

(No Model.)

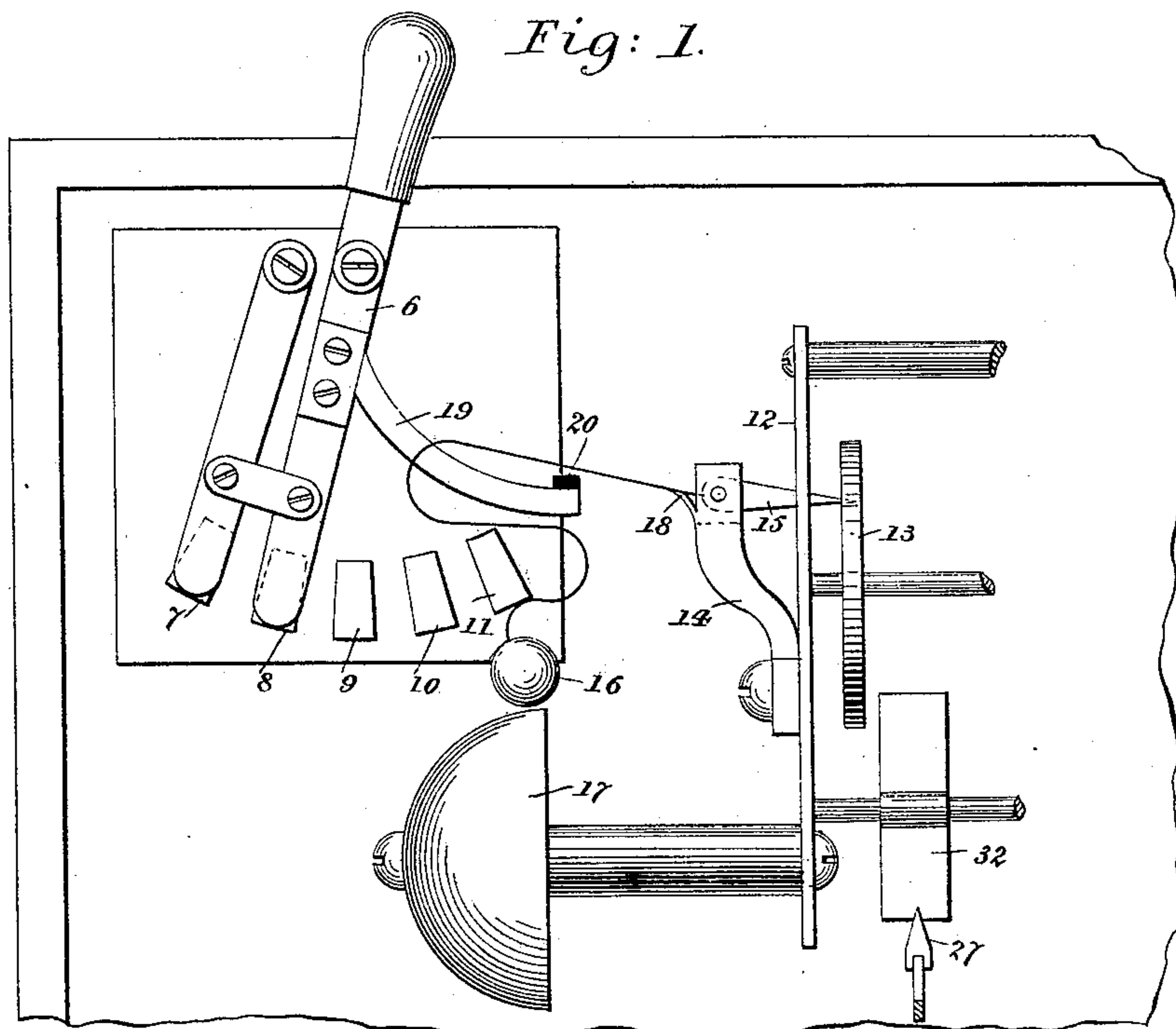
3 Sheets—Sheet 1.

