K. WEMAN.

RINGING KEY.

APPLICATION FILED JULY 10, 1907.

913,080.

Patented Feb. 23, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

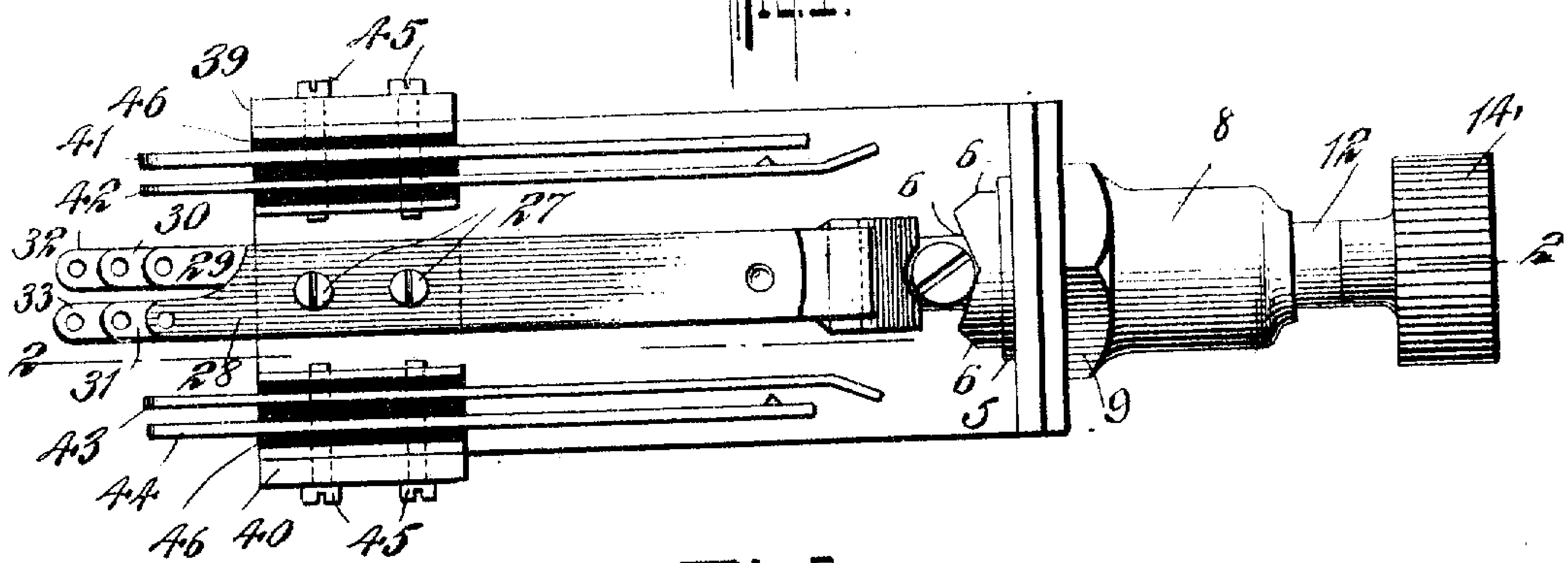


Fig. 2.

