

No. 770,424.

PATENTED SEPT. 20, 1904.

L. M. ERICSSON.

SWITCH OR RINGING KEY FOR TELEPHONE SWITCHBOARDS.

APPLICATION FILED JUNE 18, 1902.

NO MODEL.

Fig. 1.

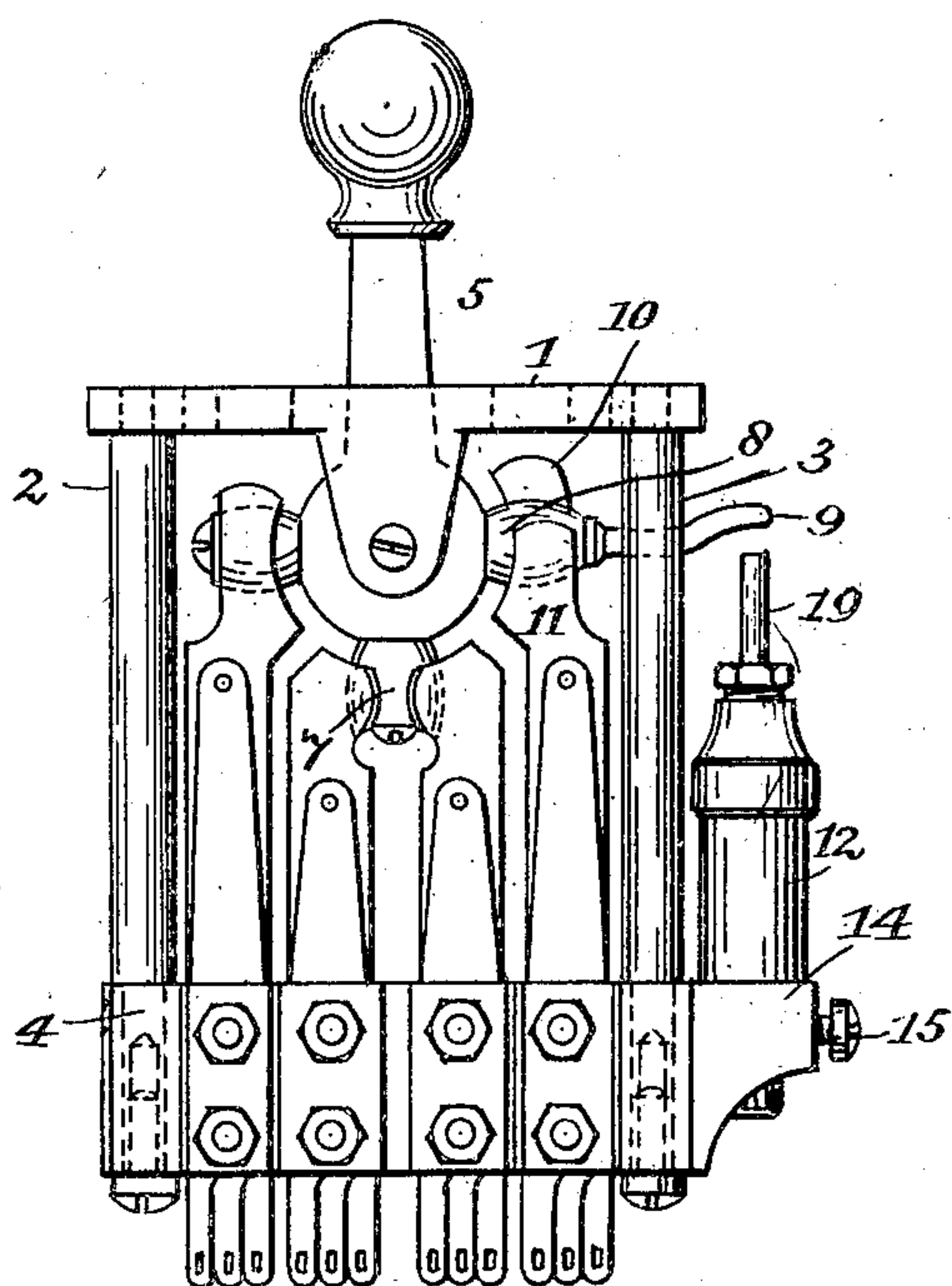


Fig. 2.

