

No. 627,242.

Patented June 20, 1899.

H. B. TAYLOR.  
ELECTRIC RELAY.

(Application filed Aug. 27, 1898.)

(No Model.)

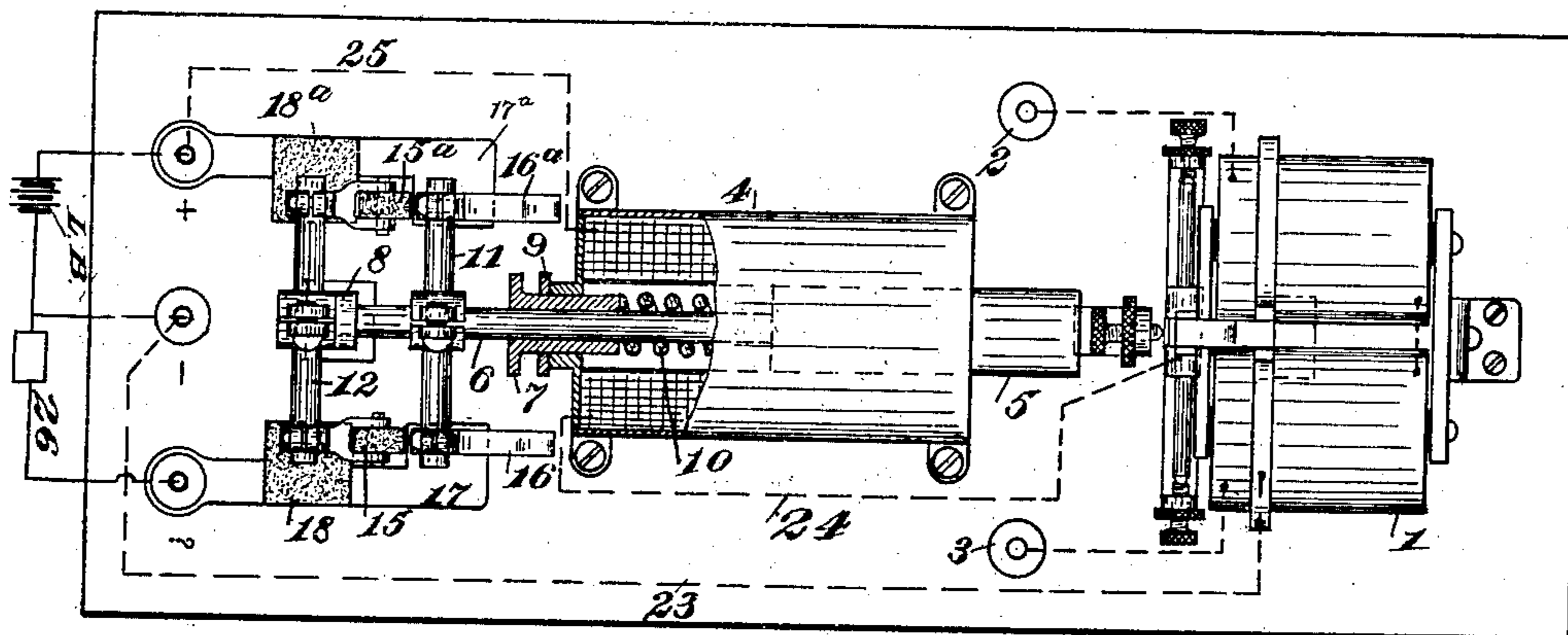


Fig. 1.

