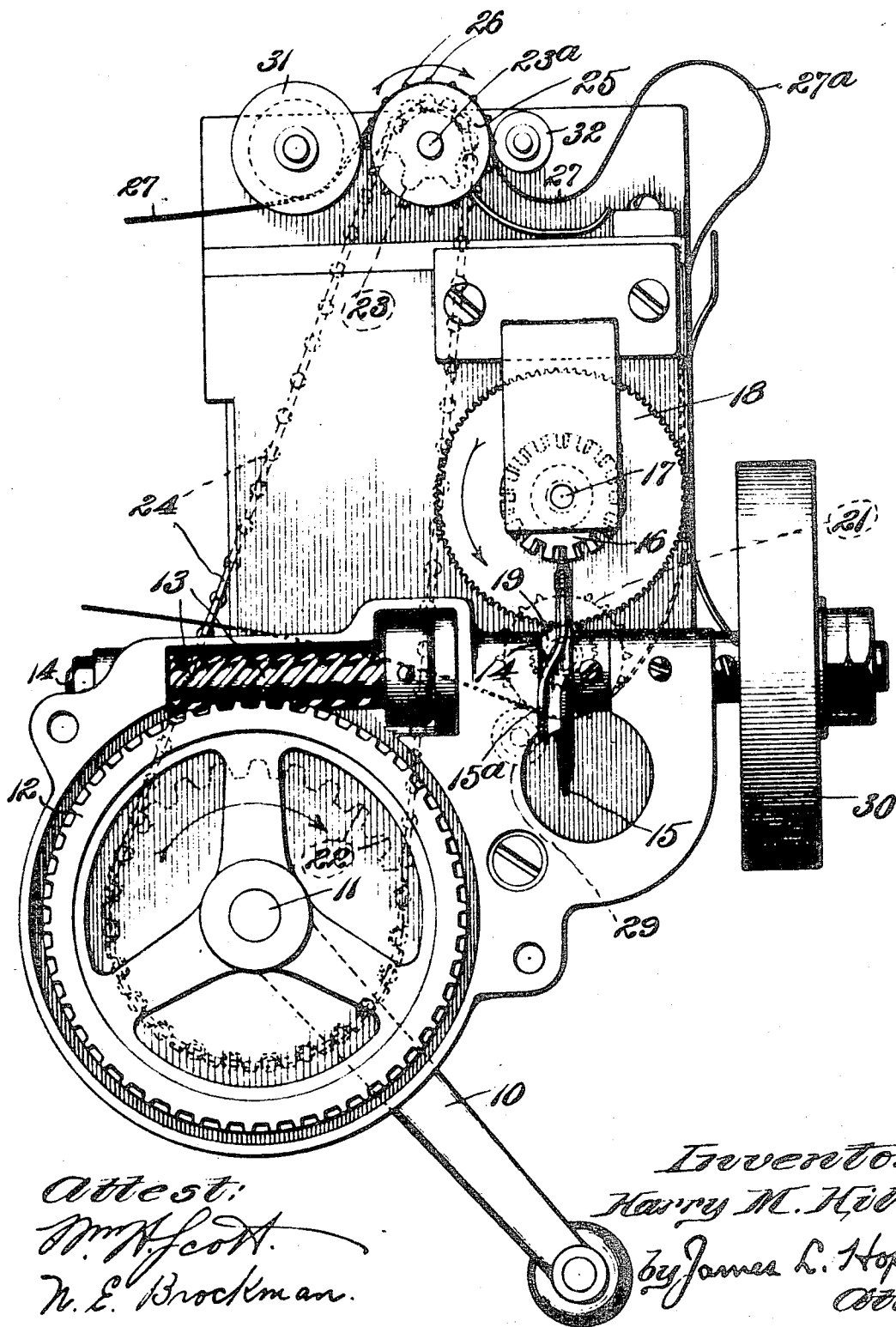


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INTERMITTENT WORM GEARING.
APPLICATION FILED NOV. 10, 1913.

Patented Feb. 6, 1917.
2 SHEETS—SHEET 1.

1,214,786.

Fig. 1.