H. ETHERIDGE.  
AUTOGRAPHIC TELEGRAPH.

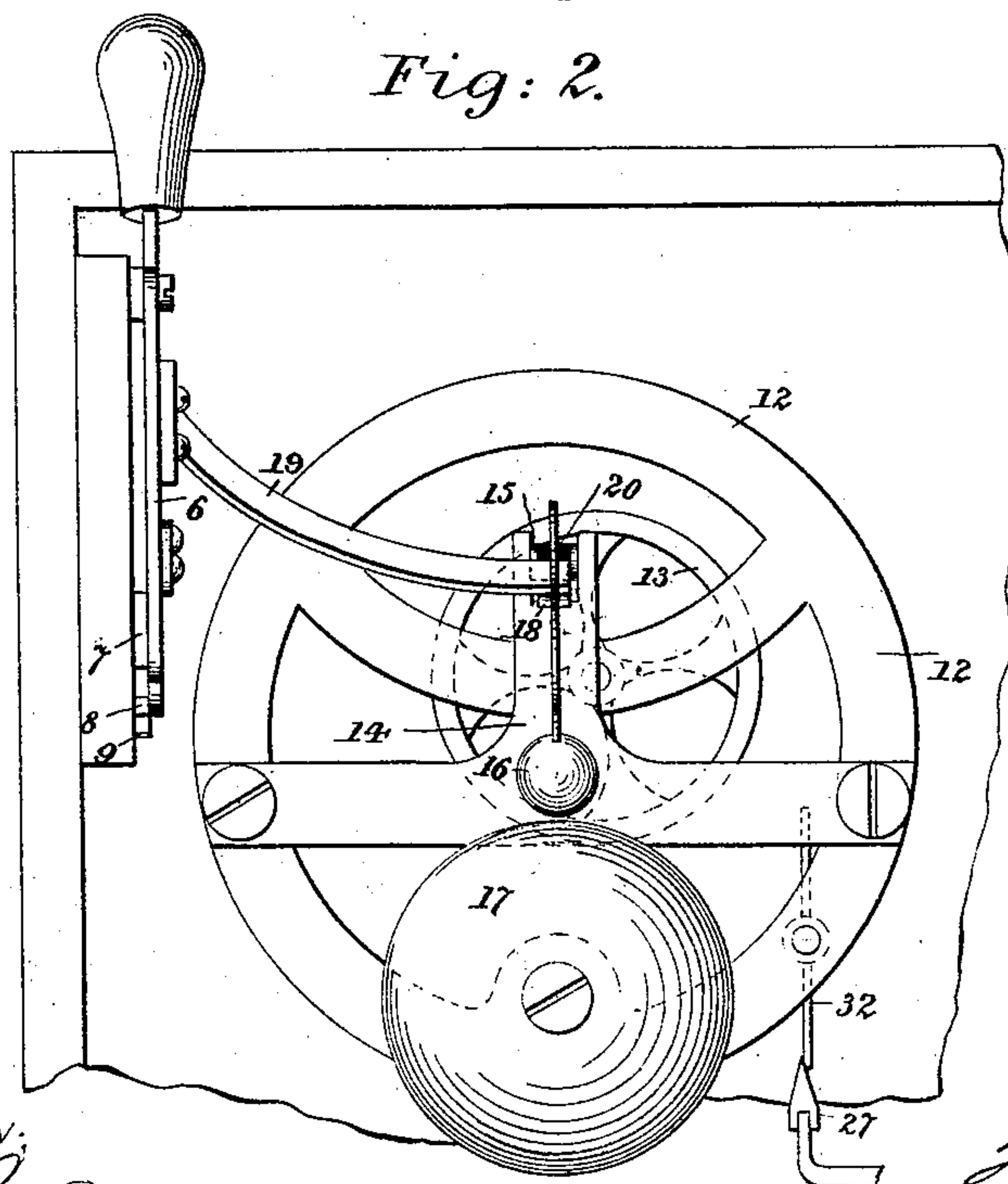
No. 435,292.

Patented Aug. 26, 1890.

*Fig: 1.*



*Fig: 2.*



Witnesses:  
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*W. E. Bowen*

Inventor,  
*Harry Etheridge*  
By his Attorney,  
*W. E. Behrens*

(No Model.)

