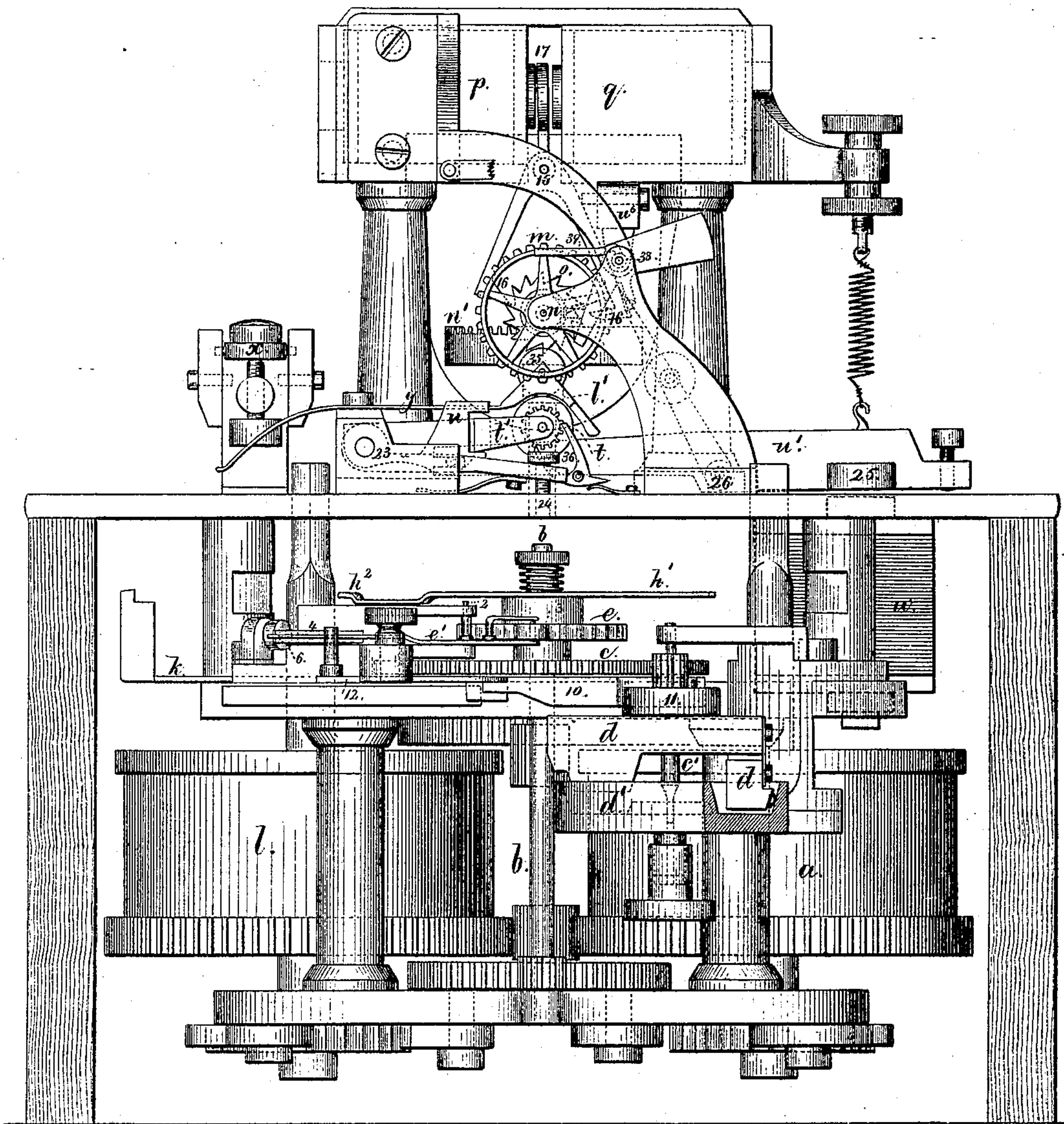


G. M. PHELPS.
Printing Telegraphs.

No. 141,076.

Patented July 22, 1873.

Fig. 2.



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Fig. 4.

