

No. 714,759.

Patented Dec. 2, 1902.

A. F. SWAN.
TELEPHONE SYSTEM.

(Application filed May 11, 1901.)

(No Model.)

2 Sheets—Sheet 1.

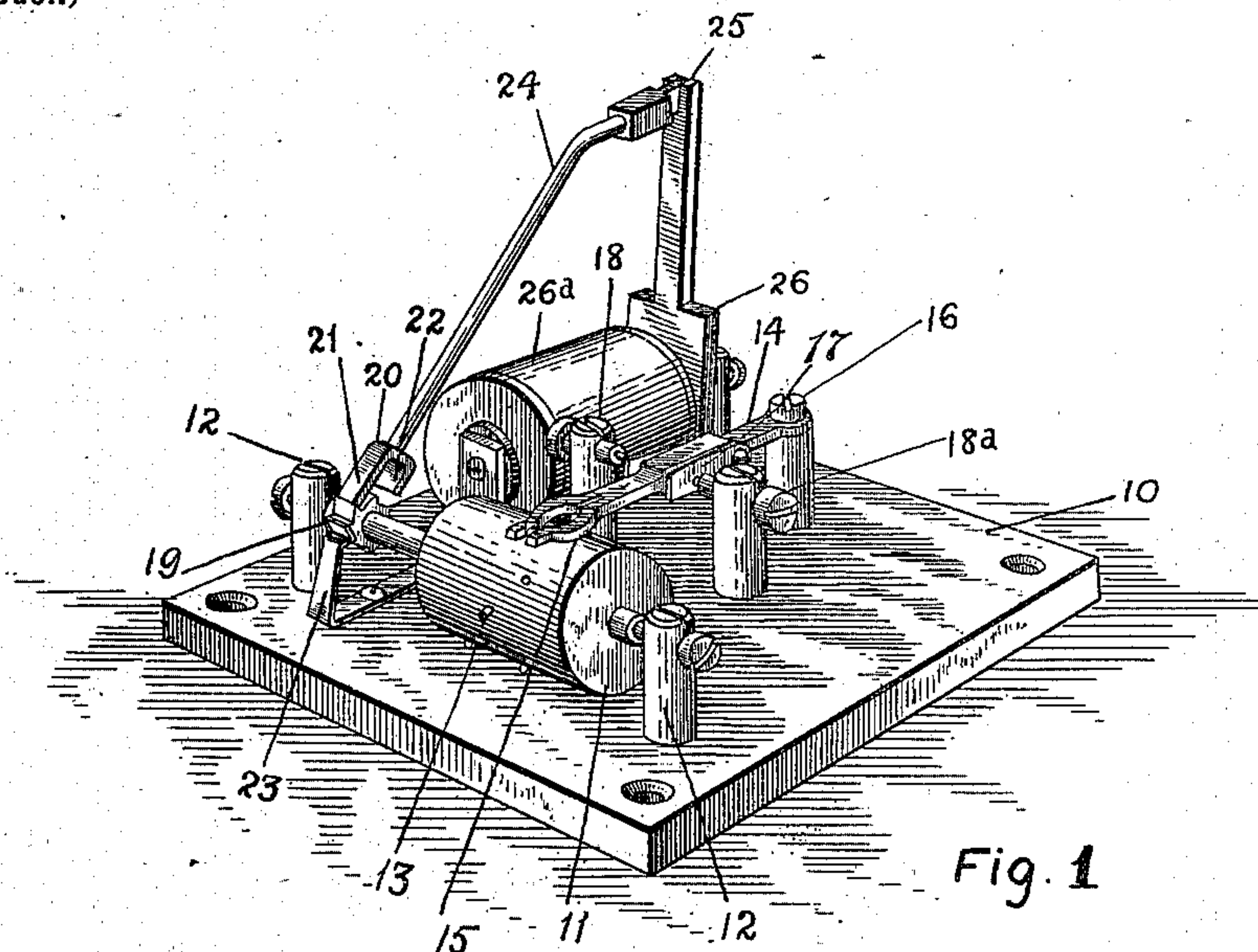


Fig. 1