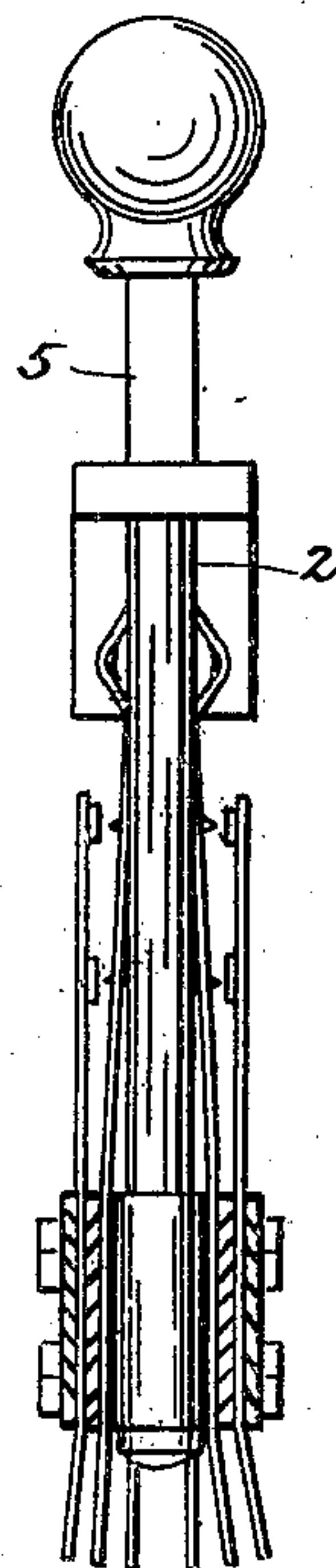


Fig. 3.

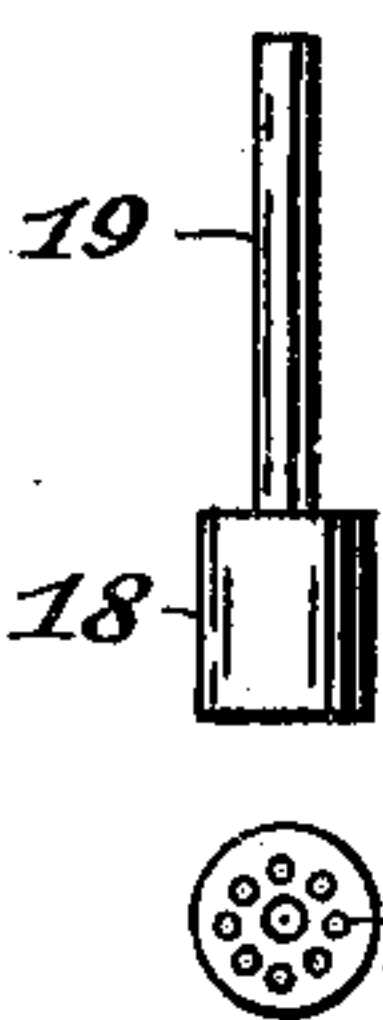
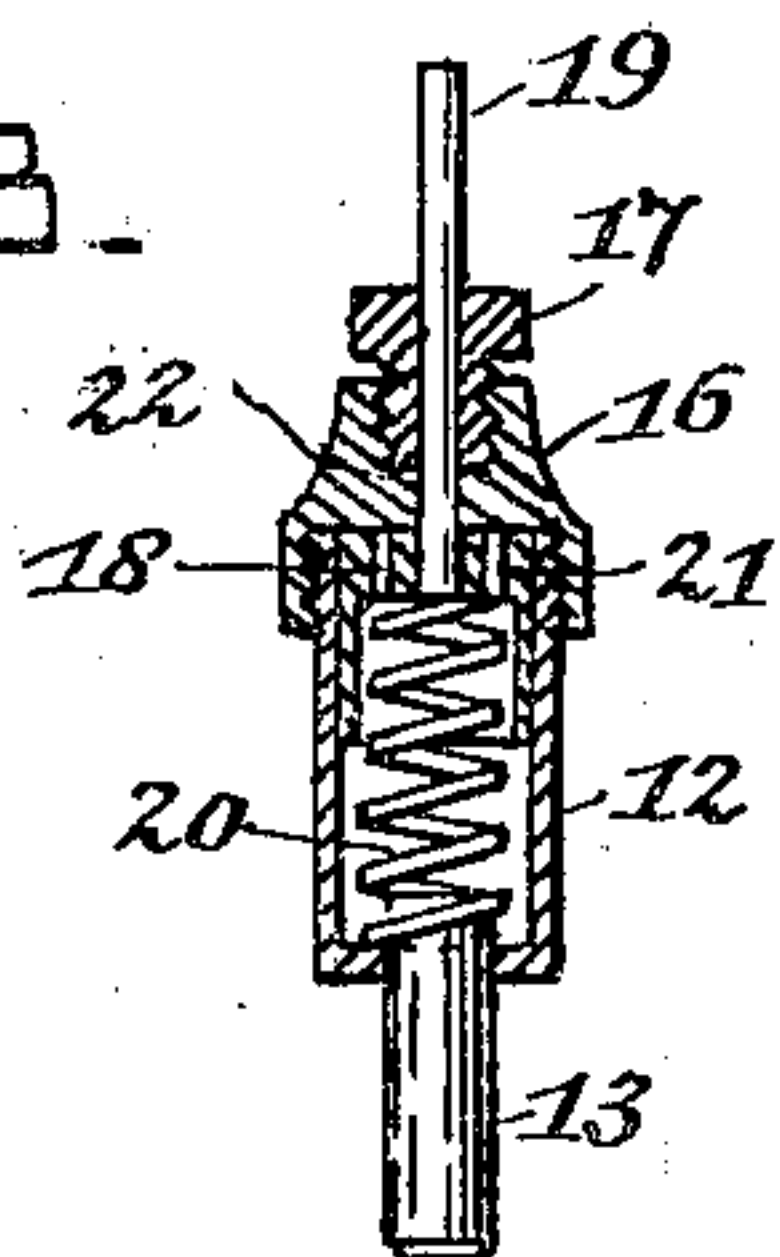


