May 5, 1931. W. T. BIRDSALL 1,804,143

FEEDING DEVICE

Filed June 8, 1926

Fig. 1.

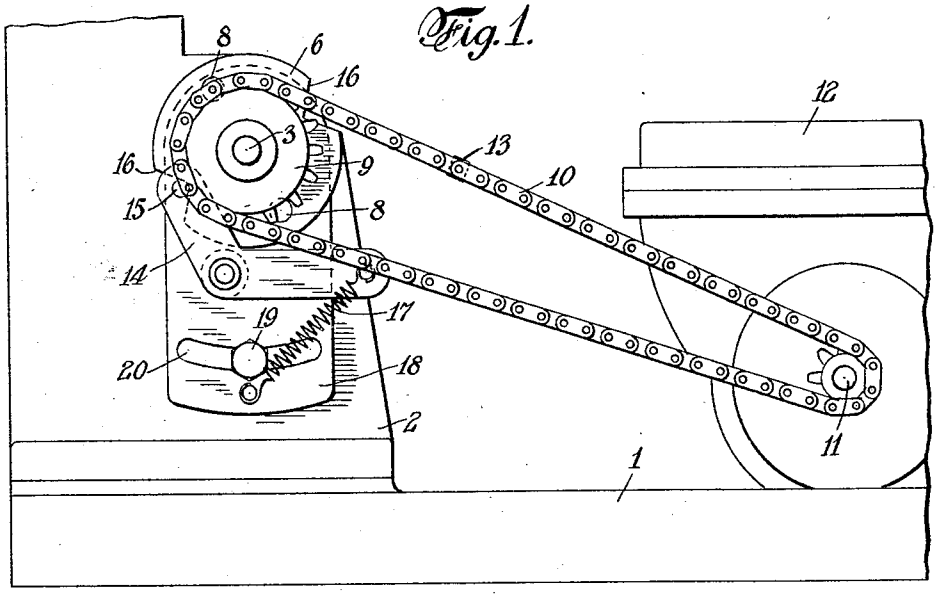
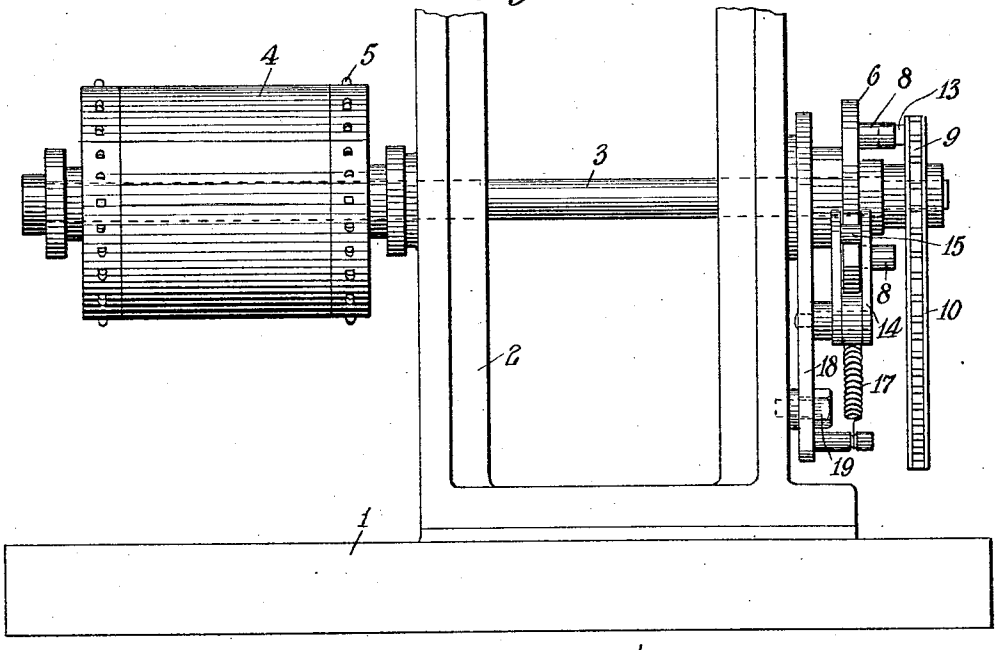


Fig. 2.



