

No. 791,095.

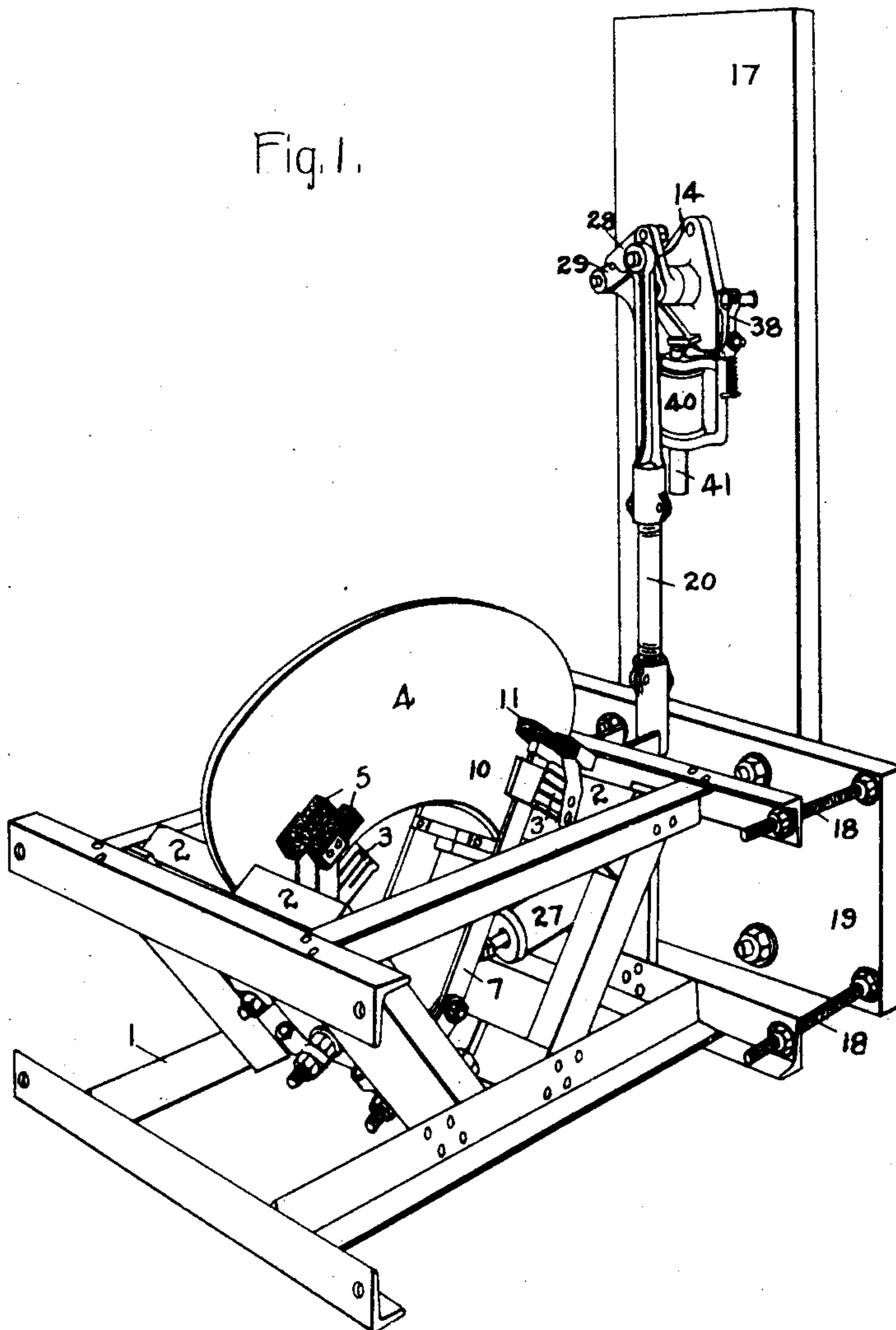
PATENTED MAY 30, 1905.

