

C. R. UEBELMESSER.
MECHANICAL MOVEMENT.
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975,659.

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Fig. 1.

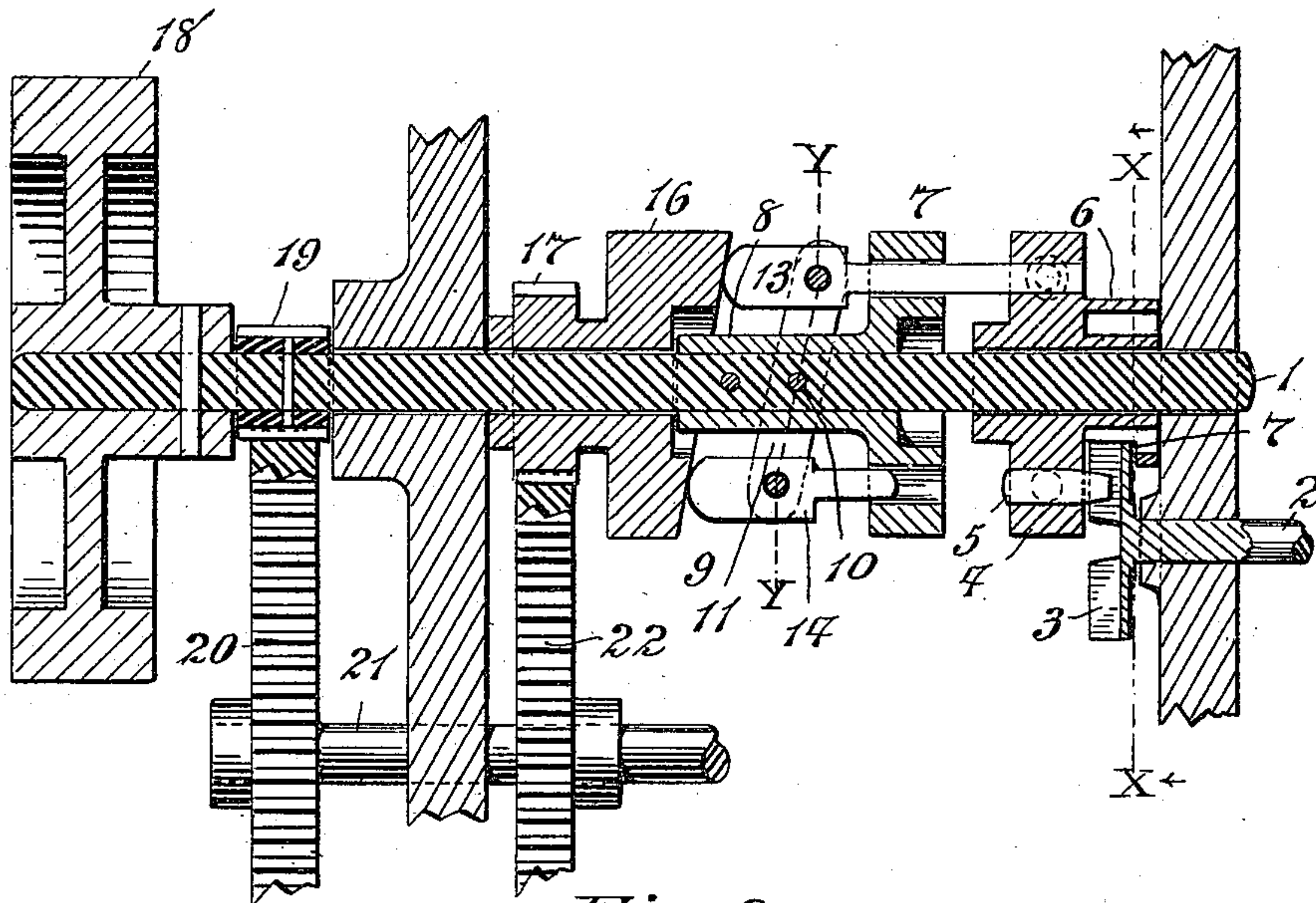


Fig. 3.