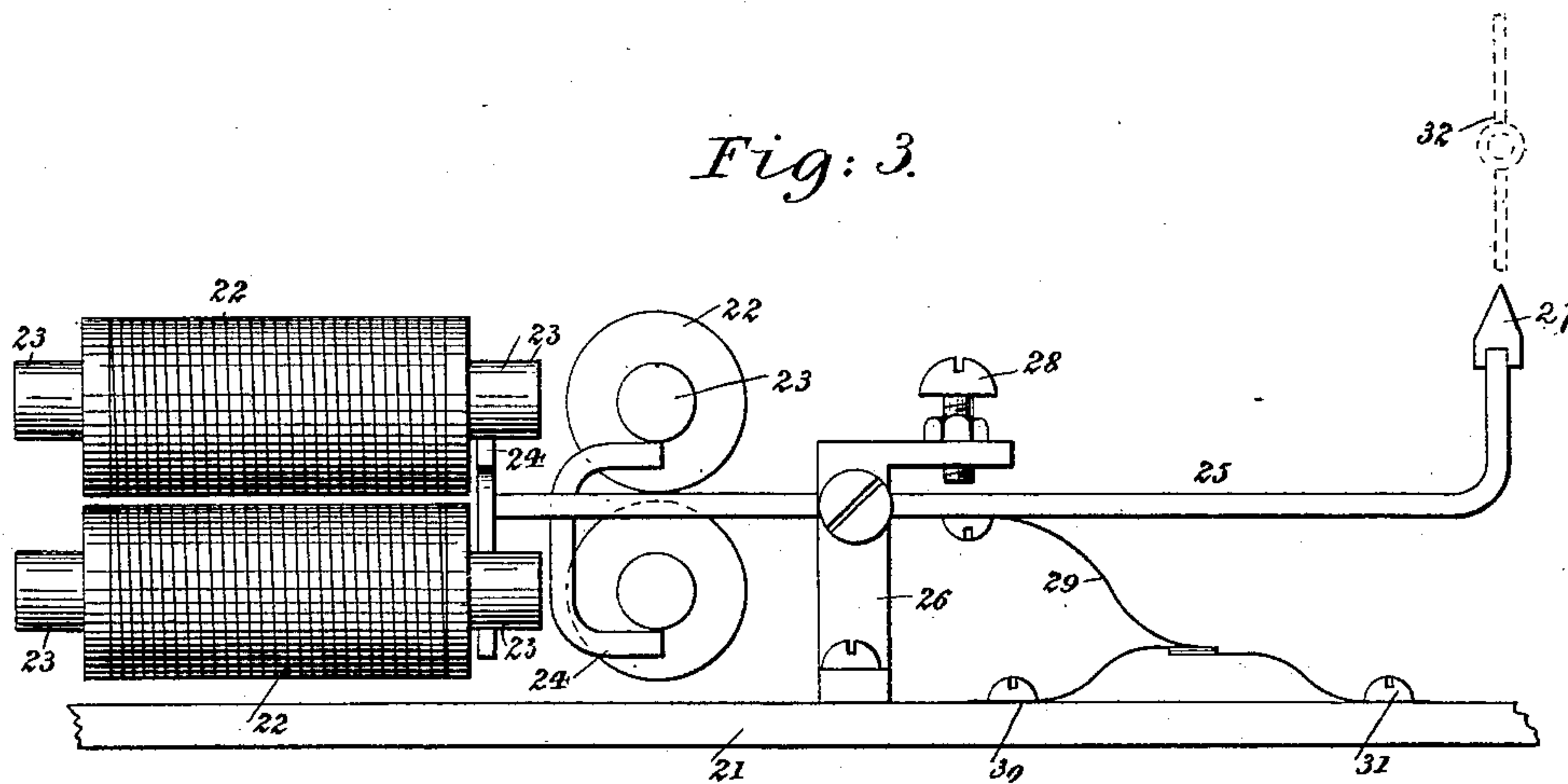
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H. ETHERIDGE.  
AUTOGRAPHIC TELEGRAPH.