E. M. HEWLETT.
CARBON BREAK FIELD SWITCH.

APPLICATION FILED JULY 29, 1903.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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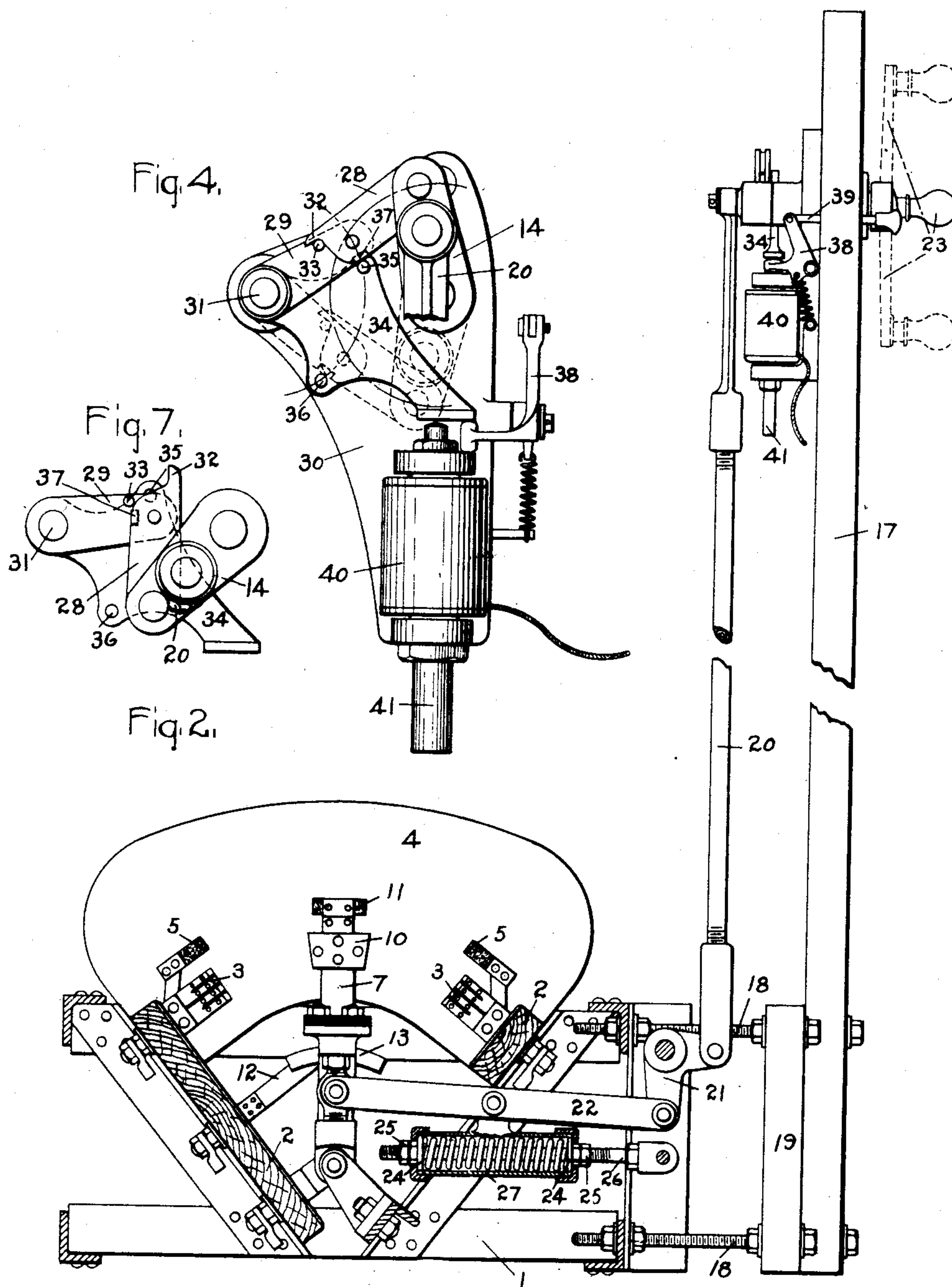
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 3.