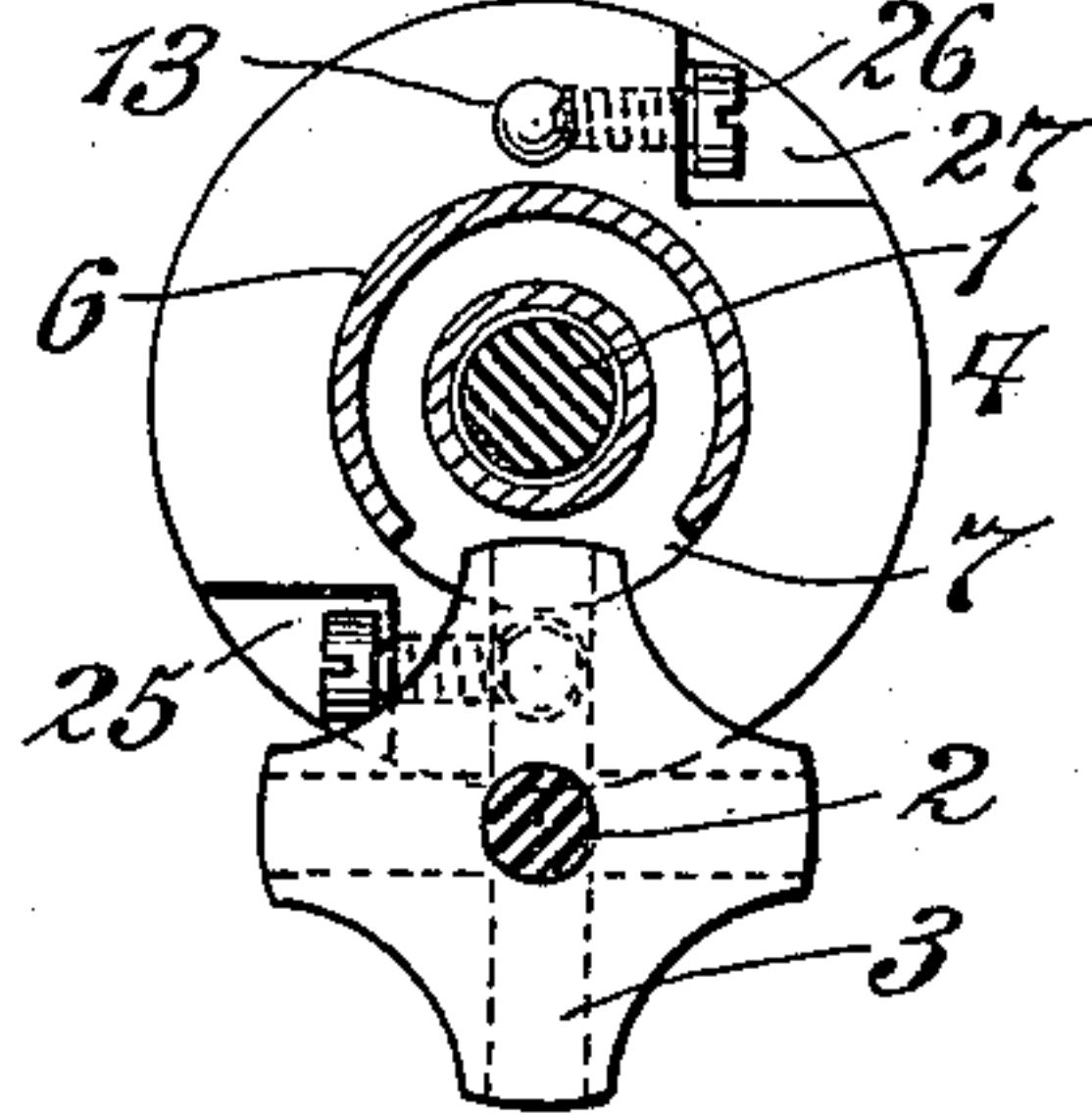


Fig. 4.

