

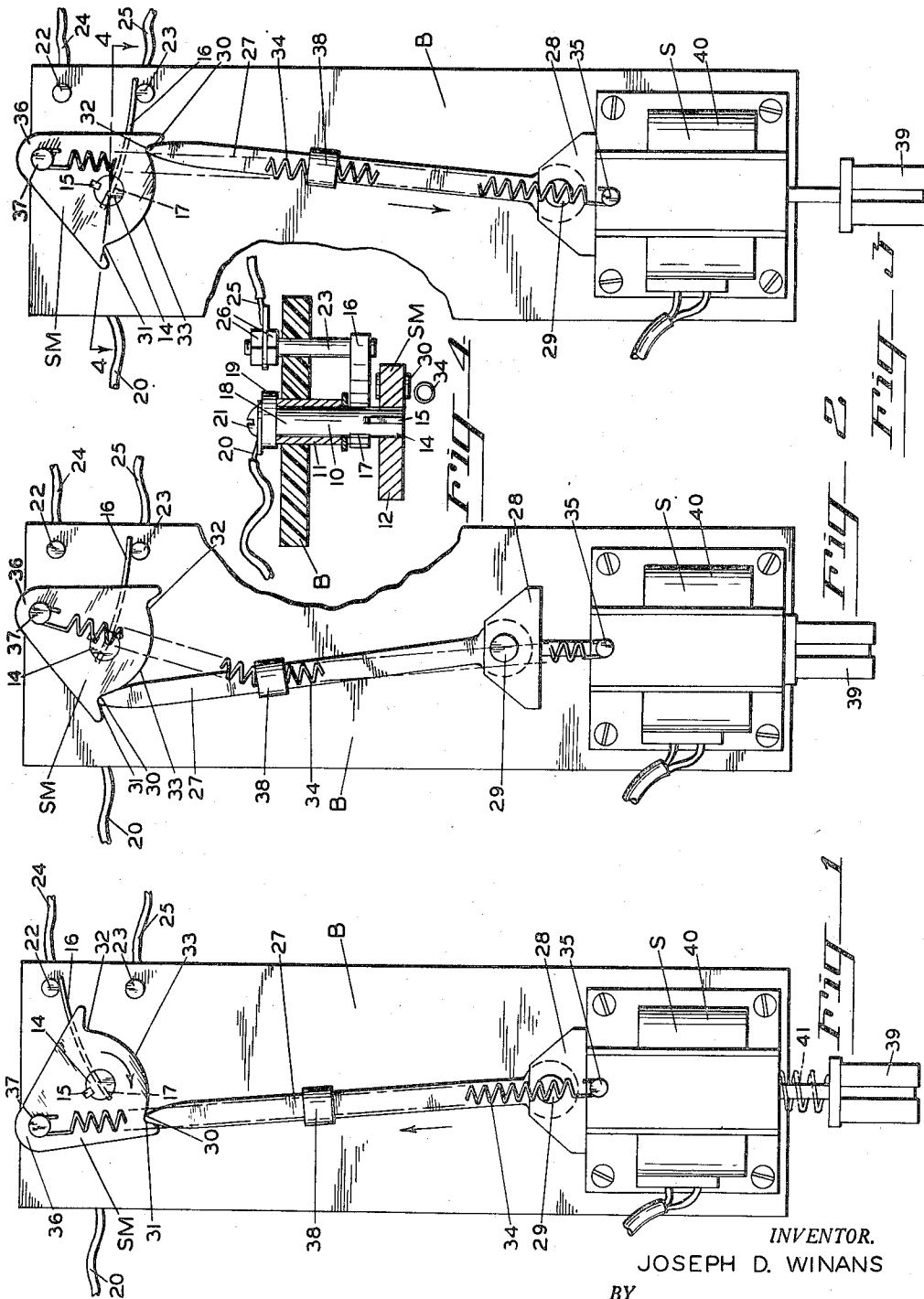
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OVER-CENTER RELAY SWITCH

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2,830,149

OVER-CENTER RELAY SWITCH

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1 Claim. (Cl. 200—87)

The present invention relates to relay switches, and more particularly to such devices which are adapted to be used in controlling one or more electric circuits by the same relay.

The primary object of the invention is to provide a relay switch adapted to close an electric circuit when operated by a magnetic impulse, remaining closed until opened by a repetition of the impulse which will open the circuit and close another circuit.

Other objects and advantages will become apparent in the following specification when considered in the light of the attached drawing, in which:

Figure 1 is a front elevation of the invention, showing one of the circuits closed;

Figure 2 is a front elevation of the invention which illustrates the position of the over-center switch after an impulse has taken place, changing the switch from one circuit to another;

Figure 3 is a front elevation of the invention which illustrates the position of the mechanism during the operation of the over-center switch, and

Figure 4 is a sectional view, taken on line 4—4 of Figure 3, looking in the direction of the arrows, illustrating the mechanical detail of the switch more fully.

Referring now to the drawings in detail wherein like reference numerals indicate like parts throughout the several figures, the reference character B illustrates generally the base plate on which the invention is mounted. An electric solenoid S and an over-center switch mechanism SM are mounted on the base B by means to be described. The over-center switch mechanism SM consists of a shaft 10, journaled within a bearing 11, which is fixedly mounted in piercing relation within the base B, referring particularly to Figure 4.

