

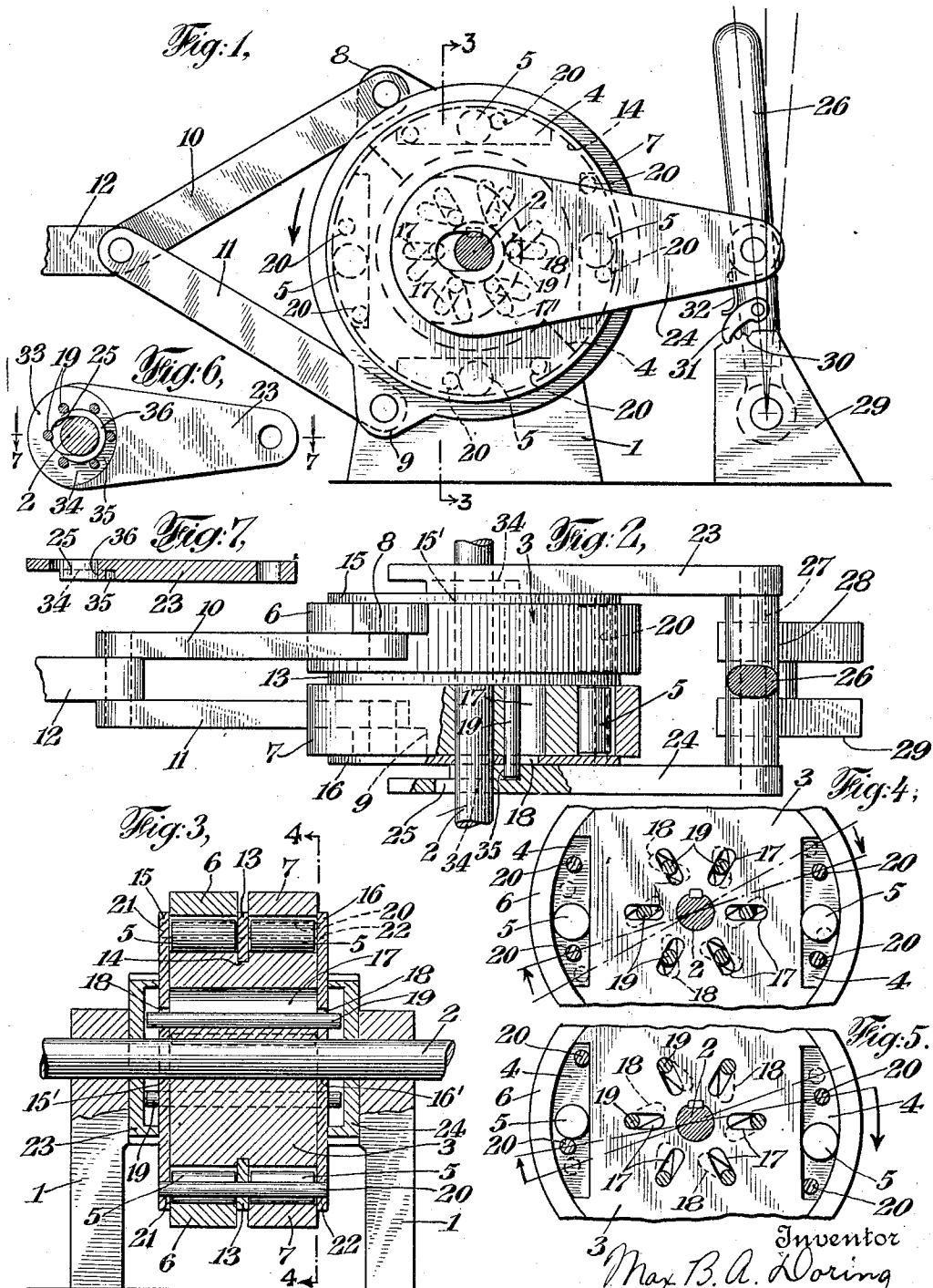
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POWER TRANSMITTING MECHANISM

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POWER TRANSMITTING MECHANISM

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This invention relates to improvements in mechanical movements and more particularly to power transmitting mechanism, and the particular object thereof is the provision of an efficient means of transmitting power to a driven shaft, whereby the shaft may be driven in either direction without requiring the medium of a clutch or other similar device. All gears are dispensed with, and the control of the direction of rotation of the driven shaft is accurate and complete in each direction.

A further object of this invention is the provision of means for transmitting power to the wheels of a self-propelled vehicle without utilizing a differential.

A further object of this invention is the provision of means for locking the device and preventing rotation of the shaft when the parts are in an intermediate position.

