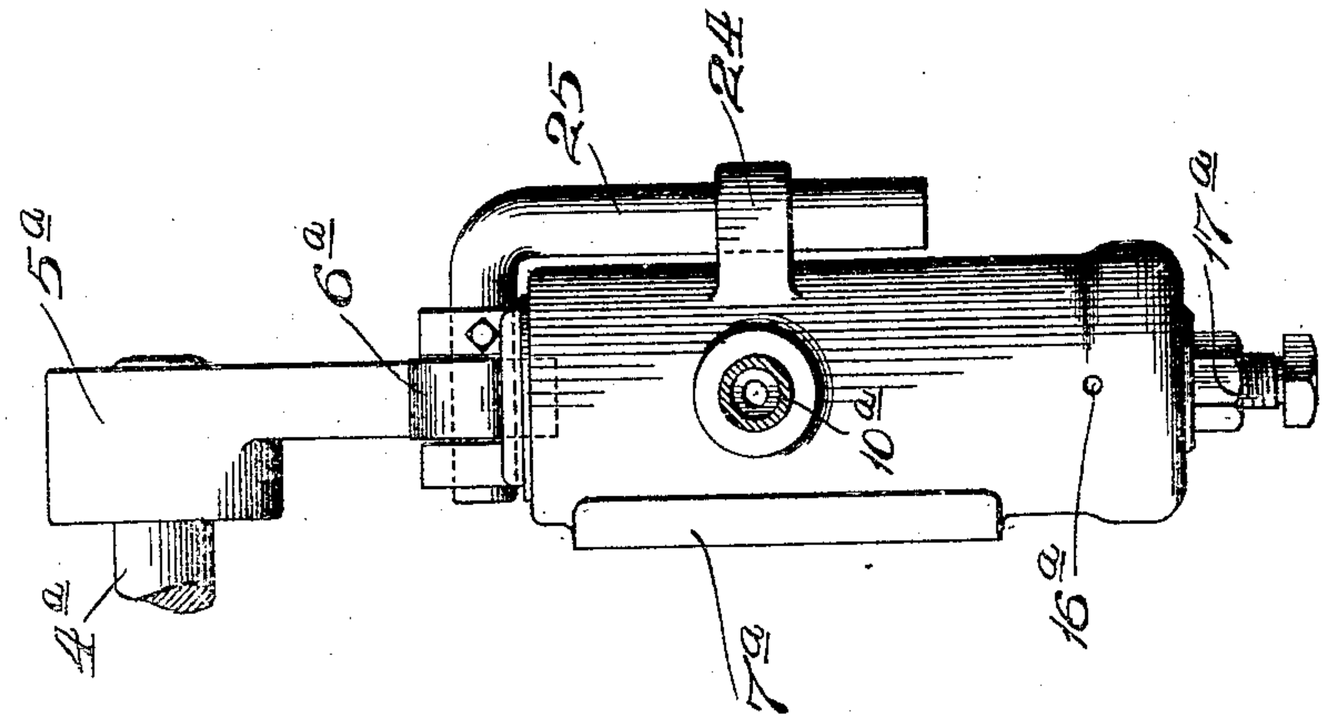
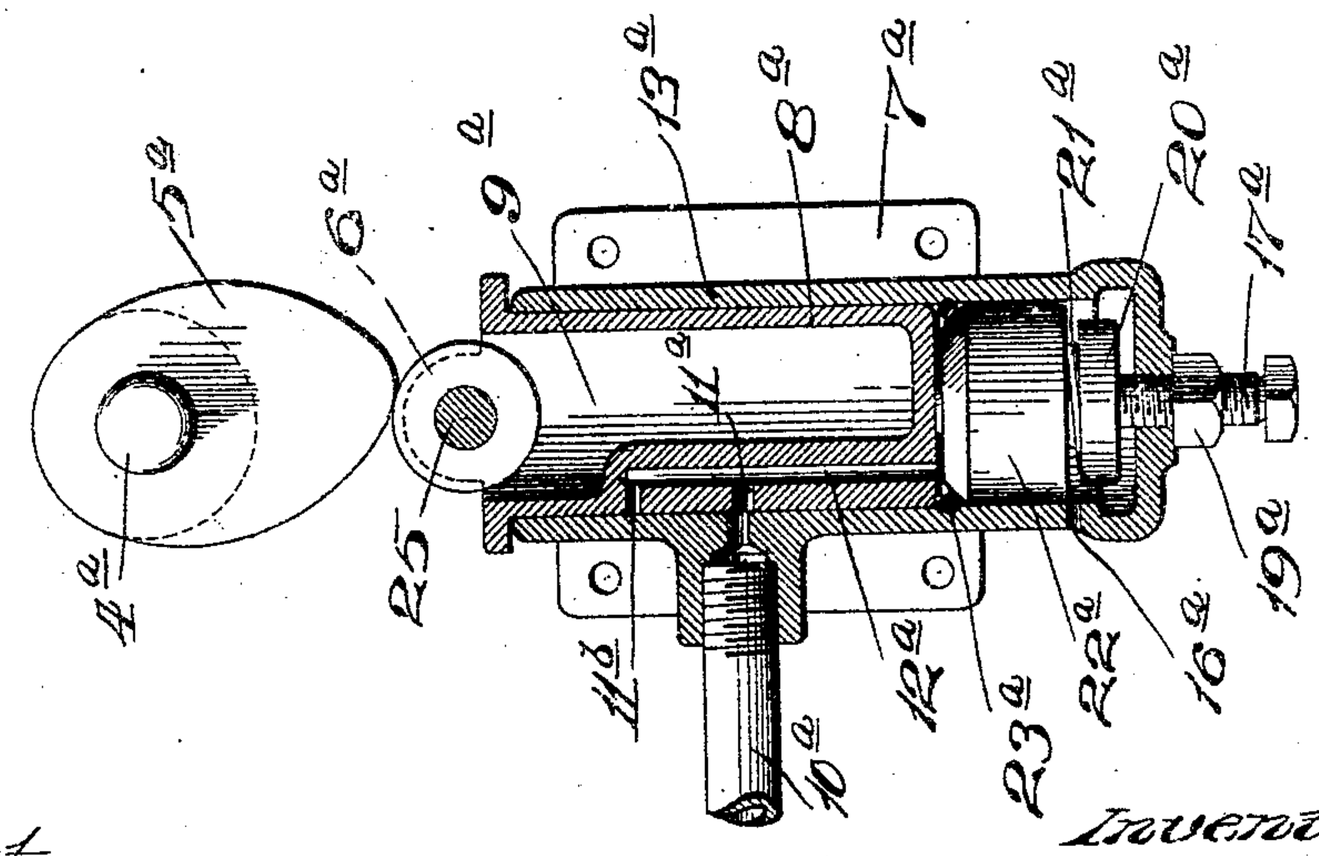


