(No Model.) 2 Sheets—Sheet 1.

A. G. HOLCOMBE.

CALL BOX FOR ELECTRICAL SIGNALING SYSTEMS.

No. 432,619. Patented July 22, 1890.

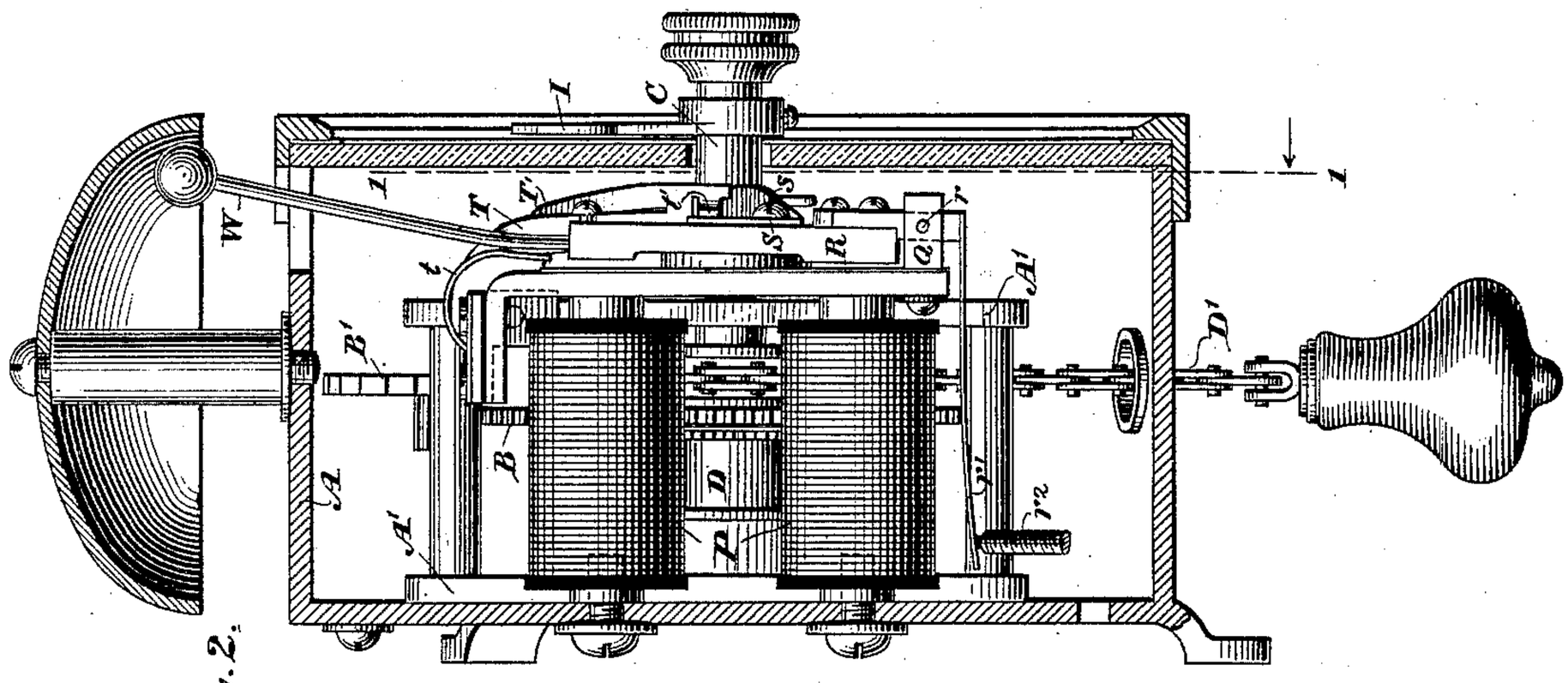
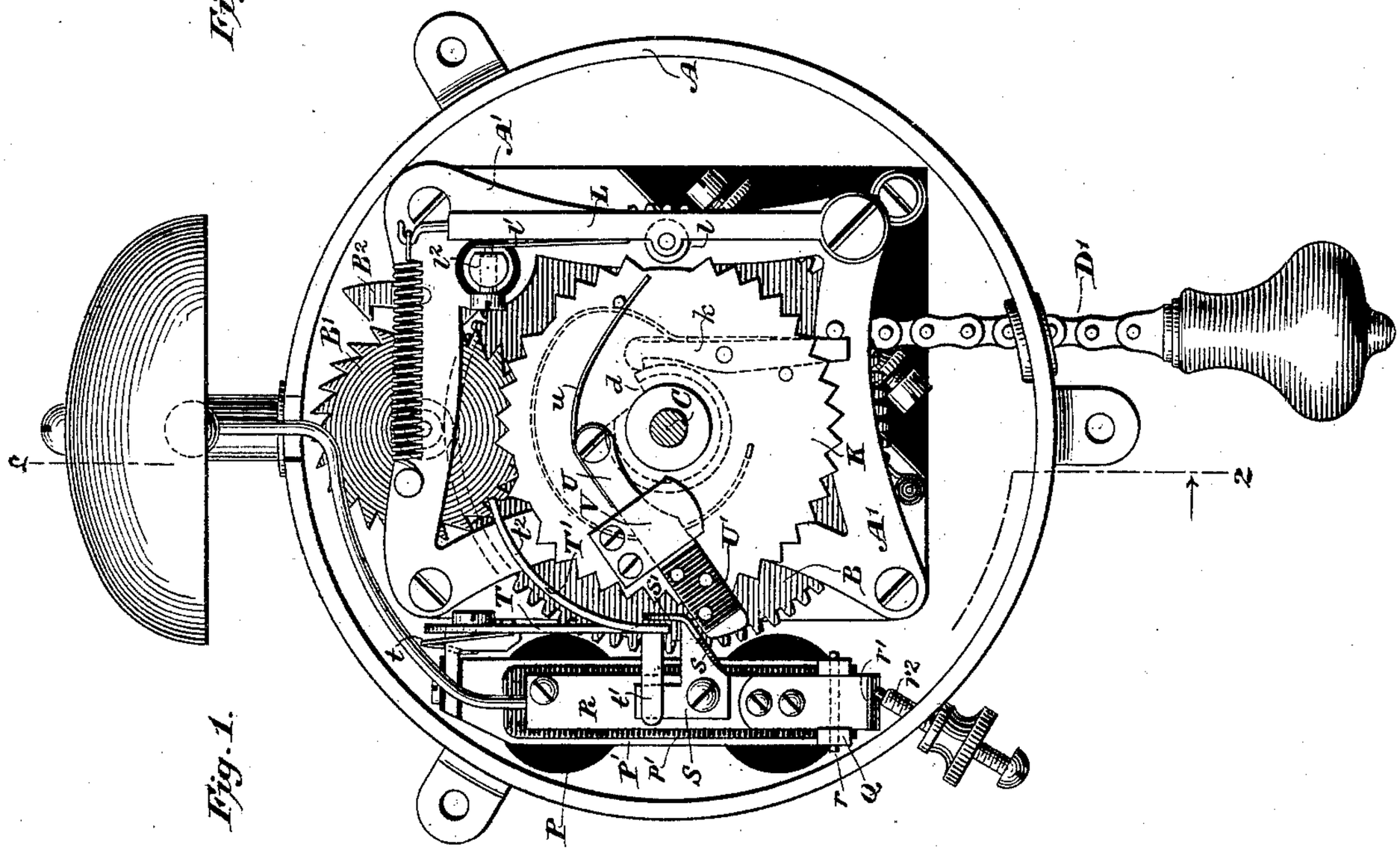