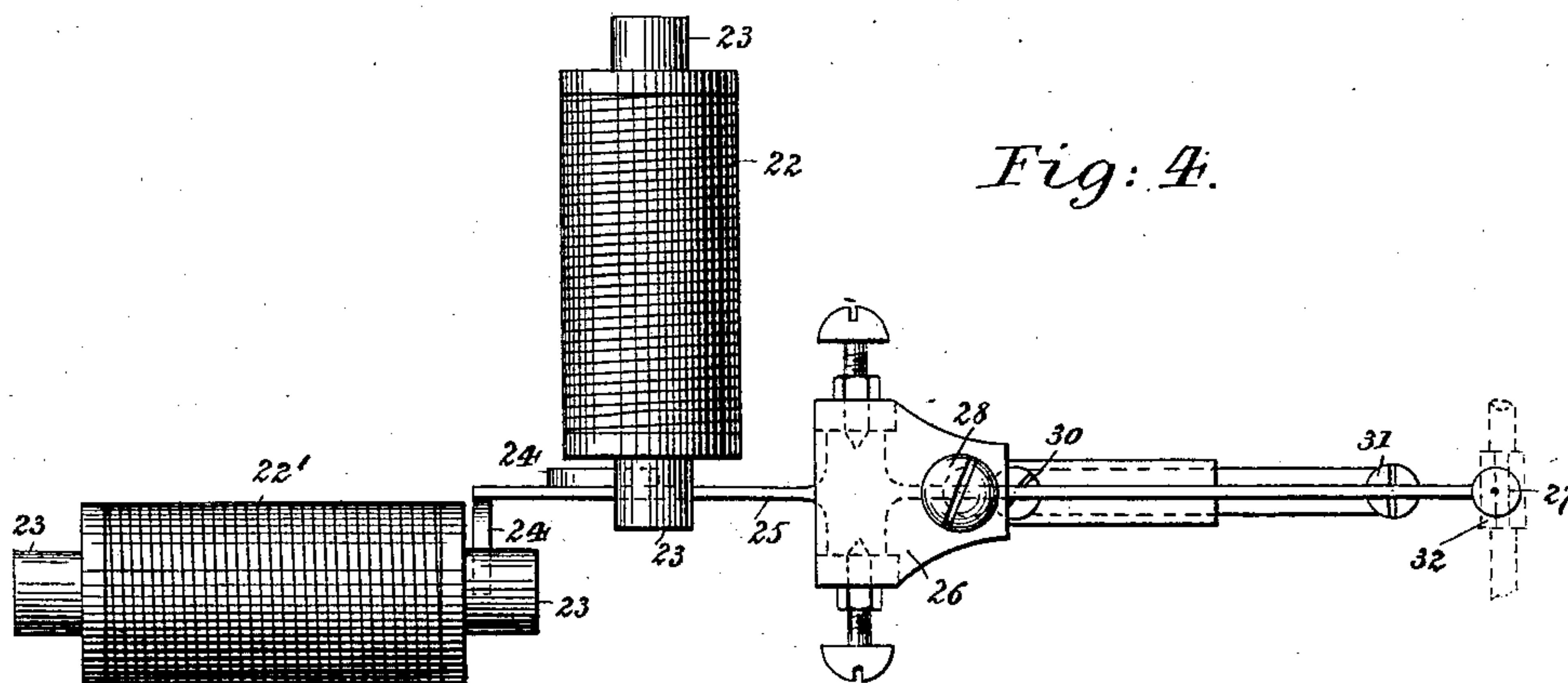
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*Fig: 3.*



