H. W. CHENEY.

SWITCH.

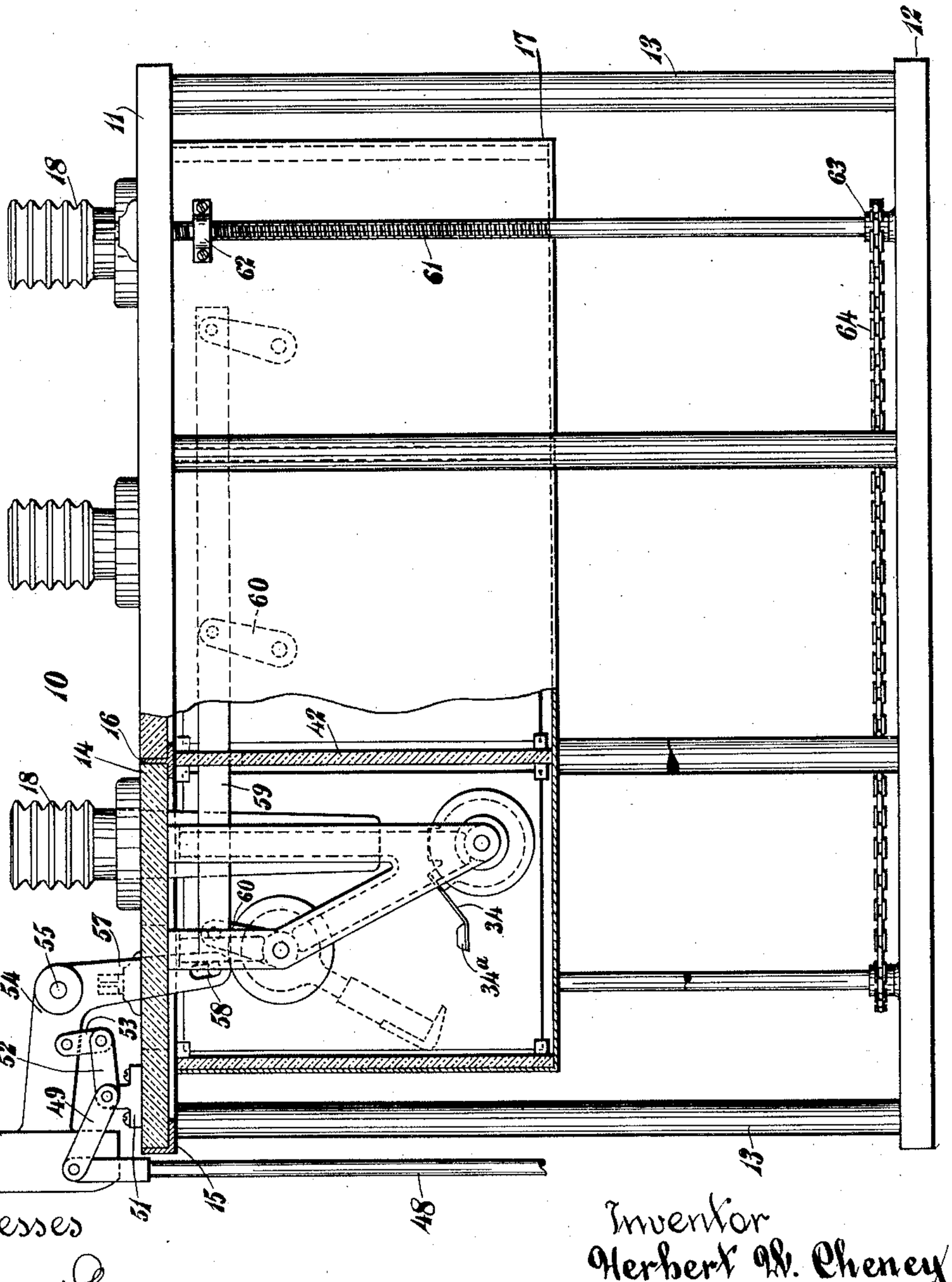
APPLICATION FILED OCT. 22, 1906.

976,549.

