(No Model.) 2 Sheets—Sheet 1.

I. H. SPENCER.

BELL RINGER FOR LOCOMOTIVES.

No. 436,271. Patented Sept. 9, 1890.

Fig. I.

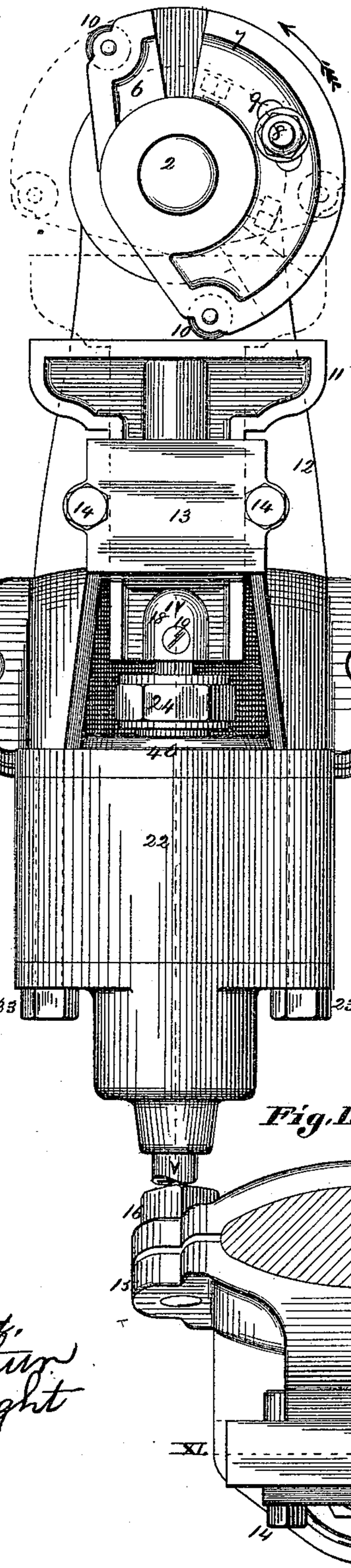

Fig. II.

