C. MARTI.

INTERMITTENT MOVEMENT.

APPLICATION FILED JUNE 17, 1914.

1,268,035. Patented May 28, 1918.

Fig. 1.

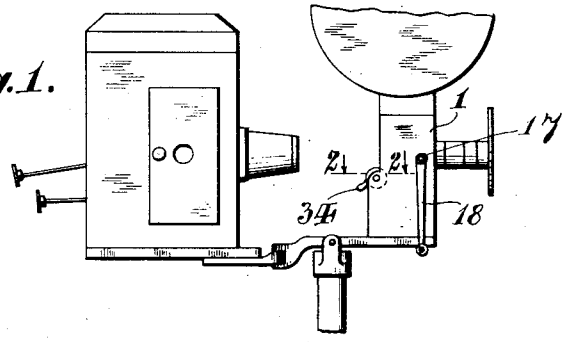


Fig. 2.

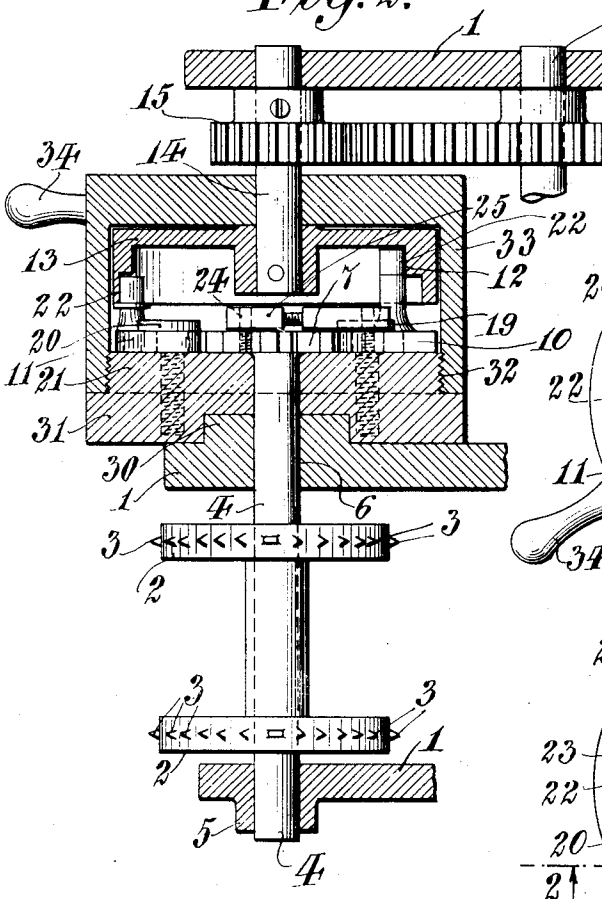


Fig. 3.

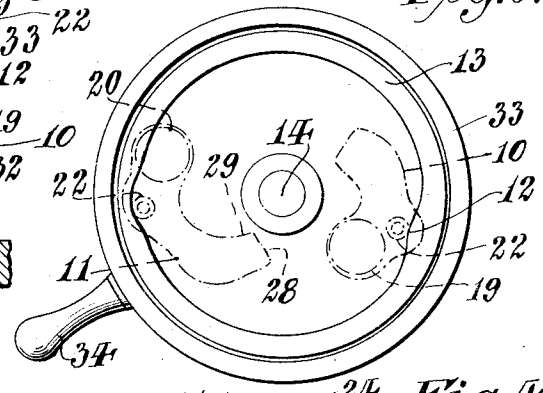
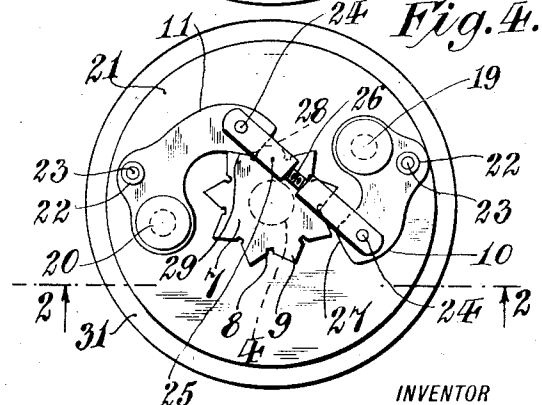


Fig. 4.



