To all whom it may concern:

Be it known that I, Frank T. Cope, a citizen of the United States, residing at Alliance, in the county of Stark and State of Ohio, have invented a new and useful Selective Oil-Break Switch, of which the following is a specification.

My invention relates to improvements in selective oil break switches and has more especial reference to a switch of this character adapted for use in raising or lowering the voltage through a transformer.

The object of my invention is to provide a switch of the character referred to in which the contact is instantaneously broken upon the operation of the switch, thus reducing to a minimum the possibility of forming an arc between the brush and the contact plates.

A further object is to provide a switch of this character with renewable arcing tips which contact before the brush and leave the contact plates after the brush, thus receiving any arc which may be caused by the operation of the switch, preventing any undue wear upon the contact brush.

With these objects in view the invention consists in the novel construction and arrangement of parts, hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of construction may be made within the scope of the appended claims, without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:

Fig. 1 is a diagrammatic view showing my improved selective oil break switch applied to a transformer.

Fig. 2 is a top plan view of a portion of the switch.

Fig. 3 is a section on the line 3—3, Fig. 4.

Fig. 4 is a transverse vertical section through the switch showing the contact brush in contact with the contact plates.

Fig. 5 is a sectional view showing the contact brush out of contact with the contact plates.

Fig. 6 is a detail perspective view of the latch carried by the operating lever.

Similar numerals of reference indicate corresponding parts throughout all the figures of the drawings.

Referring more especially to the construction illustrated in the accompanying drawings, the numeral 1 indicates the primary winding and the numeral 2 the secondary winding of a transformer, the numerals 3 and 4 indicating the wires leading from the transformer. The numerals 5 and 6 indicate the wires leading from the source of current to the transformer. The wire 7 being connected at 7 to one extremity of the primary winding, the wire 8 being connected to a stud 9 which is connected with the contact bar 9 by means of a strip 10. A series of spaced contact plates 11 are located in alignment parallel to the contact bar 9, each of said contact plates being provided with a stud 11 which is connected by a wire 12 with the primary winding of the transformer.

An elongated tank 13 is provided, said tank being preferably lined with suitable insulating material 14 and with a cover 15 of suitable insulating material, said cover being provided with a centrally located, longitudinal slot 16 which is preferably provided with the angular guide rails 17. The tank 13 should be kept full of oil as shown in Figs. 4 and 5.

A suitable web 18 is provided upon the top of the tank at each end thereof, said webs being connected to the tank in any suitable and well known manner as by the screw threaded hooks 19 which pass through suitable apertures in the angle irons 20 connected to the sides of the tank, said hooks being provided with wing nuts 21. A rod 22 is carried between the webs 18 being located through suitable apertures therein and held against movement by set screws or the like 23. The operating handle 24 is preferably provided with the bifurcated arms 25 which are pivotally and slidably mounted upon the rod 22 and the operating lever 26 is pivotally and slidably mounted upon the rod 22 intermediate the bifurcated arms of the bifurcated handle.

A catch 27 provided with a beveled end 28 is slidably mounted within the transverse walls 29 and 30 of the operating handle, a hand grip lever 31 which is pivoted at 32 upon the operating handle being pivotally connected at 33 to the opposite extremity of
the latch. The latch 27 is provided with a reduced portion 34 which is received by the bifurcated arm 35 of the locking pawl 36 which is pivoted at 37 to the operating handle. A shoulder 39 is formed upon the latch 27 and a coil spring 40 is located around the outer reduced extremity 41 of the latch said spring being interposed between the shoulder 39 and the wall 30. A collar 42 is slidably mounted upon the latch 27 and is adapted to contact with the rear face of the locking pawl 36, a spring 43 being interposed between said sliding collar and the wall 30.

