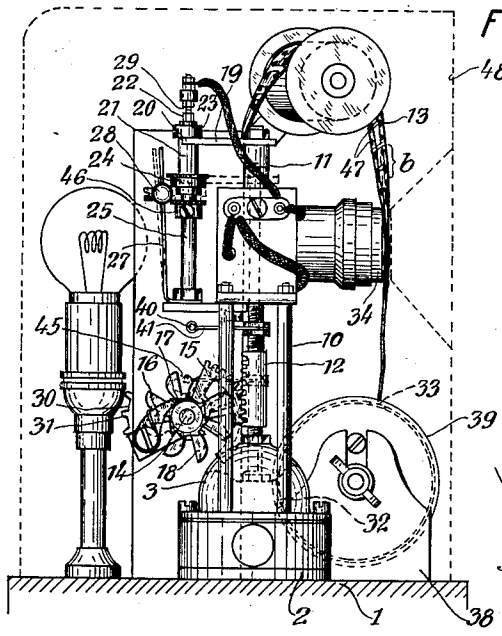
Dec. 6, 1932. G. HOPPE 1,889,785

INTERMITTENTLY ACTING FEEDING DEVICE

Filed Oct. 7, 1930

FIG. 1.



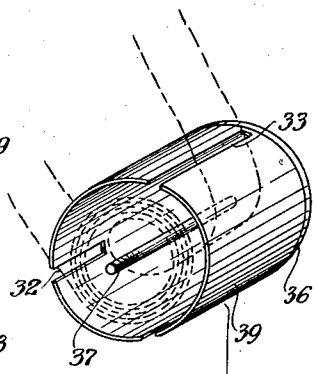


FIG. 2.

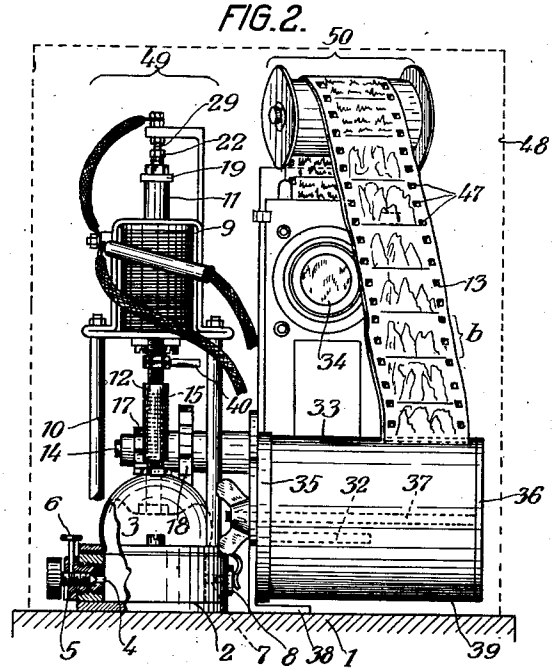
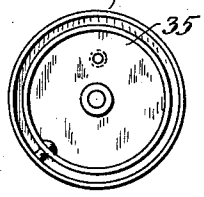


FIG. 3.



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UNITED STATES PATENT OFFICE

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INTERMITTENTLY ACTING FEEDING DEVICE

Application filed October 7, 1930, Serial No. 487,003, and in Germany October 10, 1929.

This invention relates to an intermittently acting feeding device for any purpose, especially for the picture carrier of advertising picture projectors. The main feature of the invention consists in that the means for driving the feeding mechanism is connected to the flexible closing wall of a pump mechanism, which is provided with a spring controlled discharge valve for quick pressure or feed stroke and an adjustable inlet valve for slow suction or idle stroke of the feed mechanism.

The feeding device is suitable for devices for various industries, such as for example for night illumination of houses and as automatic release for lens shutters of photographic cameras.

The form of construction illustrated by way of example in the accompanying drawing shows the use of the invention for devices for showing illuminated pictures by means of projection for advertising. In this instance the picture carrier is intermittently fed by the armature of an electro-magnet, the armature being connected to the flexible end wall of the pump mechanism.

The quick switching in and cutting out of the circuit at each end of the armature stroke is effected in that the forked lever, connected with the armature, strikes shortly before the end of its stroke against the corresponding end collar of a sleeve, movable within adjustable limits on a rod and carrying the contact and brings said sleeve either against or away from said contact.

An embodiment of the invention is illustrated by way of example in the accompanying drawing in which:

Fig. 1 is a side elevation of a feeding mechanism built in an advertising picture projector.

Fig. 2 is an end view of Fig. 1, showing the feed drum in which the film strip is wound.

Fig. 3 shows this drum in perspective and end view.

