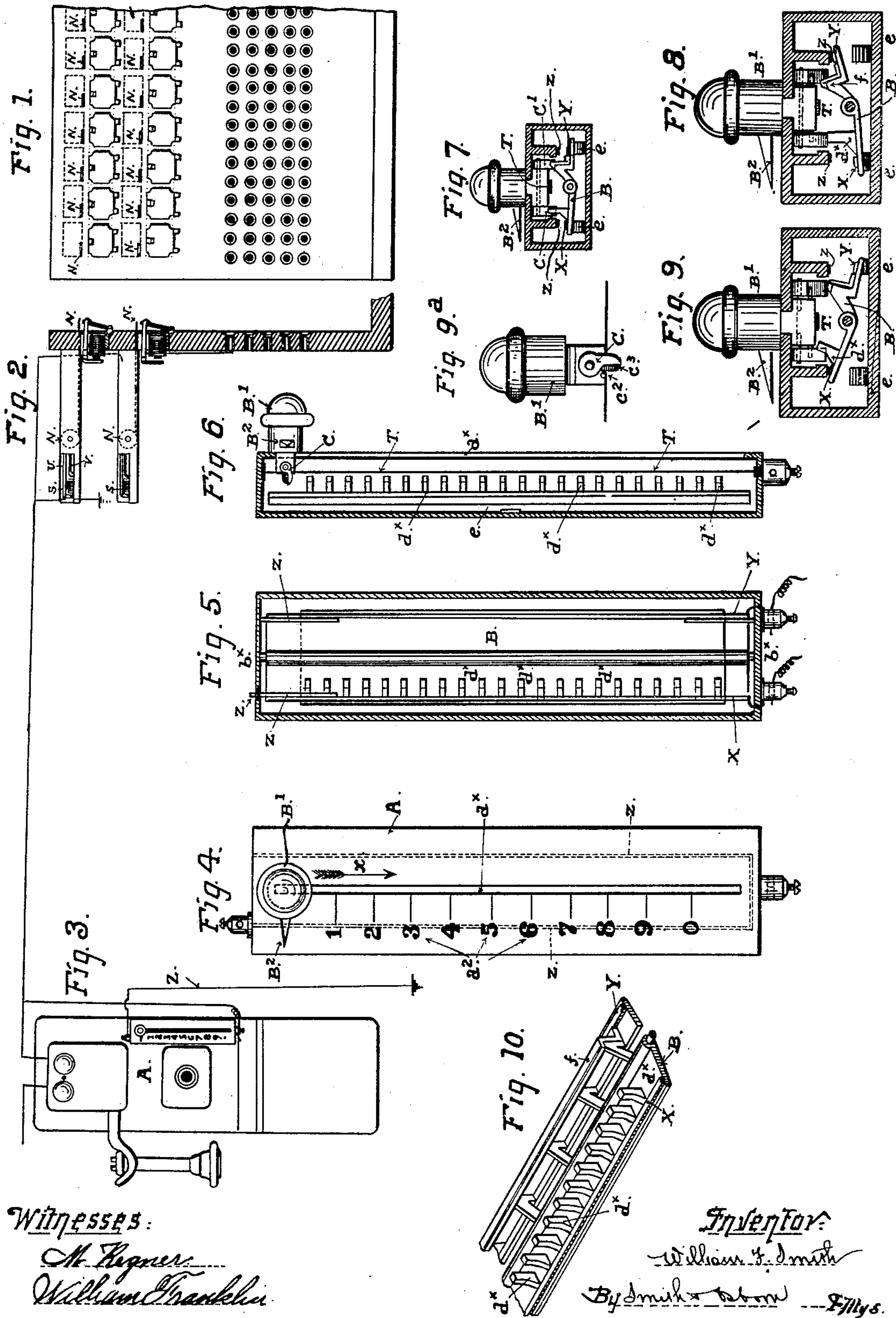


W. F. SMITH.
TELEPHONE CALL RECORDER.

No. 521,422.

Patented June 12, 1894.



Witnesses:

M. Kerner
William Franklin

Inventor:

William F. Smith

By Smith & Brown Attys.

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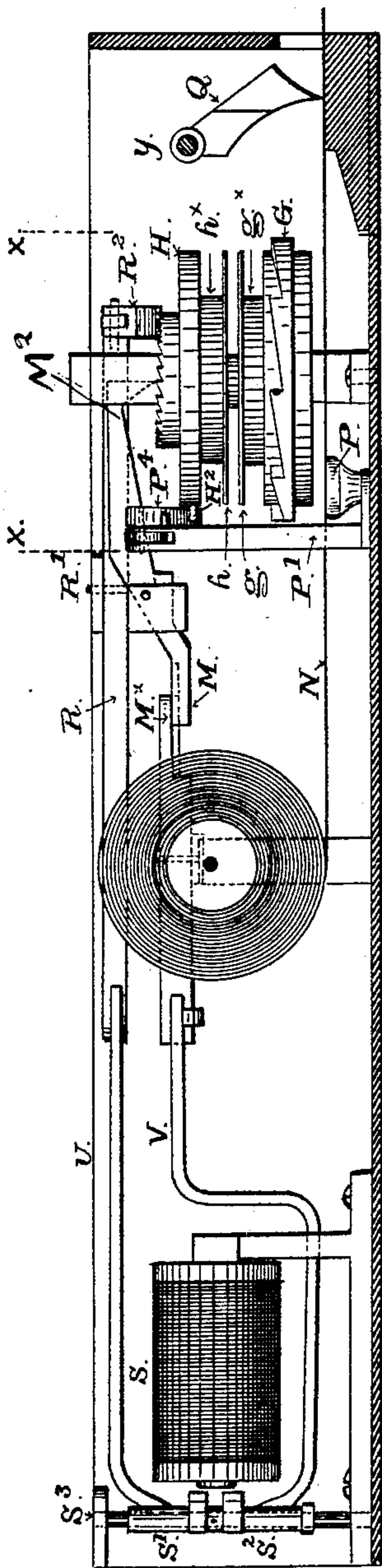
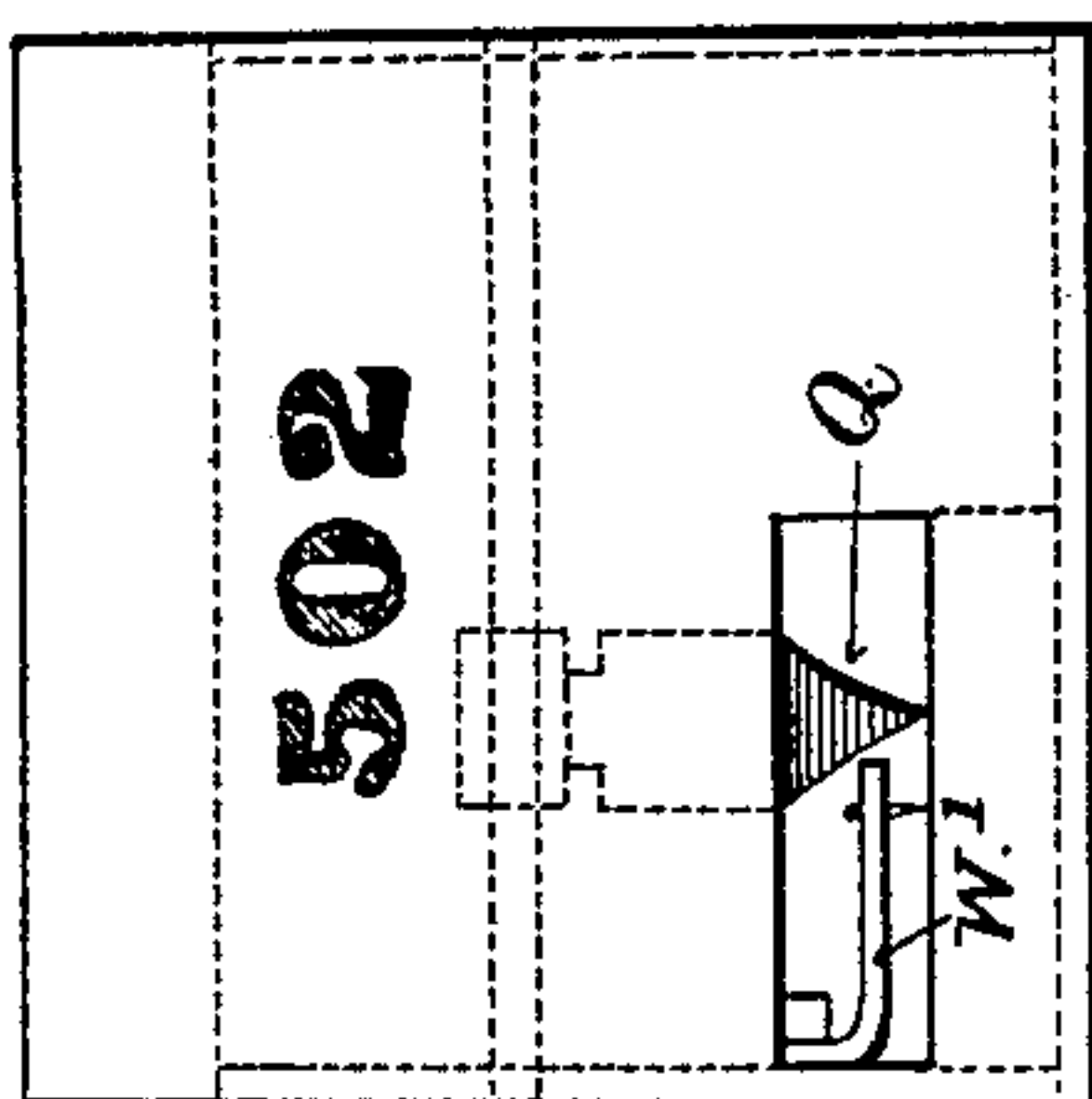


Fig. 11.

