



# UNITED STATES PATENT OFFICE.

EDWARD MANRARA AND WILLIAM D. CUSTEAD, OF NEW YORK, N. Y.

## VARIABLE-SPEED MECHANISM.

No. 824,942.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that we, EDWARD MANRARA and WILLIAM D. CUSTEAD, residing at New York city, in the county of New York and State of New York, citizens of the United States, have invented certain new and useful Improvements in Variable-Speed Mechanisms, of which the following is a specification.

This invention relates to power transmission, and has for its object to provide an improved variable-speed-transmission device that is particularly adapted for use in motor-vehicles and motor-boats or other similar situations where it is desired to vary the speed or power expended while permitting the motor to run at its speed of greatest efficiency.

In the drawings accompanying and forming a part of this specification an embodiment of the invention is illustrated applied to a motor-vehicle, in which—

Figure 1 is a plan view of a portion of the chassis of a motor-vehicle. Fig. 2 is an end elevation of one of the gripping-drums and connecting mechanisms. Fig. 3 is a central section of the parts shown in Fig. 2, certain parts being in elevation. Fig. 4 is a perspective view of the wedge used for adjusting one of the grip members. Fig. 5 is a perspective view of one of the friction-blocks. Fig. 6 shows means for adjusting the spring controlling one of the grip members. Fig. 7 shows one of the sector members.

The framework of the vehicle (indicated by reference-numeral 7) carries bearings 8 for a shaft 9, upon which is secured a sprocket-wheel 10. The latter is engaged by sprocket-chain 11, driven from some suitable motor. (Not shown.) Each of the driving-wheels of the vehicle 12 is separately or independently driven—that is, they are driven from the same motor; but in the transmission of the driving power there is a certain amount of independence. Each of the wheels is shown as mounted upon a shaft 13, which shafts have suitable bearings 14 and 15 in the framework, and each carries a sprocket-wheel 16. The shaft 9 has secured upon each end a crank 20, to each of which cranks is pivoted a link 21, connecting at its end 22 to a link 23. The link 23 has guide-ways upon it to guide a block 26, that is slidable thereon. The link 27 is pivoted to the block 26 and also pivoted to the rock-arm 28, mounted upon a stub-shaft 29, having bearings on the framework. A wrist-pin 30 on

each rock-arm has pivoted to it a pair of links 31, each of which is pivoted to an arm 32, which latter operates the grip devices, as hereinafter set forth. The continuous rotation of the shaft 9 is by means of these links converted into variable reciprocatory movement, which by means of the grip mechanism will be converted into a variable rotary movement. A flanged wheel 33, having inside and outside cylindrical grip-engaging faces 34 and 35, respectively, is provided for each of the wheels 12 and is secured upon a shaft 36. Each arm 32 has an abutment-face forming substantially a ridge 37, arranged to engage the inner face 34 of the drum. Each arm 32 also carries a member 38, having a gripping-face 39 for gripping the outer face or periphery 35 of the drum 33. A number of the parts of this mechanism are similar to those set forth in United States Patent No. 771,046, granted September 27, 1904, to one of us—W. D. CUSTEAD.

The arms 32 are arranged substantially on diametrically opposite sides of the drum 33, and their connected parts being substantially identical the description of one set will suffice for the other. An extension 321 of the arm 32 contains a circular bore 40, and the arm is movable on its abutments engaging opposite sides of the rim, whereby to shift the axis of the bore 40 toward and from the axis of the drum 33. The arm 32 has a portion channeled, into which extends the rim portion of the drum and also the gripping member 38. This member 38 is shown separately in Fig. 5 and is adjustably fastened to the member 32 by having an L portion 381 extending along one side and thence to the rear of the arm, the end of which latter portion is connected with the main portion by a bar 382, suitably secured thereto. The upper face of the member 38 has a V-shaped channel tapering forwardly, and the rear part of the member 381 has a groove 383. A wedge member 55 of tapering rectangular shape has two of its sides engaging the channel portion 54 of the block 38, and its upper two sides engage a corresponding V-shaped channel in the upper wall 53 of the said channel in the arm 32. The wedge member has a shank 56 extending through an aperture in the arm 32, which shank has a threaded extremity carrying a nut 58. The shank 56 passes through the said channel 383 and at this portion carries a sleeve 59, engaging the rear part 60 of the arm 32. It will be evident that by tighten-

ing the nut 58 the wedge member will be drawn inwardly, and the opposite engaging tapering walls will force the member 38 toward the rim of the drum. The face 39 of the block 38 may be arranged as shown in Figs. 2 and 5, having a middle portion suitably curved to engage with the rim of the drum and the side portions cut away out of engagement with the rim.

