

(No Model.)

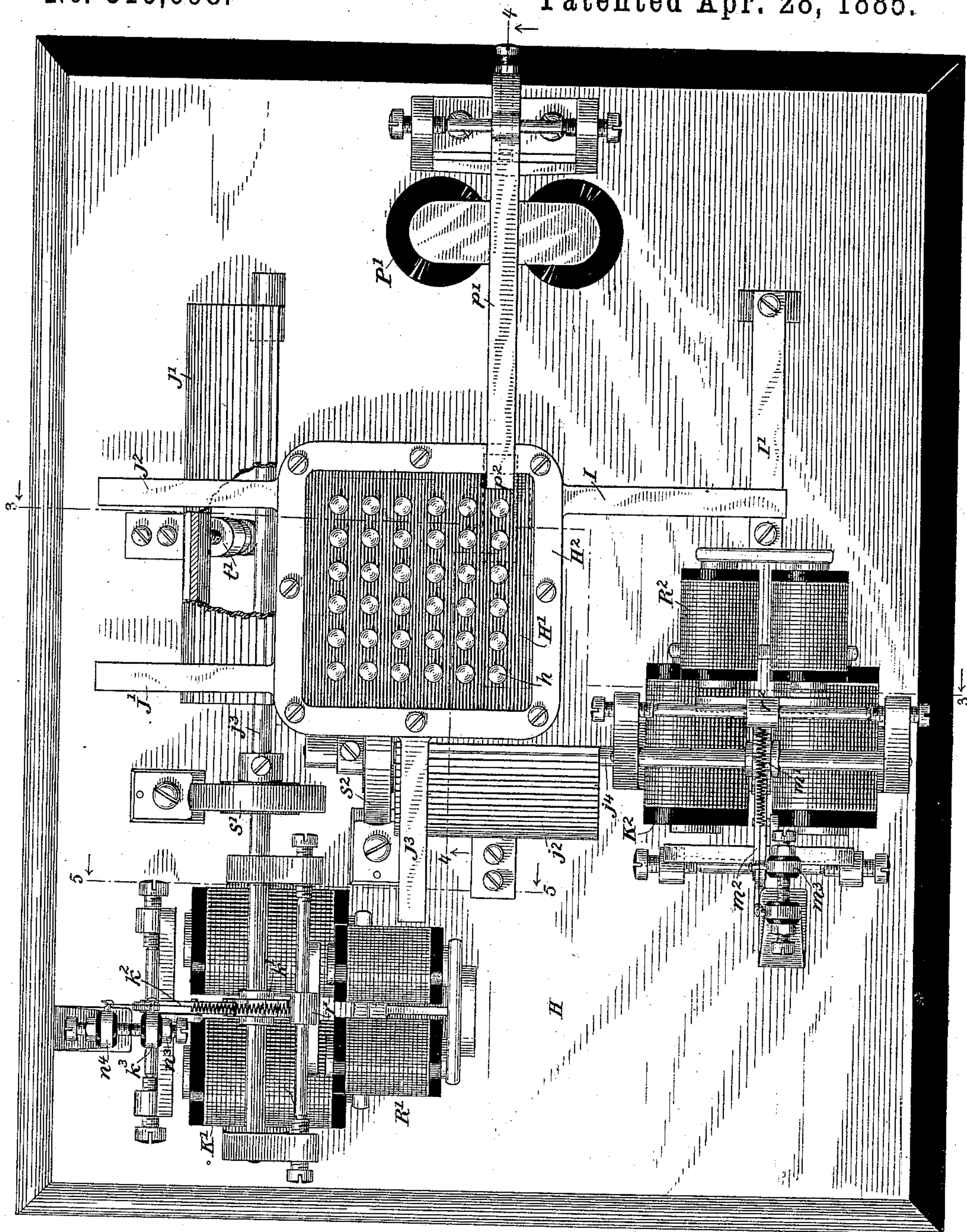
4 Sheets—Sheet 1.

H. VAN HOEVENBERGH.

RECEIVER FOR PRINTING TELEGRAPHS.

No. 316,698.

Patented Apr. 28, 1885.



Witnesses

Wm A. Shink

Geo W. Young

Fig. 1.

By his Attorneys

Pope & Edgcomb

Inventor  
Henry Van. Hoevenbergh.



(No Model.)

4 Sheets—Sheet 2.

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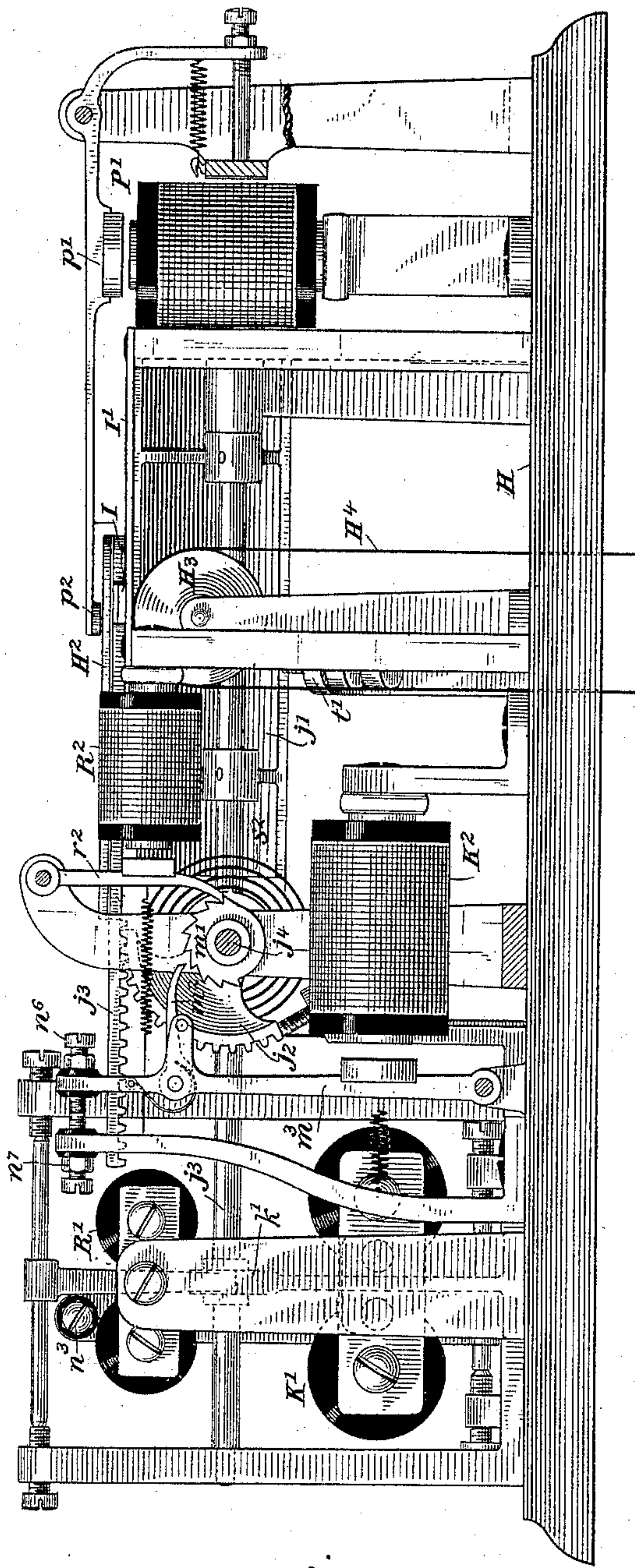