*Fig: 4.*



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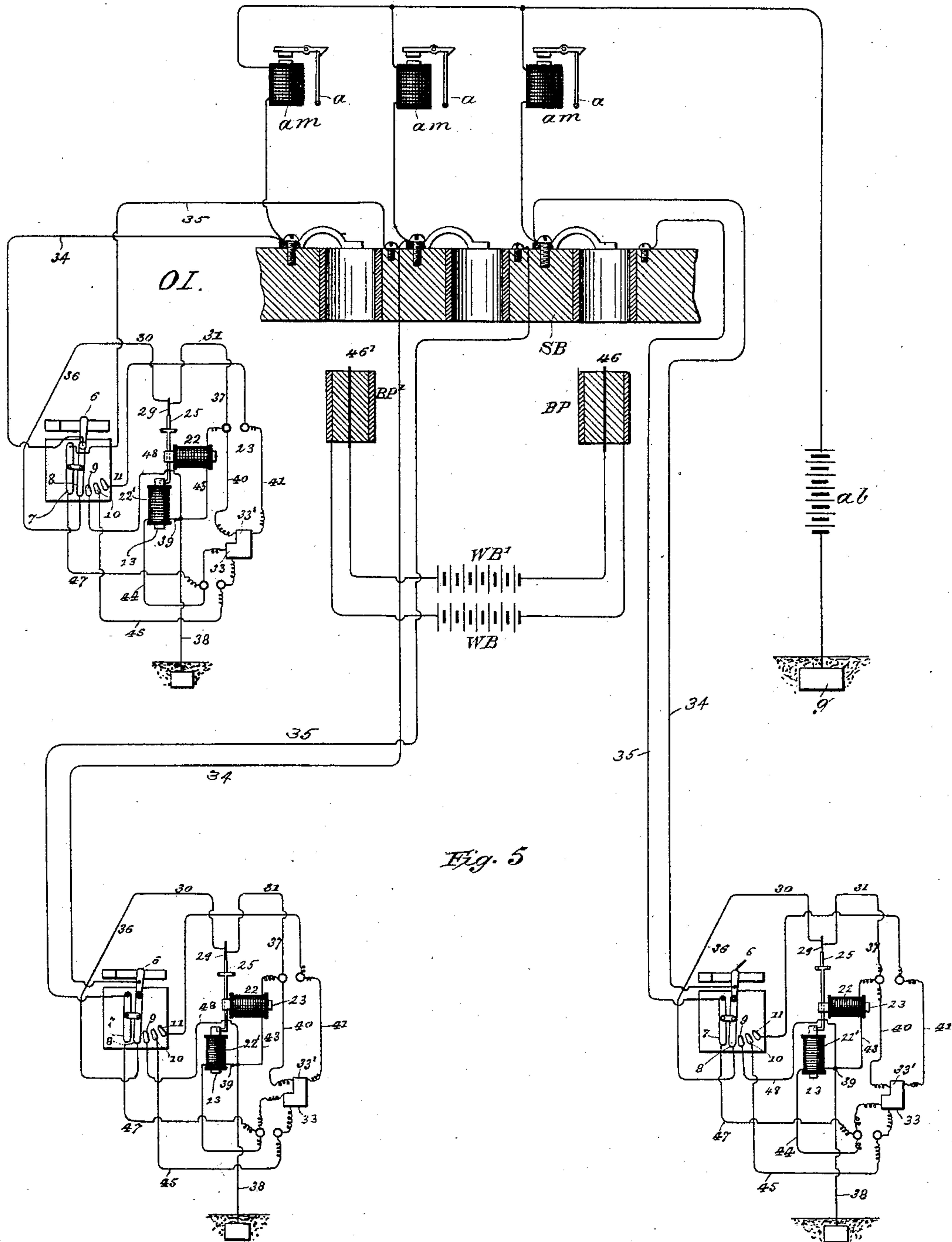
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3 Sheets—Sheet 3.

H. ETHERIDGE.  
AUTOGRAPHIC TELEGRAPH.

No. 435,292.

Patented Aug. 26, 1890.



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# UNITED STATES PATENT OFFICE.

HARRY ETHERIDGE, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE  
WRITING TELEGRAPH COMPANY, OF NEW YORK, N. Y.

## AUTOGRAPHIC TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 435,292, dated August 26, 1890.

Application filed November 16, 1887. Serial No. 255,342. (No model.) Patented in England November 29, 1887, No. 16,378; in Austria January 5, 1888, No. 18,317; in Belgium January 31, 1888, No. 80,179; in Victoria February 9, 1888, No. 5,616; in New South Wales February 13, 1888, No. 501; in South Australia February 15, 1888, No. 966; in New Zealand February 20, 1888, No. 2,818; in France March 20, 1888, No. 187,795; in Queensland March 21, 1888, No. 564; in Spain April 30, 1888, No. 7,759; in India June 12, 1888, No. 815, and in Italy August 21, 1888, No. 22,857.

*To all whom it may concern:*

Be it known that I, HARRY ETHERIDGE, a subject of the Queen of Great Britain, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Autographic Telegraphs, of which the following is a specification.

This invention relates to exchange systems for autographic telegraphs, and particularly to that class of autographic telegraphs described in the Letters Patent of the United States granted to James H. Robertson November 30, 1886, No. 353,593, and has been patented by me in the following foreign countries: in Great Britain November 29, 1887, No. 16,378; in Austria January 5, 1888, No. 18,317; in France March 20, 1888, No. 187,795; in Belgium January 31, 1888, No. 80,179; in New South Wales February 13, 1888, No. 501; in South Australia February 15, 1888, No. 966; in Queensland March 21, 1888, No. 564; in Victoria February 9, 1888, No. 5,616; in New Zealand February 20, 1888, No. 2,818; in Italy August 21, 1888, No. 22,857; in Spain April 30, 1888, No. 7,759, and in India June 12, 1888, No. 815.

