Sept. 30, 1924. 1,510,445

G. J. HENRY

BALL LOCK RELEASE AND SPRING ACTUATING MECHANISM

Filed Feb. 14, 1924

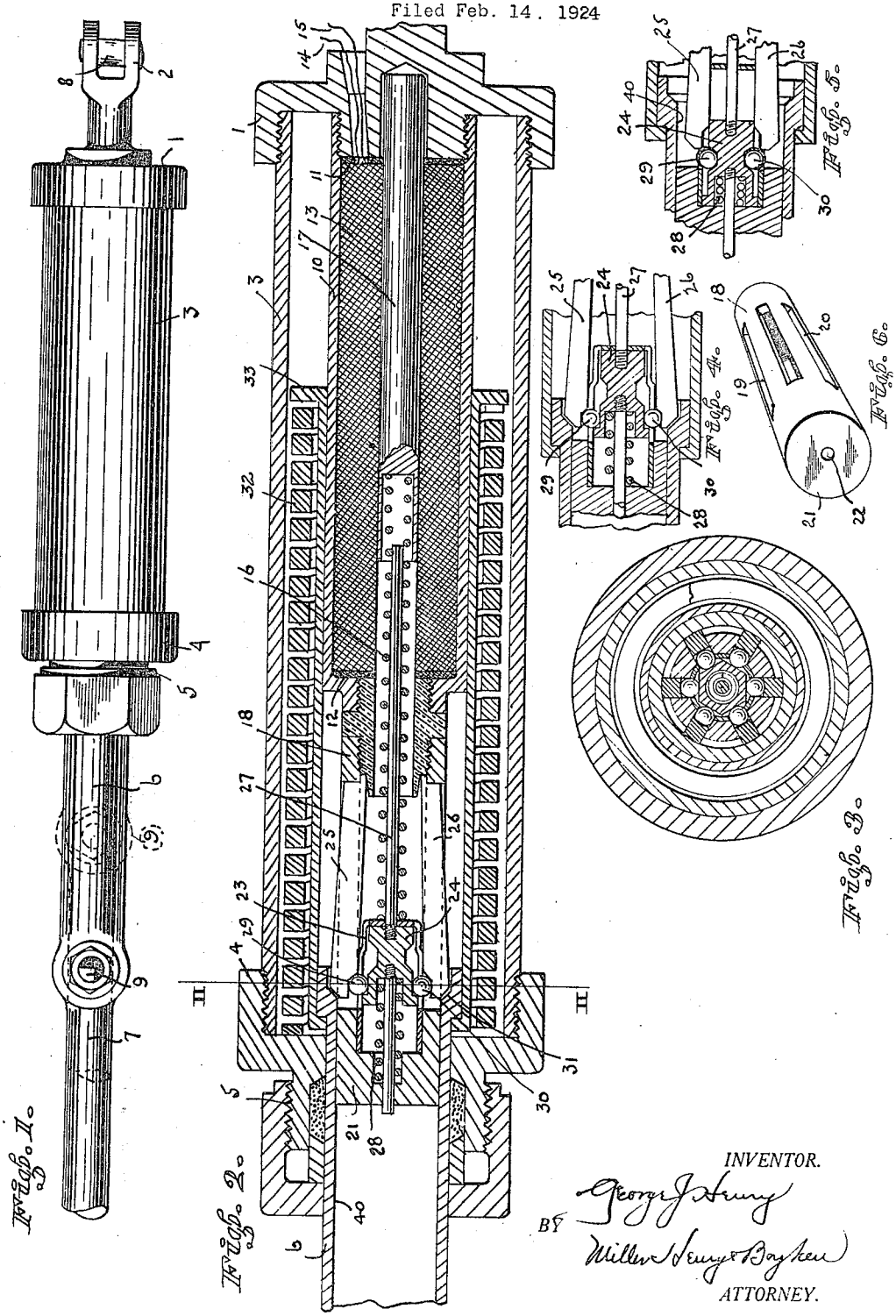


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

INVENTOR.

BY George J. Henry

Miller Henry & Boyken

ATTORNEY.

Patented Sept. 30, 1924. 1,510,445

UNITED STATES PATENT OFFICE.

GEORGE J. HENRY, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO WILLIAM H. AVERY, OF SAN FRANCISCO, CALIFORNIA.

BALL-LOCK RELEASE AND SPRING-ACTUATING MECHANISM.

Application filed February 14, 1924. Serial No. 692,930.

To all whom it may concern:

Be it known that I, GEORGE J. HENRY, a citizen of the United States, and resident of San Francisco, county of San Francisco, State of California, have invented new and useful Improvements in Ball-Lock Release and Spring-Actuating Mechanism, of which the following is a specification.

My invention is particularly applicable to any mechanism wherein it is desired to forcibly increase or decrease the distance between two movable members or between a stationary and movable member, and is particularly adapted to the setting of brakes, in vehicles or in stationary machinery, whereby an electrical or relatively light mechanical impulse may be employed to release elements to relatively move under the action of springs, weights or other impelling forces. It may also be employed to retain in locked position two members otherwise relatively movable and upon the releasing of said lock the members are allowed to move with respect to each other.

This action I accomplish by a light mechanical impulse which may be created through electrical or pneumatic means or otherwise introduced as may best suit the conditions of any particular mechanism, and whereby a plurality of ball members are rolled into a new position with respect to their contacting members as by interposing a tumbler carried by one element and normally locking or unlocking an associating element and holding the said tumbler in the desired position by interposing a ball or ball shaped member between the tumbler and a longitudinally movable piece so that when the said piece is moved longitudinally by a light impulse the ball rolls thereon and into or out of engagement with the tumbler, releasing the tumbler from locked engagement or fixing the tumbler in locked engagement.