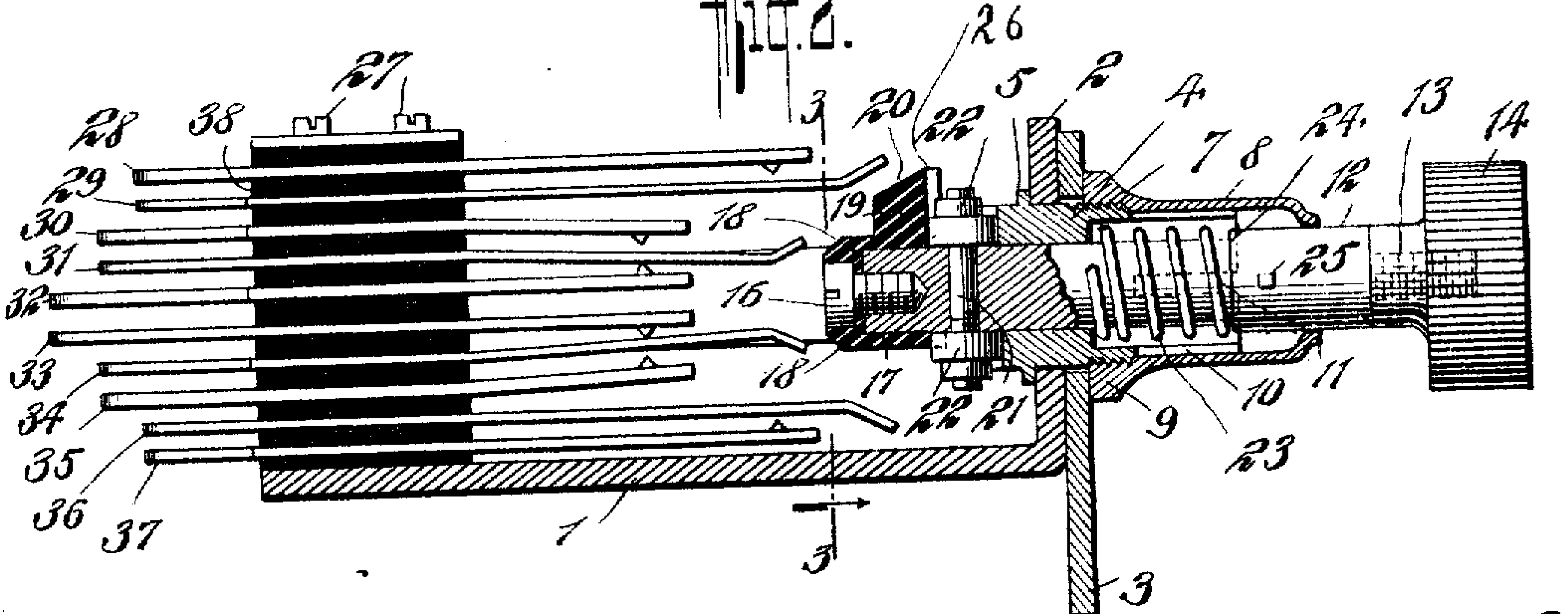


Fig. 3.