Fig. 4.



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UNITED STATES PATENT OFFICE.

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BELL-RINGER.

No. 931,108. Specification of Letters Patent. Patented Aug. 17, 1909.

Application filed May 12, 1908. Serial No. 432,509.

To all whom it may concern:

Be it known that I, EDWARD WILSON, a citizen of the United States, and resident of St. Louis, Missouri, have invented certain new and useful Improvements in Bell-Ringers, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to a bell ringer, particularly adapted for ringing the bells of locomotives, and comprises piston and cylinder mechanism operatively connected to the bell crank, and adapted to be operated by fluid pressure, such as steam or compressed air.

The objects of my invention are as follows: To provide a bell ringing apparatus so constructed as to insure positive action of the parts with a minimum amount of wear and friction; to so construct the bell ringer as that water, dust, oil, and other foreign matter is prevented from penetrating the cylinder of the device, and thereby effecting the successful operation thereof; and to provide a device which is very efficient in use and economical in the use of fluid pressure.

To the above purposes, my invention consists in certain novel features of construction and arrangement of parts, which will be hereinafter more fully set forth, pointed out in the claims, and illustrated in the accompanying drawings, in which:—

Figure 1 is an elevation of a bell ringer of my improved construction, the same being in position for use adjacent a locomotive bell; Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1; Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 2; Fig. 4 is a vertical section taken through the center of a modified form of the bell ringer; Fig. 5 is an elevation of the modified form of the bell ringer shown in Fig. 4; Fig. 6 is an elevation, partly in section, of the preferred form of bell ringer, and showing the cylinder elevated to its limit of movement.

Referring by numerals to the accompanying drawings:—1 designates the usual bell yoke, in which is arranged to swing the hanger 2, carrying the bell 3, and said hanger being provided with an extended trunnion 4, on which is arranged a crank arm 5, provided at its lower end with an anti-friction roller 6.

7 designates a bracket, which is rigidly fixed to the yoke 1, the lower end of which bracket is horizontally disposed; and seated in said horizontally disposed end is the lower end of a fixed piston 8, of cylindrical form, provided with a chamber 9; and leading into the lower end of this fixed piston is a fluid pressure supply pipe 10. Formed through the side of the piston 8 is a port 11; and formed in the upper portion of said piston is a vertically disposed passageway 12, the lower end of which extends to the exterior of the piston 8 immediately above said port 11.