The block 38 is so adjusted relative to the opposing abutment 37 of the arm that when the arm is in the position relative to the drum in which the axis of the bore 40 substantially coincides with the axis of the drum the said two abutments will not grip the rim of the drum, but will slide freely thereon. Upon the arm being shifted to one side of said position when the arm is swung by the bar 31 in one direction the drum will be gripped and carried with the arm, while when the arm is swung in the opposite direction it will move free of the drum and not rotate it. On the other hand, when the arm 32 is shifted to the opposite side of said position upon the arm being swung in one direction the drum will be carried with it, while when swung in the opposite direction the drum will not be disturbed; but in the two said positions of the arm to which the arm is moved from its middle position the swinging of the arm by the lever in the one case will rotate the drum in one direction and in the other case will rotate the drum in the opposite direction. To effect such adjustment of the position of the arm 32, a shaft 41 has one end rotatable in a bore in the shaft 36 and has secured thereon a sector-shaped member 42, whose periphery is symmetrical with that of the bore 40 and engages therewith in the intermediate position of the arm, as shown in Fig. 2. If the arm 32 in the position shown in this figure has its extremity moved to the left, the arm will continue in such position relative to the axis of the drum and will not grip the same, because the extension of the arm will be retained in such position by its engagement with the sector; but upon a force being applied in the opposite direction the arm will swing upon its pivotal gripping abutments on the rim of the drum, and thereby grip the drum and carry it along with it for the reason that the extension of the arm is free to move until the wall of the bore contacts with the reduced portion of the sector. From this it will be apparent that if the sector 42 is shifted to a diametrically opposite position upon the arm 32 being rocked it will move substantially concentric with the axis of the drum when swung in one direction, but will be shifted to an eccentric position when moved in the opposite direction, and hence the drum will be rotated in an opposite direction by the swinging of the lever 32. For the purpose of yieldably retaining the extension in engagement with the pe-

riphery of the sector a cross-arm 44 is secured to the shaft 41, and a spring 45 (see Fig. 7) has one extremity adjustably secured to this arm, while its other extremity is fastened to the end of a bar 46, secured to the arm 32. To adjust the tension of this spring, its end is secured to a sliding nut 91, meshing with a set-screw 90, the latter passing through a lug 92 on the end of the arm 44. It will be understood that when the sector is shifted to its opposite position, which may be effected by means of a sprocket-wheel 47 and suitable engaging means, (not shown,) the arm 44 will be reversed simultaneously with the reversal of the sector, and therefore the latter will be yieldably retained in engagement with the opposite wall of the bore of the extension. It will be understood that the opposite extremity of the cross-arm 44 is similarly connected with duplicate members on an oppositely - arranged arm 32, (not shown,) and the shaft 41 will have its other extremity similarly supported in a duplicate of the drum 33 and shaft 36; but in order that the two oppositely-arranged arms 32 of each drum shall be alternately active in their simultaneous oscillations the sectors are oppositely arranged upon the shaft 41.

To retain the arms 32 in proper position upon the drum, a plate 61 is secured to one face of the arm 32 and carries suitable rollers 62, that engage the end portion 63 of the drum without undue friction.

The regulations concerning certain ferries require that the engines or motor-vehicles shall be stopped when the vehicle is run on and off the boat. This renders it necessary to employ outside means for moving the vehicle; but in the present invention by rocking the speed-changing lever the grips will be caused to engage and operate the driving-wheels so that the operator can by manual power while riding on the vehicle cause the same to move on or off the boat.