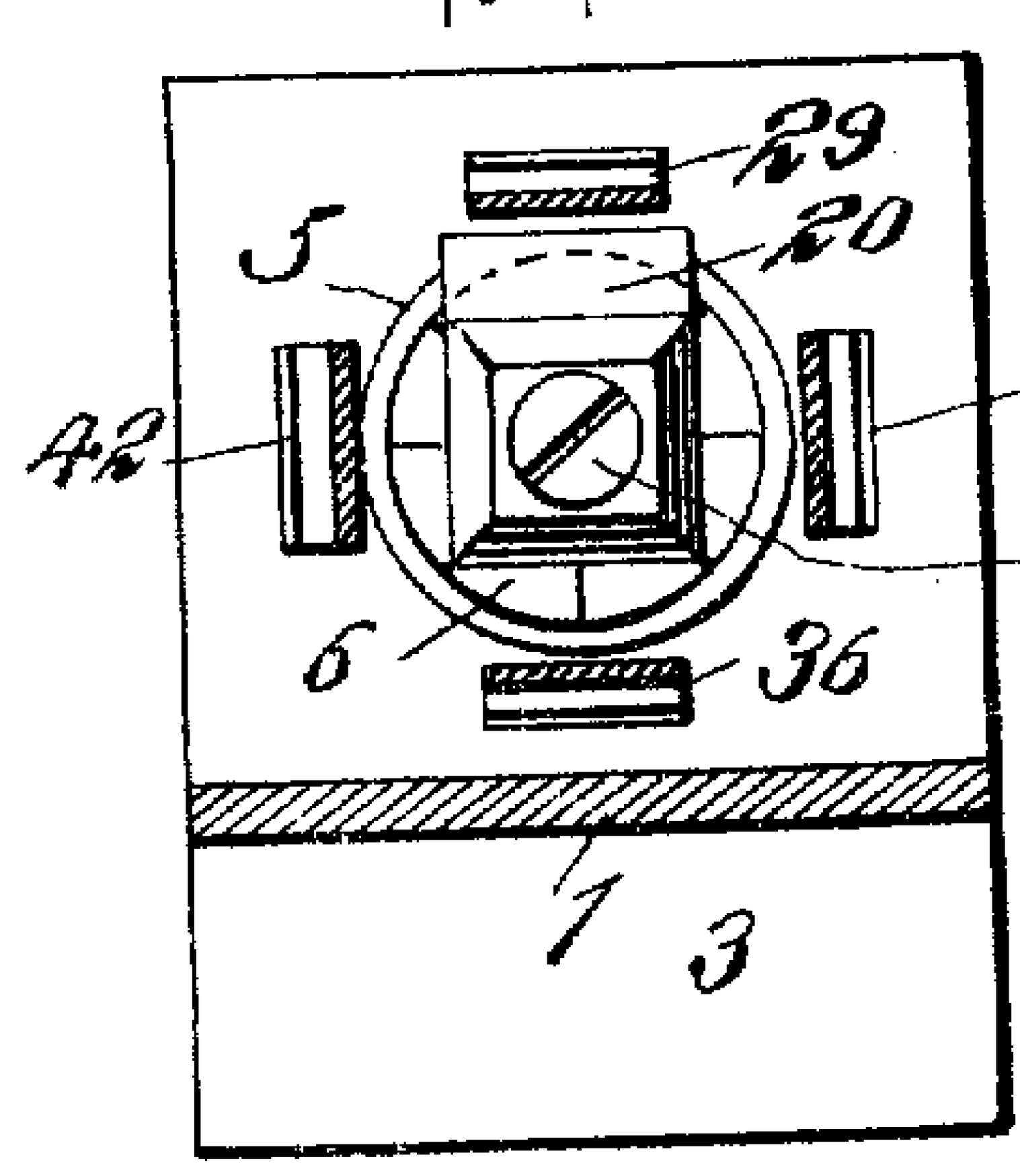