Patented Nov. 22, 1910.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

Oliver W. Sharman

Fred J. Kinsey

Inventor

Herbert W. Cheney

By Chas. E. Lord

Attorney

H. W. CHENEY.

SWITCH.

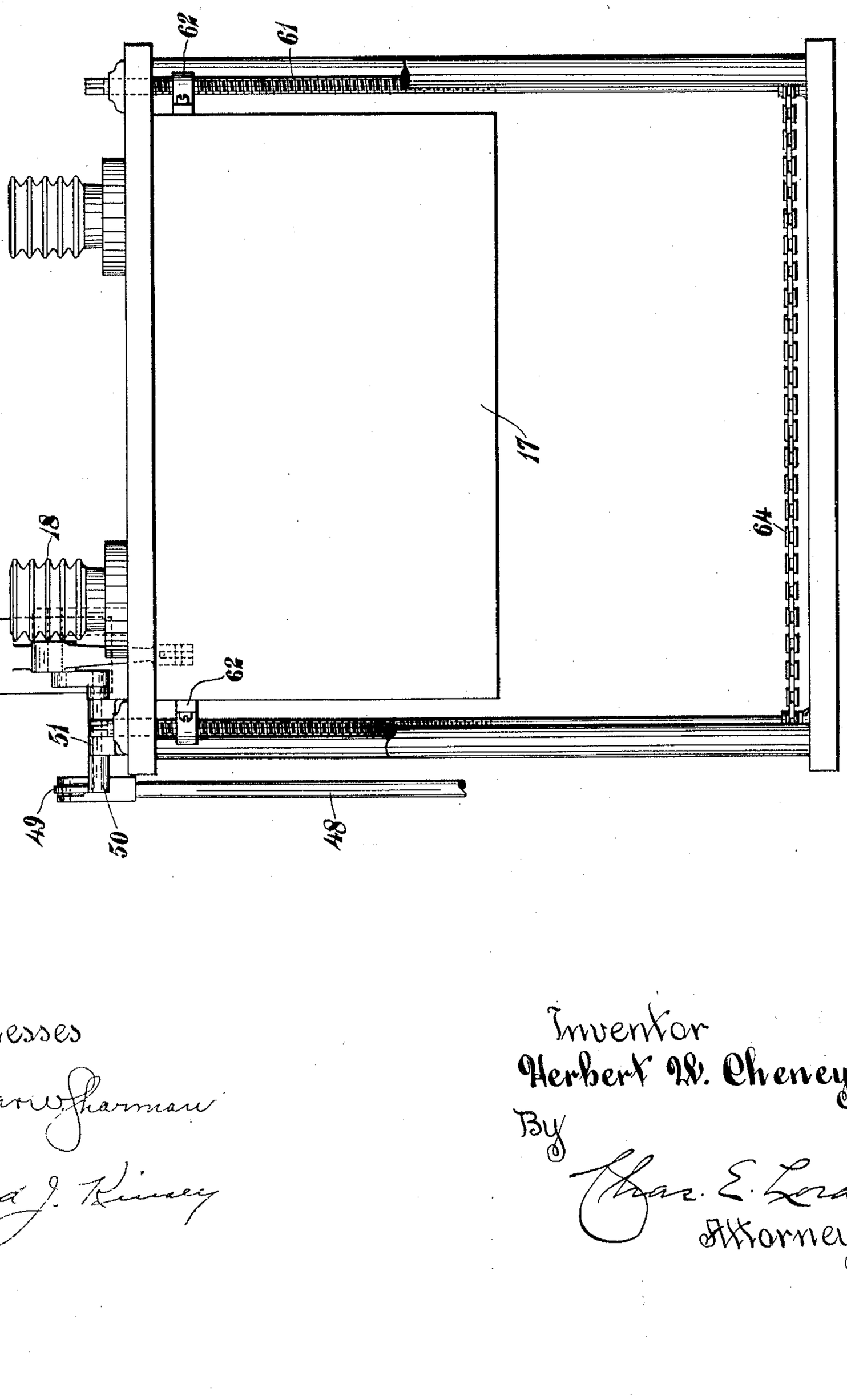
APPLICATION FILED OCT. 22, 1906.