The object of my invention is to render apparatus of the nature in question more effective in operation and to obtain increased facilities when such apparatus are employed in a system of interchange between subscribers within a district.

The invention is hereinafter described, and its features of novelty are pointed out in the claims at the end of this specification.

In the accompanying drawings, which form a part of this description, and in which like features are indicated by like figures and letters of reference in the several views, Figure 1 is a side elevation of a switch provided with contacts and a clock-work and bell and means for arresting and releasing the same. Fig. 2 is a front elevation of the apparatus shown in Fig. 1. Fig. 3 is a side elevation of magnets (preferably the receiver-magnets) and armatures, &c., which co-operate with the

clock-work mechanism of Figs. 1 and 2, as hereinafter set forth. Fig. 4 is a top plan view of Fig. 3, and Fig. 5 illustrates the utilization of my improvements in a district system.

In the drawings, 6 indicates the switch; 7 and 8, the switch-contacts for the receiver; 9, the earth-contact, and 10 and 11 the transmitter-contacts.

12 indicates a clock-work frame, and 13 a wheel of the clock-work.

14 is a support secured to the clock-work frame and having pivoted thereto an arm 15, to which arm is attached the hammer 16 of bell 17. The arm 15 is adapted to be operated upon by the spokes in wheel 13, for the purpose presently explained. On support 14 there is a stop 18, the purpose of which is to give vibration to hammer 16.

Secured to the lever of the switch 6 is an arm 19, whose office is to arrest the movement of the hammer of the bell when the switch is pulled over from the receiver-contacts 7 and 8 to the transmitter-contacts 10 and 11, thus preventing the ringing of the bell while the instrument is transmitting. The point of arm 19 is preferably insulated, as at 20.

In Fig. 3 the base of the box containing the receiving-instruments is indicated by 21, 22 designating the receiver-magnets, and 23 the cores thereof. The armatures of these magnets will be the same as shown in the Robertson patent, before mentioned. In suitable relation to this part of the apparatus I arrange a pair of armatures 24, which are attached to one end of arm 25, pivoted on the support 26, and having at its other end a steel cap 27. The relative location of the armatures 24 with reference to the receiving-magnets 22 22' is such that they in no wise interfere with the movement of the armature connected to the stylus of the receiver.

Fig. 28 indicates a screw passing through a bracket on the support 26, whereby the distance between the armatures 24 and the cores



of the receiving-magnets is regulated. An arm 29, preferably connected to 25 and insulated therefrom, serves to make contact between 30 and 31, which designates the terminals of the wires between switch-contact 8 and magnet 22.

32 indicates a fly-wheel of the clock-work, which moves the paper, and which clock-work is provided with the wheel 13, co-operating with arm 15 for the purpose of ringing the bell while the message is being received.

The switch 6 and the clock-work mechanism comprise a part of the apparatus under control of each district-subscriber, and the same will be arranged in suitable relation to the receiver and transmitter of each subscriber's instrument. The normal position of switch 6 is on the receiver-contacts 7 and 8, in which case the apparatus is in condition for receiving; but when transmitting the switch will rest upon contacts 10 and 11. The earth-contact 9 is preferably between the transmitting and receiving contacts, and besides it has a direct ground. The function of this contact in the present system is to call up the central office.

When a subscriber wishes to call up the central office, he pulls his switch over onto the transmitter-contacts 10 and 11, and in doing so necessarily switches across the earth-contact 9, which momentarily completes the circuit for dropping the annunciator on the switch-board S B at the central office, as more fully explained presently. The subscriber by the movement just mentioned puts on his transmitter, and as one battery-plug B P or B P' is always or can be put in the office-connection to the office-instrument the other plug immediately connects the person who has called, and the latter is enabled to write the number wanted. The plugging of the current at the central office, whereby the calling and called subscribers are put in communication with each other, energizes the cores 23 of the magnets 22' of both subscribers' instruments with which armatures 24 co-operate, thus instantly attracting said armatures and raising that end of arm 25 to which said armatures are affixed, with the effect of releasing the clock-work fly 32, and at the same time making connection between the contacts 30 and 31 through the medium of spring-arm 29. Upon the release of fly-wheel 32 in the manner stated the clock-work will start and begin to move the paper. As the clock-work revolves, the arm 15 is engaged by the spokes of wheel 13, with the effect of causing a regular tap on the bell 17, due to the vibration of the hammer which is secured to arm 15, as explained. By this means the subscriber is notified that a message is being received, the bell continuing to ring while the message is being received. After the message is written the central office takes out the plug, causing the armatures 24 to drop, breaking the connection between 30 and 31, and thus restoring the parts