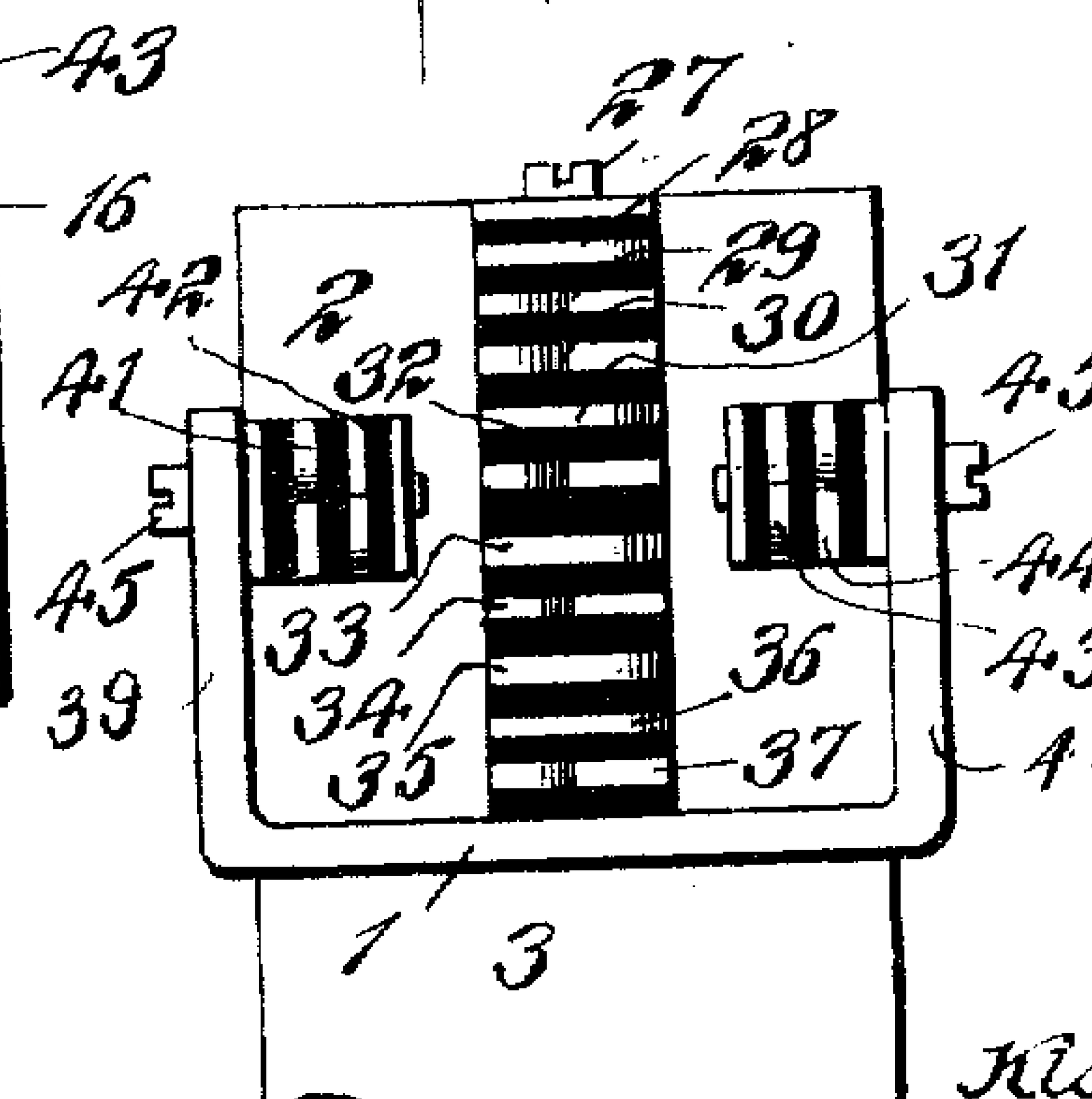


