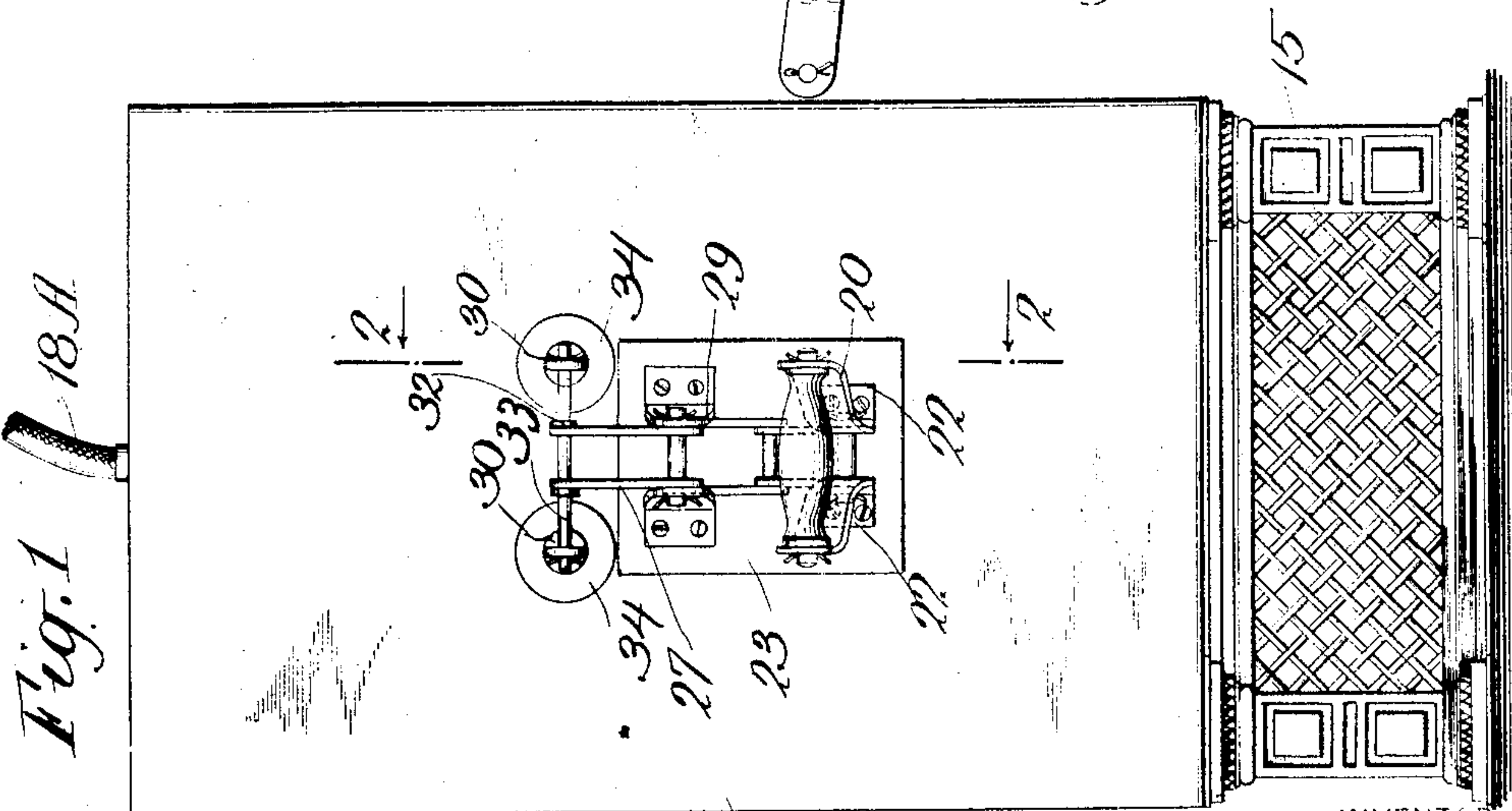
