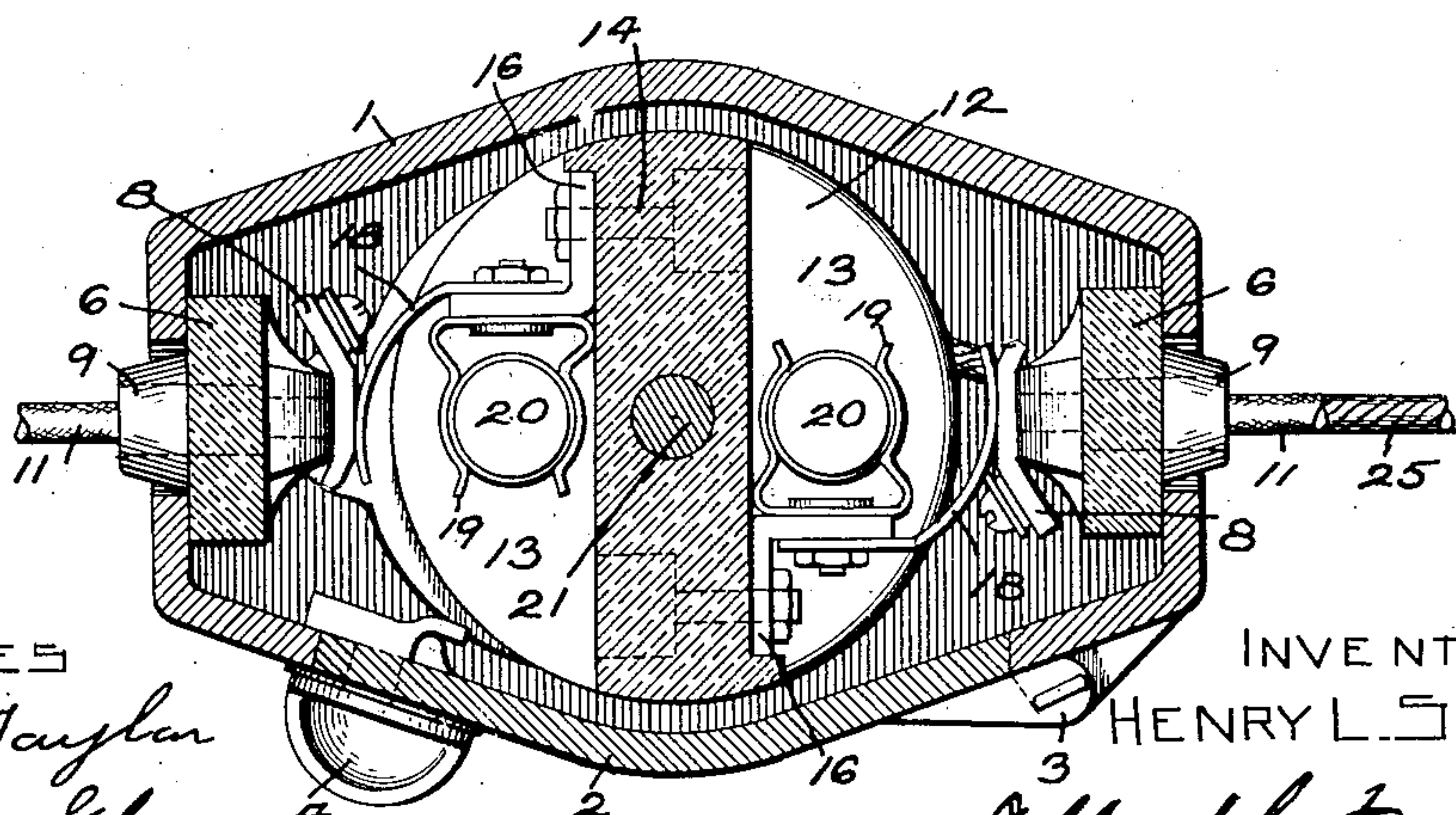