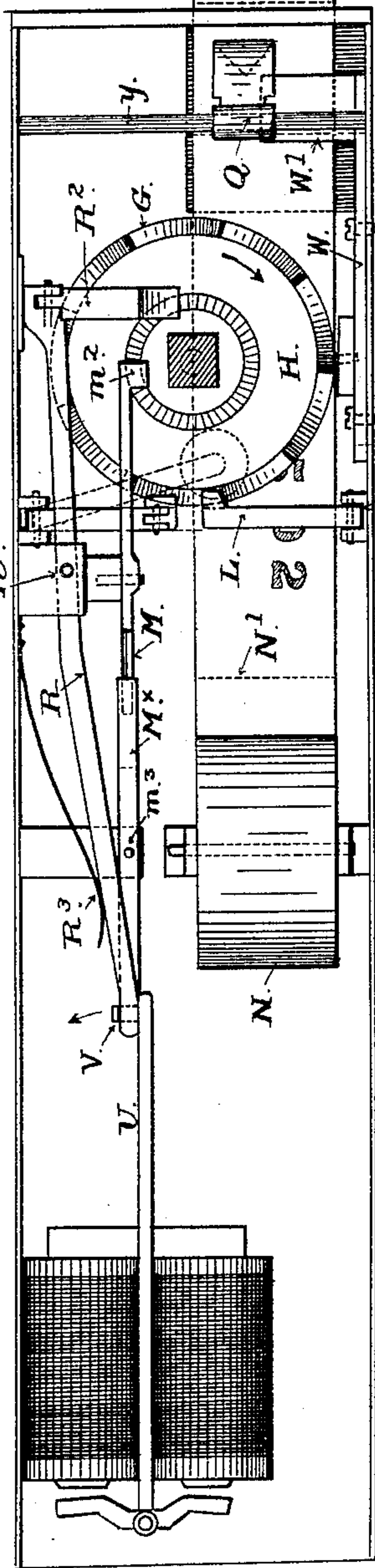


Fig. 12.

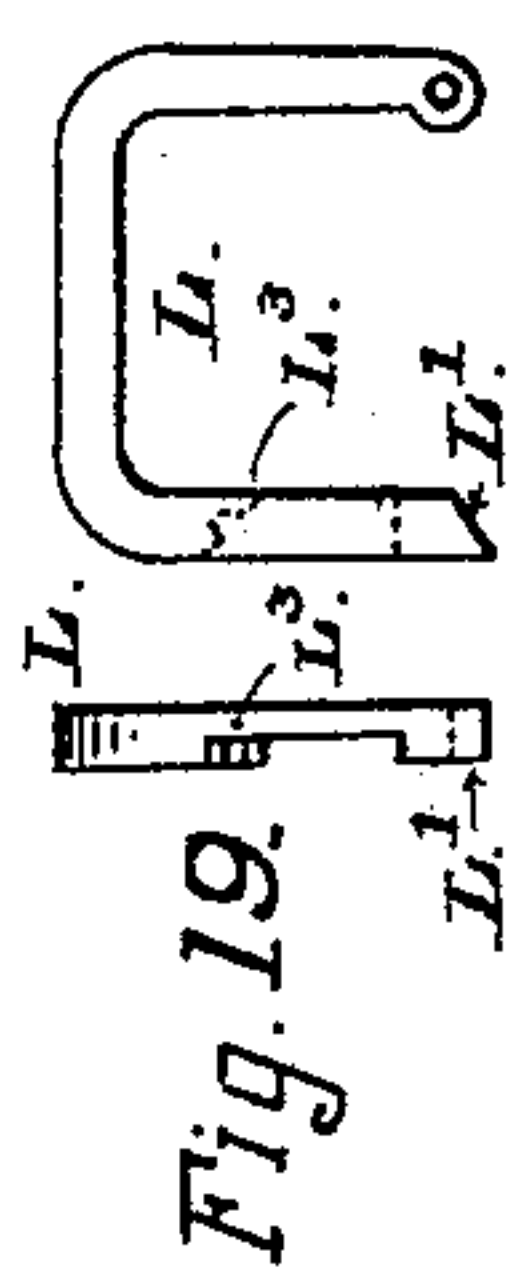


Fig. 19.

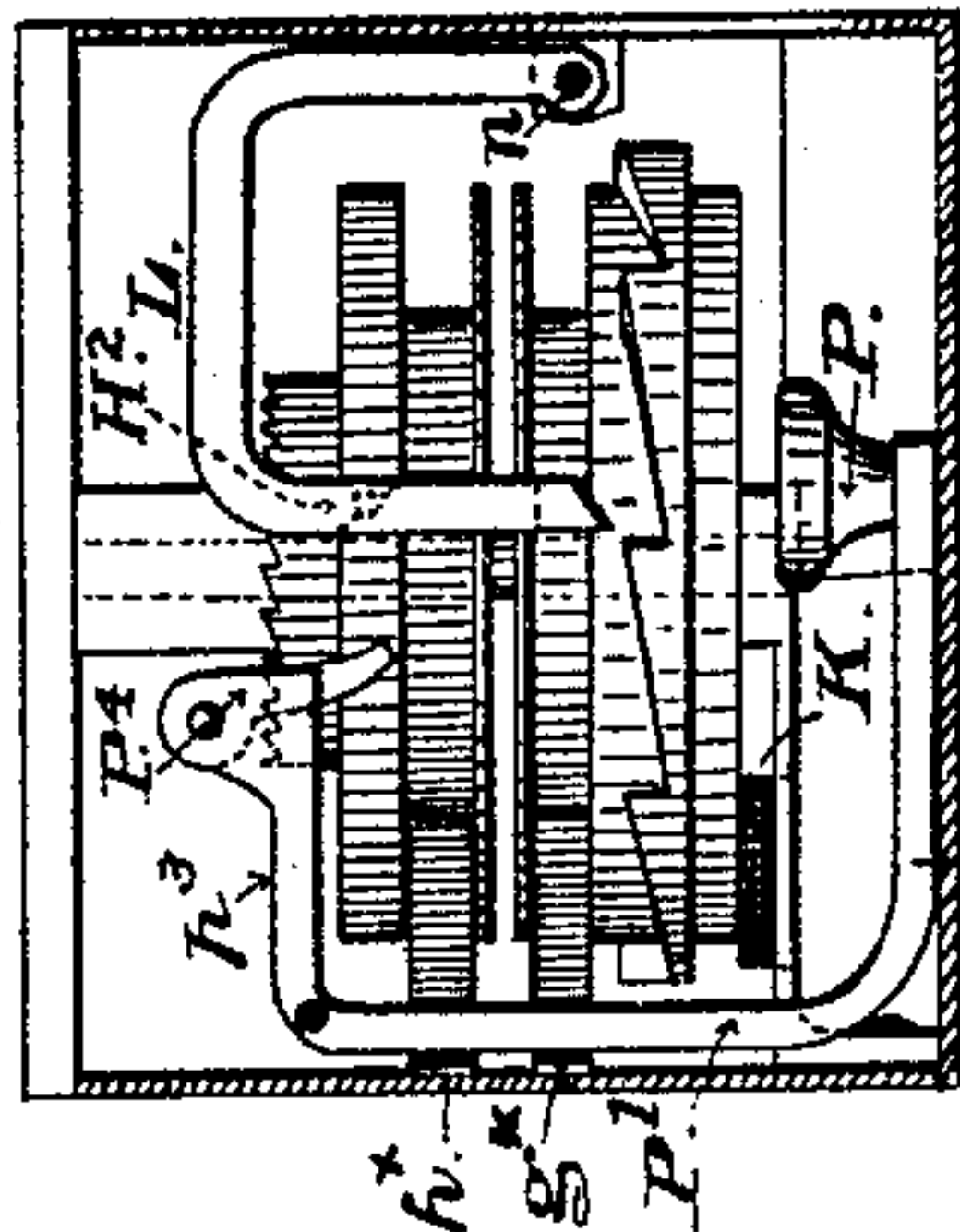


Fig. 14.

