March 20, 1951 JEAN-JACQUES GOUFFON 2,545,548

SWITCH

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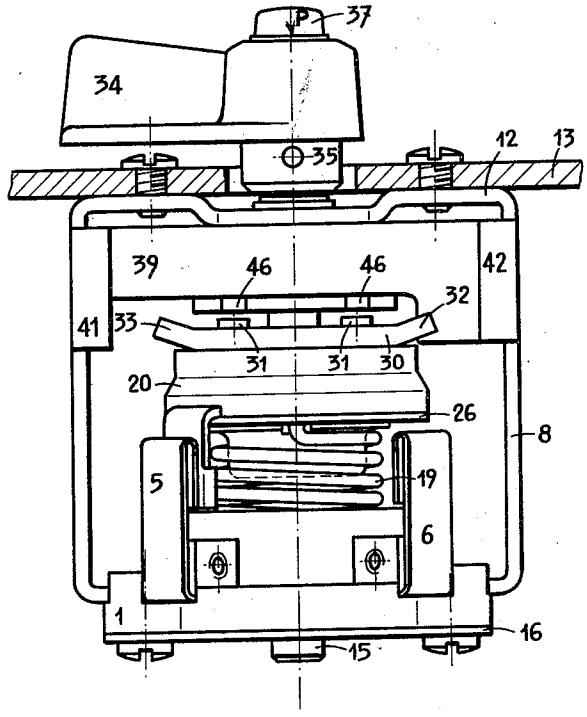

