J. F. DAVIDSON.

INTERMITTENT MOVEMENT MECHANISM.

APPLICATION FILED FEB. 10, 1917.

1,224,079. Patented Apr. 24, 1917.

Fig. 1.

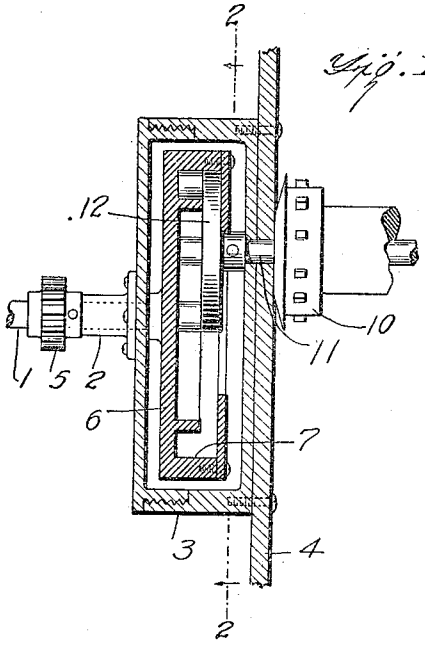


Fig. 2.

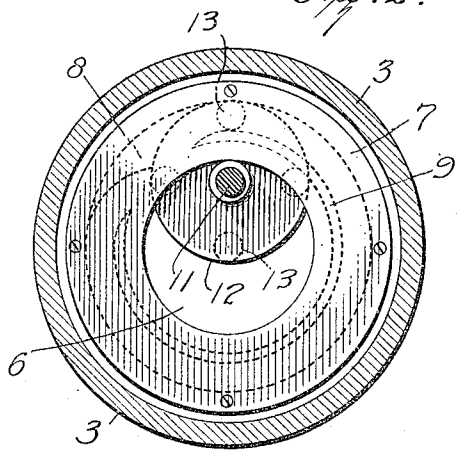


Fig. 3.

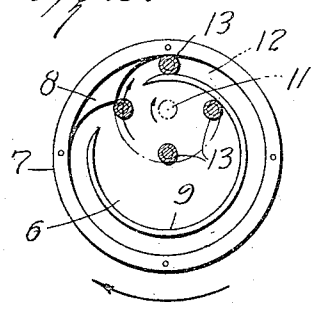


Fig. 4.

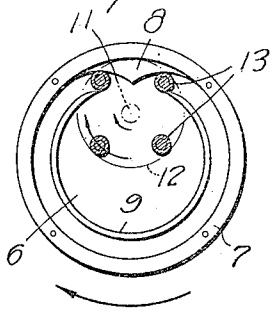


Fig. 5.

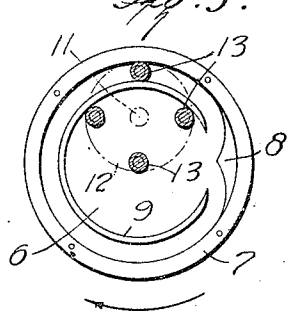
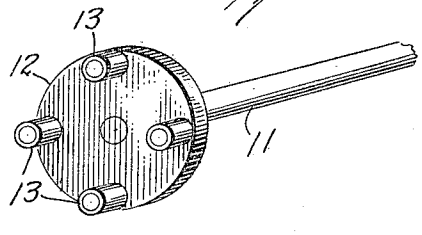


Fig. 6.



WITNESSES

H. E. Beck

INVENTOR

JAMES F. DAVIDSON,

BY Munn & Co.

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES F. DAVIDSON, OF MARLOW, OKLAHOMA.

INTERMITTENT-MOVEMENT MECHANISM.

1,224,079. Specification of Letters Patent. Patented Apr. 24, 1917.

Original application filed October 14, 1914, Serial No. 866,651. Divided and this application filed February 10, 1917. Serial No. 147,795.

To all whom it may concern:

Be it known that I, JAMES F. DAVIDSON, a citizen of the United States, and a resident of Marlow, in the county of Stephens and State of Oklahoma, have invented certain new and useful Improvements in Intermittent-Movement Mechanism, of which the following is a specification.

My invention relates to improvements in intermittent movement mechanism, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of my invention is to provide an intermittent movement which is applicable to moving picture machines and by means of which the intermittent movement of a film is accomplished in such a manner that there is very little liability of injuring the film, while at the same time rendering the device easy of manipulation and practically noiseless.

A further object of my invention is to provide an intermittent mechanism in which the driven element is positively locked in its position of rest between successive movements.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming part of this application, in which:

Figure 1 is a sectional view through the device,

Fig. 2 is a section on the line 2—2 of Fig. 1,

Figs. 3, 4 and 5 are diagrammatic views illustrating the successive positions of the intermittent mechanism throughout a single cycle of operation, and

Fig. 6 is a perspective view of a portion of the driven element.

This application is a division of a prior application, Serial No. 866,651, filed Oct. 14, 1914, said prior application being directed to a motion picture apparatus, of which this intermittent movement forms a part.

In carrying out my invention I provide a drive shaft 1 which is journaled in a bearing 2, carried by the casing 3 of the intermittent movement, the latter being secured to the frame 4 of the moving picture machine. A gear 5 is secured to the drive shaft 1, and may be driven by any suitable mechanism, not shown. At the end of the shaft 1 is a cam wheel 6 having a laterally extending peripheral rim 7 which is provided with a single inwardly extending tooth 8. The latter is designed to co-act with a discontinuous spacing flange 9 carried by the cam wheel so as to intermittently rotate the film-advancing sprocket wheel 10. The latter is mounted on a shaft 11 which is positioned eccentric with respect to the cam wheel 6.

