

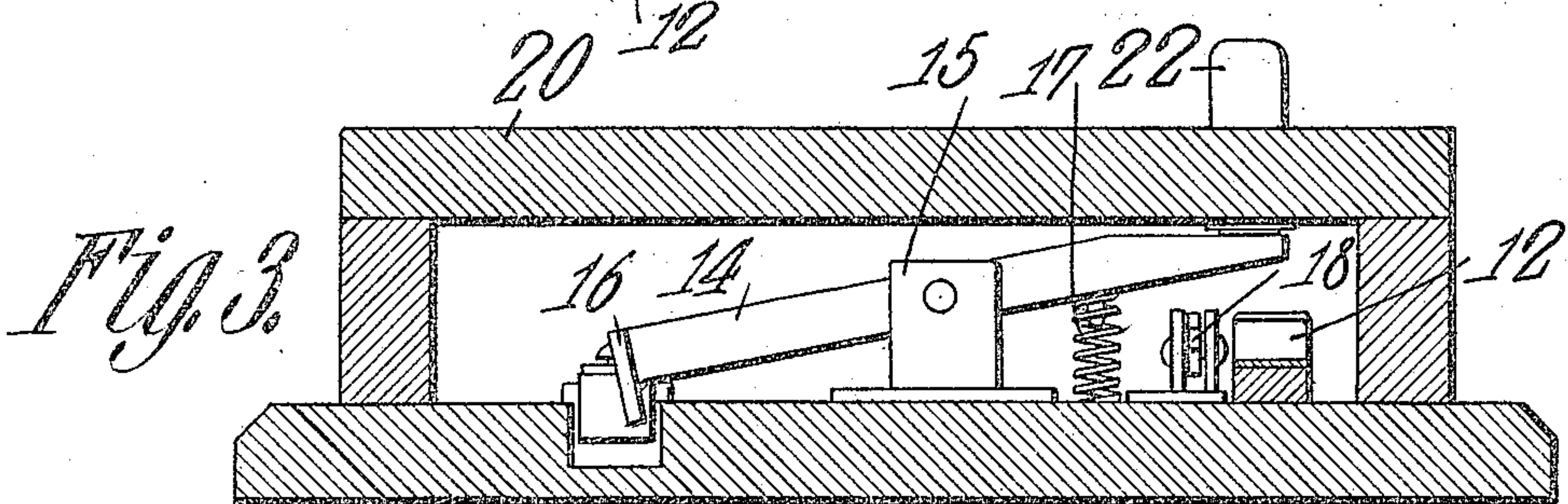
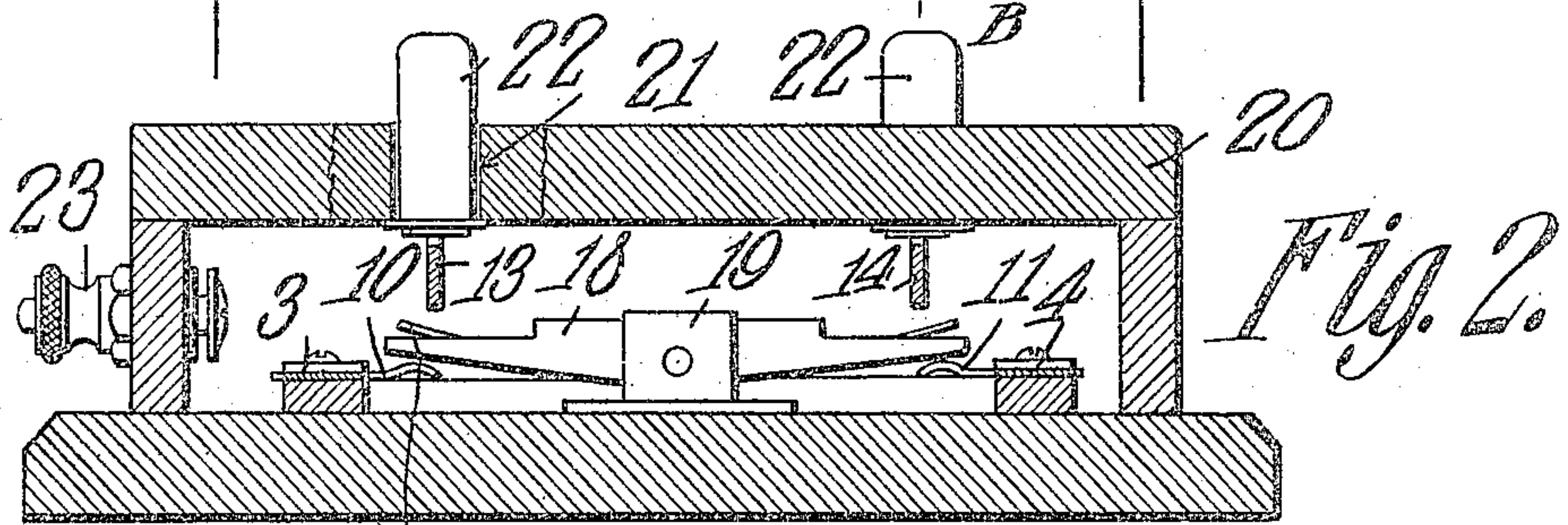