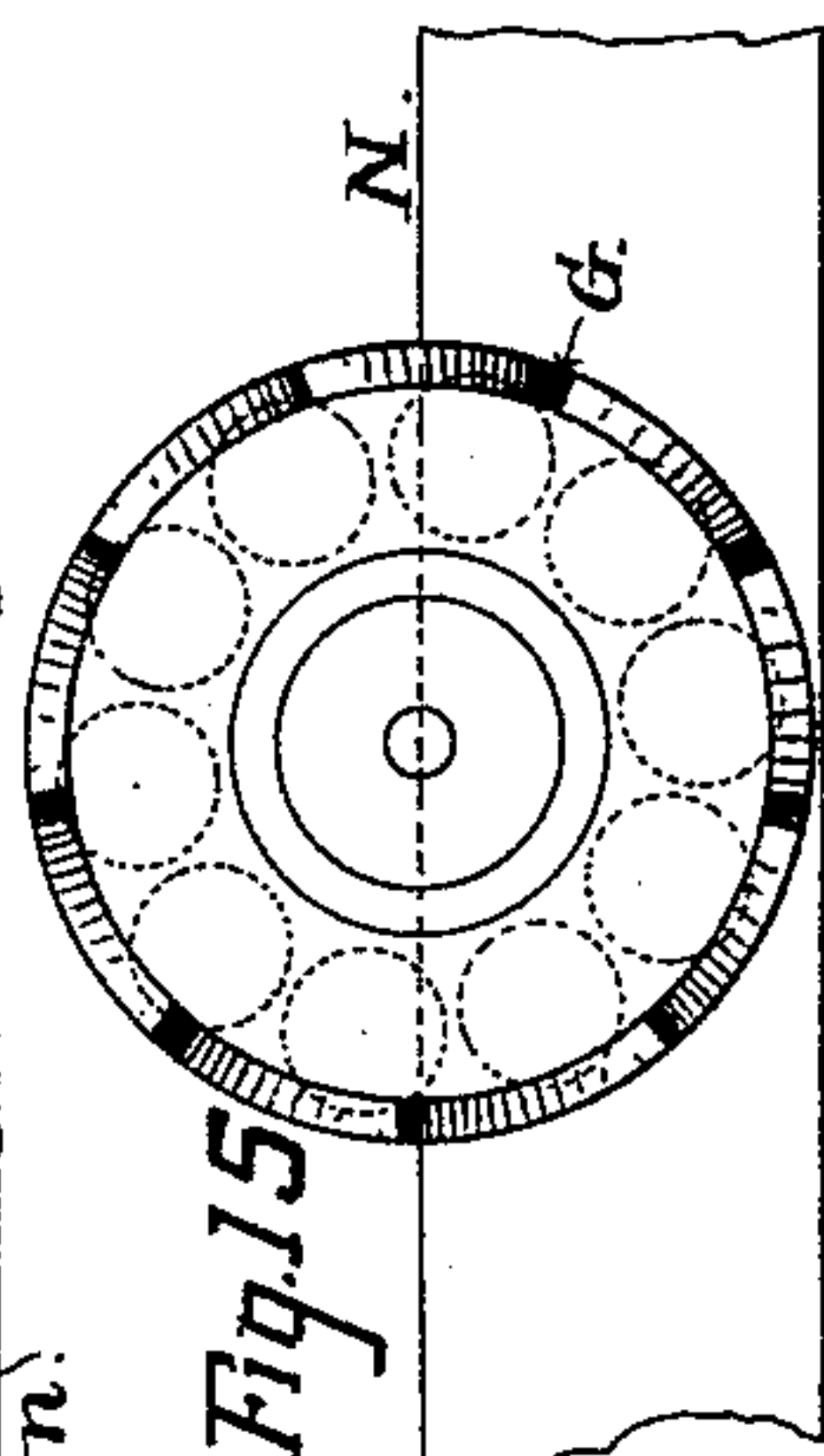


Fig. 15.

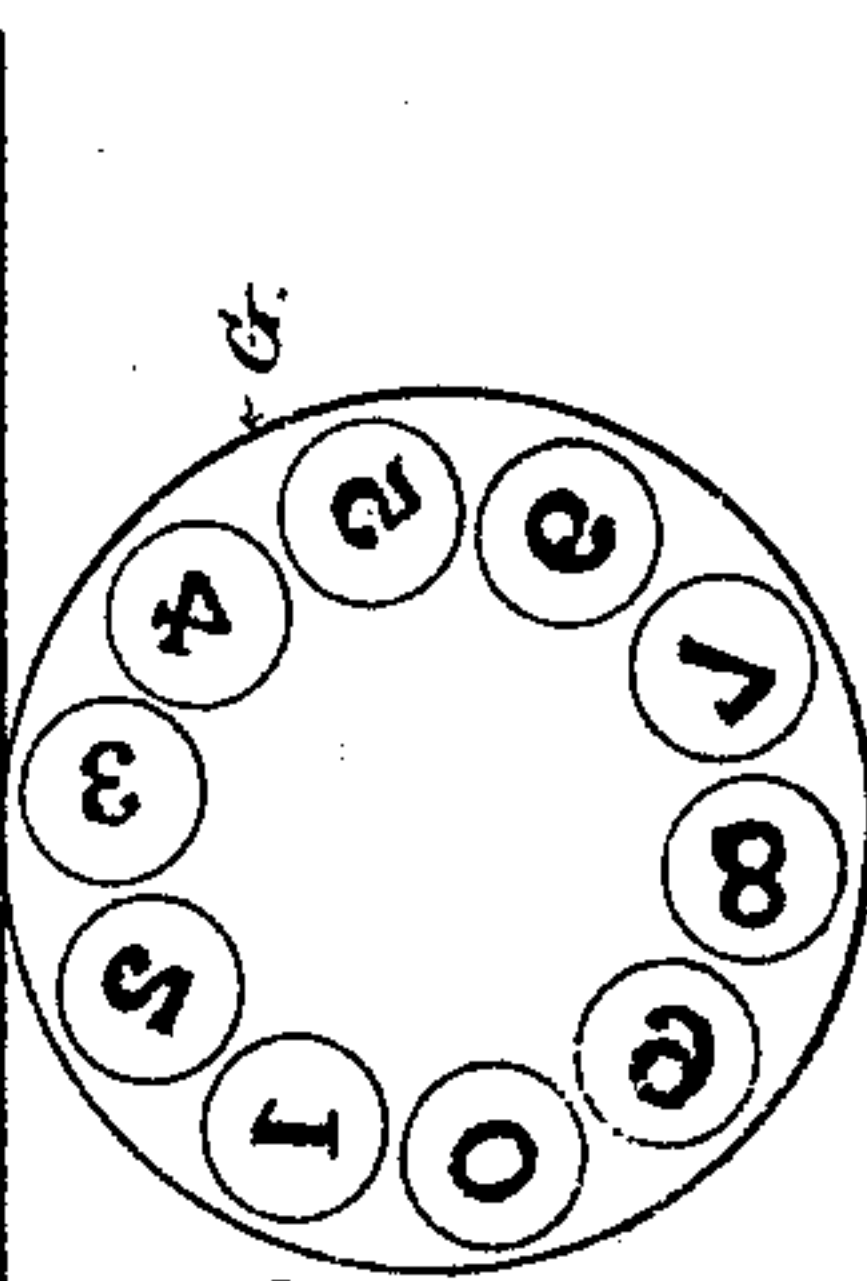


Fig. 16.

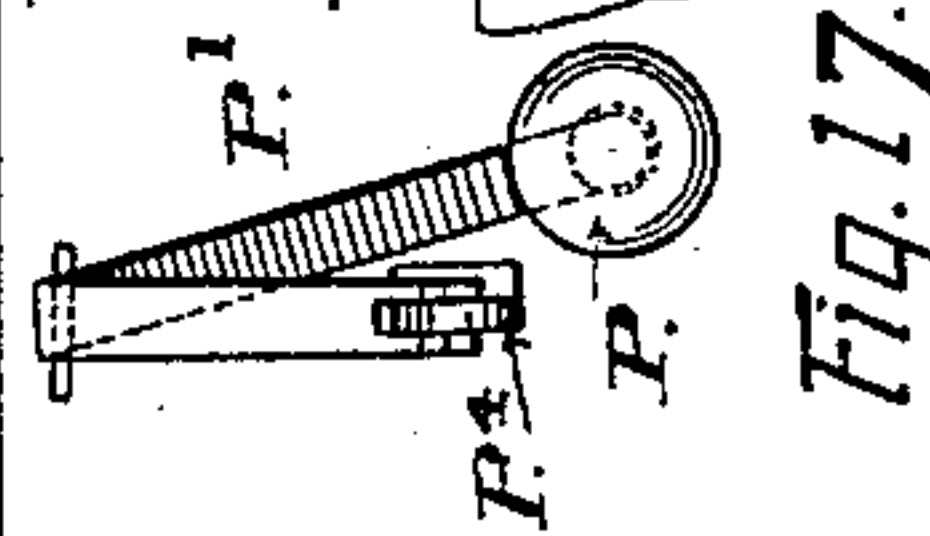


Fig. 17.