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UNITED STATES PATENT OFFICE

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FEEDING DEVICE

Application filed June 8, 1926. Serial No. 114,407.

This invention relates to projectors of the type adapted to project images from slides upon a suitable screen, and more particularly, to the means for consecutively bringing the slides into projecting position. In a copending application, Serial No. 114,404 filed June 8, 1926, I have described and claimed a conveyor formed of a band of flexible material adapted to be trained over a plurality of rollers and which is provided with peripheral perforations or apertures by means of which the band may be given movement through sprocket teeth engaging in the apertures. The sprocket teeth are formed upon one of the rollers over which the band is trained, and this invention relates to the means for giving the desired intermittent motion to the shaft upon which this sprocket roller is mounted, whereby movement of the conveyor band is obtained.

One of the objects of my invention is to provide a feeding device of simple construction and which shall be positive in operation whereby it may be employed in a projector of the type referred to. In using these projectors, it is customary to place them in continuous operation for long periods of time and, therefore, it is essential that the operation shall be certain. Therefore, by providing a feeding device which may be made of simple construction, the chances of its becoming out of order are reduced to a minimum. I have succeeded in achieving the simple construction which is desirable without sacrificing the positive operation which is so essential. In fact, another object which I have achieved is means which shall insure a positive operation in order to obtain correct and accurate projection of the slides.

Another object of my invention is to provide a feeding device which shall have a high ratio of dwell to movement. In projectors of the prior art, the time taken to change slides,—that is, to move one slide out of projecting position and another one into the same position, has been a substantial amount in proportion to the total time taken by the cycle formed by the projection of a slide, its movement out of projection position, and the movement of another slide into the same position. By my invention, the time taken by the change of slides is a very small portion of the time consumed by the entire cycle.

A further object of my invention is to provide a feed device for a projector in which, by the proper selection of elements, the amount of movement of the conveyor may be regulated. In different installations, it is found desirable to employ slides of different sizes or sprocket rollers of varying diameters to operate the conveyor upon which the slides are mounted. Obviously, then, the amount of movement of the conveyor will depend upon the above factors. A device constructed according to my invention may be readily designed to give any desired movement of the conveyor.

Still further objects of my invention are the provision of an improved means which will insure accurate registration of the slides in projection position by stopping the movement of the conveyor at the proper instant; the provision of means for adjusting the registration device so as to obtain the required accuracy regardless of inaccuracies in the mechanical parts of the feeding means; and the provision of co-acting elements which shall engage and become disengaged quickly and easily and at the proper moment.

Further objects and advantages will be apparent to those skilled in the art when the description is read in connection with the accompanying drawings, in which,

Fig. 1 is a front elevation of a selected embodiment of my invention.

Fig. 2 is a side elevation looking from the left of Fig. 1.

Referring now to the drawing in detail, 1 designates a suitable base supporting a projector or other mechanism in connection with which my invention may be employed. I have referred and shall refer to my invention as being employed with a projector adapted to project slides upon a screen, and my device is particularly adapted for use with a projector. It will, of course, be understood, however, that my invention is not limited to

use with a projector but may be employed wherever it may be found desirable.

Mounted upon the base 1 is a suitable frame 2 which in this embodiment supports a rotatable shaft 3 upon which is secured a sprocket roller 4. This roller, as described and claimed in my aforesaid co-pending application, is adapted to impart movement to a conveyor in the form of an endless band having rows of apertures adjacent the edges thereof and in which are received the teeth 5 of the sprocket roller. A further illustration and description of this portion of the projector is deemed unnecessary for the purposes of this application.

