

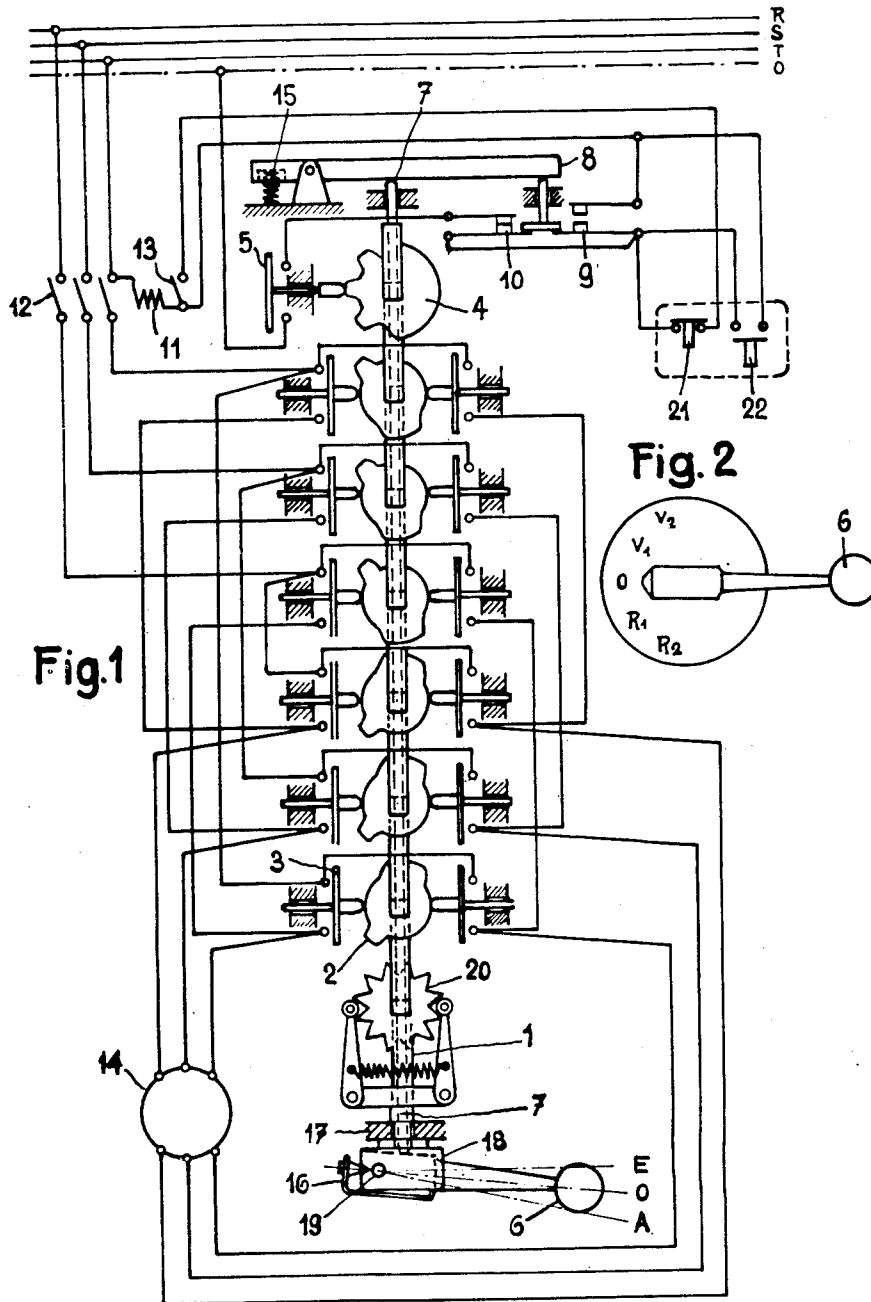
March 22, 1949.

W. GROSSEN

2,465,086

HAND OPERATED CAM SWITCH

Filed July 10, 1945



Walter Grossen
by E. F. Winderoth
Attorney

UNITED STATES PATENT OFFICE

2,465,086

HAND-OPERATED CAM SWITCH

Walter Grossen, Basel, Switzerland, assignor to
Fr. Sauter A. G. Fabrikelekt. Apparate, Basel,
Switzerland, a Swiss firm

Application July 10, 1945, Serial No. 604,177
In Switzerland May 4, 1944

Section 1, Public Law 690, August 8, 1946
Patent expires May 4, 1964

5 Claims. (Cl. 175—294)

1

My present invention relates to improvements in manually actuated switch and control devices of the cam-operated selector type, particularly for machine tools and like machines operated by electric motors; and the objects of my improvements are first, to afford facilities for automatically cutting out the current from the switch when performing any switching operations, second to make provision for superimposing two switching operations (such as e. g., cutting in a motor and switching from first to second speed) so as to permit of performing same by a single hand lever, and third to afford means which permit of adjusting any speed or operative switching position alternatively after passing through the intermediate speeds appurtenant to the intermediate positions or, by omitting same, directly from neutral.

I attain these and related objects by the switch shown, by way of one embodiment relating to a selector switch for the control of a three-phase motor in suitable connection which permits of running same at two speeds forward and reverse, in the accompanying drawing, in which:

Fig. 1 is a wiring diagram of the switch and appurtenant devices, and

Fig. 2 shows the operative interpositions which may be effected by the switch lever.

The cams 2 for the selector contacts 3 as well as the special cam 4 actuating the auxiliary contact 5, are secured to the hollow square shaft 1. The latter is actuated by the joy-stick 6 swinging in the plane of Fig. 2 at right angles thereto, and is journaled in the bearing 17. The joy-stick 6 is also mounted rockable on the pivot 18 in the guide 19 secured to the shaft 1.