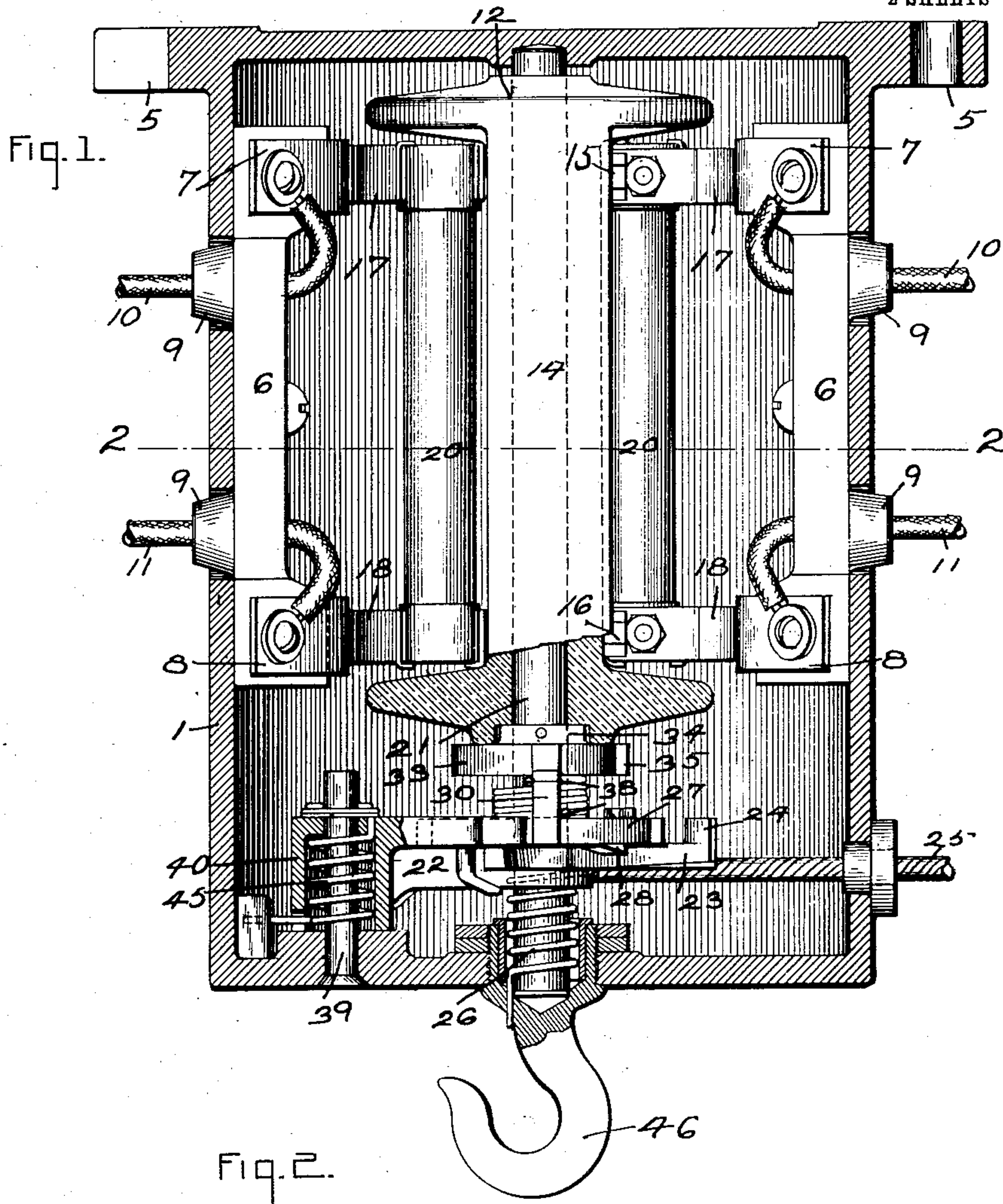