On the base plate 1 the pump casing 2, made for example of metal, is fixed, which is closed at the top by a rubber, leather or similar diaphragm 3. The casing 2 has an air admission port 4, the effective cross section of which can be regulated by a screw spindle 5. In order to prevent unintentional alterations of the adjustment of this spindle, a clamping screw 6 is provided. The casing 2 has further an air exhaust port 7, which is normally kept closed by a spring loaded valve 8. The coil 9 of the electro-magnet may be held by columns 10, which are rigidly connected to the casing 2. In the coil an iron core 11 can move the non-magnetizable rod 12 of this core forming a rack, being rigidly connected to the diaphragm 3. The rack 12 cooperates with a toothed segment 15, loosely mounted on the feed shaft 14 for the film band 13. On this toothed segment 15 a spring controlled pawl 16 is mounted, which cooperates with a ratchet wheel 17 keyed on the feed shaft 14. The pawl 16 rotates the ratchet wheel 17 and therefore the shaft 14 the distance of one tooth at each downward movement of the electro-magnet and consequently feeds through suitable gearing the endless film band the distance of one picture width. On the shaft 14, preferably at the other side of the segment toothed wheel, a further ratchet wheel 18 is mounted, made of any desired material, having suitably shaped teeth and intended to ensure the exact adjustment of the picture width b of the film band. For this purpose a blade spring 41, for example adjustable by means of a screw thread and carrying a pin 40, is mounted on the armature 11. The pin 40 always enters in the free gap 45 between two teeth of the wheel 18 in the case of the proper running of the feeding device, that is in the case of the proper feeding through the determined picture width b of the film band, whereas in the event of inaccurate engagement it strikes against the back of those teeth and therefore prevents the armature from dropping into its lowermost dead centre position, that is a breaking of a circuit.

The armature 11 carries on its upper end a lever 19, which grips with its fork 20 around a sleeve 21. On this sleeve a contract 22 and two collars 23, 24 are fixed and it is shiftable upwards and downwards on a rod 25. A stop 46 adjustable on the rod 25 limits the

downward movement of the sleeve 21. In order to secure the sleeve 21 in its upper extreme position, a holding device, for example in the shape of a wire spring 27 with a shiftable ball 28, is provided on the rod 25, which device engages under the lower collar 24 and, as mentioned, holds the sleeve 21 in its upper extreme position, in which the contact 22 strikes against a contact 29. In order to ensure a gentle striking of the lever 19, the collars 23, 24, as well as the stop on the rod 25, may be provided with a washer of suitable soft material.

The transmission of the movement through the ratchet wheel 17 is effected in the usual manner by means of a cross 30, which engages with its teeth 31 in corresponding perforations 47 of the film band 13. The band itself is preferably made endless and rolled in the manner shown on the drawing in a drum 39, provided with a short slot 32 and a long slot 33, in order to enable a suitable guiding of the pulled out film band part laterally past a lens 34. After the cover 35 has been removed, the film band is suitably inserted and secured on the base plate 1 by means of a bolt 37 preferably screwed into the other cover 36, as shown at 38 in the drawing.

The air displaced from the space 2 can be utilized for ventilating purposes, that is for causing an air circulation in the housing 48.

The operation is as follows:

In the position shown in full lines in Fig. 1, current is supplied to the electromagnet 9, which attracts the armature 11. The lever 19 of the armature 11 slides then on the sleeve 21 freely between the collars 23, 24 until it strikes against the lower collar 24 of the sleeve 21 shortly before the end of the downward stroke, carries along the sleeve to the stop 46 and thus separates the contact 22 from the contact 29. During this movement the flexible diaphragm 3 is compressed, as shown in dotted lines in Fig. 1, the air escaping through the valve 8. The downward movement itself is transmitted by means of the rack 12 and the segment 15, pawl 16 and ratchet 17 to the feed shaft 14, which moves on the film band 13 exactly one width b of the film band by means of the cross 30. Thus a picture is exposed until a new current impulse is effected.

The intermittent feeding is caused in that the depressed diaphragm 3 sucks air slowly through the aperture 4, according to the position of the valve 8, and slowly lifts the armature 11, which first slides upwards idly with its arm 19 between the collars 23 and 24 of the sleeve 21 until it strikes against the upper collar 23, lifts the sleeve 21 and closes the contacts 22 and 29. The sleeve 21 is held in this position by the ball spring 27 until the arm 19 of the armature 11 again strikes against the lower collar 24 of the sleeve 21, and the sequence of movements commences afresh.

It should be emphasized that, as shown in Fig. 2, the part of the device 49, carrying the armature and the mechanical gearing, can be removed separately as an aggregate, whereas the optical part 50 also forms a unit.

I claim:

1. An intermittently acting feeding device for any purposes especially for the picture carrier of advertising picture projectors, comprising in combination a feed mechanism, means for driving said feed mechanism consisting of an intermittently excited electric magnet with an armature, a pump mechanism casing, a resilient wall closing said casing at the top connected to said armature consisting of a rubber cap in the shape of a hollow ball cut through in the middle and open towards the interior of said casing adapted to automatically return said armature into the circuit when it has become currentless, and an inlet valve in said casing for regulating the intervals at which said cap operates.

2. A device as specified in claim 1, comprising in combination with the armature of the electromagnet the pump mechanism and the flexible diaphragm, a rack fastened to said diaphragm extending from the end of said armature, a segment shaped toothed wheel meshing with said rack, a feed shaft for the film band, a ratchet gear on said shaft adapted to be actuated during each downward movement of said armature, a rod, a sleeve shiftable on said rod, a collar at each end of said sleeve, a bifurcated lever on the upper end of said armature engaging said sleeve adapted to strike against one of said collars at the end of one stroke movement of said armature and against the other of said collars at the end of the other stroke movement of said armature, to break on the completion of the pressure stroke of said pump mechanism the circuit of said electromagnet and on the completion of the suction stroke of said pump mechanism to close the circuit of said electromagnet.

3. A device as specified in claim 1, in which the air ejected in opposition to the action of the spring loaded exhaust valve is fed into the housing, communicating with the outer air, to produce an air circulation.

In testimony whereof I affix my signature.

GOTTHOLD HOPPE.