Fig. 2.



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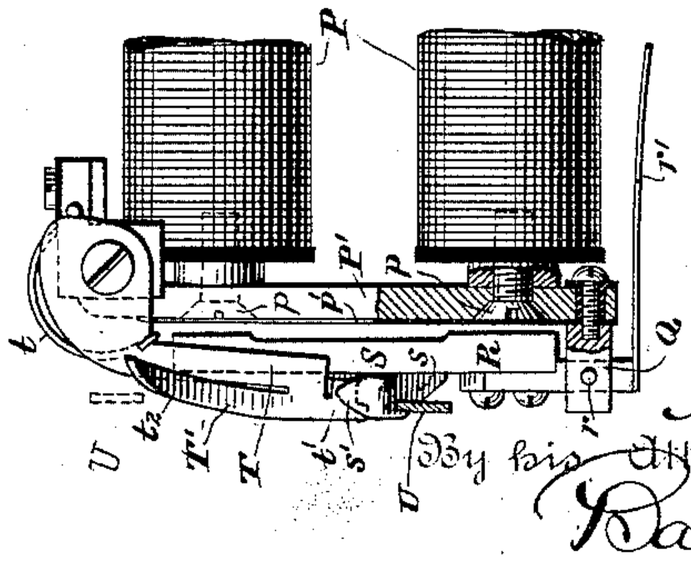

Fig. 3.