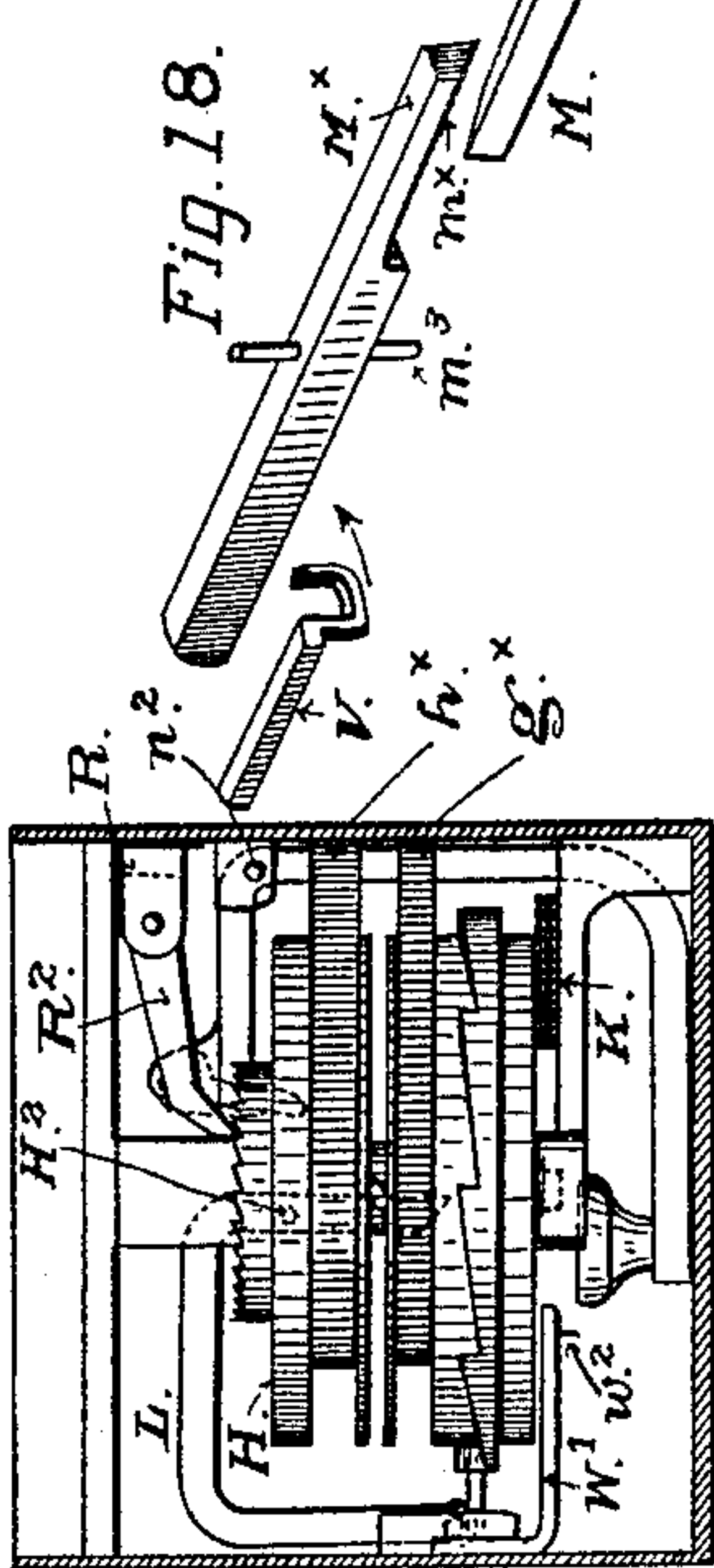


Fig. 13.

Witnesses:
M. P. H. H. H. H.

Inventor:
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By Smith & Son
Attys.

