

Aug. 11, 1959

J. FLATET ET AL
CONTACTOR RETARDER

2,899,523

Filed Feb. 24, 1958

2 Sheets-Sheet 1

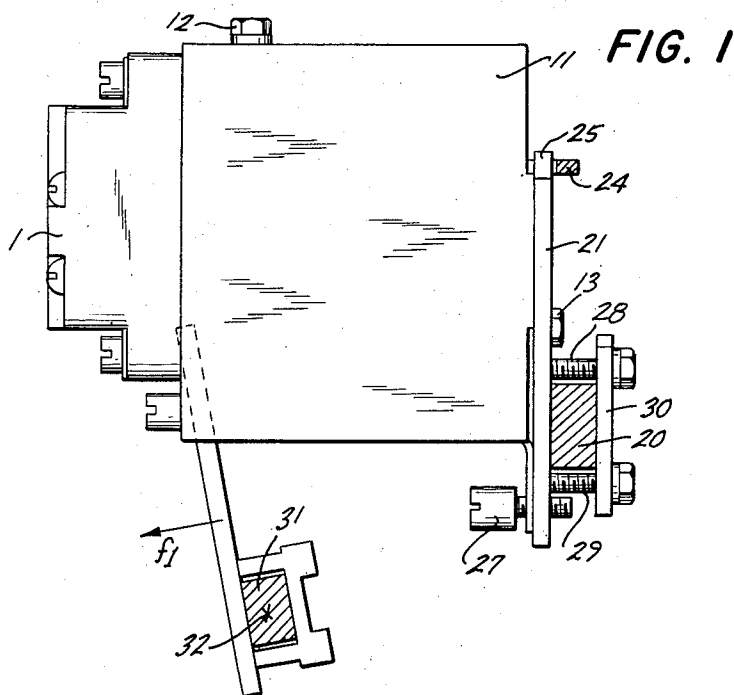


FIG. 2

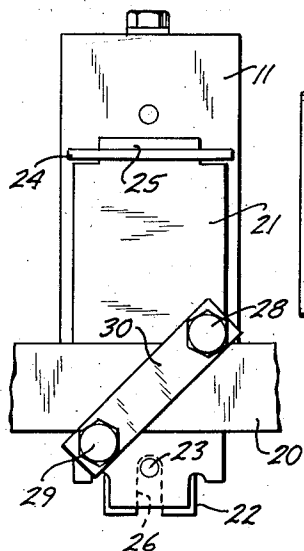
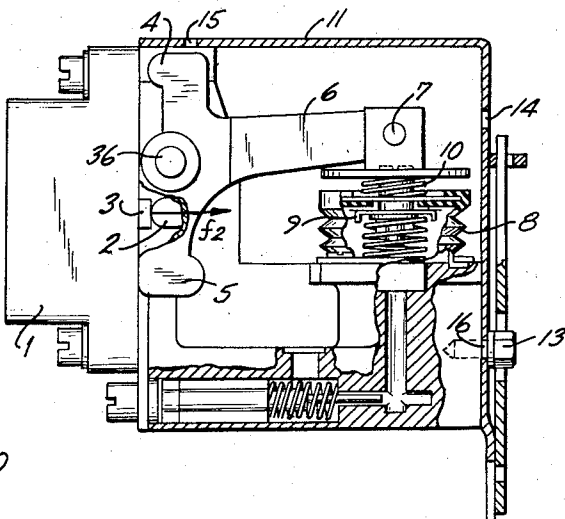


