Feb. 10, 1942. B. ELSTER 2,272,797

VIBRATION-OPERATED SWITCH

Filed Aug. 10, 1939

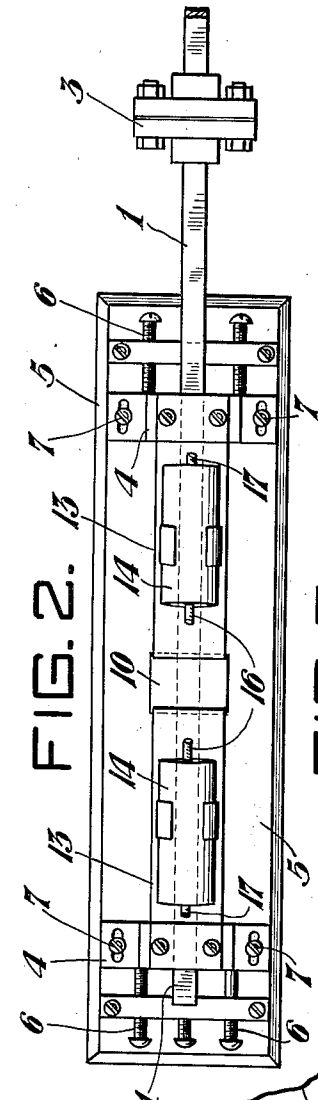


FIG. 2.

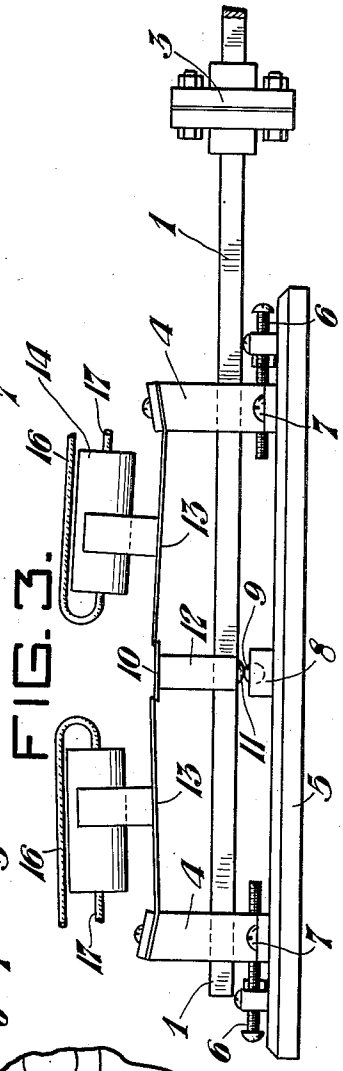


FIG. 3.

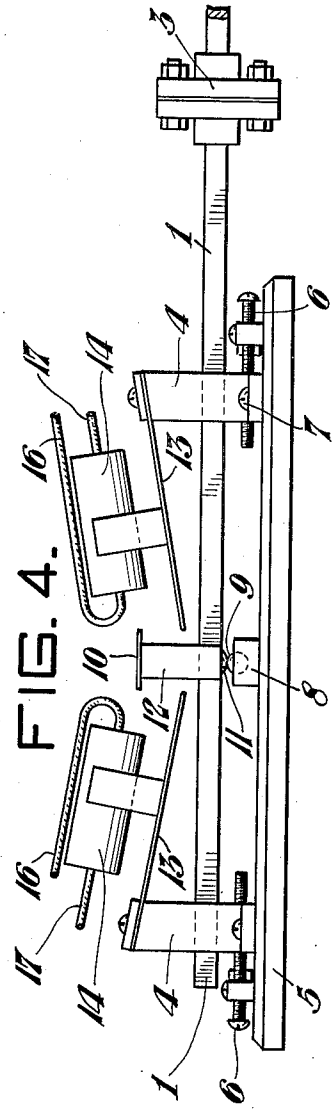


FIG. 4.

