No. 649,554.

Patented May 15, 1900.

F. SCHWEDTMANN.

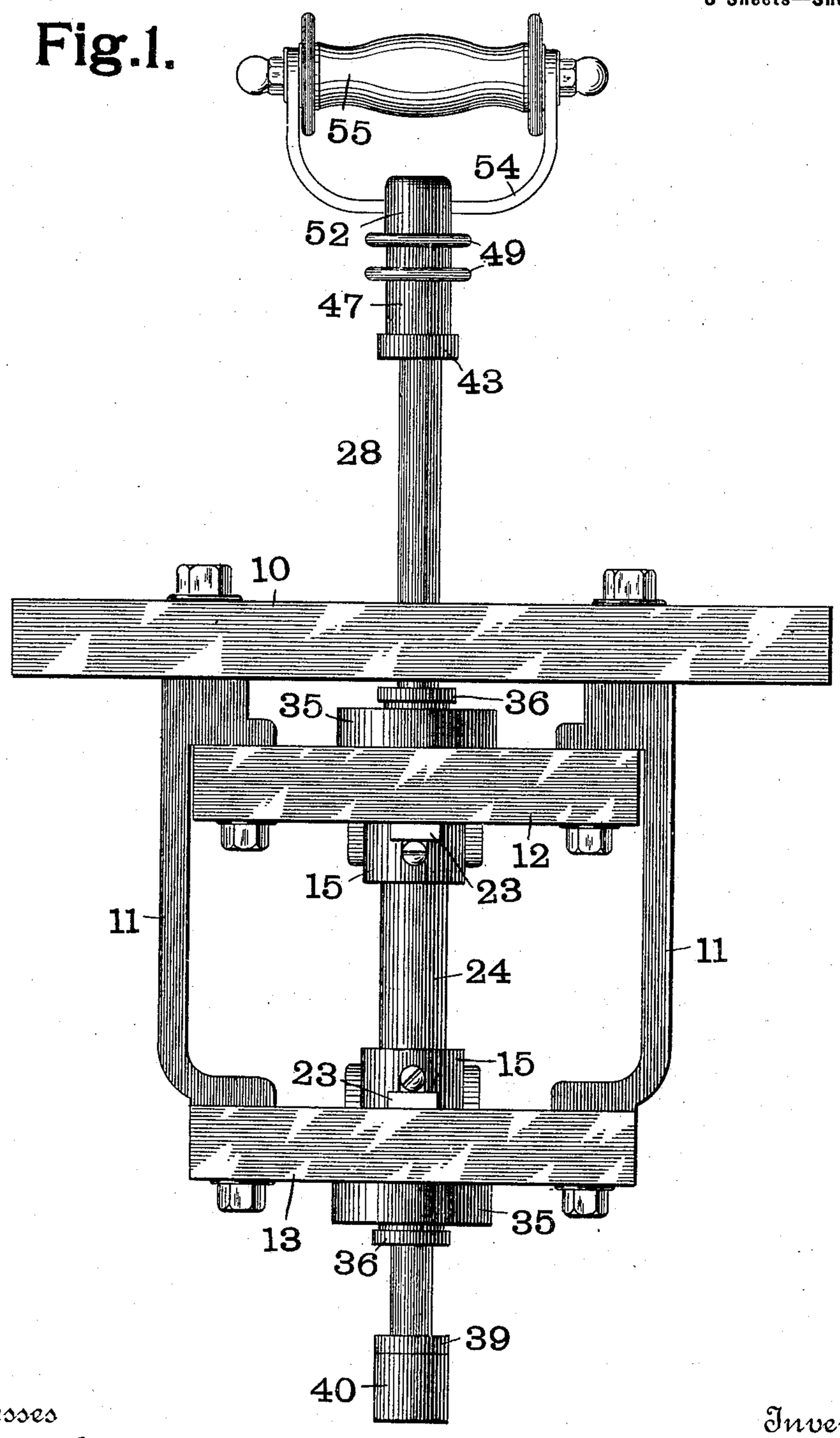
ELECTRIC SWITCH.

(Application filed Apr. 8, 1899.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



Witnesses

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Fig.2.

