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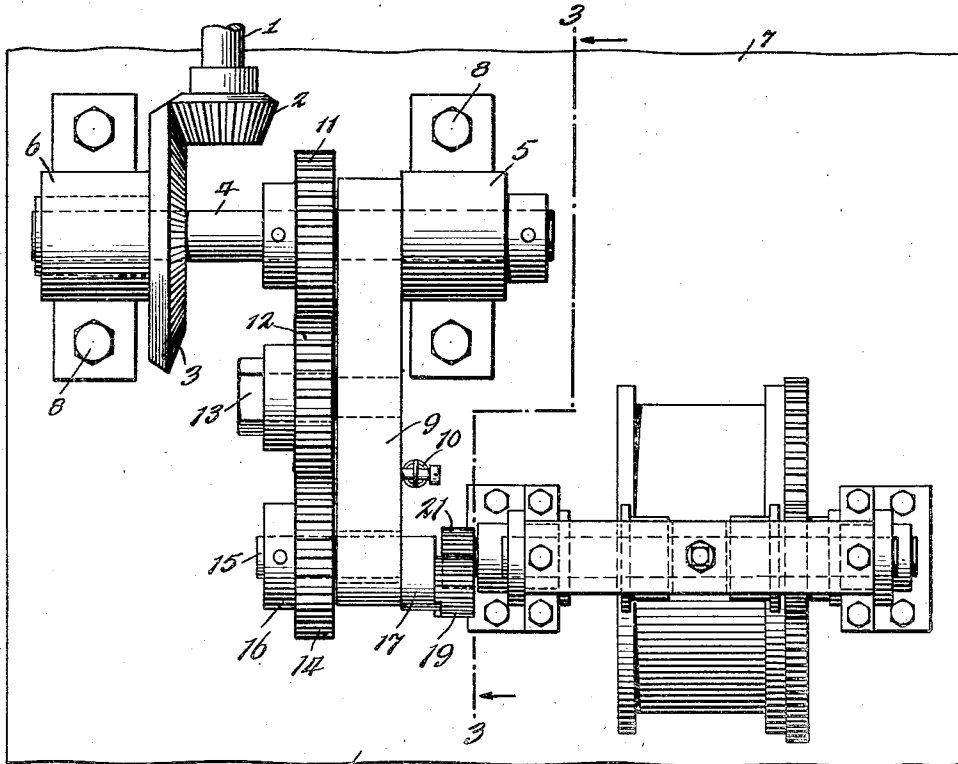
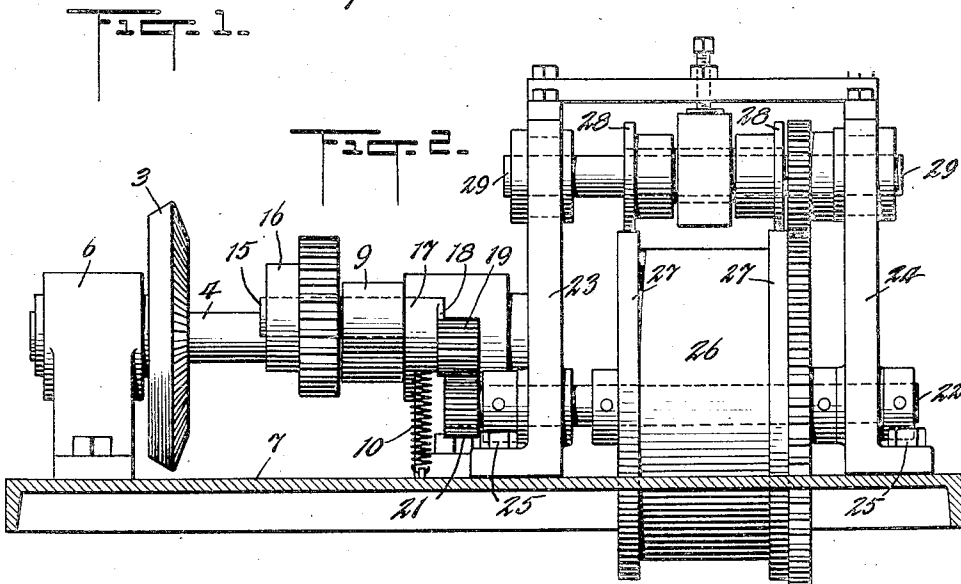
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1,916,871