Fig. 1

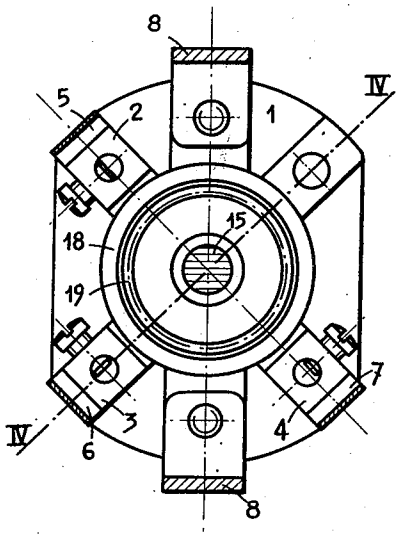

Fig. 3

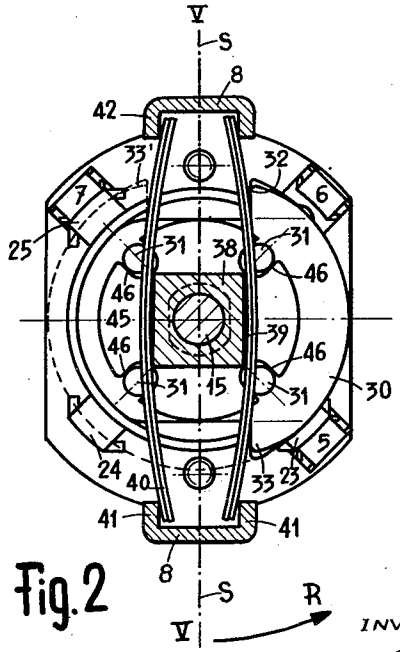

Fig. 2

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Fig.5

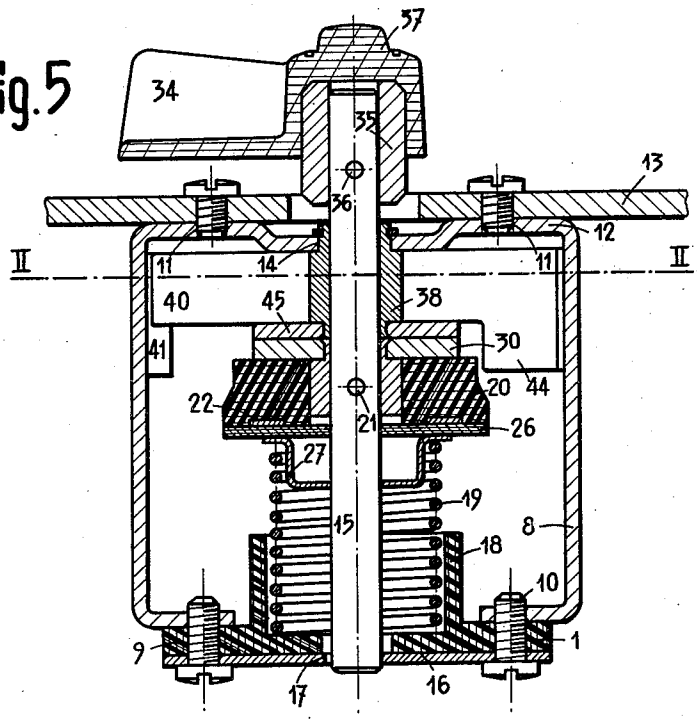
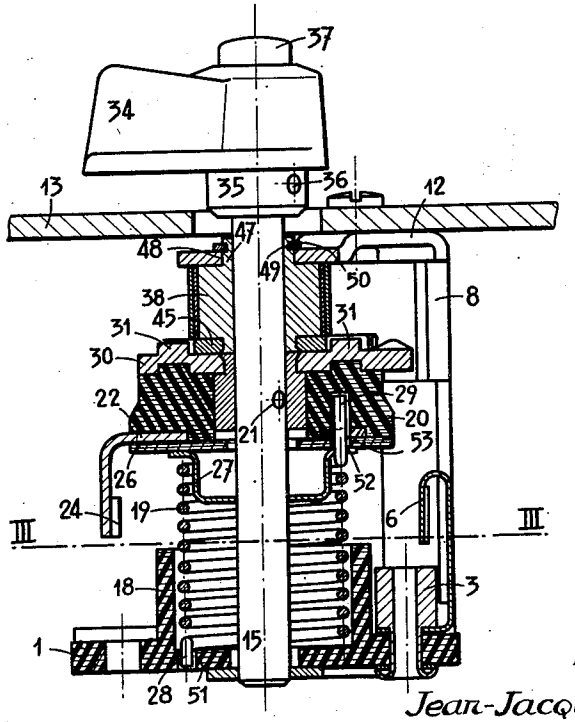


Fig.4



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Patented Mar. 20, 1951 2,545,548

UNITED STATES PATENT OFFICE

2,545,548

SWITCH

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Application October 14, 1948, Serial No. 54,509
In Switzerland October 16, 1947

3 Claims. (Cl. 200—155)

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Numerous types of switches are known of which the rotor, carrying the movable contacts, is subjected to the action of a spring causing its return to the normal or disengaged position and which is provided with a resilient locking device determining the various positions of use of the rotor. The locking device is generally composed of elements mounted on the chassis of the switch and cooperating resiliently with elements secured to the rotor. In these known switches, the control of the setting in the disengaged position is effected by means of a disengaging member separate from the actuating knob enabling the rotor to pass from one position of use to the other. The actuation of this disengaging member renders the resilient locking device of the rotor temporarily inoperative so as to enable the latter to pass over freely the switching or service positions during its return into the disengaged position. Thus complication results in the construction and the operation of the said apparatus, necessitating in general the placing in action of different parts, according as to whether it is desired to place the switch in a position of use or to produce its disengagement with sufficient rapidity for avoiding the generation of an arc between the co-operating contacts.

The present invention relates to a switch of the general type defined above, that is to say provided with stationary contacts on a framework, movable contacts secured to a rotor subjected to the action of at least one return spring into the disengaged position, an actuating member for actuating the said rotor and a resilient locking device determining the various positions of use of the switch and composed of elements secured to the framework and rotary elements.

For the purpose of remedying the disadvantage referred to, this switch is provided with a clutch normally connecting the rotor to the rotary elements of the resilient locking device and one of the parts of this clutch, movable axially, is connected to a disengaging member producing the disengagement of the corresponding parts of the said clutch and, consequently, the return to the disengaged position of the rotor under the action of its return spring.

