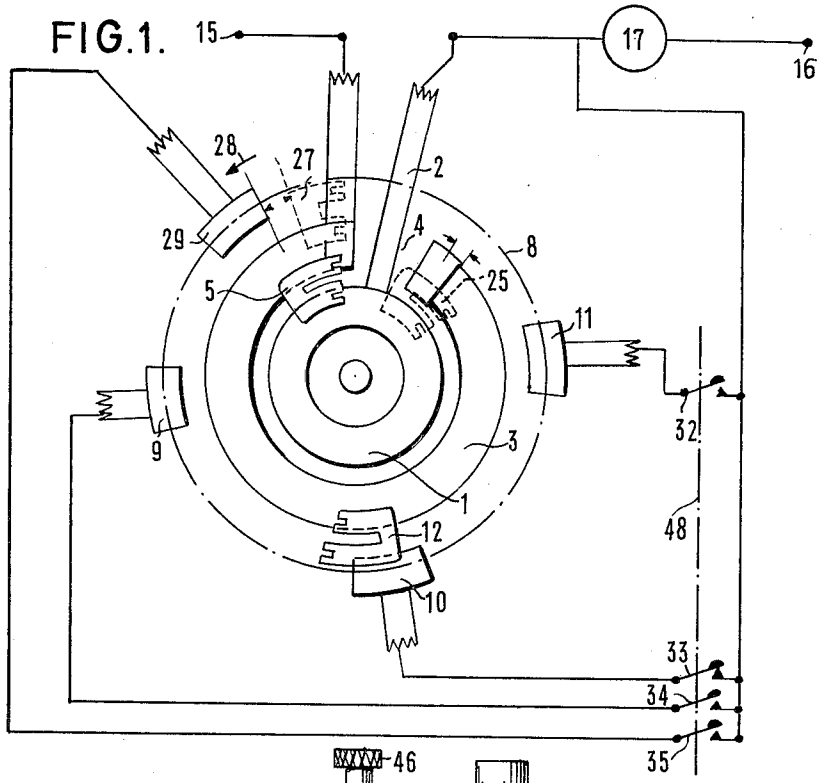
Oct. 5, 1965 W. HOLZER 3,210,487

APPARATUS COMPRISING A TIMING MECHANISM AND AN INTERMITTENT SWITCHING MECHANISM

Filed Jan. 22, 1962

FIG.1.



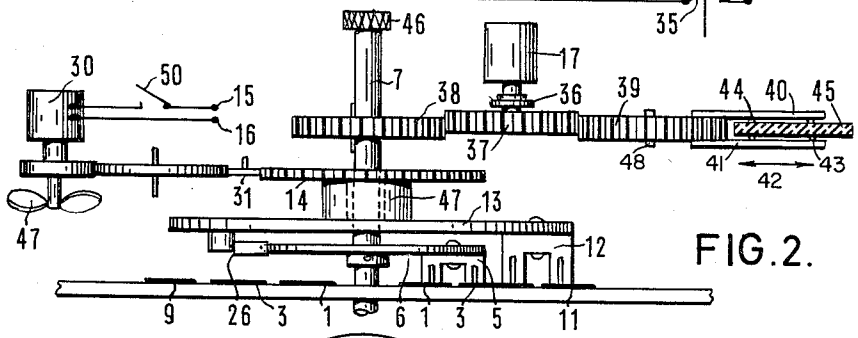


FIG.2.

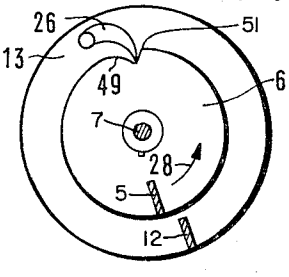


FIG.3.

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APPARATUS COMPRISING A TIMING MECHANISM AND AN INTERMITTENT SWITCHING MECHANISM

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The invention relates to apparatus for automatically changing transparencies in projectors.

The invention aims to construct such apparatus so that it is robust, shockproof, substantially unaffected by voltage fluctuations, not bulky and easy to make.

An apparatus comprising a timing mechanism and an intermittent switching mechanism is known for progressively advancing a program indexing disc in operating fully automatic washing machines. The disadvantage of this construction is that it can be used only for washing machines and is unsuitable for changing pictures in projectors.

The aim of the invention is therefore to avoid this disadvantage and make it possible to change the pictures in projectors by means of a timing mechanism and an intermittent switching mechanism.

According to the invention selector contacts are provided which operate the switching mechanism in dependence on time and which actuate means, for example a crank, by which picture-changing is effected.

The selector contacts enable the projectionist to set the time during which each individual picture is screened by operating one or another of the selector keys. The various selector keys correspond to various time intervals in the picture changing.