of the apparatus of Fig. 3 to their normal condition with the clock-work at rest, the operator at the central office being then enabled to replace the shutter of the annunciator, which cannot be done while any current is passing over the line.

In Fig. 5, which shows my improvements adapted to a district system, S B indicate a fragment of the central-office switch-board, W B and W B' the writing-batteries, and B P, B P' battery-plugs. The annunciators are located at *a*, *a b* being the battery, and *a m* the annunciator-magnets connected with battery *a b* and grounded at *g*.

Below the central-office switch-board, Fig. 5, are shown two subscribers' instruments and a central-office instrument employed in the writing-telegraph, including receiving-magnets 22 22', transmitter 33 33, and a switch 6. As already explained, the switch 6 is arranged to co-operate with contacts for receiver, transmitter, and the earth, and an arm on the switch is also arranged to coact with the clock-work mechanism, as shown in Fig. 1 of the drawings. The switch 6 of each individual set of apparatus with which each subscriber is supplied is in connection with the central-office switch-board S B by means of wires 34 and 35.

30 and 31 indicate the terminals of wires 36 and 37, and the mechanism with which the clock-work co-operates is located at some convenient point between switch 6 and receiving-magnets and is connected with terminals 30 31, as more clearly shown in Fig. 3.

Normally the switch 6, comprising a part of the apparatus under control of each subscriber, is on the receiver-contacts 7 and 8, as shown in Fig. 5, in which view each set of apparatus is in condition for receiving a message. If the subscriber on the right hand of Fig. 5 desires to communicate with subscriber controlling the other instrument on the left hand of Fig. 5, he pulls his switch 6 over onto transmitter-contacts 10 and 11, and in so doing passes over and against the earth-contact 9, the effect of which is to call up the central office, since the bringing together of switch 6 and contact 9, which has a direct ground, momentarily energizes the annunciator-magnet *a m*, thus causing the annunciator-shutter to drop, which gives the required signal to the attendant at the central office. When the switch is against earth-contact 9, the current is from ground, to which battery *a b* is connected through annunciator-magnet *a m* and wire 34 to said contact 9 and through wire 48 to ground by way of wire 38. With switch 6 on contacts 10 11 the subscriber is in condition to transmit.

When the signal is received by the attendant, a battery-plug is at once put in to connect the calling subscriber with the central-office instrument O I, and said subscriber then writes the number of the subscriber with whom he desires to communicate, and the central office makes connection with that num-



ber, thus placing the calling and called subscribers in communication, in which case the circuits will be as follows: Starting from the ground at the right of Fig. 5, which represents the calling-subscriber's instrument, the switch whereof having been moved over earth-contact 9 to the transmitting-contacts 10 and 11, the current is through wire 38 to 39, where it divides, one circuit going through magnet 22' of the receiver, through wire 44 to section 33 of the transmitter, through wire 45 to switch-contact 10, through switch 6 to central-office switch-board by way of wire 35, from thence by way of battery-plug B P to the lower battery W B, which is connected to the outside contact of said plug, as shown, thence through said battery to the outside contact of battery-plug B P' to switch-board, thence by way of wire 35 at the left of Fig. 5 to contact 7 of switch 6 of the called subscriber, and through wires 47 and 44 to magnet 22', and from thence to 39 and to ground by wire 38. The current-energizing magnet 22' lifts the armatures 24, (see Fig. 3,) and with them that end of arm 25 upon which they are carried, the corresponding depression of the other end of arm 25 simultaneously releasing the clock-work mechanism and forcing down arm 29, by which the closing of contacts 30 and 31 is effected. Instantly the clock-work is released the paper begins to be fed out, and the bell 17 is thereby rung at intervals as long as the clock-work is in motion, which continues until the central office breaks the connection by removing the battery-plug from the switch-board. The second circuit, starting at point 39, (at the right of Fig. 5,) where the current from the ground divides, is through magnet 22 of the receiver, thence through wire 40 to section 33' of the transmitter-cylinder, thence through wire 41 to switch-contact 11, through wire 34 to central-office switch-board S B, from thence through wire 46 of battery-plug B P to battery W B', thence through wire 46' of battery-plug B P' to contact 8 of switch 6 of the called-subscriber's instrument, by way of wire 34 at the left of Fig. 5, from thence through wires 36 37 to magnet 22 of the called-subscriber's instrument, and through wire 43 to 39 and by wire 38 to ground.

