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BELL RINGER

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Fig. 2.

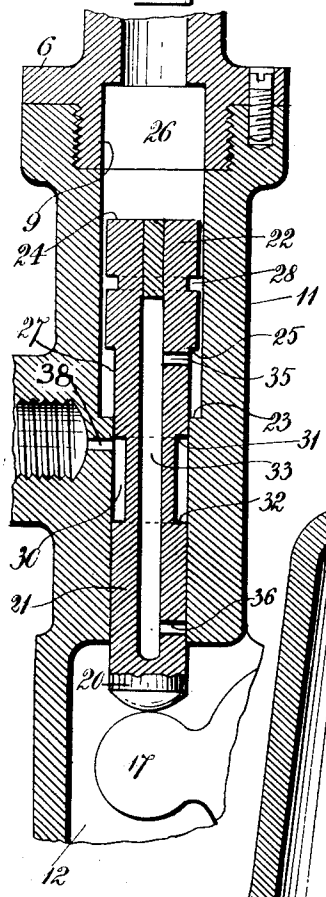


Fig. 1.

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BELL RINGER

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3 Claims. (Cl. 121—2)

The invention relates to an improvement in bell ringers of a type essentially adapted to be used on a locomotive.

The essential object of the invention is to provide a reliable and economical bell ringer by which the bell may be rung with a steady and moderate stroke.

The invention can best be seen and understood by reference to the drawing in which—

Figure 1 is a cross section of a bell equipped with the bell ringing mechanism embodying the invention, and

Fig. 2 is a cross section in enlarged detail of the plunger section of the mechanism shown in Fig. 1.

Referring to the drawing:

1 represents the bell fixed to a yoke 2 from the head of which the bell hangs suspended. The bell is provided with a frustroconical top extension 3 which fits within a socket 4 in the head of the yoke. The top extension 3 is drawn to fit tight within its socket and the bell fastened to the yoke, by means of a bolt 5 extending through the top of the bell, thence upward through its top extension 3 with projection above the extension and above the yoke. At its lower end the bolt is provided with a flange forming head 6 which bears against the interior top wall of the bell. Arranged upon the upper threaded end of the bolt, projecting above the top extension 3 and yoke as aforesaid, is a nut 7 which bears against the top surface of the yoke, a washer 8 being interposed between the nut and the yoke. With the parts thus arranged on tightening the nut the top extension on the bell will be drawn to fit tight within its socket and the bell fixedly secured to the yoke.

At its lower end inside the chamber of the bell the bolt 5 is provided with a threaded extension 9 and on this extension with top edge bearing against the flanged head 6 of the bolt is a cylinder 11 which extends downward well into the chamber of the bell. The lower end 12 of this cylinder is made cleft, and projecting laterally from the respective clefts are ears 13 to which is pivoted a lever 14 by a pin 15. The lever comprises arms 16 and 17, respectively. Of these the arm 16 forms the tongue of the bell and bears on its end a ball striker 18 which gives weight to the arm. The arm 17 of the lever is the one to which force is applied for turning the lever and thereby sounding the bell. This arm occupies an angular relation to the arm 16 and extends laterally into the cleft bottom end of the cylinder where it can be engaged by a plunger or piston 20 working within the cylinder. The arm 17 is maintained in position to be engaged by the plunger by the weighted arm 16. The arm 16 will normally hang pendant inside the chamber of the bell from the point of its pivotal support and from its pendant position is turned to strike the bell. The relative positions of the parts are such that whether the weighted arm 16 is occupying a normal pendant position or a striking position, it will in either case maintain the arm 17 within the cleft bottom end of the cylinder in position to be engaged by the plunger.

21 represents the body of the plunger and 22 its head. The head is slightly larger diametrically than the body and the cylinder is correspondingly bored in order that both the head and body of the plunger may have a sliding fit within the cylinder. This fit, however, is not so snug as to prevent entering air under pressure from passing through the joint between the plunger and the internal wall of the cylinder, as will later be explained.