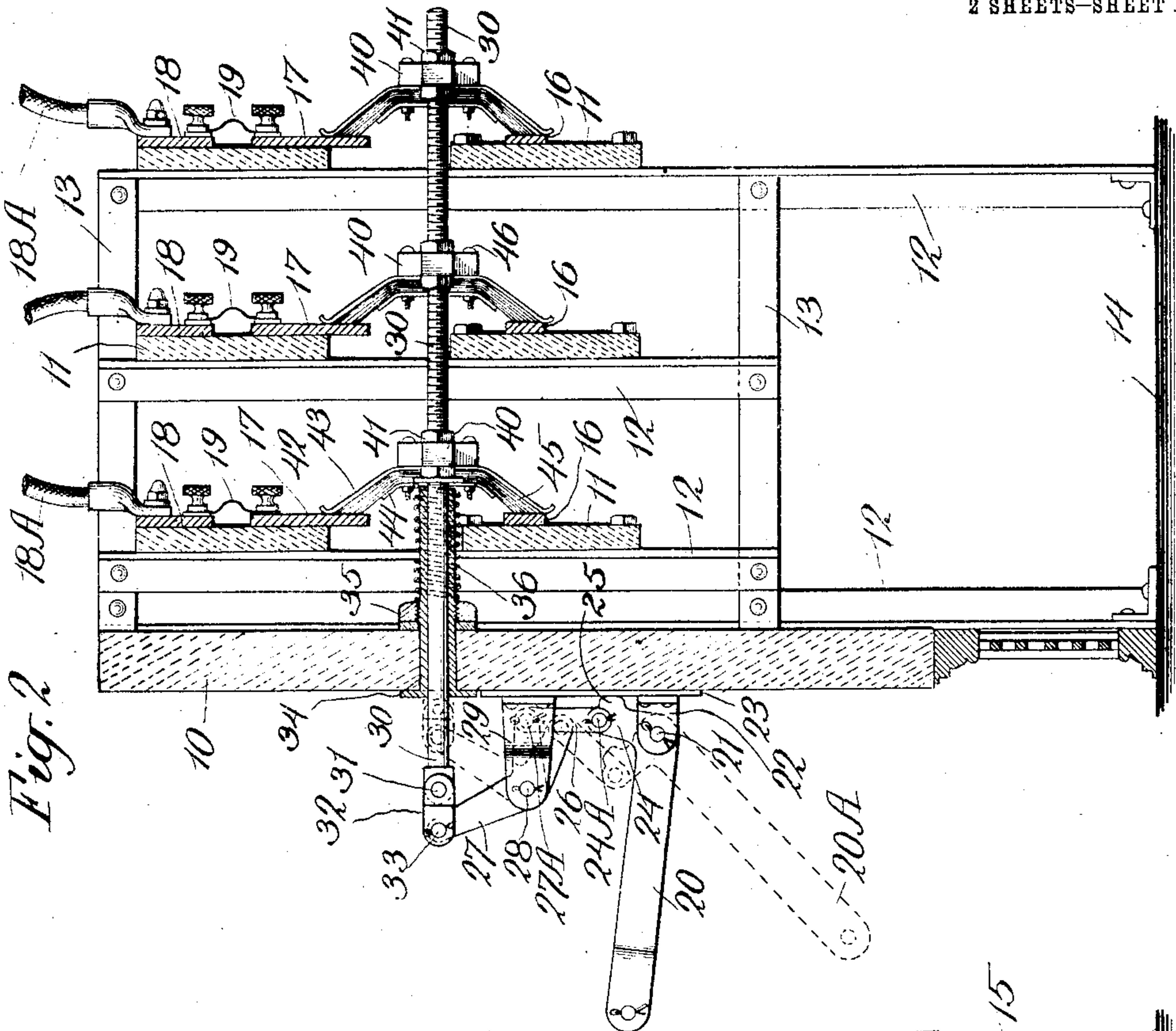


