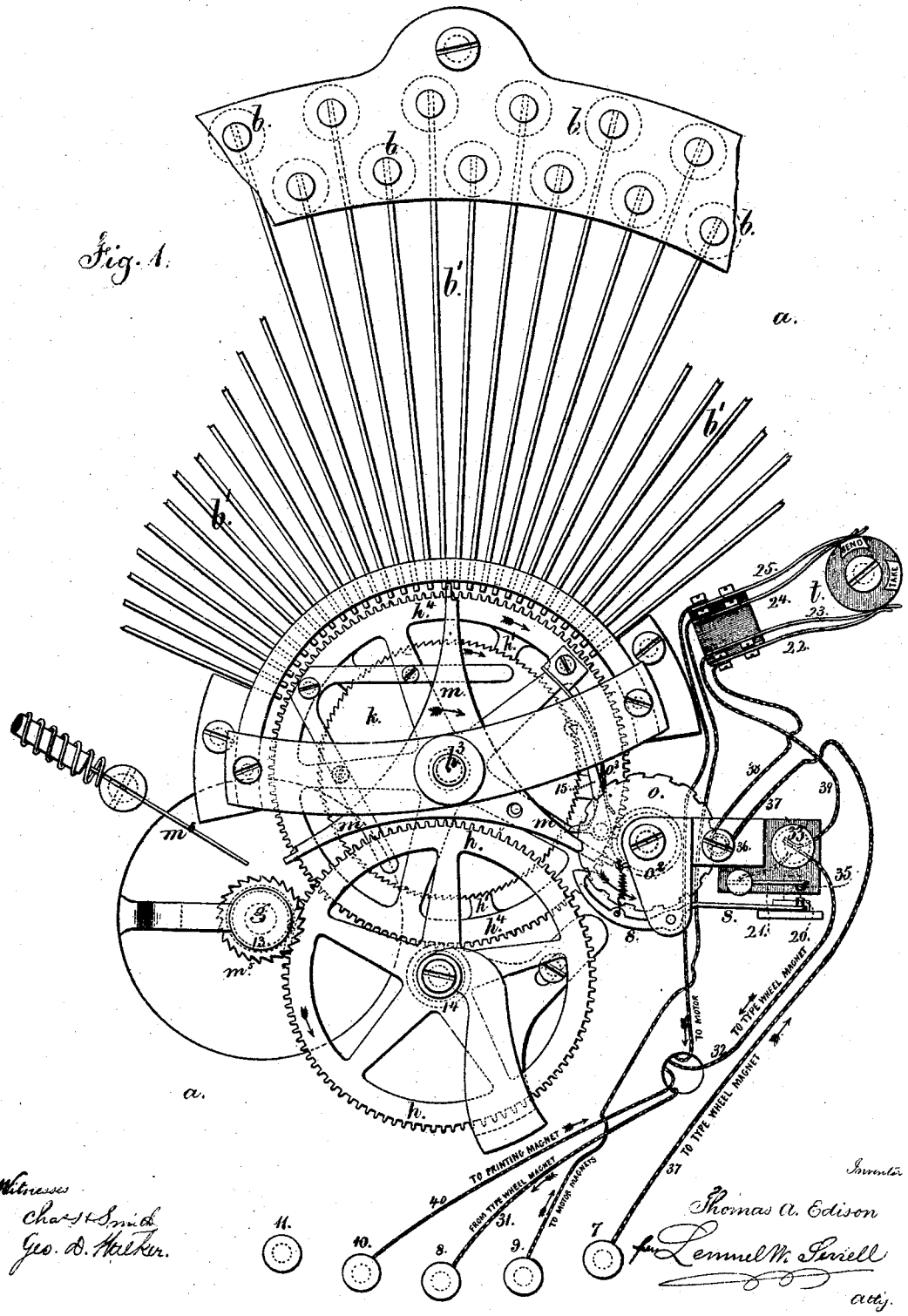
3 Sheets--Sheet 1.

T. A. EDISON.

Printing Telegraphs.

No. 140,488. Patented July 1, 1873.

Fig. 1.