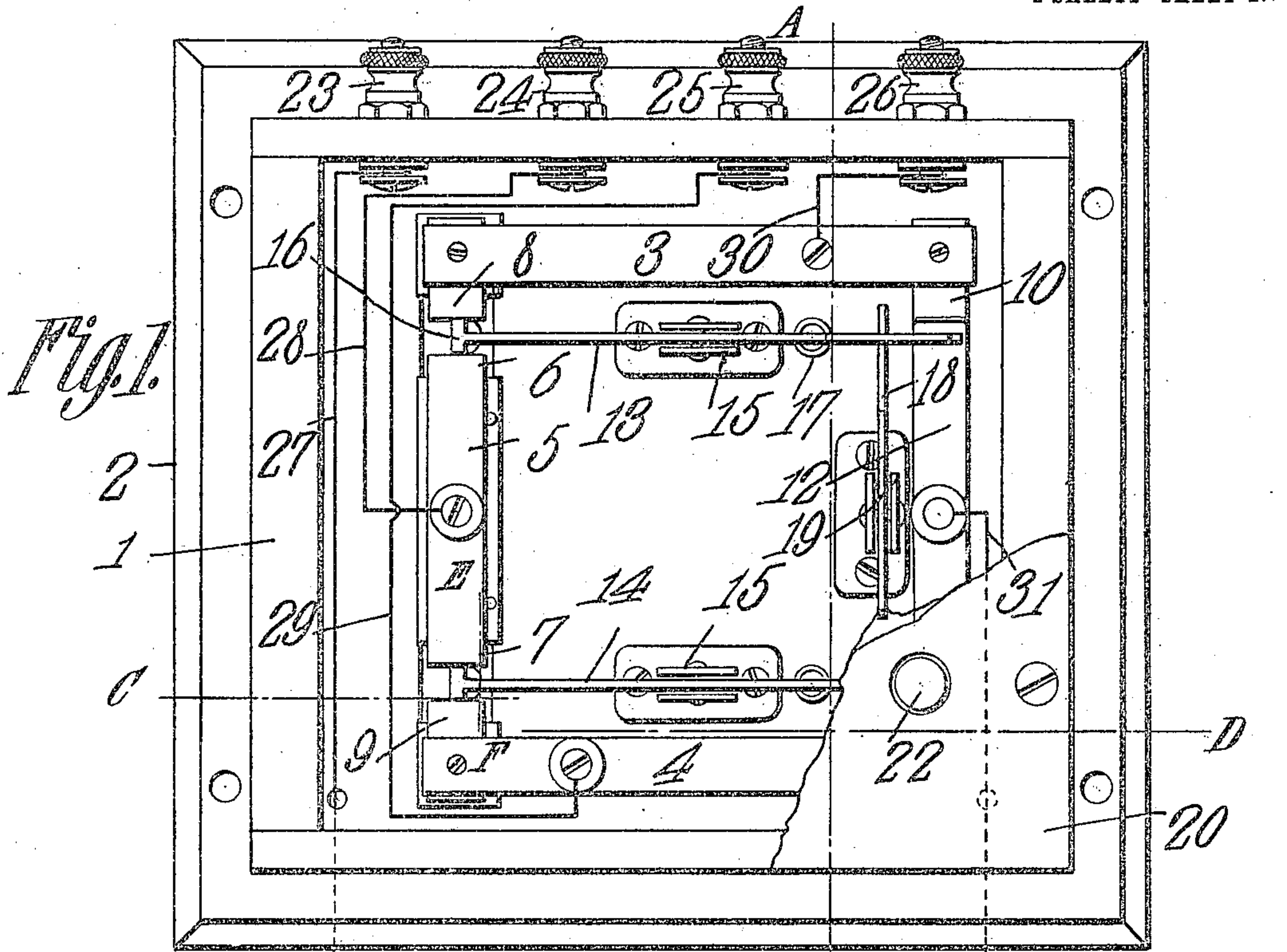
R. C. LIVINGSTON.  
TELEPHONE SYSTEM.