One form of construction of the subject of the invention is shown diagrammatically and by way of example with reference to the accompanying drawings, wherein:

Fig. 1 is a view in elevation showing the rotor in the disengaged position, the parts of the clutch being disengaged from one another.

Fig. 2 is a view in horizontal section of the upper part of the switch, on the line II—II of Fig. 5.

Fig. 3 is a view in horizontal section of the lower part of the switch, on the line III—III of Fig. 4.

Fig. 4 is a view in axial section taken at 45° to the plane of Fig. 5, on the line IV—IV of Fig. 3.

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Fig. 5 is a view in section through the axis of the rotor, on the line V—V of Fig. 2.

The base 1 of the switch, of insulating material, carries solidly three stationary contact terminals 2, 3, 4 connected electrically to flexible contact tongues 5, 6, 7 (Figs. 3 and 4). A chassis or framework 8 is secured to the base 1 by means of screws 9, 10. Holes 11, provided in the upper side 12 of the chassis, enable the switch to be secured to a panel 13 (Fig. 5). The upper side 12 of the chassis has a bore 14 forming a bearing for a shaft 15 carrying a rotor 20.

The securing screws 9 and 10 secure the base 1 to a stiffening bar 16 provided at its centre with a bore 17 forming a second bearing for the shaft 15. Coaxially with the axis or shaft 15, the base is provided with a cylindrical wall 18, forming a lower guide for a helical spring 19 coiled around the shaft 15, at a predetermined distance from this.

The movable equipment of the switch is provided firstly with a rotor having a body 20 of insulating material secured rigidly to the shaft 15 by means of a pin 21. The lower face of the insulating body 20 has a groove provided with a ring 22 of conducting material provided with radial tongues 23, 24, 25 bent at their ends. The tongues constitute the movable contacts of the switch. The ring 22 rests on a plate 26 against which bears a centering dish 27 mounted freely on the shaft 15 and in the interior of the helical spring 19 in such a manner as to complete the guiding of the latter in co-operation with the lower guide 18. The lower bent end 28 of the spring 19 is fitted into a seating 51 provided in the base 1 (Fig. 4), whilst its upper end 29, passing through a notch 52 provided in the dish 27, engages with a hole 53 in the plate 26. The helical spring 19 is subjected simultaneously to compression and torsion during the mounting of the switch in such a manner that it constantly exerts on the movable equipment 15, 20 by means of the plate 26, a return couple in the direction of the arrow R, tending to move the rotor into the disengaged position.

The insulating body 20 of the rotor carries securely on its upper face, a clutch plate 30 provided with projections 31 and having two movable stops 32, 33 formed by lugs.

The movable equipment also comprises an operating member formed by a rotary handle 34 mounted on a hub 35, secured rigidly to the shaft 15 by means of a pin 36, as also a disengaging knob 37 secured to the handle 34.

The resilient locking device for the rotor, defining its positions of service, is provided with a prismatic member 38, called "a square," of which the opposite parallel faces cooperate for each position of service of the switch, with two groups of flexible blades 39, 40 located on opposite sides of the axial plane of symmetry indicated by the

line S—S (Fig. 2) and maintained flexed by reason of the fact that the ends of the blades of one group are approached resiliently towards the adjacent ends of the blades of the other group by holding straps 41, 42 close to the uprights 8 of the chassis. At one end (Figs. 1, 2, 5) the flexible blades 39, 40 have large parts 43, 44, which form stationary damping stops.

The "square" 38 is secured, at its lower end, to a coupling disc 45 extending underneath the flexible blades and having four notches 46 uniformly distributed around its periphery. The "square" 38 is attached at the top to a section of a cylinder 47 passing through a bore 48, of the chassis 8 beyond which the section has a groove 49 provided with a resilient split ring 50 which bears against the edge of the bore 48 and holds the "square" in the axial position (Fig. 4).

Under the action of the helical spring 19 the whole of the movable equipment is held in the raised position, shown in Figs. 1 and 3, the clutch plate 30 of the rotor being then in engagement with the corresponding clutch plate 45 by the engagement of the pins 31 with the notches 46.