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ELECTRIC SWITCH.  
APPLICATION FILED MAR. 1, 1907.

998,786.

Patented July 25, 1911.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4,

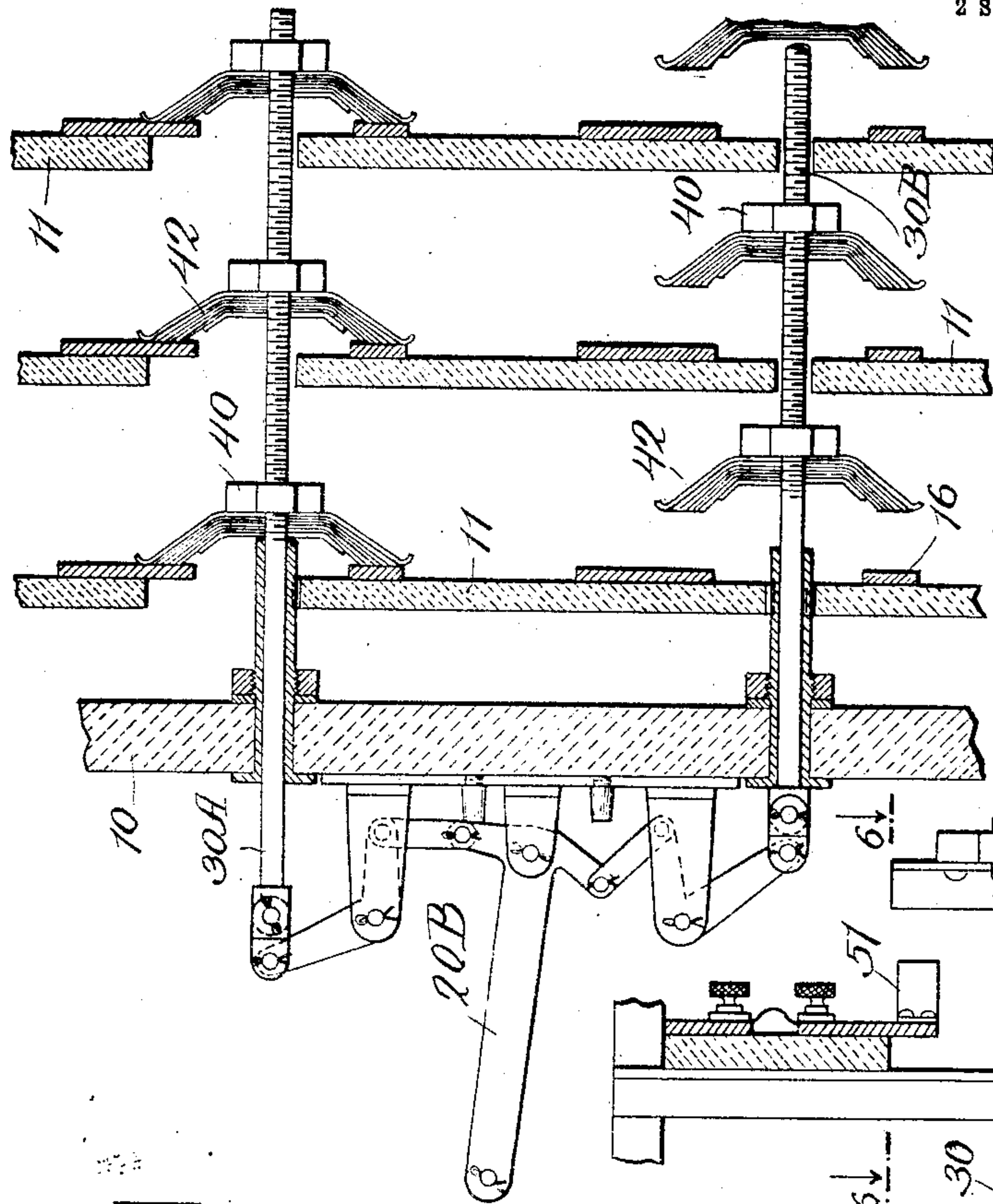


Fig. 6,

