A. K. SUTHERLAND.

INCLOSED SWITCH.

APPLICATION FILED MAR. 29, 1918.

1,288,741.

Patented Dec. 24, 1918

2 SHEETS—SHEET 1.

Fig. 2.

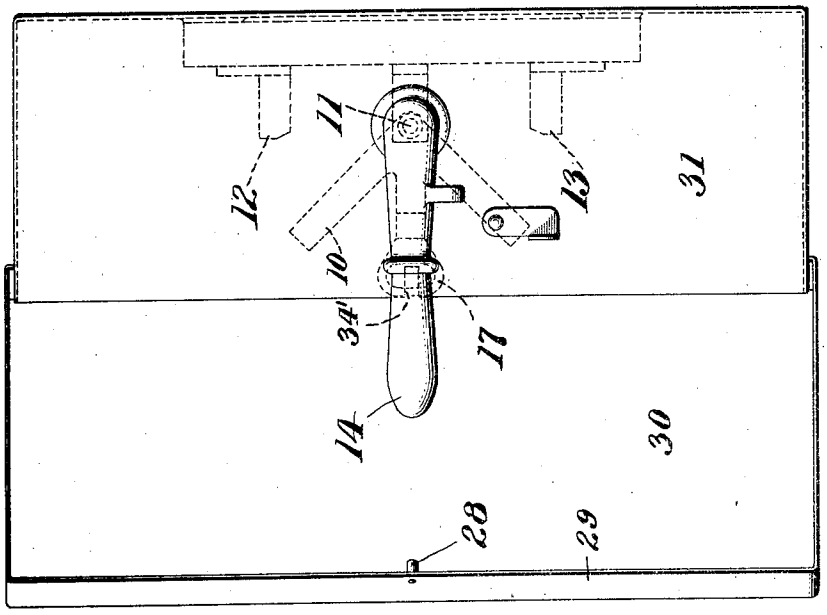
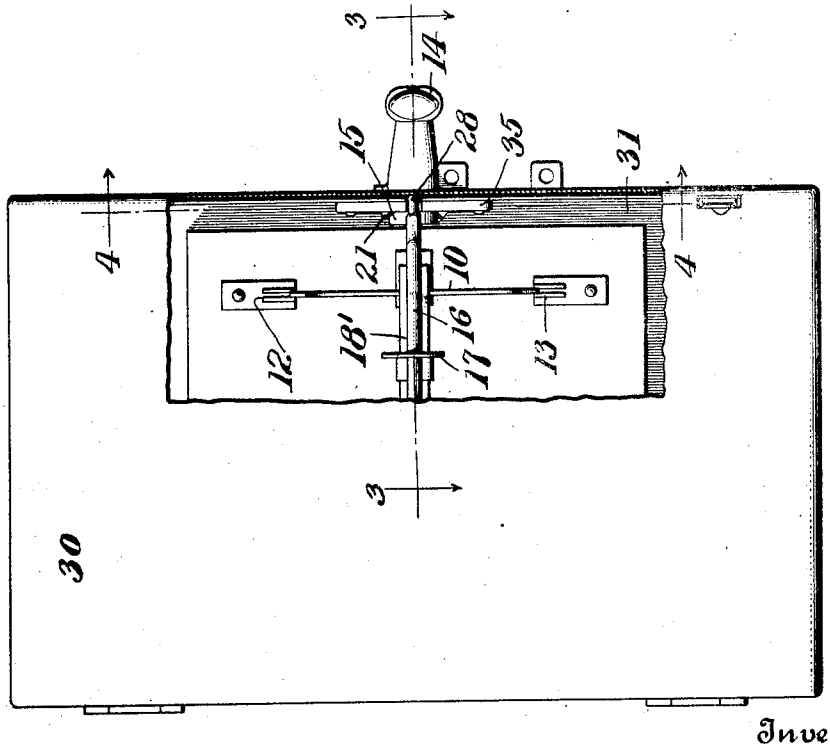


Fig. 1.



