

Feb. 4, 1941.

W. H. FRANK

2,230,428

SWITCH

Original Filed Jan. 16, 1936

2 Sheets-Sheet 1

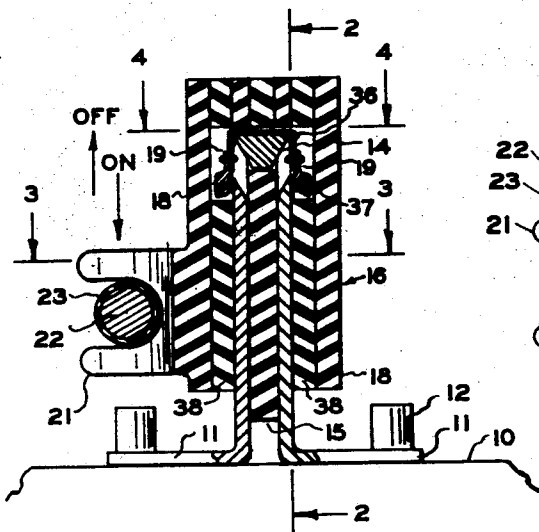


FIG. 1

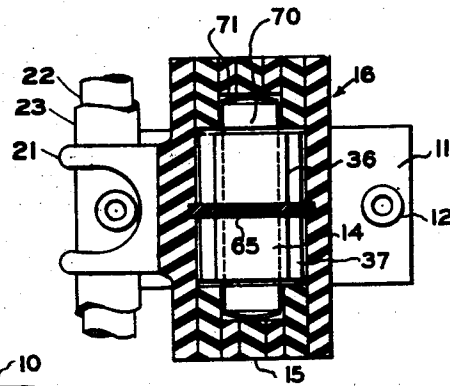


FIG. 4

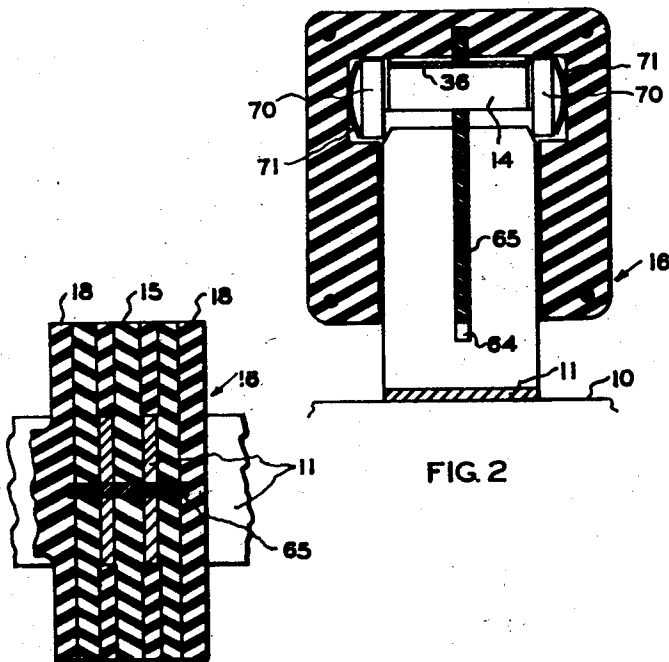


FIG. 2

FIG. 3

INVENTOR.
William H. Frank
 BY *Laurence E. Fisher*
Daniel G. Bullen. ATTORNEY.