Further objects of this invention include improvements in details of construction and arrangement, whereby an efficient and simple mechanism of this character is provided.

To the accomplishment of the foregoing and such other objects as may hereinafter appear, this invention consists in the construction, combination, and arrangement of parts hereinafter described and then sought to be defined in the appended claims, reference being had to the accompanying drawing forming a part hereof, and which shows merely for the purpose of illustrative disclosure, a preferred embodiment of my invention, it being expressly understood, however, that various changes may be made in practice within the scope of the claims without digressing from my inventive idea.

In the drawing:

Figure 1 represents a side elevation showing the parts in position to transmit rotary motion to the driven shaft in one direction.

Figure 2 is a top plan view with parts shown in section to facilitate the disclosure.

Figure 3 is a vertical cross section taken substantially on line 3—3 of Figure 1.

Figure 4 is a fragmentary sectional view taken on line 4—4 of Figure 3 showing the parts in locking position; and

Figure 5 is a fragmentary sectional view similar to Figure 4, but showing the parts

in position to transmit rotary motion to the driven shaft in a direction opposite to that in Figure 1.

Figure 6 is a plan view of the locking member; and

Figure 7 is a partial cross sectional view taken on line 7—7 of Figure 6.

Referring now to the drawing, the numeral 1 designates a support in which the driven shaft 2 is rotatably mounted. A cylindrical rotary member or rotor 3 is keyed, or otherwise secured, to the driven shaft 1, the rotary member or rotor being provided on its circumference with a plurality of spaced notches or cut-away parts 4 extending the full width of the rotor 3. Each notch or cut-away portion 4 is formed with a flat bottom portion perpendicular to a diameter of the rotor, and with the sides of the notch perpendicular to the flat bottom portion. If the parts are reversed it is to be noted that the notches 4 will be accordingly changed and may or may not be provided on the periphery of the rotor. They are symmetrically arranged, however.

Mounted within each notch or cut-away portion 4 is a pair of cylindrical rollers 5. It is to be expressly understood, however, that elements other than rollers may be employed, such as ball bearings, for instance. These rollers 5 have a diameter smaller than the maximum depth of the notches or cut-away portions. Spaced bands or rings 6 and 7 are slightly larger in diameter than the rotor 3, and form housing means for rollers 5. These rings 6 and 7 are loosely mounted on the rotor 3, and co-operate with rollers 5 to cause the rollers to become wedged between the rings and the rotor and cause rotation of the shafts. By having rollers 5 of smaller diameter than the depth of the notches, it is possible to hold the rollers out of wedging contact with the rings 6 and 7 whenever it is desired. Lug 8 provided on the top of ring 6, and lug 9, provided on the bottom of ring 7, are adapted for attachment to links 10 and 11, which links, in turn, are pivoted to a reciprocating member 12. Other means for actuating the rings 6 and 7 may be used. It is to be expressly under-

stood, however, that the rotor 3 and rings 6 and 7 may be reversed so that the rings are mounted with respect to and coact with the rotor to produce substantially the same result.

The rings 6 and 7 are separated by means of a split, flat ring 13 which is received in groove 14 in rotor 3. The ring 13 is shown as split for purposes of assembly. Rings 6 and 7 are kept in place by circular side plates 15 and 16 located on each side of the rotor 3, and provided with central apertures 15' and 16', which receive shaft 2. These plates are movably mounted on said shaft and are adapted to co-operate with other parts presently to be described to position rollers 5 in various operative positions.

Rotary member or rotor 3 is provided with radial openings or slots 17 located near the center of the rotor. The radial openings 17 need not be located near the center, since other positionings come within the contemplation of the invention as disclosed. Side plates 15 and 16 are also provided with a plurality of apertures 18 which are disposed at an angle to radial openings 17 in the rotor 3. The openings 17 and apertures 18 are shown as being of the same length. Received by said openings 17 and apertures 18 are pins or rods 19. The openings 17 and apertures 18 and pins 19 co-operate to position the side plates 15 and 16 in a plurality of positions relatively to said rotor. The function of these pins or rods 19 will be discussed more fully in connection with other parts of the device to be described later.