Fig. 2.

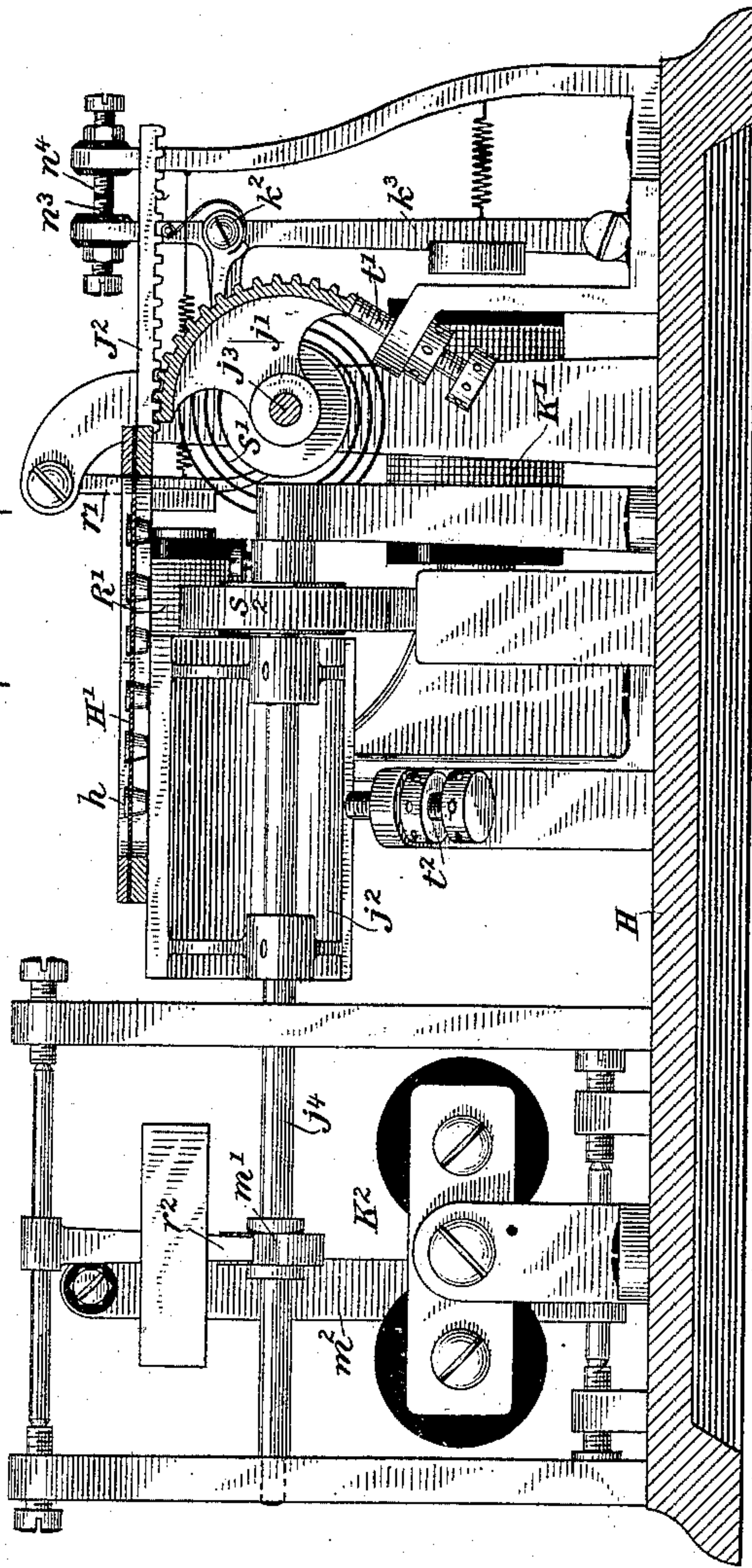


Fig. 3.

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(No Model.)

4 Sheets—Sheet 3.

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Fig. 4.