MECHANICAL MOVEMENT FOR INTERMITTENT MOTION

Filed June 6, 1931

3 Sheets-Sheet 1



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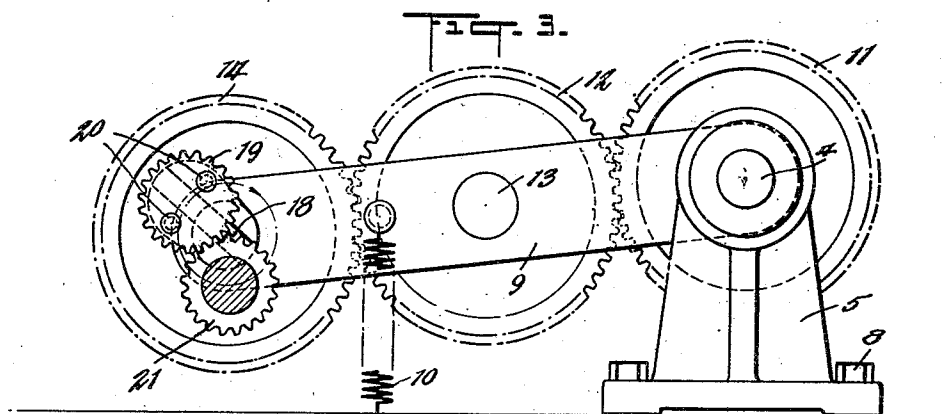
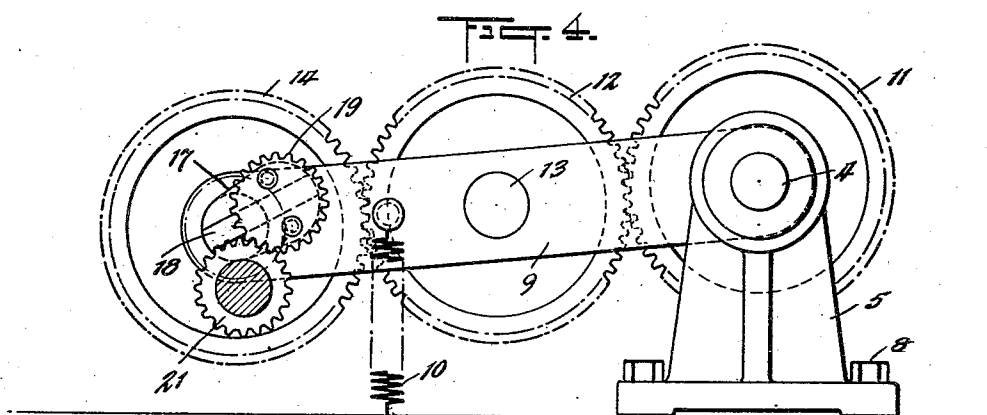
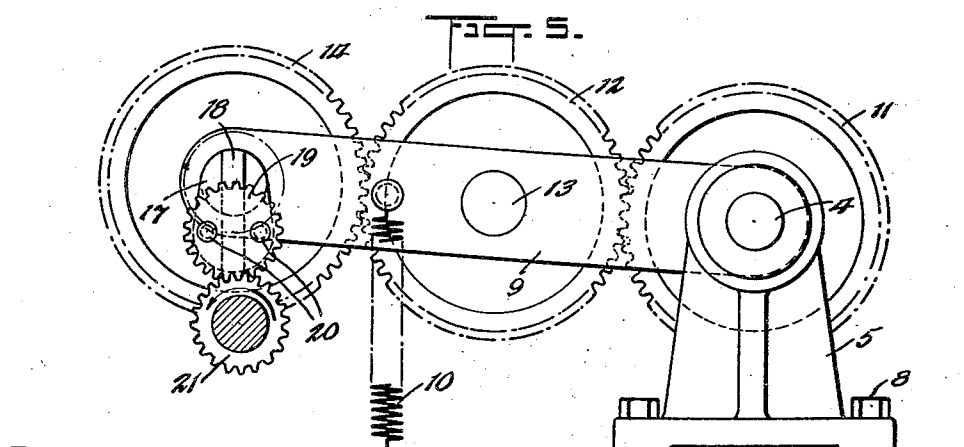
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MECHANICAL MOVEMENT FOR INTERMITTENT MOTION

