

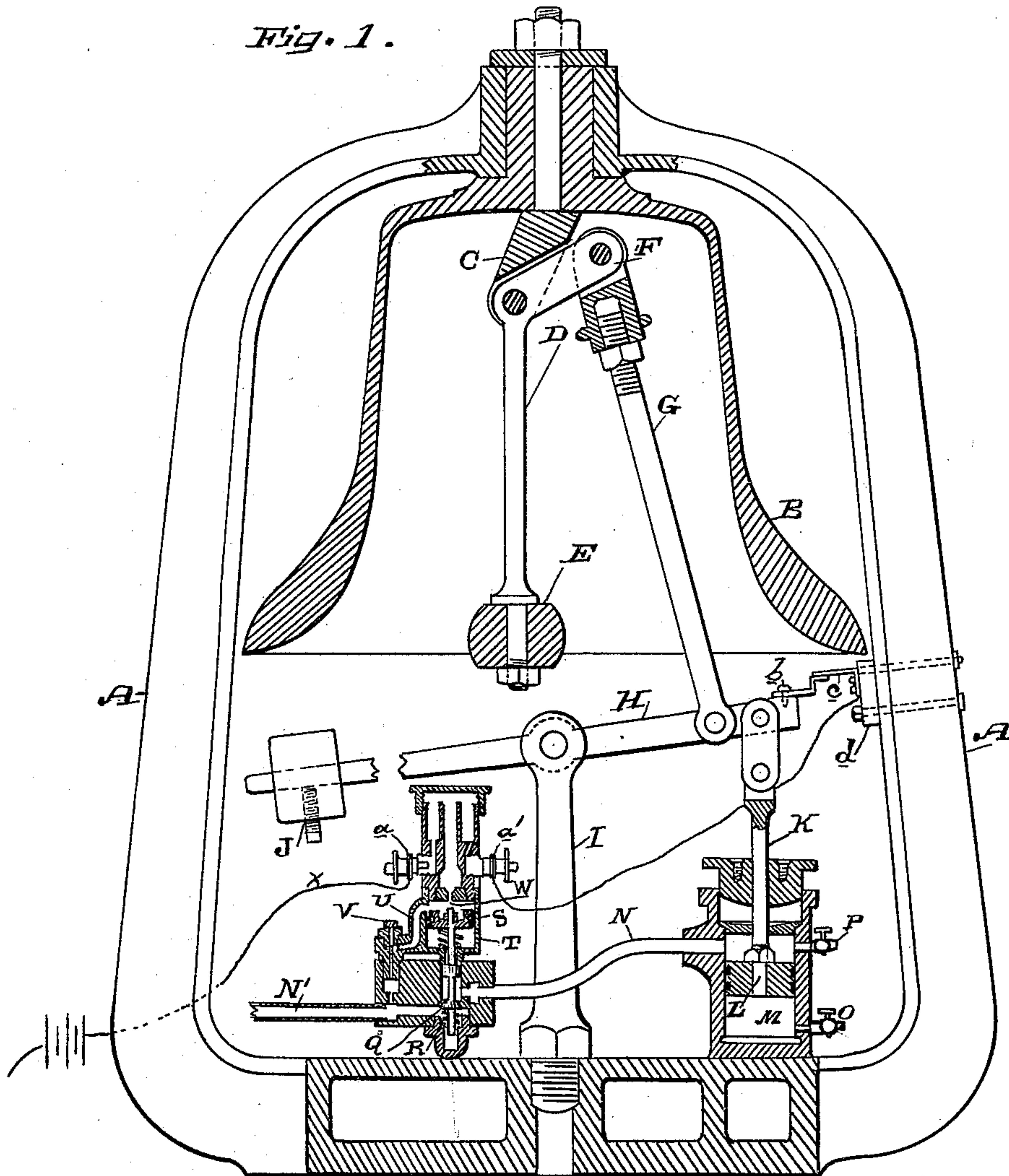
(No Model.)

2 Sheets—Sheet 1.

W. W. SLATER.
AUTOMATIC BELL RINGER.

No. 408,440.

Patented Aug. 6, 1889.



Witnesses,
Geo. H. Strong
J. H. Morse

Inventor,
William W. Slater
By Dwyer & Co.
attys

(No Model.)

