Jan. 8, 1924. 1,480,514

W. C. JEAPES ET AL

KINEMA FILM AND LIKE STRIP HAVING FEED PERFORATIONS AND MECHANISM COÖPERATING WITH SAID PERFORATIONS

Filed June 6, 1922 2 Sheets-Sheet 1

Fig. 1

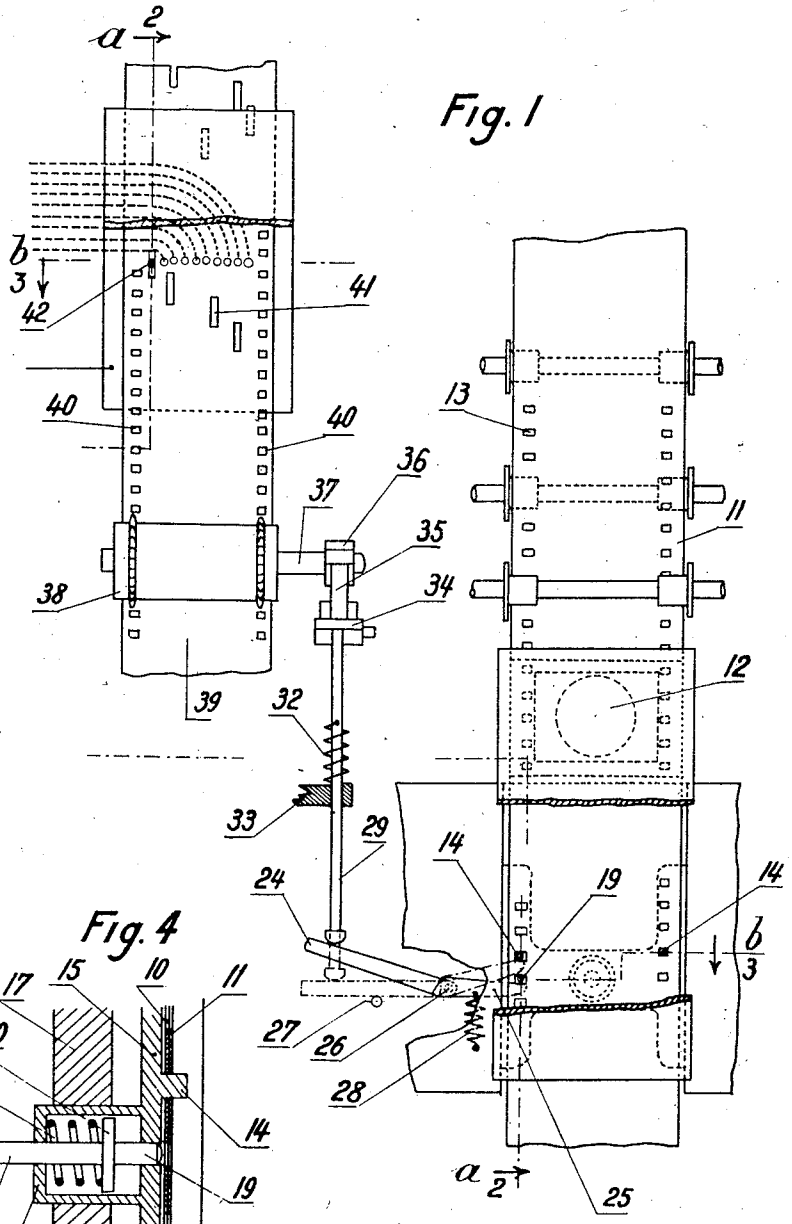


Fig. 4

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Fig. 2

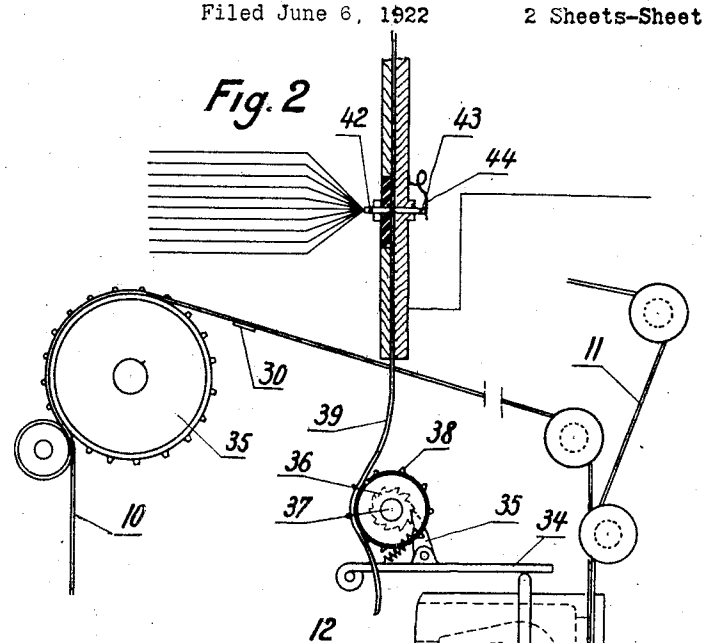
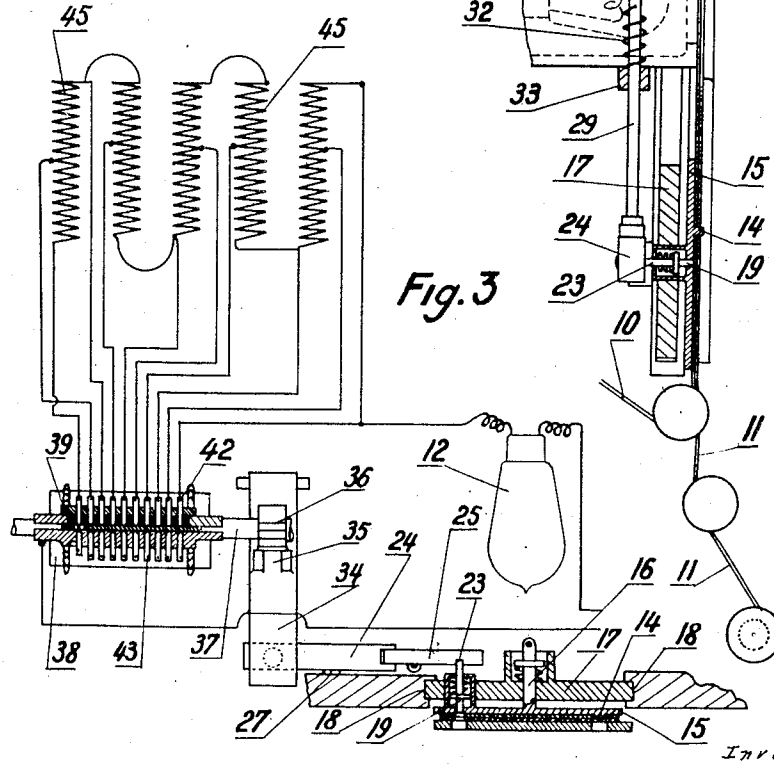


Fig. 3



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UNITED STATES PATENT OFFICE.

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KINEMA FILM AND LIKE STRIP HAVING FEED PERFORATIONS AND MECHANISM CO-OPERATING WITH SAID PERFORATIONS.

Application filed June 6, 1922. Serial No. 566,408.

To all whom it may concern:

Be it known that we, WILLIAM CECIL JEAPES, subject of the King of England, residing The Drive, Belmont, Surrey, England, and ANDRÉ LÉON VICTOR CLÉMENT DEBRIE, citizen of the French Republic, residing 111 Rue Saint-Maur, Paris, France, have themselves invented certain new and useful improvements in or relating to kinema films and like strips having feed perforations and mechanism cooperating with said perforations, of which the following is a specification.

This invention is for improvements in or relating to kinema films and like strips having feed perforations, and to mechanism cooperating with said perforations. The invention is applicable to all mechanisms of the type in which a perforated strip is fed by one or more movable pins or teeth which enter its perforations and draw it along, and is particularly applicable to automatically changing, according to the density of the negative, the intensity of the artificial light used in kinema film printing. It will be understood, however, that the invention is not limited in its scope to this particular use. It has already been proposed mechanisms of this kind in which a feeler member rests in contact with the edge of the negative