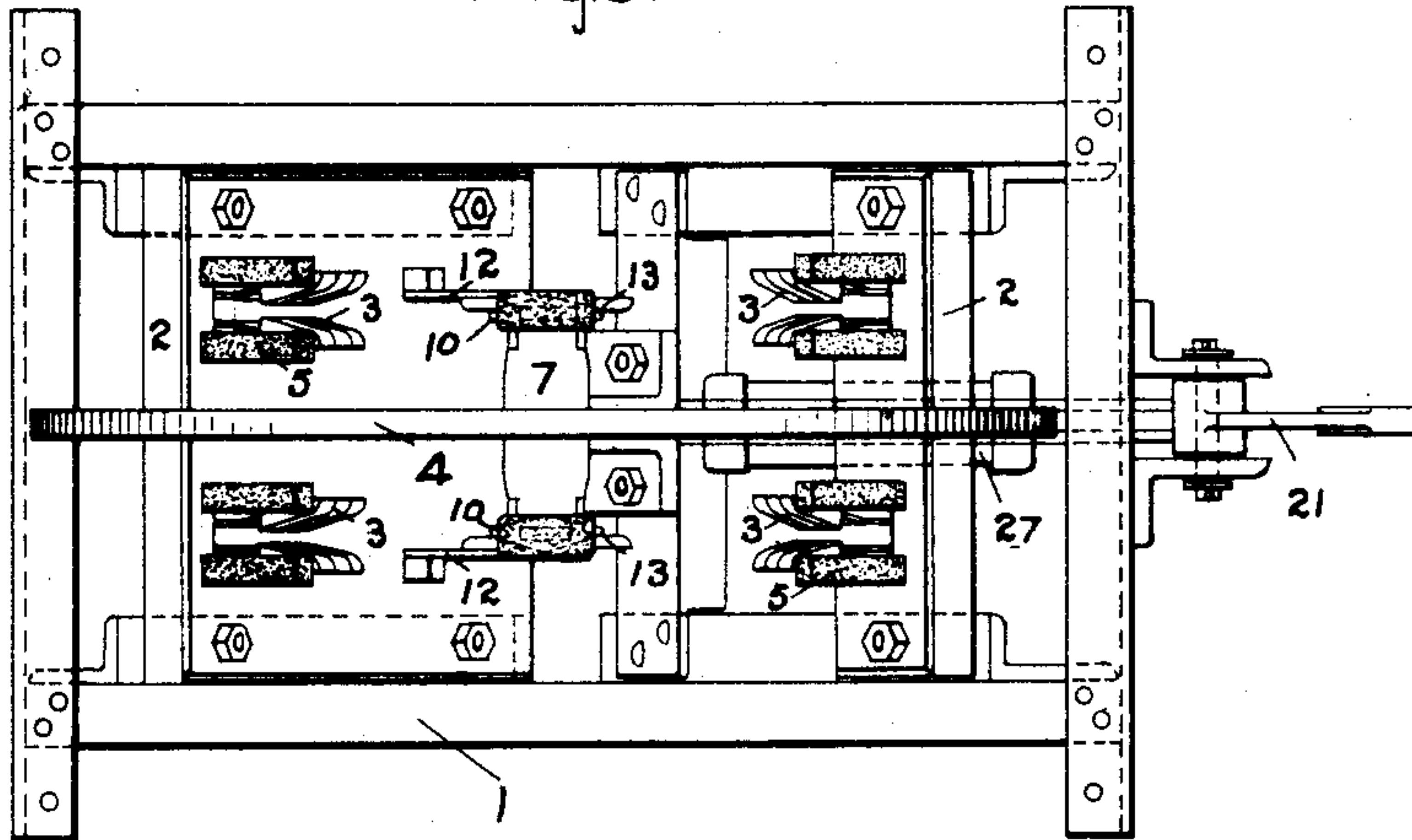


Fig. 5.