Fig. 4.



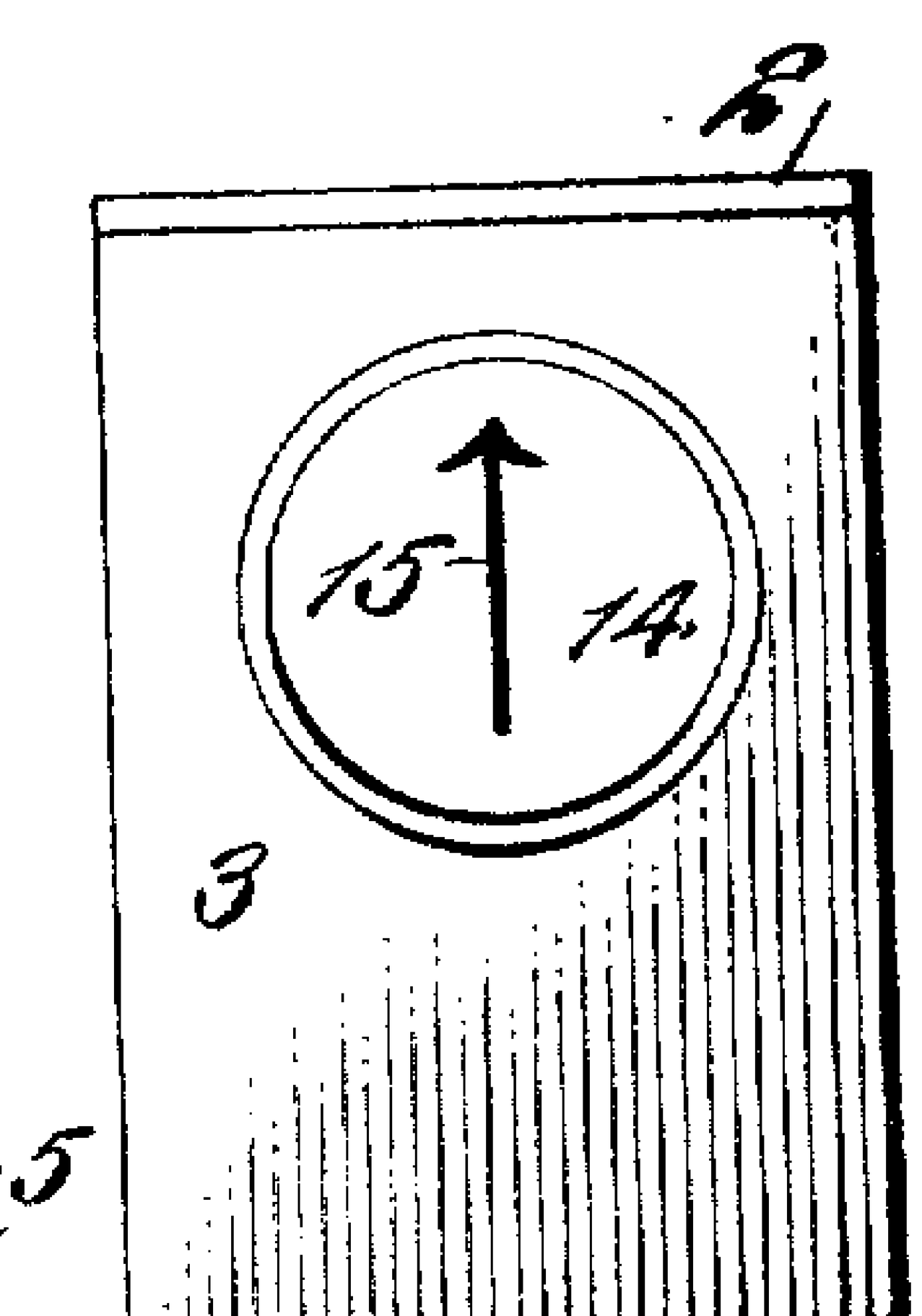


Fig. 5.