Witnesses
Chas. H. Smith
Geo. D. Walker.

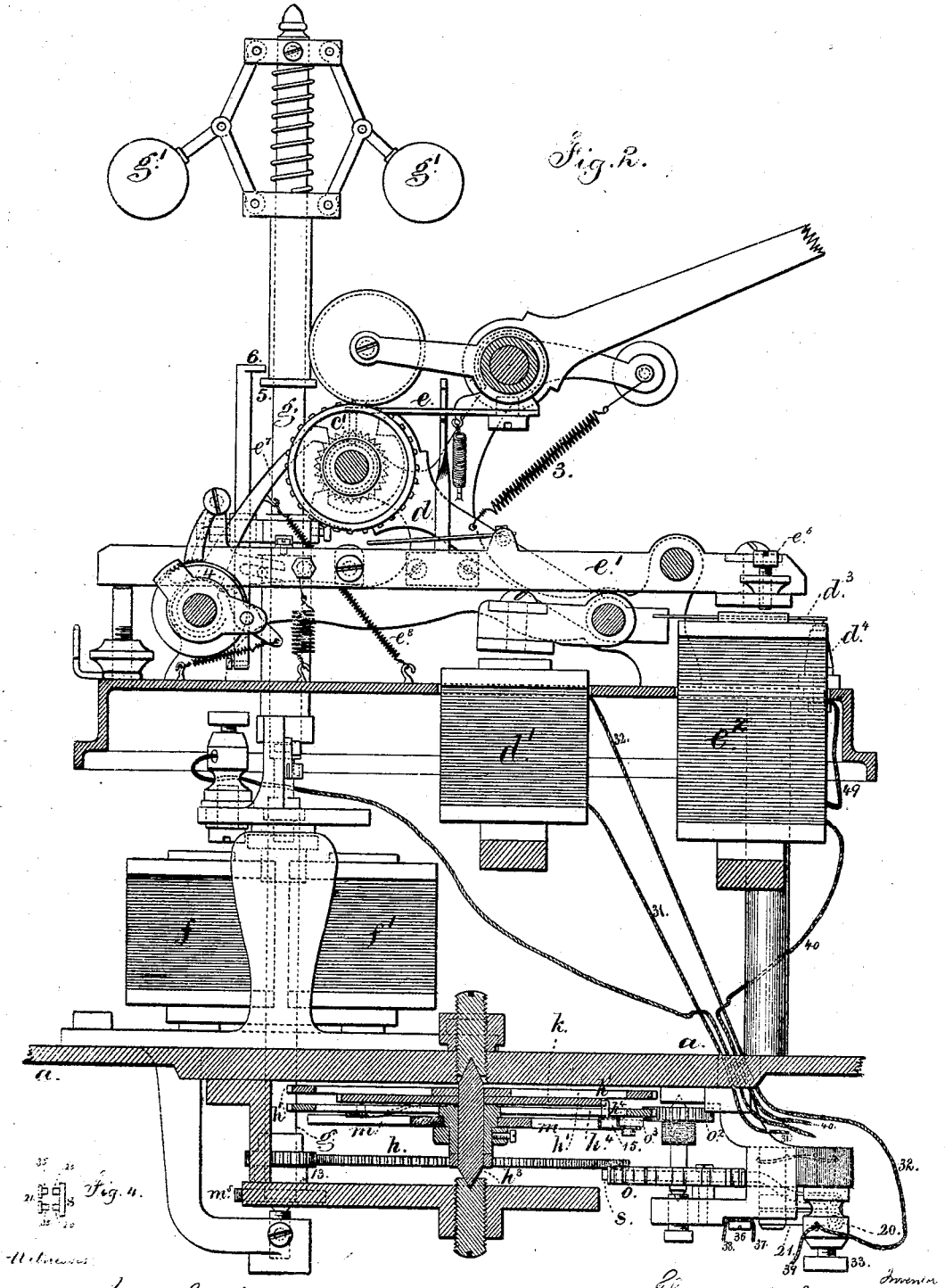
Inventor
Thomas A. Edison
by Lemuel W. Serrell
atty.