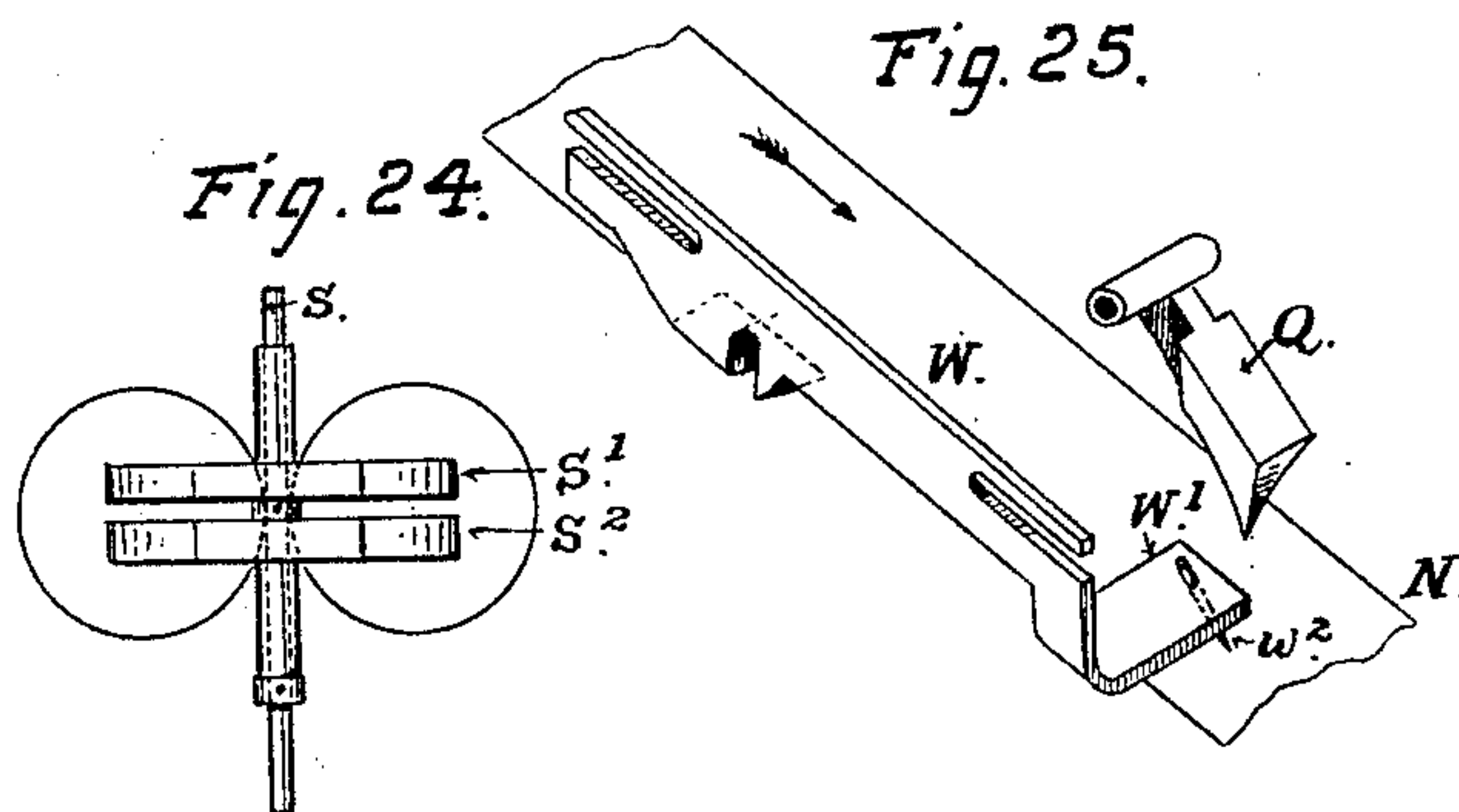
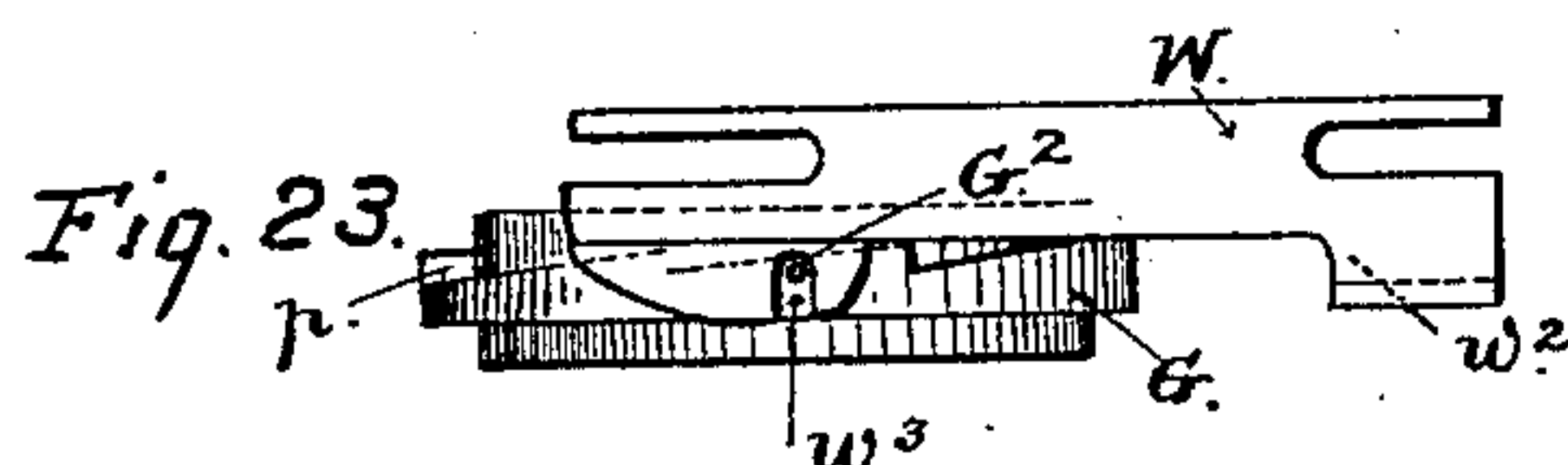
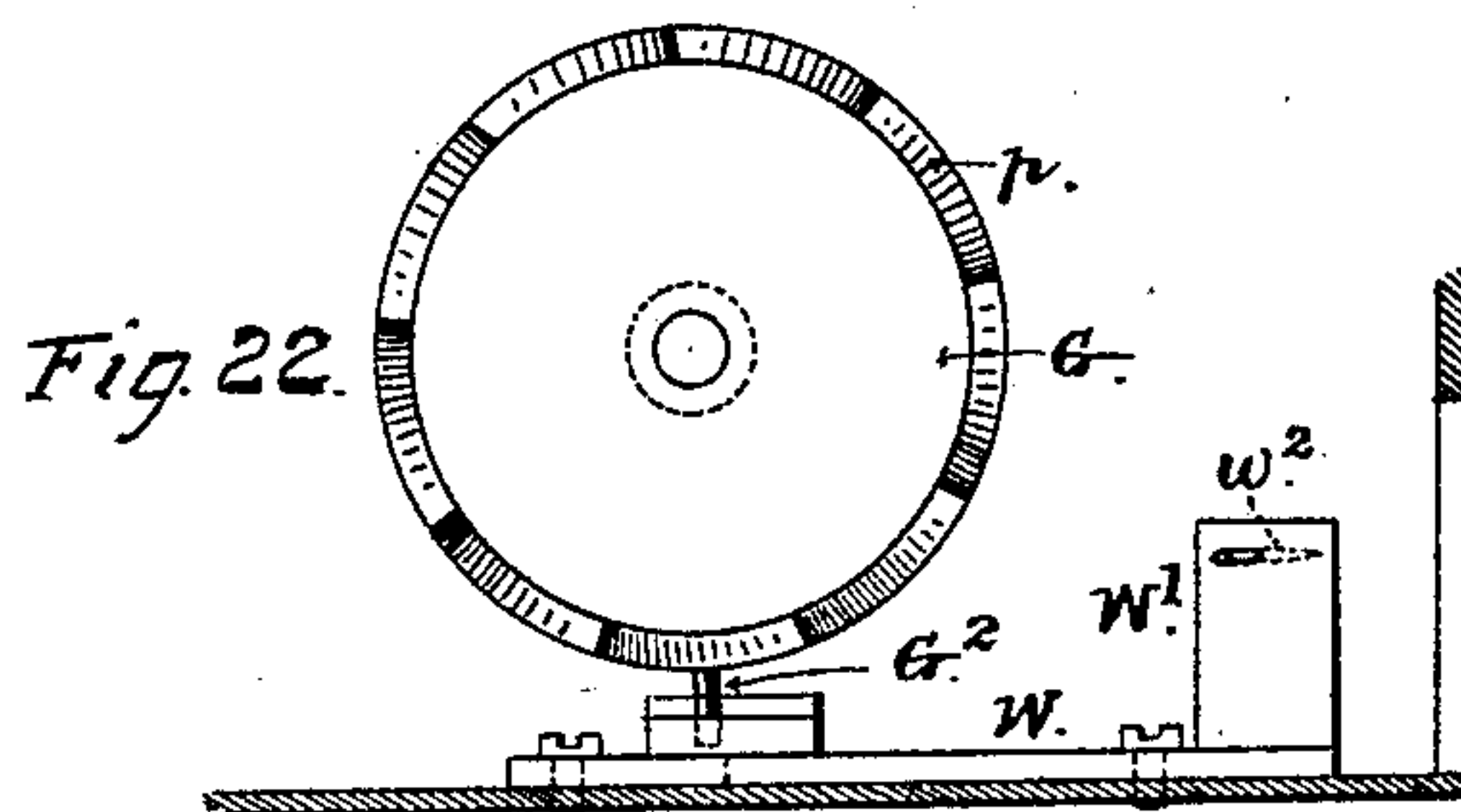
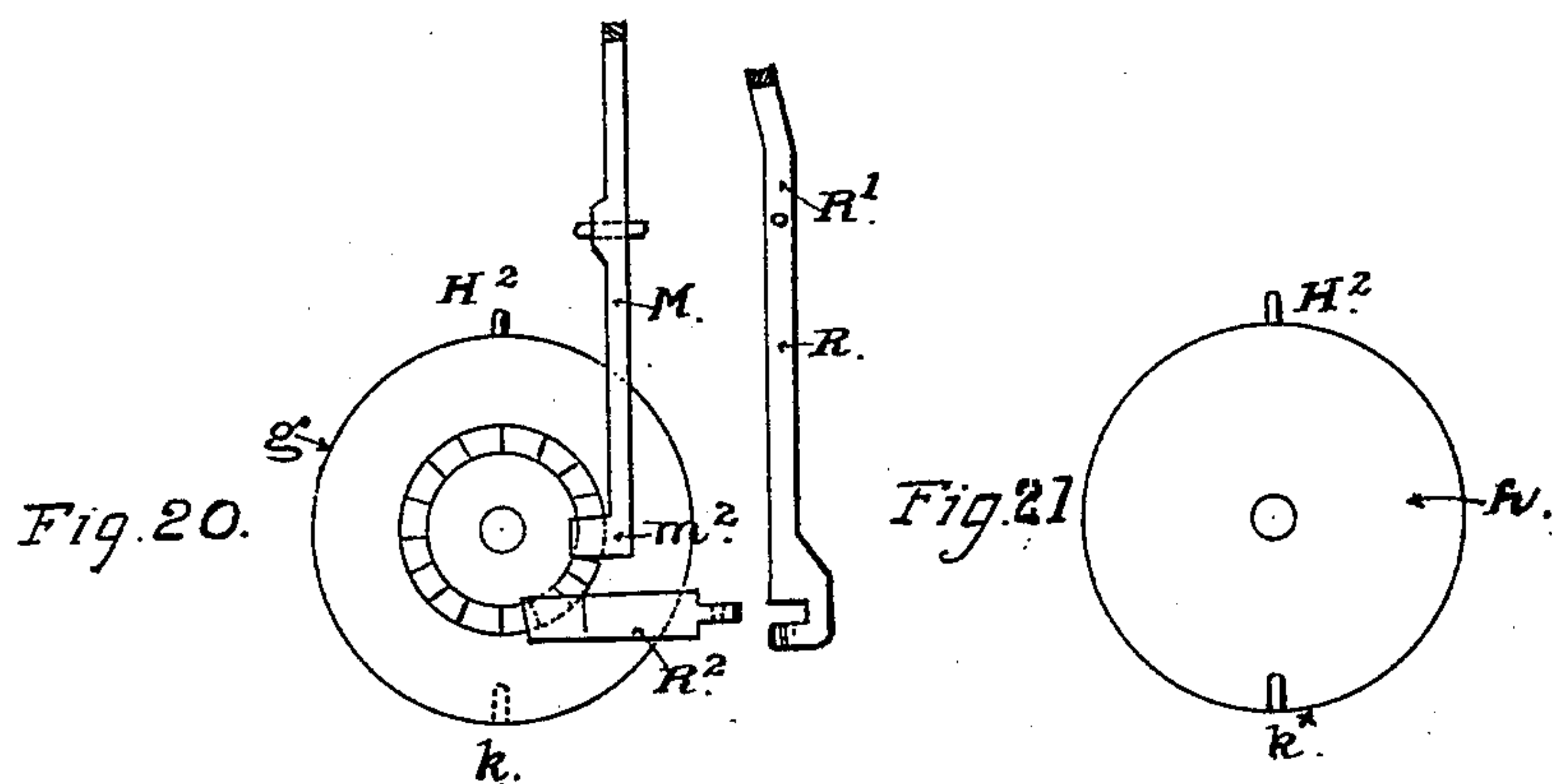
(No Model.)

3 Sheets—Sheet 3.

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Witnesses
M. Hegner
J. V. Koppitz

Inventor:
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UNITED STATES PATENT OFFICE.

WILLIAM F. SMITH, OF SAN FRANCISCO, CALIFORNIA.

TELEPHONE-CALL RECORDER.

SPECIFICATION forming part of Letters Patent No. 521,422, dated June 12, 1894.

Application filed May 5, 1893. Serial No. 473,131. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. SMITH, a citizen of the United States residing in the city and county of San Francisco and State of California, have invented an Improved Subscriber's Signal Transmitting and Recording Apparatus for Telephone Circuits, of which the following is a specification.

This invention has for its object to transmit telegraphically from a subscriber's station to the operator at a switching-station the number of another subscriber's station with which connection is desired, and it is designed to take the place of the present mode of transmitting these numbers or "calls" orally.

The invention consists essentially of a printing-mechanism at the switching-station constructed and arranged to print or mark in suitable characters upon a tape or paper strip the figures or characters composing the "call" and mechanism located at the subscriber's telephone to actuate the said printing mechanism telegraphically, substantially as hereinafter fully described.

By this apparatus the party at a telephone when calling another subscriber operates the printing mechanism at the switching-station by transmitting the electric current in pulsations or impulses along the line and prints or marks upon the tape or paper strip the number of the other telephone with which connection is desired, reproducing mechanically by means of that mechanism the "call" or switching-number in form to be read by the operator, and thereby dispensing with the operator's telephone, bell-signal or other modes of oral or audible communication. The printed tape or strips of paper, when preserved, also serve to show the number of switches made by a subscriber during any given period of time, if a record of the same is required at the switching-station.

The following description explains at length the nature of my said invention and the manner in which I proceed to construct, apply and operate the same, reference being had to the accompanying drawings.