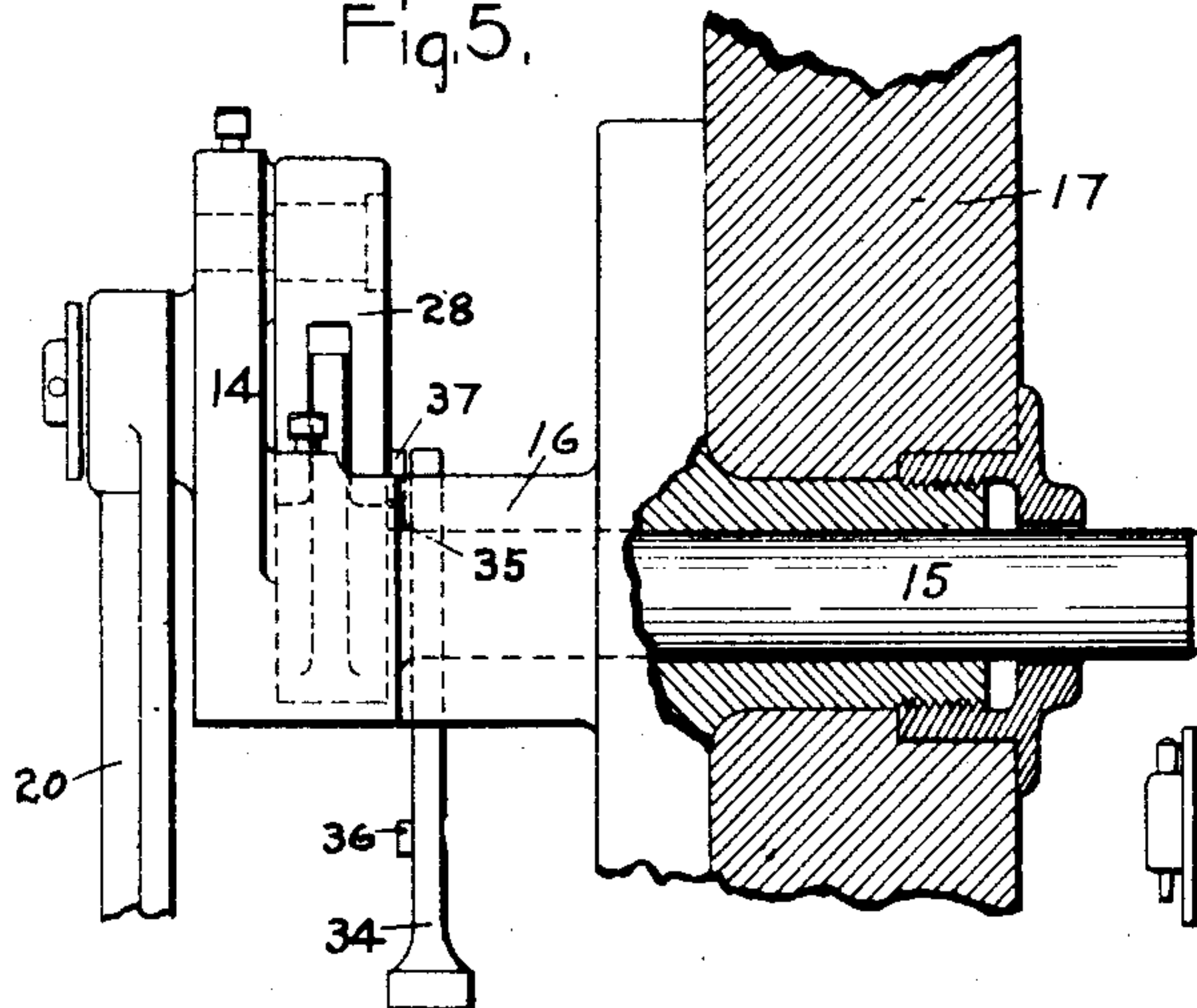


Fig. 6.