The tongue is operated to strike the bell as the plunger is moved downward in the cylinder, it being the lower end of the plunger extending outside the cylinder which engages the arm 17 of the lever of which the tongue forms a part.

The shoulder or edge 23 on the cylinder at the junction between its respective bores will form a stop for the head of the plunger as the plunger is moved downward, but the arrangement of the parts is such that the head will never engage this stop so as to prevent the effective downward movement of the plunger for operating the tongue and striking the bell. 24 represents the top surface of the plunger head and 25 its under surface. The top surface 24 is much larger in area than the under surface 25. Above the head of the plunger there is provided within the cylinder a pressure chamber 26 and this chamber is extended upward even into the body of the screw 5 to which the cylinder is attached, thus making a chamber of relatively large capacity. When the plunger is raised so that its head is spaced above the edge 23 on the cylinder a pressure chamber 27 will be formed below the head of the plunger, the bottom surface 25 of the head forming the upper edge wall of this chamber and the edge 23 on the cylinder forming the bottom edge wall of the chamber. The head of the plunger is preferably provided with an annular incision 28 opening into the joint between the head and the cylinder in order to facilitate the passage of pressure through this joint. The body of the plunger is incised to form an annular

air pocket 30 between the body of the plunger and the cylinder 31 forming the top edge wall of this pocket and 32 its bottom edge wall. Extended within the body of the plunger is an exhaust passage 33. Inlet is had to this passage from the pressure chamber 27 by way of an inlet exhaust port 35 arranged just below the head of the plunger. Outlet is had from the passage 33 to the exterior surface of the body of the plunger by way of an outlet exhaust port 36 inwardly removed from the bottom end of the plunger so that the port 36 will normally be closed by the cylinder and will be open to the atmosphere only when the plunger has been moved down a determinate distance within the cylinder, or, in other words, so far that the port 36 will lie beyond the bottom edge of the cylinder. Air under pressure is admitted to the plunger for operating it by way of an inlet pipe 37 and thence by a port 38 through the side of the cylinder. The arrangement of this port with relation to the annular pocket 30 formed in the body of the plunger is such that air will be directed through the port into the pocket when the plunger is occupying its normal position and which position corresponds with the normal gravitated position of the tongue.

Assuming that the plunger has been moved downwardly to bring the striker in engagement with the bell, the exhaust port 36 will be below the open end of the cylinder and the pressure of the fluid within the chamber 26 will be comparatively low inasmuch as the exhaust port 36 is open directly to the atmosphere. The striker then moves towards its gravitated position and in so doing tends to move the plunger upwardly. When the plunger has moved upwardly to a certain position the exhaust port 36 will be above the bottom or open end of the cylinder and when in such position substantially no fluid will be exhausted. When in this position the shoulder 31 will be below the inlet port 38 and while the latter is substantially closed by the body of the plunger a slight leak of air pressure supplied through the inlet port 38 will pass upwardly between the plunger and the cylinder wall into the chamber 27 and will build up a pressure in the latter. The fluid under pressure in the chamber 27 at this time will pass to some extent between the head of the plunger and the cylinder wall and pass into the chamber 26. However, due to the relatively small passage between the head of the plunger and the cylinder wall, the pressure at this time will be greater in the chamber 27 than in the chamber 26 and consequently will tend to cause the plunger to rise. However, as the plunger continues to rise the pressure in the chamber 26 will gradually increase. When the plunger has moved upwardly to a position to bring the annular passage 30 in registry with the inlet port 38, the rate of flow of fluid from the inlet port 38 to the chamber 27 will increase inasmuch as the length of the restricted passage between the body of the plunger and the cylinder will be less and the entire pressure of the fluid will be supplied thereto through the annular passage 30 at all points around the surface of the plunger. Finally the effective pressure within the chamber 26 will become greater than that in the chamber 27 and consequently the plunger will move downward and move the striker outwardly toward the bell. During the downward movement of the plunger there will be a slight leakage between the plunger and the wall of the cylinder when the top of the annular chamber 30 is above the inlet port 38 but this tends to supply additional fluid under pressure to the chamber 26. However, when the plunger has moved downwardly to a point such that the shoulder 31 is below the inlet port 38 the amount of fluid under pressure passing from the inlet port 38 into the chamber 27 and consequently into the chamber 26 will be greatly diminished. Slight further downward movement of the plunger causes the exhaust port 36 to be moved to a point below the bottom of the cylinder thereby permitting the pressure in the chamber 27 to be suddenly exhausted. Inasmuch as the exhaust of pressure from the chamber 26 is not as rapid, the downward speed of the plunger will be suddenly increased causing the striker to engage the bell and as it does so the pressure in the chamber 26 becomes diminished so as to permit the plunger to start upwardly when the striker starts to move to its gravitated position.