3 Sheets--Sheet 2.

T. A. EDISON.

Printing Telegraphs.

No. 140,488. Patented July 1, 1873.



Witnesses:

Chas. A. Smith

Geo. B. Parker.

Inventor:

Thomas A. Edison

per Lemuel W. Serrell

atty.

3 Sheets--Sheet 3.

T. A. EDISON.

Printing Telegraphs.

No. 140,488. Patented July 1, 1873.

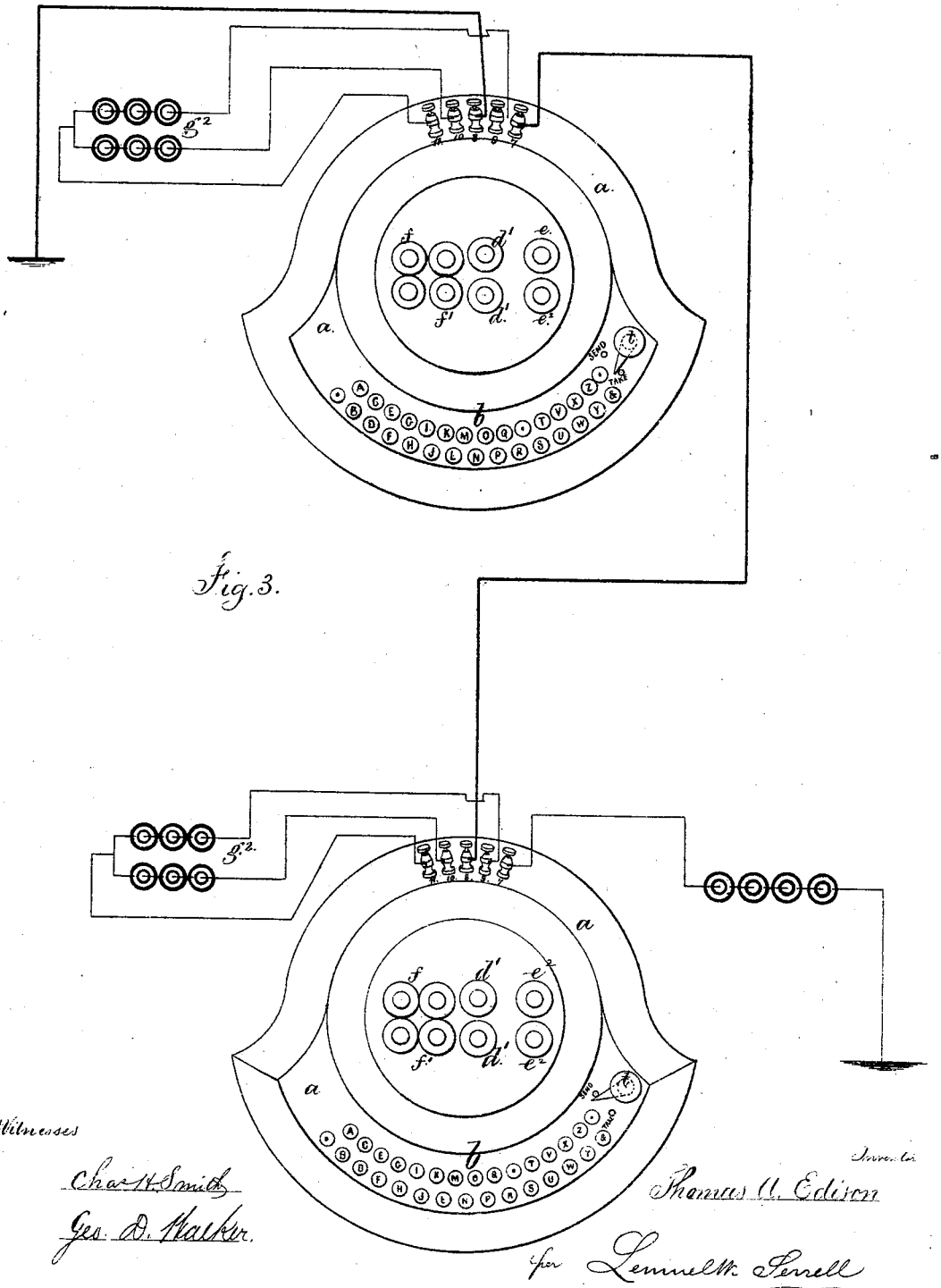


Fig. 3.