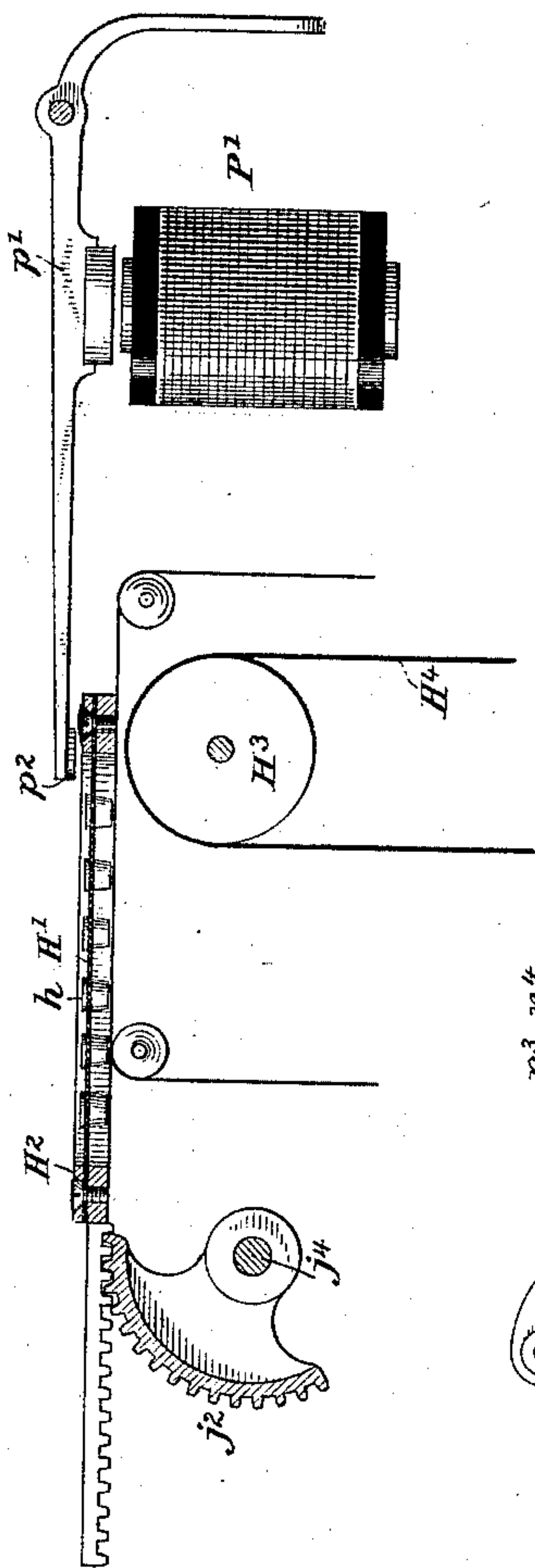


Fig. 5.

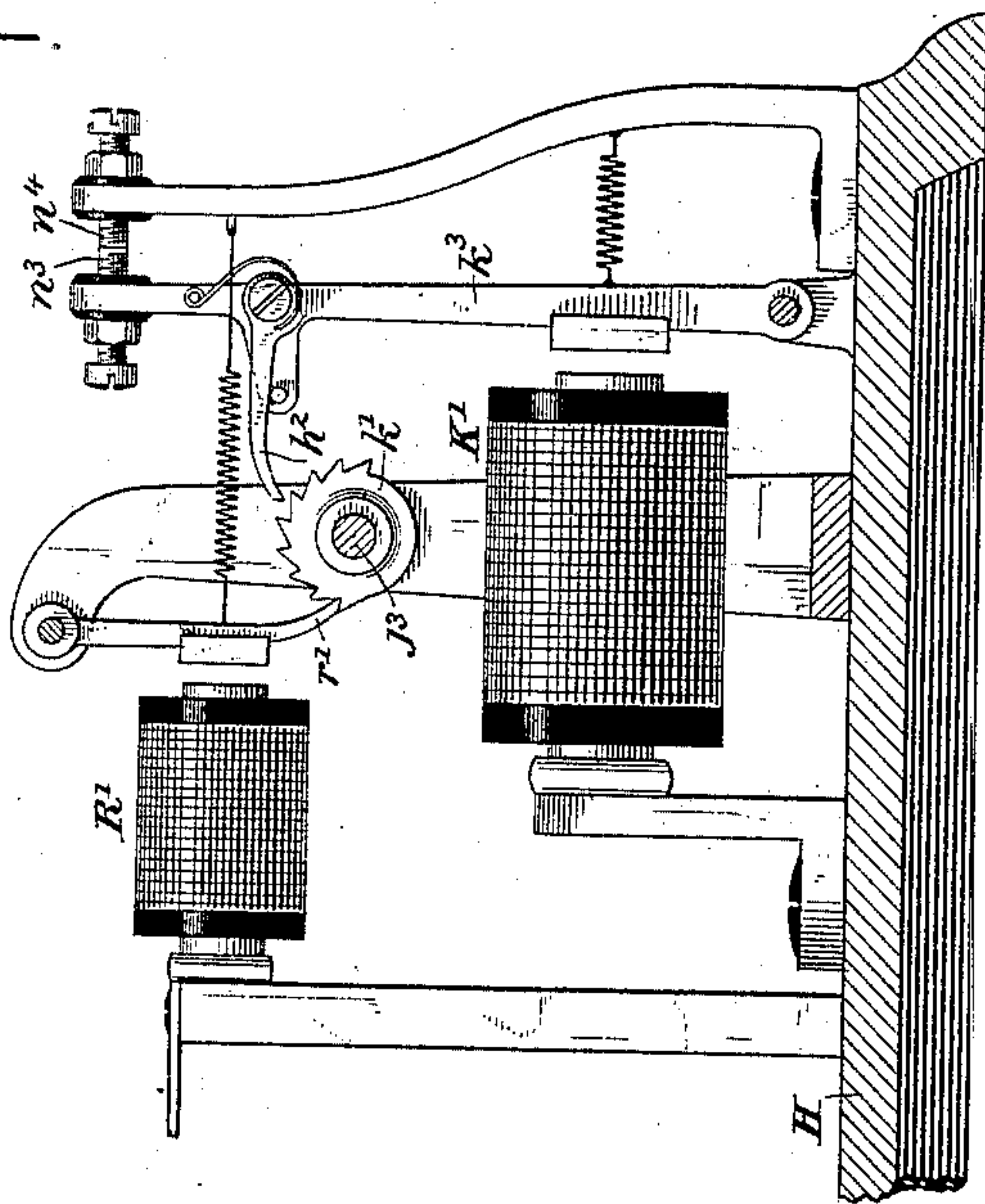
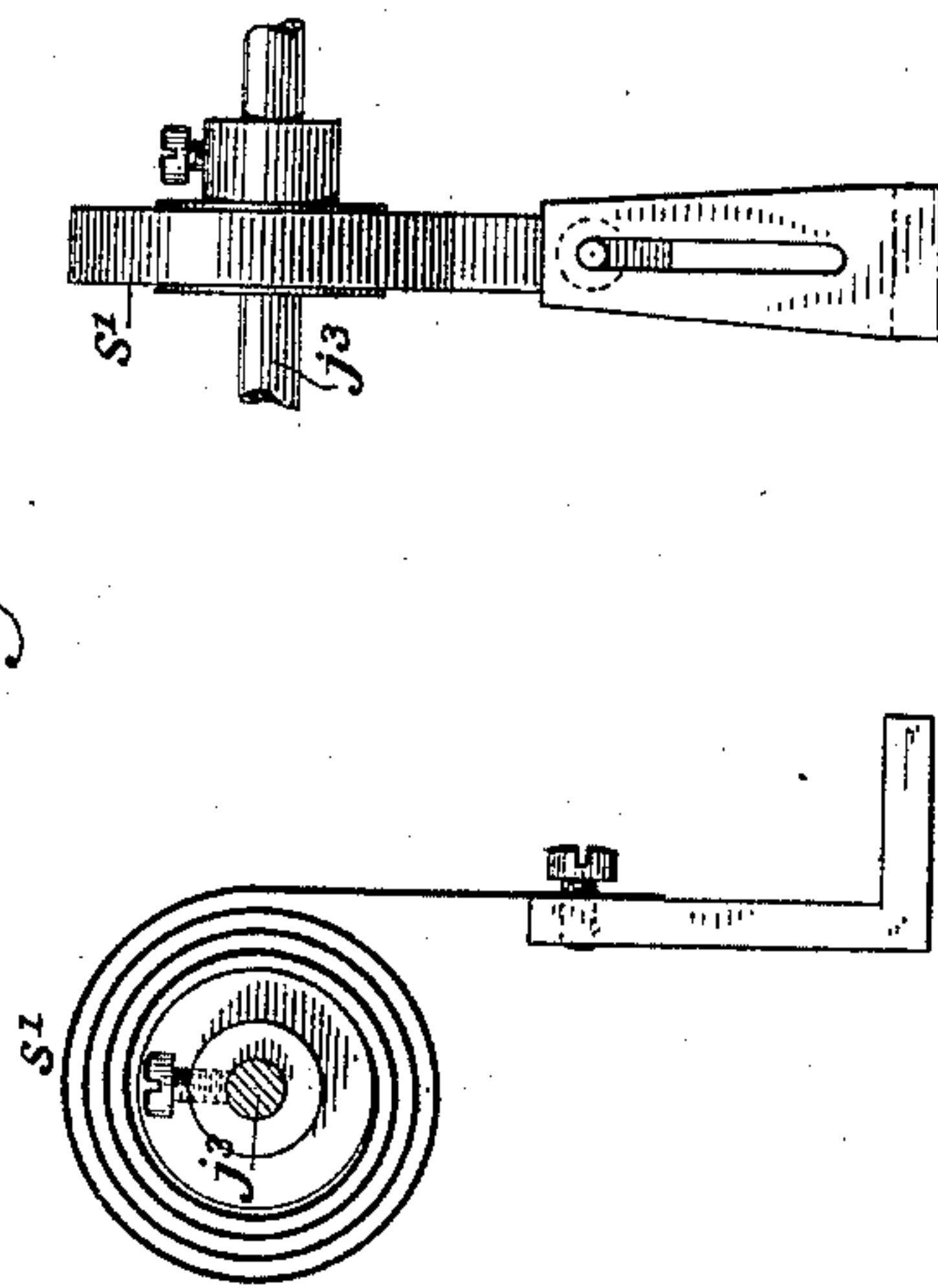