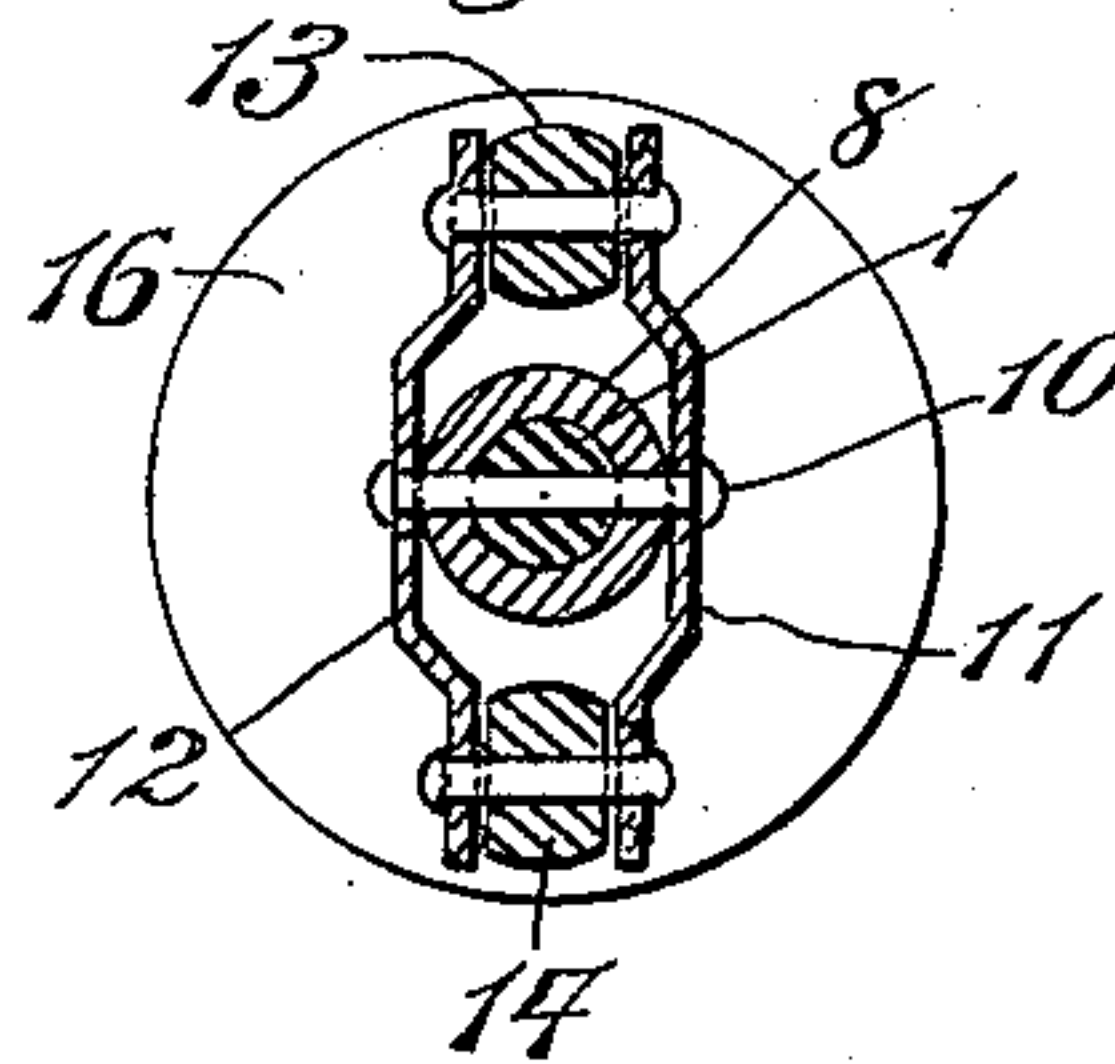