H. L. SMITH.
HANGER BOARD SWITCH.
APPLICATION FILED FEB. 21, 1908.

959,891.

Patented May 31, 1910.

2 SHEETS—SHEET 1.



WITNESSES

M. Ray Taylor
J. Ellis Glen

INVENTOR.

HENRY L. SMITH.

BY

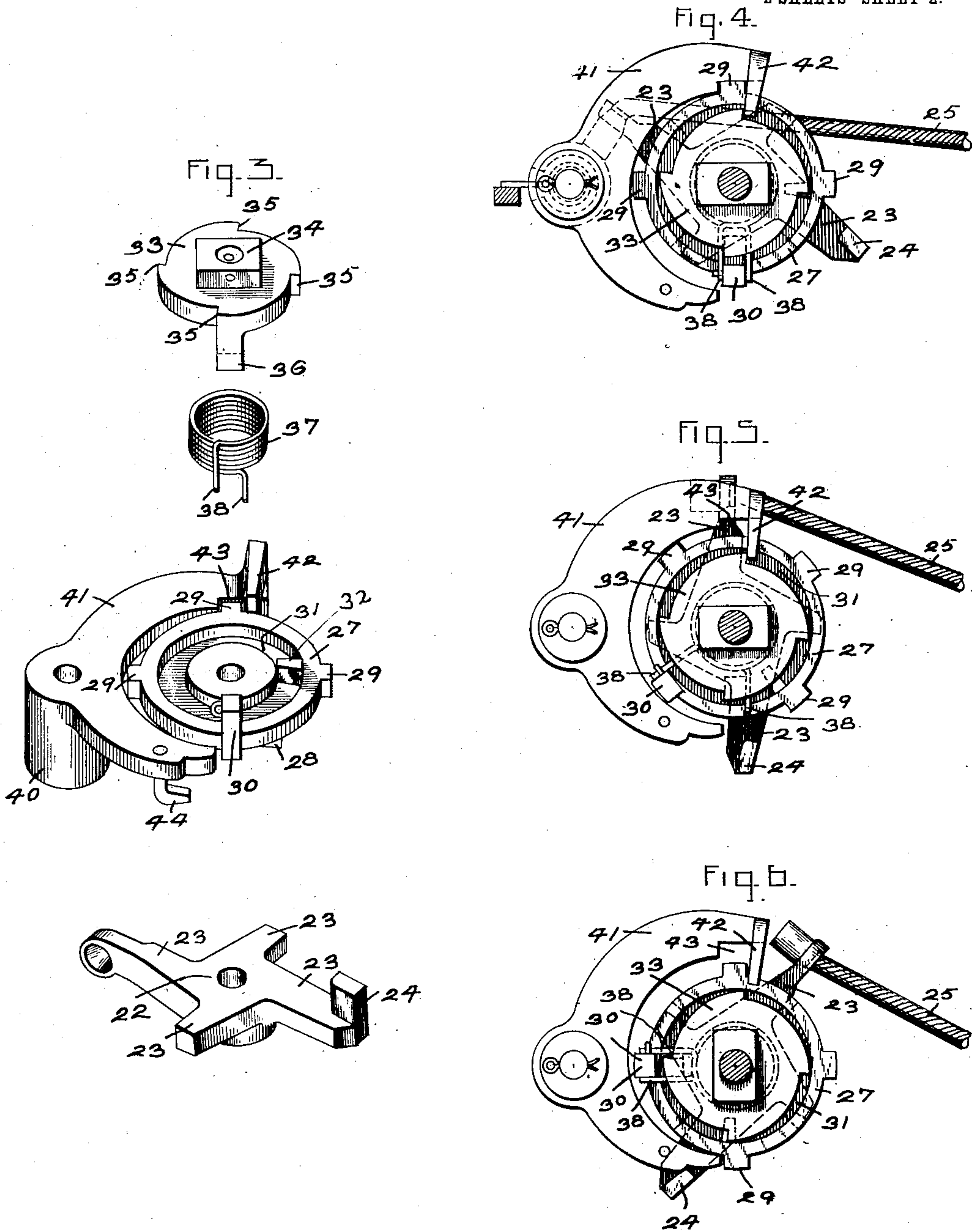
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HENRY L. SMITH.

by *Albert H. Davis*
ATTY.

UNITED STATES PATENT OFFICE.

HENRY L. SMITH, OF PITTSFIELD, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

HANGER-BOARD SWITCH.

959,891.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed February 21, 1908. Serial No. 416,980.

To all whom it may concern:

Be it known that I, HENRY L. SMITH, a citizen of the United States, residing at Pittsfield, county of Berkshire, State of Massachusetts, have invented certain new and useful Improvements in Hanger-Board Switches, of which the following is a specification.

This invention relates to rotary switches for electric lighting circuits, the object of the invention being to provide a quick-acting double pole single throw switch, having an inclosed fuse in circuit with each pole; said switch being capable of operation by a pull on a cord or the like, so that it can serve as a hanger board for an arc lamp in an elevated inaccessible position.

The invention consists in certain constructions and arrangements of the mechanism for operating the switch, as shown in the accompanying drawings and particularly pointed out in the claims.