Inventor

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2 SHEETS—SHEET 2.

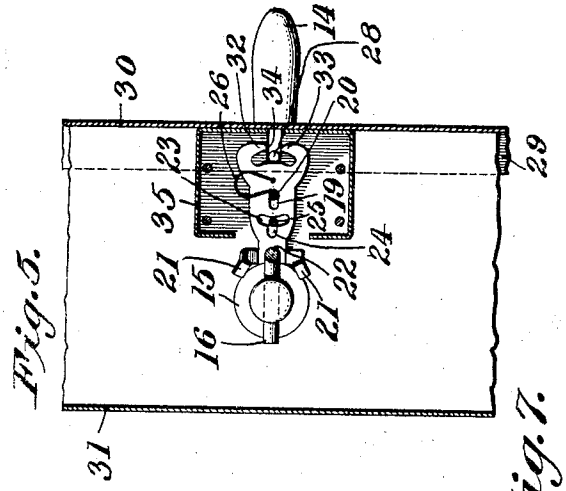


Fig. 5.

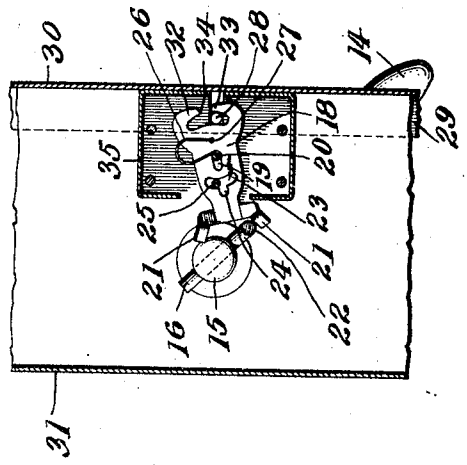


Fig. 7.

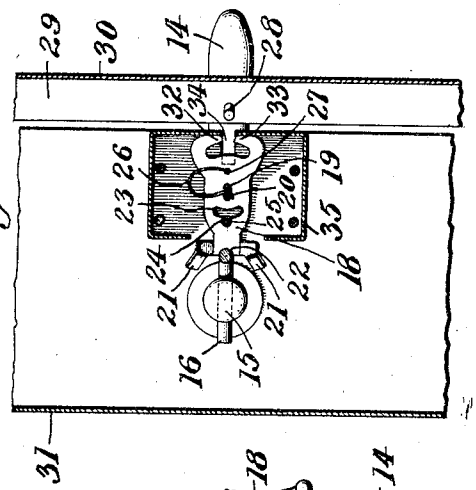


Fig. 4.

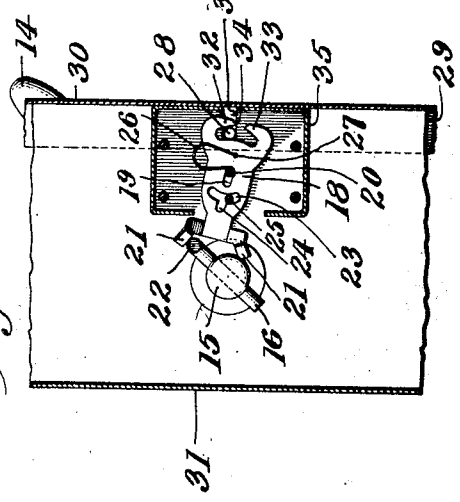


Fig. 6.

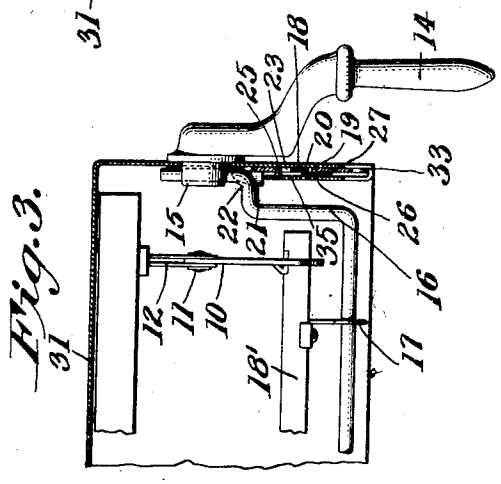


Fig. 3.