which is cut away after development wherever along its length a change in its density occurs. This cutting away permits movement of the feeler which is utilized electrically to alter the intensity of the printing light. If the edges of the negatives were always perfectly even when supplied by the makers this mechanism would be perfectly satisfactory, but in practice joints in the films and other unevennesses of their edges are present or develop and these are sometimes liable to cause undesired operation of the feeler and consequently undesired light changes. One of the objects of the present invention is therefore to avoid this difficulty.

The primary feature of the present invention consists in the employment of a strip which is wholly or partially blinded at the situation of one or more appropriate feed perforations; said feed perforations are entered by pins or teeth carried by a movable device, which can be the feeding member for the strip, so that those pins which should normally enter the perforations at the blinded situations are caused to move by contact with the strip at said situations, said device being combined with controlling, regulating, or like means (such as means for changing the intensity of printing light) which are operated by the movement of said movable pins. Thus it will be seen that the operation of the controlling, regulating or like means will be quite independent of any irregularities in the edge of the film. In one form of carrying out the invention one or more pins are resiliently mounted in the strip feeding member so as to be movable along their longitudinal axes, by contact with the strip, into such a position as to become operatively connected to the said controlling, regulating, or like means.

The invention also provides a very convenient construction of controlling, regulating or like means operable by the aforesaid strip feeding member.