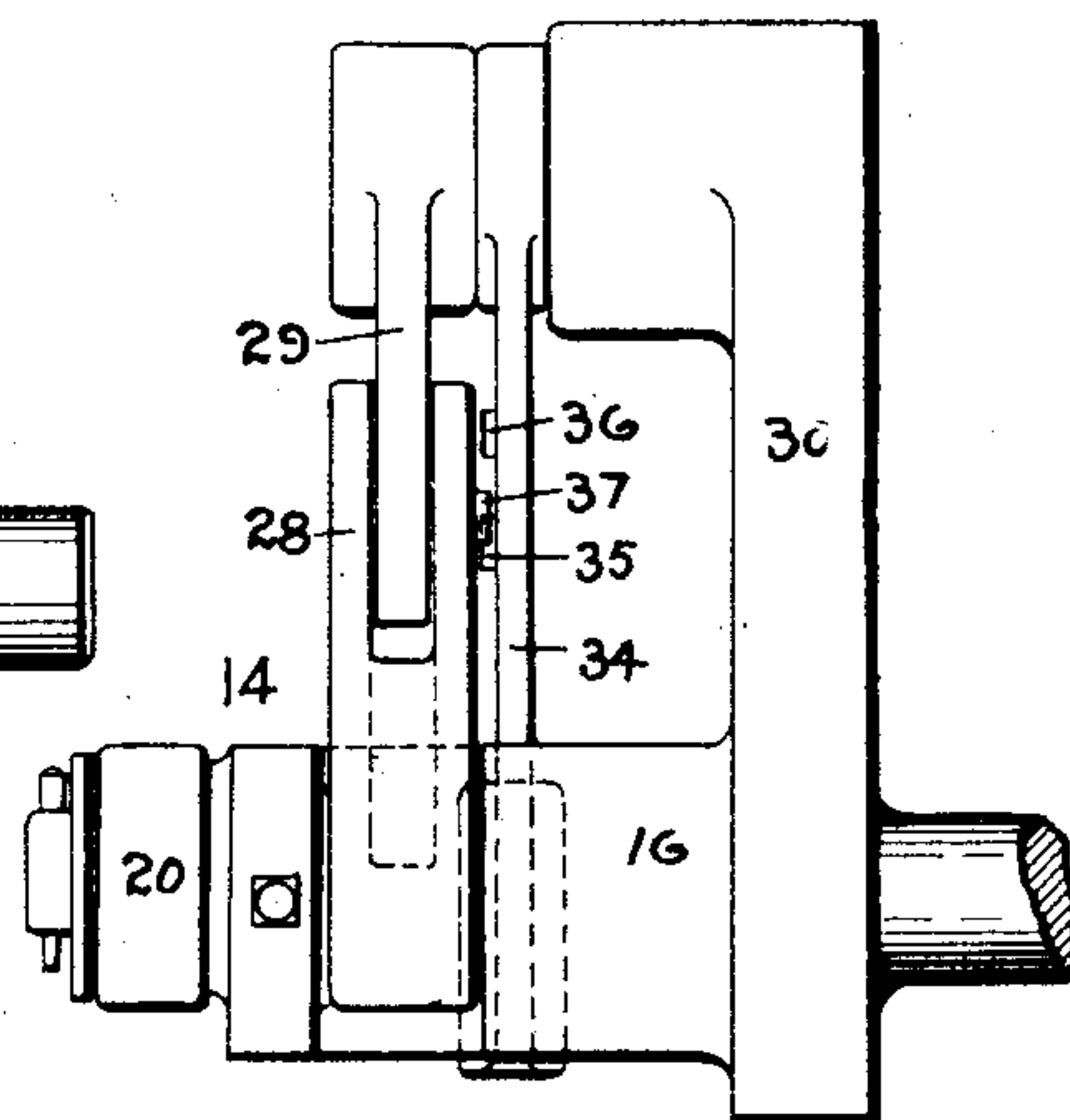
