

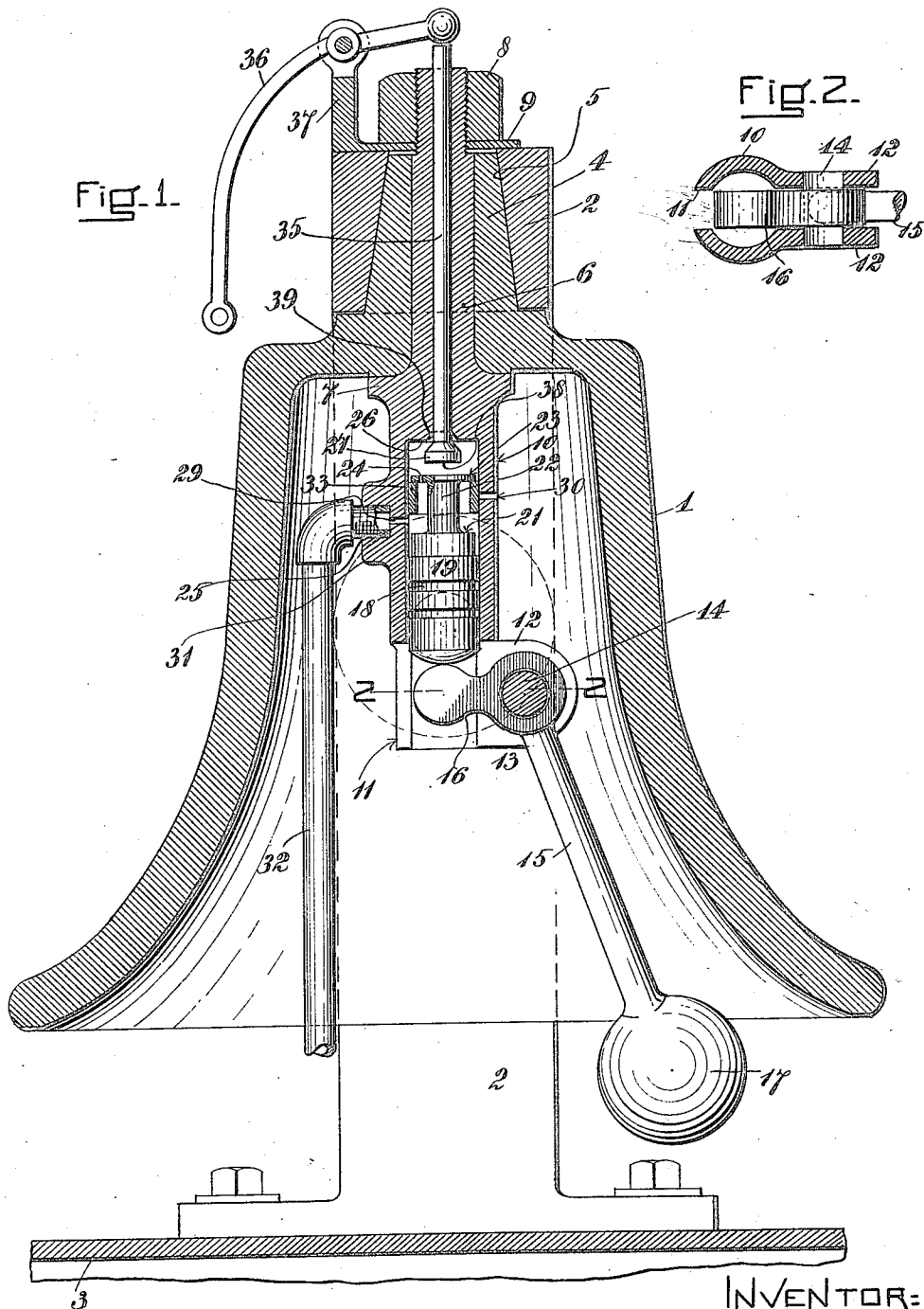
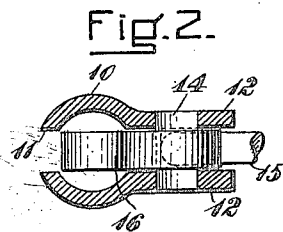
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A. L. BRIDGHAM

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BELL RINGER

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INVENTOR:
Arthur L. Bridgham
BY John E. R. May
ATTORNEY:

UNITED STATES PATENT OFFICE.