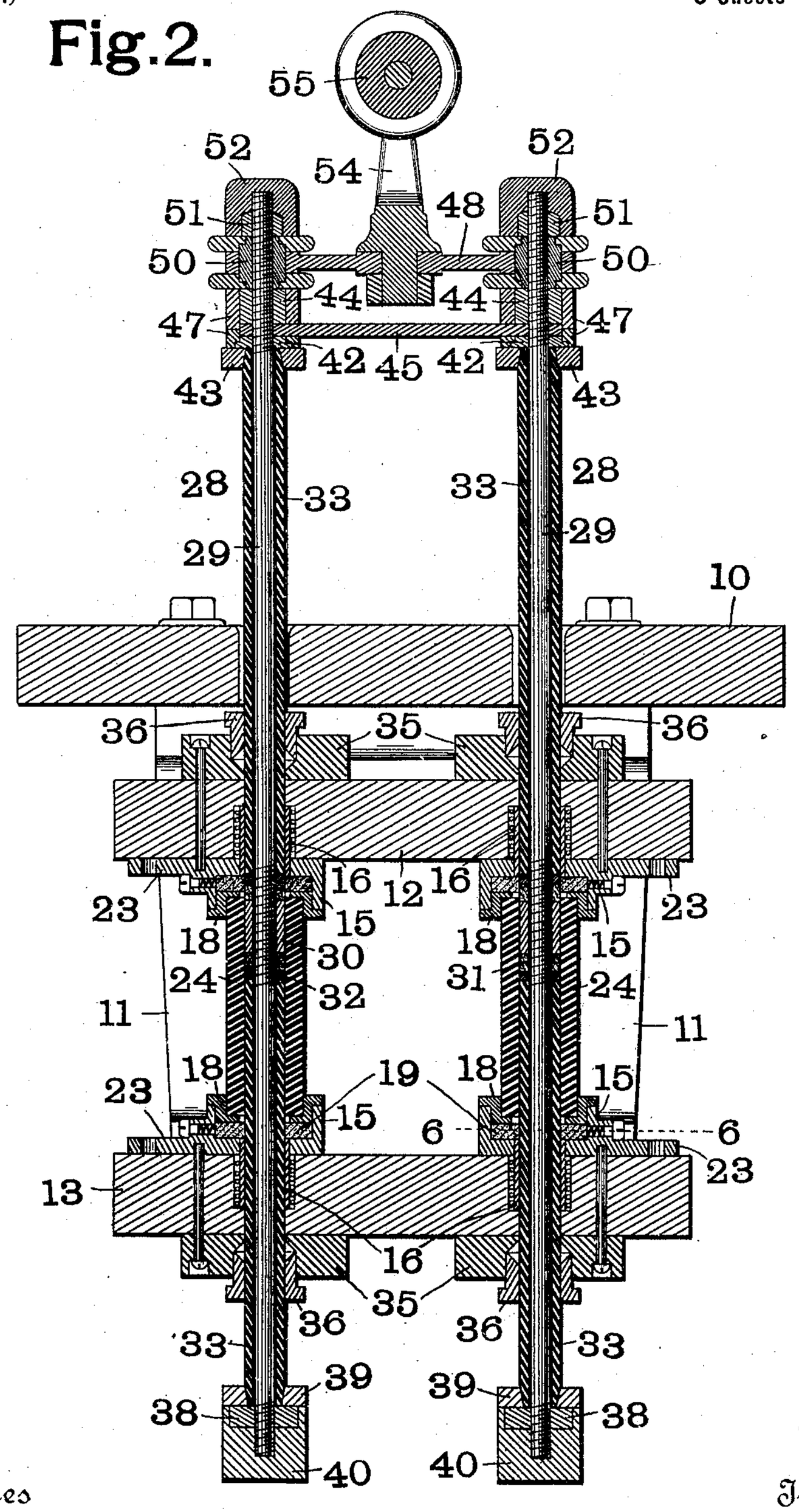

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Fig.3.