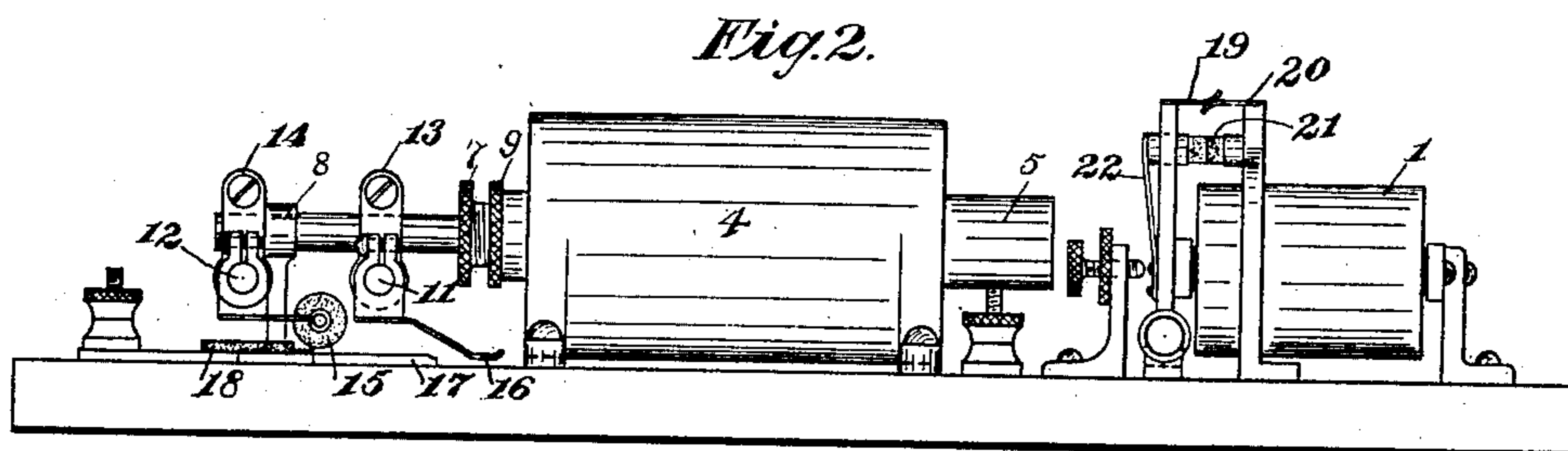


Fig. 2.