Located within each cut-away portion or notch 4 is a pair of spaced positioning spindles 20 which pass through the openings 21 and 22 positioned near the circumference of the side plates 15 and 16, respectively. Each pair of spindles has a pair of rollers 5 between them. These positioning spindles 20 being connected to the side plates 15 and 16 are adapted to be moved to various positions when the side plates 15 and 16 are moved, and the rollers 5 are thereby placed in a plurality of operative positions. The main purpose of the side plates 15 and 16 is to position the spindles 20 which in turn position the bearing members or rollers 5. In one position, as shown in Figure 1, the spindles 20 have positioned the rollers 5 so as to wedge the rollers between rings 6 and 7 and rotor 3 on the left side of the device, and the rotor is rotated in the direction shown by the arrow. In Figure 5, the spindles 20 have wedged a different set of rollers 5, other than the ones shown in Figure 1, namely, the rollers on the right side of the device, and rotation of the driven shaft is obtained in the opposite direction. The spindles 20 may be so arranged as to decrease the number with the same number of rollers 5 without changing the operation.

Locking arms 23 and 24 are movably mounted on driven shaft 2 by means of an elongated slot 25 provided in each locking arm. The locking arms 23 and 24 are connected together and pivotally connected to a hand lever 26 by means of a rod 27. The spacing member 28 is mounted on the rod 27 for keeping the locking arms 23 and 24 separated. Hand lever 26 is pivoted at its one end on a fixed support 29, which support is provided with an arcuate section having ratchet teeth 30. Adjacent these teeth is a ratchet member 31 pivotally mounted on hand lever 26, and resiliently held in contact with the ratchet teeth 30 by means of a flat spring 32 bearing against the ratchet member 31.

Each locking arm is formed of a relatively thick member having a cut-away portion 33 near the end which is provided with elongated slot 25 to form an eccentric groove 34 (see Figures 6 and 7). The groove is formed with a narrow part 35 at the right end of the groove, shown in Figure 6, of substantially the same width as the diameter of one of the rods 19 so as to form a guiding and adjusting means for one of the rods 19. Partially encircling the elongated aperture 25 is a U-shaped hub 36 which forms one side of the eccentric groove 34. It will be seen that when the locking arms are moved the pin 19 which is in the narrow part 35 of the groove will be moved or adjusted, and the rest of the pins 19 will be moved by openings 17 and apertures 18 in side plates 15 and 16.

It is not always the same pin which is received in the grooves 34, as the pins rotate with rotor 3 and any pin at the extreme right, as shown in Figure 1, will function in the same manner. When the locking arms 23 and 24 are moved by the hand lever 26, the ends of the pin or rod 19, as shown at the extreme right in Figure 1, are caused to move due to the engagement with the eccentric grooves 34, and the side plates 15 and 16 move relatively to the rotor due to the fact that the pins or rods 19 are located in the openings 17 and apertures 18. Since openings 17 and apertures 18 are disposed at an angle to each other, movement of the pins or rods 19 causes a relative movement of side plates 15 and 16 and the rotor. Spindles 20 which engage openings 21 and 22 in the side plates 15 and 16 are also moved by the rotation of the side plates. Movement of the side plates 15 and 16 automatically causes the positioning of rollers 5 by the spindles 20 so that direction of the driven shaft may be determined at will.

The operation of the device will now be given. With the parts positioned as shown in Figure 1, the driven shaft will rotate in the direction of the arrow. The hand lever 26 is so positioned that pins or rods 19 are located in the bottom of openings 17 and aper-

tures 18. The position given to the side plates 15 and 16 by this movement, places the spindles 20 so that the rollers 5 are free to drop downward on the left side of the rotor to be wedged between the rotor 3 and rings 6 and 7, and the rotation of the rotor and shaft must follow in the direction indicated in Figure 1. It is to be noted that the rollers 5 on the right side of the rotor are held up out of wedging relation between the rings 6 and 7 and the rotor 3.

In Figure 4 pins or rods 19 are shown intermediate the ends of openings 17 and apertures 18. The pins or rods 19 have been moved to this position by the interengaging of one of the rods 19 shown at the extreme right in Figure 1 with the eccentric grooves 33 of the locking arms 23 and 24. Side plates 15 and 16 have also been turned a certain angle, and hence spindles 20 have been moved so that a wedging action between rings 6 and 7 and rotor 3 is obtained by positioning rollers 5 between the rotor 3 and the rings 6 and 7 on the left and right sides of the rotor. In this position, the device is locked and no movement is obtained.

In Figure 5 pins or rods 19 have been moved to the outer ends of openings 17 and apertures 18 and side plates 15 and 16 have been given an additional movement. Spindles 20, due to their connection with said plates 15 and 16 by means of openings 21 and 22, have been placed in a position to allow rollers 5 on the right side of the rotor to drop down and be wedged between rotor 3 and rings 6 and 7, so as to cause rotation of the rotor and driven shaft in a direction opposite to that shown in Figure 1. It is to be noted that the rollers 5 on the left side of the rotor are held up out of wedging contact, and that the position of the parts shown in Figure 1 is exactly opposite to that shown in Figure 5, and rotation of the driven shaft is obtained in the opposite direction.