13 designates a vertically moving cylinder, which is free to rotate and to reciprocate on the piston 8; and formed in the lower portion of said cylinder is an annular groove 14, of such width as to communicate with the port 11, and the lower end of the passageway 12, when said cylinder is at the lower end of its stroke. Formed through the wall of the cylinder, at a point slightly above the annular groove 14, is an exhaust port 15; and formed through the side wall of the upper portion of said cylinder is a port 16. Screw seated in the top of the cylinder 13 is a stem 17, with the upper end of which is formed integral a disk 18, which normally bears against the anti-friction roller 6. A lock nut 19 is arranged on the threaded portion of the stem 17 for the purpose of locking said stem after adjustment. Loosely arranged against the end of the stem, within the cylinder 13, is a plate 20, and bearing thereagainst is an expansive coil spring 21, the lower end of which bears on a movable plug 22, which is arranged in the upper portion of the cylinder 13, and is held against downward movement beyond a certain point by a snap ring 23, which is inserted in a groove formed on the interior of the cylinder 13. Normally the spring 21 holds the lower end of the plug 22 against the ring 23, and when so positioned, the port 16 is open.

When this form of my improved bell ringer is in operation, the fluid pressure from the supply pipe 10 enters the chamber 9, and passes from thence through the port 11 into the annular groove 14; and from thence through the passageway into the space between the top of the fixed piston and the under side of the plug 22. The initial action of the fluid pressure causes the plug 22 to move upward, closing the port 16, compressing the spring 21, and storing power therein;

and as soon as this action takes place, the force of the fluid pressure is exerted to move the cylinder 13 upward on the fixed piston 8; and, as a result, the disk 18 bears against the anti-friction rollers 6, moving the same upward, and swinging the crank arm 5 laterally; and, as a result, the hanger 2 and bell 3 are swung to one side. As soon as the cylinder 13 moves upward to such a point as that the lower end of the groove 14 passes the port 11, the supply of fluid pressure is cut off; and the continued upward movement of the cylinder is brought about by reason of the expansion of the fluid pressure admitted to the space between the fixed piston and the plug 22; and when the cylinder is moved upward to such a point as that the exhaust port 15 clears the top of the piston, (as shown in Fig. 6,) the fluid pressure will exhaust through said port; and the momentum of the bell on its reverse stroke will force the piston 13 downward to its original position; or, until the annular groove 14 registers with the port 11, and the upward stroke of the piston, (as hereinbefore described,) will now be repeated. When the plug is moved upward by the action of the fluid pressure, the port 16 is closed, and thus air is trapped in the chamber above the plug; and which air is compressed to a degree, and at the same time the spring 21 is compressed; and thus a yielding cushion is formed above the upper end of the fixed piston, which cushion does away with any sudden jar or shock at the beginning of the stroke of the device; and, as soon as the exhaust port 15 is opened to allow the escape of the fluid pressure, the plug 22 will move downward to its limit of movement by reason of the expansion of the spring 21. During the downward movement of the cylinder 13, after the exhaust port 15 passes below the top of the piston 8, a certain amount of air will be trapped in the chamber between the top of the piston and the plug 22; and as the cylinder 13 continues to move downward, this air will be compressed to a certain degree, and, by reason of the spring held plug 22, a yielding cushion is provided for this compression of air on the downward stroke of the bell, as said plug will readily yield to a pressure equal to or greater than the tension of the spring 21; and thus the reciprocating movements of the cylinder 13 in both directions is cushioned, which relieves the parts of all jar or pounding.

In the modified form of the device shown in Figs. 4, and 5, a cylinder 13^a is rigidly positioned in any suitable manner, and entering the side thereof is the fluid pressure supply pipe 10^a; and arranged in the lower end of said cylinder is a plug 22^a, beneath which is located a coil spring 21^a, arranged on a plate 20^a; and which latter is adjusted by means of a set screw 17^a passing through the lower end of the cylinder 13^a, and carrying a lock nut 19^a, which performs the same function as the lock nut 19 in the construction previously described. A sliding piston 9^a is arranged for movement in the upper portion of the cylinder 13^a, in the lower portion of which piston is formed a vertically disposed passageway 12^a; and leading thereinto, through the side of the piston, is an inlet port 11^a and an exhaust port 11^b. Carried by the upper end of the piston 9^a is a roller 6^a, which engages against the eccentric surfaces of a crank arm 5^a arranged on one of the trunnions of the bell hanger; and arranged on the upper end of the piston 9^a and projecting downward through a lug 24 is a vertically disposed guide 25, which is for the purpose of preventing the piston 9^a from rotating in the cylinder 13^a. A port 16^a is formed in the lower portion of the cylinder 13^a for the purpose of admitting air to the lower end of said cylinder, and which air is trapped and compressed when the plug 22^a is forced downward as a result of the compression of the air between the piston 9^a and said plug 22^a.