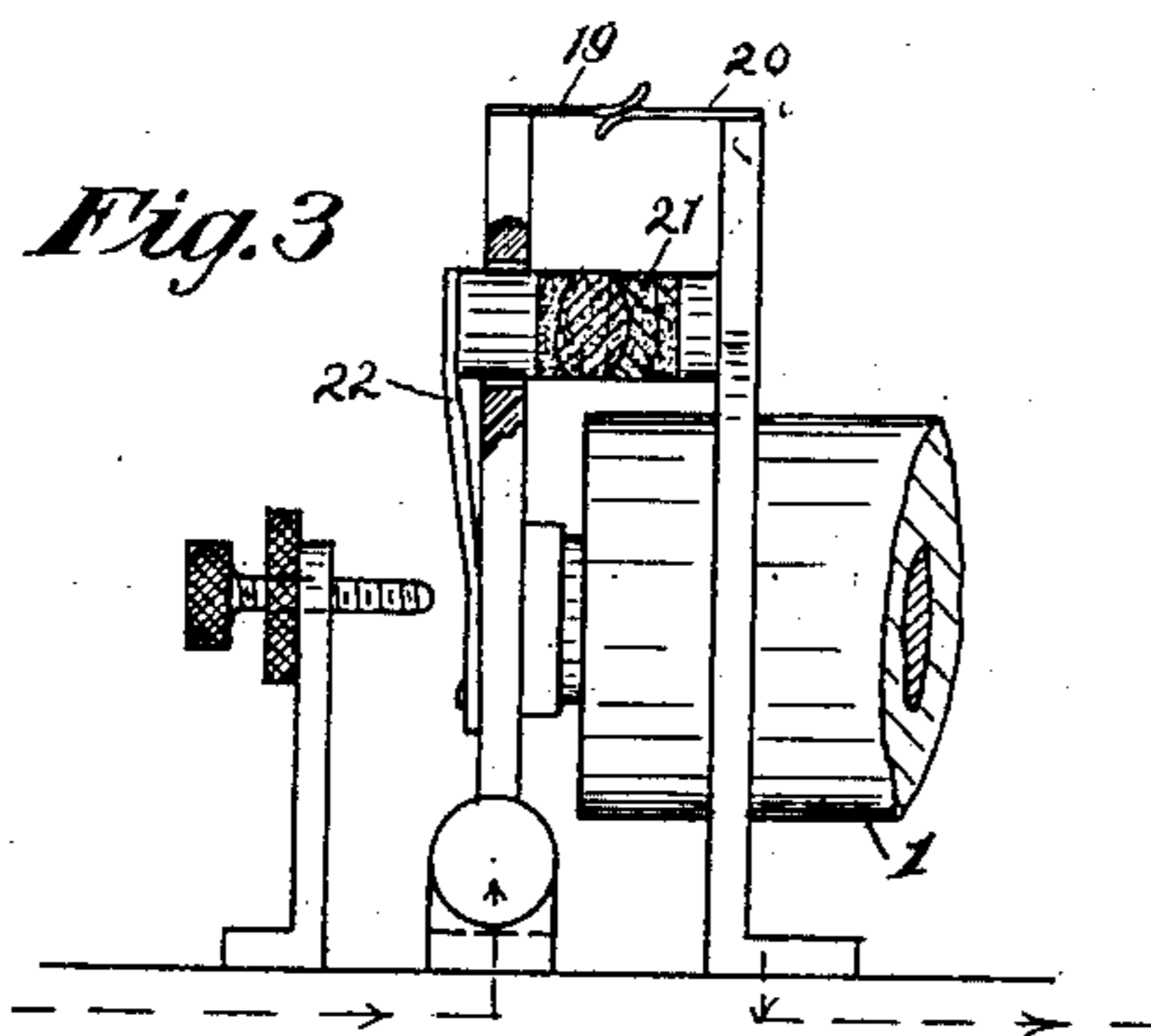


Fig. 3.