Fig. 6.



Witnesses

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(No Model.)

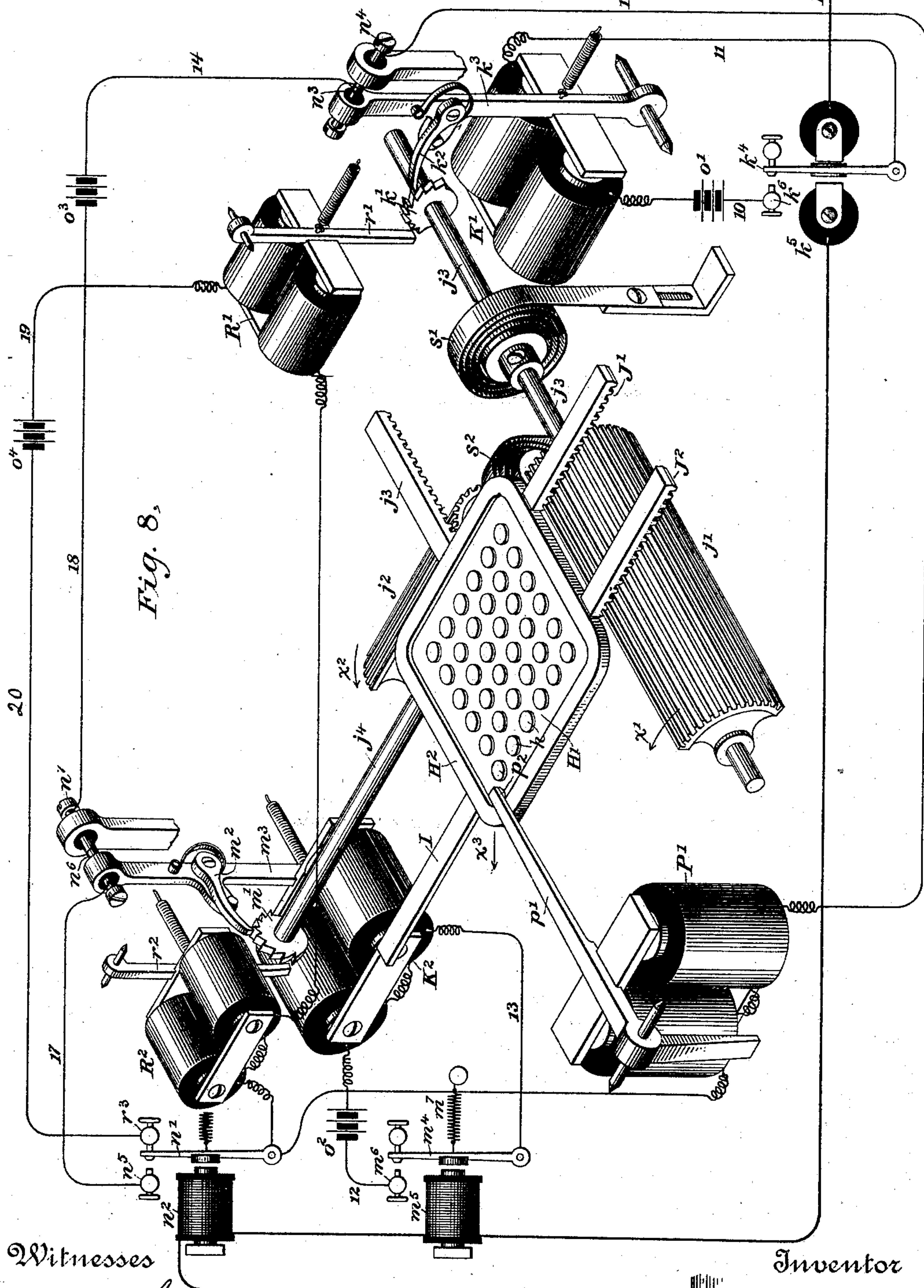
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H. VAN HOEVENBERGH.