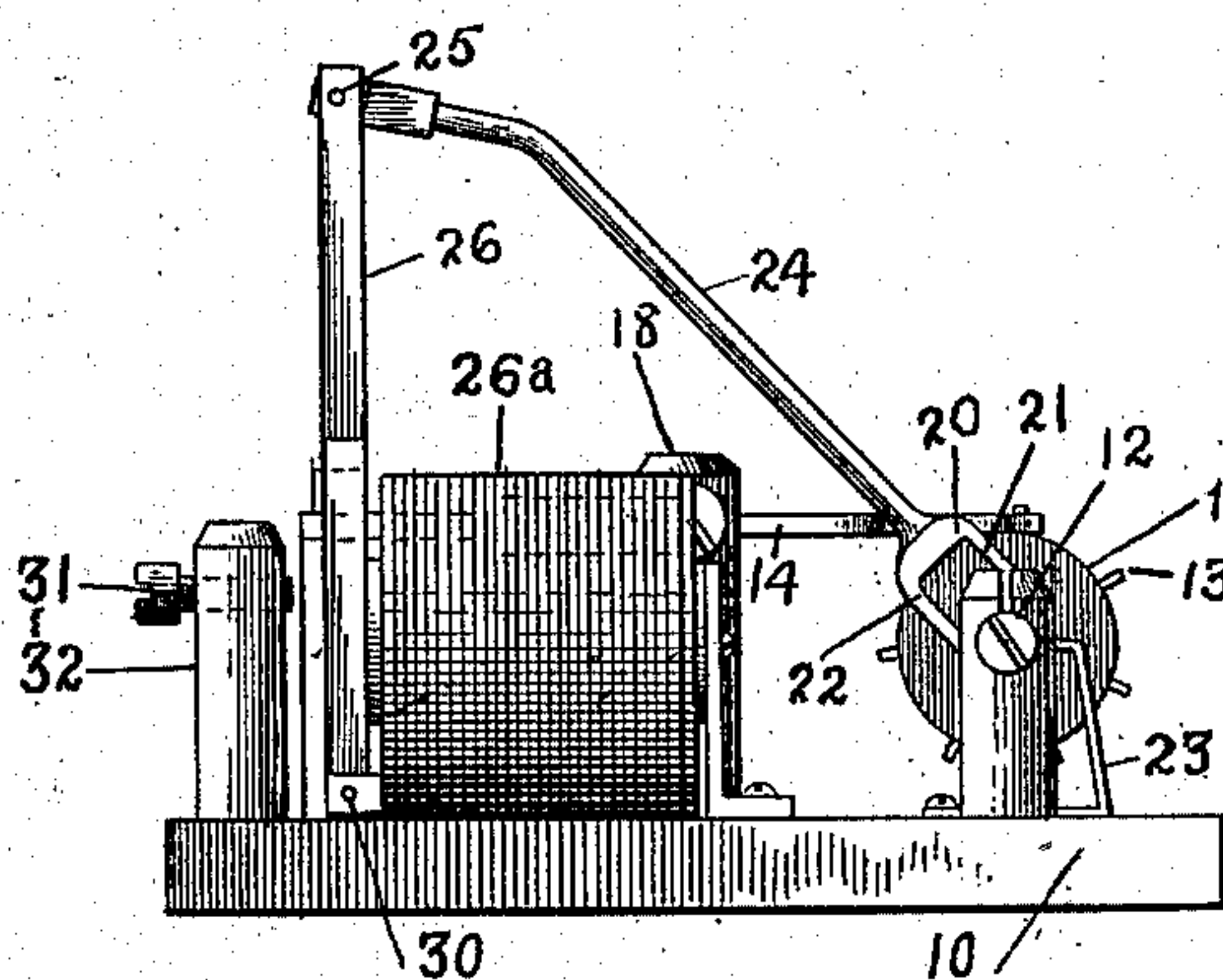


Fig. 2

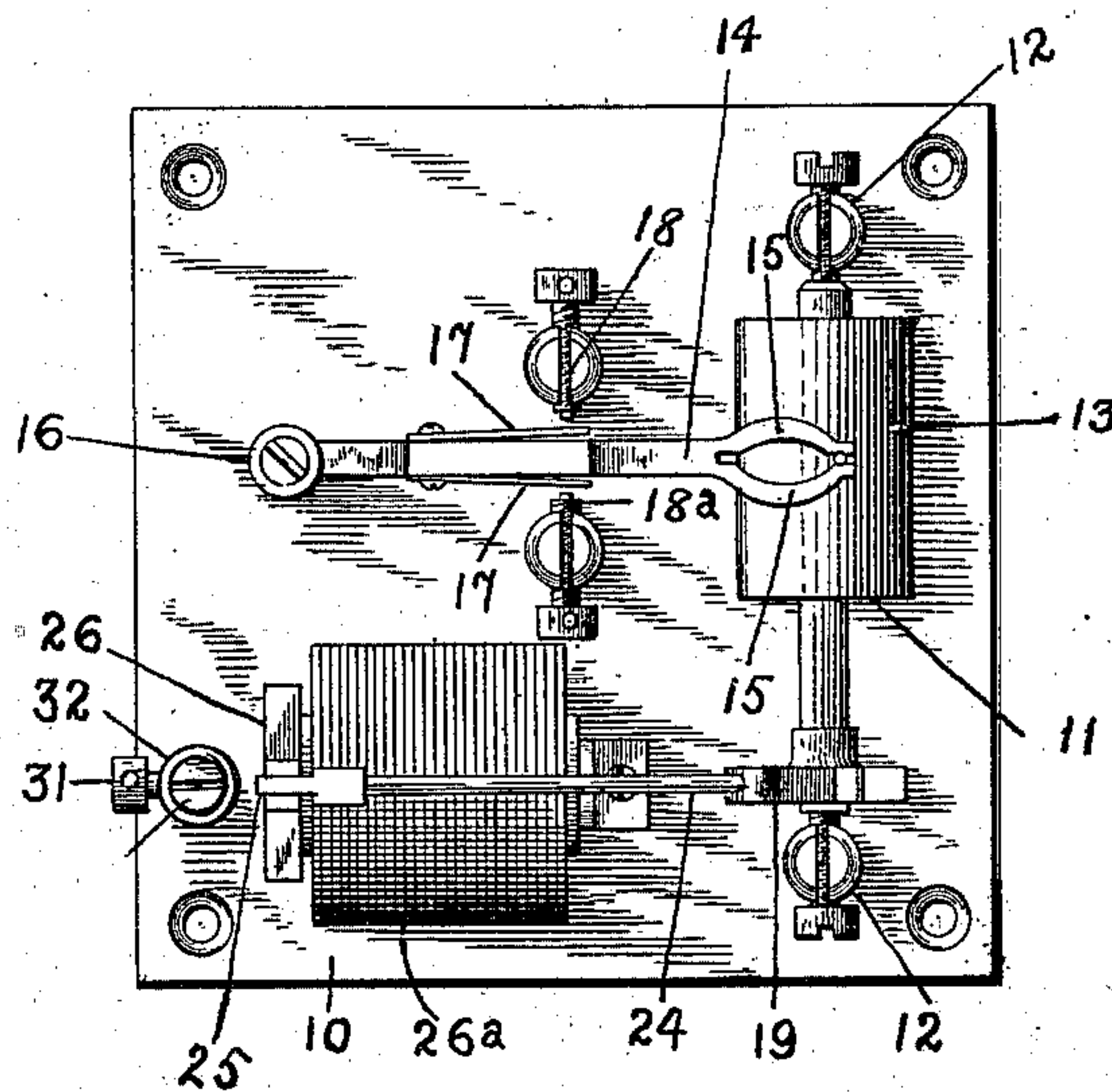


Fig. 3