976,549.

Patented Nov. 22, 1910.

4 SHEETS—SHEET 2.

Fig. 2.



Witnesses

Oliver W. Sharman

Fred J. Kinney

Inventor

Herbert W. Cheney

By

Chas. E. Lord

Attorney

H. W. CHENEY.

SWITCH.

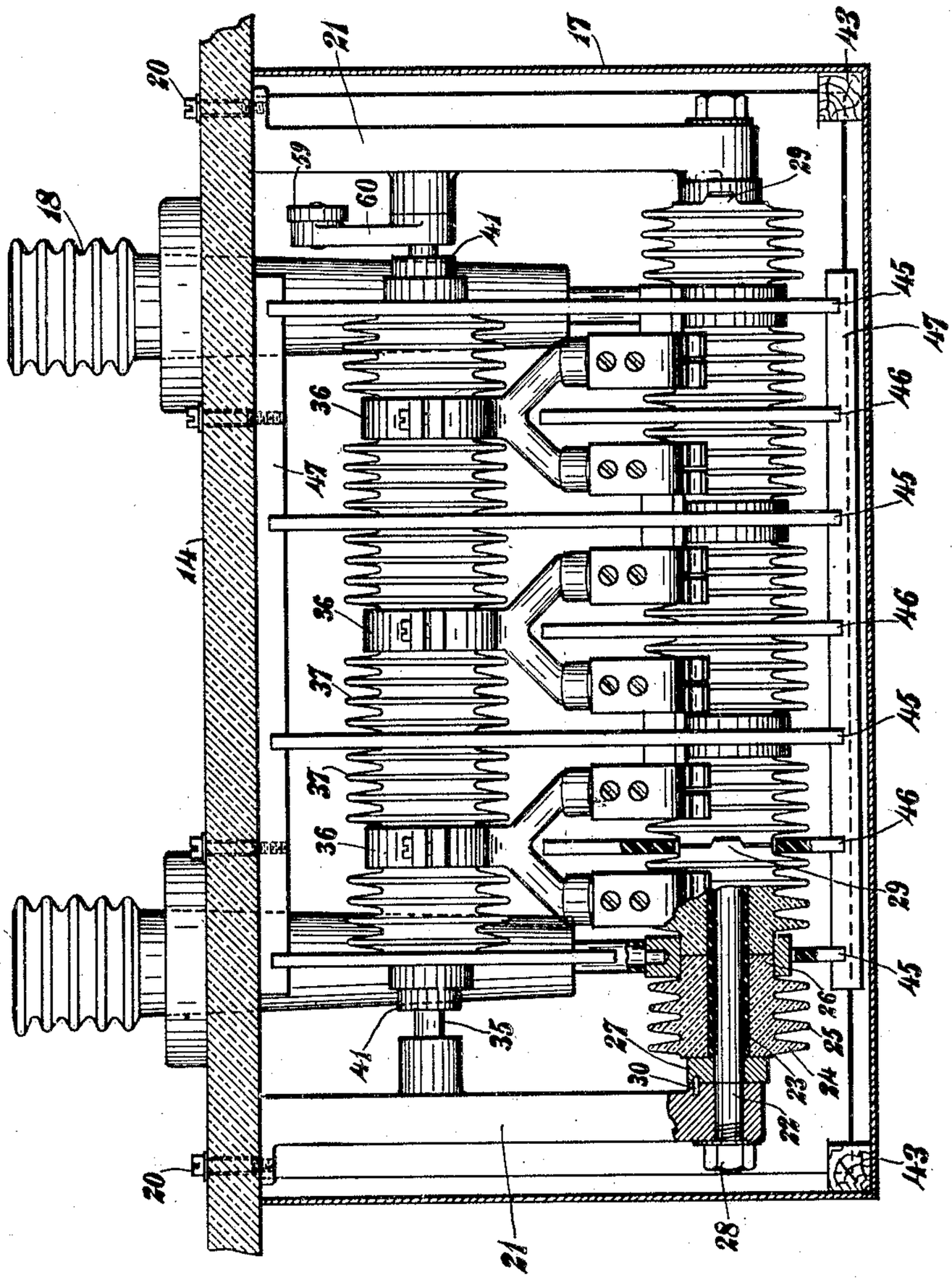
APPLICATION FILED OCT. 22, 1906.