APPLICATION FILED MAY 21, 1908.

962,645.

Patented June 28, 1910.

2 SHEETS—SHEET 1.



*Fig. 4.*

Witnesses  
*[Signature]*  
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 Reason C. Livingston,  
*[Signature]*  
 Attorneys

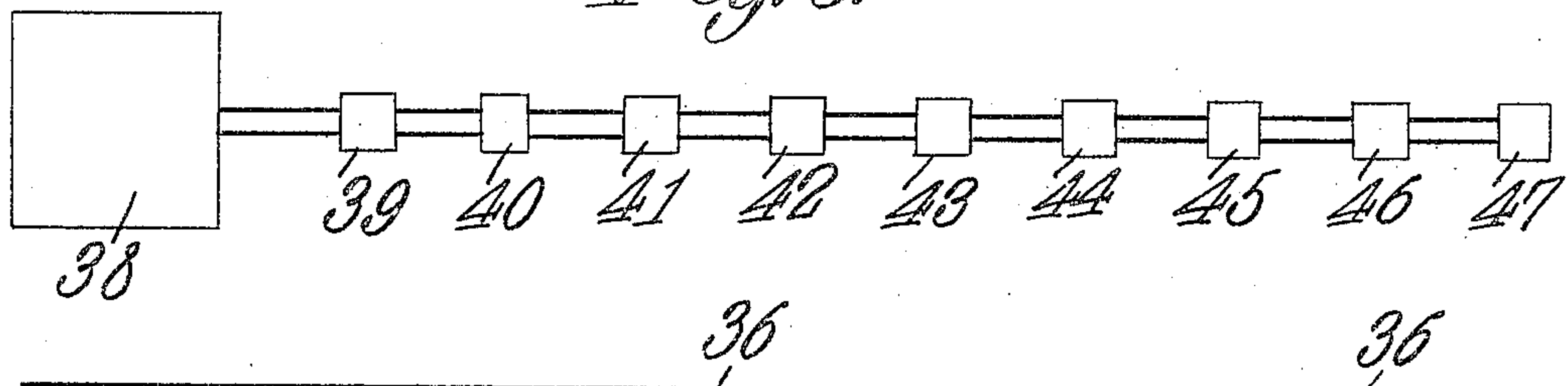
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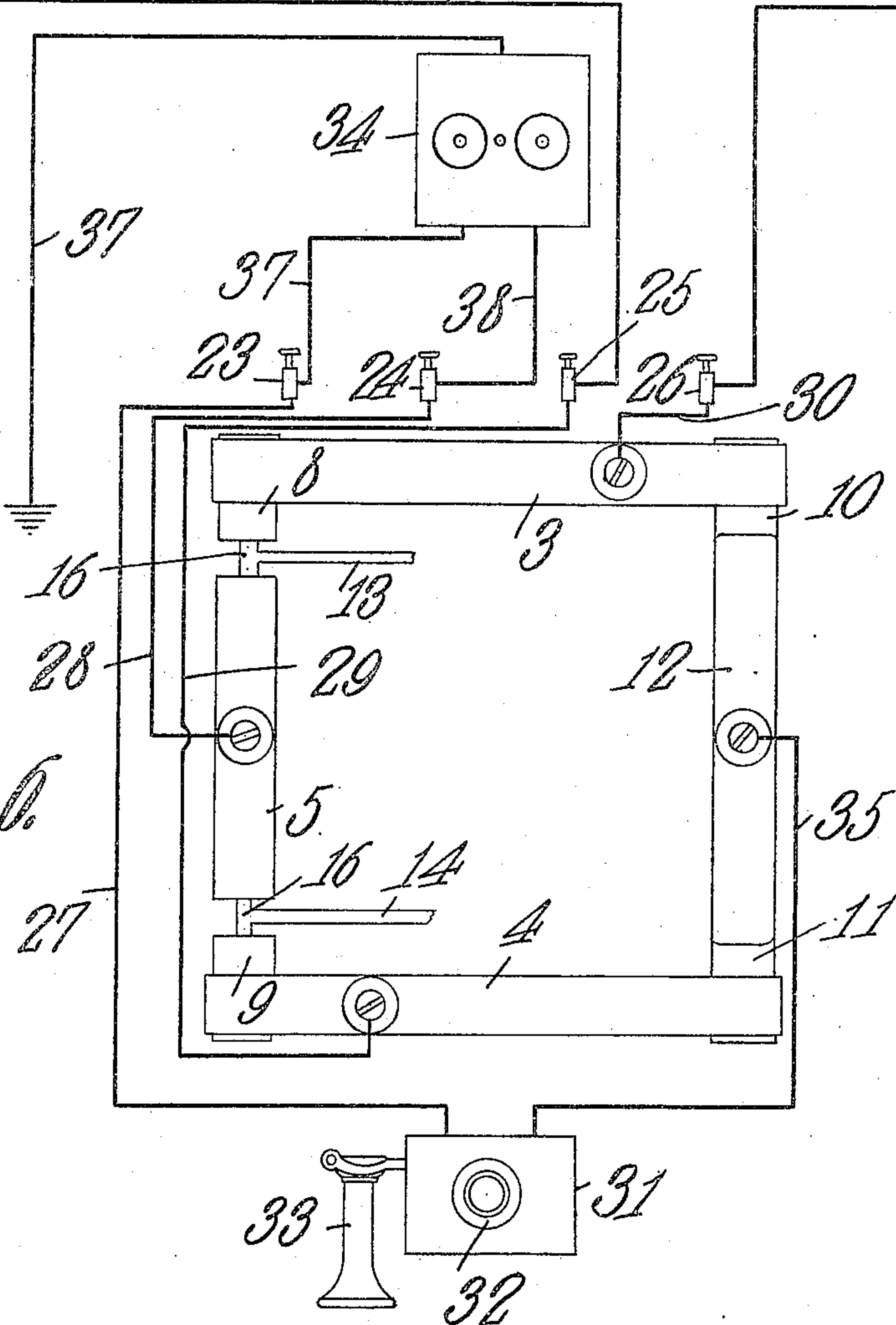
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2 SHEETS—SHEET 2.