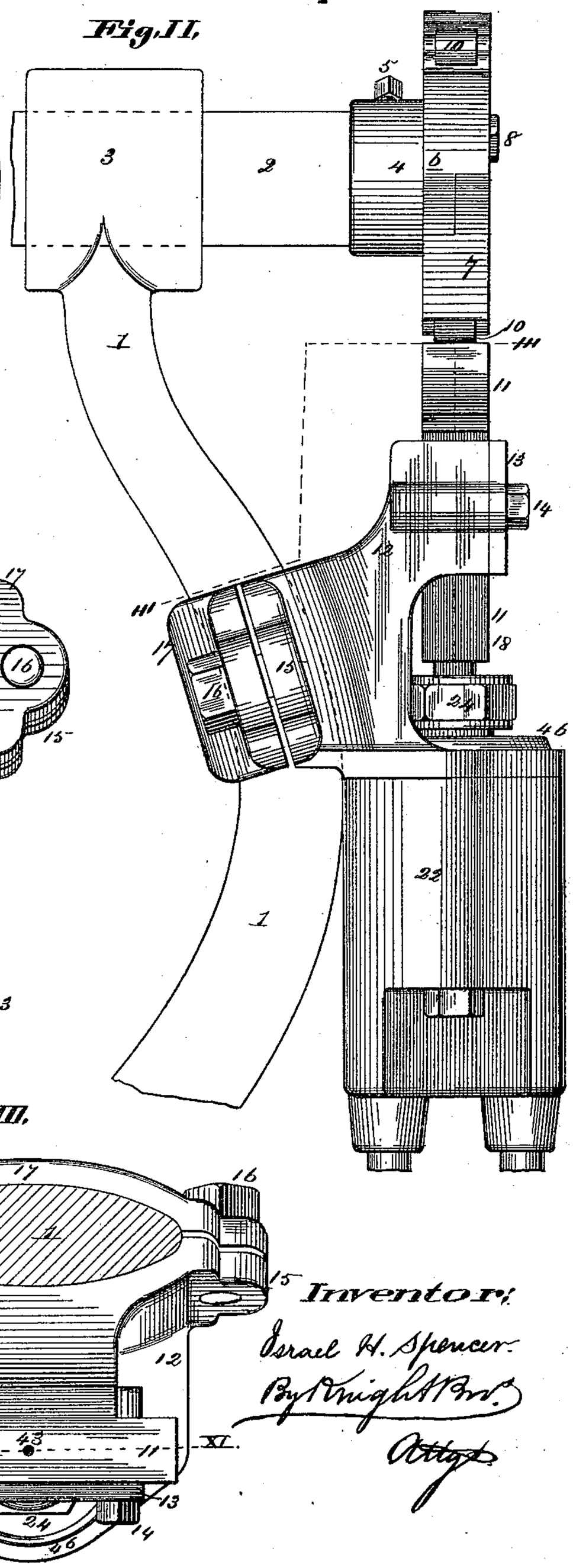

Fig. III.

Attest,
E. Arthur
S. S. Knight

Inventor:
Israel H. Spencer.
By Knight Bros.
Attys.

(No Model.) 2 Sheets—Sheet 2.

I. H. SPENCER.

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Fig. IV.

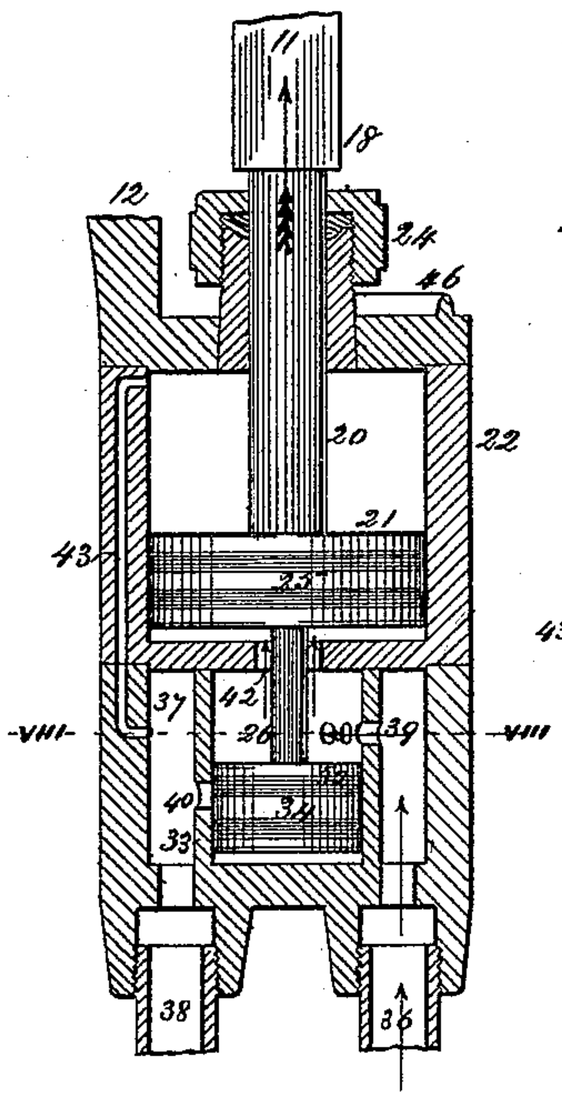


Fig. VI.

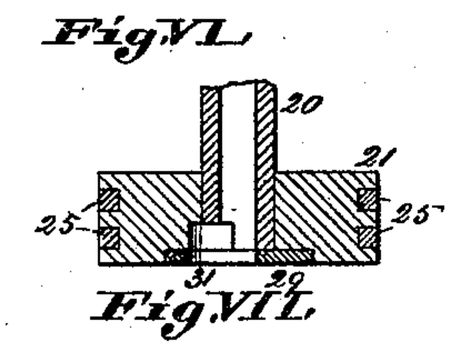


Fig. VII.