976,549.

Patented Nov. 22, 1910.

4 SHEETS—SHEET 3.

Fig 3



Witnesses

Oliver W. Harman

Fred J. Kinsey

Inventor

Herbert W. Cheney

By

Chas. E. Lord

Attorney

H. W. CHENEY.

SWITCH.

APPLICATION FILED OCT. 22, 1906.

976,549.

Patented Nov. 22, 1910.

4 SHEETS—SHEET 4.

Fig. 5

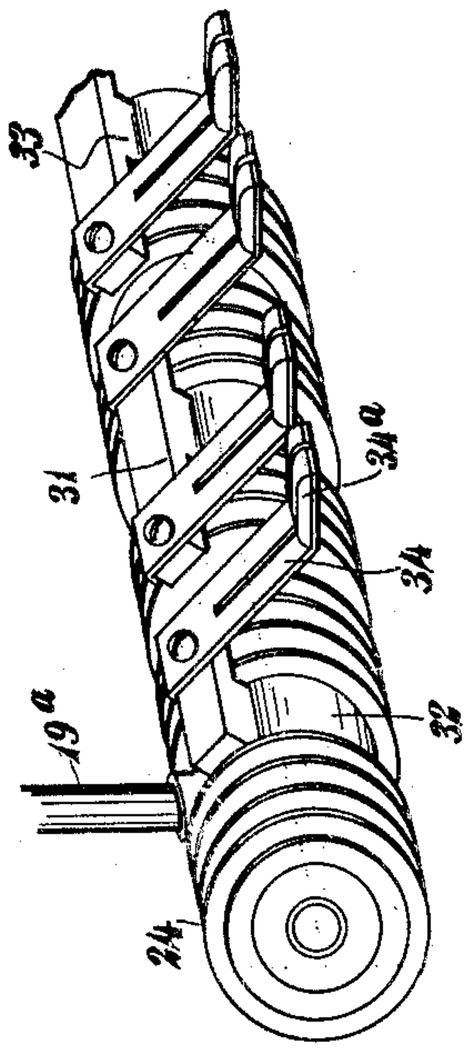


Fig. 6.