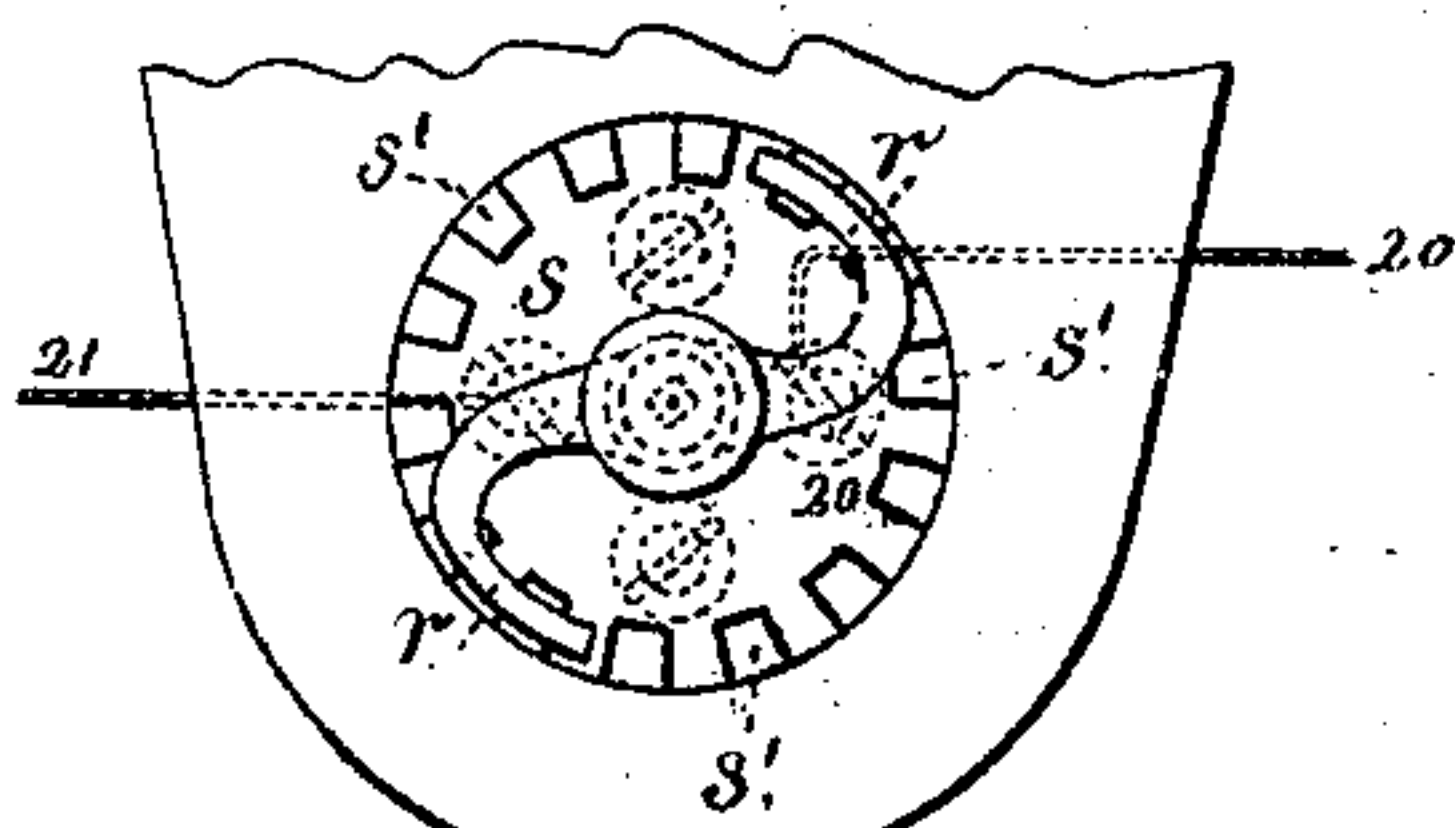


Fig. 5.

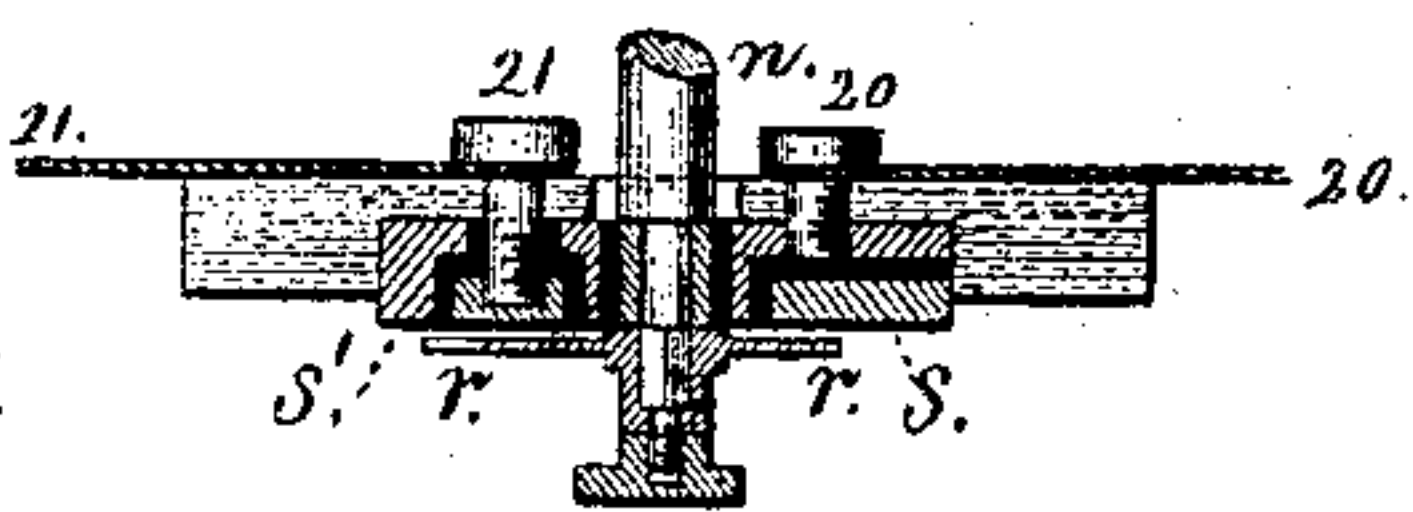


Fig. 6.