Fig. 4.

Witnesses:

E. B. Bolton
Chas. Waldron

Inventor:

Lars Magnus Ericsson

By Richard R.

his Attorneys

UNITED STATES PATENT OFFICE.

LARS MAGNUS ERICSSON, OF STOCKHOLM, SWEDEN, ASSIGNOR TO
AKTIEBOLAGET L. M. ERICSSON & CO., OF STOCKHOLM, SWEDEN.

SWITCH OR RINGING KEY FOR TELEPHONE-SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 770,424, dated September 20, 1904.

Application filed June 18, 1902. Serial No. 112,139. (No model.)

To all whom it may concern:

Be it known that I, LARS MAGNUS ERICSSON, manufacturer, a subject of the King of Sweden and Norway, and a resident of Thulegatan 5, Stockholm, in the Kingdom of Sweden, have invented certain new and useful Improvements in Switch or Ringing Keys for Telephone-Switchboards, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a switch-key or ringing-key for telephone-switchboards so arranged that a subscriber can be called from the exchange for an automatically-controlled period.

My switch-key differs from other devices hitherto used for the same purpose in that the duration of the ringing-current is controlled entirely by purely mechanical means. Switch-keys for automatic calling as hitherto used are all characterized by the combination with relays controlling the position of the switch, the ringing-current being then continued either until the subscriber answers—as, for instance, in the arrangement described in the specification of British Patent No. 13,270 of 1899—or for a period of constant length, as described, for example, in the specification of Ritter's German patent, No. 121,406. According to my invention, on the other hand, the time during which the switch-key is in calling position—that is to say, the position in which the springs connected with the generator are in contact with springs connected with the line leading to the subscriber to be called—is controlled by a slowly-operating spring device consisting of a piston acting upon a spring, the tension of which is increased when the operator brings the switch-key into ringing position, but which returns slowly, and thus moves the switch-key gradually back from the ringing position into its normal position, as soon as the operator releases the lever-arm of the switch-key.

Figure 1 is a front view of a suitable form of key made according to the invention. Fig. 2 is a side view thereof. Fig. 3 shows the spring device, partly in section; and Fig. 4

shows in side view and plan the piston of the spring device.