The mechanism shown in Fig. 3 is of course adapted to the "ticker system," where one instrument, organized as shown in the Robertson patent herein mentioned, writes on several instruments embodying merely clock-work and receivers. In adapting the mechanism shown in Fig. 3 to such an organization I merely omit the arm 29 and the contacts 30 and 31. When the current is turned on in such a system and the magnets are energized, the clock-work is released in the manner just explained, and when the current is switched off by the instrument which does the writing the clock-work of the several instruments will stop. It will thus be seen that the clock mechanism which starts and stops the paper when combined with a receiver of

the description indicated is automatically under perfect control. There may also be combined with the ticker system employing the feature just referred to the mechanism shown in Fig. 1 for signaling when a message is coming or being received.

I am aware of the patents to Buell and Buel, No. 252,288, and to Eckert and Seely, No. 288,627, both relating to telephone systems, and to what is therein shown I lay no claim.

I am aware of English Patent No. 749 of 1882, and to what is therein shown and described I lay no claim.

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

1. The combination, with the receiver and transmitter of an autographic telegraph and a switch comprising a switch-lever and three separate contacts for receiver, transmitter, and ground, respectively, of a central-office annunciator electrically connected to ground and a line connecting the central office with a station of an autographic telegraph-exchange system, substantially as described.

2. In an autographic telegraph, the combination, with a paper-feed mechanism, a signal-bell, a hammer, and a hammer-arm, of a switch-lever provided with a projection arranged in one of the positions of the switch-lever to act on the hammer-arm to automatically arrest the tapping of the bell, substantially as described.

3. The combination, with the receiver of an autographic telegraph and a paper-feed mechanism, of a pivoted armature-lever co-operating with the receiver and serving as a detent for said paper-feed mechanism, said armature-lever being provided with a circuit-closer for closing the circuit at 30 31 through the receiver, substantially as described.

4. The combination, with the receiver of an autographic telegraph and a paper-feed mechanism, of an armature provided with an arm serving as a detent for said paper-feed mechanism, a second arm, as 29, and contacts, as 30 and 31, with which arm 29 coacts for closing the circuit through the receiver, substantially as set forth.

5. The combination, with the receiver of an autographic telegraph and an armature co-operating therewith and provided with a circuit-closing arm, of a central-office battery and battery-plugs, and electrical connections between the central office and said receiver, substantially as described.

6. The combination, with the receiver of an autographic telegraph and an armature co-operating therewith and provided with a circuit-closing arm, of a switch and receiver, earth and transmitter contacts, a central-office annunciator, battery and battery-plugs, and electrical connections between the central office and said receiver, substantially as described.

7. The paper-feed mechanism provided with fly-wheel 32, in combination with the electro-



magnets 22 of the receiver, support 20, pivoted arm 23, provided with armature 24 and contact-closer 29, and contacts, as 30 and 31, substantially as described.

5 8. The combination, with the receiver of an autographic telegraph and a switch-lever, of receiver, earth, and transmitter contacts, an armature-lever co-operating with the receiver and provided with a circuit-closer, and con-  
10 tact-points closed thereby, substantially as described.

9. In an autographic telegraph-exchange system, the combination of a switch with receiver, earth, and transmitter connections, the  
15 said earth-connection arranged in appropri-

ate relation to the others, a paper-feed mechanism, a bell, a hammer operated by said feed mechanism, an electro-magnet, an armature therefor co-operating with said feed mechanism and provided with a circuit-closer, and 20 contact-points closed thereby, substantially as described.

Signed at Pittsburg, in the county of Allegheny and State of Pennsylvania, this 31st day of October, A. D. 1887.

HARRY ETHERIDGE.

Witnesses:

F. V. McMULLEN,  
ROBERT LEWELLYN.