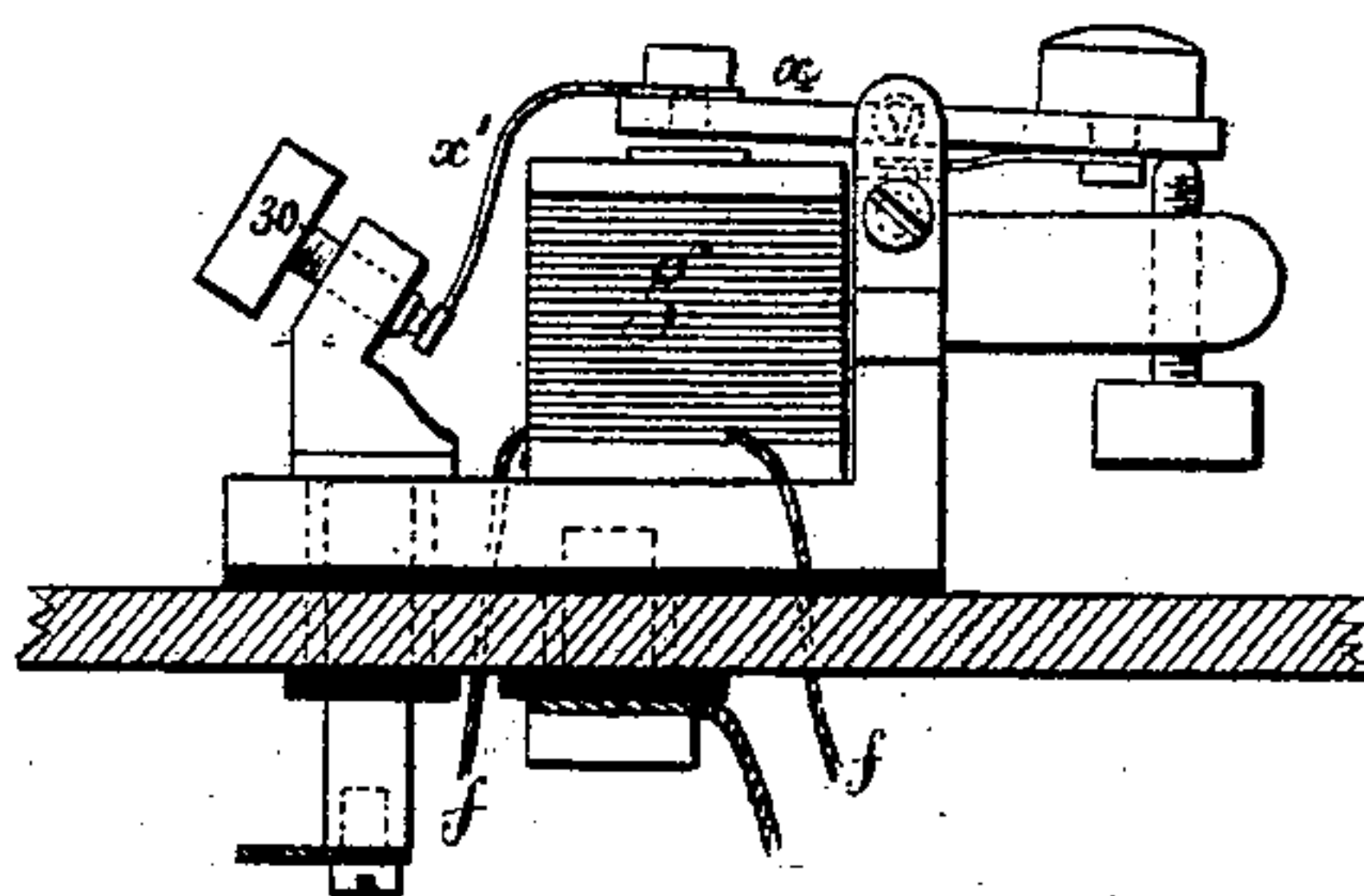