RECEIVER FOR PRINTING TELEGRAPHS.

No. 316,698.

Patented Apr. 28, 1885.



Witnesses

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# UNITED STATES PATENT OFFICE.

HENRY VAN HOEVENBERGH, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO  
THE BALTIMORE & OHIO TELEGRAPH COMPANY, OF BALTIMORE, MD.

## RECEIVER FOR PRINTING-TELEGRAPHS.

SPECIFICATION forming part of Letters Patent No. 316,698, dated April 28, 1885.

Application filed August 7, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY VAN HOEVENBERGH, a citizen of the United States, residing in Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Receiving-Instruments for Printing-Telegraphs, of which the following is a specification.

This invention is designed to provide a receiving-instrument adapted to be used in connection with a printing-telegraph transmitter of a peculiar organization which is described in another application of even date herewith; and this instrument is designed to dispense with type-wheels, which are usually employed in printing-telegraph instruments, and to so organize the parts that it may be operated with great rapidity, and also to avoid the necessity of employing unison devices. The two instruments depend, essentially, in their mode of operation upon each other; but it will be necessary in this specification to describe the transmitting-instrument to such an extent only as to show the general plan of transmitting the various classes of currents required for operating the receiver at the proper times and in the proper quantities. Considering, first, the general organization of the receiving-instrument, the type are carried upon a flexible supporting-plate, which is so supported that it is capable of two independent movements, for the purpose of bringing any one of the several type above a printing-platen, across which the paper which is to receive the message is carried. These two movements, although independent of each other, may be made simultaneously—that is to say, a resultant movement may be given to the supporting-plate for the purpose of more quickly bringing a type into position to print. The faces of the type are placed in the same plane, and they are arranged in a series of transverse rows. One movement of the flexible supporting-plate is designed to bring the proper series above the platen, and the other movement, which is at right angles to the first movement, is designed to bring the proper type in that series above the platen, and when both these movements take place simultaneously the desired type is moved diagonally toward the printing-platen. For the purpose

of obtaining these movements, the mechanism which is employed for obtaining the first movement is actuated by electric impulses of a given strength and of alternating polarity, while the mechanism which produces the second movement—that is to say, the movement in the proper direction for bringing the individual type above the platen—is obtained through the influence of electric currents of increased strength and of either positive or of negative polarity. If, however, it is desired to move the flexible supporting-plate in both directions simultaneously—that is to say, in the resultant or diagonal direction—then it will be necessary to transmit alternating impulses of increased strength. The desired type having been brought above the platen, an impression is made by forcing the flexible plate downward at the proper point by means of an electro-magnet, which is vitalized in any convenient manner, preferably, however, through the influence of a prolonged current.

It will be obvious that for the purpose of transmitting the proper impulses for operating this instrument, a transmitter of peculiar organization is required. For this purpose a series of keys corresponding to the type carried upon the flexible plate is supported in a suitable frame, beneath which two arms are adapted to move at right angles to each other. These arms, when the transmitter is operated, move simultaneously toward the key which is depressed, and each of them is adapted to transmit a number of impulses having the corresponding characteristics, depending upon the distance through which the arms move before they are arrested by the key. These impulses serve to move the plate of the receiving-instrument a sufficient distance in the corresponding direction to bring it into position to print the character corresponding to the key which is depressed. The impulses which are thus transmitted during the movement of both arms possess the characteristics assigned to each arm, and the plate of the receiving-instrument is thus moved in its diagonal direction.

The invention involves numerous details of construction, which will be described in connection with the drawings.

In the accompanying drawings, Figure 1 is



a plan view of the receiving-instrument, illustrating the general organization of the parts. Fig. 2 is a side elevation of the same, and Fig. 3 is a transverse section through the lines 3 3 of Fig. 1. Fig. 4 is a detached view through the lines 4 4 of Fig. 1, showing the organization of the impression-producing devices. Fig. 5 is a transverse section through the lines 5 5 of Fig. 1, showing the details in the construction of one of the devices for actuating the type-support. Figs. 6 and 7 illustrate certain details in the construction of the devices employed for returning the type-support to its normal position. Fig. 8 is a diagram illustrating the general organization of the apparatus, together with the circuit-connections of the same.