WITNESSES

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INTERMITTENT MOVEMENT.

1,268,035. Specification of Letters Patent. Patented May 28, 1918.

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To all whom it may concern:

Be it known that I, CHARLES MARTI, a citizen of Switzerland, and resident of Newark, county of Essex, and State of New Jersey, have invented an Improvement in Intermittent Movements, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to an improved intermittent movement which may be applied to motion picture projecting machines or similar instruments either for projecting a series of motion pictures upon a screen from a continuous film or for use in connection with a camera for taking a series of pictures in succession on one film. The object of the invention is to provide a transmission device of comparatively simple construction by means of which the intermittent motion of the film may be accurate and steady to avoid flickering, and whereby the operation of "framing" may be readily effected by a simple adjustment. I have illustrated one form of my invention in the accompanying drawings, in which—

Figure 1 is an elevation of a motion picture projecting machine illustrating the relative position of my improved mechanism with respect to the different parts of said machine;

Fig. 2 is a detail view partly in cross-section on the line 2—2 of Fig. 1;

Fig. 3 shows one form of cam suitable for use in connection with the improved intermittent movement, and,

Fig. 4 illustrates a preferred arrangement of pawls adapted to be actuated by the cam shown in Fig. 3.

An intermittent movement embodying my invention is illustrated in the accompanying drawings as applied to a motion picture projecting machine. As shown in Figs. 1 and 2, the said improved movement is suitably mounted in the frame 1 of the said projecting machine, in which I have also journaled a shaft 4 carrying sprocket wheels 2 having projections 3 adapted to mesh with corresponding perforations in the standard motion picture film. The shaft 4 may be provided at its inner end with an index 7, more clearly shown in Fig. 4. Referring thereto, a series of depressions 8 alternating with a series of projections 9 form a succession of detents on said index, here shown as substantially V-shaped, but that shape is not essential. The shaft 4 having the sprockets 3 mounted upon it may be rotated by causing said index to rotate. For this purpose, I have provided a suitable driving mechanism whereby the said index may be alternately moved and stopped thus effecting intermittent movement of the shaft 4 and the attached sprockets 3 although the power producing this motion may be applied continuously in one direction either by hand or by any other suitable means. As illustrated in Figs. 2 and 4, the driving mechanism may comprise index engaging means, as pawls 10 and 11, and means for actuating the said pawls, as a cam 12, conveniently mounted on suitable cam carrying means as a rotatable disk 13, said disk being fixed to a spindle 14 suitably journaled in the framework 1 and adapted to be rotated by means of a pinion 15 which meshes with a gear 16 fixed to the shaft 17, also mounted in the framework 1 and adapted to be rotated by means of the crank handle 18, illustrated in Fig. 1.

The pawls 10 and 11 pivoted at 19 and 20 respectively may be conveniently mounted upon a pawl carrying plate 21 adjacent to the index 7, and are provided with cam engaging members as roller bearings 22 mounted on projecting pins 23 so that said bearings may be engaged by the cam 12 with a minimum of friction. The pawls 10 and 11 are also further provided with projecting pins 24, said pins being adapted to engage corresponding holes in an extensible connecting member, as the rod 25, having suitable means for adjusting its length, here shown as a threaded screw 26 connecting its several parts.

In the illustrated embodiment of my invention, I designate the pawl 10 as the driving pawl and the pawl 11 as the locking pawl, although the latter may effect considerable rotative effect upon the index 7 in unison with or supplementary to the moving effect of the pawl 10. The driving pawl 10 may conveniently be provided with a sur-

face 27 of suitable contour to engage one of the projections 9 of the index 7 in such a manner as to cause the index to rotate. The pawl 11 may be similarly equipped with a contacting surface or surfaces, as 28 and 29, adapted to engage the index 7 for the purpose of locking it against rotation in either direction.