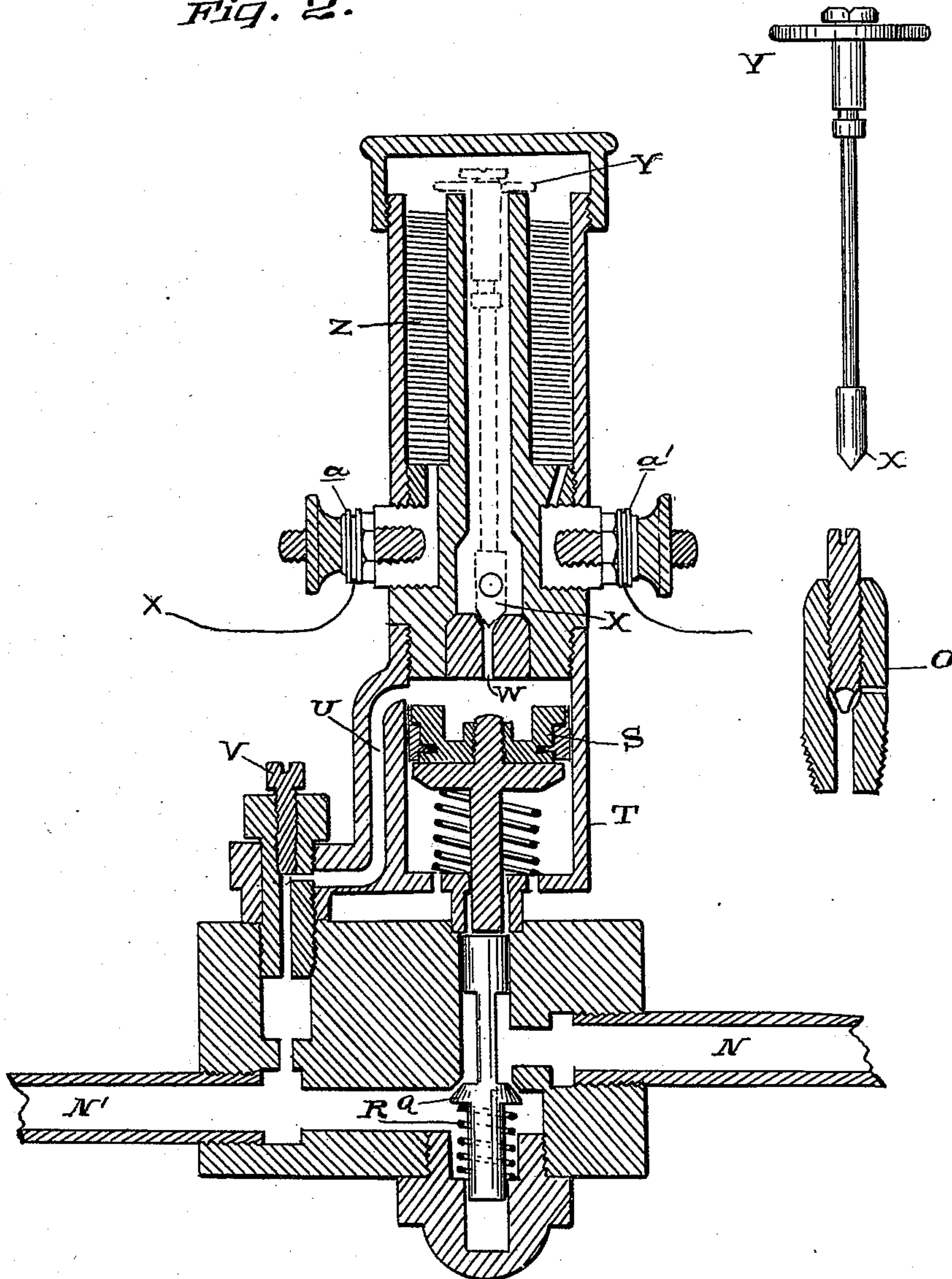
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Fig. 2.



Witnesses,
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UNITED STATES PATENT OFFICE.

WILLIAM W. SLATER, OF OAKLAND, CALIFORNIA.

AUTOMATIC BELL-RINGER.

SPECIFICATION forming part of Letters Patent No. 408,440, dated August 6, 1889.