Witnesses

Chas. H. Smith

Geo. D. Walker.

Inventor

Thomas A. Edison

per Lemuel W. Serrell

Atty

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE GOLD AND STOCK TELEGRAPH COMPANY, OF NEW YORK, N. Y.

IMPROVEMENT IN PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. **140,488**, dated July 1, 1873; application filed May 16, 1873.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Newark, in the county of Essex and State of New Jersey, have invented an Improvement in Printing-Telegraphs, of which the following is a specification:

In this machine there is a circuit-breaker driven by an electric engine, and this pulsator makes and breaks the circuit of the main line and causes all the type-wheels in the circuit to revolve in unison through the agency of an electro-magnet and step-by-step mechanism. When a key at the transmitting-station is depressed it stops the circuit-breaker and arrests the movement of the type-wheels. At each station is a local battery that is brought into action by the cessation in the movement of the type-wheel lever closing the circuit and throwing the current into the printing-magnet.

In the drawing, Figure 1 is an inverted plan, representing the principal portions of the mechanism. Fig. 2 is a vertical section, showing the operative portions of the machine; and Fig. 3 is a general plan view on a smaller scale, representing the connections.

The bed *a* of the machine is of suitable size and shape, and around on one side is a range of finger-keys, *b*, occupying one-third of the circle, and these are connected with the bars *b'*, beneath the bed *a*, that stand radially around the wheel h^4 that is in the middle of the bed, and is hereafter referred to. The type-wheel *c'* is revolved by a step-by-step movement from the lever *d*, electro-magnet d^1, and spring 3. The unison mechanism *e* and the printing-lever e^1 and magnet e^2 are similar to those in my patent No. 126,532. The feeding mechanism for the paper is similar to that in my patent No. 126,532, and there is a pawl and retaining-clamp, 4, to prevent the paper drawing back, as in said patent. The motor consists of the electro-magnets *f f'*, vertical shaft *g*, and governor-balls g^1, and the speed is regulated by short-circuiting the battery-connection by the collar 5 and finger 6, as in my patent No. 131,343. The connections are made as shown in Fig. 3; the binding-screws 7 and 8 are the line-connections, or line and earth. The connection 9 is to the engine, and 10 to the printing-magnet, and 11 is the return-connection to the local battery g^2. The motor drives the wheel *h* by the pinion 13, and this communicates motion to the pinion 14 and a wheel, h^1, to which is attached a ratchet-wheel, *k*. The wheel h^4 is loose upon the same shaft as the wheels h^1 and *k*, and it is rotated by a pawl, 15, that is upon the wheel h^4, and takes the teeth of the ratchet-wheel *k*. The arms *m*, three in number, project from a hub around the shaft h^3. One of them is contiguous to a knuckle on the pawl 15, so that when one of the finger-keys *b* is depressed, and one of the arms *m* comes into contact with the bar *b'* of the depressed key, then the arms *m* are arrested, and the wheel h^4, moving slightly by the pawl, brings the knuckle of the pawl into contact with said arm *m*, and throws the pawl out from the ratchet-wheel *k*, thereby allowing the ratchet-wheel *k* and wheel h^1 to continue to revolve, but stopping the wheel h^4 and the parts deriving motion from it. In this manner the circuit-closing wheel *o* is stopped, said wheel receiving motion from the pinion o^2, and as soon as the finger-key is raised the spring o^3 throws the pawl 15 back into contact with the ratchet-wheel *k*, and the motion of the circuit-closing wheel is renewed. The lever *s* is operated by cam-projections on the wheel *o*, and, by the contact-points 20 and 35, and springs 21, the circuit next described is opened and closed. There is an insulated block, *t*, upon which the springs 22, 23, 24, and 25 rest, and in it are conducting-blocks. When a knob above the bed of the machine is turned to the word "take," the circuit is closed through the springs 22 and 23. When it is turned to the word "send," the circuit is closed through 24 and 25. The parts are so timed that the number of times the circuit is opened and closed during each revolution of the wheel h^4 equals three times the number of the keys *b*, and hence that the pulsations acting in the line make three revolutions of the type-wheel, the pulsations passing by the binder 7, wire 37, screw 36, metallic frame and lever *s*, contact-points 20 35, springs 21, and connection to the binder 33, wire 32, magnet d^1, wire 31, and binder 8, and thence along the line to the distant instruments, and setting their type-wheels,