Figure 1 is a front elevation and Fig. 2 is a vertical cross-section of a portion of a telephone switch-board showing in position over the plugging holes that part of the apparatus

which produces the "call" at the switching-station. Fig. 3 is a front view of the telephone at a subscriber's station and that part of the apparatus which actuates telegraphically the recording mechanism at the switching-station. Fig. 4 is a front view, or top view, of this telegraphic transmitter on an enlarged scale. Fig. 5 is a similar view, with the front or top removed. Fig. 6 is a longitudinal section taken on the line xx Fig. 4. Fig. 7 is a transverse section taken on the line xy Fig. 4. Figs. 8 and 9 are transverse sections taken on the seam line but on an enlarged scale and showing the two different positions assumed by the mechanism in sending positive and negative currents. Fig. 9^a is a view of the slide B' removed from the slot. Fig. 10 is a perspective view of a portion of the rocking circuit-closer and switch by which the battery circuit is reversed. Fig. 11 represents in side elevation the printing mechanism which is located at the switch-board; one side of the frame or case being cut away to expose the parts inside. Fig. 11^a is a front view of the case enclosing the mechanism. Fig. 12 is a plan or top view of Fig. 11. Fig. 13 is a vertical section on the left hand side of line xy Fig. 11. Fig. 14 is a vertical section on the right hand side of line xx Fig. 11. Fig. 15 is a top-view of the printing wheel. Fig. 16 is a bottom view of the same part. Fig. 17 is a top-view of the printing pad and its lever. Fig. 18 is a perspective view in detail of the locking-lever of the ratchet-wheel that actuates the printing-wheel, and the levers which operate the locking-lever. Fig. 19 shows details of the dog that holds the printing-wheel from turning back during the printing operation. Figs. 20 and 21 are top-views of the disks that operate the printing-wheel. Fig. 22 is a top-view of the printing-wheel and the paper-feed. Fig. 23 is a side-elevation of the same parts. Fig. 24 is an end-view of the magnets and armatures of the setting mechanism. Fig. 25 is a view in perspective of the paper-feeding and controlling mechanism. These views are given on an enlarged scale.

That part of the apparatus that is located at the subscriber's end of the telephone-circuit I shall term in this description the "telegraphic transmitter," while that part which

is situated at the switch-board and produces mechanically the "call" at that end of the line I shall term the "printing-mechanism."

The transmitter A (Figs. 3 to 10 inclusive) is constructed to produce mechanically any required number of pulsations of a positive current from a local battery upon the subscriber's line for the purpose of setting the type-wheel of the printing-mechanism, and at the end of such setting movements to reverse the current for the purpose of throwing the type-wheel back to position after each setting movement. The principal parts of this transmitter are the rocking circuit-breaking plate B, the teeth or projecting contact-points d^x on the plate and the sliding button B', carrying two pivoted dogs C C'. The sliding piece B' is confined in a slot a^x in the case A but is free to move from end to end in this slot. Pivots $b^x b^x$ for the rocking-plate to move on have bearings in the ends of the case, and curved springs $e e$ fixed to the back or the bottom of the case are set under the rocking-plate to hold it in position when at rest.

B² is a pointer on the knob of the slide, and a^2 is a row of figures on the case along one side of the slot to measure the length of movement of the slide that is required to set a given number on the type-wheel of the printing mechanism into position to print at the other end of the line.

X and Y are conducting-strips or wires connected to the positive and negative sides respectively of a local battery.

Z is a "ground" wire running through the case, as indicated in Fig. 4 by dotted lines, and shown in the sectional views (Figs. 7, 8 and 9).

T is a fixed wire or conducting-strip extending through the case A under the slot and connected directly into the line-wire of the subscriber's circuit. The bottom end of the slide B' setting against this wire T is always in contact or electrical connection with it. The two pivoted dogs C C' on opposite sides of the slide B' are arranged to swing or yield in contrary directions, that is to say, the dog C is rigid during the movement of the slide along the slot in the direction of the arrow x , (Fig. 4) but in the return stroke or movement the dog swings back on its pivot. The other dog C' acts just in the contrary direction and is rigid on the return stroke of the slide B' while the dog C swings loose on its pivot. Both dogs are held by stop-pins c^2 on their acting stroke, but are loose and swing freely on their non-acting stroke and each one has a non-conducting block C³ on its back face. The function of these dogs is to move the rocking-plate on its centers, and each one on its acting stroke elevates the opposite side of the rocking-plate by depressing the side directly under it.

By moving the slide B' along the slot from the top toward the bottom of the scale, or in the direction of the arrow X (Fig. 4), and by

the contact of the dog C with the projections d^x on that side of the rocker-plate, the negative side of the plate is closed upon the "ground" wire Z (as shown in Fig. 8). The effect of this contact is to "ground" the negative side of the local battery and to throw upon the line-wire T a number of impulses from the positive side of the local battery through the contact of the dog C with the contact-points or projections d^x on that side of the ratchet-plate. The number of these positive pulsations sent along the line depends on the number of projections struck by the dog C in its movement, and consequently the number is determined by the length of the stroke or movement of the slide B'. The projections d^x are so spaced and arranged as to their number with reference to the type-wheel and its operative mechanism at the other end of the line that the movement of the slide in its slot from one end down to the numeral 1 of the scale will send over the line the number of pulsations required to set the numeral 1 on the type-wheel into position to print that figure on the paper strip, and so on for every numeral or character of the scale. After each setting movement of the slide B' along the scale it is returned to the top of the slot before being set to the next numeral, and by this return movement the rocker-plate is thrown into the opposite position, as illustrated in Fig. 9, by which means the positive side x is closed upon the "ground" Z and the negative side y is thrown upon the line. In this return stroke of the slide B the dog C' is rigid and acts to depress that side of the rocker-plate by striking and riding along the continuous projection f on the rocker-plate, while the other dog C rides loosely over the projections d^x and is not in electrical contact. The negative current transmitted by this position of the rocker-plate (shown in Fig. 9) acts on the printing-mechanism to set the type-wheel back to the starting-point after each printing operation. In this manner the slide of the transmitter is operated to set the type-wheel step by step for each numeral by pulsations of a positive current, and to bring the wheel back to the starting-point by reversing the current before setting it to the next numeral. The two positions of the rocker-plate that produce this alternation of the current are shown in the sectional views Figs. 8 and 9, and the position of the rocker-plate when at rest is shown in Fig. 7.

The transmitter can be mounted either directly upon the telephone or in any position convenient to the telephone.

The printing-mechanism located at the central office or switching-station consists mainly of a type-wheel, a paper-feeding mechanism acting to move a tape or strip of paper under the type-wheel, an impression pad or plate acting to bring the paper into contact with the character of the type-wheel and mechanism actuated by a polarized relay to set the type-wheel to print in successive order any