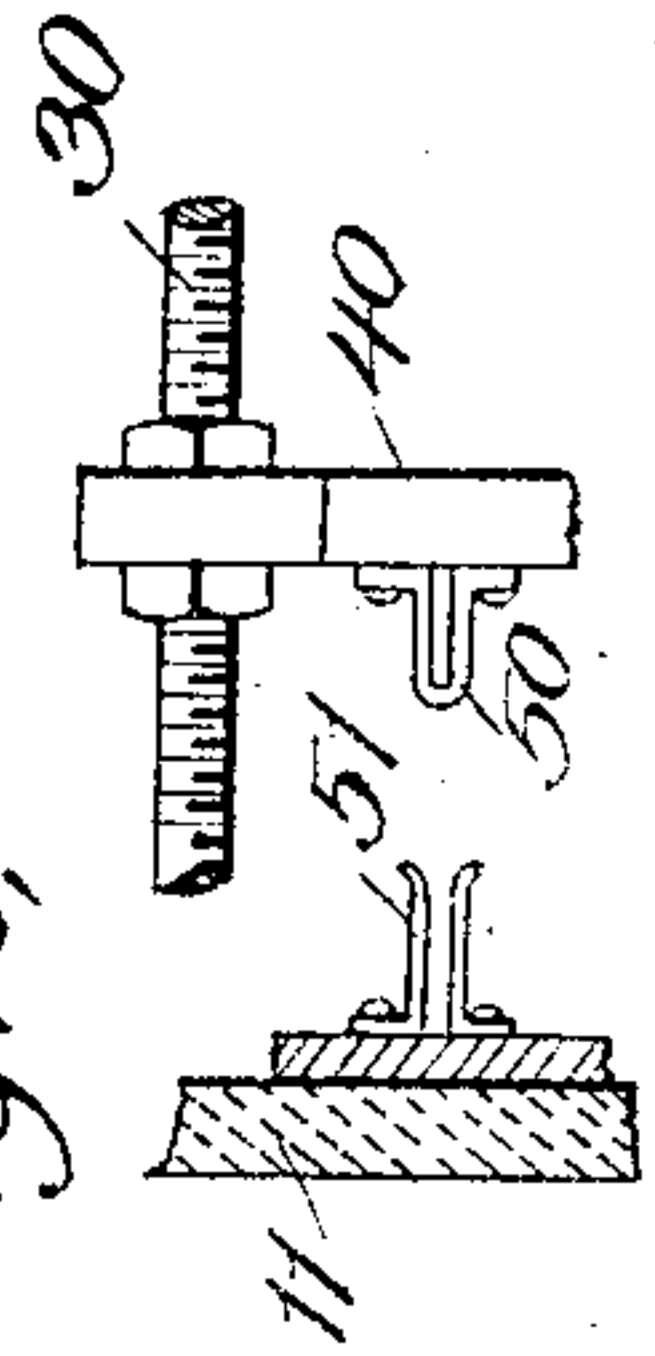


Fig. 5,

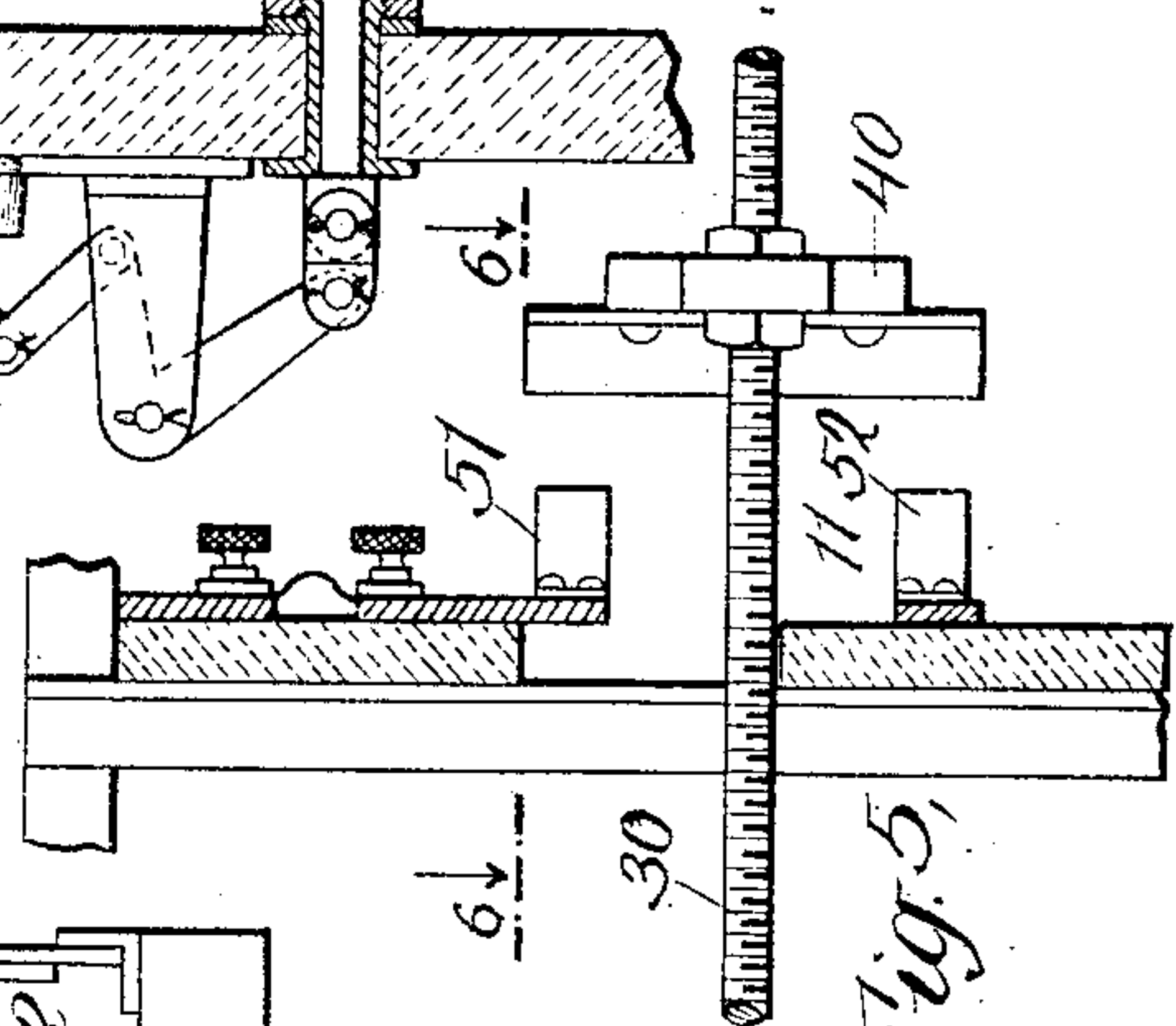
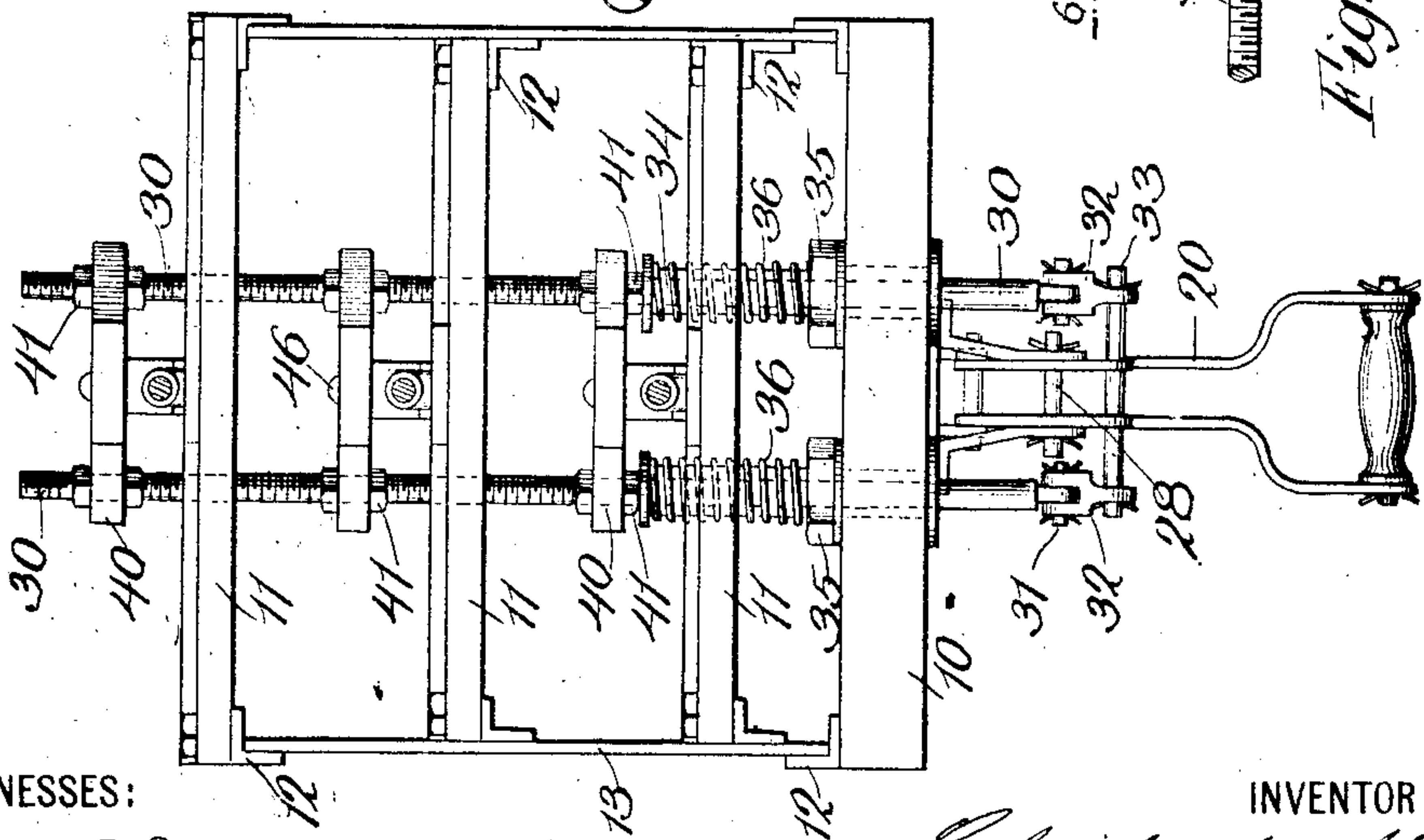