Secured to the shaft 3 on the other side of the frame 2 from the sprocket roller, is a member 6 herein shown as a disk, and which carries a plurality of pins 8 disposed concentrically about the shaft. These pins may vary in number, and while I have shown two in this embodiment, it is to be understood that any desired number may be used.

Rotatably mounted upon the end of the shaft 3 beyond the member 6 is a sprocket wheel 9 carrying a chain 10 which may be driven by any suitable means exemplified by a shaft 11 driven from suitable gearing inside of a gear casing 12, this gearing being connected to a suitable motor, not shown. For the purpose of simplicity, I shall refer to the elements 9 and 10 as the sprocket wheel and chain, respectively, but it should be understood that by these terms I do not intend to limit myself to this exact construction. I shall define the terms "sprocket wheel" and "chain", respectively, as a member rotatably mounted upon the shaft, and the chain as means for giving rotation to that member. For the purposes of this application, the shaft 11 may be considered as a source of power.

The chain has secured thereto one or more dogs 13, one such dog being shown in this embodiment. The dog is so disposed as to extend substantially parallel to the shaft 3, and it will be noted that the pins 8 are also disposed substantially parallel to the same shaft and at a distance therefrom such that the dog 13 will engage one of the pins as it passes over the sprocket wheel 9. It will thus be seen that the dog will carry the pin, and consequently the member 6, around with it until such time as the part of the chain carrying the dog leaves the sprocket wheel. At this point, the dog will be released from engagement with the pin.

The pins and dog may be made of any suitable form but I prefer to make the pins round and the dog of the square cross section shown. By this means, the engagement and disengagement of the dog with a pin will be more abrupt than if both have round contacting surfaces. This is particularly advantageous when the two parts disengage. Substantially the same results will be achieved if the pins were square and the dog round. I consider that construction to be within the scope of my invention.

The movement of the member 6 is, of course, imparted to the shaft 3 and consequently to the sprocket roller 4, and by the roller to the conveyor which it actuates. In the embodiment shown, the member 6 is given a movement of 180° before coming to a stop and is actuated once during the time that it takes for the entire length of chain to travel through the path which it follows. Obviously, the angular positions of the pins may be changed and the number of dogs may be varied so as to obtain any desired amount of rotation of the shaft 3 and to have such rotation occur as frequently as desired.

It will be seen that the time taken by the rotation of the shaft 3 is relatively small compared to the time during which it remains at rest. This latter time is the dwell of the shaft and conveyor and, therefore, in a projector, the slide which is in projection position will be exposed a relatively long time and then will be moved out of position and another slide will be moved into position in a relatively short time. That is, the ratio of dwell to movement is high. It will also be seen that this ratio may be varied between wide limits by the use of my invention.

To insure that the rotation of the shaft shall stop at exactly the desired point, I provide registration or indexing means exemplified by the pivoted detent member 14 which carries the roller 15 adapted to be received in one of a plurality of notches 16 in the edge of the disk 6. These notches are so disposed that the roller 15 will enter one of them at the time when the dog 13 is releasing one of the pins 8. The detent member is urged toward the member 6 by means of the spring 17.

The chain 10 may stretch or may develop inaccuracies because of other reasons and, therefore, it may sometimes occur that the roller 15 will not be in position to accurately engage one of the notches 16 upon release of one of the pins 8 by the dog 13. Therefore, I make the notches in the form shown, namely, the form of a flat V. The sides of the V are spread apart a sufficient distance so that the detent roller 15 will be received in the notch whenever the dog releases one of the pins, the mouth of the notch being substantially wider than the diameter of the roller. Then the action of the spring will cause the detent roller to ride quickly to the bottom of the notch, thereby imparting sufficient movement to the disk in one direction or the other to bring it to the correct position. To provide means for adjustment of the detent, I mount the same upon a plate 18 which is pivoted upon the shaft 3 and held in adjusted position by the bolt 19 which engages in a slot 20 in the plate. Swinging of the plate 18 about

its pivot will cause an adjustment of the detent in respect to the member 6 so that the shaft 3 will be stopped in its rotation at exactly the desired point, and therefore absolutely accurate registration of the slides may be obtained. The spring 17 is fastened to the detent and also to the plate 18 and therefore adjustment of the plate does not affect the tension of the spring or the operation of the detent.