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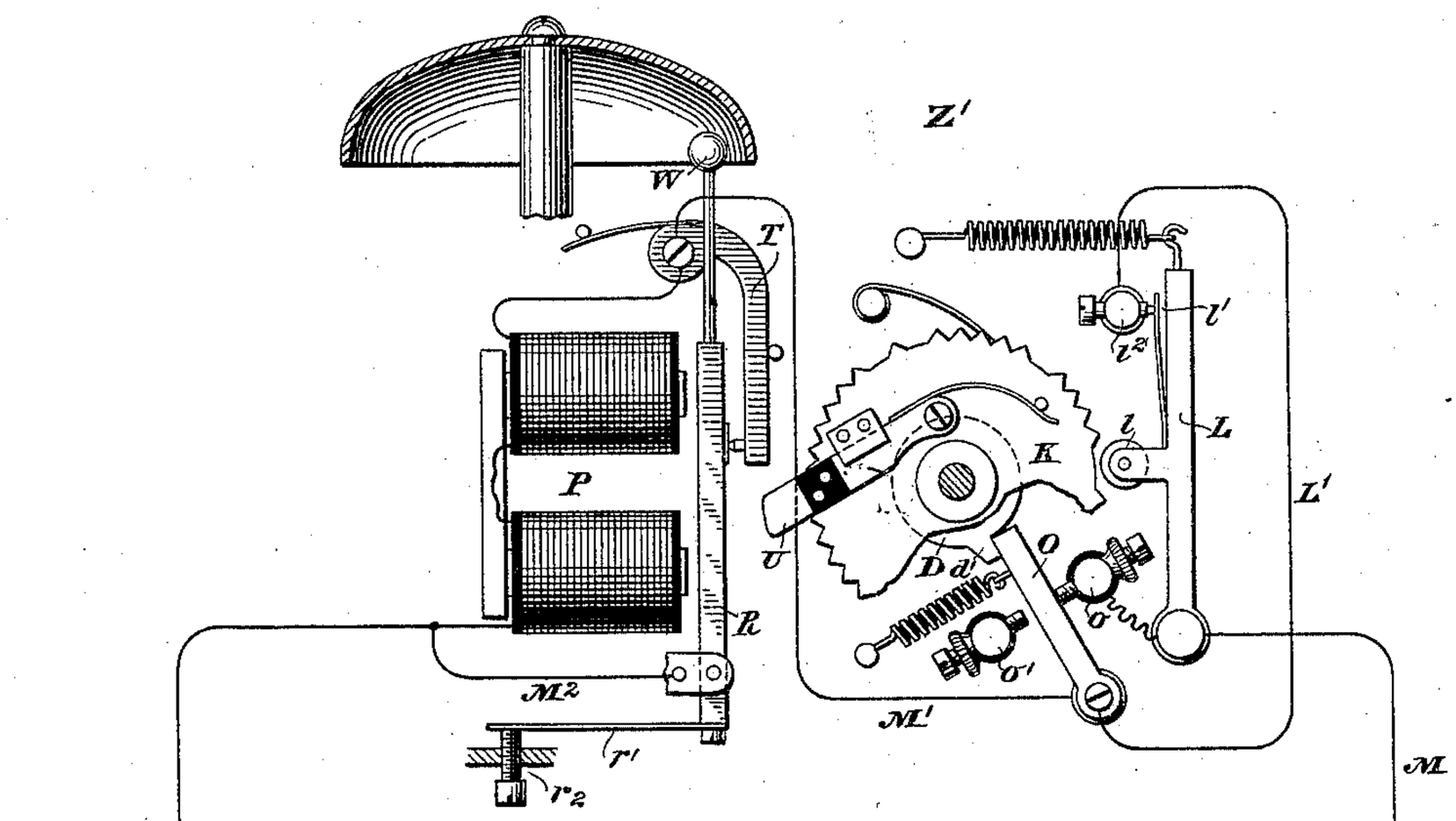
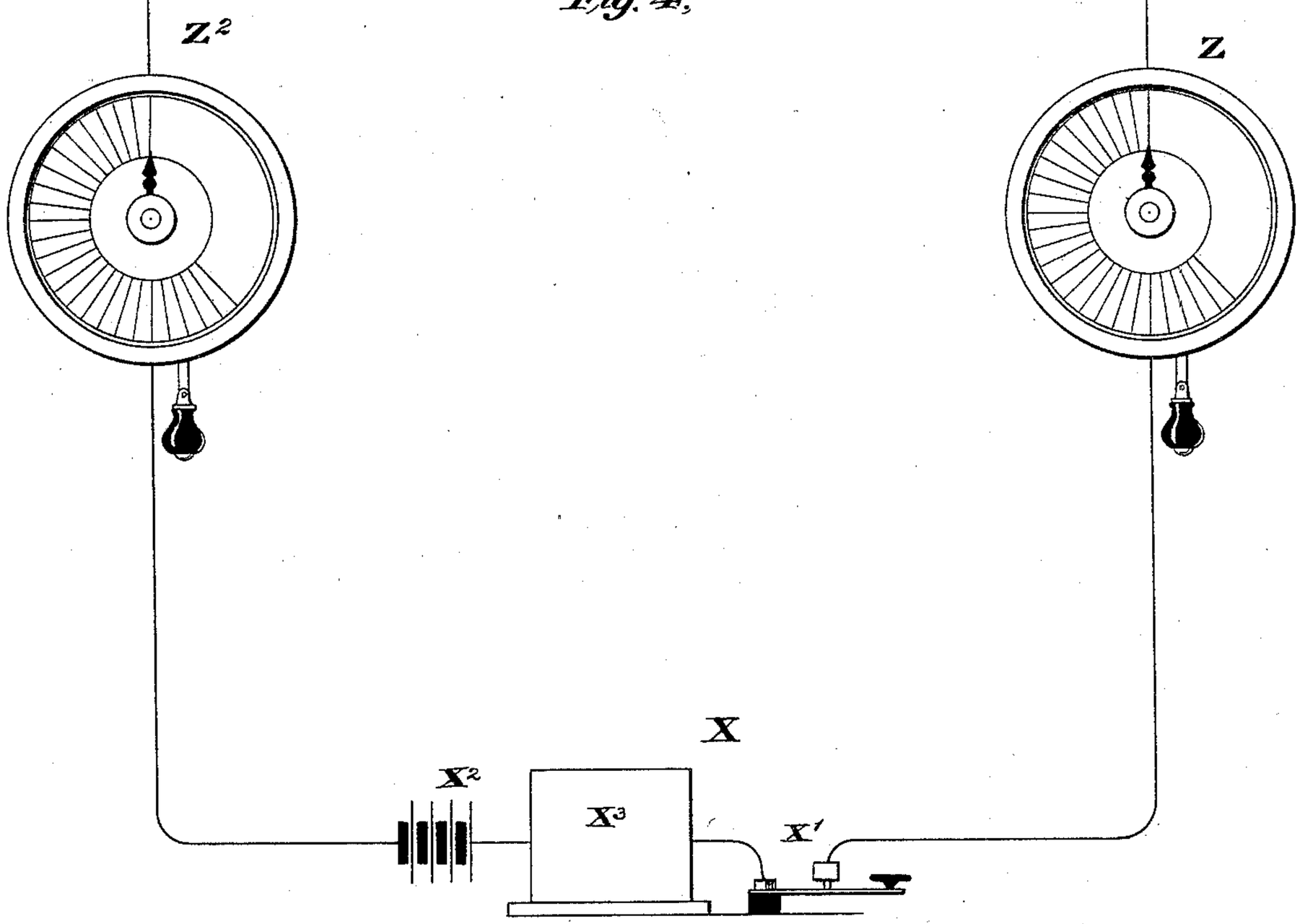