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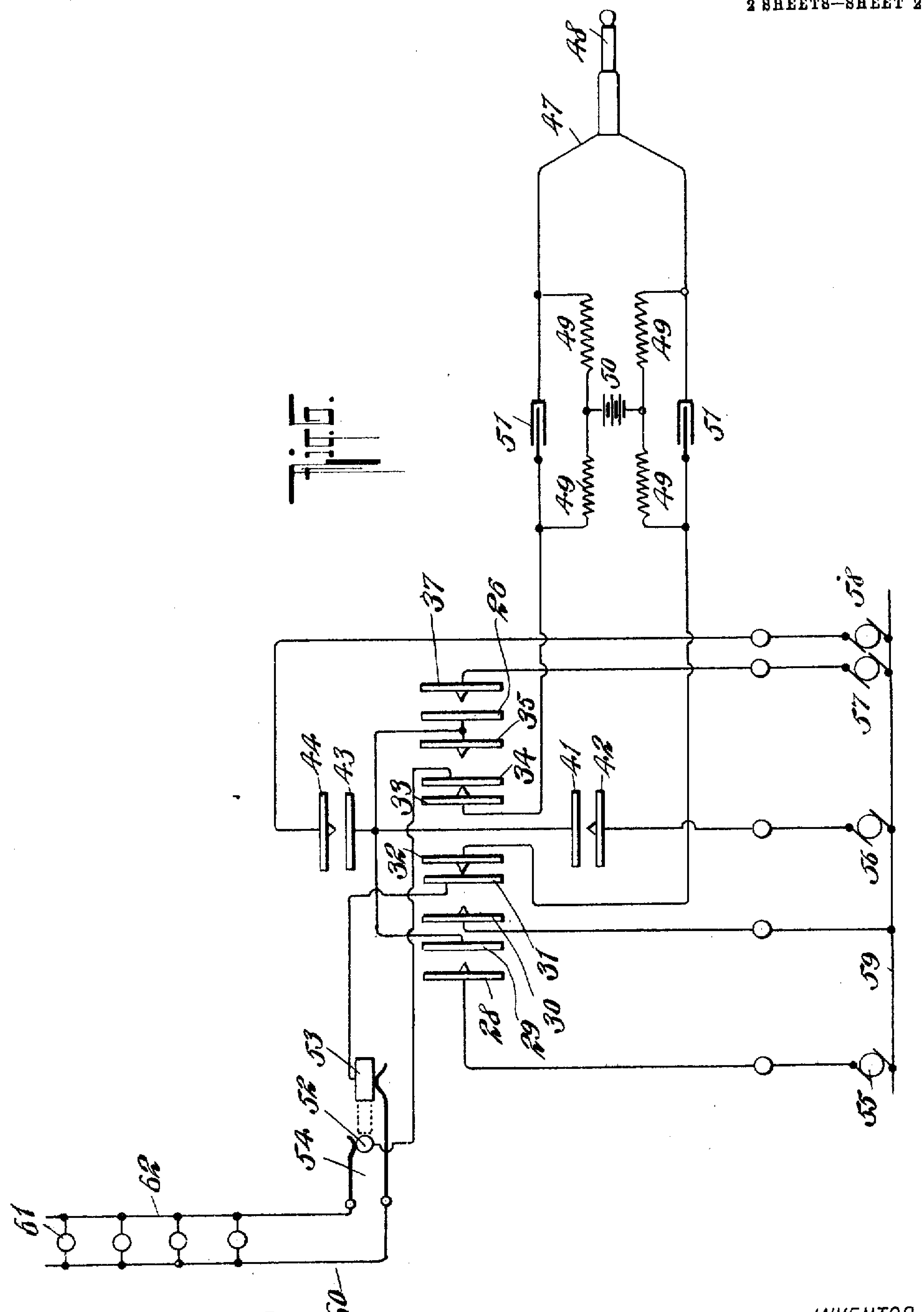
2 SHEETS—SHEET 2.

Fig. 5.



WITNESSES

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RINGING-KEY.

No. 913,080. Specification of Letters Patent. Patented Feb. 23, 1909.

Application filed July 10, 1907. Serial No. 383,035.

To all whom it may concern:

Be it known that I, KLAS WEMAN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Ringing-Keys, of which the following is a specification.

The present invention relates to ringing keys for telephone switch boards, and is of especial applicability to party line telephone systems.

One object of the invention is to dispense with the complicated mechanism now generally employed to indicate to the operator the party last called, and to substitute therefor simple means equally as and perhaps more effective than the former constructions.

Another object of the invention is to so construct the parts and arrange them relatively to each other that a compact instrument is produced, occupying but a small space on the cord shelf, thus enabling the width of the latter to be lessened and as a consequence decreasing the distance of the operator from the multiple field.

A further object of the invention is to construct a ringing key of this character in which the depression of the plunger will cause the conductors of the cord and plug to be brought into contact with the desired source of ringing or calling current, and by the same operation, and without the aid of extra cams or relays or relay devices will entirely cut off these conductors from the remaining parts of the cord circuit.

Further objects of the invention will be apparent from the following description and appended drawing, wherein the preferred embodiment of the invention is illustrated.