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3 Sheets-Sheet 2



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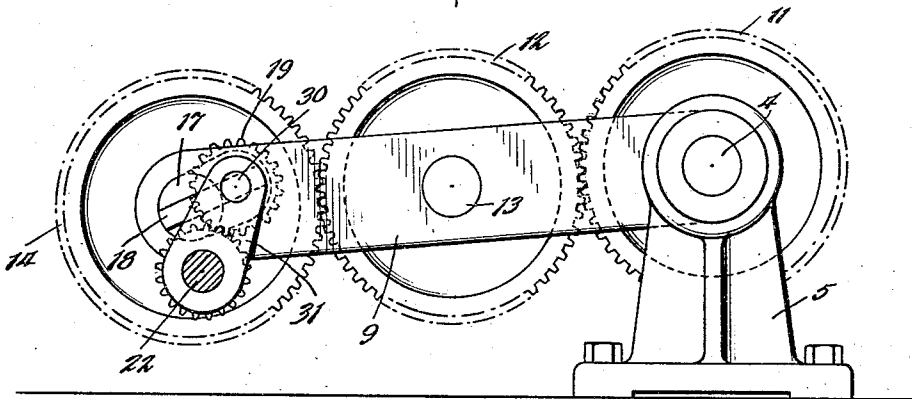
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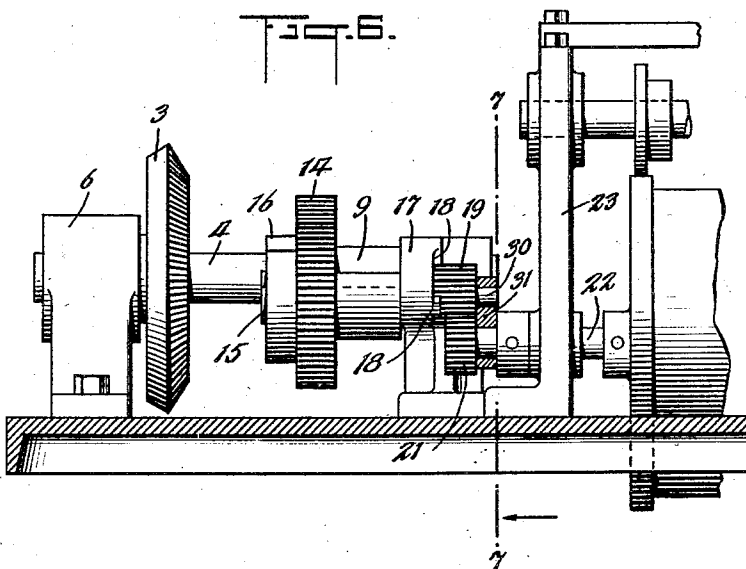
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3 Sheets-Sheet 3

Fig. 2.



T-14.6.



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UNITED STATES PATENT OFFICE

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MECHANICAL MOVEMENT FOR INTERMITTENT MOTION

Application filed June 8, 1931. Serial No. 542,505.

This invention relates more especially to mechanical movements for intermittently transmitting power with variable periods of rest and motion in devices for starting, accelerating, and decelerating feeding mechanisms such, for example, as those employed in paper-folding machines, paper-creasing machines, etc., etc.

The primary object of my invention is to provide an improved construction and arrangement of parts in devices of this character whereby the feeding movements may be started slowly, accelerated to normal speed, and then brought slowly to rest.

One of the objects of my invention is to provide an improved construction for mechanisms of this character whereby a high degree of accuracy and precision may be maintained during successive operations of a web-feeding device such, for example, as those employed in connection with card-presses, rotary printing presses, numbering machines, reciprocatory movements, etc., etc. A further object of the invention is to provide means of improved construction for providing a "dwell" period of variable duration during which certain desired operations are performed on the material which is being fed and in some cases, to provide a periodic retrograde movement to a feed roll or drum.

Among other things, my invention contemplates a mechanical movement of improved construction which is peculiarly adaptable for imparting feeding movements to a cylinder or feed roll of smaller or greater length than the circumference of said cylinder or feed roll and may be employed to provide larger or smaller amounts of "dwell" or, if desired, periodic retrograde movements in the feeding operation.

In the drawings which show a preferred embodiment of my invention,

Figure 1 is a top plan view of a feeding mechanism and intermittent drive therefor suitable for use in a card-press;

Figure 2 is a side elevation of the same;

Figure 3 is an enlarged vertical section taken on the line 3—3 of Figure 1 showing the relative positions of the parts at the beginning of the planetary movement of the

driving gear around and over the periphery of the driven gear;

Figure 4 is a view similar to Figure 3 showing the relative positions of the parts at the end of said planetary movement;

Figure 5 is a view similar to Figures 3 and 4 showing the relative positions of the parts in the midst of the normal movement of the driven shaft;

Figure 6 is a side elevation of a modified form of the mechanical movement shown in Figures 1 to 5;

Figure 7 is an enlarged section on the line 7—7 of Figure 6.