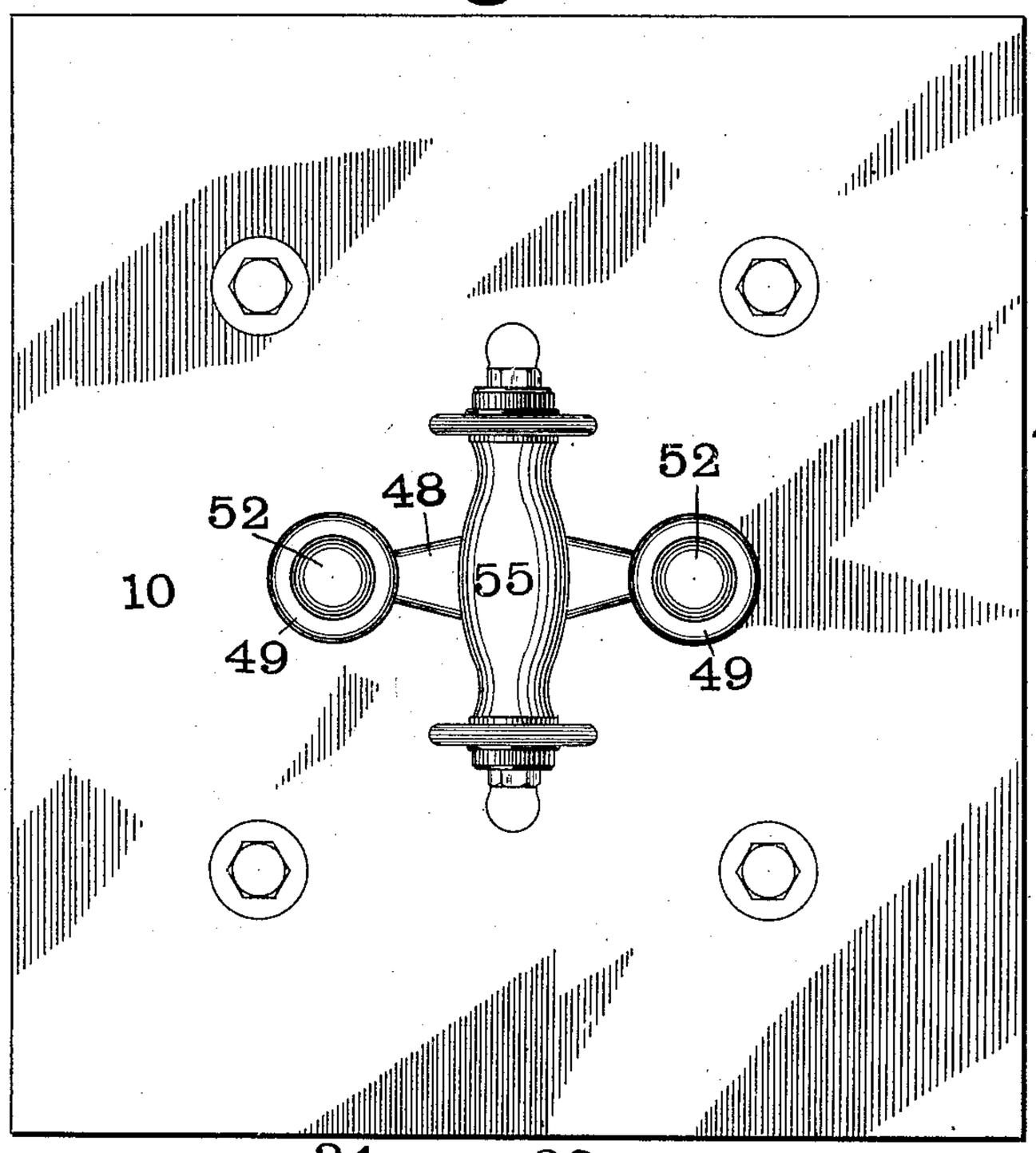


Fig.4.