The action of this form of the device is practically the same as in the preferred construction, with the exception that the piston 9^a moves vertically when the fluid pressure enters the inlet port 11^a, and passes from thence into the chamber between the lower end of the piston and the top of the plug 12^a; and, as the piston moves upward, the roller 6^a engages against the crank arm 5^a and moves the same to swing the bell to one side; and when the piston 9^a is moved upward to such a degree as to open the exhaust port 11^b, the fluid pressure beneath the piston exhausts, and the momentum of the bell causes said piston to move downward to its lowermost limit of movement, at which time the inlet port 11^a coincides with the port leading from the supply pipe 10^a; and the upward movement of the piston 9^a is repeated.

In a bell ringer of my improved construction, the tension of the spring 21 can be readily adjusted by manipulating the threaded stem 17, thereby readily obtaining the proper cushion opposite the end of the piston; and in the preferred form of the device, the closed end of the cylinder is uppermost, thereby preventing water, oil, and dust from penetrating the interior of the cylinder, and interfering with the free operation of the various parts of the device.

In the preferred form of my improved bell ringer, it will be noted that the cylinder 13 is free to rotate upon the fixed piston, which construction is carried out in order to prevent the roller 6 from traveling in a defined path on top of the disk 18, which action would wear a groove in said disk and would also cause uneven wear between the

piston and the cylinder, which uneven wear would naturally cause leakage, thus rendering the device inoperative, but by arranging the cylinder to rotate freely upon the piston and providing the annular groove 14, the wear between various parts will be evenly distributed, and consequently the device will operate with much better results and for a greater period of time than where the cylinder is held to reciprocate without rotation.

I claim:—

1. In a bell ringer of the class described, a fixed hollow piston, means whereby fluid pressure is supplied to the chamber in said piston, a cylinder arranged to freely rotate and slide on the piston, there being an annular groove formed on the interior of the cylinder, there being a port formed through the wall of the piston and adapted to coincide with the annular groove, there being a passageway formed through the upper portion of the piston, the lower end of which passageway is adapted to coincide with the annular groove, the upper end of which passage-way communicates directly with the chamber within the cylinder above the piston, and there being an exhaust port formed through the side wall of the cylinder at a point above the annular groove therein.

2. In a bell ringer of the class described, a fixed hollow piston, means whereby fluid pressure is supplied to the chamber in said piston, a cylinder arranged to freely rotate and slide on the piston, there being an annular groove formed on the interior of the cylinder, there being a port formed through the wall of the piston and adapted to coincide with the annular groove, there being a passageway formed through the upper portion of the piston, the lower end of which passageway is adapted to coincide with the annular groove the upper end of which passage-way communicates directly with the chamber within the cylinder above the piston, there being an exhaust port formed through the side wall of the cylinder at a point above the annular groove therein, and adjustable means carried by the closed end of the cylinder for engaging the arm on the bell hanger.

3. In a bell ringer of the class described, a fixed hollow piston, means whereby fluid pressure is supplied to the chamber in said piston, a cylinder arranged to freely rotate and slide on the piston, there being an annular groove formed on the interior of the cylinder, there being a port formed through the wall of the piston and adapted to coincide with the annular groove, there being a passageway formed through the upper portion of the piston, the lower end of which passageway is adapted to coincide with the annular groove the upper end of which passage-way communicates directly with the chamber within the cylinder above the piston, there being an exhaust port formed through the side wall of the cylinder at a point above the annular groove therein, a cushion located between the closed end of the cylinder and the end of the piston, and an adjustable means seated in the top of the cylinder for engaging the cushion and for bearing against the arm on the bell hanger.

4. In a bell ringer of the class described, a fixed hollow piston, means whereby fluid pressure is supplied to the chamber in said piston, a cylinder arranged to freely rotate and slide on the piston, there being an annular groove formed on the interior of the cylinder, there being a port formed through the wall of the piston and adapted to coincide with the annular groove, there being a passageway formed through the upper portion of the piston, the lower end of which passageway is adapted to coincide with the annular groove the upper end of which passage-way communicates directly with the chamber within the cylinder above the piston, there being an exhaust port formed through the side wall of the cylinder at a point above the annular groove therein, cushioning means located in the end of the cylinder above the piston there being a port formed through the wall of the cylinder and communicating with the chamber in the upper portion of said cylinder, and means whereby the resistance of said cushioning means is varied.

In testimony whereof, I have signed my name to this specification, in presence of two subscribing witnesses.

EDWARD WILSON.

Witnesses:
M. P. Smith,
E. L. Wallace.