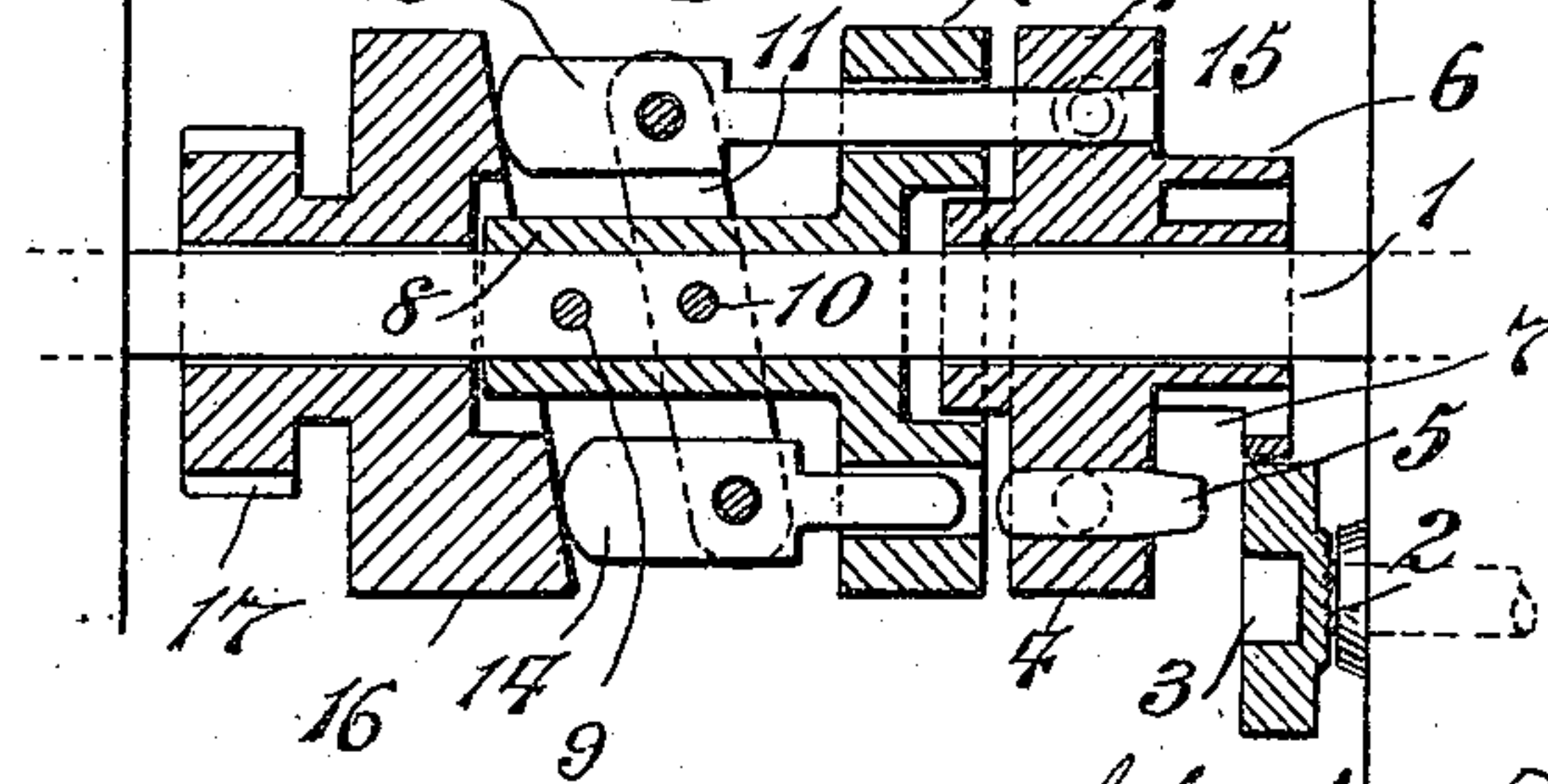