For a more complete understanding of the invention there will now be described, by way of example, only and with reference to the accompanying drawings, one constructional form of apparatus according to the invention. It is to be understood, however, that the invention is not limited to the precise constructional details set forth.

In these drawings:

Figure 1 is an elevation of a portion of the mechanism,

Figure 2 is a section on the line 2—2 of Fig. 1 looking in the direction of the arrows *a*.

Figure 3 is a section on the line 3—3 of Figure 1 looking in the direction of the arrows *b*.

And Figure 4 is a detail sectional view on a scale larger than that of the preceding figures.

Like reference numerals indicate like parts throughout the drawings.

In the drawings a kinema negative is indicated at 10 and a positive at 11, the two being fed in synchronism past a lamp 12 for printing purposes. The films have the usual feed perforations 13 which are engaged by pins or teeth 14 on a feeding member 15. This feeding member has a double movement in the well known manner, namely

towards and from the films and also vertically. The former movement occurs with the stem 16 of the member sliding in the plate 17, while the latter movement occurs with the members 15 and 17 moving together in the grooves 18. In this way an intermittent feed is imparted to the films each dwell occuring with a picture opposite the lamp 12 in order that it may be printed upon the positive 11.

In the construction shown, the member 15 has two projections 14, one for each set of perforations. These projections 14 are shown as being formed integral with the member 15. In addition to these two projections, which are the ones which effect the driving of the films and which it will be understood can be increased in number if desired, there is also a movable pin 19. This carries a collar 20 which is received in a casing 21 moving with the member 15. Inside the casing 21 is a spring 22 which tends normally to press the pin 19 towards the films. The pin 19 has an extension 23 on the opposite side of the collar 20 which reaches out through the casing 21. The pin 19 is of such dimensions as to be able to enter the perforations 13 in a similar manner to that which the projections 14 enter these perforations, and if desired this pin 19 may during part of the working of the apparatus assist the projections 14 to feed the films. At intervals along the film 10, however, individual perforations 13 are blinded and the situation of the blinded perforations is so chosen that they will always come opposite to the movable pin 19 as they are engaged by the member 15, and never come opposite to the projections 14. Thus, when such a blinded perforation comes opposite to the feeding member 15 and the projections 14 enter perforations 13 in the films, the pin 19 will be prevented from entering the blinded perforation and its extension 23 will, therefore, project further beyond the member 17 during the ensuing downward feeding movement of the latter than would otherwise be the case. Pivoted adjacent the member 17 is a lever in two parts 24 and 25 which are pivoted together at 26 and supported thereat upon a stationary part of the machine. A stop 27 prevents excessive downward movement of the part 24 and a light spring 28 prevents excessive upward movement of the part 25. The shape of the adjacent faces of the parts 25 is such that while the part 25 can be moved upwardly without moving the part 24, downward movement of the part 25 will bring an abutment upon it into contact with the part 24 and thus move the latter upwards. The normal position of the parts 24 and 25 is shown in chain lines in Figure 1. When, however, the pin 19 is stopped from its movement towards the films with the feeding member 15 owing to the presence of a blinded perforation, its extension 23 will, during the downward movement of the member 15, engage the part 25 and bring it into position shown in full lines in Figure 1. This will also move the part 24 into the position shown in full lines in Figure 1 and cause movement of a rod 29 which bears against the part 24.

The blinding of the perforations may be effected in many ways. For instance, with kinema films a piece of celluloid 30 may be stuck over the perforation to be blinded. If only one pin 19 in a set of pins is made movable relatively to the feeding member 15 then naturally care must be taken to ensure that an appropriate perforation is blinded, as obviously if some perforation is blinded which comes opposite one of the other pins in the set the desired results will not be obtained. All of the pins in a set may be made movable relatively to the feeding member 15 if desired, and it will be appreciated that at all times other than when a blinded perforation is in question the movable pins may operate in quite the ordinary way for feeding the strip along. Instead, however, of the pin or pins which are movable relatively to the feeding member being part of the ordinary set of feeding pins, they may be additional to such set and they need not necessarily take part in the feeding operation of the strip.

Where the strip has to pass over toothed wheels other than the feeding member aforesaid, one or more teeth in the wheel should be removed to correspond to the blinded perforations in the strip care being taken to ensure that the blinded perforations and the removed teeth coincide by arranging in a suitable numerical relationship the number of teeth on the wheel and the number of perforations in the strip between the blinded ones.

The rod 29 operates the controlling, regulating or like means. This may take many different forms. In the construction illustrated it consists of means for changing the intensity of the printing light, but it could take the form of means for controlling the speed at which a gramophone record is rotated or means for effecting the change-over from one record to another in mechanism which has a kinema film and a gramophone record running synchronously. These instances, however, are only given by way of example as the invention has uses apart from kinema films.