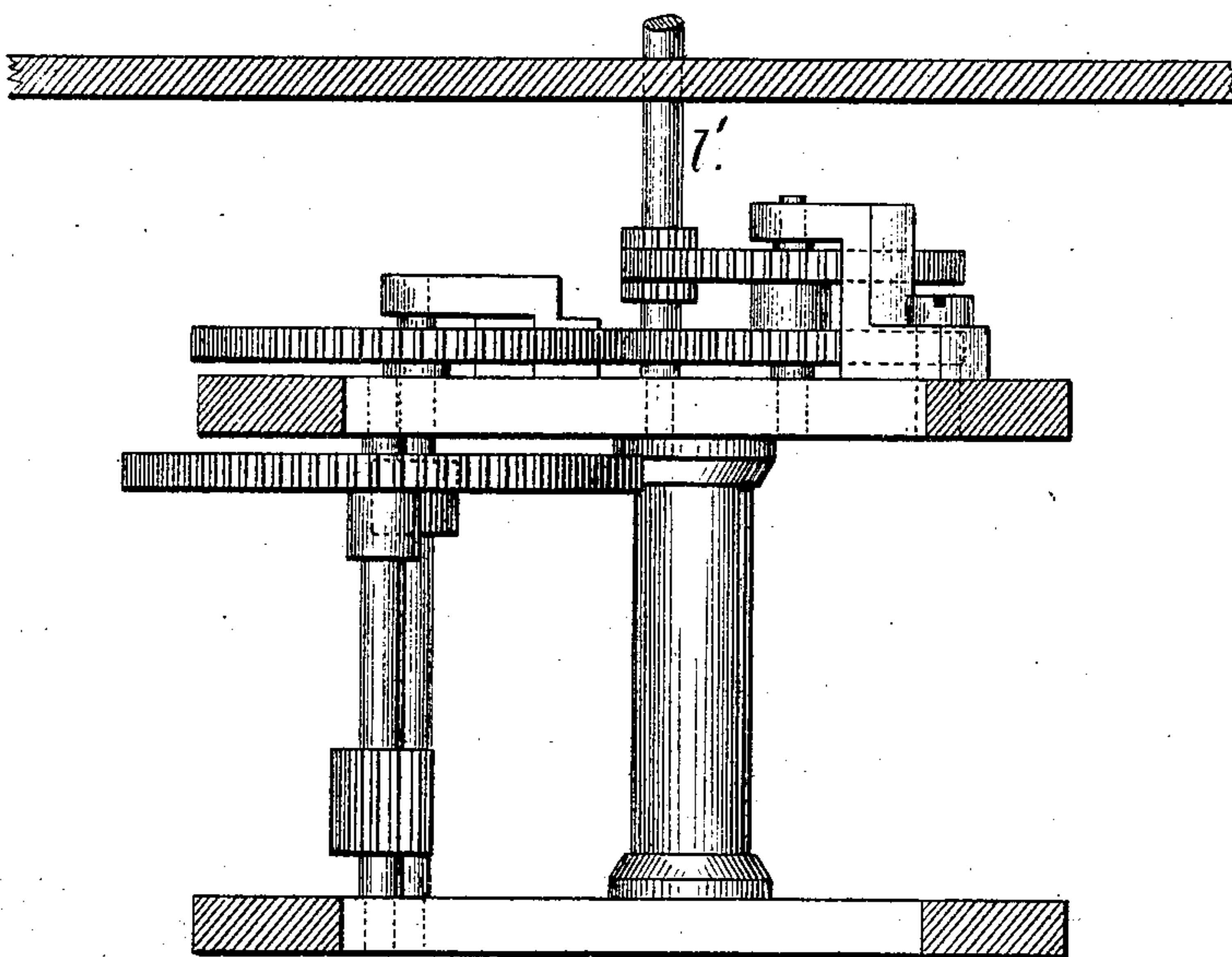