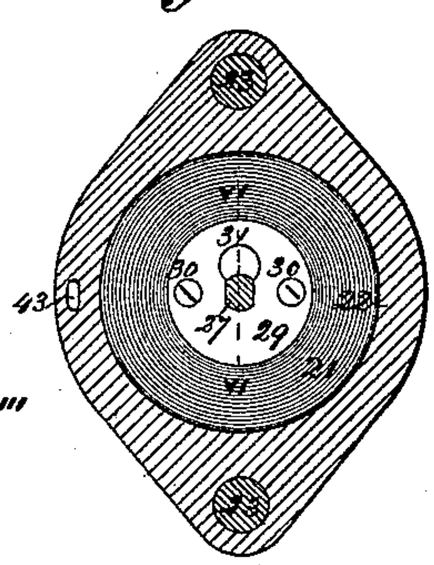


Fig. V.

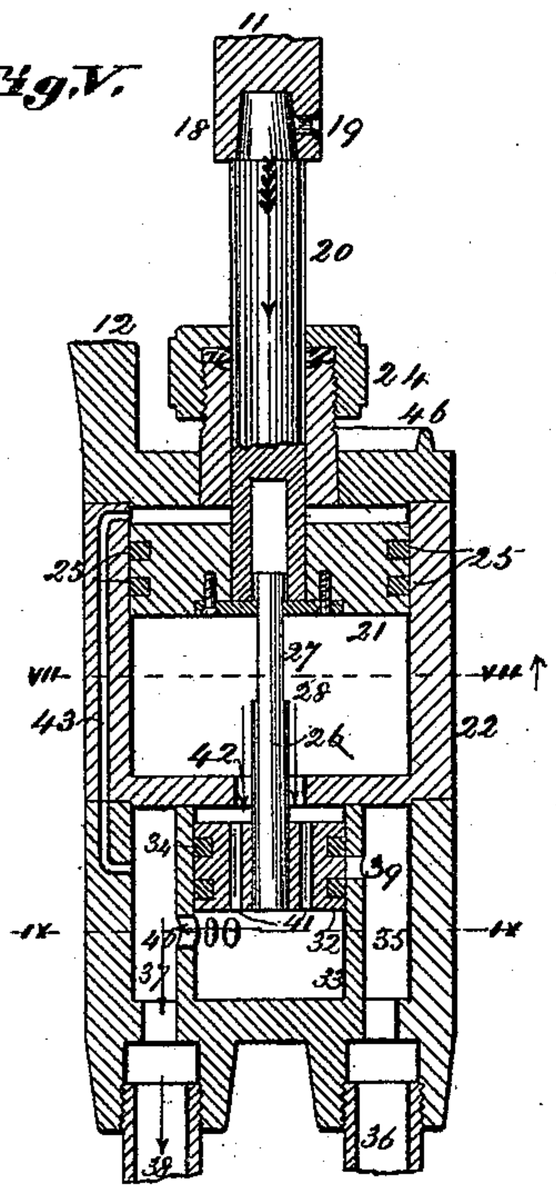


Fig. VIII.

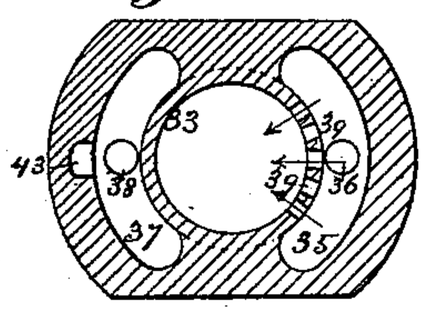


Fig. X.

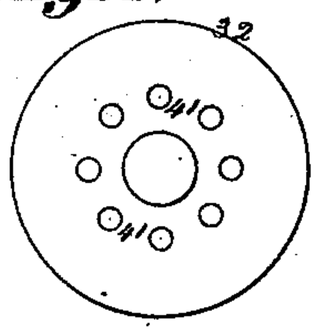


Fig. IX.

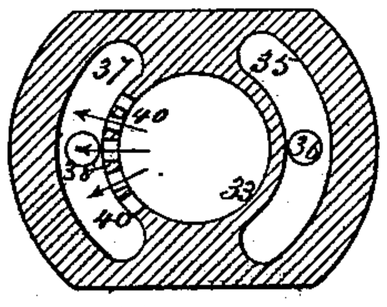


Fig. XI.