It is desirable for the selector contacts, which are in the form of keys, to have an operating position and, on further depression, a rest position. When the operating position is used, the pictures are changed in the time associated with the particular selector key in question. When the rest position is used, a multiple of the time associated with this key is obtained.

In order to permit fully automatic screening, one possibility is for the selector contacts to scan a punched card rotated by the intermittent switching mechanism. It is important for the punched card to have recesses made by hand in accordance with the desired program.

The use of a punched card enables a predetermined screening time to be allocated to each picture. The operating sequence is then fully automatic. The pictures can be shown in conjunction with, for example, a tape recorder so that the pictures can be explained.

In a simplified version the constantly running drive motor for actuating the timing mechanism also carries the fan blades for cooling the projecting lamp.

Construction is further simplified and cheaper if the drive motor for the timing mechanism and the drive motor for actuating the switching mechanism are combined to form one motor having a slide armature, switching-over being effected by altering the induction current of the magnet coil. With such a construction, the single motor cools the projecting lamp, sets the time interval as well as effects the switching.

If a printed circuit is used, the whole apparatus can be small and simple to achieve and the resulting accuracy and variety of possible combinations which are such as are otherwise found only in more expensive apparatus.

In order to permit alteration of the program sequence, it is important for the motor driving the switching mechanism to drive through a slip coupling, so that the shaft of the switching mechanism can be turned by hand.

For completely automatic projection it is also desirable to apply metal foils to the sound strip containing the accompanying text, these foils being for actuating the selector contacts or constituting the actual contacts.

In this case a recording tape is used instead of a punched card, so that the change of pictures must of necessity correctly coincide with the sequence of the accompanying text.

The timing and switching mechanism has three contact tracks. The first of these tracks is closed, the second is interrupted and the third is made up of switch segments. The spacing of these segments correspond to the selected time intervals between slide changes. The second, i.e. the central contact track, is scanned by two slides. The outer slide is moved by the drive of the timing mechanism and establishes the electric connection between the third and second contact tracks. The inner slide is moved by the drive of the switching mechanism and establishes the electric connection between the first and second contact tracks. An override clutch between the two slides enables the slide that is moved more slowly by the timing mechanism to be carried along by the faster slide that is moved by the switching mechanism. It is carried along until the slide moved by the switching mechanism reaches an interruption in the second contact track. Here it remains stationary until it is next carried along, whilst the slide moved by the timing mechanism runs on continuously.

An example of the invention is illustrated in the accompanying drawing, wherein:

FIG. 1 shows the printed circuit for the switch and intermittent switching mechanism and the selector contacts,

FIG. 2 is a diagrammatic section through the switch and intermittent switching mechanism,

FIG. 3 is a detail of an override clutch.

FIG. 1 shows the first contact track **1** in the form of a circular closed track. The connecting lug **2** of this contact track is part of a printed circuit, and so is the contact track itself. A second contact track **3** has an interruption at **4** in the form of a depression, so as to avoid burning at the beginning and end of this track, which is also printed. The first and second tracks **1** and **3** are bridged by a slide **5** mounted on a disc **6** (FIG. 2). Any type of rotating arm can be used instead of a disc. The disc **6** is attached to the spindle **7**. The third contact track **8** is made up of the segments **29, 9, 10** and **11**. The slide **12** connects the second contact track **3** to the third track **8**. The slide itself is fixed on a disc **13** which is driven by the gearwheel **14** through a hollow shaft **47** surrounding but the freely rotatable on the spindle **7**. The mains terminals are shown at **15, 16** and the drive motor for the switching mechanism at **17**. The selector contacts **32, 33, 34, 35** may be actuated manually or by the switching mechanism.

The drive motor **17** drives the spindle **7** through a one-way slip coupling **36** and the gears **37, 38**. The gear **38** is fixed to the spindle **7**. In addition, this drive motor acts through diagrammatically illustrated gearing **39** to engage a crank having thrust rods **40, 41**. The thrust rods are reciprocated in the direction of the arrow **42** depending on the ratio of the gearing **39**. They are connected by supports **43, 44** on which the pictures or transparencies **45** rest. The picture **45** drops vertically to the plane of the drawing when the thrust rods **40, 41** and their supports are moved appropriately, and the next picture follows from above. This apparatus can also be constructed in other ways. The presence of the one-way slip coupling **36** permits the spindle **7** to be turned by hand by using the diagrammatically illustrated hand wheel **46**. The drive motor **30** for the timing mechanism also drives a fan **47** for the projecting lamp (not shown). A diagrammatically indicated shaft **48** makes it possible to actuate the selector contacts **32** to **35** by the gearing **39** if

the slides are to be shown fully automatically. The selector contacts 32 to 35 could be in the form of scanning contacts of a magnetic tape onto which the contact-making foils are stuck.

