

June 14, 1949.

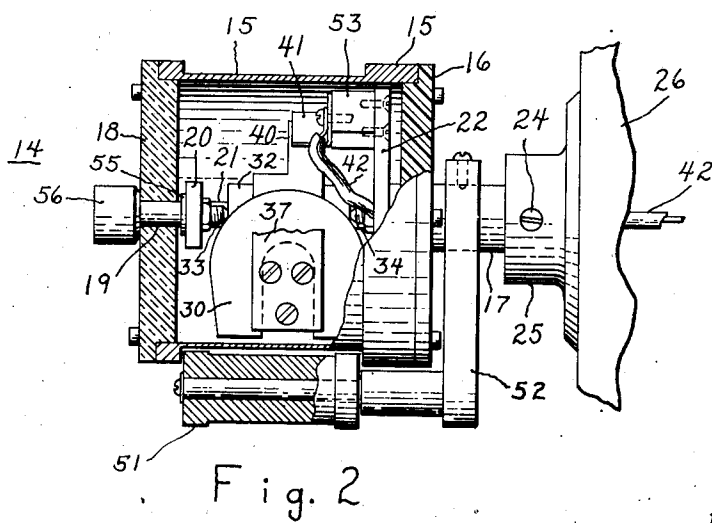
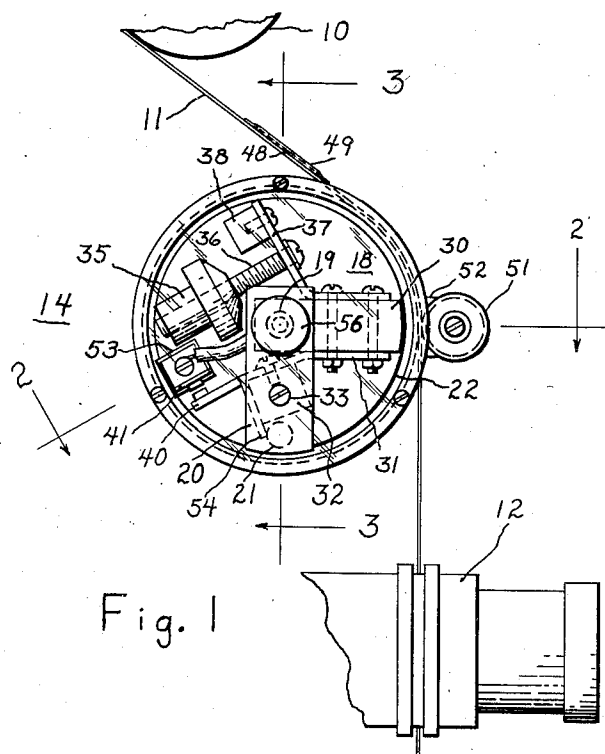
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2,473,468