Fig. 3



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# UNITED STATES PATENT OFFICE.

CHARLES LOEFFLER, OF UTICA, NEW YORK.

ELECTRIC SWITCH.

998,786.

Specification of Letters Patent.

Patented July 25, 1911.

Application filed March 1, 1907. Serial No. 360,064.

*To all whom it may concern:*

Be it known that I, CHARLES LOEFFLER, a citizen of the United States, and a resident of the city of Utica, in the county of Oneida and State of New York, United States of America, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates to new and useful improvements in electric switches and consists in the novel construction and arrangement of parts herein shown and described, the novel features of which are pointed out in claims.

Referring to the drawings, Figure 1 is a front elevation of a switch made according to my invention. Fig. 2 is a sectional side elevation of the switch shown in Fig. 1, the section being taken through the line 2—2 of Fig. 1. Fig. 3 is a top plan view of the switch shown in Figs. 1 and 2. Fig. 4 is a sectional side elevation of a portion of a double-throw switch made according to my invention. Fig. 5 is a sectional side elevation of a portion of one of my switches in this case made according to a modified form of construction. Fig. 6 is a sectional plan view of some of the parts shown in Fig. 5, the section being taken through line 6—6 of Fig. 5.

Like characters of reference designate corresponding parts in all of the figures.

10 designates the front panel of a switch-board which is usually constructed of marble, slate or other suitable non-conducting material.

11, 11 designate supporting plates for the various stationary electric conductors and contacts which will be pointed out hereinafter. These plates are also constructed of non-conducting material preferably of slate. The front panel and these supporting plates may be held together by means of a framework which may be built up, as shown, of a plurality of angle-irons 12, 12 to which the panels and plates are attached, and a plurality of horizontal bars 13, 13 securely attached to the vertical angle-irons by means of bolts or rivets. The lower ends of the vertical irons 12 may be secured to a floor or foundation 14 if desired and the space between the lower edge of the front panel and this floor filled with ornamental grille-work 15.