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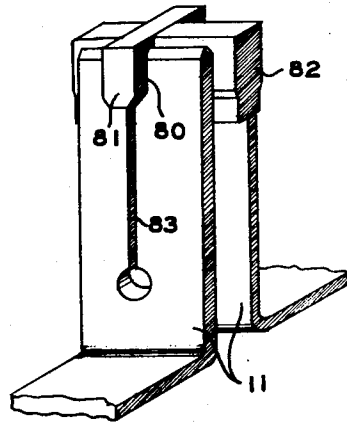


FIG. 5

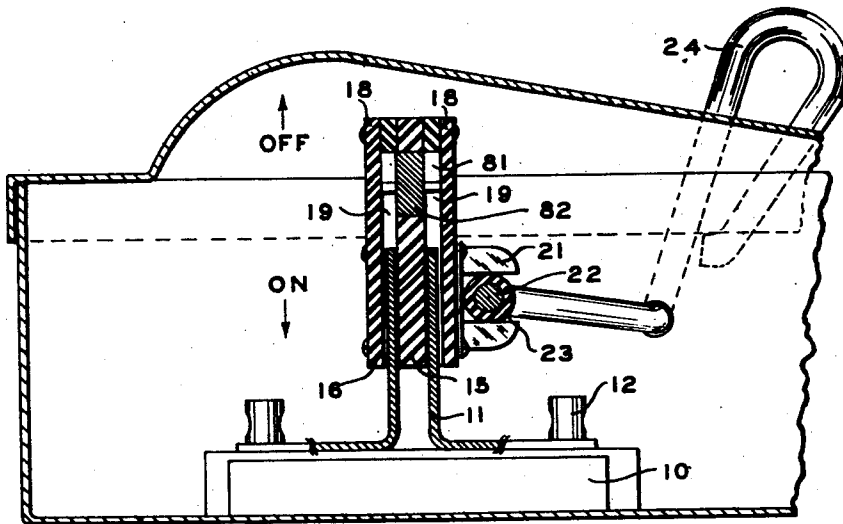


FIG. 6

INVENTORS
William H. Frank
BY *Lawrence E. Fisher*
Daniel S. Fuller ATTORNEY.

UNITED STATES PATENT OFFICE

2,230,428

SWITCH

William H. Frank and Lawrence E. Fisher,
 Detroit, Mich.

Original application January 16, 1936, Serial No.
 59,379, now Patent No. 2,128,999, dated September
 6, 1938. Divided and this application Feb-
 ruary 21, 1940, Serial No. 320,119

10 Claims. (Cl. 200—151)

This application relates to switch contact arrangements and more particularly it relates to improvements in the contact arrangements disclosed as and forming part of the switches of a prior patent, No. 2,116,673, of May 10, 1938. This application is a continuation in part of a prior application, Serial No. 217,631, filed July 5, 1938, in turn a divisional of Serial No. 59,379 filed January 16, 1936, now Patent No. 2,128,999 of September 6, 1938.

Specifically, this application relates to contact arrangement and novel details of the same differing from those previously described and adapted to produce improved contact making and breaking.

For an understanding of the improvements herein disclosed, reference should be had to the appended drawings disclosing the same. In these drawings,

Fig. 1 shows a multiple break, multiple surface, and quadruple cell contact arrangement in sectional view;

Figs. 2 to 4 are sectional views as if on corresponding lines of Fig. 1.

Fig. 5 shows another form of multiple break multiple surface contact arrangement;

Fig. 6 shows an operating arrangement for the contact set of Fig. 5, typical of that useful for the contact sets of Figs. 1-4.

Generally speaking, the contact arrangements herein disclosed resemble that of the switch of the aforementioned patent, No. 2,116,673. Accordingly, it will be seen that the stationary contacts herein disclosed are mounted upon an insulation base 10 and are referenced 11; each contact is connected to a circuit conductor by a suitable binding post 12. For bridging the stationary contacts there is provided a movable contact member 14 comprising a block supported in and occupying an opening in a slide 15 formed as part of an insulation housing generally referenced 16 and adapted to be reciprocated by a lug and ball arrangement comprising a lug 21 and a ball 22 surrounded by a bushing 23 and operated by a handle 24 so as to cause the movable contact to bridge or be clear of the stationary contacts, the housing 16 reciprocating in the directions indicated by the arrow marked "Off" and "On."