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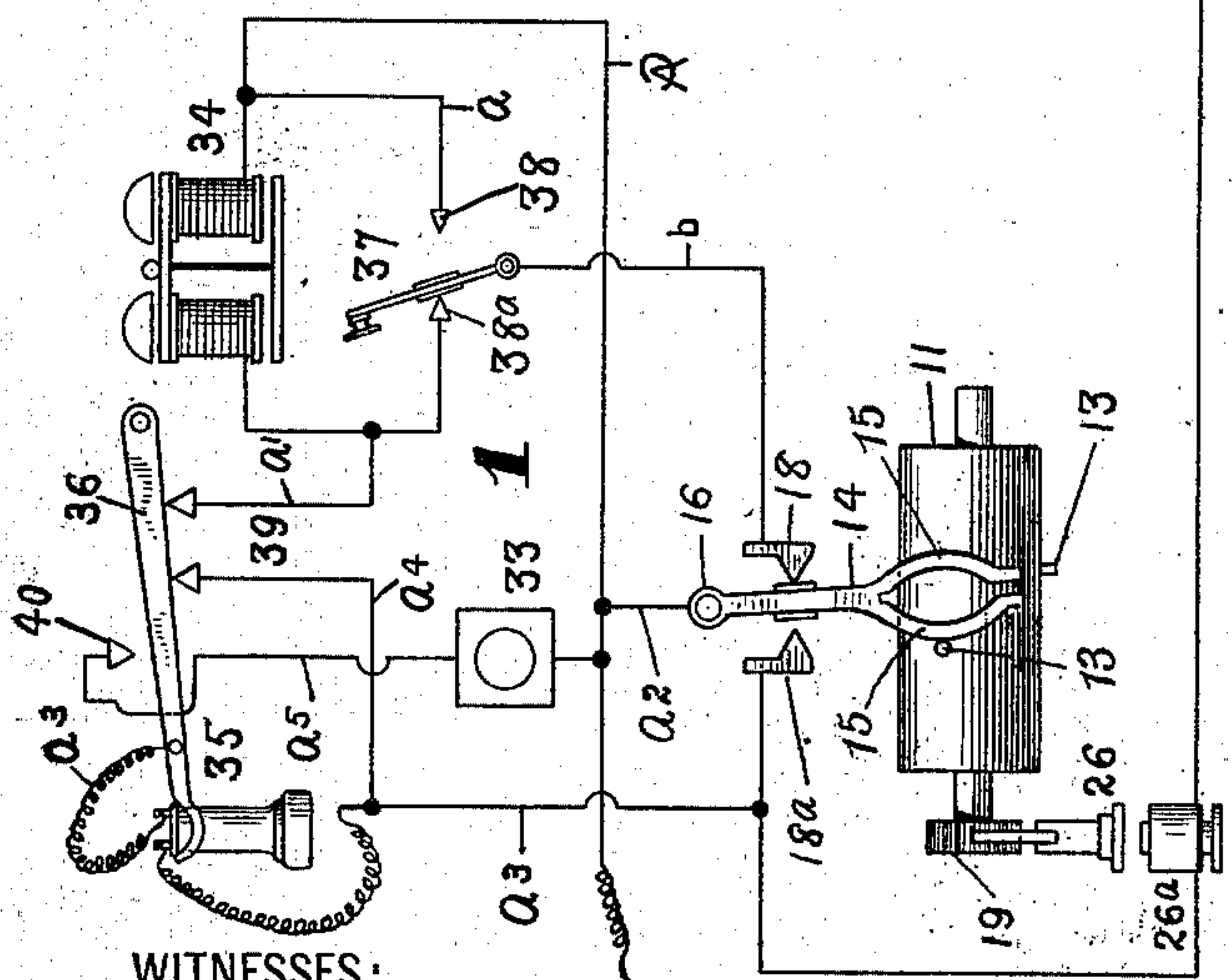
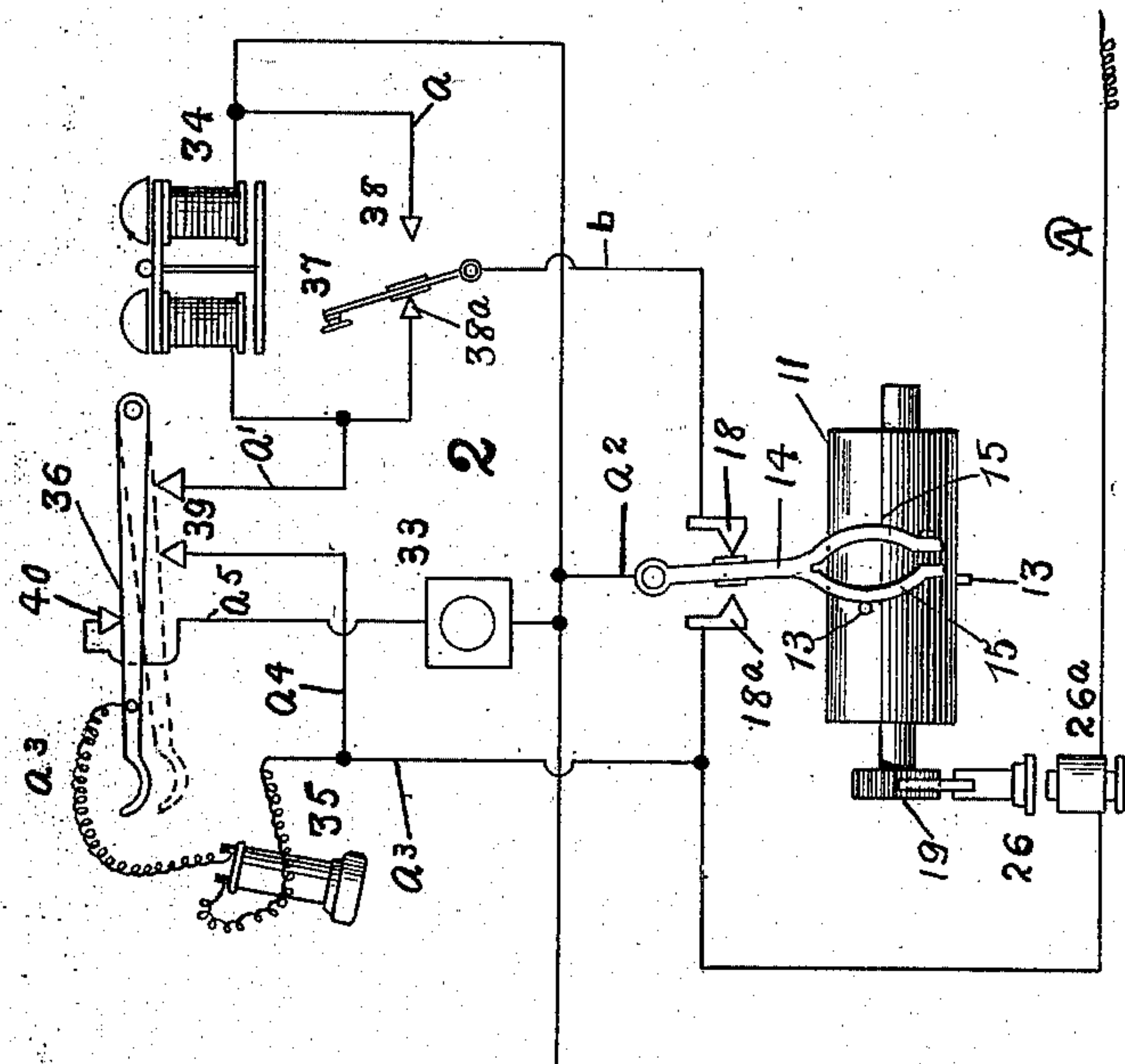
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UNITED STATES PATENT OFFICE