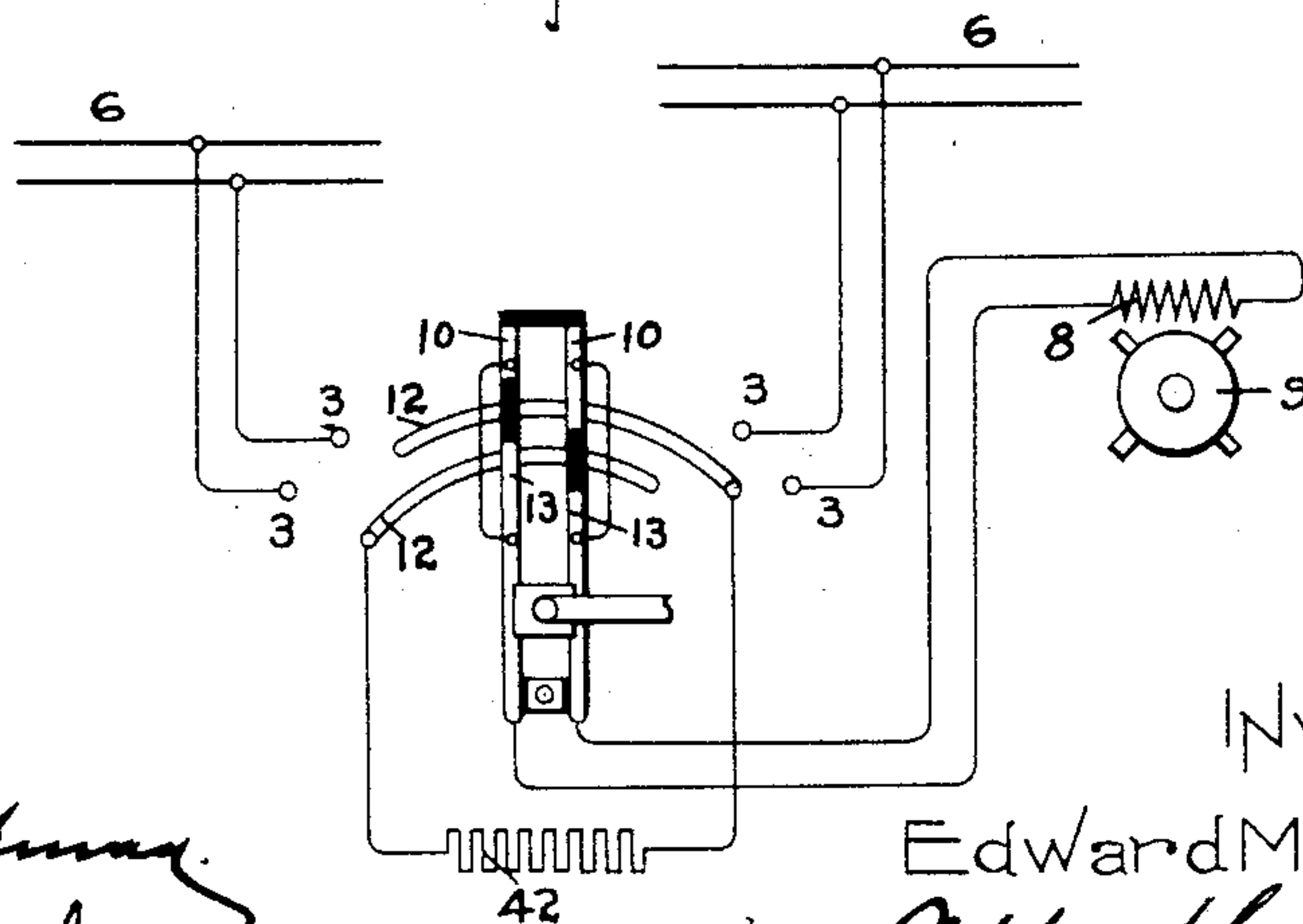