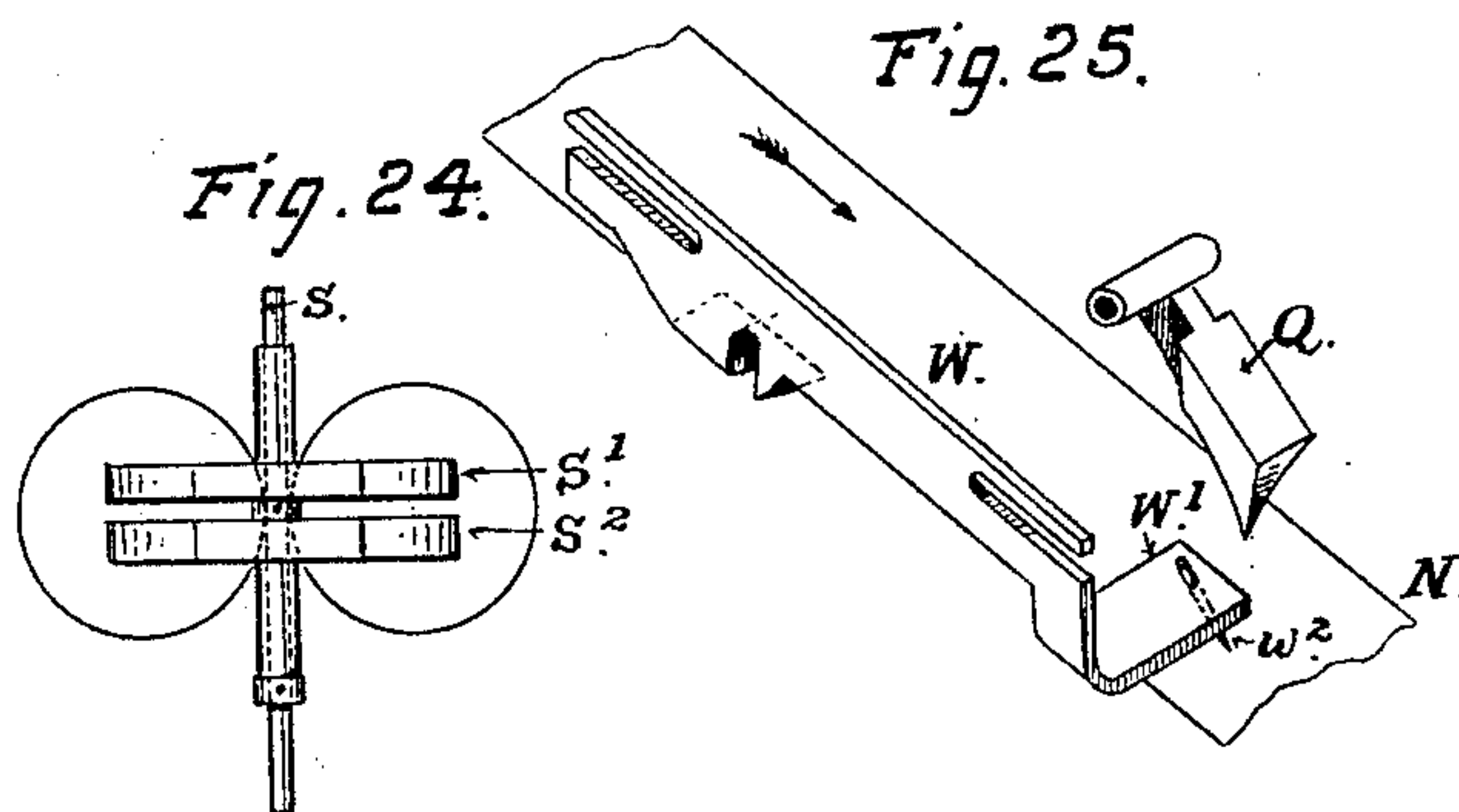
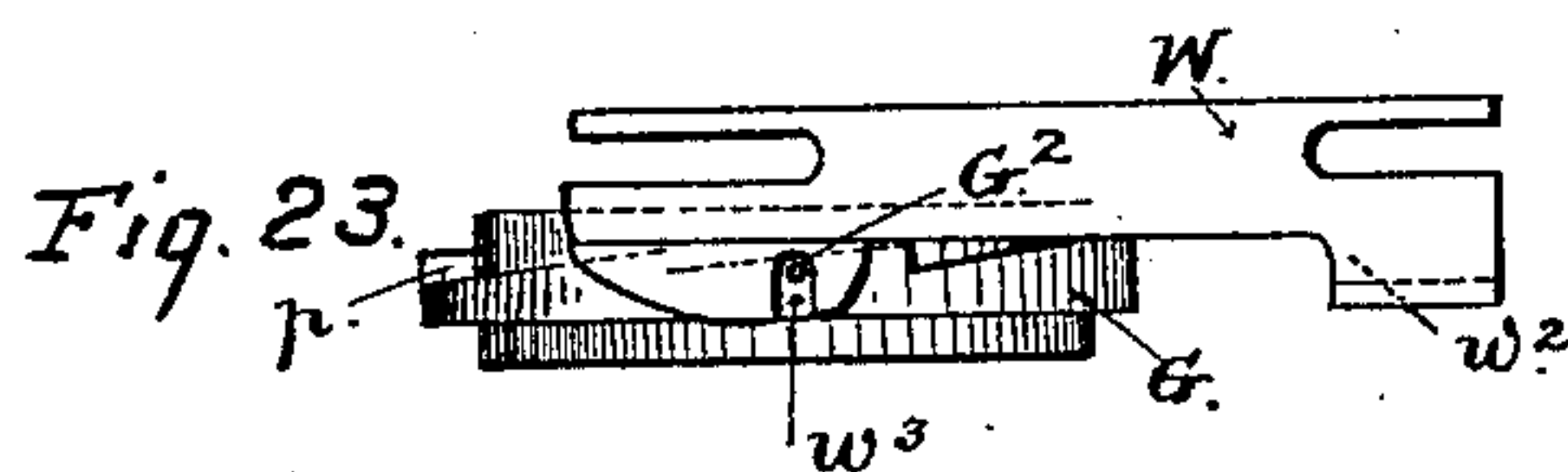
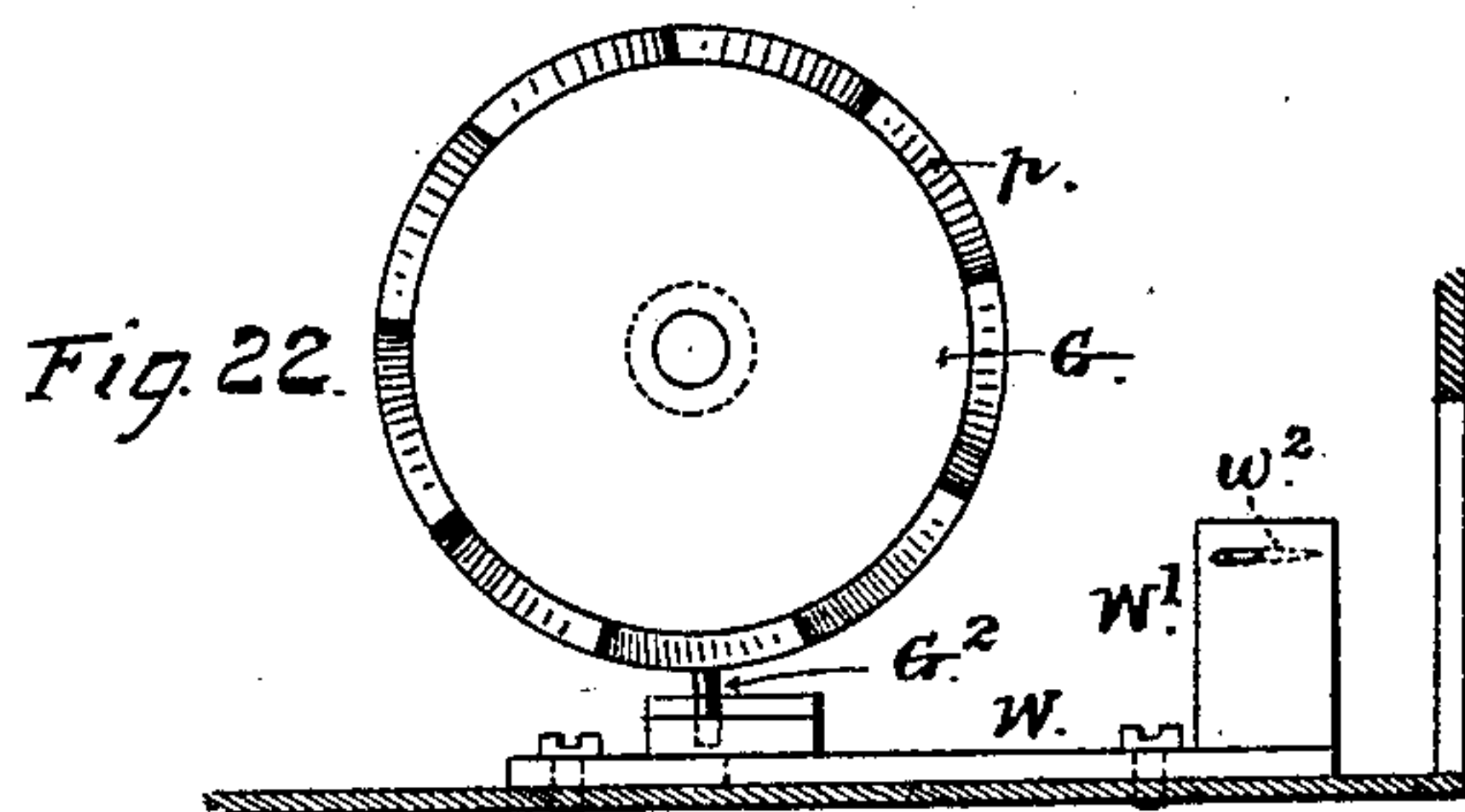
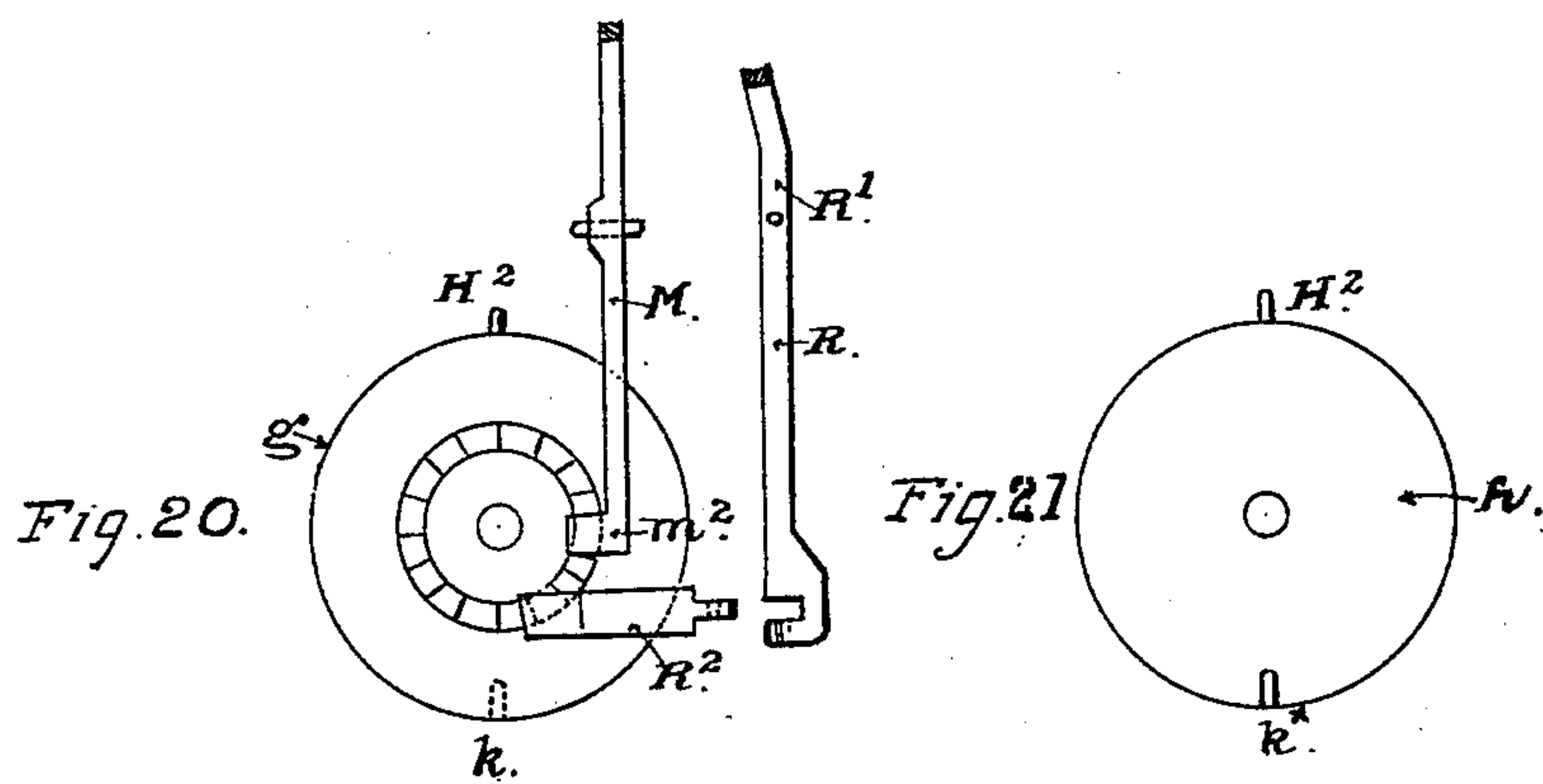
(No Model.)