Inventor

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UNITED STATES PATENT OFFICE.

ALEXANDER K. SUTHERLAND, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR TO THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, OF PLAINVILLE, CONNECTICUT, A CORPORATION OF CONNECTICUT.

INCLOSED SWITCH.

1,288,741. Specification of Letters Patent. Patented Dec. 24, 1918.

Application filed March 29, 1918. Serial No. 225,447.

To all whom it may concern:

Be it known that I, ALEXANDER K. SUTHERLAND, a subject of the King of Great Britain, residing at New Britain, Connecticut, have invented a new and useful Inclosed Switch, of which the following is a specification.

My invention relates to inclosed switches and particularly to those of the "double-throw" type.

The objects of my invention are to provide simple, practical and efficient means for automatically locking the switch in an intermediate neutral position when the switch casing is open and for automatically locking the switch casing closed, when the switch is shifted in either direction to close the circuits controlled thereby.

Other objects of the invention are to provide locking means of this character which can be readily adapted to switches of the character now in general use.

Further aims of the invention are to provide such automatically locking means which will be positive in its operation, of rugged construction and of compact design.

Briefly stated the invention comprises in a preferred form locking means in the form of a plate connected so as to be shifted by the switch and adapted to lock the switch in an intermediate neutral position, said plate being adapted to be shifted to free the switch when the cover is closed and being provided with special detents which are arranged to secure the cover in closed position when the switch is operated in either direction.

Other features and details of construction will appear as the specification proceeds, attention being now directed to the accompanying drawings wherein I have illustrated the invention embodied in a practical commercial form.

Figure 1 is a front or face view of the complete switch, with a portion of the cover shown broken away to expose the parts within, the switch being in the intermediate open-circuit position.

Fig. 2 is a side elevation of the switch with the cover unlocked and partly opened.

Fig. 3 is a transverse sectional view taken substantially on the plane of the line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken substantially on the plane of the line 4—4 of Fig. 1 showing the switch in locked condition and the cover unlocked and partially opened.

Fig. 5 is a similar view showing the cover closed and the switch unlocked and free to be operated in either direction.

Fig. 6 is a like view indicating the switch as operated in one direction, and

Fig. 7 is a view showing the switch operated in the reverse direction, the cover being locked closed under both these latter conditions.

The switch illustrated is of a type largely used for starting alternating current motors and embodying double-armed switch blades 10 pivoted at 11 and adapted when rocked in one direction to engage one set of switch contacts 12, and when rocked in the opposite direction to engage the reversely disposed set of contacts 13. This switch is operated in the present instance by means of a handle 14 having a hub portion 15 pivoted substantially in line with the pivot 11 of the switch blades and connected with the switch by means of an operating arm 16, engaged with the bracket 17 on the cross bar 18' which connects the several switch blades.

18 designates the so-called locking member which is illustrated in the form of a substantially flat plate longitudinally slotted at 19 so as to have a rocking and sliding fit over the pivot pin 20, said plate being forked or provided with a pair of spaced lugs 21 at its lower end receiving between them a shouldered portion 22 of the switch operating arm whereby to cause said plate to be operated with the switch. This locking plate is also formed with an arcuate slot 23 provided intermediate its ends with a locking recess or pocket 24 to receive the locking post 25. The plate is normally shifted outwardly so as to maintain the locking post seated in its pocket as by means of a spring 26 connected with the plate at 27 and bearing on the pivot stud 20 substantially as indicated in Fig. 4.

The locking plate is depressed against the tension of the shifting spring by means of an abutment shown as an inwardly extending pin 28 on the dependent flange 29 of the cover 30, said cover being hinged to the box body 31 which forms the receptacle for the complete switch.