The shaft 11 bears at one end a wheel 12 having four outstanding pins 13. The casing 3 houses the cam wheel and the wheel 12, together with the parts carried thereby, and is adapted to receive oil, thereby allowing the wheels to run in an oil bath, for their efficient rotation. The pins 13 are substantially equal in diameter to the space between the flange 9 and the rim 7 so that when spaced therebetween the advancing sprocket for the film or picture strip will be held rigorously stationary. The discontinuous flange 9 has its opening disposed symmetrically with respect to the single tooth 8 and is so proportioned that as the cam wheel 6 is rotated by means of the drive shaft 1, the single tooth 8 will strike against one of the pins 13 and exert a turning moment upon the wheel 12 fractionally rotating the same in a direction similar to the direction of rotation of the cam wheel 6. After the rotative movement of the wheel 12 has proceeded to a certain distance, one pin is released from the groove between the rim 7 and the flange 9, while the next adjacent pin enters the groove at the other end.

The cyclic operation is illustrated in Figs. 3, 4 and 5 wherein the arrows denote relative rotation of the wheels 12 and 6 and the cyclic manner in which the advancing sprocket wheel 10 is intermittently rotated with its period of rotation relatively smaller with respect to its period of rest, the same being proportional to the fractional part of a circumference as represented by the arcular extent of the tooth 8. The tooth 8 must have a curved length on each side equal to one-fourth of the circumference of the driven element and only one-eighth of the cycle of the driving element. This is what makes the period of rest exceptionally long.

As stated before, the advancing tooth 8 engages one of the pins 13 and causes the

turning of the wheel 12 in the same direction as the revolving cam wheel 6. In Figs. 3 and 4 the wheel 12 is in motion, but in Fig. 5 the wheel 12 is positively locked against rotation, while the wheel 6 is rotating.

I claim:

1. An intermittent and fractional rotation mechanism for film advancing mechanism for motion picture cameras, comprising a cam wheel with a single inwardly projecting tooth and having a discontinuous upstanding flange carried thereby with the opening symmetrical with respect to said tooth, and an eccentrically mounted wheel with a plurality of pins arranged in the path of motion of said tooth and adapted to engage the outer periphery of said upstanding flange.

2. A device of the class described, comprising a cam wheel including a peripheral rim with an inwardly projecting tooth, a discontinuous flange spaced therefrom with the opening therein symmetrical with respect to said tooth, and an eccentrically mounted wheel with a plurality of laterally projecting pins adapted to ride in the slot defined by the peripheral rim and outstanding flange of the cam wheel, said single tooth adapted to contact with and frictionally revolve a pin for the fractional rotation of the second mentioned wheel and the positioning of the adjacent pin within said slot.

3. An intermittent movement comprising a driving shaft, a cam wheel secured at the end of said driving shaft and having a laterally extending circular flange, an inwardly projecting tooth carried by said flange, the sides of the tooth being curved on the arc of a circle, a discontinuous arc shaped flange carried by said cam wheel, the ends of said arc shaped flange being disposed symmetrically with respect to the tooth, and the space between said discontinuous flange and said circular flange constituting a groove, a drive shaft, a wheel carried by said drive shaft at the end thereof and provided with four laterally extending cylindrical pins, each pin having a diameter substantially equal to the groove, said pin bearing wheel being disposed eccentrically with respect to the cam wheel shaft.

4. An intermittent movement comprising a driving shaft, a cam wheel secured at the end of said driving shaft and having a laterally extending circular flange, an inwardly projecting tooth carried by said flange, a discontinuous arc-shaped flange carried by said cam wheel, the ends of said arc-shaped flange being disposed symmetrically with respect to the tooth, and the space between said discontinuous flange and said circular flange constituting a groove, a drive shaft, a wheel carried by said drive shaft at the end thereof and provided with four laterally extending cylindrical pins, each pin having a diameter substantially equal to the groove, said pin bearing wheel being disposed eccentrically with respect to the cam wheel shaft, the sides of the tooth being curved.

5. An intermittent movement comprising a driving shaft, a cam wheel secured at the end of said driving shaft and having a laterally extending circular flange, an inwardly projecting tooth carried by said flange, the sides of the tooth being curved on the arc of a circle, a discontinuous arc-shaped flange carried by said cam wheel, the ends of said arc-shaped flange being disposed symmetrically with respect to the tooth, and the space between said discontinuous flange and said circular flange constituting a groove, a drive shaft, a wheel carried by said drive shaft at the end thereof and provided with four laterally extending cylindrical pins, each pin having a diameter substantially equal to the groove, said pin bearing wheel being disposed eccentrically with respect to the cam wheel shaft, the curved sides of said inwardly extending tooth being equal to one-fourth of the circumference of said pin bearing wheel.

6. An intermittent movement comprising a driving shaft, a cam wheel secured at the end of said driving shaft and having a laterally extending circular flange, an inwardly projecting tooth carried by said flange, the sides of the tooth being curved on the arc of a circle, a discontinuous arc-shaped flange carried by said cam wheel, the ends of said arc-shaped flange being disposed symmetrically with respect to the tooth, and the space between said discontinuous flange and said circular flange constituting a groove, a drive shaft, a wheel carried by said drive shaft at the end thereof and provided with four laterally extending cylindrical pins, each pin having a diameter substantially equal to the groove, said pin bearing wheel being disposed eccentrically with respect to the cam wheel shaft, the curved sides of said inwardly extending tooth being equal to one-fourth of the circumference of said pin bearing wheel, and one-eighth of the circumference of said cam wheel.

JAMES F. DAVIDSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."