The apparatus functions as follows: In the position shown, the slide 5 connects the first contact track 1 to the second contact track 3. The drive motor 17 thereby receives voltage through the mains terminal 15, the second contact track 3, the slide 5, the first contact track 1, the connecting lug 2 and the mains terminal 16. The drive motor 17 drives the spindle 7 and, acting through the gearing 39, simultaneously drives the thrust rods 40, 41 in the direction of the arrow 42. The slide 5 and disc 6 thereby move in the direction of the arrow 28 at a speed faster than that of the disc 13. On striking the slide 12, the notch 51 in the disc 6 carries along with it the lever 26 on the disc 13 and thus also the slide 12. If the disc 13 is moving faster than the disc 6, then the rounded-off edge 49 of the notch in the disc 6 prevents it from being carried along by the disc 13. When the slide 5 reaches the position 25 shown in dotted lines the drive motor 17 is de-energised since the slide 12 has then also broken the circuit of the drive motor 17. The spindle 7 then stops rotating. The thrust rods actuated through the stepping mechanism and the drive motor 17 also stop in a corresponding position and in this position the picture is supported in the projector and screened. After closing the switch 50, the slide 12 is moved by a continuously running drive motor 30, which constitutes the timing mechanism, as hereinafter described. In relation to the time intervals between picture-changing, the position 27 shown in dotted lines, can be designated the starting position of the slide 12. This position is only temporary, as will be explained later.

Depending on which of the selector contacts 32 to 35 is closed, the terminal 16 is connected to the corresponding segment 9, 10, 11 or 29 of the third contact track 8. The time taken by the slide 12 to pass from the dotted-line position 27 to the appropriate line segment is the time interval between changing pictures. In FIG. 1, the manually operated selector contact 33 is closed. When the slide 12 reaches the position shown in full lines in FIG. 1, the drive motor 17 receives current from the mains terminal 15 through the second contact 3, the slide 12, the segment 10 and the contact 33. In this way the slide 12 starts the drive motor 17 which moves in the direction of the arrow 28 the slide 5 of the switching mechanism mechanically connected to the disc 6. The full-line position of the slide 5 in FIG. 1 represents the stage where the drive motor 17 has just been started. When, after leaving the interruption 4, the slide 5 reaches the contact track 3 (full-line position), the drive motor 17 is energized through the slide 5 in a self-holding connection, and the starting circuit through the slide 12 is no longer required. This is followed by the operation already described, namely, the faster-moving slide 5 carries with it the slide 12. The slide 5 is left in the gap 4, as it has switched itself off from the motor 17 after leaving the contact track 3. The slide 12 now overtakes the slide 5 and reaches the dotted-line position 27, which is virtually identical with the dotted-line position 25 of the slide 5. The slide 12 can overtake the slide 5 because the rounded edge 49 prevents pawl 26 from carrying it along. If none of the selector contacts 32, 35 is closed, the slide 12 circulates continuously without the drive motor 17 of the switching mechanism being started. The time taken by the slide 12 to reach one of the energized segments of the contact track 8 from the dotted-line position 27 represents the time interval at which the pictures are changed. The selector contact 32, for example, gives a longer time interval than the selector contact 34. A slip clutch 31 between the drive motor 30 of the timing mechanism and the slide 12 permits the latter to be carried along more quickly by the slide 5 despite the slower drive from the motor 30.

Instead of the four segments 9 to 11, any desired number of additional segments and associated selector contacts can be provided. The drive reductions from the drive motors 17 and 30 to the spindle 7 and the gear 14, respectively, may be chosen at will. The two motors 17 and 30 could be combined, for example, with a motor which has two switching positions by means of a magnetically moved slide armature. The override clutch may also be constructed differently.

The invention can be used in all cases where an intermittent switching mechanism in an automatic circuit-breaking circuit is required to be started by a timing mechanism, preferably using printed circuits.

I claim:

1. A driving mechanism for a picture projector which changes the pictures at predetermined time intervals and which comprises one motor for operating the timing mechanism and one motor for changing the pictures, the timing mechanism comprising a frictionally driven rotating member carrying a slide at a relatively slow speed while traversing an interrupted contact track, and another track comprising a plurality of contact segments, while the picture-changing motor has a relatively high speed driving connection with a coaxially mounted rotating member carrying a slide, said slide traversing said interrupted track and a circular contact track, said rotating members being connected by a one-way slip coupling, and electric switches connected to said segments for energizing them selectively.

2. The driving mechanism of claim 1 in which said circular contact track, said interrupted contact track and said contact segments are arranged concentrically and close enough together so that each of the two intervening spaces can be bridged over by one of the two slides, and in which said electric switches and said circular contact track are connected in parallel to said picture-changing motor which is connected to one electric terminal, while said interrupted contact track is connected to the opposite electric terminal.

3. The driving mechanism of claim 1 in which said frictionally driven rotating member has an axial bore, while said coaxially mounted rotating member comprises a shaft rotatably mounted in said bore.

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