The operation of the parts thus far described will probably be best understood by reference to Figs. 4 and 5. In the first of these views the switch stands in the intermediate neutral position and the locking plate which is controlled thereby also stands in an intermediate position, shifted outwardly by the spring force to maintain the locking stud 25 engaged in the locking recess 24 in the arcuate slot 23. As the cover is closed the abutment pin 28 on the cover engages the rounded outer end of the locking plate and shifts the plate inward as indicated in Fig. 5, to thereby cause the locking post to stand in the arcuate portion of the slot 23. The switch it will be seen, with the cover closed, is now free to be shifted in either direction.

The cover is secured closed when the switch is thrown in either direction by means of the oppositely disposed detents 32 and 33 at the outer corners of the locking plate, said detents being in the nature of oppositely facing hooks, one or either of which engage over the abutment pin 28 as the plate is rocked in one direction or the other. Thus as the switch is rocked forwardly, or upwardly in the illustration, the locking plate is rocked in the reverse direction, the upper hook 32 engaging over the locking pin 28 (Fig. 6) and as the switch is rocked in the reverse direction, the second hook 33 is engaged over the cover abutment 28, (Fig. 7). As the locking plate is rocked in either direction the locking post 25 engages in the arcuate portion of the slot 23 at one side or the other of the locking recess 24 and hence said locking plate is secured in its inwardly shifted position so that any pull exerted to open the cover in this closed-circuit condition of the switch is taken up by the hooked detents and the locking post, the latter preventing any outward shifting movement of the locking plate. The hooked detents approach each other relatively closely, leaving the passage 34 therebetween sufficient only to permit the entrance of the abutment pin 28 therebetween, (see particularly Figs. 4 and 5), the side wall of the box being slotted at this point as indicated at 34′ to admit the abutment pin 28.

The locking plate may be housed within a casing, such as that indicated at 35, which may be riveted or otherwise secured to the inner wall of the switch casing. It will be apparent from the foregoing that the switch casing is locked closed when the switch is shifted in either direction from the intermediate neutral condition, and further that when the switch is shifted to the intermediate position the casing will be unlocked to permit opening of the cover. When the cover is then opened the switch will be locked in its neutral intermediate position and cannot be shifted to close the circuit until the cover is again closed. The mechanism by which these results are attained is simple and relatively inexpensive and occupies but small space.

I claim:—

1. In combination with a double-throw switch having an intermediate neutral position and movable in opposite directions from said neutral position for effecting different circuit connections, a cover for said switch, means for locking said cover closed over the switch, when the switch is thrown to either of the operative positions referred to and means positioned to unlock the cover by the movement of the switch to the intermediate neutral position.

2. In combination with a double-throw switch, a locking member operable by said switch and positioned normally to secure said double-throw switch in its intermediate neutral position, a cover for the switch, means operable on the closing of the cover over the switch for operating the locking member to release the switch and means controlled by said locking member for securing the cover closed over the switch when the switch is operated in either direction from the intermediate neutral position.

3. In combination with a double-throw switch, a locking member operable by said switch and arranged normally to secure said switch in an intermediate position, a guard for said switch, means on said guard for operating the locking member to release the switch and means on said locking member for securing the guard over the switch when said switch is operated in either direction from said intermediate position.

4. In combination with a double-throw switch, locking means operable by said switch and arranged normally to lock the switch in an intermediate position, a movable guard for the switch, means on said guard for unlocking the locking means to permit operation of the switch in either direction from said intermediate position, and securing means operable by the locking means when the switch is operated in either direction for securing the guard over the switch.

5. In combination with a double-throw switch, a pivoted locking plate arranged to be swung in opposite directions when said double-throw switch is operated in opposite directions and provided with means for

locking the switch in an intermediate position, a movable cover for the switch and means on the cover for shifting said locking plate to unlock the switch and permit the same to be shifted from the intermediate position in either direction.