The lug and ball arrangement 21-23 forms no part of the present invention, it being conventional to use such arrangements for reciprocating contact sets in switches, as indicated in a prior patent, No. 2,139,071, of December 6, 1938.

The housing 16 is of laminated construction and includes outside portions 18 between which

and the slide 15 are cells 19 closely fitting and receiving the stationary contacts 11.

Figs. 1-4

The movable contact 14 of Figs. 1-4 is formed as a trapezoidal slug to engage the tips of the stationary contacts with a butt pressure when it bridges these stationary contacts. For additional contact there is provided and secured to the movable contact of Figs. 1-4, a U-shaped spring 36 of contact material to whose ends are secured and integrally formed contact tips 37. The spring 36 will not only function to urge the tips of the stationary contacts 11 toward each other to increase the butt contact pressure between these tips and the contact 14, but in addition will urge the contact tips 37 with considerable pressure against the stationary contacts 11 so that the contacts 37 will form arcing tips outside of the stationary contacts 11 to supplement the engagement of the movable contact 14 with the tips of the stationary contacts, the proportioning of the parts being such that contacts 37 will make with stationary contacts 11 before and break therefrom after the movable contact 14 makes and breaks contact.

The open end of the housing of Figs. 1-4 is provided with supplemental portions 38 of insulation material registering with the terminals of the tips 37, the entire effect being to have the movable housing surround the stationary contacts closely and with no appreciable air gaps.

The stationary contacts of Figs. 1-4 are slotted as at 64 to receive a barrier plate member 65 of insulation through which passes and to which is fixed the contact 14 so that the housing may have four cells instead of two to provide many contact breaks, with each break being in a cell isolated from any other contact break.

The block contact 14 has its ends received in holes of contact blocks 70 which are so disposed as to wipe the edges of the stationary contacts 11, springs 71 being provided for urging the blocks 70 against such edges.

Fig. 5

In the contact set of Fig. 5, both stationary contacts 11 are slotted or split, as at 80, for receiving a transverse contact block member 81 integrally secured to contact block member 82 which slides between and engages and wipes the inside surface of the contacts 11 for providing multiple break multiple surface contact, with block 81 wiping the edges of the contacts 11 at the splits 80.

Relief slots 83 in both contacts 11 provide a springiness to them to enhance contact pressure between both contacts 11 and both ends of contact 81.

5 It will be seen that unlike known constructions, as in Badeau Patent No. 765,609 of July 19, 1904, the arrangements hereof are such that at least one of the members engaging the prongs is of insulation, and that one of them slides in the
10 splits of the prongs. At least one of these two characteristics distinguishes any embodiment herein shown from that shown by the Badeau patent.

15 Now having described the contact arrangements herein disclosed, reference should be had to the claims which follow for a determination of the inventions hereof.

We claim:

20 1. A switch comprising a pair of adjacent aligned split contacts having flat facing surfaces, a third contact arranged and proportioned to slide rectilinearly between them and to engage their flat facing surfaces, two contact elements fixed to the third contact at its ends and arranged and pro-
25 portioned to slide along the four edges of the two first mentioned contacts, an insulating plate arranged and proportioned to slide in the splits of the first mentioned contacts and fixed to the third contact which passes through it, the third
30 contact and the plate and the elements forming a unit, and means for moving said unit relative to the first two contacts so that the third contact slides between the first two, and the contact ele-
35 ments slide along the edges of the first two contacts, and so that the plate slides in the split of the first two contacts.

2. A switch comprising a pair of adjacent aligned contacts having flat facing surfaces, a
40 third contact arranged and proportioned to slide rectilinearly between them and to engage their flat facing surfaces, two contact elements fixed to the third contact at its ends and arranged and proportioned to slide along the four edges
45 of the two first mentioned contacts, the third contact and the elements forming a unit, and means for moving said unit relative to the first two contacts so that the third contact slides be-
50 tween the first two, and the contact elements slide along the edges of the first two contacts.