FIG. 3



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2 Sheets-Sheet 2

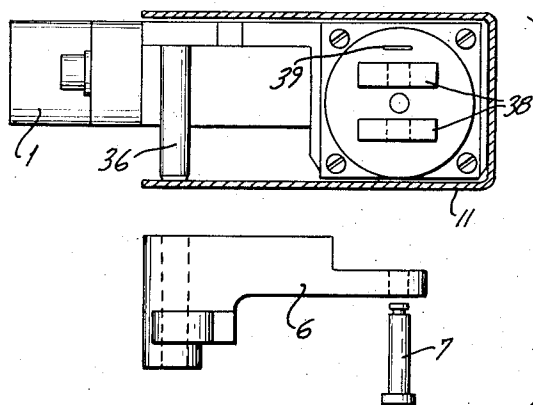


FIG. 4

FIG. 5

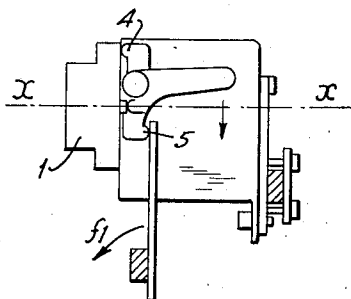


FIG. 6

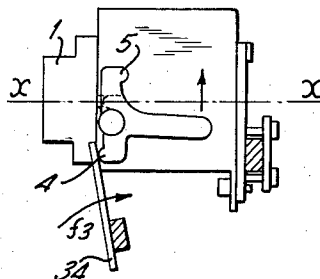


FIG. 7

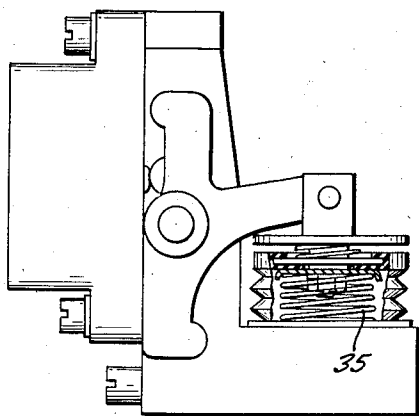


FIG. 8

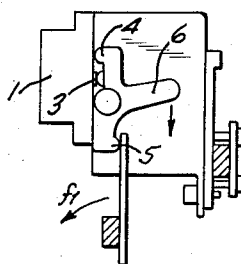
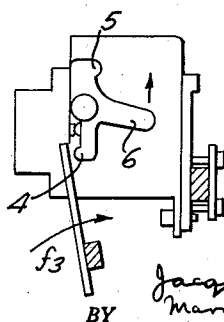


FIG. 9



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CONTACTOR RETARDER

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5 Claims. (Cl. 200—166)

Mechanical retarders have long been known wherein a piston, bellows or diaphragm is returned slowly to its initial position by a spring, retardation being due to the braking effect of the air entering through a narrow and adjustable orifice.

The same principle has also been applied to electric contacts, the braking air being either sucked in or blown out by a diaphragm or bellows deformed by an electromagnet.

It is an object of this invention to provide contact of that kind of a simple and cheap design and so disposed as to be adapted to be fitted very readily to a very common kind of contactor wherein the moving part is formed by a spindle which rotates through a predetermine angle to move the contacts.

The pneumatic retarder therefore does not require a special electromagnet and its movement is a result of the closure or opening of main contacts of the same contactor.

The contactor retarder according to the invention is in the form of a removal unit comprising a known rapid-break contact, or "microcontact," having an operating button constantly urged by a spring in the direction in which it bears against a part of a T-lever pivotally connected to the retarder base-plate, one of the two opposite arms of the T being influence by the rotation of a control member operated by the moving spindle of a contactor and acting in a plane perpendicular to the articulation of the lever, while the third arm acts on the moving part of a pneumatic retarder rigidly secured to the contact, the base of the device being carried by a stationary support rigidly secured to the contactor through a casing in which it can be placed arbitrarily in two positions offset by 180° from one another around an axis perpendicular to the pivotal axis of the T lever and substantially perpendicular to the opposite arms of the T lever.

The advantage of this arrangement is that it provides a pneumatic retarder (i.e., a retarder without gears which are liable to wear such as are found in clock-work retarders) which can be connected, without a special electromagnet, to a contactor which has a single electromagnet to operate the main contacts and auxiliary contacts, with or without time lag, it being possible for the retarder to be fitted in inverse positions providing different delay characteristics.

According to another feature of the invention, the casing is fitted to the stationary support through the agency of a plate secured thereto, the casing being fixed to the plate by a lug at one end of the plate and a screw at the other end.

According to another feature of the invention, the lever is loose on its pivot and is maintained in its lateral position by a fork borne by the retarder device and inside which the third arm of the lever is maintained by a pin.