According to the preferred embodiment of my invention shown on the drawings, a power shaft 1 carries a bevel pinion 2 which meshes with a bevel gear 3 keyed to a driven shaft 4 which is journaled in axially-spaced bearings 5 and 6, said bearings being secured to a base plate 7 by means of bolts 8. Oscillatably mounted at one end upon the shaft 4 is an arm 9 which is adapted to be raised and lowered under the tension of a tension spring 10 which is connected at one end to said arm 9 and at its other end to the base plate 7. Keyed to the shaft 4 on one side of the oscillating arm 9 is a spur gear 11 which meshes into an idler gear 12 journaled upon a stud 13 which is threaded into one face of the arm 9. The idler gear 12 is also in mesh with a spur gear 14 which is keyed to a transmission shaft 15, said transmission shaft being journaled in the outer end of the oscillatory arm 9 and held against endwise movement in one direction by a collar 16 which is pinned to the shaft 15. The other end of the shaft 15 carries a crank arm 17 which may be integrally formed thereon, said crank arm being enlarged radially outward from the axis of said shaft and provided at one face with a rib 18. Adjustably mounted on the rib 18 is a spur gear 19, said spur gear being provided with a diametral slot which slidably engages the rib 18. The gear 19 may be positioned at any desired point along the rib 18 by means of screws 20. It will be understood furthermore that before said gear 19 is secured in position on the crank arm 17, its pitch-circle may be located to pass through or at any desired dis-

tance from the axis of shaft 15. In this way, any desired amount of "dwell" may be secured in an intermittent motion, the spur gear 19 being in continuous mesh with a spur gear 21 keyed to one end of a driven feed shaft 22. As shown best in Figure 2, the feed shaft 22 is journaled upon a fixed axis in axially-spaced standards 23 and 24 which are secured to the base plate 7 by means of bolts 25. Secured to the shaft 22, is a drum 26 provided with axially-spaced feed rolls 27 which are adapted to cooperate with upper feed rolls 28 secured to an upper feed shaft 29 which is also journaled in the standards 23 and 24. It will be further understood that by setting the gear 19 upon the radial arm 17 in a position in which the axis of transmission shaft 15 extends intermediately of the pitch-circle and axis of said gear 19, a periodic retrograde movement may be imparted to the driven gear 21. It may also be noted that by the use of different ratios in the pitch-diameters of spur gears 19 and 21, the linear feed of a cylinder or feed roll may be lengthened or shortened with respect to the circumference thereof.

The modified form of my improved mechanical movement shown in Figures 6 and 7 is substantially similar in construction to that shown in Figures 1 to 5 inclusive and for this reason parts of similar form and function in the two embodiments are indicated by like reference characters. Thus, as shown in Figures 6 and 7, the shaft 22 is intermittently driven by a series of gears of like construction, arrangement and mounting as those shown in Figures 1 to 5, the tension spring 10 shown in these last-mentioned views, however, being omitted. As shown in Figures 6 and 7, on the other hand, the driving gear 19 is provided with a concentrically arranged axially-projecting pin or trunnion 30 which is oscillatably connected to the intermittently driven shaft 22 by means of a connecting link 31. Said link serves at once to prevent the pinion 19 being thrown out of mesh with the driven pinion 21 and to maintain a constant distance between the rotary axes of the meshing gears during the rising and falling movements of the oscillatory arm 9.

Operation

It will be understood from the foregoing explanation that as the power shaft 1 operates through the train of gears to rotate the transmission shaft 15 in the outer end of oscillatory arm 9, the gear 19 is revolved around the axis of shaft 15 while remaining continuously in mesh with the spur gear 21 on the fixed axis of driven feed shaft 22. If the crank arm 17 revolves in a clockwise direction around the axis of shaft 15 as indicated by the arrow in Figures 3, 4 and 5, the rotary axis of gear 19 in passing from its position shown in Fig-

ure 3 to its position shown in Figure 4, will move over a path substantially concentric to the rotary axis of shaft 22 and hence will roll idly on the periphery of gear 21 so that during this idle movement, the driven shaft 22 will remain at rest. As said crank arm 17 continues to revolve from its position shown in Figure 4, however, the circular path traced by the axis of gear 19 in its movement around the axis of shaft 15, is no longer concentric to the axis of shaft 22 and hence becomes active in driving the gear 21 until the parts again occupy their relative positions shown in Figure 3. The result of this action is to produce a slow starting of the gear 21 followed by a growing acceleration thereof to normal speed which is succeeded by a progressive deceleration thereof to a full stop. This cycle is repeated as long as power is transmitted in the manner described.