The body of the plunger may be made to have a rather snug sliding fit within the cylinder.

In order, however, that the pressure may readily pass into the pressure chamber 26 lying above the head of the plunger by passage through the joint between the head of the plunger and the cylinder, the fit of the head within the cylinder should not be an especially snug fit. In other words, the fit of the head of the plunger within the cylinder should not be so close a fit as that of the body of the plunger within the cylinder. Attention is also directed to the fact that when the exhaust is open to the atmosphere the immediate inlet to the exhaust lies below the head of the plunger where the exhaust of pressure is most needed.

But little air is used in the operation of the bell ringer. In practice air under a pressure of from 90 to 130 pounds is employed. Very little air will be lost even when the exhaust is open which is only for short intervals of time. Pressure of air will at all times be maintained within the pressure chamber 26 above the plunger inasmuch as only such amount of air will be allowed to exhaust from this chamber as will permit of the return of the tongue to its normal gravitated position.

The bell ringer operates with a very moderate stroke of from 50 to 60 strokes a minute.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States:—

1. In a striker mechanism for a bell having a striker movable into and out of engagement with the bell, the combination therewith of mechanism for moving the striker including a body providing a cylinder having an enlarged portion, said body having an inlet passage communicating with the cylinder for supplying fluid under pressure, a plunger having a body portion movable in said cylinder and an enlarged head movable in the enlarged portion of the cylinder, said plunger and cylinder having cooperating surfaces adapted to permit an increased inflow of fluid under pressure as said plunger rises above a predetermined position, said plunger and body having means adapted to cooperate when said plunger has moved to a predetermined position to exhaust fluid under pressure from said enlarged portion of the cylinder.

2. In a striker mechanism for a bell having a striker movable into and out of engagement with the bell, the combination therewith of mechanism for moving the striker including a body providing a cylinder having an enlarged portion, said

body having an inlet passage communicating with the cylinder for supplying fluid under pressure, a plunger having a body portion movable in said cylinder and an enlarged head movable in the enlarged portion of the cylinder, said plunger having an annular groove which as said plunger is moved is brought into and out of registry with said inlet passage, said plunger and body having means adapted to cooperate when said plunger has moved to a predetermined position to exhaust fluid under pressure from said enlarged portion of the cylinder.

3. In a striker mechanism for a bell having a striker movable into and out of engagement with the bell, the combination therewith of mechanism for moving the striker including a body providing a cylinder having an enlarged portion, said body having an inlet passage communicating with the cylinder for supplying fluid under pressure, a plunger having a body portion movable in said cylinder and an enlarged head movable in the enlarged portion of the cylinder, said plunger having an annular groove which as said plunger is moved is brought into and out of registry with said inlet passage, said plunger and body having means adapted to cooperate when said plunger has moved to a predetermined position to exhaust fluid under pressure from said enlarged portion of the cylinder, said means including a passage in the body of said plunger adapted to communicate at one end with the enlarged portion of said cylinder and adapted to communicate at its other end with the atmosphere when said plunger has moved to said predetermined position.

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