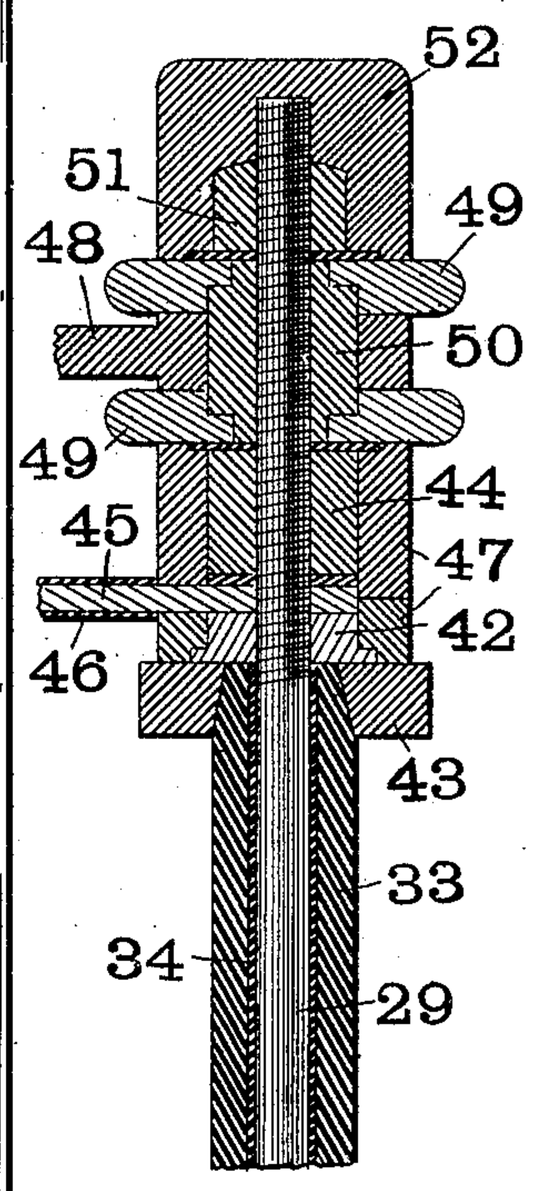


Fig.5.

