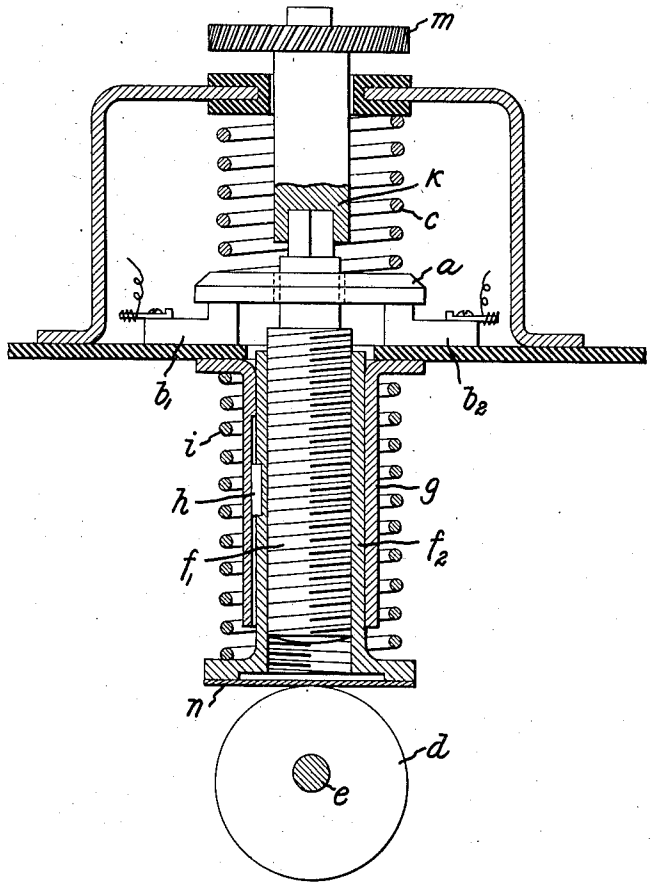
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MECHANICAL SWITCHING DEVICE

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MECHANICAL SWITCHING DEVICE

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6 Claims. (Cl. 200—30)

For regulating the period during which the lifting contacts of switching devices, particularly mechanical converters, are in contact, these contacts being actuated by a plunger operated by an eccentric located on a shaft which rotates in synchronism with the alternating current which is to be switched, it has ben proposed to displace the stationary contact relative to that of the lifting contact actuated by the plunger so that the opening position of the contacts relative to each other is varied. It has also been proposed to alter the stroke of the contact by displacing an eccentric element which actuates the plunger and has a conical operating surface for the latter transversely to the direction of motion of the plunger. Devices of this kind have, however, the disadvantage that they are only suitable for a rough adjustment of the contact stroke and in order to achieve a fine adjustment very long cones are necessary which result in a big increase in the dimensions of the switching device. Furthermore the shape of the eccentric becomes very complicated when various speeds and times are required for the opening and closing of the contacts.

The present invention concerns a device for regulating the period during which the contacts are in contact with each other by altering the contact stroke in switching devices with lifting contacts which are actuated by a plunger controlled by an eccentric located on a shaft rotating in synchronism with the alternating current to be switched, particularly mechanical converters. The disadvantages of the known devices referred to are avoided according to the present invention by varying only the effective length of the practically rigid plunger during operation in such a manner that a fine adjustment of the contact stroke occurs.

A constructional example of the invention is illustrated diagrammatically in the accompanying drawing.

The lifting contact a of the switching device is pressed against the stationary contacts $b_1 b_2$ by the spring c and opened against the action of the spring by means of a plunger actuated by an eccentric d which is located on the shaft e which rotates in synchronism with the alternating current which is to be switched. The plunger consists of two telescoped parts f_1, f_2 which are provided with fine threads for adjustment of the effective length of the plunger between the contact a that is carried by the inner plunger member f_1 and the other end of the outer plunger member f_2. The plunger is guided in a sleeve g and rotation of the member f_2 in the guide sleeve is prevented by the key h that slides in a longitudinal slot in the guide sleeve. The plunger is under the action of a spring i which keeps it in contact with the eccentric d. The relative rotation of parts f_1, f_2 of the plunger is achieved by means of an intermediate element k operated either manually or by means of a motor over the pinion m and if necessary also over a gearing not shown in the drawing.

By using a fine thread between the parts of the plunger it is possible to rotate plunger member f_1 in either direction by very small amounts during operation and, by means of this fine adjustment of the effective length of the plunger, to obtain a fine adjustment of the stroke of the lifting contact and of the contact period or opening time of the contacts. The disc-shaped eccentric d enables the necessary adjustment for a different speed and contact period to be obtained and due to the reduction in the closing speed of the contacts reduces the wear on the latter.

In order to limit the acceleration of the lifting contact a when the plunger strikes it and also to reduce the reaction of the plunger on the eccentric and the drive it is an advantage if a resilient or pressure-damping element such as a metal or felt diaphragm n is provided between the plunger and its driving element. This can easily be located in the operating surface of the plunger as shown in the drawing.

I claim:

1. In a switch, stationary contact means, a cooperating contact, spring means tending to retain said contact in engagement with said contact means, a plunger carrying said contact, a rotatable shaft and eccentric thereon for displacing said plunger against the force exerted by said spring means to open said switch, said plunger comprising two telescoped parts threaded into each other, and means adjustable during rotation of said shaft and eccentric to effect relative angular movement of said plunger parts to alter the effective length of said plunger and thereby the lengths of the switch-closed periods when the shaft is rotated at a constant speed.

2. In a switch, the invention as recited in claim 1 wherein the inner telescoped part of said plunger carries said contact, and the outer telescoped part carries means engageable by said eccentric.

3. In a switch, the invention as recited in claim 1 wherein the inner telescoped part of said plunger carries said contact, and the outer tele-

scoped part carries pressure damping means engageable by said eccentric.

4. In a switch the invention as recited in claim 1, in combination with a sleeve guiding the outer telescoped part of said plunger for reciprocating movement, and means preventing rotation of said outer telescoped part with respect to said guide sleeve, said adjustable means engaging the inner telescoped part of said plunger to rotate the same with respect to said outer telescoped part.

5. In a switch, stationary contact means, a cooperating contact, a plunger carrying said contact and comprising two telescoped parts threaded into each other, a sleeve guiding said plunger for reciprocating movement, a rotatable shaft and eccentric for reciprocating said plunger, spring means tending to retain said contact in engagement with said contact means, and spring means pressing said plunger towards said eccentric.

6. In a switch, the invention as recited in claim 5, in combination with means including said guide sleeve preventing rotation of one of the telescoped parts of said plunger, and means adjustable during cyclic operation of said switch by said eccentric for rotating the other telescoped part with reference to the non-rotatable telescoped part.

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