Having thus described our invention, we claim—

1. The combination of a shaft, a wheel fast on the shaft and provided with a rim having inner and outer friction-faces concentric with the shaft, an arm having a continuous cylindrical bore in one end, and having an abutment arranged to engage the inner face of said rim, the arm being movable on said abutment to shift the axis of said bore toward and from the axis of said shaft, a bearing-block carried by the arm, and engaging the outer face of the rim, a sector arranged to oscillate in the bore of the arm, means for yieldably retaining the arc face of the sector in engagement with one side of the bore in the arm, and means for shifting said latter means whereby the sector is yieldably retained in engagement with the side of such bore opposite to said side.

2. The combination of a shaft, a wheel fast

thereon and provided with a rim having inner and outer friction-faces concentric with the shaft, an arm having a continuous cylindrical bore in one end and having an abutment arranged to engage the inner face of the rim, a sector arranged to oscillate in the bore of the arm, a bearing-block carried by the arm and engaging the outer face of the rim, means for yieldably retaining the sector in engagement with one side of the bore in the arm, means arranged to swing the sector to engage the opposite side of said bore, and to simultaneously swing said retaining means to a position to yieldingly retain the sector in engagement with such opposite side of the bore in the arm.

3. The combination of a shaft, a wheel fast thereon and provided with a rim having inner and outer friction-faces concentric with the shaft, an arm having a continuous cylindrical bore in one end and having an abutment arranged to engage the inner face of the rim, a sector arranged to oscillate in the bore of the arm, a block carried by the arm and engaging the outer face of the rim, a second shaft, a sector fast on the shaft and located in said bore in the arm, a bar fast on the second shaft, a finger carried by said arm, and a spring secured between the bar and the finger.

4. The combination of a shaft, a wheel fast on the shaft and provided with a rim having inner and outer friction-faces concentric with the shaft, an arm having a continuous cylindrical bore in one end, and having an abutment arranged to engage the inner face of said rim, the arm being movable on said abutment to shift the axis of said bore toward and from the axis of said shaft, a bearing-block carried by the arm and engaging the outer face of the rim, means for adjusting the position of the block on the arm, a sector arranged to oscillate in the bore of the arm, and means for yieldably retaining the periphery of the sector in engagement with one side of the bore in the arm, and means for shifting said latter means whereby the sector is yieldably retained in engagement with the side of the bore of the arm opposite to said side.

5. The combination of a shaft, a wheel fast on the shaft and provided with a rim having inner and outer friction-faces concentric with the shaft, an arm having a continuous cylindrical bore in one end, and having an abutment arranged to engage the inner face of said rim, the arm being movable on said

abutment to shift the axis of said bore toward and from the axis of said shaft, a bearing-block carried by the arm and engaging the outer face of the rim, a wedge arranged between the blade and the arm, means for moving the wedge to adjust the block, a sector arranged to oscillate in the bore of the arm, means for yieldably retaining the periphery of the sector in engagement with one side of the bore in the arm, and means for shifting said latter means whereby the sector is yieldably retained in engagement with the side of the bore of the arm opposite to said side.

6. The combination of a shaft, a wheel fast thereon and provided with a rim having inner and outer friction-faces concentric with the shaft, a pair of arms each having a continuous cylindrical bore in one end and having an abutment arranged to engage the inner face of the rim, two sectors each engaging the bore of one arm and extending in opposite directions, means for yieldably retaining the sectors in engagement with the respective bores on opposite sides, means arranged to simultaneously swing the sectors to engage opposite sides of the respective bores and at the same time swing the retaining means to yieldingly retain the sectors in engagement with such opposite sides of the bores.

7. The combination of a shaft, a wheel fast thereon and provided with a rim having inner and outer friction-faces concentric with the shaft, a pair of arms each having a continuous cylindrical bore in one end and having an abutment arranged to engage the inner face of the rim, blades carried by each arm and engaging the outer face of the rim, a second shaft, a pair of sectors fast on the second shaft and extending in opposite directions and each located in one of said bores of the arms, a cross-bar fast on the second shaft, a finger fast on each arm, a spring secured between the end of one finger and one end of the cross-bar, and a spring secured between the other finger and the other end of the cross-bar.

Signed at Nos. 9 to 15 Murray street, New York, N. Y., this 10th day of January, 1905.

EDWARD MANRARA.  
WILLIAM D. CUSTEAD.

Witnesses:

CHAS. LYON RUSSELL,  
C. AUGUSTUS DIETERICH.