Figure 1 of the drawings is a vertical sectional elevation of my improved switch; Fig. 2 is a cross section on the line 2—2, Fig. 1; Fig. 3 is an exploded view of the operating mechanism; and Figs. 4, 5 and 6 are plan views of said mechanism, showing it in three successive positions.

The parts are inclosed in a waterproof casing 1, preferably made of cast metal and provided with a door 2 hinged at 3 and secured by a turn button 4. The casing is also provided with supporting lugs 5 by means of which it can be attached to a hanger board. Inside the casing and at opposite sides thereof are secured two bars 6 of insulating material carrying line terminals 7 and branch terminals 8. Tubular nipples 9 extend from said bars through holes in the walls of the casing to insulate the line conductors 10 and the branch conductors 11, which enter the casing through said nipples and are attached to the respective terminals 7 8. Midway of the casing is located an upright drum 12 of insulating material, having in opposite sides deep recesses 13 which leave a central longitudinal web 14 to which at each end and near opposite edges are secured brackets 15 16 carrying resilient contact fingers 17 18 cooperating with the stationary terminals 7 8. The brackets also carry clips 19 to receive the inclosed fuses 20, one on each side of the web, and connecting the brackets 15 16. When the parts

stand as shown in Figs. 1 and 2, the line terminals are connected with the branch terminals through the inclosed fuses. But when the drum is given a quarter turn, both sides of the circuit are broken. The drum is mounted on a vertical shaft 21 journaled in the top and bottom of the casing, and the mechanism for rotating it step by step, a quarter turn at a time, will now be described. Loosely journaled on the shaft near the bottom of the casing is a driver or actuating lever 22 having four equidistant arms 23, one of which carries an upwardly projecting lug 24, while the opposite arm is suitably formed for the attachment of a flexible operating connection, such as the cord 25, which runs out through a bushed opening in one wall of the casing. A light spring 26 encircles the shaft 21 below the lever, being secured at one end to the casing and at the other end to the lever, and serving not only to press the lever yieldingly against the underside of a wheel located just above it, but also to retract the lever to the normal position shown in Fig. 4 when the cord is slacked.

Immediately above the lever and journaled loosely on the shaft 21 is a tripping wheel 27, having four equidistant sawtooth lugs 28 on its under side, and four equidistant teeth 29 on its periphery. One of these teeth is extended upward to form a tusk 30. The upper surface of the tripping wheel contains a circular groove 31 concentric with the shaft. A lug 32 extends radially across said groove adjacent to the tooth 29 next behind the tusk 30.

Adjacent to the lower end of the drum is an escape-wheel 33 having a polygonal hub 34 entering a corresponding socket in the end of the drum. The escape-wheel is secured to the shaft 21 and has four equidistant ratchet teeth 35, one of which is extended downwardly to form a tusk 36, which is arranged to stand normally in the same radial plane as the tusk 30, and with its end in the groove 31. Between the tripping wheel and the escape-wheel is a helical spring 37 concentric with the shaft 21 and having radially projecting ends 38 which lie normally on opposite sides of and in contact with the two tusks 30, 36.

A stud 39 rises from the bottom of the casing and serves as a pivot for the hub 40 of a U-shaped member or anchor 41, whose ends lie on opposite sides of the tripping

wheel, one of them having a lug or pallet 42 extending up into the plane of the escape-wheel and adapted to engage with a tooth thereof. The anchor has a notch 43 adjacent to the pallet, to permit the inner curved edge of the anchor to swing in to a position eccentric with the tripping wheel when the pallet is in engagement with a tooth on the escape-wheel. The opposite end of the anchor carries a stop lug 44 to limit the throw of the actuating lever 22, and this end of the anchor is also adapted when struck by said lever to be brought into position to engage with a tooth 29 of the tripping wheel. A spring 45, coiled in the hollow hub of the anchor, urges it toward the position in which it is shown in Fig. 4.