The operating lever 28 is provided with a tail 44 having a beveled end 45. A flat face 46 is provided at the inner extremity of the latch 27 upon the under side thereof, said face engaging the upper edge 47 of the tail 44 of the operating lever when the parts are in the closed position as shown in Fig. 4. Pivoted centrally at 48 is the extremity of the lever 26 is a pair of upwardly disposed links 49 to the upper extremities of which are pivotally connected heads 50, each of said heads carrying a downwardly disposed rod 51. The rods 51 pass through the insulating block 52 and are provided with suitable nuts 53. A handless bolt 54 is centrally located through the block 52 and passes through the saddle 55, the spring member 56 which carries the renewable arcing tips 57 at its extremities, and through the laminated contact brush 58 and the convex block 59, nuts 60 being provided at the upper and lower extremities of said bolt.

A contact strip 61 is located along the outer edge of the contact strip 9 and is adapted to be engaged by the adjacent arcing tip 57 when the parts are in the closed position as shown in Fig. 4. Each of the contact plates 11 is provided along its outer edge with a contact strip 62 adapted to be engaged by the adjacent arcing tip 57.

A strip 63 is carried between the webs 18 and located parallel to the rod 22, said strip being provided opposite each of the contact studs 11 with a notch 64 adapted to be engaged by the recess 65 provided in the locking pawl 36.

When the parts are in the position shown in Fig. 4 the circuit through the transformer is closed by means of the laminated brush connecting the contact strip 9 with one of the contact plates 11. When it is desired to raise or lower the voltage the hand grip lever 31 upon the operating handle is gripped, drawing the extremity of the latch 27 out of contact with the tail of the operating lever. The laminated brush 38 being formed of spring material will instantaneously spring away from the contact strip and plate reducing the possibility of causing an arc between said brush and the contact strip and plate. The renewable arcing tips 57 are provided in order to receive any arc which may be caused at any time upon the operation of the switch. These arcing tips being adapted to contact with the strips 91 and 92 before the brush contacts and to remain in contact with the strips 91 and 92 until the contact of the brush is broken. As the grip 31 is moved farther toward the handle 24 the shoulder 66 upon the latch 27 will engage the locking pawl 36, moving said pawl out of engagement with the notch 64. The operating handle may then be moved into a position bringing the locking pawl clear of the strip 63. The parts will then be in the position shown in Fig. 5 of the drawings. The operating handle may then be moved laterally upon the rod 22 until the brush is brought opposite the desired contact plate 11. The operating handle is then moved down into the position shown 65 in Fig. 3, bringing the brush into contact with the strip 9 and the desired plate 11.

By the construction of the operating handle and lever herein described it will be seen that it is impossible to break the contact between the brush and the contact strip and plate slowly. Further, it will be seen that the brush must necessarily be released from contact with the contact strip and plate, before it can be moved into position to register with any of the other contact plates.

Although Fig. 1 shows the contact plates 11 connected with the primary winding of the transformer it will of course be understood that this is merely an illustration of one of the many forms in which the present invention may be used. The same results may be obtained by connecting the contact plates with the secondary winding of the transformer and in fact the device disclosed herein may be used in any instance where it is desirable to make selective contact between any pair of a plurality of terminals.

By providing the strip 63 with notches 64 opposite to the contact plates 11 and by constructing the locking pawl 36 with the elongated lower portion herein the notch 65 therein it will be seen that it will be impossible to bring the operating handle into the position shown in Fig. 4 thus forming a contact except when the operating handle is moved in such position that the pawl 36 will register with one of the notches 64. Thus it will be impossible to bring the brush into contact with the strip 9 at a point intermediate two of the plates 11, preventing a possible short circuit between two of the contacts 11.

Although the drawings and above specification disclose the best mode in which I have contemplated embodying my invention I desire to be not limited to the details of such disclosure, for in the further practical application of my invention, many changes in form and construction may be.
made, as circumstances require or experience suggests, without departing from the spirit of the invention, within the scope of the appended claims.

1. In a switch of the character described, a contact strip, a plurality of contact plates located in alignment parallel with said contact strip, a movable bridge member arranged for selectively making contact between each pair of said contacts, means for automatically releasing said bridge member from contact before shifting said bridge member into the position to make contact with one of said contact plates.