The operation of my invention will be readily understood from the above description and it is not deemed necessary to repeat it here in detail. The dog 13 will engage one of the pins 8 and cause a partial rotation of the shaft 3, the roller 15 being cammed out of the notch 16 in which it is resting. The amount of rotation depends upon the point at which the dog releases the pin. This point may be varied by varying the length of chain in contact with the sprocket wheel. In this embodiment, the chain contacts with approximately 180° of the sprocket wheel, and thus the wheel is given a rotation of substantially 180°. Obviously, this rotation may be changed to one of approximately 90° by having the chain contact with 90° of the sprocket wheel. The shaft will be held in desired position when it is not in movement and the proper adjustment may be made as described above.

I am aware that numerous changes may be made in the embodiment which I have illustrated and described without departing from the scope of my invention and I do not intend to limit myself except by the appended claims.

I claim:

1. In combination, a shaft, a member secured to said shaft and carrying a plurality of projections concentric to the shaft, a sprocket wheel loosely mounted on said shaft, a chain engaging said sprocket wheel and having a dog adapted to engage said projections one at a time to rotate said shaft, and means to drive said chain.

2. In combination, a shaft, a member secured to said shaft and carrying a plurality of projections concentric to the shaft, a sprocket wheel loosely mounted on said shaft, a chain engaging said sprocket wheel and having a dog adapted to engage said projections one at a time to rotate said shaft, means to drive said chain, and means to engage said member to hold said shaft in correct position when stationary.

3. In combination, a shaft, a member secured to said shaft and carrying a plurality of projections concentric to the shaft, and means moving along substantially an elliptical path for engaging said projections one at a time to rotate said shaft.

4. In combination, a shaft, a member secured to said shaft and carrying a plurality of projections concentric to the shaft, means moving in a path in part concentric to the shaft and adapted to engage said projections one at a time to rotate said shaft, and means to engage said member to hold said shaft in correct position when stationary, said first named means comprising an endless, flexible member.

5. In combination, a frame, a shaft journaled in said frame, a member secured to said shaft and carrying a plurality of projections concentric to the shaft, a sprocket wheel loosely mounted on said shaft, a chain engaging said sprocket wheel and having a dog adapted to engage said projections one at a time to rotate said shaft, and a plate pivotally mounted on said frame and carrying a detent, said detent adapted to engage said member to hold it in correct position when stationary.

6. In combination, a shaft, a notched disk carried thereby, means to intermittently rotate said shaft, a detent mounted adjacent said disk and urged toward said disk and adapted to co-operate with one of said notches, each notch being provided with inclined edges forming a mouth wider than the detent whereby when said detent enters a notch it will move to the bottom thereof and cause rotative movement of said shaft to correct position.

7. In combination, a shaft, a member secured to said shaft, a sprocket wheel loosely mounted on said shaft, a chain engaging said sprocket wheel, co-acting elements on said chain and on said member to impart intermittent movement to said shaft, one of said elements having a curved contacting surface and the other a flat contacting surface.

8. In combination, a rotatable member carrying a projection, an idler wheel rotatable about the axis of said rotatable member, a member spaced from said idler wheel, an endless flexible member spanning said idler wheel and said second named member, and a projection on said flexible member for engaging said first named projection to rotate said rotatable member.

9. In combination, a shaft, a member secured to said shaft and carrying a projection, an idler sprocket wheel rotatable about the axis of said shaft, a second sprocket wheel spaced from said first named sprocket wheel, an endless chain spanning said sprocket wheels, and a projection on said endless chain for engaging said first named projection to rotate said shaft.

In testimony whereof, I have affixed my signature to this specification.

WILFRED T. BIRDSALL.