The operation is as follows:—An arc lamp is suspended from the hook 46 at the lower end of the casing, and its terminals are connected by the conductors 11 with the stationary contacts or terminals 8. When the parts are in the position shown in Figs. 1, 2 and 4, current will flow from the line conductors 10 to the lamp, through the fuses 20. To extinguish the lamp, the cord 25 is pulled, which oscillates the lever 22, whose arms 23 engage the lugs 28 and turn the tripping wheel 27. The tusk 30 on this wheel carries with it one end of the spring 37, thus putting a tension on said spring and causing its other end to press harder against the tusk 36 on the escape-wheel. This latter wheel is held stationary by means of the pallet 42 on the anchor engaging one of the teeth 35. But the rotary movement of the tripping wheel also causes one of its teeth 29 to bear against the inner curved edge of the anchor and crowd it away from the normal position it occupies in Fig. 4. The action is illustrated in Fig. 5. By the continued movement of the tripping wheel 27, the anchor is finally oscillated so far that its pallet 42 slips off the tooth of the escape-wheel, leaving said wheel free to be suddenly actuated by the spring 37, which is bearing against the tusk 36 on said wheel. In order to prevent the escape-wheel from overrunning the proper position of rest, the lug 24 on the lever 22 strikes the end of the anchor and draws it into the path of the tooth 29 on that side of the tripping wheel, just as the pallet trips the escape-wheel. The tripping wheel is thus prevented from any further rotation, and the spring 37 effectually stops the angular movement of the escape-wheel as soon as its tusk 36 arrives adjacent tusk 30. This insures an exact quarter turn of both wheels. This quarter revolution of the escape-wheel restores its tusk to the same radial plane as the tusk 30, as shown in Fig. 6, in which position there is no tendency for the spring to exert any further turning movement. Inasmuch as

the escape-wheel is secured to the drum, the latter will be given a quarter turn and will stop in a position ninety degrees from that in which it is shown in Figs. 1 and 2; that is, with the lamp circuit open. When the cord is slackened, the spring 26 returns the lever 22 to its normal position, its arms sliding easily over the sawtooth lugs 28 as it yields longitudinally of the shaft. As soon as the lug 24 clears the end of the anchor, the spring 45 returns that element to its normal position, the pallet 42 engaging with the new ratchet tooth 35 on the escape-wheel which has moved up into the position shown in Figs. 6 and 4.

The function of the lug 32 in the groove 31 of the tripping wheel is to start the escape-wheel in case it sticks by reason of undue friction between the contact fingers 17 18 and their stationary contacts. This lug will strike the tusk 36 near the end of the rotary movement of the tripping wheel, and forcibly start the escape-wheel.

It thus appears that the switch can be opened and closed alternately by pulling on the cord; the drum giving an exact quarter turn at each actuation of the mechanism, and operating with a quick action which effectually breaks any arc that may form at the contacts.

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

1. The combination with a rotary contact-carrying drum, of an escape-wheel connected therewith, a pivoted member carrying a pallet cooperating with said wheel, a spring having one end engaging with said wheel, a wheel engaging with the other end of said spring, and provided with means to trip said pallet, and means for actuating said tripping wheel.

2. The combination with a rotary contact-carrying drum, of an escape-wheel connected therewith, a pivoted anchor carrying a pallet cooperating with said wheel, a spring having one end engaged with said wheel, a tripping wheel engaging the other end of said spring and provided with teeth adapted to act upon said anchor and trip said pallet, and means for actuating said tripping wheel.

3. The combination with a rotary contact-carrying drum, of an escape-wheel connected therewith, a pivoted anchor having a curved inner edge normally eccentric with the axis of said escape-wheel, a pallet on said anchor cooperating with said escape-wheel, a spring having one end engaged with said wheel, a tripping wheel engaging with the other end of said spring and having teeth adapted to engage with the inner edge of said anchor and oscillate the same on its pivot and thereby trip the pallet, and a pivoted lever for actuating said tripping wheel.

4. The combination with a rotary con-

tact-carrying drum, of an escape-wheel connected therewith, a pivoted U-shaped anchor having a curved edge normally eccentric with the axis of said wheel, a pallet at one
5 end of said anchor cooperating with said wheel, a spring having one end engaged with said wheel, a tripping wheel engaging with the other end of said spring and having teeth adapted to engage with said
10 anchor and oscillate the same on its pivot to trip said pallet, and a pivoted lever for

actuating said tripping wheel, and for bringing the end of the anchor opposite said pallet into line with a tooth on the tripping wheel to stop the motion of said wheel. 15

In witness whereof, I have hereunto set my hand this 18th day of February, 1908.

HENRY L. SMITH.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.