Figure 1 is a front elevational view of my improved ringing key; Fig. 2 is a vertical sectional view thereof taken on the line 2—2 of Fig. 1; Fig. 3 is a horizontal sectional view taken on the line 3—3 of Fig. 2; Fig. 4 is a bottom plan view; Fig. 5 is a top plan view; and Fig. 6 is a diagrammatic illustration of the connections of the ringing key in the cord circuit.

The construction of the key will first be described with reference to Figs. 1 to 5 of the drawings, and thereafter its operation set out with reference to Fig. 6. The several operative parts of the key are preferably mounted upon an angular metallic bracket comprising the arms 1 and 2, and the entire key is mounted in the shelf by means of the plate 3 arranged over the shorter arm 2 of the supporting bracket. As will be noted upon reference to Fig. 2 the arm 2 and plate 3 are centrally orificed to receive a tube 4, having an annular shoulder 5 which abuts against the lower face of the arm 2, and is secured thereto in any suitable manner. The lower edge of the tube 4 is serrated, being provided with preferably four notches 6 for a purpose hereinafter described. Substantially at its median part 7 the tube 4 is externally screw threaded to receive an interiorly screw threaded hollow nut 8 which when screwed home rests with its lower flange 9 against the upper face of the plate 3. The upper portion 10 of the tube 4 is reduced in diameter and thickness and is provided with a number of slots 11, corresponding in number and position with the lower serrations 6. Arranged for reciprocation and rotation within the tube 4 is a plunger 12, the upper portion of which is reduced and screw threaded at 13 and is designed to receive a button 14, having engraved therein an arrow or similar indicating character 15, which is provided to inform the operator, by the direction in which it points, of the subscriber last called. At its lower extremity there is secured to the plunger 12, by a screw or the like 16 an angular plunger head 17 of insulating material, having its edges faced off at 18 and being provided with an extension 19 the edge of which is faced off at 20. Immediately above the plunger head the plunger is traversed by a pin 21, carrying at each end a roller 22, which said rollers are designed to enter the serrations or notches 6 in the tube 4 when the plunger is not depressed. At approximately its central part the plunger is reduced in diameter and is encircled by a spiral spring 23 which at its upper part contacts with an annular flange 24 formed by reducing the plunger, and at its lower part rests upon the shoulder of the wall of the tube 4. The purpose of the spring as will be readily apparent is to return the plunger to its upper position after pressure of the hand is removed from the button 14. A short distance above the flange 24 a pin 25 is passed through the plunger 12, the pin being preferably angular in form and having projecting ends which are designed to enter the slots 11 in the tube 4 and prevents the plunger from turning, when it has been depressed for the purpose of signaling any party on the line. The upper face of the

plunger head 17 is preferably slightly cut out or depressed at 26 to provide resting surfaces for the rollers 22. Secured to the lower part of the arm 1 by screws 27 is a series of contact springs numbered from 28 to 37 both inclusive which extend parallel to the arm 1 and are insulated from each other and from the arm by suitable insulating material 38, and extending at right angles from each side of the arm 1 is a flange 39 and 40 respectively, carrying contact springs numbered from 41 to 44 both inclusive, being secured to the flanges by screws 45 and insulated from each other and from the flanges by insulating material 46.

Referring now to Fig. 6, showing the principle of the usual common battery cord circuit, 47 and 48 represent the answering cord and plug respectively, 49 the supervisory relay windings, 50 the battery, 51 the condensers, 52 the tip and 53 the sleeve of the ringing plug, and 54 the line jack. The ringing plug is normally in circuit with the source of talking current, viz. the battery 50. Four sources of ringing current for calling the parties on the line are represented at 55, 56, 57 and 58 and a common return wire for these several currents is represented at 59.