Referring to the drawings, H represents a suitable base, upon which the various parts of the instrument are supported. A flexible supporting-plate, H', for the type *h* is carried in a suitable frame, H<sup>2</sup>, above the base H. This frame is designed to be moved above a suitable impression platen or roller, H<sup>3</sup>, so that any one of the type may be brought into position to print its character upon the paper H<sup>4</sup>, which is moved across the platen in any suitable manner. For this purpose the frame H<sup>2</sup> is supported by means of a guide or rest, I, and three rack-bars, J', J<sup>2</sup>, and J<sup>3</sup>. The bars J' and J<sup>2</sup> rest upon a sector of an elongated pinion, j', and the bar J<sup>3</sup> in like manner rests upon a similar segment, j<sup>2</sup>. The entire plate is thus free to move under the influence of the pinions j' and j<sup>2</sup>. If one pinion, j', alone is revolved in the direction indicated by the arrow x', then the entire plate will be moved in the corresponding direction, the bar J<sup>3</sup> sliding along the teeth of the pinion j<sup>3</sup>. Likewise, if the pinion j<sup>2</sup> be alone revolved in the direction of the arrow x<sup>2</sup>, then the plate will move in the direction at right angles to the movement occasioned by the pinion j', and the bars J' and J<sup>2</sup> will slide along the teeth of the pinion j'. If, however, both pinions be simultaneously revolved, then a movement will be given to the plate in a resultant or diagonal direction, as indicated by the arrow x<sup>3</sup>. The type *h* are arranged in series, and these series are successively brought above the printing-roller H<sup>3</sup> when one pinion alone is revolved, and the individual type in one of the series will be successively brought above the printing-roller when the other pinion alone is revolved. When both pinions are simultaneously revolved, then the diagonal movement of the plate will cause the first type of the first series to be replaced by the second type of the second series, and that by the third type of the third series, and so on. If, for example, it is desired to print from the fifth type of the fourth series, a diagonal movement of the plate would be occasioned by the simultaneous movement of both pinions until the fourth type of the fourth series is in position above the printing-roller, and then one

pinion alone is revolved for the purpose of bringing the fifth type of that series into position.

For the purpose of obtaining the desired movements of the pinions, a ratchet-wheel, k', is applied to the shaft or arbor j<sup>3</sup> of the pinion j', and to this ratchet-wheel there is applied a driving-pawl, k<sup>2</sup>. The pawl k<sup>2</sup> is carried upon the armature-lever k<sup>3</sup> of an electro-magnet, K'. This electro-magnet is included in the circuit of a local battery, o', the connections of which are made and broken by means of the armature-lever k<sup>4</sup> of a polarized relay, k<sup>5</sup>. The relay k<sup>5</sup> is included in the circuit of a main line, L', extending from the transmitting-instrument. One pole of the battery o' is connected by conductor 10 with a contact-stop, k<sup>6</sup>, of the armature-lever k<sup>4</sup>, and this lever is connected by the conductor 11 through the coils of an electro-magnet, K', with the remaining pole of the battery o'. When, therefore, the relay is actuated by means of a current of the proper polarity—say, for instance, positive—then the armature-lever, by making contact with its stop k<sup>6</sup>, will complete the circuit of the battery and cause the electro-magnet K' to be vitalized, thereby giving to the driving-pawl k<sup>2</sup> a forward impulse which will serve to advance the ratchet-wheel k'. The pinion j' will thus be advanced a sufficient distance to carry a second series of type, *h*, into line with the printing roller or platen.

The transmitting-instrument is provided with suitable means for sending positive electric impulses of a number dependent upon the position of the series in which the desired type stands, and these positive impulses secure the proper advancement of the frame H<sup>2</sup> to bring that series into position to print. It is evident, however, that the type may be the first, second, or any other type in such series, and for the purpose of bringing that particular type above the platen the pinion j<sup>2</sup>, with its bar, is employed. This pinion is provided with a shaft or arbor, j<sup>4</sup>, carrying a ratchet-wheel, m', which is similar to the ratchet-wheel k'. A pawl, m<sup>2</sup>, carried upon an armature-lever, m<sup>3</sup>, is employed for driving this ratchet-wheel through the influence of an electro-magnet, K<sup>2</sup>. The electro-magnet K<sup>2</sup> is included in the circuit of a second local battery, o<sup>2</sup>, the connections of which are designed to be completed and interrupted by means of an electro-magnet, m<sup>5</sup>, which is included in the circuit of the main line L'. For this purpose the electro-magnet m<sup>5</sup> is provided with an armature-lever, m<sup>4</sup>, to which there is applied a front contact-stop, m<sup>6</sup>. One pole of the battery o<sup>2</sup> is connected by a conductor, 12, with the stop m<sup>6</sup>, while the lever m<sup>4</sup> is connected by a conductor, 13, including the coils of the electro-magnet K<sup>2</sup>, with the remaining pole of the battery. A retractile spring, m<sup>7</sup>, which is applied to the armature-lever, is so adjusted that the lever will respond only to currents of greater strength than are necessary for actu-



ating the electro-magnet  $k^5$ . When, however, such currents are transmitted through the main line of whatever polarity, the armature-lever  $m^4$  will make contact with the stop  $m^6$  and cause the electro-magnet  $K^2$  to be vitalized. Each impulse, therefore, of sufficient strength will cause the pawl  $m^2$  and ratchet-wheel  $m'$  to advance the frame  $H^2$  in the corresponding direction through the distance corresponding to that which separates one type from a second type in the same series. If these currents be of negative polarity, then the electro-magnet  $K'$  will not be vitalized, and the frame  $H^2$  will be driven only by the pinion  $j^2$ . If, however, they be of positive polarity, then both pinions will be actuated simultaneously, and the resultant movement will be given to the plate in the direction of the arrow  $x^3$ . Any one of the several type may thus be brought into position to print by the transmission of the proper electric impulses, and for the sake of economy of time more or less of these impulses may be simultaneous—that is to say, a simultaneous movement of the two pinions may be obtained by the use of positive currents of sufficient strength to actuate the electro-magnet  $m^5$ . In this manner, if, for instance, the last-named type of the last series shown in the drawings were desired, then the plate would be moved diagonally, so that that type would approach directly toward the platen.