Other objects will appear from the drawings and specifications which follow:

Referring to the drawing and following specifications my invention will be made clear.

Figure 1 represents in perspective an example of mechanism employing my invention adapted to shorten the distance between a stationary and a movable element, as for example such as would be used to set the brakes on an automobile. The remaining parts forming no part of my invention but well known and therefore not shown.

Figure 2 is a longitudinal cross section through mechanism of Figure 1 employing my invention.

Figure 3 is a cross section of Figure 2 on the line II—II thereof.

Figure 4 is a detail of certain of the parts of Figure 2 in the locked position.

Figure 5 is similar to Figure 3 with the parts in unlocked position where the tumblers have collapsed and the mechanism is functioning to create the braking impulse.

Figure 6 is a perspective view of the two members in which the tumblers are adapted to seat.

In the example here shown a light electrical impulse is employed to initiate the unlocking operation.

Throughout the figures similar numerals refer to identical parts.

The numeral 1 indicates a head carrying the fork or other terminal connection 2. 3 indicates a casing and 4 a second head carrying the gland and nut 5 through which the rod 6 functions to shorten the distance and therefore to pull together the brake rod 7 and any connection at 8 when the mechanism is unlocked. The pivot 9 at such times being shifted to the dotted position 9 of Figure 1.

Referring now to Figure 2.

A shell of soft iron 10 having iron end washers 11 and 12 respectively forms an electromagnet when the winding 13 is energized through the lead wires 14 and 15. At 17 is a movable core piece normally held in the retracted position by the spring 16. A tube member 18 is provided with a plurality of slots 19, 20 and end 21 and a central hole 22 and within this is an inner projecting thimble 23, against which the spring 16 bears. This thimble 23 is threaded or pressed into the end 21. (See Figures 2, 4, 5), and the dog 24 is slidable inside of this thimble. The thimble is slotted on its periphery to correspond with the slots in the member 18 so that the tumblers, two of which are shown at 25, 26 may collapse into the said slots. This occurs when the dog 24 moves toward the left of the figure upon the core piece 17 striking the rod 27 thus compressing the springs 16 and 28 and forcing

the dog to the left at which time the balls, two of which are shown at 29, 30, roll half of the distance of said movement and thus roll from under the projecting ends of the tumblers, allowing the tumblers to collapse from the position shown in Figure 4 to the position shown in Figure 5.

It will now be seen that the concave end 31 of the rod 6, which has heretofore been bearing against the sloping ends of the tumblers, is released and will under the action of the master spring 32, which is normally under compression as shown in Figure 2 against the shouldered tube 33, bearing against the rod end 31; shoot forward to the right of the figure drawing with it the rod 6 and thus shortening the distance between the fork 2 and pivot 9 and exerting the full spring stress to pull together the members 8 and 7 to which the mechanism is connected.

The mechanism is restored by interrupting the current through the solenoid connecnections 14, 15 which allows the core 17 to resume its retracted position (Figure 1) under the action of spring 16, at which time the spring 28 forces the dog 24 against the balls 29, 30 which will now be held from further movement by the tumblers 25, 26, while the tumblers are retained in the position of Figure 5, by bearing against the inner surface 40 of the tube 6.

If now the members 7, 8 be separated as by pulling up the emergency brake rod of an automobile, as fully set forth in United States Letters Patent No. 1,398,399, issued Nov. 29, 1921, the tubular rod 6 will be restored to the full line position shown in Figures 1 and 2, at which time the tumblers 25, 26 will be forced out from the position of Figure 5 to the position of Figure 4, the balls 29, 30 will roll under the tumbler ends and upon releasing the aforesaid emergency lever the sloping surface of the rod end 31 will bear against the now outwardly locked tumblers with the full pressure of the master spring 32 and the parts will be locked in this position with the members 8 and 7 held apart, all as shown in Figures 2, 3, 4 and will be held thus locked until the solenoid 13 is again energized and the dog 24 moved to the left under the blow received by the rod 27 from the core piece 17 causing the balls again to roll outward and release the tumblers 25, 26 to collapse as before.

I claim:

1. In a locking and release device comprising a tubular shell and an enclosed spring, a member extending through said shell and actuated by said spring to move longitudinally with respect to said shell when released, releasing means for said member comprising tumbler means normally locking said member and resting on spherical elements, a spool concentric with said tumblers, spherical elements interposed between the spool and the tumblers, and actuating means to move the thimble whereby the said elements are rolled with respect to the tumblers, enabling the tumblers to move to unlock the member.

2. Mechanism as set forth in claim 1 wherein the spherical elements are steel balls and wherein the spool has a plurality of diameters adapted to the said balls.

3. Mechanism as set forth in claim 1 wherein said actuating means comprises a solenoid and a plunger, said plunger adapted to strike a motivating blow to move said spool and roll said elements when solenoid is energized.

4. Mechanism as set forth in claim 1 wherein said actuating means comprises a solenoid and a plunger, said plunger adapted to strike a motivating blow to move said spool and roll said elements when solenoid is energized and wherein the spherical elements are steel balls and wherein the spool has a plurality of diameters adapted to the said balls.

5. In a locking and releasing device, tumbler means adapted to hold parts in a locked position, a steel ball between a tumbler and an axially movable member whereby the tumbler is held in spaced relation with the member and in turn holds the said parts in locked position, an axially movable member which upon movement rolls the ball with respect to the tumbler enabling the tumbler to move into position to release the parts, and actuating means for said movable member.

6. Mechanism as set forth in claim 5 wherein said actuating means comprises a solenoid and a plunger, said plunger adapted to strike a motivating blow to move said member and roll said ball when the solenoid is energized.

GEORGE J. HENRY.