ALFRED F. SWAN, OF BAYONNE, NEW JERSEY.

TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 714,759, dated December 2, 1902.

Application filed May 11, 1901. Serial No. 59,861. (No model.)

To all whom it may concern:

Be it known that I, ALFRED F. SWAN, of Bayonne, Hudson county, New Jersey, have invented certain new and useful Improvements in Telephone Systems, of which the following is a full, clear, and exact description.

My invention relates to improvements in party-line telephone systems; and the object of my invention is to produce a very simple and positive apparatus by which all the parties on a line can be called up severally from the central office and by which when one telephone apparatus is cut into line all the others on the line will be automatically cut out.

My invention is intended to improve and simplify the system shown in Letters Patent of the United States, No. 609,173, dated August 16, 1898, and at the same time make the apparatus much more positive and accurate in operation.

To these ends my invention consists of certain features of construction and combinations and organizations of parts which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters and figures of reference refer to similar parts throughout the several views.

Figure 1 is a perspective view of that part of my invention which is arranged at an ordinary telephone-box. Fig. 2 is a side elevation of the structure shown in Fig. 1. Fig. 3 is a plan view thereof. Fig. 3^a is a detailed plan of modification of switch barrel and arm. Fig. 4 is a diagrammatic view showing two telephones connected up in accordance with my invention, and Fig. 5 illustrates a development of the switch-barrels of three telephones where there are three on a line. My invention is not limited to three telephones on a line, but may be extended to include any indefinite number.

Quite a part of the apparatus shown in the accompanying drawings is like that in ordinary telephones and like the mechanism described in previous patents to me and is shown to illustrate my present improvements. (See Letters Patent to Swan, No. 609,173, August 16, 1898.)

In the drawings my improved apparatus is

mounted, preferably, on a base-plate 10, which may be any suitable support, and on this turns the switch-barrel 11, which is journaled in suitable posts 12 or bearings and is provided at intervals with pins 13, adapted to engage and operate the bifurcated cam end 15 of the switch-arm 14, which arm is pivoted at one end, as shown at 16, while its bifurcated end rides on the switch-barrel 11, above referred to, which switch-barrel is of insulating material. The switch-arm 14 is split at its free end, as shown, and the two parts 15 thereof curve outward, so as to have a cam-like effect and give the arm sufficient breadth to have it properly engage and be moved by the pins 13 on the switch-barrel as the said pins come in contact with its sides. This is illustrated in Fig. 3^a, in which the switch-barrel 11 is shown with a cam-groove 11^a engaging a pin 13^a on the under side of the switch-arm 14. The switch-arm 14 is preferably, but not necessarily, provided with contact-springs 17, which engage the opposed contacts 18 and 18^a and which by so doing controls the telephone-circuit, as hereinafter described.

The switch-barrel 11 is turned by mechanism similar to that in my former patent referred to, except that I have special means for making the movement accurate, which means will be described below. The switch-barrel has on its shaft a ratchet-wheel 19, which is engaged and turned by the forked head 20, which has one relatively long arm 21 to push on the teeth of the ratchet-wheel and a short arm 22, which engages the second tooth back of the tooth engaged by the arm 21, and so prevents the ratchet-wheel from being turned more than the distance of one tooth by the advance movement of the head 20. It will be seen, therefore, that this peculiar form of head acts as an escapement, which makes a positive movement the distance of a tooth every time that the head is advanced. The ratchet-wheel is prevented from turning back by a detent 23. The head 20 is carried and moved by an arm 24, which at its upper end is pivoted to the upper end of an armature 26, and the latter is pivoted at its lower end, as shown at 30, and moved by a magnet 26^a, which is included in the line-circuit of the

telephone. The armature vibrates between the magnet 26^a and the screw 31, which is adjustable in the post 32 behind the armature.

The mechanism which I have described above is shown in connection with the ordinary telephone apparatus, which comprises a transmitter 33, a magneto or other signal 34, a receiver 35, and the usual telephone-hook 36. I also show and employ a pair of contacts 38 38^a in the bell or signal circuit and the usual contacts 39 to engage the hook 36, together with a single contact 40 to engage the hook when the latter rises. I also use a switch or push-button 37 to move between the contacts 38 38^a.

The wiring is as follows: The line-wire A connects with the bell 34 and contact 38^a, and a branch α from the line connects with one of the contacts 38, while the second branch α' leads from the line between the contact 38^a and the bell to one of the contacts 39. A third branch α^2 leads from the line to the hook 36, including the receiver 35, and from this branch α^3 leads a wire α^4 to the second contact 39. A wire α^5 leads from the line through the transmitter 33 to the contact 40, and a wire b leads from the switch or push-button 37 to the contact 18. The opposite contact 18^a is a branch in the line A.