Fig. 3.



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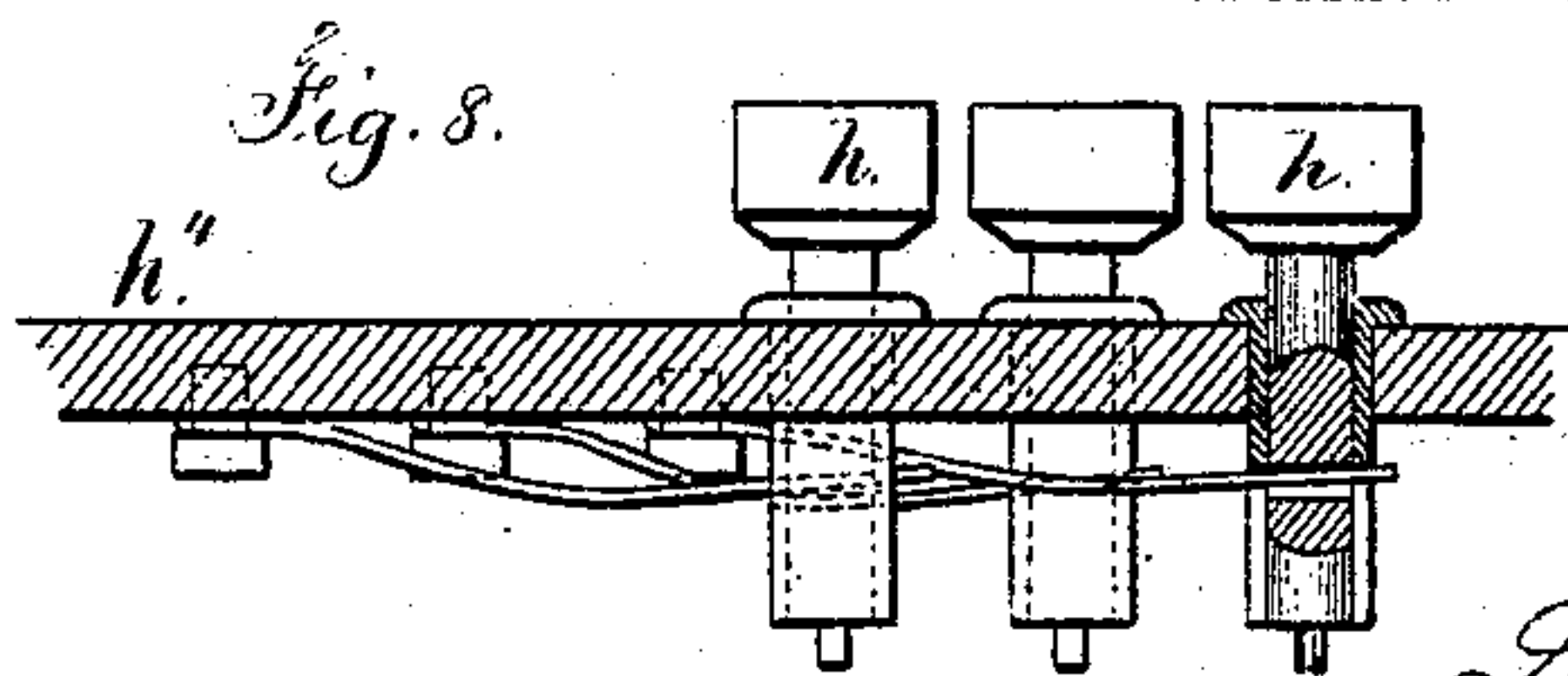
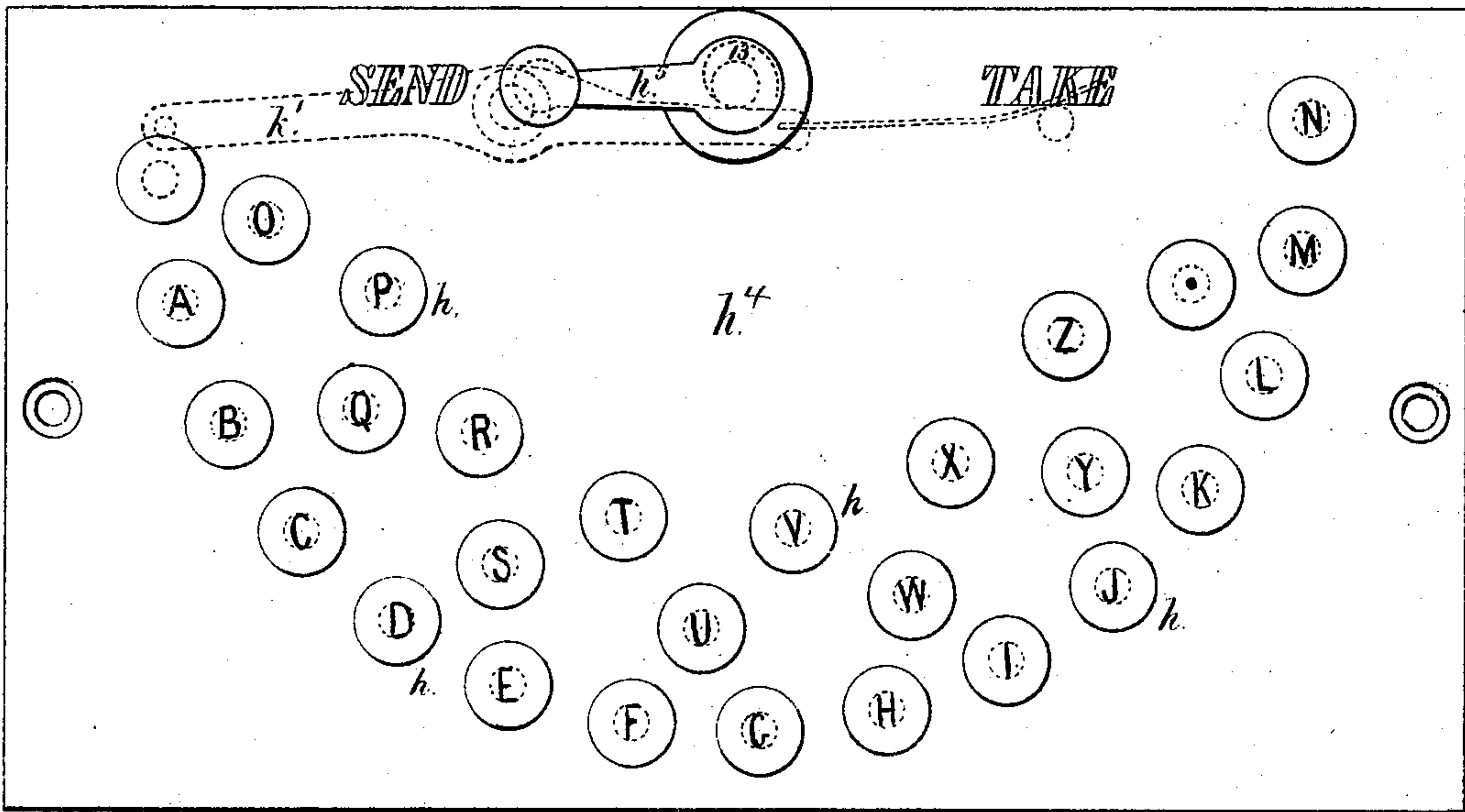
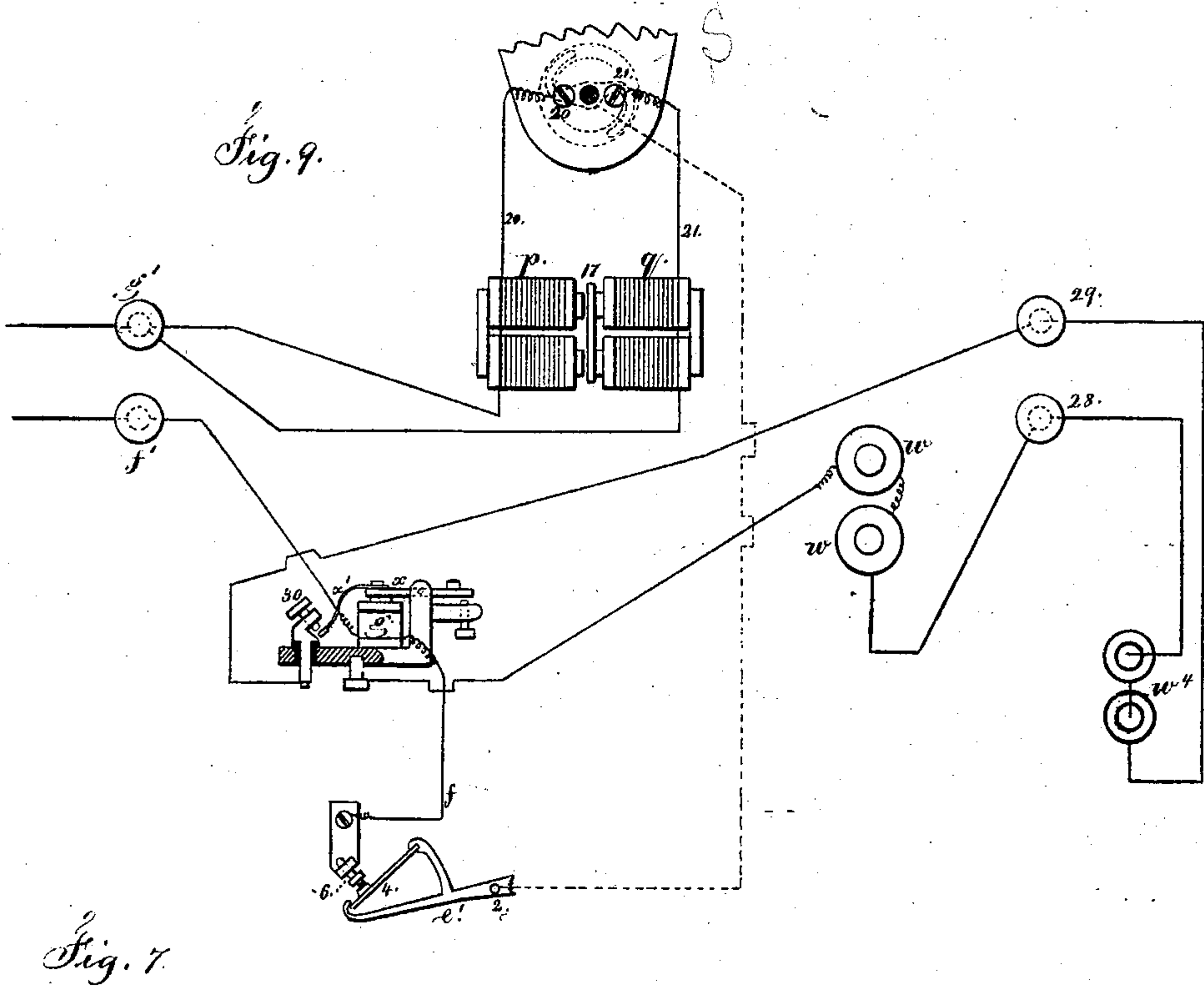
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IMPROVEMENT IN PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. **141,076**, dated July 22, 1873; application filed December 17, 1872.