An A-shaped cam 12 is keyed to the end 14 of the shaft 10 by a key 15. A switch bar 16 is fixedly secured to the shaft 10 passing through a slot 17 in which it is bound. The opposite end 18 of the shaft 10 has a collar 19 for maintaining the shaft 10 within the bearing 11. This end 18 of the shaft 10 is adapted to receive electric energy through the conductor 20, which is fixedly secured thereto by the set screw 21.

Electric terminals 22 and 23 are fixedly mounted to the base B, as best illustrated in Figure 4, and have the electric conductors 24 and 25 fastened thereto by the lock nuts 26. The terminals 22 and 23 and the shaft 10 are insulated from one another by the base B. I have illustrated a base B made from an electrical insulating material but other means of insulating these elements apart could be provided.

The cam 12 is operated from the position shown in Figure 1 to that shown in Figures 2 and 3 by the solenoid S through a push rod 27, which is pivotally connected to the core 28 of the solenoid as at 29. The opposite end 30 of this push rod 27 engages the socket portions 31 and 32 of the cam surface 33. A spring 34 is fixedly secured at 35 to the body of the solenoid S. The opposite end

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of the spring 34 is pivotally connected to the apex 36 of the A-shaped cam 12 at 37. This spring 34 also passes through a guide 38 forming part of the push rod 27.

The core 28 of the solenoid S has the usual weight 39 forming part thereof, adapted to lower the core 28 when the solenoid coil 40 is demagnetized. A spring may be added to further this return movement, as indicated by the broken lines 41 in Figure 1.

The operation of this relay S will now be described. When the solenoid coil 40, referring to Figure 1, is energized by any source whatever, it will raise the core 28, together with the push rod 27. This will force the tip 30 of the push rod against the socket 31 of the cam 12, rotating the cam 12 from the position shown in Figure 1 to that shown in Figure 2. This moves the spring 34 with the cam at an angle to the push rod.

When the solenoid 40 is demagnetized, the core 28 will return to the position shown in Figure 3, withdrawing the tip 30 of the push rod 27 from the socket 31 allowing the tip 30 to ride over the cam surface 33 to the position shown in Figure 3, aligning itself with the socket 32 of the cam 12. The spring 34 causing the shift of the push rod 27 from the position shown in Figure 2 to that shown in Figure 3, due to the over-center action of the spring 34 from the position shown in Figure 1, to that shown in Figures 2 and 3. The weight of the core 28 and its additional weight 39 will withdraw the plunger 27 from the position shown in Figure 2, to that shown in Figure 3 ready to reverse the movement of the over-center cam 12 on the next impulse imparted by the solenoid S.

When the cam 12 was moved from the position shown in Figure 1 to that shown in Figures 2 and 3, the contact bar 16 breaks the contact from the contact terminal 22 and makes contact with the contact terminal 23 as shown in Figure 3, controlling the operation of whatever the switch SM is designed to control from an electric circuit completed through either of the conductors 24 or 25 from the electric conductor 20.

This new and improved over-center relay switch was especially designed to control the operation of the cutter blades associated with clippers used in plywood plants, the plywood plant not being illustrated herein. Photo electric cells are used to control the operation of the clipper blades, therefore these photo cells are adapted to energize the solenoid S of this new and improved over-center relay switch when the photo cells are uncovered by the moving veneer being clipped.

In the operation of the clipper blade, the blade is moved first in one direction, completing a cut, by an air cylinder controlled by a magnetic air valve. When another cut is to be made, the same air cylinder moves the blade in the opposite direction but controlled by an other magnetic air valve, there being two separate magnetic air-controlled valves. The relay switch has two separate electric conductors 24 and 25. One conductor 24 supplies energy to one magnetic valve for moving the cutting blade in one direction, while the other electric conductor 25 supplies energy to the other magnetic air-controlled valve, causing the blade to move in the opposite direction, completing a cut through the veneer being clipped.

In the operation of the magnetic air valve it is desirable to keep them energized until reversing the direction of the air cylinder, moving the cutter blade, therefore, with this new and improved over-center relay this result is accomplished, but it is understood that there are other adaptations for this new and improved relay.

Having thus described the preferred form of the invention, it should be understood that numerous structural modifications and adaptations may be resorted to without departing from the scope of the appended claim.

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What I claim is:

An over-center relay switch comprising a base, a pair of spaced contacts mounted on said base, a shaft journaled in said base, a cam plate keyed to said shaft, a contact arm carried by said cam plate projecting between said spaced contacts, said contact arm selectively engaging said spaced contacts on rotatory movement of said cam plate, a hollow solenoid mounted on said base in spaced relation to said cam, an armature core positioned within said solenoid for reciprocation therein on energization of said solenoid, a push rod having one end pivotally connected to one end of said armature core, said push rod having the free end thereof engaged with said cam plate, a cylindrical guide eye secured to said push rod intermediate its ends, a tension coil spring extending through said guide eye, means securing one end of said spring to said solenoid, and means securing the other end

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of said spring to said cam plate at a point spaced from said shaft oppositely from said push rod, said coil spring biasing said cam plate to bring said contact arm into engagement with a selected one of said contacts and said coil spring simultaneously biasing said push rod into an aligned relation with the means securing the opposite ends of said spring.

References Cited in the file of this patent

UNITED STATES PATENTS

1,966,285	Deans	July 10, 1934
2,090,522	Sippell	Aug. 17, 1937

FOREIGN PATENTS

201,521	Great Britain	Feb. 27, 1923
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