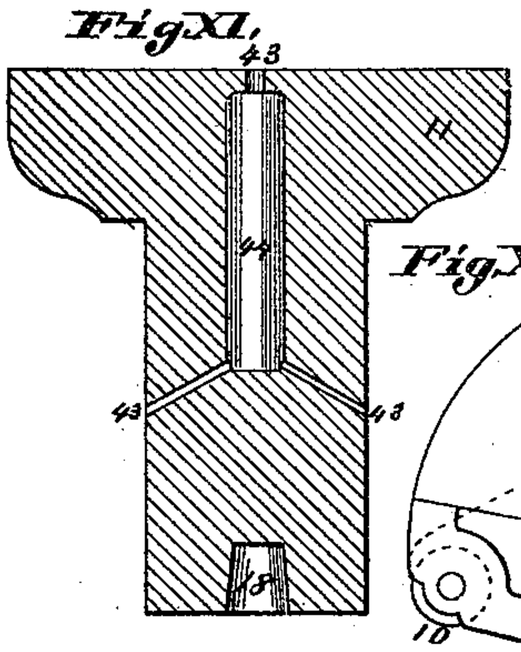


Fig. XII.

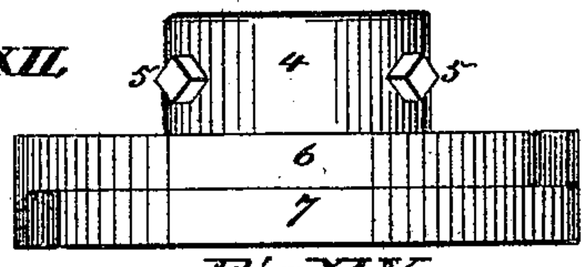


Fig. XIII.

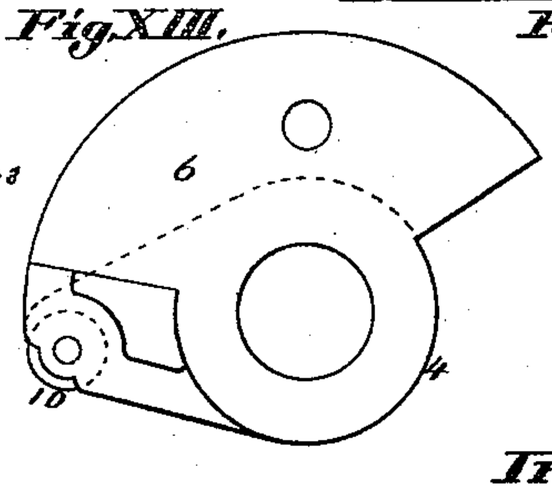
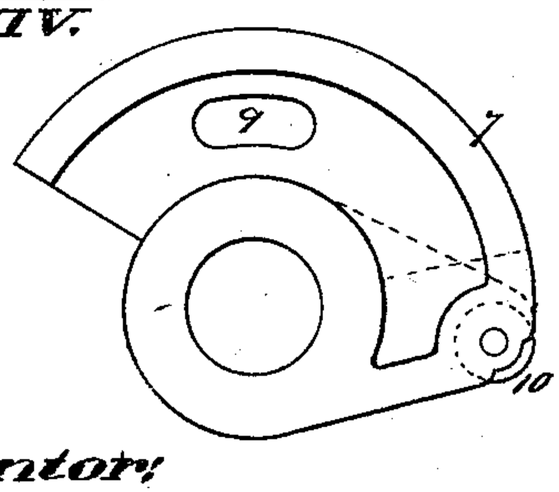


Fig. XIV.



Attest:
E. Arthur.
S. H. Knight.

Inventor:
Israel H. Spencer.
By Knight Bros.
Attys.

UNITED STATES PATENT OFFICE.

ISRAEL H. SPENCER, OF ST. LOUIS, MISSOURI.

BELL-RINGER FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 436,271, dated September 9, 1890.

Application filed September 30, 1889. Serial No. 325,561. (No model.)