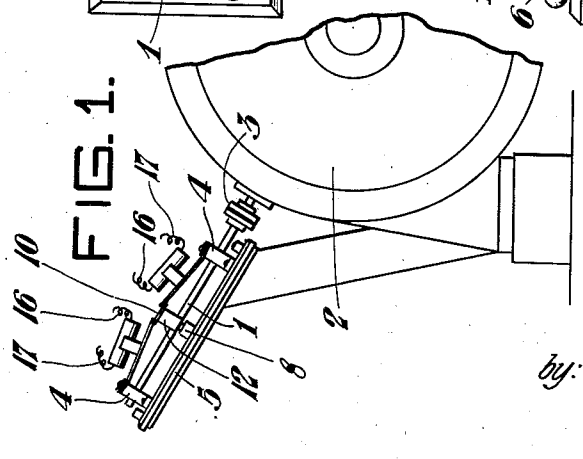


FIG. 1.

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VIBRATION-OPERATED SWITCH

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Application August 10, 1939, Serial No. 289,478

2 Claims. (Cl. 200—52)

This invention is concerned with the protection of machines which vibrate excessively when operating improperly. A specific example is a synchronous electric motor. When one or more of its rotor coils becomes short circuited, this immediately sets up a vibration which may be sufficiently severe the wreck the motor foundation.

One of the objects of the invention is to provide a device which acts to control an electric circuit when a machine starts to vibrate with a motion in excess of predetermined limits, whereby to enable the device to control an electrical system for stopping the machine or for sounding an alarm.

A specific example of a device embodying the principles of the invention is illustrated by the accompanying drawing, in which:

Figure 1 shows the device in use;

Figure 2 is a top view of the device; and

Figures 3 and 4 are side views showing its operation.

More specifically, these drawings show the device in use with a vibration transmitting rod 1 in contact with the stator 2 of a synchronous electric motor. A flange coupling 3 serves to connect the rod 1 to the mechanism in vibration.

Referring now to the device itself, standards 4 are mounted by a base 5 and are capable of longitudinal adjustment through the medium of adjusting screws 6, the standards 4 being locked by screws 7 when their positions have once been adjusted. Since the rod 1 passes through the standards 4 and is fixed to the motor or other source of vibration, it is necessary for the standards 4 to be slidable respecting the rod 1, this having the further advantage that in the case of vibrations of large amplitudes, the rod can vibrate in its entirety. A socket 8 mounts a ball 9 in the center of the base 5, the rod 1 of the device mounting a catch 10 above this ball 9, this catch being mounted by a screw 11 and which engages a standard 12 through the medium of which the catch 10 is positioned. This screw 11 has a rounded head riding on the ball 9.

Flat springs 13 are fixed to the tops of the standards 4 with their free ends engaging the catch 10, these springs 13 being, in effect, latches which are urged by their spring tension to travel considerable distances downwardly when they are released by movement of the catch 10. Since such movement is quick, a snap actuating effect is secured. Such movement is effected when the rod 1 is vibrated with an amplitude sufficient to move the catch 10, in either direction, sufficiently far to release one or the other of the latches.

With this arrangement, operation is effected at both extremes of the movement of the vibration. The amplitude at which operation is effected is determined by the position of the standards 4.

Each of the latches 13 mounts a mercury-actuated switch 14 through which leads 16 and 17 may be connected into any desired circuit. In the case of the application illustrated, should the stator 2 begin to vibrate with a damaging amplitude, one or the other of the latches 13 will be released, this tilting the mercury-actuated switch associated with the released latch and closing a circuit through the leads 16 and 17 of that switch. A circuit may be provided which, when either closed or opened in this fashion, automatically stops the motor or provides for an alarm.

I claim:

1. In combination with a machine which vibrates excessively when operating improperly, a vibration transmitter connecting with said machine, a latch device operatively connected with said transmitter and releasable upon the transmission of vibration of determined amplitude through said transmitter and a control element operative by releasal of said latch device, the latter being positively fixed against movement with said transmitter by means that is stationary respecting said machine.

2. A vibration-operated switch comprising a rod directly coupled to the source of the vibration, a catch fixed to said rod, latches engaging said catch, means for positively fixing said latches against movement by said catch so that movement of said catch in either direction of the vibration received by said rod effects releasal of one or the other of said latches with the full force of the vibration imparted said rod and electric switching means operatively associated with said latches for operation upon releasal of the latter, said latches being spring-urged to move considerable distances in their releasing direction, whereby to provide snap actuation of said switching means upon releasal of either of said latches.

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