MAGNETIC SWITCH APPARATUS

Filed Aug. 6, 1946

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

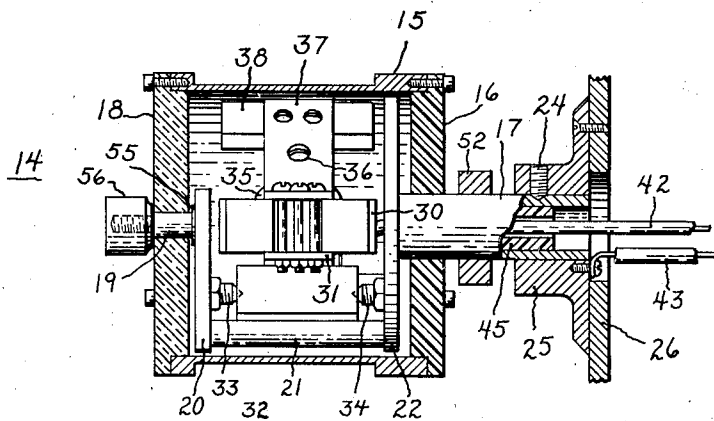


Fig. 3

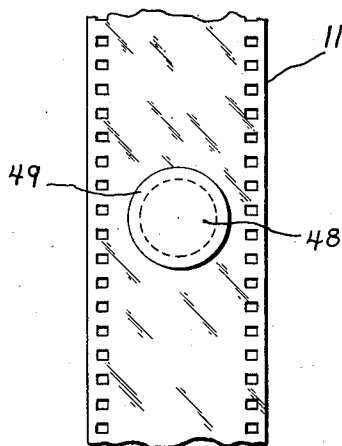


Fig. 4

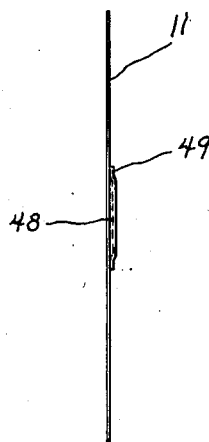


Fig. 5

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UNITED STATES PATENT OFFICE

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MAGNETIC SWITCH APPARATUS

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1 Claim. (Cl. 200—52)

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The present invention relates to electrical switch devices and while it is not necessarily limited thereto it is particularly adaptable for use in connection with automatic film changeover apparatus.

In the operation of motion picture projectors it is desirable to provide means for automatically switching in a second projector as the end is reached on the film of the first projector. It has been proposed heretofore to provide means in the form of a conductive element or notches on the end portion of the film for engagement by contact or feeler fingers mounted adjacent the path of travel of the film for controlling a circuit connected to the second projector. In the first mentioned instances, even though low voltage is employed arcing may occur as contact is made and broken and which sometimes results in fire or damage to the film. Moreover, under certain circumstances dust may collect on one or both of the contact fingers so that an imperfect contact is made by the bridging element and the second projector is not started up as the film is exhausted in the first projector. In the case of notches or perforations, the feeler fingers cause undesirable abrasion to the film and are frequently falsely operated by splices or the like. For these and other reasons the changeover apparatus and particularly the initiating switch mechanisms now being used have been found unsatisfactory.

It is an object of the present invention, therefore, to provide a new and improved control switch mechanism for film changeover apparatus.

A further object of the invention is to provide a new and improved control switch apparatus which is safe to use and which does not result in arcing in the surface of the film.

Another object of the invention is to provide a new and improved switch control unit for film changeover apparatus which unit is relatively simple and easy of manufacture and efficient in operation.

More specifically, it is an object of the present invention to provide a magnetic switch controller operable by a magnetic element attached to the end portion of the film.

Additional objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings while the features of novelty will be pointed out with greater particularity in the appended claim.

In the drawings Fig. 1 is an end view of the controller of the present invention; Fig. 2 is a

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cross sectional view taken along the line 2—2 of Fig. 1; Fig. 3 is a cross sectional view taken along the line 3—3 of Fig. 1; Fig. 4 is an enlarged side elevation illustrating a strip of film having a magnetic element attached thereto; Fig. 5 is an edge view of the film portion illustrated in Fig. 4.

Referring now to the drawings the invention will be described with particular reference to automatic film changeover apparatus it being understood, however, that the control switch of the present invention is not necessarily to be limited thereto since it may equally well be used in other applications where it may be desired to effect a switching operation in response to movement of a strip or web of nonmagnetic material past a predetermined point.

In Fig. 1 a projector is indicated diagrammatically as including a guide roller 10 for the film 11 passing through the gate of the lens system 12. The control switch of the invention is illustrated as being positioned between the guide roller 10 and the lens system 12, it being understood, however, that it may be mounted anywhere along the path of travel of the film 11 between the supply reel and the take up reel.

The control switch comprises a cylindrical housing indicated generally at 14 and having an annular groove 15 in its outer cylindrical surface of a width slightly greater than the width of the film 11. The housing 14 is journaled for free rotation about its longitudinal axis, the end wall 16 being rotatably mounted upon the cylindrical bearing support or sleeve 17. The opposite end wall 18, which may be transparent, is journaled for free rotation upon the bearing 19 provided with thrust shoulder 55 and nut 56 to restrict the lateral movement of the housing. Bearing 19 is secured to the bracket member 20 and which in turn is mounted upon the end of a spacer rod 21 secured at its opposite end to the disc 22 rigidly mounted upon the end of the sleeve 17 within the housing. The outer end of the sleeve 17 is secured as by a set screw 24 to a supporting bracket 25 and which in turn may be mounted upon a suitable portion of the projector machine indicated at 26 (Figs. 2 and 3). The film 11 is preferably trained about the cylindrical housing within the groove 15 and in engagement therewith over a suitable arcuate angle whereby sufficient frictional resistance is had between the housing and the film to effect rotation of the housing.