3 Sheets—Sheet 3.

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Witnesses
M. Hegner
J. V. Koppitz

Inventor:
William F. Smith
By Smith & Babson
his attys

[illegible][illegible]

Case	Year	Age	Sex	Occupation	History	Findings	Diagnosis	Outcome
1	1985	45	M	Teacher	Headache, dizziness	Normal	None	Recovered
2	1986	32	F	Nurse	Nausea, vomiting	Normal	None	Recovered
3	1987	58	M	Engineer	Blurred vision	Normal	None	Recovered
4	1988	25	F	Student	Headache, fatigue	Normal	None	Recovered
5	1989	65	M	Retired	Dizziness, imbalance	Normal	None	Recovered
6	1990	40	F	Homemaker	Headache, nausea	Normal	None	Recovered
7	1991	35	M	Software Engineer	Headache, dizziness	Normal	None	Recovered
8	1992	50	F	Manager	Headache, fatigue	Normal	None	Recovered
9	1993	28	M	Student	Headache, dizziness	Normal	None	Recovered
10	1994	60	F	Retired	Headache, dizziness	Normal	None	Recovered
11	1995	42	M	Engineer	Headache, dizziness	Normal	None	Recovered
12	1996	38	F	Nurse	Headache, nausea	Normal	None	Recovered
13	1997	55	M	Teacher	Headache, dizziness	Normal	None	Recovered
14	1998	30	F	Student	Headache, fatigue	Normal	None	Recovered
15	1999	62	M	Retired	Headache, dizziness	Normal	None	Recovered
16	2000	48	F	Manager	Headache, nausea	Normal	None	Recovered
17	2001	33	M	Software Engineer	Headache, dizziness	Normal	None	Recovered
18	2002	52	F	Homemaker	Headache, fatigue	Normal	None	Recovered
19	2003	27	M	Student	Headache, dizziness	Normal	None	Recovered
20	2004	67	F	Retired	Headache, dizziness	Normal	None	Recovered
21	2005	43	M	Engineer	Headache, dizziness	Normal	None	Recovered
22	2006	37	F	Nurse	Headache, nausea	Normal	None	Recovered
23	2007	56	M	Teacher	Headache, dizziness	Normal	None	Recovered
24	2008	31	F	Student	Headache, fatigue	Normal	None	Recovered
25	2009	61	M	Retired	Headache, dizziness	Normal	None	Recovered
26	2010	49	F	Manager	Headache, nausea	Normal	None	Recovered
27	2011	34	M	Software Engineer	Headache, dizziness	Normal	None	Recovered
28	2012	53	F	Homemaker	Headache, fatigue	Normal	None	Recovered
29	2013	29	M	Student	Headache, dizziness	Normal	None	Recovered
30	2014	68	F	Retired	Headache, dizziness	Normal	None	Recovered
31	2015	44	M	Engineer	Headache, dizziness	Normal	None	Recovered
32	2016	39	F	Nurse	Headache, nausea	Normal	None	Recovered
33	2017	57	M	Teacher	Headache, dizziness	Normal	None	Recovered
34	2018	32	F	Student	Headache, fatigue	Normal	None	Recovered
35	2019	63	M	Retired	Headache, dizziness	Normal	None	Recovered
36	2020	51	F	Manager	Headache, nausea	Normal	None	Recovered
37	2021	36	M	Software Engineer	Headache, dizziness	Normal	None	Recovered
38	2022	54	F	Homemaker	Headache, fatigue	Normal	None	Recovered
39	2023	30	M	Student	Headache, dizziness	Normal	None	Recovered
40	2024	69	F	Retired	Headache, dizziness	Normal	None	Recovered

ters in the signal to be transmitted and recorded. At the end of every operation the mechanism is restored to position again by a simple return movement of the button.

5 It will be understood that the rod U is always restored to position ready to start at the first pulsation; because the spring R^3 throws the lever R over and holds it against the rod as soon as the current is off; but the
10 rod V has no spring and remains in whatever position it is set by its armature S^2 . When a positive current is transmitted, therefore, the beveled end of the lever M^x is thrown over to the left and the lever M is released
15 and its end M^2 is allowed to drop into the ratchet-teeth in the wheel H; and in that position the lever remains until the current is reversed, while the upper rod U continues to vibrate while the positive pulsations are flow-
20 ing over the line. As soon as the current is reversed the beveled end of the lever M^x is thrown over to the right and it acts then to depress the rear end of the lever M and throws up its dog m^2 clear of the ratchet-
25 wheel.

To ink the characters of the type-wheel an inking pad K is fixed under the wheel in position to come in contact with the face of the characters as the printing-wheel turns.

30 The case or frame in which are mounted the parts of the printing and paper-feeding mechanism has an opening in the front through which the paper is projected; and in arranging this part of my apparatus at
35 the switch-board or central office it is set behind an opening in the switch-board in convenient position to the keyboard of the operator; so that as each printed portion of paper is projected through the opening in the
40 switch-board it can be seized and detached from the continuous strip. When these subscriber's "calls" are printed on a continuous strip I provide a paper tape N specially prepared for this purpose, having lines of
45 perforations or indentations N' at intervals apart across it which divide the tape B' into strips of proper length, as illustrated in Fig. 12. For the greater convenience of the operator and also to prevent confusion where
50 several "calls" may be received at the switch-board at the same time, the telephone number of the subscriber can be printed on each division of the tape, as shown in Fig. 12. Each strip when detached at the line of per-
55 forations N' bears both the subscriber's telephone-number and the number of the "call" which he sends in; and by preserving these detached strips they furnish a perfect record

of the number of switches made by a subscriber during any given period of time. 60

The subscriber's printing-mechanism is placed either above or below his individual annunciator at the switch-board, where annunciators are used; but in most cases such
65 annunciators can be dispensed with, as the printing tapes or strips of paper will furnish a sufficient signal to the operator as they are projected through the openings in the switch-board.

Having thus fully described my invention, 70 what I claim therein as new, and desire to secure by Letters Patent, is—

1. The combination of the type-wheel G, setting-wheel H, setting-lever R, brake-lever M, coil-springs $g^x h^x$ and a polarized relay 75 having separately acting armatures $S' S^2$ and rods or arms U V actuated by said armatures, constructed to operate substantially as described.

2. The combination of the type-wheel G, 80 setting-wheel H, coil-springs $g^x h^x$ setting-lever R means to vibrate the said lever by pulsations of an electric current, brake-lever and actuating means whereby said lever is caused to hold and release said setting-wheel 85 at proper intervals to set and reset the type-wheel, locking lever and printing-lever actuated by or from the movements of said setting mechanism while the type-wheel is held at rest, constructed to operate substantially as 90 described.

3. The combination with the reciprocating feed-plate adapted to feed the paper-strip step by step with relation to the movements of the type-wheel G as described, of the swing- 95 ing brake-block Q having a pointed end to engage the paper, for operation as and for the purpose described.

4. The combination of the sliding-piece B' , dogs G G' carried thereby and arranged to 100 act in contrary directions, the rocker-plate B having contact-points and surfaces d^x and f set in working relation to said dogs as described, the stationary conducting strip T, "ground-wire" z , contact-strip X Y and slot- 105 ted-plated having a numbered scale therein to measure the length of movement of the sliding-piece, constructed for operation substantially as described.

In testimony that I claim the foregoing I 110 have hereunto set my hand and seal.

WILLIAM F. SMITH. [L. S.]

Witnesses:

EDWARD E. OSBORN,
CHAS. E. KELLY.