To all whom it may concern:

Be it known that I, GEORGE M. PHELPS, of Brooklyn, E. D., in the county of Kings and State of New York, have invented an Improvement in Printing-Telegraph Instruments, of which the following is a specification:

This instrument is adapted to transmitting or receiving. The transmitting portion of the instrument consists in a pulsator-wheel revolved by a frictional connection to a train of gearing having a weight or spring. Said wheel operates a pulsator-lever that sends along the line pulsations, in consequence of making and breaking the connection with the battery; and the receiving instrument has a type-wheel that is rotated, as hereafter described, by such pulsations, and the type-wheel and pulsator-wheel move synchronously. An arm or arms connected with the pulsator-wheel revolve below a circular range, or two semicircular ranges, of finger-keys, and is arrested by depressing one of such keys. The type-wheel at the receiving instrument is stopped at the same point, and the printing effected by the pause that allows a local battery to operate. The type-wheel is revolved by clock-work, and its movements are controlled by pallets or an escapement that is moved by the pulsations acting in electromagnets, my special improvements relating to a circuit-changer that revolves with the type-wheel, and directs one pulsation through one magnet and the next through the other magnet, thereby moving the escapement in first one direction and then the other.

In the drawing, Figure 1 is a general plan of the instrument with the finger key-plate removed. Fig. 2 is an elevation of the machine with inclosing-case in section. Fig. 3 shows the gearing that revolves the type-wheel. Fig. 4 is an elevation, and Fig. 5 a horizontal section, of the revolving circuit-changer. Fig. 6 is a side view of the local circuit-closing magnet. Fig. 7 is a plan of the finger key-plate. Fig. 8 is a section of the same; and Fig. 9 is a diagram illustrative of the connections.

From the spring-barrel *a* the gearing extends to and revolves the shaft *b*, upon which

is a wheel, *c*, that gives motion to the shaft *c'* and governor *d* revolving within the stationary shell *d'*, as in my Patent No. 126,329. The pulsator-wheel *e* is upon the shaft *b*, and is driven by a frictional connection, so that the wheel may be stopped while the train of gearing continues to revolve. In the periphery of this wheel *e* are projections or cams equal in number to the characters and blanks of the type-wheel. A lever, *e'*, upon the fulcrum 2, is provided with a roller, 3, against the edge of the wheel *e*, a contact-spring, 4, and a retractile spring, 5, forming my improved pulsator, that opens and closes the circuit with the insulated contact-screw, 6, with which the conductor *f* is connected, that passes from the line binding-screw *f'* through a small magnet, *g*, and to 6, and as the pulsations are produced by the vibrations of *e'* they pass along through the frame of the machine, and receiving the portions of the instrument hereafter described, and from the binding-screw *g'* to the line, ground, or battery connection.

It is to be understood that two machines—one at each end of the line—made as herein described, are employed in sending and receiving, and that one or more intermediate instruments can be connected in the circuit to receive from or send to the other stations, all the machines operating simultaneously in receiving from the one sending instrument.

In order to arrest the pulsator-wheel *e* at the letter to be printed, the designated key *h* is depressed and its end coming into the line of the arm *h'* or *h''* upon such wheel *e* stops the further rotation and produces a pause in the pulsations that causes the printing to be operative. A lever, *k*, is pivoted upon the frame of the clock-work. One arm of the lever extends as a spring, 10, adjacent to the friction-wheel 11 on the shaft *c'* of the governor, and another arm, 12, is contiguous to the pulsator-lever *e'*. Above the finger-key plate *h'* of the instrument is a crank-arm, *h''*, that is connected by a shaft with the cam 13 below said plate adjacent to the spring-lever *k'*.

When the instrument is set for sending the message the lever *k* is in the position shown