ARTHUR L. BRIDGHAM, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO
HARRY W. MAXWELL, OF WOLLASTON, MASSACHUSETTS.

BELL RINGER.

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The invention relates to an improvement in bell ringers of a type in which the bell is rung by application of fluid pressure though permitting of manual ringing as occasion may require.

The essential object of the invention, apart from the obtaining of a bell-ringing mechanism of practical and economic structure, is to obtain one capable of so ringing the bell that there will be a proper time interval between its strokes, the ringing being more or less comparable with hand ringing. A difficulty which has hitherto been encountered with a mechanical bell ringer is that it is apt to ring the bell too violently and too fast, and my object is to obviate this difficulty.

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

Figure 1 is a view partly in cross section and partly in side elevation of a bell equipped with a bell-ringing mechanism embodying the invention, and

Fig. 2 is a front elevation of a detail of construction to which reference will later be made.

Referring to the drawings:—

1 represents the bell fixed to a yoke 2 from the head of which the bell hangs suspended. The yoke is secured to any suitable base of support 3. The bell is provided with a frusto-conical top extension 4 which fits within a socket 5 in the head of the yoke and into which it is drawn and tightened and the bell fastened to the yoke by means of a bolt 6 the head 7 of which bears against the interior of the top wall of the bell while the shank of the bolt extends through the top of the bell and through its top extension 4 with threaded end projecting above the extension and beyond the adjacent top side of the yoke. On the threaded end of the bolt thus projecting is arranged a tightening nut 8 which bears against the top side of the yoke, a washer 9 being interposed between the nut and the yoke. With the parts thus arranged, when the nut is tightened the bell will become securely fixed to the yoke.

Fixed to the head 7 of the bolt and preferably by integral connection is a cylinder 10 which projects into the chamber of the bell. The bottom end 11 of this cylinder is cleft and projecting laterally from the cleft portions thereof are spaced ears 12 to which is

pivoted a lever 13 by a pin 14. The lever comprises arms 15 and 16, respectively. Of these the arm 15 forms the bell tongue or clapper by which the bell is sounded. The arm bears upon its end a ball striker 17 which gives weight to the arm. The arm 16 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 15 and extends laterally into the cleft end of the cylinder 10 where it may be engaged by a plunger 18 working within the cylinder. The weighted arm 15 of the lever which in so far as the lever is concerned controls the position of the arm 16, will normally hang pendant inside the chamber of the bell from the fixture to which it is pivoted and from this pendant position it is turned to strike the bell. The relative disposition of the arms 15 and 16 of the lever is such that the arm 16 will continue to be contained within the lower end of the cylinder 11 whether the arm 15 is occupying either a gravitated or striking position. In other words, the arm 16 will occupy such position with relation to the plunger 18 operating within the cylinder as to be capable of being acted upon or of acting upon this plunger whatever the position of the arm 15 of the lever may be.

The plunger 18 working within the cylinder 10 is provided with outstanding ribs or rings 19 by which it has a snug sliding fit within the cylinder. It is the lower end of the plunger which engages the arm 16 of the lever 13. On its upper end the plunger presents a shoulder 21 from which rises a contracted neck portion 22 bearing upon its end a head 23 with ports or openings 24 through it. There is thus left between the shoulder 21 of the plunger and its head 23 an annular chamber 25 within the cylinder 10. The disposition and arrangement of the plunger with relation to the top end 26 of the cylinder are such that a chamber 27 will be left between the end 26 of the cylinder and the head 23 of the plunger. The cylinder 10 is also provided with inlet and outlet ports 29 and 30, respectively, for the admission and escape of fluid pressure. The inlet port 29 is arranged to pass through the wall of the cylinder and communicate with the annular chamber 25 between the shoulder 21 and the head 23 of the plunger. The outlet port 30 is arranged to communicate with the chamber 27

above the head of the plunger whereby fluid pressure may escape therefrom to the atmosphere during the operation of the device as will later be explained. Adjacent the inlet port 29 the cylinder is thickened by an annular boss 31 and having threaded connection with this boss is a fluid inlet pipe connection 32 by which fluid under pressure, preferably compressed air, is admitted through the port 29 to the chamber of the cylinder for actuating the plunger and thereby turning the lever 23 for operating the bell clapper or tongue for ringing the bell as will presently be explained.