Fig. 5.



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UNITED STATES PATENT OFFICE.

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MECHANICAL MOVEMENT.

975,659.

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To all whom it may concern:

Be it known that I, CHARLES R. UEBELMESSER, a subject of the Emperor of Germany, residing in the borough of Manhattan, city, county, and State of New York, have invented a certain new and useful Improvement in Mechanical Movements, of which the following is a specification.

This invention has reference to an improvement applicable to use with what is known as the "Geneva gear" whereby the usefulness of this device is considerably enhanced. By "Geneva gear" I mean an intermittent gearing which comprises a driven disk sometimes called a star-wheel, in which are radial slots, grooves, or channels, with which a driving member or pin successively engages as it rotates about a center.

While the invention is applicable to many other forms of apparatus, it is particularly useful in connection with the intermittent driving mechanism employed in operating the picture ribbons or tapes in moving picture machines.

In apparatus of the kind last mentioned it is common to employ a toothed drum over which the picture tape extends and by which it is moved, this drum being jerked forward at rapid intervals by means of a Geneva gear on the shaft of the drum which is driven by a pin carried on a disk which rotates upon a consequently moving shaft. In these cases it is important to shorten the time occupied in moving the picture tape as much as possible, while maintaining the exposure of each picture during a correspondingly long proportion of the time allowed for the combined exposure and movement.

In the moving picture machines hitherto used the rapidity of movement imparted to the Geneva gear always corresponds to the speed of the constantly rotating shaft, and therefore, in order to increase the rapidity of the intermittent forward movement of the picture tape it becomes necessary to increase the speed of the constantly rotating shaft and thus increase the number of pictures exposed per second.

It is obvious that, where a very large number of pictures is exposed in a given time the tape required for exhibition of a single series of movements will become excessively long and cumbersome. It is therefore a disadvantage incident to the older forms of

moving picture machines that the rapidity of the movement of substitution is inseparable from a corresponding increase in the number of pictures presented in a given period of time.

The principal object of my present invention is to provide a mechanical movement whereby the constantly rotating shaft may be run at a very high speed, thereby producing a very rapid movement of picture-substitution, while at the same time a corresponding increase in the number of pictures presented per second is avoided. I attain this object by so arranging the driving and driven members of my improved gear that the operative engagement between them is interrupted at regular intervals without interrupting the movement of the constantly rotating shaft. Thus, instead of getting a forward jerk of the driven shaft once for each revolution of the constantly rotating shaft, I am able to limit the periods of engagement so that the driven shaft is only thrown forward once for every two or three or more revolutions of the constantly moving shaft.

My invention in its broadest aspect is capable of movement in various forms and I have shown one preferred form in the accompanying drawings wherein—

Figure 1 is a vertical central section through the improved gearing, Fig. 2 is a plan view of a preferred form of Geneva gear showing its relation to the driving pin, Fig. 3 is a sectional view of a portion of the apparatus on the line *x x* in Fig. 1, Fig. 4 is a sectional view on line *y y* in Fig. 1 and Fig. 5 is a sectional view of a portion of the apparatus on the same plane as Fig. 1, but showing the driving parts in their engaging position.

The essential elements in my invention comprise a driving shaft as 1, a driven shaft as 2, a Geneva gear 3 or its equivalent on the driven shaft, the usual driving disk 4 and pin 5 on the driving shaft, and means automatically driven in connection with the driving shaft for intermittently interrupting operative connection between the pin 5 and the Geneva gear 3.

In the preferred form shown the disk 4 carries the concentric projecting barrel which is hollow and is arranged so as to turn in the cavities outside of the Geneva gear

so as to lock the same between operations. The barrel is cut away as shown at 7 to give room for the projecting portion of the Geneva gear to turn over when driven by the pin 5.

Mounted centrally upon the shaft 1 just behind the disk 4 is a guide disk 7 having a hub 8 which is fixed to the shaft 1 in any desired manner, as for instance by means of pins 9, 10. Upon the pin 10 is loosely pivoted a pair of side levers 11, 12 between the ends of which are pivotally secured two thrust pins 13, 14 extending into apertures in the guide disk 7 and capable of sliding easily therein. One of these pins, 13, is extended as far as the driving disk 4 being secured thereto as shown at 15.