From the foregoing description of the construction of the key 1, and the connections in the cord circuit, the following statement illustrative of the operation of the invention will be clearly understood:—Assuming the parts to occupy the relative positions shown in Fig. 2, when the operator depresses the plunger 12 against the tension of the spring 23 the plunger descends, the projecting ends of the pin 25 entering appropriate grooves, and the beveled edges of the plunger head will engage the pair of springs 31 and 34 causing them to break contact with springs 32 and 33 and to make contact with springs 30 and 35. This action breaks both sides of the cord from the remainder of the cord circuit and places the sleeve 53 in electrical connection with the common return wire 59. By the same operation of depressing the plunger the plunger head extension 19 will engage the spring 29 and force it into contact with spring 28, placing the tip 52 into electrical connection with the source of current 55, the current being traceable from the generator or current source 55, over the tip 52, the line 62, the instruments 61, the line 60, back through sleeve 53 and to the common return 59. The current has thus passed through the instrument of the party wanted and caused an audible signal to be given. It will be understood that the plunger 12 may be rotated to call any of the four parties on the line, and as the circuits for all are similar the above illustration when one party is called will suffice to give a clear understanding of the operation. As long as the plunger is held in its depressed position current will be sent out upon the line and the signal will continue. When pressure from the button 14 is removed the spring 23 will unflex, returning the plunger to its upper position, and in this return movement the projecting ends of the pin 25 travel in the slots 11 and at the end of the upward travel of the plunger two of the rollers 22 enter two of the serrations 6. The coöperation between the pin 25 and the slots 11 causes the plunger to descend and ascend without turning and when the rollers enter the serrations, at the end of the upward travel of the plunger, the latter is held in position, and the operator, by glancing at the arrow 15 and noting its position may at once tell which party was last called.

I desire it to be understood that my invention is susceptible of modification in numerous details and that while I have shown and described the preferred embodiment of my invention the latter is not to be understood as being limited to the specific details.

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

1. In a ringing key for telephone switchboards, the combination with a longitudinally slotted tube having a lower serrated edge, of a plunger provided with a transverse pin having projecting ends designed to travel in the slots in the tube, and a second pin carried by said plunger having rollers adapted to rest in the serrations in said tube.

2. In a ringing key for telephone switchboards, the combination with a longitudinally slotted tube, of a reciprocable plunger provided with a transverse pin having projecting ends designed to travel in the slots in the tube, serrations upon the lower end of said tube, a second pin carried by the plunger having rollers designed to engage the said serrations, and a plunger head provided with a lateral projecting member.

3. In a ringing key for telephone switchboards, the combination with sets of contact springs of varying lengths, of a tube having a serrated edge, a plunger reciprocable and rotatable in said tube, a head formed on the plunger, adapted, when the latter is depressed, to operate the same set of contact springs irrespective of the angular position of the plunger, a projection carried by the head for selectively operating the set of contact springs determined by the angular position of the plunger, and a pin carried by the plunger for entering the serrations in the tube, substantially as described.

4. In a ringing key for telephone switchboards, the combination with sets of contact springs, of a slotted tube having a serrated edge, a plunger reciprocable and rotatable in said tube, a head formed on the

plunger, adapted, when the latter is depressed, to operate the same set of contact springs irrespective of the angular position of the plunger, a projection carried by the head for selectively operating the set of contact springs determined by the angular position of the plunger, a pin traversing the plunger and designed to enter the slots in the tube, and a second pin carried by the plunger for entering the serrations in the tube, substantially as described.

5. In a ringing key for telephone switchboards, the combination with sets of contact springs, of a source of talking current connected with one of said sets and sources of ringing current connected with the other sets of contact springs, a tube having a serrated edge, a plunger reciprocable and rotatable in said tube, a head formed on the plunger, adapted, when the latter is depressed to operate the set of springs connected with the source of talking current irrespective of the angular position of the plunger, a projection carried by the head for selectively operating that one of the sets of contact springs connected with the sources of ringing current determined by the angular position of the plunger, and a pin carried by the plunger having rollers designed to enter the serrations in the tube, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

KLAS WEMAN.

Witnesses:
CARL H. SMITH,
E. M. TYLER.