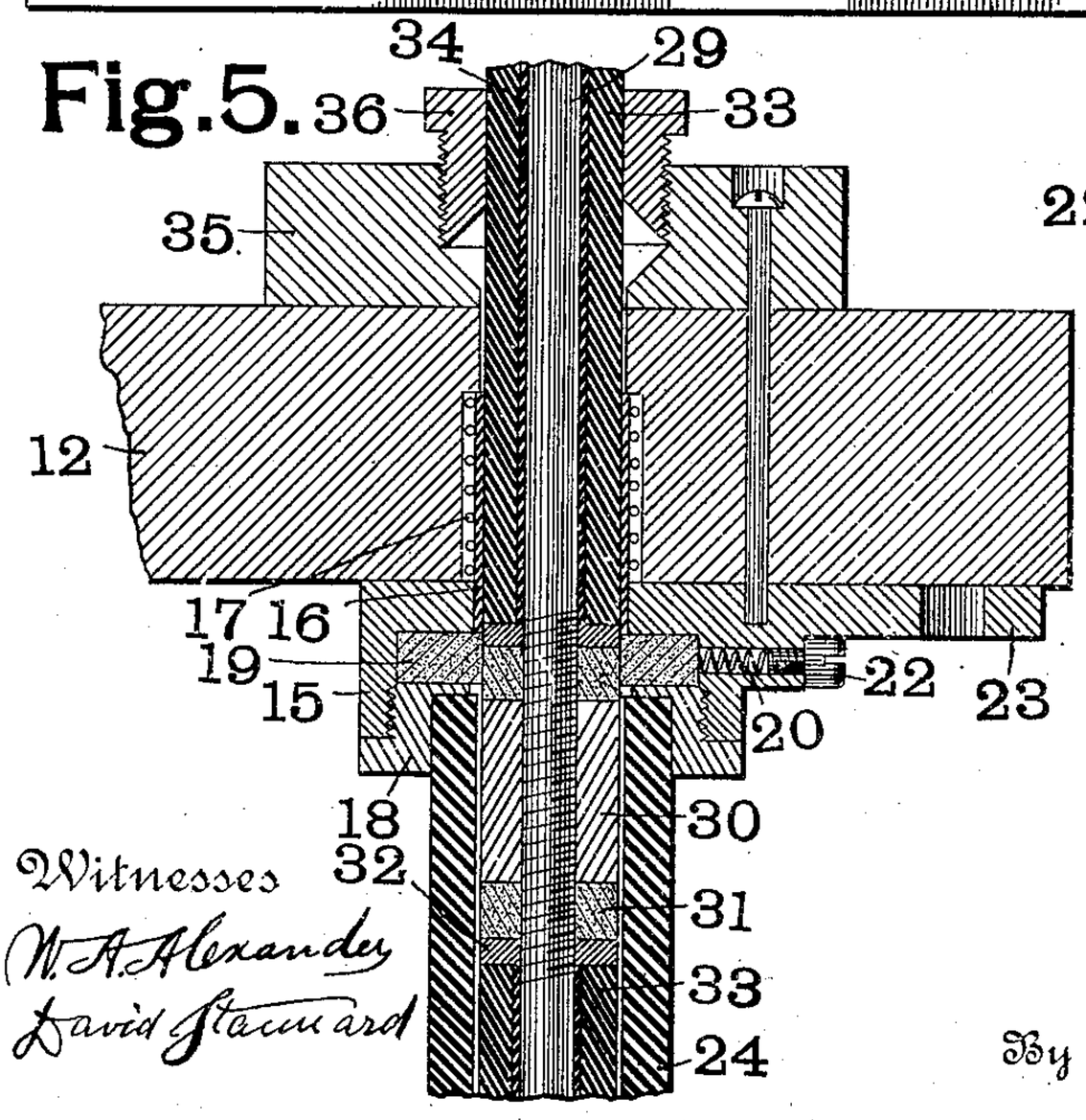
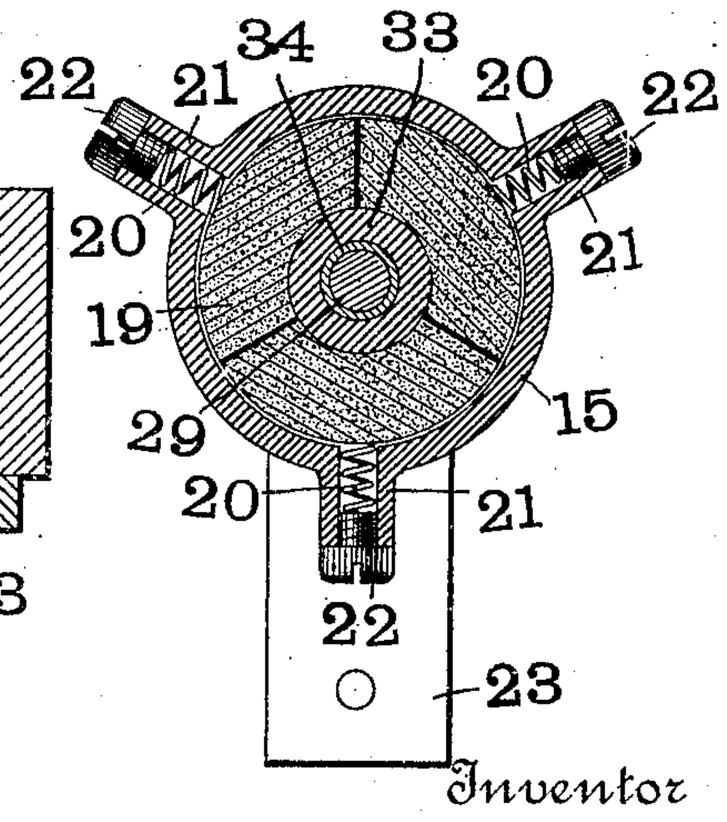


Fig.6.



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UNITED STATES PATENT OFFICE.

FERDINAND SCHWEDTMANN, OF ST. LOUIS, MISSOURI.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 649,554, dated May 15, 1900.

Application filed April 8, 1899. Serial No. 712,294. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND SCHWEDTMANN, a citizen of the United States of America, residing at St. Louis, in the State of Missouri, have invented a certain new and useful Electric Switch, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates more especially to that type of electric switches known as "plunger-switches," in which the current is controlled by manipulating a handle to which is attached one or more conductors in the form of plungers and which are intended for handling heavy currents.

One object of my invention is to so construct the switch that the possibility of arcing will be reduced to a minimum.

Another object of my invention is to improve the construction of the switch.