The rear ends of the pins 13, 14 are enlarged and rounded so as to make smooth contact with the inclined face of the rotary cam 16 which turns loosely on the shaft 1 and is provided with the pinion 17 whereby it is rotated.

The shaft 1 is driven by any convenient mechanism such as the pulley 18 and it carries the small driving pinion 19 which engages with the gear wheel 20 on the counter shaft 21. A second gear wheel 22 also on this counter shaft gears with and drives the pinion 17 on the cam 16.

The operation of my device is as follows:—The driving shaft 1 being rotated very rapidly, carries with it the disk 7 with its hub 8 whereby are also rotated the pins 13 and 14. The attachment of the pin 13 to the driving disk 4 will be sufficient in some cases for transmitting rotary motion from the shaft 1 to said disk 4. In any case the disk 4 will be so arranged as to be capable of sliding easily longitudinally upon the shaft 1 while nevertheless turning with said shaft. As the shaft 1 rotates it will at first bring the pin 5 into engagement with the Geneva gear 3 in a well known manner with the result of imparting a momentary forward jerk through a fraction of a circle to said Geneva gear and its shaft 2. As the rotation of the shaft 1 is continued however, the gears 20 and 22, driven by the pinion 19, act through the pinion 17 to so rotate the cam 16 as to push the pin 14 forward. This motion is transmitted through the levers 11 and 12 of the pin 13 whereby the driving disk 4 is with-drawn from the vicinity of the Geneva gear, and the apparatus assumes the position shown in Fig. 5 so that when the pin 5 next comes opposite the Geneva gear 3, it is out of the plane of engagement and no motion is transmitted. In the form shown, further rotation of the shaft 1 causes the further rotation upon it of the cam 16, and thrusts the pin 13 forward so that the position of the mechanism is once more that shown in Fig. 1 by the time the pin 5 has made another revolution. Thus it will be

seen that the Geneva gear is engaged by the pin and caused to move forward once for every second turn of the shaft 1.

It will be obvious that by proper proportioning of the gears 20 and 22 with the pins engaged with them, the relative speed of the shaft 1 and the cam 16 may be altered so as to keep the pin 5 out of engagement with the Geneva gear 3 for more than the duration of one revolution. It is to be understood that my invention covers a construction of the kind shown whether arranged for transmitting power every other revolution of the shaft 1 or less often.

It will be noticed that my device is positive in its action both in with-drawing and returning the disk 4. That is to say the pins 13 and 14 remain constantly in simultaneous contact with the surface of the cam 16. There is therefore no lost motion or rattling and perfect certainty of operation is secured.

A secondary object of my invention is to provide an improved form of Geneva gear and pin so constructed that adjustment to compensate for wearing may be easily accomplished. For this purpose I make the transverse channels in the Geneva gear taper toward the bottom as shown at 23 in Fig. 2, and I give the pin 5 a corresponding taper. The pin 5 passes through an aperture in the disk 4 within which it can be moved back and forth by loosening the set screw 24 the head of which preferably occupies an appropriate cavity 25 cut into the periphery of the disk 4. By thus slightly moving the pin 5 forward or backward after loosening the screw 24 the proper adjustment of the driving surface of the pin with respect to the sides of the channels in the Geneva gear may be obtained, and this may be preserved by proper adjustments in spite of wear.

As will be seen in Fig. 3 I prefer to fasten the pin 13 to the disk 4 by means of a set screw 26 whose head occupies a cavity 27 in the periphery of the disk, in the same manner as above described with respect to the pin 5.

My invention may take various forms which will occur to those skilled in the art and I do not limit myself to the details herein shown and described.

What I claim is—

1. A driven disk provided with radial channels, a driving shaft, a pin mounted thereon so as to turn with said driving shaft and to move longitudinally in relation thereto, and means actuated by said shaft for moving said pin back and forth, out of and into engagement with said channels.