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALFRED G. HOLCOMBE, OF LONG ISLAND CITY, ASSIGNOR TO THE ELECTRIC SIGNAL MANUFACTURING COMPANY, OF NEW YORK, N. Y.

CALL-BOX FOR ELECTRICAL SIGNALING SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 432,619, dated July 22, 1890.

Application filed February 11, 1890. Serial No. 339,997. (No model.)

To all whom it may concern:

Be it known that I, ALFRED G. HOLCOMBE, a citizen of the United States, residing at Long Island City, State of New York, have invented certain new and useful Improvements in Call-Boxes for Electrical Signaling Systems for Producing Return-Signals, of which the following is a specification.

The object of the invention is to provide for a return-signal at the call-box, or, in other words, an answering-signal to indicate that a call sent to a central station has been received and noted. I prefer to produce the return-signal by a momentary interruption of the circuit at the central office, and to permit of such an operation without the introduction into the line of too much resistance in the shape of magnet-coils I provide an improved organization, hereinafter fully set forth. In my improved method of operation the armature-lever of the return-signal magnet at the call-box is at the termination of a transmitted signal pressed against the magnet-poles. The circuit being normally closed, and although the magnet has not sufficient power to attract its armature from its retracted position, it is sufficiently strong to hold the armature when it is pressed against the poles. A momentary break in the circuit under these circumstances is inevitably followed by the retraction of the armature-lever, and the return-signal is thereby sounded.

My invention is of course adapted for use in either an individual-line system or in a single-circuit system with the call-boxes in series.

In the accompanying drawings, Figure 1 is a front sectional view on the line 1 1 of Fig. 2. Fig. 2 is a transverse vertical section on the line 2 2 of Fig. 1. Fig. 3 is a detail elevation, partly in section, of the return-signal magnet and the mechanism for pressing its armature against the poles upon the termination of the transmission of a signal. Fig. 4 is a diagram view indicating circuit-connections.

The call-box mechanism is inclosed in a casing A, and is provided with a gear B, an escapement-wheel B′ driven thereby, and a governing-pallet B^2.

A′ represents the interior frame, in which the main shaft C and wheels have their bearings.

The call-box in which I have chosen to illustrate my present invention is, with the exception of the return-signal mechanism hereinafter specifically described, identical in all respects with that shown in my patent No. 397,364, of February 5, 1889, with the exception that the box herein shown is always in circuit, and detailed description of the various parts is therefore unnecessary. It is sufficient for the purposes of this description to understand that in sending a signal the shaft C, carrying the index-finger I and the signal-wheel K, is rotated (to the right) to the desired position to transmit the required signal. The spring-drum D is then wound by pulling down the chain D′, and upon the release of the chain the drum D rotates. The notch *d* in the hub of the drum engages the dog *k*, pivoted on the signal-wheel, and moves the signal-wheel back to the normal position, thus transmitting the signal through the medium of the lever L, having a roller *l*, against which the teeth of the signal-wheel act to open and close the circuit at the contacts l' l^2, Figs. 1 and 4. During the setting of the signal-wheel, as above described, no interruption of the circuit occurs, because the line M, which runs to the lever L, is also connected with an insulated post *o*, against which the lever O is pressed by a projection d' on the hub of the spring-cylinder D, the circuit being completed through this part of the apparatus by the wire M′, leading from the lever O. The signal-wheel having, however, been set, when the spring-drum is wound by the pulling down of the chain the projection d' is moved away from the lever O, and the lever is drawn by its spring against an insulated adjustable post o'. The only path for the current is now through the lever L, contacts l' l^2, and branch wire L′. The circuit is opened and closed at the contacts l' l^2 by the teeth of the signal-wheel acting on the lever L, and the signal is thus transmitted.

All this part of the apparatus is identical with that shown in my prior patent, both in construction and operation, and further description is unnecessary.