2. In a switch of the character described, an oil containing tank, a contact strip located in said tank, a plurality of contact plates located in alignment parallel to said strip, a rod mounted upon said tank, an operating handle slidably mounted upon said rod, an operating lever slidably mounted upon said rod, means for connecting said operating lever with said handle, means for disengaging said lever from said handle, and a short circuiting member carried by said lever and arranged to make selective contact with said contact strip and one of said contact plates.

3. In a switch of the character described, an oil containing tank, a contact strip located in said tank, a plurality of contact plates located in alignment parallel to said strip, a rod mounted upon said tank, an operating handle provided with bifurcated arms, said bifurcated arms slidably mounted upon said rod, an operating lever slidably mounted upon said rod, a spring pressed latch slidably mounted in said operating handle and arranged to engage one extremity of said operating lever, a hand grip pivotally mounted upon said hand lever and connected to said latch, and a short circuiting member carried by said lever and arranged to make selective contact with said contact strip and one of said contact plates.

4. In a switch of the character described, an oil containing receptacle, a contact strip located in said receptacle, a plurality of contact plates located in alignment parallel to said strip, a rod mounted upon said receptacle, an operating handle provided with bifurcated arms, said bifurcated arms slidably mounted upon said rod, an operating lever slidably mounted upon said rod between said bifurcated arms, a spring pressed latch slidably mounted in said operating handle and arranged to engage one extremity of said operating lever, a shoulder formed upon said latch, a locking pawl pivotally connected to said operating handle and adapted to be engaged by said shoulder, a notched strip carried by said receptacle and provided with notches adapted to receive said locking pawl, a loose spring pressed collar slidably mounted upon said latch and adapted to engage said locking pawl, a hand grip pivotally connected to said hand lever and connected to said latch, and a short circuiting member carried by said lever and arranged to make selective contact with said contact strip and one of said contact plates.

5. In a switch of the character described, a plurality of pairs of contacts, a movable bridge member arranged for selectively making contact between each pair of said contacts and means for automatically releasing said bridge member from contact before shifting said bridging member into the position to make contact with a different pair of contacts.

6. In a switch of the character described, a contact strip, a plurality of contact plates located in alignment parallel with said contact strip, a rod located parallel with said contact strip, an operating handle slidably mounted upon said rod, an operating lever pivotally mounted upon said handle, a short circuiting member carried by said lever and arranged to make selective contact with said contact strip and any one of said contact plates, means for moving said lever with said handle, means for disengaging said lever to quickly break the contact between said strip and any of said plates and means for preventing said handle from being moved until said contact is broken.

7. In a switch of the character described, a contact strip, a plurality of contact plates located in alignment parallel with said contact strip, an operating handle slidably mounted upon said rod, an operating lever pivotally mounted upon said handle, a short circuiting member carried by said lever and arranged to make selective contact with said contact strip and any one of said contact plates, means for moving said lever with said handle and means for disengaging said lever to quickly break the circuit between said strip and any of said plates.

8. In a switch of the character described, a tank adapted to contain oil, one or more pair of terminals located in said tank, a rod mounted upon said tank and arranged parallel to said terminals, a lever slidably mounted on said rod, links connected to said lever and extending into said tank, and a short circuiting member carried by said links and movable by said lever in a direction normal to the plane of the terminals and arranged to make selective contact with any pair of said terminals by means of the operation of said lever.

9. In a switch of the character described, a tank, a contact strip located within said tank, a plurality of contact plates located in said tank, a plurality of contact plates located in alignment parallel to said strip, a rod mounted upon said tank and arranged parallel to said terminals, a lever slidably mounted on said rod, links connected to said lever and extending into said tank, and a short circuiting member carried by said links and movable by said lever in a direction normal to the plane of the terminals and arranged to make selective contact with any pair of said terminals by means of the operation of said lever.
alignment parallel with said contact strip, a rod mounted upon said tank and arranged parallel to said contact strip, a lever slidably mounted upon said rod, links connected to said lever and extending into said tank, a short circuiting member carried by said links and arranged to make selective contact with said contact strip and any of said contact plates and means for preventing said lever from being slidably moved upon said rod when said short circuiting member is in contact with said contact strip and any of said contact plates.

In testimony that I claim the above, I have hereunto subscribed my name.

FRANK T. COPE.