The parts thus far described form no

part of my invention but simply serve as a supporting frame for the various parts of my improved switch and operating mechanism which I will now proceed to describe.

20 designates a manually operated lever which is pivoted at 21 in a bracket 22, which bracket is rigidly attached to a plate 23 upon the front panel 10. This lever is constructed to form a short arm 24, the back portion of which may be provided with or shaped to form a stop-piece 25 which limits the upward movement of the lever 20 by striking against the plate 23. This arm 24 of lever 20 is connected by a link 26 with a bell-crank 27. One end of this link 26 is pivoted at 24<sup>A</sup> in the short arm 24 of the operating lever and the other end of the link is pivoted at 27<sup>A</sup> in one end of the bell-crank 27. The bell-crank itself is pivoted at 28 in a bracket 29 upon the plate 23.

30, 30 designate a pair of horizontal reciprocating-rods which are connected with the bell-crank 27 by means of a connecting rod 33 and links 32 which are pivoted to the ends of the rods 30 by means of pins 31.

While I have described the operating lever, the bell-crank and the connecting-links as single pieces these are, for the sake of cheapness of manufacture, preferably constructed of sheet metal stamped into the required forms made in duplicate and connected together in parallel according to the construction illustrated clearly in Figs. 1 and 3.

34, 34 designate metallic bushing which are arranged to pass through the front panel 10 and to be securely locked thereto by means of nuts 35, 35. These bushings serve the purpose of supporting and guiding the reciprocating-rods 30, 30 and their connected parts and form the only support for these reciprocating rods. In constructing this device I prefer to thread all of that portion of the reciprocating-rods 30 except that which passes through the bushings 34 and the end to which the link 32 is connected.

40, 40 designate yokes of insulating material such, for example, as hard rubber or fiber, which are placed upon the reciprocating rods 30, 30 and which are securely held thereto in desired positions by means of nuts 41, 41.

42, 42 designate contact brushes which may be built up as shown of an outer piece 43 of some thickness which is bent into the desired form and an inner piece 44 of similar



construction. Between these are a plurality of thin flat conductors 45 which are held in position between the parts 43 and 44. These contact brushes are rigidly held upon the insulating yokes 40 by means of bolts or nuts 46.

16, 16 designate a plurality of bus-bars or main line conductors which are rigidly attached to the supporting plates 11, 11.

17, 17 designate stationary contacts which are also attached to the supporting plates 11, 11. Above these contact plates 17 are terminal plates 18 which are connected to the stationary contacts 17 by means of fuses 19.

18<sup>A</sup>, 18<sup>A</sup> designate conductors which may be connected with the stationary contacts 17 through the terminal plates 18 and the fuses 19.

In Figs. 1, 2 and 3 the switch is shown in its closed position. It may be seen in these figures that the contact brushes 42 have been pushed up against the bus-bars 16 and the stationary contacts 17 in such a manner as to electrically connect each one of these bus-bars with one of the stationary contacts 17. These contact brushes may be adjusted by means of the nuts 41 upon the reciprocating-rods 30 to cause the brushes to be brought against the stationary bus-bars and contacts under considerable pressure in order to insure perfect contact between the brushes and the stationary parts. The peculiar arrangement of parts which are shown in front of the panel 10 will insure these parts being held securely in position. These cause the short arm 24 of the operating lever 20 and the link 26 which connects this short arm with the link 27 to form a toggle which is arranged to cause the connecting pivot 24<sup>A</sup> to be moved past the center line between the pivot 21 and the pivot 27<sup>A</sup>. The stop 25 coming in contact with the plate 23 will arrest the movement of these parts when they have reached the proper position. To open the switch it is necessary to depress the operating lever 20 until it reaches the position designated by dotted lines at 20<sup>A</sup> in Fig. 2. The bell-crank lever will thereby be moved until it assumes the position designated by dotted lines in which case it will have thrust the reciprocating-rods 30, 30 inward and caused the brushes 42 to be moved away from the stationary contacts with which they are arranged to coact.