in Fig. 1 and is inoperative. When the instrument is prepared for receiving, the cam 13 is turned to move the lever *k* by the lever *k'*, and in so doing the governor is stopped by the friction-arm 10 and wheel 11, and the arm 12 presses the pulsator so as to keep the circuit closed at the points 6, 4. The spring-barrel *l* and train of gearing serve to revolve the vertical shaft *l'* and turn the type-wheel shaft *n* by a gear-wheel, *n'*, and pinion. The type-wheel *m* contains the desired characters and spaces, and the escapement-wheel *o* upon the shaft *n* contains half the number of teeth that there are projections upon the pulsator-wheel *e*. A rock-shaft, 15, carries the pallets 16 and armature 17. This armature is between two electro-magnets, *p* and *q*; hence, when one magnet is energized the escapement will allow the type-wheel to move one space, and when the other magnet is energized the armature is moved the other way, and thus a step-by-step movement allowed to the type-wheel. At the end of the shaft *n* is a circuit-changer made of one or two arms, *r*, secured to the shaft, and the end revolving in contact with the compound disk *s s'* that is made, as shown in Fig. 5, of two insulated plates each, with half the number of projections that there are upon the pulsator *e*, and the projections from the back disk *s'* extend out sidewise, and are between the projections around the disk *s*, the surfaces of the projections being flush with each other, so that the arm *r* will revolve around freely; but when in contact with the projections of *s'*, the pulsation of electricity coming from the shaft *l'*, as aforesaid, and thence through the type-wheel shaft *n* and arm *r*, will pass by *s'* and the screw and wire 20 to the magnet *p*, thence to the binder *g'*, and when the arm *r* is in contact with *s* the pulsation will pass by the screw and wire 21 to the magnet *q*; thence to the binding-screw *g'*. The position of the parts is such that the pulsation through *s'* and *p* will attract the armature and allow the movement of the type-wheel and arm *r*, so that when the next pulsation is sent it will go through the arm *r* and disk *s* to the magnet *q*, and this will again move the parts so that the arm *r* will move into contact with the next projection upon *s'*, and so on; thus the movement of the type-wheel simultaneously changes the connections, so that the pulsations go first through one magnet and then through the other. The printing-roller *t* is in a frame *t'* swinging upon the axis 23, and having a limited movement regulated by the jaw *u* and set-screw 24 to adjust said jaw. The armature-lever *w¹* and armature 25 swing upon the fulcrum 26, and are operated by the electro-magnet *w*, and the lever *w¹* and frame *t'* are connected, so that the printing is effected when the magnet *w* is energized. There is a local battery, *w⁴*, connected with the magnet *w*, through the binding-screws 28 29, contact-screw 30, and armature *x* of the electro-mag-

net *g*. While this magnet *g* is energized by the line pulsations passing through it, the balanced armature *x* is kept from contact with 30; but as soon as the pulsation ceases the circuit through 30 is closed, and the local magnet *w* energized to effect the printing, the rapidity of movement causing the frame *t'* and roller *t* to move further than the lever *u* and give the impression, and then fall slightly away from the type-wheel *m*. The armature *x* is made with a spring end, *x'*, contiguous to the contact-screw 30, and this screw 30 is at an inclination to the one in which the armature end vibrates. The object of this is to insure a slight sliding motion between the screw 30 and spring *x'*, to keep the surfaces clean, and the spring *x'* prevents a rebound at the point of contact, hence the pulsation to the printing-magnet is full and definite. The strip of paper passes above the roller *t*, between that and the small roller 35, carried by the spring *y*, said spring serving to guide the paper, and the feed is effected by revolving the roller *t* by the pawl 36, as the roller and its frame descend. A screw upon the type-wheel shaft gives end motion to a shaft, 38, and weighted unison-finger 39, so that, after two or more turns of the type-wheel consecutively, the finger 39 will be brought into the path of a stop upon the type-wheel, and arrest the further movement of the same until the printing-lever *w¹* is operated, which swings the detent from the screw and allows a weighted lever or spring, *w⁶*, to press away the unison-finger by sliding such finger with its shaft in its bearings; this is done at each impression, because the unison is not to be self-acting, except when the type-wheel is purposely rotated several times to bring it into operation for adjusting all the instruments in the line.

By the use of weights, instead of springs, upon the unison mechanism, there is no risk of the parts becoming disarranged or inoperative, because the power of the weights remain uniform, and they are not subjected to change of adjustment in cleaning the instrument, nor to injury by breakage, as the springs heretofore employed.

I claim as my invention—

1. The pulsator-wheel *e*, lever *e'*, and springs 4 and 5, combined with the circuit-screw 6, for opening and closing the circuit by the wheel *e*, substantially as set forth.

2. The lever *k*, spring-brake 10, and arm and pin 12, in combination with the pulsator-lever *e'*, for stopping the motor and closing the circuit simultaneously, substantially as set forth.

3. The two magnets *p* and *q*, acting in opposite directions upon the armature 17 and escapement 16⁰ for the type-wheel *m*, in combination with the circuit-changer, acted upon by the type-wheel shaft, to direct the pulsations alternately through the magnets *p* and *q*, substantially as set forth.

4. The sliding shaft 38, and stop 39, and

weighted pawl, taking the screw upon the type-wheel shaft, in combination with the weighted lever w^6 , substantially as and for the purposes set forth.

5. The weighted armature x and electro-magnet g , in combination with the circuit-closing spring x' , point 30, and main and

local circuits, substantially as specified, and operating as set forth.

Signed by me this 12th day of December, A. D. 1872.

Witnesses: GEO. M. PHELPS.
GEO. T. PINCKNEY,
CHAS. H. SMITH.