The operation of the switch described is as follows:

When the rotor 20 occupies the disengaged position shown in the Figs. 1 and 3, in particular, the flexible blades 39, 40 being applied to two opposite faces of the "square" 38, the latter is locked resiliently. The movable contacts 23 and 25 are then connected electrically to the stationary contacts 5, 7.

For passing from the disengaged position to the first position of service, the operator turns the operating handle 34 in a clockwise direction through a quarter of a revolution against the action of the return spring 19. As the two parts of the clutch device 30, 45 remain in engagement, the "square" 38 is set in rotation and moved through a quarter of a revolution. For this first position of service, the flexible blades 39, 40 co-operate with two of its opposite faces and lock the rotor in the correct position. By turning the handle through a further quarter of a revolution in the same direction the operator can cause the rotor to pass into its second position of service, for which the movable stop 33 of the clutch plate 30 is located in immediate proximity to the wide part 44 of the flexible blades 40 (position 33' shown in broken lines in Fig. 2). Consequently it is practically impossible to turn the operating handle 34 through an appreciable angle beyond this second position of service, as the movable stop 33 is arrested by the group of flexible blades thus forming, in these circumstances, an end resilient counterstop for the end of the stroke which prevents an angular movement of the rotor beyond its last position of service.

The rapid return of the switch into the disengaged position is produced by an axial thrust P applied from the top downwardly (Fig. 1) on the release member 37 which is integral with the handle 34. The whole of the movable equipment is then moved axially in the direction of the arrow P and against the action of the spring 19 until the hub 35 bears against the side 12 of the chassis 8 (Fig. 1). This operation has the effect of disengaging the pins 31 from the notches 46, in other words, to release one from the other of the two parts of the clutch 30, 45. The helical torsion spring 19 returns the rotor 30 with its shaft 15 rapidly into the disengaged position. The nose of the stop 32 strikes against the wide part 43 of the flexible blades 39, which results in lessening the shock when stopping the movable equipment.

When the axial push P, ceases, the same spring 19 repels the rotor 30 upwards (Figs. 4 and 5), so that the projections 31 again engage with the corresponding notches 46 of the clutch disc 45. The switch is then ready for a fresh operation.

The switch above described has the following main advantages:

A single helical spring holds the two parts 30, 45 in engagement and ensures the return of the rotor into the disengaged position. A part of the resilient locking device of the rotor, that is to say one of the flexible blades, is used for determining the stop position of the movable equipment in the disengaged position whilst absorbing the shock when stopping.

The switch is not provided with a release member external to the handle and nevertheless it is possible to dispense with a hollow rotor shaft necessary in other constructions for the mounting of a transmission ensuring the release.

The speed of release is independent of the operation of the handle 34; it may be very high, it being the greater the smaller the mass of the movable equipment.

The switch has a small overall size whilst providing sufficient interrupting distances.

I claim:

1. A switch comprising frame means, an operating shaft mounted for rotation and axial motion in the frame means, a rotor rigid with the shaft, contacts fixed to the rotor, a yieldable member reacting against the frame means and urging the rotor to a certain angular and axial position in which the contacts are disengaged, yieldable means holding the rotor in each of a plurality of positions and including flexible members anchored to the frame means and a rotatable member of non-circular section engaged by the flexible members and held thereby in various angular positions, a clutch device for releasably connecting the rotor to the rotatable member and including an element rigid with the rotatable member, and a second element rigid with the rotor and therefore releasable from the first clutch element by axial motion of the shaft, said yieldable member also urging the rotor toward the rotatable member and thereby the second clutch element to releasably engage the first clutch element.

2. The switch according to claim 1 and wherein one of the flexible members includes a stop portion engageable by the second clutch element upon return of the rotor to its disengaged position to absorb the shock incident thereto.

3. The switch according to claim 2 and also including a stop on the second clutch element and engageable with the other of the flexible members to prevent turning of the rotor beyond its engaged position.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,146,204	Pearce	July 13, 1915
1,347,885	Wurts	July 27, 1920
1,391,524	Bissell	Sept. 20, 1921
2,420,768	Beveridge	May 20, 1947