6. In combination with a double-throw switch, a pivoted locking plate arranged to be swung in opposite directions when said double-throw switch is operated in opposite directions and provided with means for locking the switch in an intermediate position, a movable cover for the switch and means on said cover for shifting said locking plate to unlock the switch and permit the same to be shifted from the intermediate position in either direction, said locking plate having locking elements engaging the cover when the switch is shifted in either direction to thereby secure the cover over the switch.

7. In combination with a double-throw switch, a depressible locking member operable by the switch and arranged when not depressed to lock the switch in an intermediate position, a movable cover for the switch, means on said cover for depressing the locking member to unlock the switch and detents on said locking member engageable with the cover as the switch is shifted in either direction to secure said cover over the switch.

8. In combination with a double-throw switch, a depressible locking member operable by the switch and arranged when not depressed to lock the switch in an intermediate position, a movable cover for the switch, means on said cover for depressing the locking member to unlock the switch, detents on said locking member engageable with the cover as the switch is shifted in either direction to secure said cover over the switch, and means for holding the locking member in depressed position as the switch is rocked in either direction.

9. In combination with a double-throw switch, a pivoted and slidably supported locking plate connected with the switch so as to be swung on its pivot in the switch movements, a locking post engaged by said locking plate in the intermediate position of the switch, a movable cover over the switch, an abutment on said cover engageable with the locking plate to slide the same free of holding engagement with the locking post and oppositely disposed detents on the locking plate for engagement with a portion of the cover.

10. In combination with a double-throw switch, a pivoted and slidably supported locking plate connected with the switch so as to be swung on its pivot in the switch movements, a locking post engaged by said locking plate in the intermediate position of the switch, a movable cover over the switch, an abutment on said cover engageable with the locking plate to slide the same free of holding engagement with the locking post, oppositely disposed hooked detents having a passage therebetween for the abutment on the cover and arranged as the locking plate is rocked by the switch to engage over said abutment to thereby secure the cover in place.

11. In combination with a double-throw switch, a pivot stud, a locking plate slidably and pivotally engaged on said stud and provided with an arcuate slot therein with a detent pocket intermediate the ends of the same, a locking stud received in said slot, means for sliding the locking plate on its pivot to retain the detent pocket engaged with the locking stud, a working connection between the switch and locking plate, whereby the locking plate may be rocked on its pivot by the switch, a movable cover over the switch and an abutment on the cover for engagement with the locking plate to slide the same free of the restraint of the locking post.

12. In combination with a double-throw switch, a pivot stud, a locking plate slidably and pivotally engaged on said stud and provided with an arcuate slot therein with a detent pocket intermediate the ends of the same, a locking stud received in said slot, means for sliding the locking plate on its pivot to retain the detent pocket engaged with the locking stud, a working connection between the switch and locking plate, whereby the locking plate may be rocked on its pivot by the switch, a movable cover over the switch, an abutment on the cover for engagement with the locking plate to slide the same free of the restraint of the locking post and oppositely disposed detents engageable over said cover abutment as the locking plate is rocked in opposite directions.

13. In a switch of the character described, a casing provided with a hinged cover, a double-throw switch mounted in said casing, a handle for operating the switch in either direction, a locking member pivotally and slidably supported in the casing, a locking post arranged to secure said locking member in position to hold the switch in a definite condition, an abutment on the cover arranged to shift said locking member and free the same from the restraint of the locking post, and detents on the locking member arranged to engage over the abutment on the cover as the locking member is rocked in either direction.

14. In combination with a double-throw switch, a pivotally and slidably supported locking plate provided with a bifurcated inner end engaged with the switch mechanism and with oppositely disposed hooked

detents at the outer corners of said plate, said plate further having an arcuate slot provided with a locking recess intermediate the ends of the same, a locking post received in said arcuate slot and adapted when engaged in said locking recess to secure said locking plate against rocking movement and an abutment pin on the cover arranged to slide the locking plate to free the locking recess from the locking post, said abutment pin being adapted to be engaged by one or the other of the hooked detents as the locking plate is rocked in one direction or the other.

ALEXANDER K. SUTHERLAND.