and when the revolution of h^4 is stopped by depressing a key, the letter of the type-wheels corresponding to that on the depressed key is in position for printing. At the receiving instrument the block t is turned to take, and the circuit-closer is no longer included in the circuit, but the pulsations go direct through the magnet d^1 to set the type-wheel, the route being by binder 7, wire 37, binder 36, wire 38, spring-arms 22 and 23, wire 39, binder 33, wire 32, magnet d^1, wire 31, and binder 8 to line or earth connection. While the type-wheel lever d is vibrating the spring d^3 thereon does not remain in contact long enough with the anvil d^4 to energize the printing-magnet e^2; but so soon as the pulsation in the type-wheel magnet ceases the circuit is closed through d^3 and d^4, the current passing by binder 10, wire 40, magnet e^2, wire 49, anvil d^4, spring d^3, lever e^1, frame and bed a, and binder 11 back to battery g^2, and the printing effected. The fulcrum of the printing-lever e^1 is to be loose in its bearings, so that the momentum may carry the lever and its pad up to the type and produce the impression, and then fall away to prevent blurring the letter when the type-wheel is again revolved. The brass screws e^6 passing through the armature of the lever e^1, coming into contact with the cores of e^2, prevent adhesion between the surfaces and adjust the blow of the impression-pad. A ratchet-wheel, m^5, upon the governor-shaft g is provided, and a spring-pusher, m^6, is used to start the governor and motor in the right direction when the machine is put into motion. The contact-points 20 and spring contact-points 35 are in pairs, as seen in the detached view, Fig. 4, and two of the points touch before the other two, the object being to lessen the risk of false or defective pulsations, because the intensity of the spark between the contact-points produces oxidation that sometimes prevents the transmission of the pulsation. This spark is between the points that first come into contact; but if the spark fails between these it passes between the second pair of contact-points, and because this second pair is so seldom exposed to the action of the spark, their surfaces remain free from oxidation a very long time.

Stop-pawls have been used to prevent the type-wheel turning back, but they have been employed in connection with spring-pawls or on a separate ratchet-wheel. I employ the pawl e^7 and spring e^8 in connection with the wedge-acting pallets shown, and such pawl is so constructed that it prevents the type-wheel being turned the wrong way by holding the type-wheel in place when the pawls are not in contact with the ratchet-wheel, but are moving from one side to the other.

I claim as my invention—

1. The circuit-breaking wheel o actuated by the wheel h^4, in combination with the pawl 15, ratchet-wheel k, arms m, and range of finger-key bars b', substantially as and for the purposes set forth.

2. The switch-block t, circuit-springs 22 23 24 25 and their connections, substantially as set forth, in combination with the circuit-closer o, line-connections and type-wheel magnets d^1, substantially as set forth.

3. The starting mechanism, consisting of the pawl m^6 and ratchet-wheel m^5, in combination with the governor and magnetic motor, substantially as set forth.

4. The screws e^6 applied to the armature of the printing-magnet, for the purposes set forth.

5. The stop-pawl e^7, in combination with the type-wheel, wedge-acting pallets, and ratchet-wheel, for the purposes set forth.

6. The double pairs of spring circuit-closing points 20 and 35, one pair set to come into contact before the other pair, for the purposes set forth.

Signed by me this 23d day of April, A. D. 1873.

THOS. A. EDISON.

Witnesses:

CHAS. H. SMITH,

GEO. T. PINCKNEY.