To all whom it may concern:

Be it known I, ISRAEL H. SPENCER, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Bell-Ringers for Locomotives, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This is a device for automatically ringing the bell after it has been tilted by the usual bell-cord through means of a steam-engine and a cam upon the bell-shaft by which the slide-valve of the engine is opened to admit steam.

Figures I and II are elevations of the device. Fig. III is a section at III III, Fig. II. Figs. IV and V are sections at IV V, Fig. I, showing the valve and piston in different positions. Fig. VI is a vertical section of the piston at VI VI, Fig. VII. Fig. VII is a horizontal section at VII VII, looking upward and showing a bottom view of the piston. Fig. VIII is a horizontal section at VIII VIII, Fig. IV. Fig. IX is a horizontal section at IX IX, Fig. V. Fig. X is an enlarged bottom view of the valve. Fig. XI is a section of the lifting-head at XI XI, Fig. III. Fig. XII is a top view of the cam. Figs. XIII and XIV are side views of the parts of the cam separated.

1 is part of an ordinary stand-frame upon which the bell is supported.

2 is the rock-shaft upon which the bell is hung. The rock-shaft turns in usual bearings, one of which is shown at 3. 4 is the hub of a cam which is upon the shaft 2 and secured thereto by a key or set screw or screws 5. The cam may consist of a single piece, but preferably is composed of two parts 6 and 7, one of which 6 may be in one piece with the hub 4, as shown, while the other piece 7 is made adjustable on the piece 6 and is secured thereto by a set-screw 8, which passes through a slot 9 in the piece 7 and engages in the piece 6. At the salient corners of the parts 6 7 of the cam I prefer to place anti-friction rollers 10, which, as the bell swings and the rock-shaft 2 oscillates, come alternately in contact with the top of lifting-head 11, the cam being non-circular and its reduced or flat side being turned toward the said head. The shank or stem of the head slides in a guide-socket on a bracket 12.

13 is a removable cap or plate forming the front of the guide-socket and secured in place by screws 14. The bracket 1 has lugs 15, having screw-holes to take the screws 16, which pass through the clip-plate 17. The bracket and clip plate are formed to fit the standard, which constitutes one side of the frame 1, as seen in Fig. III, so that the bracket 12 is held rigidly to the standard.

The shank of the lifting-head has at its lower end a socket 18, which receives the upper end of the rod 20 of the piston 21. The end of the rod is held in the socket 18 by a set-screw 19 or other means. The piston works in a cylinder 22, which is secured to the bracket by screws 23. The bracket is spread out at bottom, so as to form the head of the cylinder, and has upon it a stuffing-box 24, through which the rod 20 passes. The piston has any suitable packing at 25. The rod 20 extends axially through the piston and has an axial bore receiving the upper end of the valve-stem 26, which works vertically therein as the piston moves upward and downward. The valve is moved by the piston, but there is no lost motion between them.

To enable the piston to draw the valve upward the stem is flattened at 27 from a point 28 to a point near its upper end, which upper end forms a head the full size of the rod. The flattened part of the stem fits in a slot made in a plate 29, which occupies a recess or counter-bore in the bottom of the piston, and which is held in place by screws 30. At one end of the slot is a round hole 31 the full size of the stem and communicating with the slot, so that in attaching the parts together the head of the stem may be passed upward through the hole 31 in the plate and then the flattened part moved transversely into the slot, when the side projections of the head prevent its being drawn downward through the slot.

The valve 32 has the form of an ordinary piston and works in a cylinder 33. It has circumferential packing 34. At one side of the valve cylinder or case 33 is a live-steam chamber 35 with steam-supply pipe 36, while upon the other side of the valve-cylinder is

an exhaust-chamber 37 with an exhaust-pipe 38.

The steam and exhaust chambers 35 and 37 communicate with the interior of the cylinder through orifices 39 and 40, respectively, the steam orifices or orifices 39 being closed when the valve is in upper position, as seen in Fig. V, the exhaust orifice or orifices 40 being closed when the valve is in the lower position, as seen in Fig. IV.