Application filed March 30, 1889. Serial No. 305,453. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. SLATER, of the city of Oakland, county of Alameda, State of California, have invented an Improve-
5 ment in Automatic Bell-Ringers; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a device for auto-
10 matically ringing a bell. It is especially adapted to ring cautionary or alarm bells—such as are employed at railroad-crossings—and for other similar purposes.

It consists of a bell fixed in a suitable sup-
15 porting-frame and having a swinging tongue or clapper with a mechanism for actuating the same, which is operated by the pressure of air upon a piston within a cylinder, and in connection therewith of an electro-magnet de-
20 vice, whereby the valve is opened to admit air to the operating-cylinder, the circuit being alternately made and broken by the movement of the piston.

Referring to the accompanying drawing for a more complete explanation of my inven-
25 tion, the figure is a vertical section taken through the bell and the air-cylinder, showing also the connecting-levers and the valve-operating electro-magnet and mechanism.

A is the frame, mounted upon the top of a
30 post or other suitable support and having the bell B fixed within it by means of a shank and bolt at the top or by other suitable or convenient device. In the present case I have shown a bolt for this purpose having a
35 downwardly-projecting forked end C, within which is fulcrumed a bell-crank lever, one arm D of which hangs vertically when in its normal position and carries the tongue or clapper E, which is secured to its lower end,
40 as shown. The other end F of the bell-crank lever has connected with it a rod G, with a suitable adjusting-screw to regulate the length of the rod, and the lower end of this rod is connected with a lever H, which is cen-
45 trally fulcrumed upon a post I, fixed upon the base of the frame-work A, as shown. The lever G connects with this lever H near one end, and upon the opposite end of H is a counter-weight J, which is fitted to slide upon the
50 lever, and may be adjusted to any desired

point to counterbalance the mechanism connected with the opposite end of the lever.

Connected with the end of the lever H near the point of attachment of the rod G is the piston-rod K, which extends upward from the
55 piston L within the cylinder M, and is connected with the lever by a suitable link, which admits a vertical motion of the piston-rod, while allowing the circular motion of the end of the lever H.
60

A pipe N opens into the cylinder above the piston L, and when air is admitted into this cylinder through the pipe its effect is to force the piston down, and acting upon the lever
65 H, the rod G, and the bell-crank lever which carries the clapper the latter is caused to swing and strike the side of the bell with a degree of force dependent upon the pressure of air, and also upon the amount of cushion at the bottom of the piston. This latter is
70 regulated by means of a small discharge-opening at the bottom of the cylinder, which is controlled by an adjusting-screw or petcock O, which will allow the air to escape
75 from beneath the piston when the latter is forced down by pressure from above, but which will cushion the piston by adjusting the cock or screw so as to allow the air to escape more or less rapidly. Above the piston
80 and opposite the inlet-pipe is another adjusting-screw or petcock P, by which the air is allowed to escape after it has performed its office of forcing the piston down, the weight
85 of the counter-balance J upon the lever H and that of the clapper or tongue acting to return the piston, and by adjusting the discharge at this point by means of the cock or screw the speed with which the piston returns after the air-supply has been cut off
90 will be regulated.

The air-supply pipe is of sufficient size so that when its valve is opened the air which is admitted will always be sufficient to force the piston down with rapidity, notwithstanding that a small portion of the supply will escape
95 through the cock P; but the amount escaping is so much less than the supply that it does not interfere with the action of the piston, while the opening P is sufficiently large to
100 discharge the air after the supply has been