When the device is used to transmit power in a self-propelled vehicle, no differential is required. A split axle is used and when one part of the axle moves faster than the other, as when the vehicle is turning a corner, a "running-ahead" is permitted by the vehicle. The fact that the device allows the axle to "run-ahead" of the engine speed, gives the further advantage that whatever momentum the car may gain will be added to the engine speed, with the result that the car speed may be greater than the engine speed. In the cars now in use, with the engine in gear, the car cannot travel faster than the engine, and the momentum of the car is, therefore, lost.

It will be apparent that I have provided a relatively simple device which will function to transmit power and rotate a shaft in either direction without using a clutch or similar device, and which can be used to propel a ve-

hicle without the use of a differential or similar device.

What I claim is:

1. In a device of the character described, a rotor having radial openings near its center, rings mounted on said rotor, bearing members positioned between the rings and the rotor, apertured plates for holding the rings on said rotor, a rod passing through the apertures in said plates and the openings in the rotor, and a control member provided with an eccentric groove for receiving the end of said rod.

2. In a device of the character described, a rotor provided with a plurality of notches, said rotor also being provided with a plurality of radial openings, a plurality of rings loosely associated with said rotor, bearing members in said notches, said bearing members being less in thickness than the depth of the notch, side plates provided with apertures and adapted to hold the rings on the rotor, rods passing through the apertures in the side plates and openings in the rotor, and a plurality of connected control members provided with an eccentric means for guiding the ends of one of said rods, said control members when moved being adapted to actuate the rods and cause relative movement between the rotor and the side plates so as to position the bearing members.

3. In a device of the character described, a rotor having radial openings, rings mounted on said rotor, bearing members positioned between the rings and the rotor, apertured plates for holding the rings on said rotor, rods passing through apertures in the plates and the openings in the rotor, and a control member provided with means adapted to co-operate with said rods to position the plates in a plurality of positions.

4. In a device of the character described, a rotor having radial openings near its center, rings mounted on said rotor, bearing members positioned between the rings and the rotor, apertured plates for holding the rings on said rotor, rods passing through the apertures in said plates and the openings in the rotor, and control members provided with eccentric grooves for receiving the ends of one of the rods.

5. In a device of the character described, a shaft, a rotor thereon provided with a plurality of radial openings, side-plates provided with a plurality of angular apertures to co-operate in pairs with the radial openings in the rotor, and pins passing through said openings in said rotor and said apertures in said plates, and means for moving said pins so as to turn the side plates with respect to the rotor.

6. In a device of the character described, a rotor having openings therefor, side-plates provided with angular apertures to pair with the openings of the rotor, pins passing

through said openings and apertures to force the side plates to turn with the rotor, the pins extending beyond the side-plates, an eccentrically grooved control plate adjustably mounted on one side of the rotor to receive the ends of said pins and means for moving said control plate relatively to the center of the rotor.

7. In a device of the character described, a rotor having radial openings, side-plates provided with apertures to turn with the rotor, control plates provided with eccentric grooves and mounted adjacent the sides of the rotor, pins passing through said apertures in the side plates and through the radial openings in the rotor and extending beyond the side plates to pass successively through eccentric grooves in said control plates, means for moving the control plates relatively to the center of the rotor to change the position of the side plates relatively to the rotor.

8. In a device of the character described, a notched rotor having radial openings, apertured side plates, a grooved control plate adjacent said rotor, pins passing through said apertures in said side plates and said openings in said rotor and extending beyond the side plates to pass successively through said groove in said control plate, spindles mounted in the side plates and passing through the notches of the rotor, bearing members located in the notches of the rotor, and means for moving the control plate to and from the center of the rotor so that the spindles position the bearing members.

9. In a device of the character described, a rotor provided with notches and radial openings, bearing members in said notches, side plates having angular apertures to aline with said openings in the rotor, pins passing through alined openings and apertures in said rotor and said plates, spindles mounted in the side plates and passing through the notches of the rotor, control plates adjustably mounted on the sides of the rotor and provided with eccentrically shaped grooves to successively receive the ends of the pins passing through the openings in the rotor and apertures in the side-plates, means to laterally shift the control plates to change the position of the side plates relatively to the rotor to laterally shift the spindles in the notches of the rotor and so changing the position of the bearing members in the notches of the rotor.

In testimony that I claim the foregoing, I have hereunto set my hand this 12th day of February, 1930.

MAX B. A. DORING.