2. A driven disk provided with radial channels, a driving shaft, a collar slidably mounted upon and arranged to rotate with said shaft, a driving pin projecting from

said collar, and means actuated by said shaft for sliding said collar back and forth on its shaft to thereby move the driving pin out of and into engagement with said channels.

5 3. A driven disk provided with radial channels having tapered parallel sides, a driving shaft, a collar slidably mounted thereon, and an adjustable driving pin in said collar.

10 4. A driven disk provided with radial channels having tapered parallel sides, a driving shaft, a collar slidably mounted thereon and arranged to rotate with said shaft, a tapered pin adjustably supported
15 by said collar, and means for sliding said collar back and forth on its shaft to thereby move the driving pin out of and into engagement with said channels.

20 5. A driven disk provided with radial channels, a driving shaft, a collar slidably mounted upon and arranged to rotate with said shaft, a driving pin projecting from said collar, a sliding pin attached to the collar, guiding means for the sliding pin
25 affixed to the shaft, and a cam acting upon the sliding pin to reciprocate it.

30 6. A driven disk provided with radial channels, a driving shaft, a collar slidably mounted upon and arranged to rotate with said shaft, a driving pin projecting from said collar, two oppositely sliding mechanically connected pins, one of said pins being connected with said collar, guiding means
35 for the sliding pins affixed to the shaft, and a cam acting upon both of said sliding pins to reciprocate them.

40 7. A driven disk provided with radial channels, a driving shaft, a collar slidably mounted upon and arranged to rotate with said shaft, a driving pin projecting from the collar, two oppositely sliding mechanically connected pins, one of said pins being connected with said collar, guiding means
45 for the sliding pins affixed to the shaft, levers pivoted to the shaft and connecting said sliding pins for simultaneous movement, and a rotary cam on the shaft arranged to maintain constant contact with both of said sliding pins to reciprocate them.

50 8. A driving shaft, a driving collar thereon, guiding means affixed to said shaft, a sliding operating pin for said collar carried by the guiding means, means driven by the shaft for reciprocating the sliding pin and

the collar, and a rotary member intermittently driven by said collar. 55

9. A driving shaft, a driving collar thereon, guiding means affixed to said shaft, a sliding operating pin for said collar carried by the guiding means, a rotary cam loosely
60 mounted upon said shaft for reciprocating the sliding pin and the collar, and a rotary member intermittently driven by said collar.

10. A driving shaft, a driving collar thereon, guiding means on the shaft, a sliding operating pin for the driving collar carried by the guiding means, a rotary cam loosely
65 mounted upon said shaft for reciprocating said sliding pin, gearing driven by the shaft for rotating the cam, and a rotary member
70 intermittently driven by said collar.

11. A driving shaft, a driving collar thereon, guiding means affixed to the shaft, a sliding operating pin for the driving collar carried by the guiding means, a rotary cam
75 loosely mounted upon the shaft for reciprocating said sliding pin, reduction gearing driven by the shaft for rotating the cam whereby the sliding pin is reciprocated at intervals proportional to the rotation of the
80 shaft, and a rotary member intermittently driven by the collar.

12. A driven shaft, a driven disk thereon provided with radial channels, a driving shaft, a collar slidably mounted upon and
85 arranged to rotate with said driving shaft, a driving pin projecting from the collar, a cam loosely mounted upon the driving shaft and arranged to reciprocate said collar and driving pin out of and into engagement with
90 said channels, and reduction gearing between the driving shaft and the cam for causing said reciprocations to take place at intervals proportional to the rate of rotation
95 of the shaft.

13. Apparatus for producing quick partial turns of a driven shaft at intervals, which consists of a star wheel on the driven shaft for driving it, a driving shaft, a disk and pin on the driving shaft for turning the
100 star wheel and a device moved by the driving shaft for shifting the relative positions of the star wheel and the disk which carries the pin.

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