Located within the chamber 25 in the cylinder 10 and between the shoulder 21 and head 23 of the plunger is a valve 33 which controls the inlet and outlet ports 29 and 30, respectively. This valve is in the nature of a short internal sleeve slidable upon the interior of the cylinder and covering its respective ports depending upon the moved position of the valve. The valve has a snug sliding fit on the interior wall of the cylinder so that it will maintain any position to which it is moved.

The general operation is as follows:—

The operating parts as shown in Fig. 1 are occupying the relative positions occupied by them at about the beginning of the period when the fluid pressure is acting upon the plunger for turning the lever 13 and thereby actuating its tongue or clapper element to strike the bell. At this time it will be seen that the valve 33 is occupying a position where it leaves uncovered the inlet port 29, but covers and thereby closes the outlet port 30. Fluid pressure then entering by way of the pipe 32 and inlet port 33 will pass into the chamber 25 within the cylinder 10 and thence by way of the ports 24 in the head 23 of the plunger will pass into the chamber 27 in the cylinder above the head of the plunger. The pressure will then be kept from escaping through the outlet port 30 by the valve. The pressure thus contained in the respective chambers will operate to move the plunger downward. As the plunger moves downward it will operate to turn the lever 13 and thereby actuate its tongue or clapper element to strike the bell. As the plunger is moved downward, its head engaging the valve 33 will move the valve downward within the cylinder 10 and at about the time the tongue or clapper has been moved into striking engagement with the bell the valve 33 will have been moved by the head of the plunger to a position where it covers and thereby closes the inlet port 29 and opens the outlet port 30. Thereupon the fluid pressure is cut off and any fluid pressure already contained within the cylinder is allowed to escape to the atmosphere. The fluid pressure thus being cut off, the lever 13 will be permitted to turn back in the direction of its normal gravi-

tated position, its tongue or clapper then moving away from the bell. As the lever thus turns back, actuated by gravity, it will operate to lift the plunger. At about this instant the shoulder 21 on the plunger will be occupying a position spaced from and below the lower side of the valve. Accordingly the valve remaining closed and no fluid pressure being admitted to the cylinder, the lever will have opportunity to gravitate back toward its normal position an appreciable amount or until the plunger has been lifted to a point where its shoulder 21 will engage the valve 33 and elevate the valve until it uncovers the inlet port 29 and closes the outlet port 30 or, in other words, occupies a position substantially as shown in Fig. 1. When the plunger has thus raised the valve to its open position by the engagement of its shoulder 21 as just noted, the head 23 of the plunger will have been elevated to a position above the valve 33. Thereupon the valve, leaving open the inlet port 29, closes the outlet port 30 and fluid pressure will be allowed to enter the chambers 25 and 27 within the cylinder and thereupon will operate to depress the plunger and turn the lever 13 for striking the bell, which action continues until the head of the plunger engages the valve 33 when the operation continues as just described.

It will be observed in connection with this operation that the pressure is acting to actuate the tongue or clapper for striking the bell only at timed intervals. That is, there is a certain lag in the operation of the parts which permits the lever 13 and its tongue or clapper element, which does the actual striking, to turn back from a striking position by gravity and accordingly with more or less slowness of movement. Consequently though fluid pressure is employed to actuate the tongue or clapper for striking the bell, yet there is a certain relatively slow precision in the striking operation so that the tones of the bell will be separate and distinct and not run together.

In addition to the mechanism above described for ringing the bell by application of fluid pressure, provision is also made by which the bell may be rung manually. To this end a rod 35 is passed down through the bolt 6 and through the end of the cylinder 10 so that the inner end of the rod may engage the head 23 of the plunger 18, the outer end of the rod thus extending above and beyond the end of the bolt. Thus arranged, upon an application of pressure to the upper end of the rod it will be moved downward to engage the plunger and the plunger will be moved downward by it, thereby turning the lever 13 from its normal gravitated position into its active or engaging position where its arm 15 acting as a clapper will strike the bell. Thereupon pressure on the rod 35 being released, the lever will be allowed to fall back

to its normal gravitated position, both plunger and rod then being lifted, when the operation may be repeated.

For applying pressure to the rod 35 a lever 36 is employed mounted to turn upon a standard 37 preferably fitted to the washer 9 which is interposed between the yoke 2 bearing the bell and the nut 8. The lever 36 may be turned through a flexible connection (not shown) secured to its operating arm.