When rocking the joy-stick 6 on the pivot 18, i. e. axially to the shaft 1, the rod 7 housed in the latter is axially displaced therein and rocks the lever 8. The latter is spring-loaded at 15, and controls the auxiliary contacts 9 and 10. When pushing the lever 8 into the position E, the contact 9 is made, and when pulling same out into the position A, the contact 10 is broken. When the joy-stick is let loose in the position A or E, it is restored to neutral O through the action of the spring catch 16.

The coil 11 of the circuit-breaker 12 is connected across the holding contact 13 in series with the auxiliary contacts 10 and 5, and the cut-in auxiliary contact 9 is connected in parallel with the holding contact 13. Contacts 9 and 10 are biased to closed position.

When the lever 8 is in the position O of Fig. 2, the circuit-breaker 12 is broken. When swinging

2

the lever 8 into any of the positions V₁, V₂ (forward) and R₁, R₂ (rearward), is held by the dented disk 20. The auxiliary cam 4 is so adapted as to open the auxiliary contact 5 when the lever 8 in Fig. 2 is in the position O or in positions intermediate of V₁ and V₂ or R₁ and R₂, and to close same in these latter or switching positions.

When throwing the motor 14 into first or second speed, forward or reverse (Fig. 2), the coil current of the circuit-breaker control 11 is interrupted every time, and the breaker 12 drops off, i. e. the switching according to Fig. 2 is done without current.

When starting the motor 14, the lever 8 is first swung into the desired position of Fig. 2, and then rocked into engagement (position E of Fig. 1) axially with the rod 7. During the swinging movement the switch 12 remains broken, and only closes when the lever 8 is rocked into the position E of Fig. 1. The lever 8 also, however, may be rocked into the latter position while swinging, whereby the switch 12 is cut in. In swinging the lever according to Fig. 2, the switch 12, in this latter case, is momentarily interrupted due to the breaking of the contact 5. When switching the motor 14 off, the lever 8 is rocked or pulled forward (Fig. 1), thereby breaking the contact 10 and interrupting the control current of the switch 12. When swinging the lever 8 according to Fig. 2, without simultaneously rocking or pushing it back (Fig. 1), the switch 12 is opened in the neutral or intermediate positions thereof.

In order to permit of starting or cutting out the motor 14 also from another place, two push buttons 21, 22 are provided for. When pushing the button 21, the holding circuit of the switch 12 is interrupted, thereby dropping off the latter and keeping it open. When pushing the button 22, the switch 12 is excited and remains closed.

Any other wiring scheme than the one here illustrated may be used, of course, whereby the number of rocking cams and switching positions may be changed as desired.

A particular advantage of the switch and control device described, aside from the currentless switching of the selector contacts, is that any speed or, respectively, switching position may be alternatively set either after having passed the intermediate speeds appurtenant to the intermediate positions or, by omitting same, directly from neutral.

What I claim is:

1. A hand operated cam switch for machine tools or the like comprising a switch housing, a hollow shaft rotatably journaled in said housing,

3

a plurality of selector cams secured to said shaft, a plurality of pairs of selector contactors coacting with said selector cams upon rotation of said shaft to determined positions, an auxiliary cam secured to said shaft, a single contactor coacting with said auxiliary cam, a loose rod extending axially through said shaft and slidable therein, a spring loaded lever pivoted on said switch housing and engaging said loose rod, a coil-tripped circuit-breaker series connected with said selector contacts, a pair of contactors actuated by said spring loaded lever, said last named contactors being so connected to said single contactor and said circuit breaker that said circuit breaker will be disconnected from said selector contactors and said single contactor when said contactors are rocked by said lever through actuating said loose rod, and said auxiliary cam being so shaped that when said selector cams and selector contacts are not in contact at a determined position of aforesaid lever said single contact and said circuit breaker will be temporarily disconnected, whereby selective current and non-current switchings of a motor drive for said tool may be made.

2. In a switch as defined in claim 1, a hand lever engaging said hollow shaft when being swung in one plane and engaging said loose rod when rocked in one direction in a plane at right angles to the former plane, and wherein said loose rod follows the rocking of said lever in the opposite direction under the action of said spring-loaded lever, the said lever being rocked to neutral whenever let loose.

3. A switch of the class described and according to claim 1, in which the said coil-trip controlled circuit-breaker comprises a holding contactor, and the said pair of contactors a cut-out

4

contactor, said holding contactor being series-connected to the latter, and said cut-out contactor being actuated by the rocking movements of the switch lever.

4. A switch as claimed in claim 3, in which the said pair of contactors comprise a cut-out contactor and a cut-in contactor, said single contactor being series-connected to the cut-out contactor and said holding contactor of the circuit breaker, the said single contactor being open when the switch is in the no-load position.

5. A switch as claimed in claim 4, and wherein a push-button 2-point make-and-break for the independent control of the said circuit-breaker is provided, each of said latter contacts being series-connected to the holding contactor of the circuit-breaker and parallel-connected to the cut-in contactor.

WALTER GROSSEN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
897,497	Seabolt	Sept. 1, 1908
1,123,283	Harris	Jan. 5, 1915
1,836,838	Coldwell	Dec. 15, 1931
1,964,467	Hunter et al.	June 26, 1934
2,050,076	Wilms	Aug. 4, 1936
2,398,007	Hunter	Apr. 9, 1946
2,432,959	Wortman	Dec. 16, 1947

FOREIGN PATENTS

Number	Country	Date
28,188	Great Britain	Nov. 11, 1909