S. S. SCOTT.

TRANSMISSION GEARING.

APPLICATION FILED JUNE 1, 1909.

950,144. Patented Feb. 22, 1910.

FIG. 1.

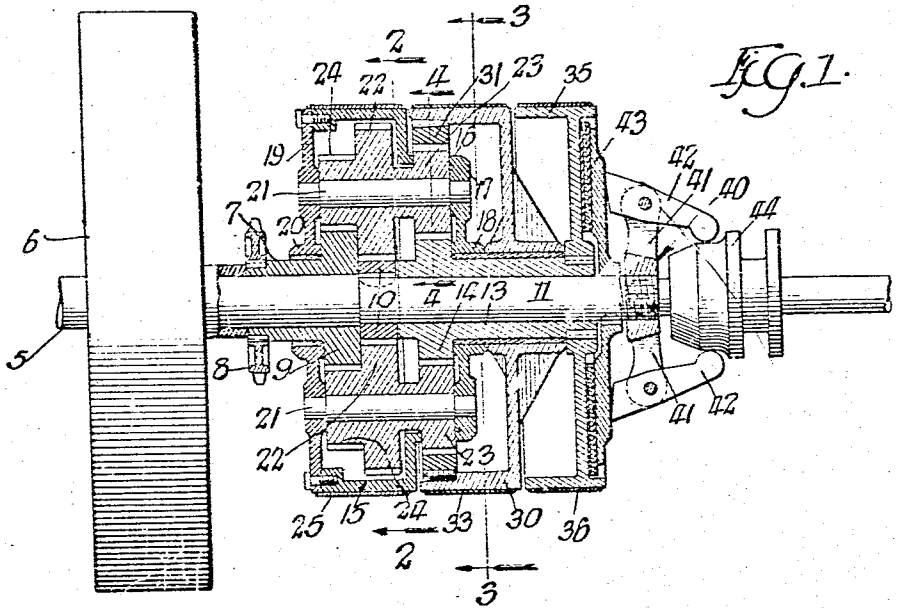


FIG. 2.

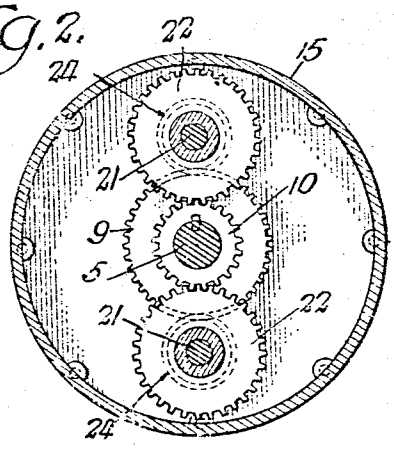


FIG. 3.

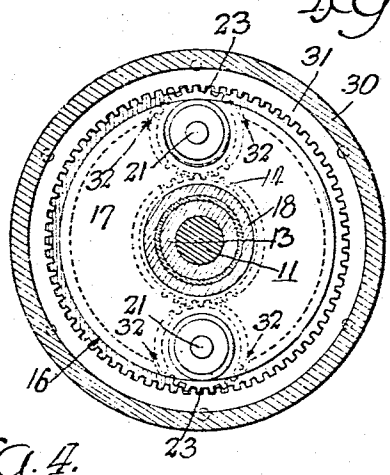
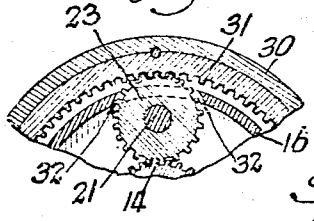


FIG. 4.



Witnesses:
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by

UNITED STATES PATENT OFFICE.

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TRANSMISSION-GEARING.

950,144. Specification of Letters Patent. Patented Feb. 22, 1910.

Application filed June 1, 1909. Serial No. 499,324.

To all whom it may concern:

Be it known that I, SEMPLE S. SCOTT, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Transmission-Gearing; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to improvements in transmission gearing of that type which is commonly employed in connection with automobiles or like devices in which it is desired to impart motion from a constantly rotating shaft to a driven part both at variable speeds with relation to the shaft and in a reverse direction to that of the shaft.