Fig. 8.



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UNITED STATES PATENT OFFICE.

EDWARD M. HEWLETT, OF SCHENECTADY, NEW YORK, ASSIGNOR TO
GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

CARBON-BREAK FIELD-SWITCH.

SPECIFICATION forming part of Letters Patent No. 791,095, dated May 30, 1905.

Application filed July 29, 1903. Serial No. 167,401.

To all whom it may concern:

Be it known that I, EDWARD M. HEWLETT, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Carbon-Break Field-Switches, of which the following is a specification.

This invention relates to switches for electric circuits. It is capable of a variety of applications, but has been especially designed for connecting the field-circuit of an alternating-current generator to the exciter bus-bars and for disconnecting it therefrom and simultaneously short-circuiting the field-coil through a resistance for the purpose of taking care of the induced current or "kick" in such circuit.

The switch is preferably of the double-throw type for connecting the field-coils to either one of two sets of bus-bars. It can be operated by hand at any time, either directly or by an electromagnet in circuit with a distant push-button.

The novelty resides in the several details of construction and arrangement, as hereinafter set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of the switch closed. Fig. 2 is a side elevation, partly in section. Fig. 3 is a top plan view. Fig. 4 is a rear elevation of the tripping mechanism on a larger scale. Fig. 5 is a side elevation of the same. Fig. 6 is a top plan view of the same. Fig. 7 is a detail, and Fig. 8 is a diagram of the circuits.

The switch is mounted on a suitable frame 1, preferably made of angle-iron, as shown, and forming a V-shaped support for plates 2 of insulation, on which are mounted the two pairs of contact-clips 3, separated by an upright barrier 4 of insulation which bridges the space between the plates 2. On each clip are supported two parallel blocks of carbon 5 to serve as a break-terminal. Each pair of clips is connected with a pair of bus-bars 6. The switch-lever 7 is pivoted near the apex of the V-shaped support and is duplex, being composed of two parallel arms insulated from each other and located one on each side of the

bridge 4. Each arm is in electrical connection with one terminal of the field-coil 8 of the generator, the armature 9 being connected with the supply-circuit. (Not shown.) On each arm of the switch-lever is a contact-blade 10, adapted to enter one of the clips in each pair at each end of its throw. Adjacent to each blade is a carbon break-block 11 to enter between the break-terminals 5. The resistance-shunt is connected with auxiliary contacts 12, one on each side of the frame, and on each arm of the switch-lever is a contact-segment 13, adapted to close on the contacts 12 when the lever is in an upright position midway between the clips 3, but to separate from said contacts 12 when the lever is closed upon either pair of clips. The arrangement is such that the shunt-circuit will be closed just before the blade 10 leaves the clips 3 in order that there may be no break in the field-circuit.

The switch-lever is operated by a crank 14 on a shaft 15, journaled in a bearing 16, fastened to a suitable support, such as an upright panel 17 of a switchboard, rigidly attached to the frame 1, as by spacing-bolts 18, extending from a plate 19, attached to the panel 17. The crank is connected with the switch-lever, preferably by a connecting-rod 20, an elbow-lever 21, and a link 22. The crank-shaft extends through the panel 17 and is provided with a handle 23. When the crank is turned nearly to its highest point, it causes the switch-lever to close on the right-hand set of clips in Fig. 2. To close the lever on the other set of clips, the crank is turned nearly to its lowest position. In moving from a central "off" position into contact with either set of clips the lever compresses a spring which operates to throw the switch open when the crank is released. The spring is preferably arranged as shown in Fig. 2, being held between suitable abutments, such as loose follower-plates 24, which abut against nuts 25 on a rod 26, attached to the frame 1. A cylinder 27 incloses the spring and followers and has at each end a flange engaging with the adjacent follower. The cylinder is attached to the link 22, so that a movement of the link in either direction will carry with it the cylinder

and one of the followers, compressing the spring against the other follower. By this construction a single spring serves to open the switch from either end of its throw. Moreover, the lever is always held exactly in its midway position when open, and there is no liability of its departing therefrom in case the spring breaks, whereas such a departure would probably happen if one of two separate opposed springs should break.

The means for locking the switch comprises a toggle composed of two links 28 29, one pivoted to the crank and the other to a bracket 30, extending from the bearing 16, the pivot pin 31 on said bracket being practically in the horizontal plane of the shaft 15. When the crank reaches either end of its throw the toggle straightens out, and then slightly passing the dead-center it locks itself, preferably by a lug 32 on one link engaging with a stop 33 on the other.