3. A switch comprising a pair of adjacent aligned split contacts having flat facing surfaces, a third contact arranged and proportioned to slide
55 rectilinearly between them and to engage their flat facing surfaces, an insulation plate arranged and proportioned to slide in the splits of the first mentioned contacts and fixed to the third
60 contact which passes through it, the third contact and the plate forming a unit, and means for moving said unit relative to the first two con-
65 tacts so that the third contact slides between the first two and so that the plate slides in the split of the first two contacts.

4. A switch comprising a pair of adjacent
65 split contacts having flat facing surfaces, a member arranged and proportioned to slide between them and to engage their flat facing surfaces, and a member secured to the other member so as
70 to be movable therewith, arranged and proportioned for sliding in the splits of the first pair of contacts, the two members forming a unit, and
75 means for moving said unit relative to the first pair of contacts so that the first member slides between the contacts of the pair and the second member slides in the splits of the contacts of the

pair, one of said members being of contact material.

5. A switch comprising a pair of adjacent split contacts having flat facing surfaces, a member
85 arranged and proportioned to slide between them and to engage their flat facing surfaces, and a member secured to the other member so as to be movable therewith, arranged and proportioned for
90 sliding in the splits of the first pair of contacts, the two members forming a unit, and means for moving said unit relative to the first pair of
95 contacts so that the first member slides between the contacts of the pair and the second member slides in the splits of the contacts of the pair, one of said members being of contact material,
100 and one being of insulating material.

6. A switch comprising a pair of adjacent con-
105 tacts having flat facing surfaces and edge surfaces, a member arranged and proportioned to slide between them and to engage their flat facing surfaces, and a member arranged and pro-
110 portioned to engage their edge surfaces, the two members forming a unit, and means for moving said unit relative to the pair of contacts so that the first member slides between the con-
115 tacts of the pair and the second member slides on the edges of the contacts of the pair, one of said members being of contact material, and one being of insulating material.

7. A switch comprising a pair of adjacent con-
120 tacts having flat facing surfaces and edge surfaces, a member arranged and proportioned to slide between them and to engage their flat facing surfaces, and a member arranged and proportioned
125 to engage their edge surfaces, the two members forming a unit, and means for moving said unit relative to the pair of contacts so that the first member slides between the contacts of the pair
130 and the second member slides on the edges of the contacts of the pair.

8. A switch comprising a pair of adjacent con-
135 tacts having flat facing surfaces and edge surfaces, a member arranged and proportioned to slide between them and to engage their flat facing surfaces, and a member arranged and pro-
140 portioned to engage their edge surfaces, the two members forming a unit, and means for moving said unit relative to the pair of contacts so that the first member slides between the contacts of
145 the pair and the second member slides on the edges of the contacts of the pair, the contacts being split so that the edges of the splits are the edge surfaces of the contacts which are engaged
150 by the second named member.

9. A switch comprising a pair of adjacent con-
155 tacts having flat facing surfaces and edge surfaces, a member arranged and proportioned to slide between them and to engage their flat facing surfaces, and a member arranged and proportioned
160 to engage their edge surfaces, the two members forming a unit, and means for moving said unit relative to the pair of contacts so that the first member slides between the contacts of
165 the pair and the second member slides on the edges of the contacts of the pair, the contacts being split so that the edges of the splits are the edge surfaces of the contacts which are engaged
170 by the second named member, the latter being of contact material.

10. A switch comprising a pair of adjacent
175 contacts having flat facing surfaces and edge surfaces, a member arranged and proportioned to slide between them and to engage their flat facing surfaces, and a member arranged and proportioned to engage their edge surfaces, the two

members forming a unit, and means for moving said unit relative to the pair of contacts so that the first member slides between the contacts of the pair and the second member slides on the edges of the contacts of the pair, the contacts being split so that the edges of the splits are the

edge surfaces of the contacts which are engaged by the second named member, both members being of contact material.

WILLIAM H. FRANK.
LAWRENCE E. FISHER.