A further object of my invention has been to provide a mechanical movement for use in motion picture projecting apparatus to simplify the operation of "framing" the picture. In many present devices, this framing is accomplished by manipulating comparatively cumbersome mechanism or by shifting the position of a comparatively large part of the mechanism of the projecting apparatus. With my improved construction, however, I may rotate the film actuating shaft 4 in either direction independently of its intermittent rotation to adjust the film to any desired position with respect to the framing aperture. For this purpose, I provide in the framework 1, Fig. 2, a bearing portion or hub 30 concentric with the shaft 4 and a rotatable base plate 31 journaled upon said hub 30 and upon which is mounted the pawl carrying plate 21 here shown as provided with a threaded peripheral portion 32. A suitably shaped covering member or drum 33 may be loosely mounted upon the spindle 14 and be so connected with the plate 21 as to wholly inclose the cam, pawl, and index mechanism heretofore described. The drum 33 being rotatable about the spindle 14 on the one hand, and the pawl carrying plate 31 being similarly rotatable on the hub 30, the pawl actuating means and the index actuating means inclosed by said drum may be rotated independently of each other. A suitable knob or lever, as 34 may be conveniently attached to the drum 33 so that the latter may be readily rotated in either direction.

In operation, and as applied to a projecting machine, it will be understood that the web of film (not shown) ordinarily passes downwardly in the path of the projections 3 on the sprocket wheels 2 and is moved in the direction of rotation of said wheels across the framing aperture when the operator turns the crank shaft 18 or applies driving power in any other suitable manner. In the present case, power may be transmitted through the gear and pinion connection hereinabove described to the spindle 14 upon which is mounted the cam carrying member or disk 13 provided with the cam 12. The roller bearing 22, mounted upon the pawl 10, is engaged by said cam 12 to actuate the pawl 10 which in turn moves the index 7. At the same time, the pawl 11 may move in coöperation with the pawl 10, being deflected out of the path of the index 7 when said pawl 10 is driving the latter and being again brought into engagement with the index 7, both to complete the required movement of the latter and then to lock the same momentarily against movement in either direction.

It is well understood in the art to which this improvement relates that satisfactory projection of motion pictures requires a succession of stops with alternating movements of rotation of comparatively very short duration. If the stop is not positive, there may be a slight reverse movement of the film carrying shaft which causes the so-called flickering. By the use of my improved intermittent movement, it is contemplated that this flickering may be entirely prevented. In many projecting machines now in use, the intermittent movement may operate well for a short time and as long as the parts retain the accuracy with which they were originally fitted together; but on account of the high speed and hard usage which this mechanism receives in practice, the parts soon become worn, and the resulting looseness causes imperfect projection of the pictures. In such devices it is usually difficult and expensive to make repairs. To obviate these difficulties, I have provided, in my improved movement, adjusting means whereby wear on the moving parts may be compensated for or taken up by manipulating the threaded portion or adjusting member 26 which joins the two parts of the connecting rod 25. This adjusting device insures accurate engagement of the pawls 10 and 11 with the index 7 thereby insuring positive rotation and positive stopping of the film actuating shaft 4. In case the roller bearing 22 should become worn, it is obvious that it may quickly and inexpensively be replaced by a new bearing and the whole mechanism be readjusted to proper operative relation.

Besides doing away with flickering, it will be clear from previous description that a device constructed in accordance with the present invention affords an especially simple means for "framing". When it is desired to shift the film vertically with respect to the framing aperture, the operator may rotate the pawl carrying plate 21 in either direction by moving the lever 34 up or down. By so doing, the angle at which the pawls engage the index is changed, thereby changing the relative position at which the projections 3 successively engage the perforations in the film. This rotation of the index and of the shaft 4 is entirely independent of the intermittent rotation caused by engagement of the pawls with said index and may be effected either when the pawls are inoperative or during ordinary operation of the machine.