In order to prevent fluid pressure escaping upward by way of the opening through the end of cylinder and bolt within which the rod 35 is slidably mounted, the inner end of the rod is provided with a valve 38 which lies within the chamber 27 of the cylinder. This valve is adapted to close against a valve seat 39 formed on the end 26 of the cylinder around the opening through which the rod extends. When the valve is closed engaging its seat fluid pressure is prevented from escaping through the opening, and the valve will be closed upon entry of the fluid pressure into the chamber 27, the pressure then acting upon the head of the valve lying within this chamber for closing it.

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

1. The combination with a bell, of a striker arranged to swing between an engaging position and a disengaging gravitated position, mechanism operable by fluid pressure active when the striker is in its gravitated position for moving the striker from its gravitated position to its striking position, means for the introduction of fluid pressure to said mechanism, and means automatically controlled by said mechanism excluding said fluid pressure and permitting of the return by gravity of the striker from its engaging position to its gravitated position.

2. The combination with a bell, of a striker arranged to swing between an engaging position and a disengaging gravitated position, mechanism operable by fluid pressure active when the striker is in its gravitated position for moving the striker from its gravitated position to its striking position, means for the introduction of fluid pressure to said mechanism, a valve for controlling the introduction of the fluid pressure to said mechanism, and means whereby said mechanism will close said valve when the striker has attained its striking position and permit of the continued closure of said valve during the return of the striker from its striking position to its disengaging gravitated position and will open said valve when the striker is in its gravitated position.

3. The combination with a bell, of a lever comprising in part a striker adapted to have a normal gravitated disengaging position or an engaging position dependent upon the turned position of the lever, a cylinder, a

plunger reciprocable within the cylinder and in normal engagement with the lever, means for pivotally arranging the lever whereby it may be turned and its striker moved from a gravitated disengaging position into an engaging position by the plunger as the plunger is moved in one direction and the plunger be moved in a reverse direction by said lever when its striker by the turning of said lever is permitted to resume its disengaging gravitated position away from its engaging position, means whereby fluid pressure may be admitted to said cylinder for moving the plunger in said one direction, and means for automatically controlling said fluid pressure whereby it may be admitted to move the plunger in said one direction when the striker is in its gravitated disengaging position and the fluid pressure be excluded from the cylinder and plunger after the striker has attained a striking position and during its return to its gravitated position.

4. The combination with a bell, of a lever comprising in part a striker adapted to have a normal gravitated disengaging position or an engaging position dependent upon the turned position of the lever, a cylinder having fluid-pressure inlet and outlet ports, respectively, a plunger reciprocable within the cylinder having a body portion presenting a shoulder, a contracted neck portion and a head, said plunger being in normal engagement with the lever, a valve within the cylinder interposed between the head and shoulder portions of the plunger for controlling the respective ports in the cylinder depending as the plunger is moved in reverse directions, means for pivotally arranging said lever whereby it may be turned and its striker moved from a gravitated disengaging position into an engaging position by the plunger as the plunger is moved in one direction and the plunger be moved in a reverse direction by said lever when its striker by the turning of said lever is permitted to resume its disengaging gravitated position away from its engaging position, and means for admitting fluid pressure to the inlet port of the cylinder.

5. The combination with a bell, of a lever comprising in part a striker adapted to have a normal gravitated disengaging position or an engaging position dependent upon the turned position of the lever, mechanism operable by fluid pressure active to turn the lever when its striker is in its gravitated position for moving the striker from its gravitated position to its striking position, said mechanism including a plunger in normal engagement with said lever, means for pivotally arranging the lever whereby it may be turned and its striker moved from a gravitated disengaging position into an engaging position by the plunger as the plunger is moved in one direction and the plunger be moved in a reverse direction by said lever when its striker

by the turning of said lever is permitted to resume its disengaging gravitated position away from its engaging position, means for the introduction of fluid pressure to said 5 mechanism, means for automatically controlling the fluid pressure whereby it may be admitted to move the plunger in said one direction when the striker is in its gravitated disengaging position and the fluid pressure be excluded from the plunger after the striker 10 has attained a striking position and during its return to its gravitated position, and means whereby said plunger may be manually moved in said one direction for turning the lever, said means including a push rod 15 and means for manually operating said rod.

ARTHUR L. BRIDGHAM.