cut off. By this construction I avoid the complication of valves or similar devices in connection with the cylinder. The supply of air is furnished, as before stated, through the
 5 pipe N, and this pipe has in it a puppet-valve Q, which is closed by the action of a small spring R, as well as the pressure of air upon its back. This valve is opened by means of
 10 a piston S, working in a cylinder T and having a stem or plunger extending downward through the bottom of the cylinder and pressing upon the upper end of the valve-stem. When the piston moves downward, this temporarily forces the valve open, allowing the
 15 air to pass freely into the operating-cylinder of the bell-clapper. This piston S is actuated by the pressure of the air which is admitted from the main pipe through a passage U, the supply being controlled by an adjusting-
 20 screw V, by which it may be regulated. W is an opening in the upper end of the cylinder T, which is of sufficient size to allow the air which enters through the passage U to escape without acting upon the piston S; but if the passage W be closed temporarily
 25 the pressure of air will accumulate sufficiently to force the piston S down within its cylinder, and thus open the valve Q, and thus admit air to the bell-operating cylinder. In order
 30 to close this passage W, I have shown a valve X, which fits into the seat at the upper end of this discharge-passage W, and has a shank extending upwardly and connecting with an armature Y above the solenoid or electro-
 35 magnet Z, this electro-magnet being in the present case shown as arranged in line above the cylinder T. The wires from the battery and to the ground, respectively, are connected by means of holding-screws *a*, so that when
 40 the circuit is completed the current, passing from the battery to *a*, thence through the solenoid Z, thence through *a'* to *c*, and thence to the ground through contact *b*, will act upon the armature Y and temporarily force the
 45 valve X down upon its seat, which will close the passage W, so that the air entering through the passage U will act upon the piston S and force it down and open the valve Q, and thus admit air to the bell-operating cylinder M. The circuit is closed when the bell-operating
 50 piston L rises by means of two strips or bars *b* and *c*. The strip *b* is secured to the end of the lever H, and the strip *c* is secured to a hard-rubber insulating-piece *d*, which is fixed
 55 at some convenient point upon the frame A, as shown, and the battery is connected with the strip *c* through the solenoid, so that when the strip *b* comes into contact with *c* it will complete the circuit and operate the electro-
 60 magnet Z and open the air-valve, as before described. This completion of the circuit takes place at each rise of the piston and the lever H after a stroke of the clapper has taken place, and it will be manifest that the strokes
 65 of the bell may be made as fast and as forcible

as may be desired by regulating the air-escape passages in the cylinder M, whereby the movement of the piston L is made rapid or slow, and the cushion is correspondingly made greater or less to make a lighter or
 70 heavier blow upon the bell.

The whole operation is automatic, and as long as a supply of air under pressure is contained in the pipe N the bell will continue to ring unless stopped by cutting off the elec-
 75 tric circuit or the supply of air.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A fixed bell having a swinging clapper 80 connected with the piston-rod and a piston reciprocating within a cylinder, an air-supply pipe admitting air to one side of said piston, so as to force it to the end of its stroke, and an escape-passage with a controlling screw or
 85 cock of smaller capacity than the air-supply pipe, through which the air may escape after the supply has been cut off, substantially as described.

2. The cylinder having the reciprocating 90 piston, the rod of which is connected with the swinging clapper of a fixed bell, said cylinder having an inlet-pipe through which air is admitted to force the piston to one end of its stroke, an air-escape passage of smaller ca-
 95 pacity than the supply-pipe, with a regulating cock or screw, and a second escape-passage below the piston, with a regulating cock or screw, substantially as and for the purpose as herein described. 100

3. The fixed bell with the swinging clapper and the cylinder having the reciprocating piston and piston-rod, whereby the clapper is actuated, and an air-supply pipe leading into
 105 said cylinder, in combination with a valve closing said pipe, a second piston moving within its cylinder and acting to open said valve, a passage through which air is continuously supplied above said secondary piston and a sec-
 110 ond passage through which it is allowed to escape without acting upon the piston, and a valve controlling the escape-passage and operated by an armature of an electro-magnet so as to close said escape-passage and allow
 115 the air to act upon the piston in the secondary cylinder so as to open the main air-valve, substantially as herein described.

4. The bell-swinging clapper-piston moving within a cylinder and connected with said clapper so as to actuate it, an air-supply pipe 120 connected with the cylinder and having a valve by which a supply is cut off, a second cylinder with a piston, whereby said valve is opened, and passage through which air is supplied to and escapes from the secondary
 125 cylinder without acting upon its piston, in combination with a valve by which said passage may be closed so as to imprison the air within the cylinder, an electro-magnet by which said valve is actuated and contact- 130

point whereby the circuit is closed, one of
said points being stationary and the other
connected with the upper end of the clapper-
actuating piston-rod, so that the clapper re-
5 turns to its normal condition after contact is
made and the valve opened to supply air
to the cylinder, substantially as herein de-
scribed.

In witness whereof I have hereunto set my
hand.

WILLIAM W. SLATER.

Witnesses:

GEO. H. STRONG,
S. H. NOURSE.