Another object of my invention is to so construct the switch that none of the current-carrying parts will be exposed, and thus protect the operator from danger.

My invention consists in various novel features and details of construction, all of which are described in the following specification and pointed out in the claims affixed hereto.

In the accompanying drawings, which illustrate a single-pole two-throw switch made in accordance with my invention, Figure 1 is a side elevation. Fig. 2 is a vertical central section. Fig. 3 is a top plan view. Figs. 4 and 5 are views, on an enlarged scale, showing parts of Fig. 2; and Fig. 6 is a section, also on an enlarged scale, on the line 6 6 of Fig. 2.

Like marks of reference refer to similar parts in the several views of the drawings.

10 is a slab of marble or other non-conducting material. Secured to the slab 10 are arms or brackets 11, carrying two smaller slabs 12 and 13, also preferably of marble.

15 represents hollow metal disks, two of which are attached to the lower face of the slab 12 and two to the upper face of the slab 13. Carried by the disks 15 and extending into openings in the slabs 12 and 13 are split metal tubes 16, surrounded by coil-springs 17. Held in the hollow disks 15 by screw-plugs 18 are carbon rings 19. Each of the rings 19 is divided into segments, preferably three in number, as shown in Fig. 6. The segments of the rings 19 are forced toward the center by coil-springs 20, held in projections 21 by screws 22. Formed on each of the hollow disks 15 is a plate 23, to which a suitable line-wire terminal may be secured. In each of the screw-plugs 18 is a recess in which rests one end of a tube 24, of lava or other refractory non-conducting material.

Passing through the slabs 10, 12, and 13 and the disks 15 and tubes 24 are two plungers 28. The center of each of the plungers 28 is formed of a rod 29, of brass or other conducting material. Rigidly secured on each of the rods 29 is a collar 30, of copper or other conducting material. The collar 30 is of such a size as to fit closely in the tubes 16 and form with them connections, such as are described in Letters Patent No. 612,123, granted to me October 11, 1898. Placed around the rods 29, at each end of each of the collars 30, are a carbon ring 31 and a ring 32, of some refractory non-conducting material, such as vulcabeston, as best shown in Fig. 5. Any arc which may be formed in operating the switch will be formed between the carbon rings 31 and the spring-actuated rings 19, thus protecting the metal contacts 16 and 30.

The object of the vulcabeston rings 32 is to protect the insulating-sleeves, hereinafter to be described.

In a single-throw switch only one of the carbon rings 31 and one of the vulcabeston rings 32 would be necessary for each plunger, as only one pair of contacts 16 would be used.

Placed around the rods 29 are sleeves 33, preferably of fiber. The sleeves 33 are of the same or substantially the same diameter as the collars 30, so as to fill the tubes 16 completely and exclude the air therefrom. In order to make the insulation more perfect, I place a layer 34 of mica between the rods 29 and the sleeves 33.

35 represents fiber stuffing-boxes, two of which are secured to the upper face of the slab 12 around the plungers 28 and two to the bottom of the slab 13 around said plungers. Each of the stuffing-boxes 35 is provided with a follower 36.

The object of the stuffing-boxes 35 and followers 36 is to more effectually exclude the air from the contacts, and thus aid in preventing the formation of an arc.

On the lower end of each of the rods 29 is a nut 38, Fig. 2, which holds the lower sleeve 33 in position and also supports a soft-rubber washer 39, adapted to strike against the follower 36 of the lower stuffing-box 35 and prevent jars when the switch is operated. The nuts 38 and ends of the rods 29 are protected by caps 40 of fiber or other insulating material.

Near the upper end of each of the rods 29 is a nut 42, which holds in place the upper sleeve 33 and a soft-rubber washer 43. Held between the nuts 42 and nuts 44 is a strip 45, of copper or other good conducting material, which forms an electrical connection between the cores 29 of the plungers 28. The strip 45 is covered by insulation 46, as shown in Fig. 4. The nuts 42 and 44 are protected by jackets 47 of hard-rubber or other insulating material.