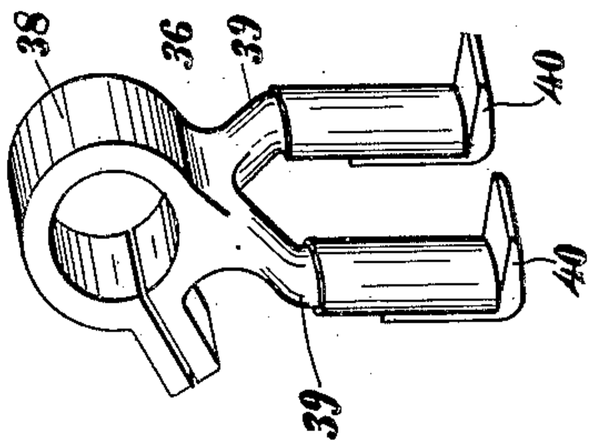
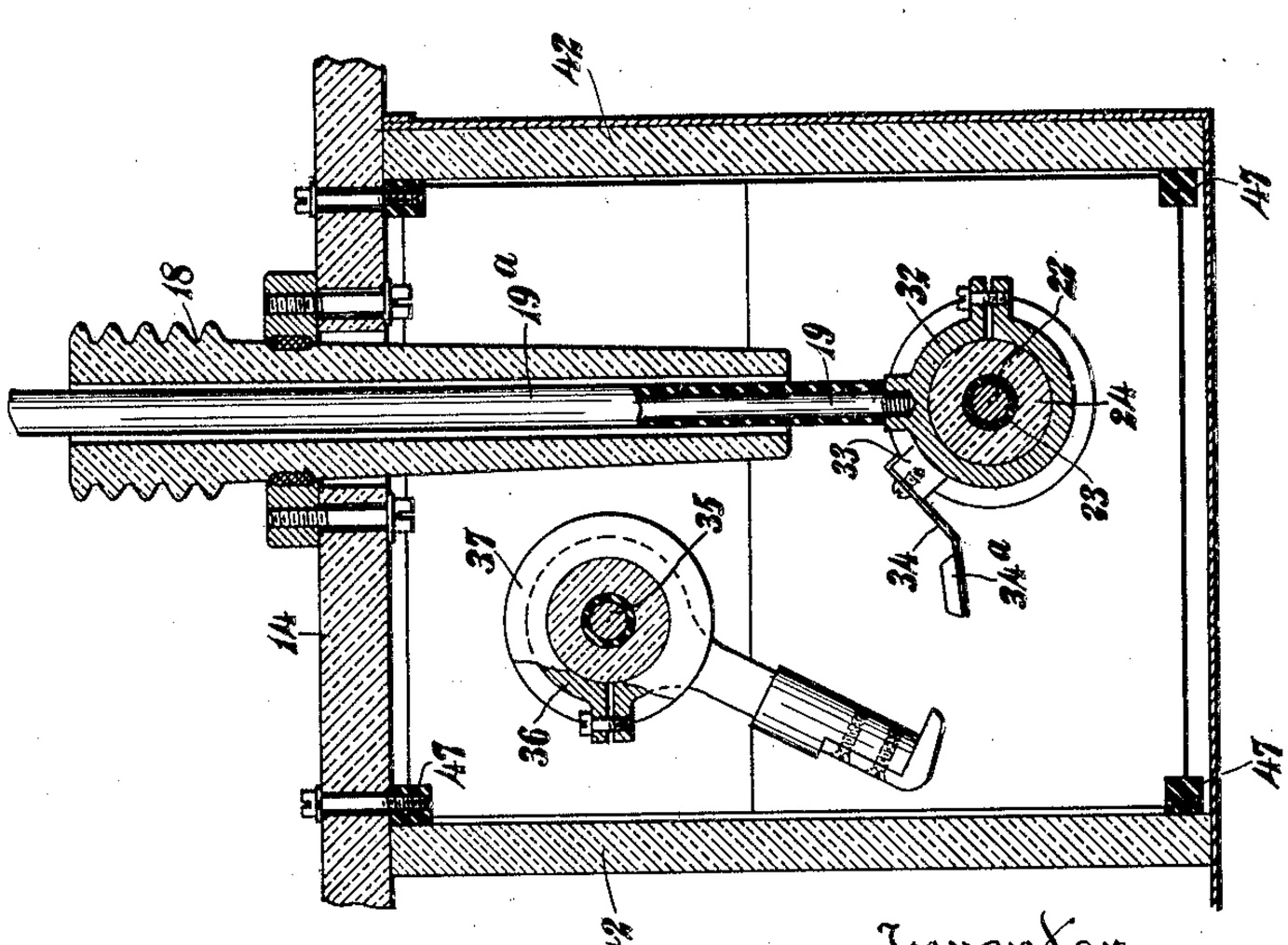


Fig. 4



Witnesses

Oliver W. Sharman

Fred J. Kinsey

Inventor

Herbert W. Cheney

By Chas. E. Lord

Attorney

UNITED STATES PATENT OFFICE.

HERBERT W. CHENEY, OF NORWOOD, OHIO, ASSIGNOR TO ALLIS-CHALMERS COMPANY, A CORPORATION OF NEW JERSEY, AND THE BULLOCK ELECTRIC MANUFACTURING COMPANY, A CORPORATION OF OHIO.

SWITCH.

976,549. Specification of Letters Patent. **Patented Nov. 22, 1910.**

Application filed October 22, 1906. Serial No. 339,906.

To all whom it may concern:

Be it known that I, HERBERT W. CHENEY, citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Switches, of which the following is a full, clear, and exact specification.