The switch-key shown in the drawings consists of a rectangular frame with top plate 1, standards 2, 3, and bottom plate 4. The springs of the switch-key are fixed to the plate 4 vertically and in groups. The lever arm or handle 5 of the switch-key is pivoted in lugs extending downward from the under side of the top plate and is provided with three switching-fingers 6, 7, and 8, the last mentioned having an extension or arm 9 projecting through a slot formed in the standard 3. When the switch-key is in the position shown in Fig. 1, its normal position, and the pair of cords to which the switch-key is joined are employed for connecting two lines, the instruments of the subscribers are connected for communication with each other. When the lever-arm is swung to the left, and thus brought into the answering position, the instrument of the operator will be connected with the one line, and when the lever-arm is swung to the right, the ringing position, an alternating current passes to the subscriber to be called. The springs 10 and 11 are so shaped as to attempt to hold the lever-arm in the ringing position when it is brought into this position by the operator.

The slowly-operating spring device, arranged like a pump, is mounted below the end of the arm 9 and upon a bracket 14, projecting from the bottom plate 4. The said device consists of a cylinder 12, in the bottom of which a pin 13 is fixed, Fig. 3. The cylinder is closed by a cover 16, screwed on its end, a nut 17, adapted to hold a washer 22 of a suitable material, being screwed in the cover. The rod 19 of a piston 18, working in the cylinder, passes through holes formed in the cover and the said nut. The piston has a recess in which the upper end of a spiral spring 20 is inserted, the lower end of the said spring resting upon the bottom of the cylinder 12. Small holes 21, for the purpose mentioned below, are made in the upper disk-shaped part of the piston, as shown in Fig. 4. The cylinder is filled with oil or other suitable liquid

of thick consistency, and the pump can easily be fixed to and removed from the bottom plate, for which purposes the latter is provided with a hole in which the pin 13 is inserted, the screw 15 being then tightened, thus holding the pump in position.

The operation of the switch-key is as follows: When a subscriber is to be called from the exchange, the operator swings the lever-arm 5 to the right, Fig. 1. The arm 9 then presses down the rod 19, and thereby the piston 18, in the cylinder 12. When the piston is depressed, the tension of the spring 20 is increased and the oil in the cylinder is forced through the narrow holes 21 in the upper part of the piston. The amount of movement of the lever-arm to the right is determined by the length of the slot formed in the plate 1, through which the said lever-arm passes. When the lever has been brought into its outermost position to the right, the finger 8 has been moved down so far between the springs 10 and 11 that it will be jammed by the same, whereby the springs will hold the lever-arm in the ringing position even when the operator has released it. When the lever-arm of the switch-key is relieved of pressure, the spring in the cylinder returns the piston and its rod upward, the oil being forced through the holes 21, thus causing the spring to return slowly. The piston-rod in its turn presses the arm 9 and finger 8 gradually upward, the finger being thus finally moved to a point in which the arresting action of the springs 10 and 11 will cease, so that the springs rebound, the switch-key returns to its normal position, and ringing ceases. In calling a subscriber, therefore, an operator only has to bring the switch-key into the ringing position. When this is done, no further attention need be paid to the switch-key, which remains in the ringing position for a certain time and is then automatically brought back to its normal position.

According to the drawings the switch-key is so arranged that the connection of the instrument of the operator with the lines as well as

the calling of a subscriber can be effected. The same arrangement for automatically controlling the time during which the ringing-current is to flow may, however, be employed in a switch-key exclusively adapted for the calling of a subscriber.

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

1. In a switch-key or ringing-key for telephone-switchboards the combination with a dash-pot, a manually-operated switch-lever arm 5, a finger 9 extending from the same, and a return-spring 20, separated from the said lever 5 and its finger 9, the tension of which is increased through the action from the said finger 9 when the arm is brought in ringing position, said key being unaffected by the said dash-pot and spring when moved into another position, substantially as described.

2. In combination in a ringing-key for switchboards, a lever-arm 5, a series of fingers 6, 7 and 8 projecting therefrom, springs with which the said fingers contact, one of said fingers having an extension 9, a spring for returning the said lever-arm to normal position and a piston interposed between said spring and extension 9 substantially as described.

3. In combination in a ringing-key for switchboards, a lever-arm 5, a series of fingers 6, 7, and 8 projecting therefrom, springs with which the said fingers contact, one of said fingers having an extension 9, a spring for returning the said lever-arm to normal position, and a piston interposed between said spring and extension 9, the said springs of the switch-key being shaped to restrain the lever-arm when brought into the ringing position, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

LARS MAGNUS ERICSSON.

Witnesses:

ERNST SVANGVIST,
AUG SÖRENSEN.