It is contemplated that various mechanical equivalents may be substituted for the parts shown in the drawings and heretofore described without departing from the spirit of my invention, it being apparent that such substitution may be extensively applied, particularly to the mechanism for actuating the index and the mechanism connecting the same with the driving element.

I claim as my invention:

1. In an intermittent movement, the combination of a shaft to be rotated, an index operatively connected therewith, index engaging means for alternately moving and locking said index, and a cam rotatable concentrically with said index to actuate said index engaging means.

2. In an intermittent movement, the combination of a shaft to be rotated, an index operatively connected therewith, coöperating pawls for alternately moving and locking said index, a cam adapted to actuate said pawls, and means between said pawls and said cam to provide rolling contact between the pawls and cam.

3. In an intermittent movement, the combination of a shaft to be rotated, an index operatively connected therewith, a pawl for moving said index, means for locking the index after each movement, a cam to actuate the aforesaid pawl and index locking means, and means between said pawl and said cam to provide rolling contact between the pawl and the cam.

4. In an intermittent movement, the combination of a shaft to be rotated, an index operatively connected therewith, means for moving said index, means for locking said index, and means between said index moving and index locking means to adjust the same with respect to their engagement with said index.

5. In an intermittent movement, the combination of a shaft to be rotated, an index operatively connected therewith, a rotatable cam, means between said cam and said index to move the latter, means to lock the index after each movement, and means to adjust the index moving means and index locking means.

6. In an intermittent movement, the combination of a shaft to be rotated, an index operatively connected therewith, means for moving said index to rotate said shaft, means to lock said index after each movement of rotation, and means for adjusting the relation of said index moving and index locking means.

7. In an intermittent movement, the combination of a shaft to be rotated, an index operatively connected therewith, means for moving said index to rotate said shaft, means to lock said index after each movement of rotation and adjustable means for connecting said index moving and said index locking means.

8. In an intermittent movement, the combination of a shaft to be rotated, an index operatively connected therewith, means normally maintained in fixed position with respect to said shaft and adapted to actuate said index, and means for shifting the position of said index actuating means relatively to said shaft.

9. In an intermittent movement, the combination of a rotatable member, means for alternately moving and arresting the same, and means concentric with the rotatable member for actuating said moving means.

10. In an intermittent movement, the combination of a rotatable member, an index operatively connected with said rotatable member, means to alternately move and lock said index, and means concentric with the rotatable member for actuating the index moving means.

11. In an intermittent movement, the combination of a shaft to be rotated, an index operatively connected therewith, an index moving pawl, an index locking pawl, and means concentric with said shaft to actuate said pawls.

12. In an intermittent movement, the combination of a rotatable member and means revoluble concentrically therewith to alternately move and lock said member.

13. In an intermittent movement, the combination of a shaft rotatable intermittently and means whereby said shaft may be rotated in either direction independently of said intermittent rotation.

14. In a motion picture projecting machine, the combination of means for intermittently moving a film strip past the projection aperture of said machine and means revoluble concentrically with said strip moving means for rotating said means in either direction independently of said intermittent motion.

15. In a motion picture projecting machine, the combination of film feeding means and rotatable means for rotating said film feeding means in either direction to frame the projected pictures.

16. In a motion picture projecting machine, the combination of film feeding means comprising pawls and rotatable means for displacing said first means relatively to its driving means to adjust said film feeding means in either direction to frame the projected pictures.

17. In an intermittent movement, the combination of a shaft, means for rotating said shaft intermittently, and means revoluble concentrically with said shaft and arranged to rotate the same in either direction independently of said intermittent rotation.

18. In a motion picture projecting ma-

chine, the combination of a shaft, means for rotating said shaft intermittently, means fixed on said shaft for operatively engaging a film, and means for rotating said shaft and thereby said film operating means independently of intermittent motion of rotation of the shaft.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

CHARLES MARTI.

Witnesses:
HERMAN KAMPER,
FLORENCE LEVIEN.