In the accompanying drawings, which are given by way of example and for a better understanding of this description:

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Figs. 1 and 2 are external side and end elevations respectively one form of construction in accordance with the invention;

Figs. 3 and 4 are respectively a side view (with some parts cut away) and a plan view of the internal assembly;

Figs. 5 and 6 are two corresponding diagrammatic views showing two possible methods of assembling this device;

Fig. 7 is a part-sectional view of another form of construction; and

Figs. 8 and 9 are corresponding diagrammatic views showing two possible methods of assembling this device.

In the arrangement shown in Figs. 1 to 4, the delaying device comprises a contact proper 1 in the form of any appropriate mechanism comprising a projecting button 3 which is constantly urged outwards by the spring of the mechanism (not shown for the sake of simplicity in the drawings and because this invention is independent of the nature of such mechanism). Bearing against the button is a protuberance 2 of a T-shaped lever, each lateral arm of which comprises a stop 4, 5, one or the other of such stops receiving, depending upon the assembly position, the drive from the moving control spindle of the contactor, while the axial arm 6 of the T-lever is secured by a spindle 7 to a bellows retarder 8.

The retarder 8, which comprises a conventional retarding mechanism, includes a valve 9 urged by a spring 10 against the action of a return spring, the return of the valve being effected under the combined action of the forces provided by the spring 10 and the spring of the contact 1.

This delaying assembly is adapted to be received in a supporting casing 11 which surrounds it on all sides except on the sides of the contact 1 (the bottom side can also be left open) and this assembly is maintained in its casing merely by two screws 12, 13 extending through holes 15, 16. Hence, the assembly can be very simply slid into or out of position after the screws 12, 13 have been removed. An additional hole 14 is provided for securing the assembly in the inverted position as will be described in detail later on.

The casing 11 containing the assembly thus formed is secured to the stationary support 20 of the contactor by a fixing plate 21 so arranged as to permit dismantling or reassembly by the unscrewing of a single screw. To this end, the casing 11 is provided with a projecting tongue 22 notched at 23 and also carries a flange 24 at a distance from the strip 22. The fixing plate 21 has at one end a tongue 25 so shaped as to be adapted to penetrate below the flange 24, and near its other end a screwthreaded hole 26 receiving a clamping screw 27. The plate 21 carries two screws 28, 29 extending through a reinforcing plate 30. It will therefore be apparent that the fixing plate 21 can be secured to the support 20 by tightening the screws 28, 29. After the fixing plate has been thus secured, the assembly formed by the casing 11 and the parts therein can be fitted or dismantled merely by tightening or loosening the screw 27 after the strip 25 has been engaged in, or disengaged from, the flange 24.

It will be seen from Fig. 4 that the T-lever is mounted on a pin 36 on the body of the retarding mechanism and that the end of the T-lever arm 6 is pivotally mounted on the stem of the valve 9 by means of a pin 7 engaged in holes in two flanges 38 and locked in position by a circlip 39 or the like. When the retarder/contact assembly is withdrawn from the casing 11, the T-lever can be dismantled merely by being slid along its pin 36 after removal of the circlip 39.

Of course, a series of identical casings 11 can be mounted adjacent to one another along the bar 20 of the stationary support so as to be mounted and dis-

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mantled individually with the greatest ease in the manner described above.

Also, the contactor comprises a movable spindle 31 mounted to rotate around a spindle 32 and comprising, for each time-lag contact of the kind described above, a control finger 33 adapted to bear, when it receives an impulse in the direction of the arrow f_1 , against the bearing surface 5 of the T-lever.

Hence, when the control finger 33 is moved in the direction f_1 , it bears against the surface 5 and rotates the T-lever clockwise so that the button 3 of the contact 1 and the bellows of the retarder are depressed. When the pressure exerted by the finger 33 in the direction f_1 disappears, the button 3, urged by the contact return spring, forces the protuberance 2 of the T-lever back in the direction f_2 (Fig. 3) so that the retarder is restored to normal. This restoration is performed slowly since the air returns through a narrow calibrated orifice.