A magnetic or magnetized unit 30 is mounted within the housing, it being supported upon a bracket 31 which in turn is secured to a trans-

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verse member 32, the transverse member 32 being supported for pivotal movement between adjustable bearing pins 33 and 34 mounted upon the internal frame members 20 and 22 respectively. The unit 30, preferably a permanent magnet, is illustrated as extending in the horizontal plane with its outer ends extending relatively closely adjacent the inner surface of the cylindrical wall of the housing but spaced slightly therefrom. The permanent magnet is normally biased away from the housing wall by means of a counterbalancing weight 35 adjustably threaded onto a screw 36 mounted on a bracket arm 37 attached to the upper side of the permanent magnet 30. A fixed weight 38 is also shown attached to the upper end of the bracket arm 37 for assisting in balancing the magnet 30.

Attached to the rear extremity 40 of the magnet supporting bracket 31 is a movable contact while a cooperating contact 41 is mounted upon insulating block 53 which is fixedly attached to disc 22. A connection is made by lead 42 extending through the sleeve 17 to the fixed contact 41 while connection is made to the movable contact 40 through the grounded lead 43 which in turn is conductively connected through the sleeve 17 and pivot pins 33, 34 to the magnet supporting arm 31. An insulating sleeve 45 is preferably provided within the sleeve 17 for adequately insulating lead 42 from the remainder of the housing structure.

A magnetic element 48 may be attached by any suitable manner to the end portion of the strip of film 11 and as illustrated the magnetic element may comprise a thin disc of shim steel secured to the film such as by an adhesive disc 49 having a diameter somewhat greater than that of the magnetic element 48. As the magnetic element on the strip of film passes over the housing 15 and immediately in front of the end portions of the permanent magnet 30 the magnet is attracted thereby and will be rocked about its pivotal support in the clockwise direction as viewed in Fig. 1 to effect momentary closure of the contacts 40, 41. It is to be understood that the housing 14 is of nonmagnetic material or at least that portion thereof at the bottom of the film groove 15. Closure of contacts 40, 41 also serves to restrict the movement of magnet 30 and prevent the magnet touching revolving drum 15.

The film 11 will be held in contact with the surface of the housing at the bottom of the film groove by means of an idler roller 51 mounted adjacent thereto upon the end of a bracket arm 52 and directly in front of the end of the permanent magnet 30. The roller 51 as well as its

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supporting shaft should also be of nonmagnetic material. Immediately upon passage of the magnetic element away from the immediate proximity of the end portions of the permanent magnet the permanent magnet will rock back to its original position for opening the contacts 40 and 41. This original position is established when arm 45, which is an extension of bracket 31, comes in contact with rod 21.

It is to be understood that the contacts 40 and 41 are connected by leads 42 and 43 to the control circuit which will turn off the first projector and simultaneously turn on the second projector but which apparatus forms no part of the present invention.

Having described the present invention in what are considered to be certain preferred embodiments thereof it is desired that it be understood that the specific details shown and described are merely illustrative and that the invention may be carried out by other means.

What I claim is:

A magnetic switch device for motion picture projection apparatus, the combination comprising a strip of film, a relatively small, thin, magnetic element, means attaching said element onto said film, said element and said attaching means being flexible and sufficiently thin so as not to interfere with the normal feeding of the film through the projection apparatus, a cylindrical housing, means for training said film over said housing in firm engagement with the cylindrical wall thereof, means for supporting said housing for free rotation about its longitudinal axis, at least the cylindrical wall of said housing being of nonmagnetic material, a magnetized unit, means mounting said magnetized unit within said housing for movement toward and away from the cylindrical wall thereof, said magnetized unit being adapted to be actuated in response to movement of said magnetic element attached to said film therepast on the exterior of said housing, and switch means mounted within said housing and operatively connected to said magnetized unit for actuation thereby.

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

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