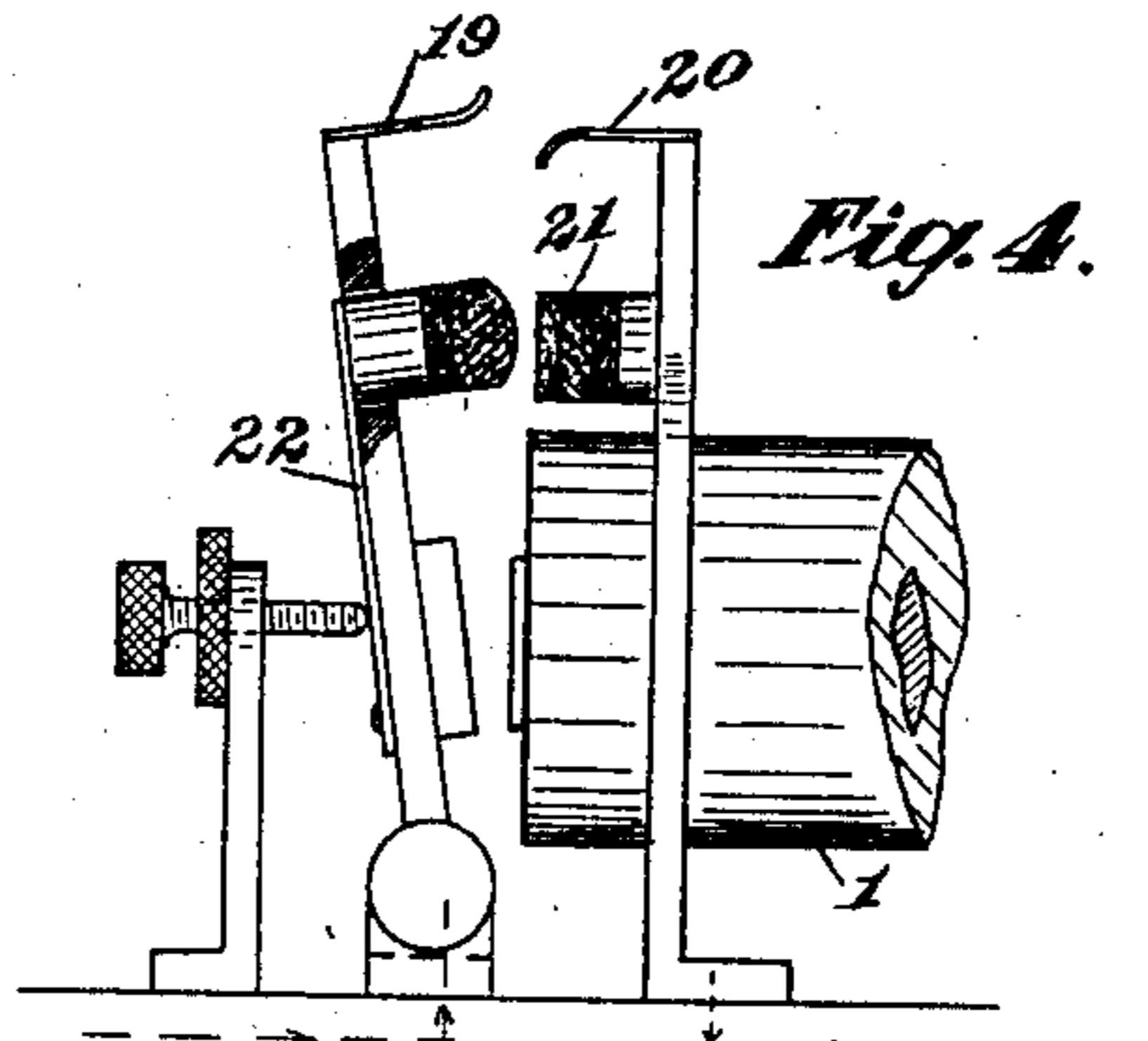


Fig. 4.

WITNESSES:  
Geo. B. Rowley  
C. Loring

INVENTOR  
Herbert B. Taylor  
BY Robert Head  
his ATTORNEY

# UNITED STATES PATENT OFFICE.

HERBERT B. TAYLOR, OF NEWARK, NEW JERSEY, ASSIGNOR TO JAMES WAYLAND, OF SAME PLACE.

## ELECTRIC RELAY.

SPECIFICATION forming part of Letters Patent No. 627,242, dated June 20, 1899.

Application filed August 27, 1898. Serial No. 689,635. (No model.)

*To all whom it may concern:*

Be it known that I, HERBERT B. TAYLOR, a citizen of the United States, and a resident of Newark, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Electric Relays, of which the following is a specification.

This invention relates to electric relays, the object being to enable the relay to open and close a local circuit carrying a heavy current without damage to its working qualities from sparking and to dispense with the use of platinum at the spark-gap.

A further object is to provide for a long break or spark-gap.

In carrying out the invention I employ a solenoid to control the circuit-breaker which operates the local circuit and provide the latter with a plurality of contact-points, part of which are scraping metallic contacts and part rolling carbon contacts, so arranged that the latter open later than the former, and thus absorb the spark. The scraping contacts afford a good and reliable metallic connection and the rolling carbons insure uniformity of wear and absence of pitting. I may and preferably do provide an auxiliary line-relay, in the local circuit of which is inserted the solenoid above described, this relay also being provided with combined carbon and metal contacts of somewhat similar construction—that is to say, the metallic contacts being arranged to scrape on one another and the carbons adapted to avoid uneven wear. The carbons may be arranged to engage like a ball-and-socket joint, one being concave and the other convex on its engaging face.

The several features of novelty will be more particularly hereinafter described and will be definitely indicated in the claims appended to this specification.

In the accompanying drawings, which illustrate the invention, Figure 1 is a top plan, part in section, of an apparatus embodying my improvements. Fig. 2 is a side elevation, and Figs. 3 and 4 are detail views.

The relay is especially designed for use on railway signal systems, in which much trouble is experienced from the sparking due to the comparatively heavy working current used to actuate the signals. It is, however, appli-

cable to other uses, and, in fact, wherever it is desired to cheaply and effectively avoid interference with reliable operation by the sparking due to a rupture of current.