My invention relates to oil switches for circuits of high voltage and large amperage.

One of the objects of my invention is to provide a switch which is so constructed that circuits of large voltage and amperage can be opened and closed without danger of injury to the operator or to the surrounding apparatus from arcs at the contact terminals.

A further object is to provide for circuits of high voltage and large amperage a switch which is compact, simple in construction, and effective in operation.

My invention comprises certain novel details of construction, and combinations and arrangements of parts described in the specification and set forth in the appended claims.

For a better understanding of my invention, reference is had to the accompanying drawings in which—

Figure 1 is an elevation of my improved switch including the operating and supporting mechanism, parts being broken away and removed for the sake of clearness; Fig. 2 is an end elevation of the same; Fig. 3 is a transverse section through the switch showing the construction of each pole; Fig. 4 is a partial transverse section through one of the poles of the switch, the section being substantially at right angles to that shown in Fig. 3; Fig. 5 is an isometric view of a portion of the stationary contact members and insulating supports; and Fig. 6 is a similar view of one of the bridging contact members.

Referring now to the figures of the drawing, 10 represents a three pole oil switch for a three-phase circuit. The switch mechanism is supported by a frame consisting of an upper horizontal portion 11, a base 12 and a plurality of vertical supporting members 13. The upper horizontal portion 11 consists, in this case, of a rectangular frame and three slabs of slate or soapstone 14. The frame consists of side and end angle bars 15 and transverse inverted T-shaped bars 16. The three slabs 14 of slate or soapstone are supported on the flanges of the angle and T-bars. These slabs support portions of the switch operating mechanism and form the cover for the oil tank 17, which is adapted to be raised and lowered with respect to the cover, as will be described later.

Each insulating slab 14 is provided with two terminal openings for one pole of the switch. Located within the terminal openings are insulating bushings 18 carrying terminal rods or conductors 19 surrounded by insulating sleeves 19ª. Secured to the lower side of each insulating slab 14 by screws or bolts 20 are two spaced supporting brackets 21. Carried by the lower ends of the brackets is a stationary rod 22 which supports the stationary contact members. Surrounding the rod 22 is an insulating sleeve 23 on which are mounted a plurality of porcelain bushings 24. The bushings are provided with corrugated portions 25 and with smooth or uncorrugated necks 26 in engagement with one another. Between the two outer bushings and the brackets 21 are metal collars 27. The collars 27 and bushings 24 are all tightly clamped together between the brackets 21 by nuts 28 on the ends of the rod 22. The collars and bushings are preferably all interlocked to prevent turning, the bushings and collars having interfitting tongues and grooves 29 and the collars being fastened to the brackets by one or more dowel-pins 30. Mounted on the insulating bushings are a number of isolated stationary contact members 31, in this case four in number. Each of the stationary contact members consists of a split clamping sleeve 32, a lug or bar 33 and one or two spring contact fingers 34 having contact tips 34ª at their outer ends. The sleeves 32 are tightly clamped over the neck portions 26 of the adjacent bushings. The two outer contact members are arranged directly below the terminal rods 19 and are provided with lugs into which are screwed the lower ends of the rods (see Figs. 4 and 5). These two outer contact members and the two intermediate contact members differ slightly in construction. The lug or bar 33 of the former extends on one side only of the split ring and has only one spring contact finger. The bar or lug of each of the intermediate contact members extends on each

side of the split sleeve and has at each end a contact finger forming a double or bridging contact member. I prefer, however to consider each of the stationary contact members 31, as a single contact isolated and insulated from the others, so as to distinguish from the movable contacts which are all bridging contacts. Also supported by the brackets 21, above the rod 22 and at one side thereof, is a rotary spindle or rod 35 which supports three isolated and insulated movable contact members 36, in this case bridging members. The spindle 35 is provided with porcelain bushings 37 similar to the bushings 24 on the rod 22. The movable bridging contact members, each of which consists principally of a split collar 38 having two arms or fingers 39 on the outer ends of which are mounted contact faces or tips 40 (see Fig. 6), are tightly clamped on the bushings 37 with the arms 39 opposite the contact fingers of adjacent stationary contact members. The bushings are preferably clamped together by nuts 41. It is seen that when the movable switch member is rotated so that the movable bridging contacts engage the stationary contacts, a circuit is completed through all the contacts between the two terminal rods 19 of each pole, and when the switch is opened the circuit is ruptured at a large number of points, thus reducing the size of the arcs to a minimum.