*Fig. 5*



*Fig. 6*



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# UNITED STATES PATENT OFFICE.

REASON C. LIVINGSTON, OF SPRING VALLEY, MINNESOTA.

TELEPHONE SYSTEM.

962,645.

Specification of Letters Patent. Patented June 28, 1910.

Application filed May 21, 1908. Serial No. 434,170.

*To all whom it may concern:*

Be it known that I, REASON C. LIVINGSTON, a citizen of the United States, residing at Spring Valley, in the county of Fillmore and State of Minnesota, have invented a new and useful Telephone System, of which the following is a specification.

This invention has reference to improvements in telephone systems and is designed for use more particularly in connection with party lines.

The object of the invention is to provide means whereby conversation may be carried on between two parties on a party line without being interfered with by other parties and without interfering with conversation by other parties on either side of the two parties conversing, and any party can ring all of the telephone signals on the line in either direction.

The invention comprises a switching mechanism which, under normal conditions, does not interfere in any manner with the transmission of signals over the line in either direction. Should, however, the subscriber desire to call up any other subscriber on the same line without the necessity of going through the central office or exchange, the improved switch provides means whereby a call may be sent in either direction and then conversation may be carried on in the desired direction without danger of interference from any other party on the line. Furthermore, the act of removing the receiver from the switch hook does not weaken the line because the transmitter and receiver and other parts co-acting therewith are never on the main line and only on the private line by means of the switch mechanism forming the subject of the present invention.