Referring to the drawings, 1 represents a line-relay, the coils of which are fed from two line-terminals 2 3. This relay controls the operating-current for a local relay 4, which I preferably make a solenoid or axial magnet containing an iron core 5, secured to a brass or other non-magnetic rod 6, mounted to slide in guides 7 8. One of these guides is formed in a standard mounted on the base and the other is fixed to the head of the coil. An adjusting-screw and lock-nut 9 may form part of the guide 7, the former engaging to coil-spring 10 surrounding the rod 6 and adapted to regulate the delicacy of action of the core, the guide-nut being capable of longitudinal adjustment in the head of the coil and the lock-nut 9 being adjustable relatively thereto. On the rod 6 are mounted two cross-heads 11 and 12, adjustably secured thereto by split collars 13 and 14, which may be clamped in place by set-screws, as shown, when the parts are properly spaced. The cross-head 14 carries at each side a carbon contact-roller 15, mounted on a flexible spring and fastened to the cross-head by a split collar and set-screw, as shown, to facilitate adjustment to render the contact firmer or lighter. A good quality of carbon for the purpose is a short piece of arc-light pencil. The cross-head 13 carries at each end a contact-spring 16, similarly mounted to the roller just described. On the base of the instrument are fixed metal plates 17 17<sup>a</sup>, with which the springs 16 16<sup>a</sup> coöperate. Plates of carbon 18 18<sup>a</sup>, set on the metal plates, coöperate with the carbon rollers 15 15<sup>a</sup>. The contacts for the line-relay 1, which carry a weaker current, may with advantage as to cheapness have a simpler construction, as shown in detail in Figs. 3 and 4. The metal springs 19 and 20 may be curled at the extremities, so that in meeting they will firmly engage with elastic pressure and rub over one another, thus maintaining the surface of contact always bright and clean. One carbon is fastened to the front or back stop, as shown at 21, and the other to a leaf-spring 22, carried by the armature-lever. The engaging faces

of the carbons are convex and concave, respectively, forming a ball and socket which turn with a grinding motion on one another, which insures uniformity and prevents  
 5 change of conductivity from pitting under the combustion due to the sparks. The arrangement of the circuits will be sufficiently evident upon inspection of Fig. 1. The line-relay throws the solenoid 4 into circuit with  
 10 the local battery L B by way of wires 23 24 25, the work-circuit 26, including the contacts controlled by solenoid 4, being in shunt relation to the solenoid. The latter should therefore have its ohmic resistance properly pro-  
 15 portioned with relation to that of the work-circuit.

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

20 1. A relay having its armature provided with a carbon and a metal contact cooperating respectively with corresponding contacts of carbon and metal, one carbon contact having a concave and the other a con-  
 25 vex engaging face, one of them being yieldingly mounted.

2. A relay having its armature provided with duplicate contacts of metal and carbon, the metal pair being mounted to engage with  
 30 a rubbing motion and the carbon pair being concave and convex respectively on the engaging faces.

3. The combination with a line-relay of a local relay comprising an axial magnet or

solenoid the core of which carries an elasti- 35 cally-mounted carbon roller and a metallic contact adjusted respectively to engage a co-operating contact-surface so that the rupture occurs last on the carbon roller.

4. The combination with a line-relay, of a 40 local relay comprising an axial magnet or solenoid having a spring-controlled core, adjustable cross-heads 11, 12, carbon contact-roller 15 and metallic contact 16 carried by said cross-heads, and a contact-surface coop- 45 erating with said contacts.

5. The combination with a line-relay, of a 50 local relay comprising an axial magnet or solenoid having a core moving in fixed guides and provided with longitudinally-adjustable 50 cross-heads 11, 12, carrying elastically-mounted contacts of carbon and metal adjusted to produce a final rupture of the circuit on the carbon contact.

6. The combination with a line-relay, of a 55 local relay comprising an axial magnet or solenoid having a spring-actuated core moving in fixed guides, a nut 7 for adjusting the tension of the spring, longitudinally-adjust- 60 able contact-rollers 15, 15<sup>a</sup>, companion metallic contacts 16, 16<sup>a</sup> and contact-surfaces engaging said contacts.

In witness whereof I have hereunto signed my name this 25th day of August, A. D. 1898.

HERBERT B. TAYLOR.

Witnesses:

ROBT. H. READ,  
 GEORGE B. ROWLEY.