When the telephone instruments along the line are in normal or zero position, they are cut out, as shown in full lines at apparatus 1 in Fig. 4, and the circuit is as follows: from the line A, through the wire α^2 , the switch-arm 14, the contact 18, the wire b , the switch 37 and contact 38^a, the wire α' , the contacts 39 and hook 36, and the wires α^4 and α^3 back to the line, so that when central rings up a subscriber he has to first step the subscriber's instrument around to talking position, as described below. If now a subscriber wishes to call central, he pushes the switch or push-button 37 over against the contact 38 and after signaling lifts his receiver from the hook 36, as usual with all telephones, and this permits the hook to rise against the contact 40, as shown at apparatus 2 in Fig. 4, while the switch 37 will close back against the contact 38^a, and the circuit is now as follows: from the line A through the transmitter 33 and wire α^5 , the contact 40, the hook 36, the wire α^3 , and receiver 35 back to the line. It will be seen then that while the talking-circuit is in use the bell is absolutely cut out and every other instrument on the line is also cut out, as presently described. When a subscriber is called and his instrument is in talking-circuit, all the switch-barrels on the party-line are simultaneously moved, and that of the subscriber who is talking is moved so that his switch-arm 14 is in contact with the contact 18; but the same movement of the other switch-barrels will have caused the arms 14 of the other subscribers to engage the contacts 18^a, so that they are completely cut out while he remains in circuit. When the arm 14 is against the contact 18^a, it will be seen

that the circuit is from the wire A, through the contact 18^a, the arm 14, and the wire α^2 back to the line, so that the entire instrument is completely cut out and cannot be cut in until the line is out of use and the instruments thereon again stepped back to normal position.

It will be readily understood from the foregoing description that if three makes and breaks are made in the line as many impulses will be given to the several armatures 26, and consequently the several switch-barrels will be turned the distance of three of the teeth on the ratchet-wheels 19. If four impulses are given, the switch-barrel will be moved the distance of four teeth, &c. In Fig. 5 I have shown a development of the switch-barrels adapting the system to a party-line having three instruments on the line, and the arrangement of pins 13 on the switch-barrels will vary with the number of instruments on the line. It will be seen, too, that these pins may readily be arranged so that if one subscriber is in talking-circuit with a subscriber on another line the other subscribers on the line will be cut out, and also so that any two subscribers on the same line may talk with each other. The one thing necessary is to arrange the pins so that a given number of impulses will cause the switch-barrels 14 of the several instruments to be similarly or dissimilarly adjusted, according to the desired result. If the pins are arranged so that the two arms are similarly moved and held by a certain number of turns of several switch-barrels, then the two instruments having the said similarly-placed arms will be in talking-circuit; otherwise one of them will be cut out.

It is not thought necessary to illustrate all the possible combinations of the three instruments as per the diagram in Fig. 5, for it will be readily seen that this idea can be easily carried into effect. This feature of the invention is not unlike the idea disclosed in my United States Letters Patent No. 607,173, and this invention relates more especially to the use of the single arm 14, the means for causing the arm to do the required work, and the mechanism for controlling accurately the movement of the ratchet-wheel 19 and the switch-barrel therewith connected.

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

1. The combination with the telephone apparatus and the line, of a single horizontal pivoted switch-arm connected with the line, said arm having a widened and bifurcated end thereon, of a rotating cylinder operated by makes and breaks in the line, pins disposed thereon so that one set of pins in unison in contact with the bifurcated switch-arm will cut the telephone to line and the other set out of line by short-circuiting.

2. The combination with the telephone apparatus, the line, contacts suitably connected and a horizontal pivoted switch-arm having

a widened and bifurcated end, of a rotating cylinder operated by makes and breaks in the line having pins so disposed thereon that one set of pins engaging the bifurcated arm cuts the apparatus to line and another set out of line substantially as described.

3. The combination with the telephone apparatus and the line, of a single switch-arm pivoted, said arm having a widened and bifurcated end thereon, pins disposed upon a rotating cylinder to engage and move the pivoted switch-arm, contacts formed thereby so that one position of the pins in series will cut the telephone apparatus to line and the other out of line by short-circuiting substantially as described.

4. In an apparatus of the kind described,

the combination with the telephone apparatus and the pivoted switch-arm arranged to control the circuit through the telephone apparatus and provided with a bifurcated free end portion, of the rotating switch-barrel having pins to engage the free end of the switch-arm and move it, means for turning the switch-barrel by makes and breaks in the line.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED F. SWAN.

Witnesses:

WARREN B. HUTCHINSON,
ED. A. ISAACS.