Springs 36, 36 may be provided between the locking nuts 35, 35 and the nuts 41, 41 which hold the first insulating yoke 40 onto the reciprocating-rods 30, 30. When these springs are added they assist in the operation of opening the switch and add materially to its action.

It may be seen that by a peculiar arrangement of parts above described the action of opening the switch by depressing the operat-

ing lever 20 may be a quick one so far as the movement of the brushes 42 is concerned, and this quick-break effect will be materially increased by use of the springs 36, 36.

In Fig. 4 I have shown that my invention may be applied for the operation of two switches from a common operating handle 20<sup>B</sup>. In this case a reciprocating-rod 30<sup>A</sup> is connected to the operating handle 20<sup>B</sup> in a manner already described and a similar reciprocating-rod 30<sup>B</sup> is also connected to the operating handle 20<sup>B</sup> by a similar mechanism. In this case, however, one of these reciprocating-rods and its connected parts are arranged to be moved into their closed position when the other reciprocating-rod and its connected parts are moved into their open position.

In the modification illustrated in Figs. 5 and 6 I have shown a knife-switch mounted upon one of the insulating yokes 40 and arranged to be moved between and into contact with two pairs of metallic clips 51 and 52 whenever the reciprocating-rod 30 is moved forward toward the front panel 10 and to be moved back out of contact with these metallic clips whenever the reciprocating-rod 30 is moved in the opposite direction.

A switch made according to my invention may be constructed at a great saving both of time and material. The operating mechanism is simple in construction and efficient in operation. Nearly all of the moving parts are placed upon the face of the front panel 10 where they are easily accessible. It may be seen that the current for feeders is taken directly from the bus-bars thus avoiding further connections and leads to the front of the board. A switch made according to this construction has therefore but little resistance. As the operating mechanism is entirely upon the front face of the board this form of construction is particularly applicable for use in conjunction with circuit breakers having an automatic release, or arranged to be released from some distance from the board.

The manipulation of a switch made according to my invention is safe, as none of the parts which are upon the face of the front panel 10 is connected with the electrical circuits. The fact that all live wires and connections are behind the front panel 10 makes it even possible to construct this panel of wood or of iron, or of any other desired material, and it is not necessary that such material should be a non-conductor of electricity.

I have illustrated several forms of my invention to show that it is not confined to any specific construction.

The brushes 42 and 50 are of well known design and construction. Of course, other forms of brushes may be used if desired.



What I claim is—

1. In an electric switch, a bus-bar and a stationary contact, a frame supporting said bus-bar and contact, means for insulating the bus-bar and stationary contact from said frame, a panel affixed to the frame in front of the bus-bar and stationary contact, a pair of reciprocatory rods passing through the panel and between the bus-bar and said contact and supported only by the panel, a yoke of insulating material connecting said rods, means for adjusting the position of said yoke on the rods, a movable contact mounted upon the forward face of said yoke and arranged to be moved thereby directly against the bus-bar and the stationary contact, a toggle actuating mechanism mounted upon the front of the panel, and a mechanical connection between said toggle mechanism and the reciprocatory rods.

2. In an electric switch, a plurality of bus-bars, a plurality of stationary contacts, a frame supporting said bus-bars and contacts, means for insulating the bus-bars and the stationary contacts from said frame, a panel affixed to the frame in front of the bus-bars and the stationary contacts, a pair

of independent metallic bushings passing through said panel and affixed thereto, a pair of horizontal reciprocatory rods passing through the panel and between the bus-bars and the stationary contacts, said rods being guided and supported only by said bushings in the panel, a plurality of yokes of insulating material connecting said rods, means for adjusting the positions of said yokes upon the rods, a movable contact mounted upon the forward face of each of said yokes, each of said movable contacts being arranged to be moved directly against one of said bus-bars and one of the stationary contacts, a hand lever, and intermediate toggle mechanism connecting the hand lever and the reciprocatory rods, said hand lever and toggle mechanism being mounted upon the front of the panel and supported thereby.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES LOEFFLER.

Witnesses:

W. C. CAHILL,  
F. F. MURPHY.