48 is a cross-bar which is held at each end between two washers 49, preferably of fiber, and which is kept out of contact with the rods 29 by short sleeves 50, preferably of hard rubber. The washers 49 are held in place by nuts 51, and the said nuts and the ends of the rods 29 are protected by caps 52. The sleeves 50 and washers 49 keep the cross-bar 48 out of contact with the metal parts of plunger 28, thus preventing any electrical communication between the handle, hereinafter to be described, and the current-carrying parts of the switch. Secured to the cross-bar 48 is a spade-handle 54, the grip 55 of which is preferably of hard rubber or other insulating material.

The operation of my switch is as follows: When the handle 54 is drawn upward, the copper collars 30 are drawn into the upper tubes 16, thus making good electrical connection therewith. The current now passes from one of the terminal strips 23, through the disk 15, tube 16, and collar 30, into the rod 29, thence up the rod 29, across the strip 45, down the other rod 29, and out through the other collar 30, tube 16, disk 15, and terminal strip 23, thus completing the upper circuit. To break the circuit, the handle 54 is forced downward. This withdraws the collars 30 from the tubes 16 at the same time the insulating-sleeves 33 are forced into the said tubes, excluding the air therefrom, and thus preventing the liability of the formation of an arc. If, however, any slight arc should be formed, it will be formed between the carbon rings 31 and the segments 19. When the handle 54 is forced to its lowest position, the collars 30 are forced into the lower tubes 16. In this position the current flows from one of the lower terminal strips 23, through the lower disk 15 and tube 16, into the sleeve 30, when it flows around, as previously described, to the other sleeve 30 and thence out through the other lower tube 16, disk 15, and terminal strip 23, completing the lower circuit. The stuffing-boxes 35 and followers 36 aid in preventing any air from entering around the plungers 28. The handle 54 being completely insulated from the rods 29 of the plungers 28, the operator of the switch is fully protected from any danger of a shock by operating the switch.

While I have shown a single-pole double-throw switch, I wish it to be understood that I do not limit myself to such form of switch, as my invention is applicable to either single or double throw switches and also to switches having two or more poles.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an electric switch, a hollow contact-piece, a suitable rod of conducting material passing longitudinally through said contact-piece, a cylindrical piece of conducting material carried by said rod and adapted to fit in said hollow contact, and an insulating-sleeve surrounding said rod of conducting material at one end of said cylindrical piece of conducting material and adapted to enter said contact when the circuit is broken and exclude the air therefrom.

2. In an electric switch, two hollow contacts, a plunger sliding in said contacts and having one part of its surface of conducting material and another part of insulating material, a tube of refractory, non-conducting material arranged between said hollow contacts and into which the conducting-surface of said plunger passes when moving out of either of said hollow contacts, and means for excluding the air from said tube of refractory, non-conducting material.

3. In an electric switch, a suitable hollow contact, a plunger passing through said contact, a metallic cylinder carried by said plunger and adapted to fit in said contact, an insulating-sleeve also carried by said plunger and adapted to fit in said contact, a carbon ring between said sleeve and said cylinder, and a spring-actuated carbon ring carried by said contact.

4. In an electric switch, a plunger having one part of its surface of conducting material and another part of insulating material, a passage in which said plunger slides, a part of the walls of said passage being of conducting material and adapted to make contact with the conducting-surface of said plunger, and a packing at the ends of said passage for permanently maintaining air-tight joints around said plunger and excluding the air from said passage.

5. In an electric switch, a suitable hollow contact, a plunger adapted to pass through said contact, a metallic cylinder carried by said plunger and adapted to fit said contact, an insulating-sleeve also carried by said plunger and adapted to fit said contact, and a

stuffing-box and follower at each side of said contact and around said plunger to exclude the air from said contact.

6. In an electric switch, two plungers each having a core of conducting material, suitable contacts coöperating with said plungers to make and break the circuit, a connecting-strip of conducting material for said plungers, a cross-bar secured to the cores of said plungers but insulated therefrom by sleeves of non-conducting material, washers of non-conducting material between which said cross-bar is held, and a handle secured to said cross-bar for actuating said plungers.

In testimony whereof I have hereunto set my hand and affixed my seal in the presence of the two subscribing witnesses.

FERDINAND SCHWEDTMANN. [L. S.]

Witnesses:
W. A. ALEXANDER,
C. D. GREENE, Jr.