Each pole is provided with a construction similar to that described. It is seen that each pole is a separate unit having separate rotary and stationary switch members each provided with a plurality of isolated and insulated contacts. The different poles or units are separated from one another and from the ends of the tank by vertical insulating partitions or barriers 42 preferably of slabs or stone, dividing the switch into three main compartments. The partitions 42 are preferably supported by the tank, in this case resting in slots in two wooden bars 43 secured to the lower corners of the tank and extending longitudinally thereof. The partitions are preferably removable with the tank, so that when the tank is removed the contacts are accessible. If desired however, the barriers may be removably secured to the cover 11. The adjacent contacts of each compartment or pole are separated by vertical barriers 45 and 46. The barriers 45 are situated between the bridging contact members 36, being supported by four wooden strips 47 located adjacent the four corners of the compartment. The barriers 46 are located between the arms 39 of the bridging contacts, being supported by the two lower strips 47.

I have provided simple and effective means for operating all the rotary switch members simultaneously at a point remote from the switch, as will now be described. At one end of the switch is a vertical operating rod 48 which may extend down through the floor, and may be operated automatically or manually in any desired manner. The rod 48 engages at its upper end one arm 49 of a bell-crank lever having a horizontal portion 50 pivotally mounted in the stationary lugs 51 on the top and near the corner of the first insulating slab 14. The opposite end 52 of the bell-crank lever is connected by a link 53 to a second bell-crank lever 54 pivoted at 55 above the switch, which lever is provided with a weighted arm 56 and a second arm 57 which extends downwardly through slab 14. The lower end of the arm 57 is connected at 58 to the end of a horizontal, longitudinally reciprocating, operating rod or bar 59 located just beneath the horizontal cover 11 of the switch. This rod 59 is connected to all rotary spindles 35 by means of arms or links 60 each of which is secured to one of the spindles 35. It will be seen that when the operating rod 48 is moved downward the weight 56 is raised and the rod 59 is moved longitudinally, rotating the horizontal spindles 35 which carry the bridging contacts 36 and closing the switch. The arm 52 and link 53 form a toggle for holding the switch closed. When the rod 48 is moved upward so that the toggle can be broken the weight 56 drops, moving the longitudinal rod in the opposite direction and opening the switch with a quick break.

The oil tank inclosing all the contacts is necessarily large and heavy. I have in this case provided for the purpose of raising and lowering said tank, four vertical threaded rods 61 located adjacent the corners of the switch frame with the upper ends passing through the upper horizontal cover 11 and journaled in the base 12. The tank is also provided with an equal number of properly located lugs 62 which are threaded to receive the rods 61. Each rod is provided at its upper end with a squared portion to receive a turning wrench or tool and at its lower end near the base 12 with a sprocket wheel 63. The rods 61 are in this case rotated simultaneously by means of a sprocket chain 64 engaging all the sprocket wheels; thus by turning any one of the operating rods 61 all the rods are rotated, either raising or lowering the tank. When completely raised, the tank engages the lower side of cover 11.

It do not wish to be confined to the exact details shown but aim in my claims to cover all modifications which do not involve a departure from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent is:—

1. In a multipole switch or circuit breaker, a horizontal frame, brackets extending

downwardly therefrom, a plurality of fixed and a plurality of rotary contact supporting members extending between the brackets, there being one fixed and one rotary contact supporting member for each pole of the switch, the fixed contact supporting members extending between the lower portions of the brackets and being provided with contact members having lateral projecting contact fingers, and the rotary contact supporting members being located above and at the side of the corresponding fixed contact supporting members and being provided with contact members having downwardly projecting portions which are substantially vertical when the switch is closed and are adapted to coöperate with said contact fingers, and means for operating said rotary contact supporting members simultaneously.