I come now to a description of my present

invention. The return-signal magnet P is mounted in the casing A. Its poles are connected by a non-magnetic cross-piece P′, secured to the poles by iron screws *p*, that form the pole-pieces. The face of the bar P′ and of the pole-pieces is covered with a strip *p′* of insulating material—such, for instance, as hard rubber. The lower end of the bar P′ carries a block Q insulated therefrom, and in this block the armature R of the magnet is pivoted at *r*. *r′* is the spring of this armature and r^2 its adjusting-screw. The armature has bolted to it a bracket S, having an inclined surface *s* and a surface *s′* about parallel with the armature. The upper end of the bar P has pivoted to and insulated from it a cam-plate T, having a spring *t*, that normally presses the finger or lug *t′* of the cam-plate against the armature R. The cam-plate may be formed, as indicated, of sheet metal split longitudinally, and having the outer part T′ bent inwardly toward the center of the box and preferably curved on the arc of a circle, of which the shaft C is the center. The pressure due to the spring *t* of the finger *t′* of the cam-plate against the armature R is sufficient to give a good contact at that point, but not sufficient to press the armature R toward the magnet. The end of the cam-plate and the part *s′* of the bracket S overlap without touching, and at that point their edges are flush with each other. Upon the signal-wheel K is pivoted an arm U, the outer portion U′ of which is of insulating material to prevent the crossing of the circuit through the frame of the apparatus. The arm U is provided with a spring *u*, that tends to throw it outwardly away from the shaft C, its movement being limited by a bracket or plate V, screwed to the signal-wheel K and beneath which the arm U works. As the signal-wheel is set, as above described, the curved or rounded end of the pivoted arm U, striking the inclined face *s* of the bracket S on the armature, is snubbed back, being pressed against the force of its spring toward the shaft C. After passing the face *s′* of the bracket S it is similarly held down by the face of the curved part T′ of the cam-plate without tending to press the armature toward the poles of the magnet. When the signal-wheel is carried back by the spring-drum for the transmission of the signal, as above described, the end of the arm U rides upon the cam-edge t^2 of the plate T′ and presses it down, the finger *t′* forcing the armature R against the poles of the magnet P. As the arm U passes off of the part T′ of the cam-plate, the transmission of the signal is finished, but the arm U still bears upon the edge of the bracket S and holds the armature for a brief interval against the poles of the magnet. At the moment that the arm U leaves the edge of the cam-plate T′ the plate is lifted by its spring and the coils of the magnet are included in the main circuit, the shunt around the magnet previously existing by reason of the contact of the finger *t′* with the armature being opened. The arm U then passes off of the bracket S and pauses in the normal position, but the magnet has had time to become energized and holds up the armature until the operator at the central station X momentarily opens the main-line circuit, when the armature R is retracted by its spring and the bell-hammer W carried thereby strikes the bell. It will be noted that the armature is lifted against the magnet during the time that the signal is being transmitted, and that during this operation the shunt around the coils of the return-signal magnet is preserved. Immediately after the signal is completed the arm U permits the cam-plate to rise and the magnet is thrown directly into circuit. One important effect of this arrangement is that practically all the periphery of the signal-wheel may be utilized for signals. This will all now be plain from the diagram Fig. 4. The wire M′ runs from the lever O to the cam-plate T, the shunt-circuit being completed through the armature and by wire M^2 to the main line, and the coils of the magnet are included in the closed branch of the line, as shown. Fig. 4 shows diagrammatically a single-circuit line, Z Z′ Z^2 being call-boxes, and X the central station, where X′ may represent the key for opening the circuit, X^2 the source of energy, and X^3 a register or receiver of any suitable character.

It will be observed that the coils of the return-signal magnet are always shunted, except after the transmission of a signal, and are immediately shunted out again when the circuit is opened and the return-signal given, and as the armature is pressed against its poles when the magnet becomes energized but a small amount of magnetic energy is required to hold it there, and consequently the magnet-coils may be of comparatively low resistance.

I claim as my invention—

1. The combination, substantially as set forth, of the signal-transmitting devices, the return-signal magnet, the armature and cam-plate through which the coils of the magnet are normally shunted, the pivoted arm on the signaling-wheel, and the arm-deflecting bracket S.

2. The combination, substantially as set forth, of the notched signaling-wheel, the arm pivoted thereon, the return-signal magnet, its pivoted armature, the bracket S, secured thereto, the cam-plate normally in contact with the armature and having the curved part T′, and circuit-connections, as set forth.

3. The combination, substantially as set forth, of the signaling-wheel, the arm U, pivoted thereon, the return-signal magnet, its armature, the cam-plate normally in contact with the armature and on which the arm U acts when returning to the normal position to press the armature toward the poles of its

magnet, and circuit-connections by which the magnet is normally shunted through the cam-plate and armature.

4. The combination, substantially as set forth, of the return-signal magnet, its armature, the cam-plate having the part T, and the curved arm or part T′, having a contact normally bearing upon the armature, the signaling-wheel, the arm pivoted thereon, and circuit-connections, as described.

5. The combination, substantially as set forth, of the magnet, the non-magnetic bar connecting its poles, the cam-plate pivoted in one end of the bar, and the armature on the other.

6. The combination, substantially as set forth, of the signaling-wheel, the return-signal magnet, a normally-closed shunt around the signal-magnet, the armature of said magnet, an arm turning with the signaling-wheel and that lifts the armature against the magnet during the transmission of a signal, separable contacts through which said shunt is completed, and means for opening said contacts to throw the magnet into circuit immediately upon the completion of the signal.

7. The combination, substantially as set forth, of a signaling-wheel, the return-signal magnet, the signaling or main circuit normally completed outside of the coil of said magnet, the armature of the magnet, means for lifting the armature to the magnet during the transmission of a signal, and means for throwing the coils of the magnet into the main circuit after the completion of the signal.

In testimony whereof I have hereunto subscribed my name.

ALFRED G. HOLCOMBE.

Witnesses:

EDWARD C. DAVIDSON,

MAMIE J. KELLEY.