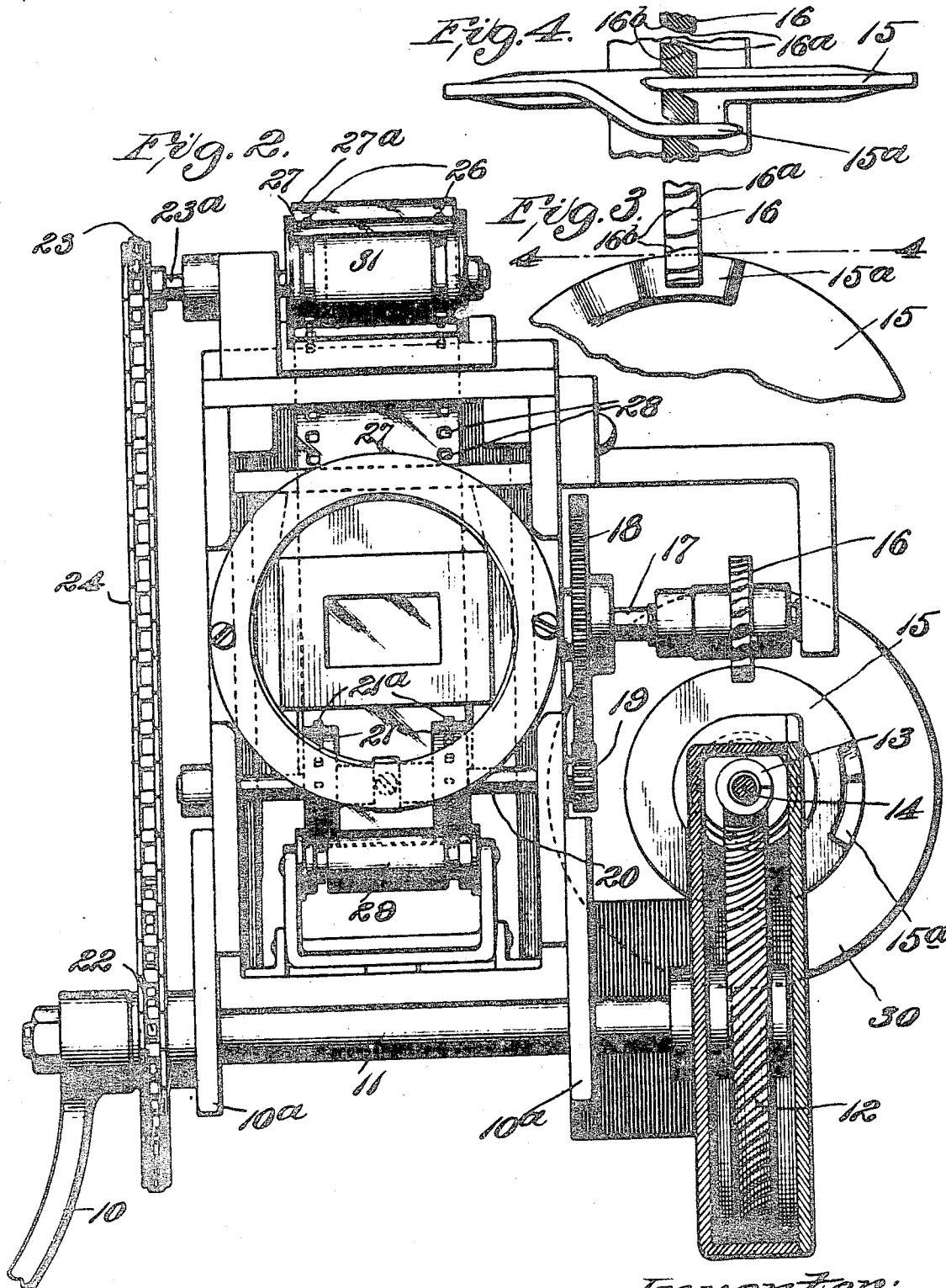
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UNITED STATES PATENT OFFICE.

HARRY M. HILL, OF ST. LOUIS, MISSOURI, ASSIGNOR TO EDUCATIONAL MOTION PICTURE MACHINE & FILM CO., A CORPORATION OF MISSOURI.

INTERMITTENT WORM-GEARING.

1,214,786.

Specification of Letters Patent.

Patented Feb. 6, 1917.

Application filed November 10, 1913. Serial No. 800,114.

To all whom it may concern:

Be it known that I, HARRY M. HILL, a citizen of the United States, and a resident of St. Louis, Missouri, have invented certain new and useful Improvements in Intermittent Worm-Gearing, of which the following is a specification.