By virtue of the features described above, the same device can be used when the force applied to the movable spindle, instead of being in the direction f_1 , is in the opposite direction f_3 (Figs. 5 and 6). To adapt the device to this new method of operation, all that is required is to dismantle the retarder and contactor assembly by unscrewing the screws 12 and 13, turn it through 180°, from the position shown in Fig. 5 to the position shown in Fig. 6, and refit it. The finger 33 is replaced by another differently shaped finger 34 and now bears in the direction f_3 against the bearing surface 4 (and not against the bearing surface 5) of the T-lever (and not in the direction f_1); but since the T-lever has been turned round, the same actions as hereinbefore described occur for these new movements of the moving part.

It will be seen that by means of this arrangement it is possible to group together by simple means individual contacts which are identical but which operate some in one direction and others in the other direction.

In the embodiment described above, it has been assumed that the retarder was returned by the sum of the forces of two springs. The invention also applies to the case in which the retarder is returned to its initial position by the difference in the forces between the spring 35 and the contact spring, as shown in Figs. 7 to 9.

In this case, when the moving part is moved in the direction f_1 and bears against the bearing surface 5 (Fig. 8), the lever 6 compresses the bellows and its return spring 35, while the button 3 of the contact merely follows the stop 2; similar considerations apply when, after reversal of the assembly, the moving armature moves in the direction f_3 (Fig. 9) and bears against the bearing surface 4.

What we claim is:

1. A contactor retarder in the form of a detachable unit comprising a known rapid-break contact having an operating button constantly urged by a spring in the direction in which it bears against a part of a T-lever pivotally mounted on the retarder base plate, one of the two opposite arms of the T being influenced by the rotation of a control member operated by the moving spindle of a contactor and acting in a plane perpendicular to the articulation of the lever, while the third arm acts on the moving part of a pneumatic retarder rigidly secured to the contact, the base of the device being mounted on a stationary support rigidly secured to the contactor through a casing in which it can be placed arbitrarily

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in two positions offset by 180° from one another around an axis perpendicular to the pivotal axis of the lever and substantially perpendicular to the opposite arms of the lever.

2. A device according to claim 1 wherein the casing is mounted on the stationary support through a plate secured thereto, by means of a lug at one end of the plate and a screw at the other end.

3. A device according to claim 1 wherein the lever is loose on its pivot and is maintained in its lateral position by a fork carried by the retarder and inside which the third arm of the lever is maintained by a pin.

4. A contactor retarder, comprising, in combination, a support; a contactor mounted on said support and having an actuating member reciprocable between two positions thereof; a retarder unit; a retarder actuator mounted on said support; and means for alternatively securing said retarder unit on said support in two positions, said retarder unit including a base member, a two-armed lever pivotally mounted on said base member, an abutment on one of the arms of said lever, said abutment being engageable with said actuating member in both secured positions of said retarder unit for moving said actuating member from one to the other one of said positions thereof when said lever is pivoted, resilient means urging said lever to pivot in one direction and a pneumatic retarder connected to said lever for retarding pivoting movement thereof in said one direction, said retarder actuator being adapted to cooperate with said lever for actuating pivoting movement thereof in a direction opposite to said one direction and being engageable with one of the arms of said lever when said retarder unit is secured to said support in one of the positions thereof, and with the other one of the arms of said lever when said retarder unit is secured to said support in the other one of the positions thereof.

5. A contactor retarder, comprising, in combination, a support; a contactor mounted on said support and having an actuating member reciprocable between two positions thereof; a retarder unit; a retarder actuator mounted on said support; and means for alternatively securing said retarder unit on said support in two positions, said retarder unit including a base member, a two-armed lever pivotally mounted on said base member, an abutment on one of the arms of said lever, said abutment being engageable with said actuating member in both secured positions of said retarder unit for moving said actuating member from one to the other one of said positions thereof when said lever is pivoted, resilient means urging said lever to pivot in one direction, and a pneumatic retarder connected to said lever for retarding pivoting movement thereof in said one direction, said retarder actuator being adapted to cooperate with said lever for actuating pivoting movement thereof in a direction opposite to said one direction and abutting against one of the arms of said lever when said retarder unit is secured to said support in one of the positions thereof, and abutting against the other one of the arms of said lever when said retarder unit is secured to said support in the other one of the positions thereof.

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