It will now be obvious to those skilled in the art that by relatively varying the diameters of gears 19 and 21 and by varying the radial distance of the axis of gear 19 from the axis of shaft 15, the feeding periods as well as the periods of rest in this periodic transmission of power may be shortened or lengthened as desired.

I claim:—

1. In a mechanical movement for intermittent motion, the combination of a main drive shaft rotatable on a fixed axis, an arm oscillatable on said main drive shaft, a stub shaft journaled in the outer end of said oscillatable arm and projecting on opposite sides thereof gearing connections between one end of said stub shaft and said main drive shaft, a radial arm mounted on the other end of said stub shaft, a driven shaft rotatable on a fixed axis, a gear keyed to said driven shaft, and another gear mounted on said radial arm with its axis offset from the axis of said stub shaft and continuously in mesh with said driven shaft gear.

2. Web-feeding mechanism according to claim 1, in which means are provided for retaining the gear on said radial arm mesh with the driven shaft gear during relative angular displacements between the rotary axis of said gears.

3. Web-feeding mechanism according to claim 1, in which means are provided for pressing said oscillatable arm in a direction to retain said radial arm and driven shaft gears in mesh with each other during relative angular displacements between the rotary axes of said gears.

4. Web-feeding mechanism according to claim 1, in which the gear on said radial arm is provided with a concentric trunnion and in which a connecting link is connected at opposite ends to said trunnion and driven shaft respectively.

5. In an intermittent power drive of the character described, the combination of a

driven shaft journalled about a fixed axis, a gear keyed to one end of and concentric with said driven shaft, a supporting beam oscillatably mounted at one end about a fixed axis parallel to the fixed axis of said driven shaft, the other end of said oscillatable supporting beam being movable towards and away from the axis of said driven shaft, a stub shaft journalled in said other end of the supporting beam, an orbital gear eccentric to said stub shaft and continuously meshing with said driven shaft gear, means rigidly uniting said orbital gear to said stub shaft and means for driving said stub shaft.

6. In an intermittent power drive, the combination of a shaft rotatable about a fixed axis, a gear concentrically keyed to one end of said shaft, a supporting beam oscillatably mounted at one end about an axis distant from the fixed axis of said shaft and having its other end movable towards and away from the fixed axis of said shaft, a stub shaft journalled in the outer end of said supporting beam, an orbital gear movable around the axis of said stub shaft and continuously meshing with the gear on said shaft rotatable about a fixed axis, means for connecting said orbital gear to said stub shaft, and a link having one end pivotally connected to the shaft which is rotatable about a fixed axis and its other end concentrically pivoted to said orbital gear.

7. In a power drive, the combination of a power shaft continuously rotatable about a fixed axis, a driving gear keyed to said power shaft, a driven shaft rotatable at intervals about a fixed axis parallel to and distant from said fixed axis of the power shaft, a supporting beam oscillatably mounted at one end upon said power shaft and having its other end movable upwardly and downwardly with respect to the horizontal axial plane of said power shaft, a gear keyed to one end of said driven shaft, a power-transmitting stub shaft journalled in the outer end of said beam and

projecting at opposite sides thereof, a radial arm mounted on one end of said stub shaft adjacent to the gear on said driven shaft, a gear on the other end of said stub shaft, an intermediate gear rotatably mounted on said supporting beam and meshing with the gears on said stub shaft and said power shaft, and an orbital gear secured to said radial arm with its axis eccentrically disposed with respect to the axis of said stub shaft, said orbital gear being adapted by its continuous revolution around the axis of said stub shaft to intermittently drive said gear on the driven shaft and to raise and lower the outer end of said supporting beam.

8. In an intermittent power drive, the combination of a power shaft continuously rotatable about a fixed horizontal axis, a driven shaft rotatable at intervals about a fixed horizontal axis parallel to the fixed axis of said power shaft, the distance between the respective horizontal planes including the fixed axes of said power and driven shafts being relatively small as compared to the distance between the respective vertical planes including said fixed axes, a supporting beam pivotally mounted at one end upon said power shaft and having its other end extending past said driven shaft, a gear keyed to said driven shaft, a power-transmitting stub shaft journalled in the outer end of said beam and projecting at opposite sides thereof, a radial arm mounted on one end of said stub shaft, a gear keyed to the other end of said stub shaft, an orbital gear secured to said radial arm with its axis eccentrically disposed with respect to the axis of said stub shaft, said orbital gear being continuously in mesh with the gear on said driven shaft, a drive gear keyed to said power shaft, and an idler gear journalled on said supporting beam and intermeshing with said stub shaft and power shaft gears.

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