With a party line including a number of subscribers, it is possible for two subscribers to talk together without other subscribers being able to hear the conversation or to break in thereon. At the same time other subscribers on either side of the two subscribers then using the line may connect between themselves and hold conversation without interfering, although a party on the one side of the connected telephones cannot talk to a party on the other side of the connected telephones. By this means the capacity of a multi-party line is greatly increased, since several conversations may be

taking place at the same time on the same party line without interference.

The invention, however, will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, in which drawings:

Figure 1 is a plan view of the improved switching device with the major portion of the cover removed. Fig. 2 is a section on the line A—B of Fig. 1. Fig. 3 is a section on the line C—D of Fig. 1 with some of the remoter parts omitted. Fig. 4 is a detail section on the line E—F of Fig. 1. Fig. 5 is a diagram of a central station and the multi-party line emanating therefrom. Fig. 6 is a diagram illustrating the circuit connection at a party station on a multi-party line.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, there is shown a box or casing 1 mounted upon a suitable base 2. Within the box 1 on opposite sides thereof are two conducting bars 3, 4. Extending between two adjacent ends of the strips 3, 4 is another strip or bar 5 having downward turned ends 6, 7, the said down turned ends 6, 7 being unsupported so as to render them elastic.

Secured to the end adjacent to the strip or bar 5 are short strips 8 and 9 having downturned ends matching the ends 6 and 7 of the bar 5 and spaced a short distance therefrom.

Projecting from the ends of the bars 3 and 4 remote from the plate or bar 5 and toward each other are two contact plates 10 and 11 extending a short distance from the corresponding edges of the said bars 3 and 4. In operative relation to the two contact plates 10 and 11 are the spring ends of a spring plate 12 secured centrally to a fixed portion of the bottom of the box. The spring ends of the plate 12 are normally out of engagement with the contact plates 10 and 11 but may be forced into engagement therewith as will hereinafter appear.

Between the two bars 3 and 4 and parallel therewith and adjacent thereto are levers 13 and 14 mounted in suitable brackets 15 fast on the bottom of the box 1. One



end of each lever 13 and 14 is formed with a bridging block or head 16 adapted to enter between the spring members 6 and 8 or 7 and 9, as the case may be. The other end of each lever extends over and into operative relation to a corresponding end of the spring plate or strip 12. The end of each lever 13 and 14 remote from the head 16 is constantly urged away from the spring plate or strip 12 by a helical spring 17 between the outer edge of the lever and the bottom of the box or casing 1.

Extending between those ends of the levers 13 and 14 adjacent the spring 17 is a rock arm 18 centrally supported and there pivoted in a suitable bracket 19 fast on the bottom of the casing. This rocker arm 18 is so located as to be engaged by either lever 13 or 14 when the latter is moved against the action of the spring 17. Thus when one of the levers is depressed, the corresponding end of the arm 18 is depressed and the other arm raised into engagement with the other lever, so that the second lever cannot at the same time be moved against the action of its spring 17. By this means while either lever may be moved freely against the action of its spring, both levers cannot be so moved at the same time.

The casing 1 is provided with a top member 20 and through this top member are passages or perforations 21 matching the ends of the levers 13 and 14 and adjacent to the spring 17. Extending through each perforation 21 is a push button 22 engaging the corresponding end of the lever 13 or 14 as the case may be.

The casing 1 carries a number of binding posts which for convenience of description are referred to by the numerals, 23, 24, 25 and 26, respectively. The binding post 23 is connected to a conductor 27 to which reference will hereinafter be made. The binding post 24 is connected by a conductor 28 to the strip or bar 5. The binding post 25 is connected by a conductor 29 to the bar 4 and the binding post 26 is connected by a conductor 30 to the bar 3.

Mounted upon the main board or in any other suitable location with reference to the switch mechanism so far described, is a telephone set or unit 31 comprising the usual transmitter 32 and receiver 33. The battery connections for the transmitter have been omitted. At the subscriber's station where the telephone unit 31 and the switch mechanism so far described are located, is also located a call bell 34 which may be of the ordinary magneto type.

The conductor 27 before referred to as coming from the binding post 23, is connected with one side of the telephone unit 31. To the other side of the telephone unit is connected a conductor 35 leading to the elastic strip or plate 12.