For the purpose of effecting an impression of any type which has thus been placed in position to print, an electro-magnet,  $P'$ , is employed. This electro-magnet is designed to be vitalized by means of a local battery,  $o^3$ , the connections of which are controlled by means of the armature-levers of the electro-magnets  $K'$  and  $K^2$  and an armature-lever,  $n'$ , of an electro-magnet,  $n^2$ , which is included in the main line  $L'$ . For this purpose one pole of the battery  $o^3$  is connected, by means of a conductor, 14, with an insulated contact-point,  $n^3$ , carried upon the armature-lever  $k^3$ , and this contact-point is provided with an insulated resting-point,  $n^4$ . The point  $n^4$  is connected by conductor 15 through the coils of the electro-magnet  $P'$  with the armature-lever  $n'$ . This lever is provided with a front contact-stop,  $n^5$ , which in turn is connected through conductors 16 and 17 with an insulated contact-point,  $n^6$ , carried upon the armature-lever  $m^3$ . A resting contact-stop,  $n^7$ , applied to this point, is connected by a conductor, 18, with the remaining pole of the battery  $o^3$ . When, therefore, both armature-levers  $k^3$  and  $m^3$  are remote from their electro-magnets, and the armature-lever  $n'$  is drawn forward, then the circuit of the battery  $o^3$  will be completed and the electro-magnet  $P'$  will be vitalized.

For the purpose of thus bringing the armature-lever  $n'$  into contact with its stop  $n^5$  and causing it to remain in such position a sufficient length of time, while the armature-levers  $k^3$  and  $m^3$  are remote from their electro-magnets, I prefer to employ upon the main line a

current of less strength than is necessary to vitalize the electro-magnet  $n^5$  and of negative polarity, and also of greater duration than is normally required for actuating the two electro-magnets,  $k^5$  and  $n^5$ . When the electro-magnet  $P'$  is vitalized, its armature-lever  $p'$  is thrust downward toward the face of the plate  $H'$ , and the extremity  $p^2$  of this lever serves to strike the particular type which chances to be above the printing-platen. The plate  $H'$  is sufficiently flexible to allow the downward thrust of the lever  $p'$  to strike the face of the type against the surface of the paper carried upon the printing-roller  $H^3$ , and to thus effect an impression.

It remains now to describe the means whereby the plate is returned to its normal position after an impression has been effected. Two retaining pawls or dogs,  $r'$  and  $r^2$ , are respectively applied to the ratchet-wheels  $k'$  and  $m'$ . These pawls constitute extensions of the armature-levers of two electro-magnets,  $R'$  and  $R^2$ , respectively. The electro-magnets  $R'$  and  $R^2$  are included in the circuit of a local battery,  $o^4$ ; but the connections of this battery are designed to be completed only for such brief periods during the operation of bringing a type into position to print that the electro-magnets will not become vitalized. When, however, an impression has been made and it is desired to return the type-plate to its normal position, the electro-magnets  $R'$  and  $R^2$  are allowed to become vitalized. For this purpose one pole of the battery  $o^4$  is connected by conductor 19, including the coils of the electro-magnets  $R'$  and  $R^2$ , with the armature-lever  $n'$ . The back contact-stop,  $r^3$ , of this armature-lever is connected by means of a conductor, 20, with the remaining pole of the battery  $o^4$ . When, therefore, the electro-magnet  $n^2$  is not vitalized, the circuit of the battery  $o^4$  is completed, and the pawls  $r'$  and  $r^2$  are drawn away from or out of engagement with the corresponding ratchet-wheels. During the transmission, however, of alternating impulses, or of the successive impulses employed for moving the type-plate, the armature-lever  $n'$  continues to vibrate between the stops  $r^3$  and  $n^5$  with such rapidity that the circuit of the battery  $o^4$  is not completed sufficient time to vitalize the electro-magnets  $R'$  and  $R^2$ ; but when the current of the main line is interrupted, then the continued contact of the armature-lever with the stop  $r^3$  serves to cause these electro-magnets to be vitalized.

To the shafts  $j^3$  and  $j^4$ , respectively, there are applied two coiled springs,  $s'$  and  $s^2$ . These springs are caused to be wound by the forward movement of the corresponding pinions, and when the wheels are released they serve to return the pinions to their normal or starting positions. The dogs  $r'$  and  $r^2$ , however, prevent this return during the operation of setting the plate in position to print. When, however, both armature-levers  $k^3$  and  $m^3$  are remote from their electro-magnets and the



electro-magnets  $R'$  and  $R^2$  are vitalized, and the pawls  $r'$  and  $r^2$  are respectively drawn out of engagement with their ratchet-wheels  $k'$  and  $m'$ , then the springs  $s'$  and  $s^2$  serve to rotate the pinions back to their starting-point, thus placing the type-plate in the position shown in the drawings.

Suitable stops,  $t'$  and  $t^2$ , are applied to the pinions  $j'$  and  $j^2$ , respectively, for the purpose of limiting the backward movement of the same. It is desirable, however, that the frame  $H^2$  should normally stand in such a position that the first current transmitted over the main line should place the first type of the first series beneath the extremity  $p^2$  of the lever  $p'$ . The transmitter is preferably so organized that this current will be a positive current of the greater strength, and the prolongation of the weak negative current which immediately follows may be employed for printing.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of two or more series of independently-movable type, a flat support for the same, a printing roller or platen, means for moving said support in a direction parallel with its plane for bringing the series successively in line with said printing-platen, means for bringing the successive type in each series into line with said platen, which means may be operated independently of or simultaneously with each other, and means for actuating any one of said type thus brought into position.

2. In a printing-telegraph instrument, the combination, substantially as hereinbefore set forth, of two or more series of type, a printing-platen, means for causing said series to be successively moved across said platen, means for causing the type in each series to be successively moved across said platen, which means may be simultaneously set in operation, and an electro-magnet for actuating any type in said series.

3. The combination, substantially as hereinbefore set forth, of a series of type, a frame in which said type are carried, a pinion and rack-bar for advancing said frame in one direction, a pinion and rack-bar for advancing the same in a different direction, and means, substantially such as described, for actuating either one or both of said pinions at will.