My invention relates to improvements in intermittent worm gearing and has for its object to provide mechanism whereby the step-by-step movement of the film can be so accomplished as to obviate jerks, and whereby each picture on the film is held rigidly in exposed position during a predetermined interval of time.

In the drawings Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a front elevation of the same. Figs. 3 and 4 are enlarged details of the cam-disk and cam-gear whereby the film is advanced.

As shown in the drawings, power is derived from the hand-crank 10, rotating the worm-wheel 12 through the shaft 11; the worm-wheel 12 engages with the worm-gear 13 on the shaft 14, which carries the disk 15. This disk 15 has a peripheral worm-tooth 15^a formed as shown in Figs. 1, 2, 3 and 4, being bent outwardly from the plane of the face of the disk 15, then parallel with said plane (see Figs. 1 and 4). A flywheel 30 is mounted on the outer end of the shaft 14 to insure the regular movement of the cam 15. A gear 16 is formed with serrations as shown in Figs. 2, 3 and 4, so as to provide peripheral teeth; these serrations are primarily oblique to the plane of the face of the gear 16, but the adjacent transverse faces 16^a and 16^b of the teeth are cut at an angle to each other. The head or leading end of the worm 15^a overreaches the tail end thereof, and is spaced apart therefrom and in advance thereof by an interval equal to the peripheral extent of one of the peripheral teeth of gear 16 so that upon forward rotation of disk 15 the advancing extremity of the single worm-tooth 15^a enters a serration while the peripheral flange of the disk 15 is still holding the gear 16 at rest by engagement in another serration. As the disk 15 progresses, the oblique portion of the worm-tooth 15^a advances the gear 16.

The gear 16 is fixed on the shaft 17, which carries the spur gear wheel 18. The spur gear wheel 18 in turn meshes with the pinion 19 on the shaft 20. Toothed feeding rollers

21—21 are carried by the shaft 20, their teeth 21^a engaging in the perforations 28 on the marginal edges of the film 27, which thence passes rearwardly to a receiving reel, not shown. A friction roller 29 serves to keep the film in engagement with the teeth 21^a.

The shaft 11 is journaled in bearings 10^a and carries the sprocket-wheel 22, from which the chain 24 drives the shaft 23^a through the sprocket wheel 23. The shaft 23^a carries the toothed roller 25, having teeth 26, to which the film 27 is fed from beneath the guide-roller 31, another guide-roller 32, this feeding mechanism serving to feed the film 27 forwardly to form the loop 27^a.

I am aware that various other mechanisms have been employed to advance the film step by step, and do not claim such mechanism broadly. My invention resides in the mechanism including the beveled-tooth gear and the disk 15 bearing a worm-tooth, for advancing the film, exposure after exposure, evenly, and without jerking, the disk 15 and gear 16 coöperating to hold each exposure fixedly and firmly in proper position for projection, for a predetermined period of time. This mechanism secures a motion-picture projection free from flickering, and with such exposure of each component picture as will insure its sufficient projection upon the screen to give the eye of the spectator its full pictorial value.

It will be observed that the disk 15 in its mode of operation serves as a worm, having in the worm-tooth 15^a, a single worm-tooth, with a forwardly projecting straight edge. The obliquity of the curve of this single worm-tooth 15^a corresponds with nicety to the obliquity of the oblique cuts, intersecting the straight faces 16^b of the peripheral teeth on the gear 16, so that said faces correspond in their obliquity with the pitch of the worm-tooth 15^a, while the holding faces 16^a extend parallel to the normal portions of the worm tooth for proper holding engagement therewith.

Having thus described my invention what I claim as new and desire to have secured to me by the grant of Letters Patent, is—

1. In an intermittent worm gearing the combination of a disk having a peripheral flange and a single worm-tooth whose advancing end is parallel with said flange; and a film-actuating gear-wheel having its

edges provided with serrations formed by intersecting transverse and oblique cuts, said oblique cuts registering with the pitch of the worm-tooth.

- 5 2. In a mechanism of the class described, a worm gear arranged for continuous rotation and having a relatively long peripheral holding portion disposed normal to the axis of rotation and a relatively short portion
10 pitched relative to the holding portion, and an intermittently rotated gear having teeth

with faces disposed to cooperate with the holding portion of the worm gear and other faces disposed to cooperate with the pitched portion thereof.

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

HARRY M. HILL.

Witnesses:

J. L. HOPKINS,
N. E. BROCKMAN.