2. In a multipole switch or circuit breaker, a horizontal frame, a plurality of brackets secured to said frame and extending downwardly therefrom, a plurality of stationary contact-supporting members extending between the lower portions of said brackets, and each having arranged thereon a plurality of contacts insulated from one another, a plurality of rotary contact-supporting members extending between the brackets above the stationary contact-supporting members, each of said rotary contact-supporting members having arranged thereon a plurality of contacts, said contacts being insulated from one another and having downwardly extending portions adapted to coöperate with the contacts of the stationary contact-supporting members, means for operating said rotary contact-supporting members simultaneously, and an oil tank at the lower side of the frame and inclosing said contacts and said contact-supporting members.

3. In a multipole switch or circuit breaker, a horizontal frame, a plurality of brackets secured to the frame and extending downwardly therefrom, a plurality of stationary contact-supporting members extending between the lower portions of the brackets, a plurality of rotary contact-supporting members extending between the brackets and each being located above and at one side of one of the stationary contact-supporting members, each of the stationary contact-supporting members having a plurality of contacts provided with laterally projecting contact fingers and each of the rotary contact-supporting members having a plurality of contacts provided with downwardly extending portions adapted to coöperate with said contact fingers, there being one stationary contact supporting member and one rotary contact supporting member for each pole of the switch, barriers separating the poles of the switch, means for operating said rotary contact-supporting members simultaneously, and an oil tank at the lower side of said frame and inclosing all the contacts and contact-supporting members.

4. In a multipole switch or circuit breaker, a horizontal frame, a plurality of pairs of brackets secured to the lower side thereof and projecting downwardly therefrom, there being one pair of brackets for each pole, a fixed contact-supporting rod extending between the lower ends of the brackets of each pair and having mounted thereon a plurality of contacts insulated from one another and provided with laterally projecting contact fingers, a rotary contact-supporting rod extending between the brackets of each pair above and at one side of the corresponding stationary contact-supporting rod, the rotary contact-supporting rod having mounted thereon a plurality of contacts provided with downwardly extending portions adapted to coöperate with the contact fingers of the corresponding stationary contact-supporting rod, and an oil tank at the lower side of said frame inclosing all the contacts and contact-supporting members.

5. In a switch or circuit-breaker, a series of independent stationary contacts, a series of independent movable contacts, supports for each series of contacts comprising a plurality of interlocking hollow insulators, a rod extending through the insulators, and means for securing rigid connection between the insulators and the rod.

6. In a switch or circuit breaker, a single pole unit having coöperating movable and stationary switch members, one of said members comprising a rod, an insulating sleeve surrounding the rod, hollow insulators mounted on said sleeve, a plurality of contacts each supported upon the end portions of two adjacent insulators, and means for securing rigid connection between said insulators and the rod.

7. In an oil switch, a frame, contact members supported thereby, an oil tank having laterally projecting threaded members movable with the tank, means for supporting and for moving said tank toward and away from said frame comprising a plurality of vertical threaded bolts mounted for rotary movement and engaging said threaded members, and operating means connecting said bolts whereby the latter may be rotated simultaneously so as to shift the tank.

8. In an oil switch, a frame, switch members supported thereby, an oil tank, means for supporting and moving said tank comprising a plurality of threaded bolts or rods, and lugs on said tank and engaged by said bolts or rods, and means for turning all of said bolts simultaneously.

9. In a multipole switch or circuit breaker, each pole having a stationary and a rotary

supporting member, interlocked insulators mounted on each supporting member, and contact members clamped about said insulators.

10. In a switch or circuit breaker, movable and stationary switch members, one of said switch members comprising a support, a plurality of insulators mounted side by side on said support, and a plurality of contact members supported on the end portions of adjacent insulators.

In testimony whereof I affix my signature, in the presence of two witnesses.

HERBERT W. CHENEY.

Witnesses:
ARTHUR F. KWIS,
FRED J. KINSEY.