4. The combination, substantially as hereinbefore set forth, in a printing-telegraph instrument, of a series of type, a flexible support for said type, a frame carrying said support, a pinion and rack-bar for moving said support in one direction, a second pinion and rack-bar for moving it in another direction, and means, substantially such as described, for actuating either one or both of said pinions at will.

5. The combination, substantially as hereinbefore set forth, in a printing-telegraph instrument, of a type-support, a series of type

carried thereby and having their faces supported in a common plane, means, substantially such as described, for forcing any one of said type out of such plane, a rack-bar attached to said support, a pinion with which it gears, and electro-magnets for controlling the same substantially as described, whereby said support may be moved in a constant plane carrying all of said type in a straight line.

6. The combination, substantially as hereinbefore set forth, of a series of type having their faces in a common plane, a frame in which said type are carried, two pinions placed at an angle to each other, rack-bars extending from said frame and engaged by said pinions respectively, a ratchet-wheel applied to each of said pinions, two electro-magnets for driving said ratchet-wheels respectively, and means, substantially such as described, for vitalizing either or both of said electro-magnets at will.

7. The combination, substantially as hereinbefore set forth, of a series of type having their faces in a common plane, a frame in which said type are carried, two pinions placed at an angle to each other, rack-bars extending from said frame and engaged by said pinions respectively, a ratchet-wheel applied to each of said pinions, two electro-magnets for driving said ratchet-wheels respectively, means, substantially such as described, for vitalizing either or both of said electro-magnets at will, two retaining pawls or dogs respectively applied to said ratchet-wheels, a main line, a polarized and a neutral relay included in the circuit thereof, and two local circuits one of which is completed by the action of said polarized relay when traversed by currents of a given polarity, and the second of which is completed by the action of said neutral relay when traversed by currents of an increased strength and of either polarity.

8. The combination, substantially as hereinbefore set forth, of two or more series of type, a movable support for the same, two local batteries, a local electro-magnet in the circuit of one of said local batteries, means, substantially such as described, controlled by said local electro-magnet for moving said type-support in one direction, a second electro-magnet included in the circuit of the second local battery, and means, substantially such as described, controlled by said second electro-magnet for moving said type-support in another direction.

9. The combination, substantially as hereinbefore set forth, of a telegraphic main line, a polarized and a neutral relay, two local batteries the circuit-connections of which are controlled by said relays respectively, a series of type having their faces in a common plane, and means, substantially such as described, applied to each of said relays, whereby said type may be moved in one direction or another or in a resultant direction, substantially as described, by the action of said relays.



10. The combination, substantially as hereinbefore set forth, of a telegraphic main line, a polarized and a neutral relay, two local batteries the circuit-connections of which are controlled by said relays respectively, a series of type having their faces in a common plane, means, substantially such as described, applied to each of said relays, whereby said type may be moved in one direction or another or in a resultant direction, substantially as described, by the action of said relays, and means, substantially such as described, for returning said type to their normal position.

11. The combination, substantially as hereinbefore set forth, of a telegraphic main line, a polarized and a neutral relay included in the circuit of the same, two local circuits the connections of which are controlled by said relays, respectively, two electro-magnets respectively included in said local circuits, a series of type, and means, substantially such as described, controlled by said electro-magnets for moving said type, springs or equivalent devices tending to return said type to their normal position, retaining-pawls for normally preventing said springs from acting, and an electro-magnet included in the circuit of the main line, and serving to cause said springs to be released from said retaining-pawls only when the main-line circuit is interrupted.

12. The combination, substantially as hereinbefore set forth, of a telegraphic main line, relays included in the circuit of the same, local circuits respectively controlled by said relays, electro-magnets respectively included in said circuits, their armatures and armature-levers, a series of type, and means, substantially such as described, controlled by said electro-magnets for moving said type in one direction or another or in a resultant direction, a printing-magnet for effecting impressions from said type, a local circuit for causing said printing-magnet to be vitalized, resting contact-stops applied to said armature-levers, through which the connections of the last-named circuit are formed when said electro-magnets are demagnetized, and means, substantially such as described, for causing said printing-magnet to be vitalized under the influence of a prolonged current traversing said main line.

13. In a printing-telegraph instrument, the combination, substantially as hereinbefore set forth, of a printing-platen, a series of type, a

single flexible support for all of said type, a printing-lever extending above said printing-platen, and means, substantially such as described, for causing any one of said type to be placed between said platen and lever by moving them all simultaneously in any one of three directions.

14. In a printing-telegraph instrument, the combination, substantially as hereinbefore set forth, of a series of type having their faces in a common plane, means, substantially such as described, for moving said type in any one of three directions simultaneously in the plane of their faces, and means, substantially such as described, for effecting impressions from any one of said type at will.

15. In a printing-telegraph instrument, the combination, substantially as hereinbefore set forth, of a series of type arranged in transverse and longitudinal series, and having their faces in a common plane, and means, substantially such as described, for moving said type in a direction parallel either to the transverse or to the longitudinal series or in a resultant direction.

16. In a printing-telegraph instrument, the combination, substantially as hereinbefore set forth, of the flexible plate  $H'$ , the type  $h$ , the pinions  $j'$  and  $j''$ , the rack-bars engaged by said pinions, the ratchet-wheels  $k'$  and  $m'$ , the driving-pawls applied thereto, the electro-magnets for actuating said pawls, the retaining-pawls  $r'$  and  $r''$ , the electro-magnets controlling the same, the printing-magnet  $P'$ , and the local batteries for completing the circuit-connections of said electro-magnets respectively, all arranged substantially as described.

17. The combination, substantially as hereinbefore set forth, of a series of type, a supporting-plate for the same, an electro-magnet, its armature, and armature-lever responding to electric currents of alternating polarity to move said plate in a given direction, and an electro-magnet, its armature, and armature-lever responding to electric currents of a given strength for moving said plate in another direction, substantially as described.

In testimony whereof I have hereunto subscribed my name this 26th day of June, A. D. 1884.

HENRY VAN HOEVENBERGH. [L. S.]

Witnesses:

DANL. W. EDGECOMB,

CHARLES A. TERRY.