The valve has exhaust-steam passages 41 passing through it from top to bottom, the steam exhausting through them when the exhaust-orifice 40 is not closed by the valve, the exhaust-steam passing through the annular orifice 42, surrounding the valve-stem in the bottom of the cylinder 22. (See Figs. V and X.)

43 is an exhaust-steam passage extending from the upper part of the cylinder 22 to the exhaust-chamber 37. The shank of the lifting-head is lubricated in its bearing by oil supplied through oil-holes and chamber 44 45. (See Fig. XI.)

46 is a bead upon the cylinder-head, forming a shallow cup to catch oil drippings.

The operation of the device is as follows: The bell is normally at rest and the steam-pipe 36 is open, so that live steam fills the chamber 35. The induction-port 39 is at this time being closed by the valve 32. To cause the bell to ring it is tilted up by means of the ordinary bell-cord, which brings one of the corners or rollers 10 of the cam upon the top of the lifting-head 11, and the piston 21 and valve 32 are carried down into the position shown in Fig. IV, when the steam-port 39 is open and the exhaust-port 40 closed, so that the steam forces up the piston 21 to the position shown in Fig. V. Just before the piston reaches its upper position the valve 32 is drawn up, closing the induction-port 39 and opening the exhaust-port 40, so that the piston is free to descend. As the piston rises the head 11 presses against the corner or anti-friction roller 10 and tilts the bell over in the opposite direction, when the other corner or roller 10 of the cam comes in contact with the lifting-head and the bell is again tilted over. This movement continues until stopped by means of the hand-cord.

The action of the engine upon the bell may be regulated by means of the adjustable cam, for it will be seen that as the arc of the cam is increased the amplitude of movement in the bell will be increased, as it will be raised to a higher point by the cam.

The cam is shown and described in its preferred form—namely, made in two pieces adjustable upon each other. In a simpler form it may be in a single piece having the two projections at 10, or the projections may be upon separate cam-arms, either fixed rigidly to the shaft or made adjustable thereon, as indicated by dotted lines in Figs. XIII and XIV.

The anti-friction rollers 10 may be dispensed with and the cam have a fixed bearing of the same form.

I have described the apparatus as driven by steam, but do not confine myself to this means of driving. It is obvious that the apparatus may be driven by means of compressed air, and in many cases this would be done by connecting the induction-pipe 36 with an air-compressor.

I claim as my invention—

1. The combination, in a bell-ringing device, of a cam on the bell-shaft having salient corners or projections, and an engine having a lifting-head 11 upon the piston-rod adapted to receive the pressure of the said corners or projections, substantially as and for the purpose set forth.

2. The combination, in a bell-ringing device, of a rock-shaft, a bell on said shaft, a piston having a lifting-head, and a non-circular cam on said shaft having its flat or reduced side turned toward said head and adapted to impinge the latter as the bell oscillates, substantially as set forth.

3. The combination, in a bell-ringing device, of a cam on the shaft composed of two adjustable parts 6 7, and a lifting-head 11, adapted to receive the pressure of the cam, and attached to the rod 20 of a piston 21, substantially as set forth.

4. The combination, in a bell-ringing device, of a cam upon the bell-shaft 2, a lifting-head 11, a piston-rod 20 and piston 21, rigidly connected to the lifting-head, and a valve 32, connected to the piston, substantially as and for the purpose set forth.

5. The combination, in a bell-ringing device, of the shaft 2, a cam thereon, a lifting-head 11, rigidly attached to the piston-rod 20, and piston 1, cylinder 22, cylindrical valve 32, suspended from the piston and working in a cylinder 34, with induction and eduction ports 39 40 at different elevations, substantially as and for the purpose set forth.

6. The combination, in a bell-ringing device, of the shaft 2, a cam thereon, lifting-head 11, piston-rod 20, piston 21, cylinder 22, valve-stem 26, valve 32, and cylinder 34, with ports 39 40, the bottom of cylinder 22 and valve 32 having openings through them for the passage of the fluid medium used in driving the device, substantially as set forth.

ISRAEL H. SPENCER.

Witnesses:
SAML. KNIGHT,
E. S. KNIGHT.