Referring to the particular construction illustrated the rod 29 is controlled by a spring 32 which tends to move it downwards. At its upper end the rod which is guided in a suitable bearing 33, bears against a pivoted arm 34 carrying a spring-controlled ratchet pawl 35. This engages a

ratchet wheel 36 to turn the latter one tooth each time the rod 29 is lifted owing to a blinded perforation 13 coming opposite to the movable pin 19. The ratchet wheel 36 is mounted upon the shaft 37 of a driving drum 38 for a perforated insulating strip 39. The strip 39 has perforations 40, similar to those in a kinema strip, whereby it is driven by the drum 38, and it also has other perforations 41. The strip 39 is arranged to move between two opposed series of electrical contacts 42 and 43 which are in co-operating pairs, the contacts in each pair being adapted to engage each other and complete a circuit when a perforation 41 in the strip 39 is brought between them. Conveniently the contacts 42 are stationary and the contacts 43 movable and pressed by springs 44 towards the contacts 42. The perforations 41 are of such dimensions and so placed that the contacts in one pair at least are always in engagement. The contacts are so wired in conjunction with resistances 45 that each co-operating pair of contacts corresponds to a different current through the lamp 12, and since the circuits are arranged in parallel, the arrangement of the perforations 41, just described will ensure that during operation of the device current will always be flowing through the lamp 12. Sparking at the contacts will thereby be avoided which is of particular importance in kinema work.

In carrying out the invention as applied to the variation of the intensity of the printing light for kinema films, the negative is first of all inspected and the places at which changes in the intensity of the light are necessary noted. Appropriate perforations 13 are then blinded and a master strip 39 so perforated that the position of its perforations 41, and the order in which they occur, corresponds to the changes in intensity of the printing light required.

It will be appreciated that the invention provides not only an improved printing mechanism or other mechanism for handling or operating upon a kinema film or like strip having feed perforations, but also improvements in the films or other strips themselves.

The mechanisms whereby the movable pins operate the means for changing the intensity of printing light or for effecting some other desired object, may be either mechanical or electrical as desired and may take any suitable form according to circumstances. Furthermore the feeding member may take the form of a gate or comb for step-by-step feed as above described or may take other forms as desired. Other modifications may also be made in the constructional details of the apparatus.

What we claim is:

1. A strip comprising a kinema film having feed perforations, said strip being blinded at the location of appropriate feed perforations.

2. In apparatus handling a strip having feed perforations and particularly in film printing apparatus, the combination of a strip which is blinded at the location of appropriate feed perforations, a movable member co-operating with said strip, pins carried by said movable member and entering the feed perforations, means for moving said pins by contact with the strip at the blinded portions and operating means, actuated by the movement of said pins for changing the intensity of printing light.

3. In apparatus handling a strip having feed perforations and particularly in film printing apparatus, the combination of a strip which is blinded at the location of appropriate feed perforations, a movable feeding member for the strip, pins carried by said movable member and entering the feed perforations, means for moving said pins relatively to the feeding member by contact with the strip at the blinded portions and operating means, actuated by the movement of said pins for changing the intensity of printing light.

4. In apparatus handling a strip having feed perforations and particularly in film printing apparatus, the combination of a strip which is blinded at the location of appropriate feed perforations, a movable feeding member for the strip, pins carried by said movable member and entering the feed perforations, one at least of said pins being resiliently mounted in said member, so as to be movable along its longitudinal axis by contact with the strip at the blinded portions and operating means, actuated by the movement of said pins for changing the intensity of printing light.

5. Apparatus for handling a strip having feed perforations and particularly film printing apparatus comprising, in combination, a strip which is blinded at the location of appropriate feed perforations, a movable member cooperating with said strip, pins carried by said movable member and entering the feed perforations, means for moving said pins by contact with the strip at the blinded portions, two opposed series of electrical contacts arranged in co-operating pairs, a perforated insulating strip driven by movement of said pins, and arranged to move between said series of electrical contacts, the contacts in each pair being adapted to engage each other and complete a circuit when a perforation in the strip is brought between them.

6. In apparatus handling a strip having feed perforations and particularly in film printing apparatus, the combination of a strip which is blinded at the location of appropriate feed perforations, a movable

member cooperating with said strip, pins carried by said movable member and entering the feed perforations, means for moving said pins by contact with the strip at the blinded portions, two opposed series of electrical contacts arranged in cooperating pairs, and a perforated insulating strip driven by the movement of said pins and arranged to move between said series of electrical contacts, the perforations in the insulating strip being of such dimensions and so placed that the contacts of at least one pair of contacts are always in engagement.

In witness whereof we have hereunto set our signatures.

WILLIAM CECIL JEAPES.
ANDRÉ LÉON VICTOR CLÉMENT DEBRIE.