One of the main line conductors 36 is broken and one end is connected to the binding post 25 and the other end to the binding post 26. The binding post 23 is connected by a conductor 37 to ground and this conductor may, for convenience, go through the box containing the magneto 34. The signal bell mechanism of the magneto signal 34 is coupled up by a conductor 38 to the binding post 24 and on the other side may be carried to ground through the conductor 37. Of course, it will be understood that instead of carrying the conductor 37 to ground it may be carried throughout the system as one of the main conductors, as would be the case on an all metal circuit.

In Fig. 5 there is indicated a central station which is designated by the numeral 38, and branching from this station is a party line including by way of example nine private party line stations or subscribers' stations numbered, respectively, from 39 to 47 for convenience of description. Suppose that No. 43 desires to call up No. 45, which is to the right of No. 43, as viewed in the drawing. Under normal or quiet conditions, the circuit from one branch of the conductor 36 to the other may be traced from the binding post 25, through the conductor 29 to the bar 4, thence by way of the bridging head 16 to the bar or strip 5 and then by way of the other head 16 to the bar 3 and conductor 30 out through the binding post 26, while the circuit out through the talking members of the telephone circuit is broken at the plate 12. The signal 34, however, is responsive through the branch conductor 28 from the binding post 24 and thence by the conductor 28 and finally to ground through the conductor 37, or through an all metal circuit represented by the conductor 37 when the ground is omitted. Now by depressing the lever 14 against its spring 17 by proper manipulation of the push button 22 the circuit between the strip 4 and the strip 5 is broken thus cutting out that branch of the main circuit 36 extending toward the left from the binding post 25. There is maintained, however, a circuit from the main conductor or ground conductor 37 through the signal mechanism 34, conductor 38, binding post 24, conductor 28, to the strip 5, and thence through the head 16 of the lever 13 to the strip 3 and conductor 30 to the binding post 26, out through the conductor member 36 extending toward the right as viewed in Fig. 6. The subscriber at station 43 may now ring up No. 45 and then release the push button previously set and presses the other push button and removes the receiver 33 from its hook. There is now established a circuit through the main or ground wire circuit by the conductor 37 to the telephone circuit 31 thence by the conductor 35, to the



strip 12. The depression of the lever 13 against the action of the spring 17 has caused the strip 12 to be brought into contact with the contact strip 10 thus completing the circuit from the strip 12 to the bar 3 and out through the conductor 30 to the main conductor 36 leading toward the right as viewed in Fig. 6. Under these conditions the circuit between the strip 3 and the other side of the conductor 36 leading toward the left is broken by the removal of the bridging head 16 from between the bar 5 and conducting strip 8. Conversation may now continue between stations 43 and 45 so long as desired, it being understood that at station 45 the proper lever 13 or 14 has been depressed to couple up the telephone toward the left in order that the subscriber at station 45 may converse with station 43.

While the conversation is taking place between the stations 43 and 45, stations 46 and 47 may converse together without interference, or any of the stations from 39 to 42, inclusive may converse without interference from the other stations, but while the conversation is continuing between the stations 43 and 45, no station to the left of 43 can converse with a station to the right thereof, nor can conversation take place in the contrary direction.

When it is desired to ring up another station, in another direction, the push button manipulated for this purpose is opposite to that used when conversation is taking place in the same direction.

It is to be noted that the lifting of the telephone receiver from its hook or the leaving off of the receiver from its hook through carelessness cannot in any manner affect the main line 36, 37, since the telephone set is

never included in the main line except when the proper lever is depressed, nor can listening occur, since the main lines are entirely cut out on either side of the station using the line at any particular time.

Breaks or grounds on the line do not interfere with inter-party communication on either side of the break or ground, and such break or ground may be readily located.

What is claimed is:—

1. In a telephone system, a suitable main having its continuity broken at each station at two points, independently operable switches each normally closing a respective one of the breaks in the main, a telephone unit normally excluded from the main, a signal mechanism normally connected to the main through both switches and excluded from the respective side of the main by the operated switch, and means individual to each switch for coupling the telephone unit to the respective side of the main.

2. In a telephone system, a main having its continuity broken at two points, a signal means connected to the main between the said breaks, separate bridging means normally closing both breaks in the circuit, a telephone unit, and circuit closing means independent of and having a common connection to the telephone unit under the individual control of the separate bridging means when either of the latter is moved to break the continuity of said main.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

REASON C. LIVINGSTON.

Witnesses:

E. H. ADAMS,

C. W. ACKLEY.