Suitable means are provided for tripping the toggle and allowing the spring to open the switch, preferably a knock-off arm 34, pivoted on the pin 31 and having two fingers 35 36 projecting laterally therefrom. On the link 28 is a laterally-projecting lug 37, which when the toggle is locked stands just above the finger 35 or 36. An upward swing of the arm 34 causes the finger to engage the lug, lift the links, and break the toggle, thus releasing the crank and permitting the spring to throw open the switch. When the toggle breaks, the link 28 is turned upward, thus carrying the lug 37 out of the path of the finger 35 and permitting the joint of the toggle to pass said finger both in coming down and going up. (See Fig. 7.) The straightening of the toggle, however, brings the lug back into line with the fingers.

Both hand and power devices are provided for actuating the knock-off arm. The former is preferably a bell-crank lever 38, fulcrumed on the bracket 30 and having one laterally-bent arm terminating under the end of the knock-off lever, while its other arm is connected with a pull-rod 39. The power device is preferably a solenoid 40, suitably supported on the bracket 30 with its core 41 standing under the end of the knock-off arm. The solenoid is connected in circuit with a distant push-button and when energized will lift the core and cause it to actuate the knock-off lever.

Fig. 8 shows the switch and its circuit connections in diagram, from which it will be seen that in the off position the field-coil 8 is in series with the resistance 42, while if the switch-arm is thrown to the right or to the left it cuts out the resistance and connects the field-coil across one or the other pair of bus-bars which are connected with exciter-machines. (Not shown.)

In accordance with the patent statutes I have described the principle of operation of my invention together with the apparatus

which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a switch a V-shaped support, pairs of contact-clips mounted thereon, secondary contacts connected to and extending above said clips, and a duplex switch-lever provided with cooperating primary and secondary contacts pivoted near the apex of said support.

2. In a switch, the combination with a V-shaped support carrying plates of insulation, pairs of contact-clips mounted thereon, secondary contacts connected to and extending above said clips, a barrier of insulation between said clips bridging said plates, and a switch-lever comprising two arms, one on each side of said bridge, each arm being provided with cooperating primary and secondary contacts.

3. In a switch, the combination with a V-shaped support, of bus-bar clips thereon, resistance-terminal contacts thereon, a switch-lever carrying contact-blades for the clips, and contact-segments for the resistance-contacts.

4. The combination with a double-throw switch-lever, of a helical compression-spring, stationary abutments for the ends of said spring, and connections between the lever and the ends of said spring, whereby the movement of the lever either way from a midway position will compress said spring against the opposite abutment.

5. The combination with a switch-lever, of a rod, abutments thereon, a spring held between said abutments, and a compression member engaging with the ends of said spring.

6. The combination with a double-throw switch-lever, of a rod, abutments thereon, a spring held between said abutments, and a cylinder moving with the lever and engaging with the ends of said spring.

7. The combination with a double-throw switch, a crank connected therewith, a toggle for locking said crank in its two opposite positions, and a knock-off device for breaking said toggle in each of its locking positions.

8. The combination with a switch-lever, of a crank for operating the same having two operative positions, a toggle for locking the crank in each of said positions, a laterally-projecting lug on one link of the toggle, and a knock-off device for engaging said lug in each of its locking positions.

9. The combination with a switch-lever, of a crank for operating the same, a locking-toggle for the crank having one of its links directly connected to the crank, a lug on the toggle-link pivoted to the crank, and a knock-off arm having a finger, the parts being so arranged that the lug will be in the path of said

finger when the toggle is locked, but will be carried out of said path when the toggle is broken.

10. The combination with a switch-lever, of
5 a crank for operating the same, a toggle for locking the crank in two opposite positions, a knock-off arm having two fingers, and a lug on the toggle adapted to be engaged by one

of said fingers in each of its locking positions.

In witness whereof I have hereunto set my right hand this 27th day of July, 1903.

EDWARD M. HEWLETT.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.