My invention more particularly relates to a construction whereby in addition to the two speeds forward, heretofore obtained in such transmission gearing, that is to say, a low speed and the speed of the driving shaft, there is obtained an intermediate speed forward. This construction is provided with the usual reversing mechanism.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

In the drawings illustrating this invention:—Figure 1 is a longitudinal cross-sectional view of the apparatus relating to this invention. Fig. 2 is a transverse cross-sectional view taken upon line 2—2 of Fig. 1. Fig. 3 is a transverse cross-sectional view taken upon line 3—3 of Fig. 1. Fig. 4 is a fragmentary detail section taken on line 4—4 of Fig. 1.

As shown in the drawings, 5 designates the engine or motor shaft which is driven constantly in one direction and which is provided on one end with a fly wheel 6. Rotatively mounted upon said motor shaft is a sleeve 7 upon one end of which is secured a driving sprocket 8 and upon the other end of which is formed a pinion 9.

10 designates a pinion which is mounted upon a reduced portion 11 of the shaft 5 adjacent to the pinion 9. Said pinion 10 is keyed to the shaft 5 and constitutes the driving means for the transmission gears hereinafter described. Rotatively mounted upon the reduced portion 11 of the engine shaft is a sleeve 13 carrying a pinion 14 on its end adjacent to the pinion 10. The pinions 9 and 14 coöperate with the driving pinion 10 and planet gears and drums hereinafter described to vary the speed and rotation of the driving sprocket 8.

The slow speed drive is obtained by means of the following arrangement of planet gears and a drum: Mounted concentrically with the shaft 5 and adapted to rotate independently thereof is a drum 15. Said drum 15 is of a width to inclose the pinions 9, 10 and 14 and is provided on its inner end with a reduced portion embracing a horizontal part 16 and a vertical part 17 which is provided with a journal bearing 18 surrounding the sleeve 13 outside of the pinion 14 thereon. Secured to the face of the drum 15 adjacent to the fly wheel of the engine is a plate or disk 19 which is provided with a journal bearing 20 surrounding the sleeve 7 between the sprocket and pinions thereon. Said plate 19, together with the vertical portion 17 of the drum 15, forms supports for horizontally arranged stub shafts 21, 21 upon each of which are carried three gear wheels 22, 23 and 24 of different diameters. The largest or middle gear 22 constitutes the primary or initial gear and is constantly in mesh with the fixed pinion 10 on the motor shaft, while the secondary gears 23 and 24, decreasing in size in the order named, are in mesh with the pinions 14 and 9, respectively. Said gears 22, 23 and 24 are adapted to rotate together and are preferably formed integrally for this purpose. The drum 15 is surrounded by a brake band 25 which is controlled by suitable mechanism within reach of the operator. As will be seen from this construction, when the drum 15 is locked against rotation the pinion 10 meshing with the gears 22, 22 of the planet group will drive said group in the opposite direction to the direction of rotation of the driving shaft, thus causing the gears 24, 24 of the planet group to drive the pinion 9 and sprocket wheel 8 in the same direction as the direction of rotation of the driving shaft but at a much slower speed than the speed of the driving shaft due to the difference in diameter of the driving and driven gears.

The intermediate or second speed of the machine is obtained through the medium of a second drum 30 journaled upon the sleeve 13. Said drum 30 surrounds the reduced portion of the drum 15 and is provided near its margin adjacent to the drum 15 with an

integral gear 31 which may be secured thereto in any suitable manner. Said internal gear is in mesh with the pinions 23, 23 of the planet group, which pinions project through apertures 32, 32 in the horizontal portion 16 of the drum 15. The drum 30 is adapted to rotate independently of the drum 15 and shaft 5 and is surrounded by a brake band 33 controlled in the same manner as the brake band 25, but by means independent thereof. When the drum 30 is employed in driving the sprocket wheel 8, said drum is locked against rotation by tightening the brake band thereon and the drum 15 is left free to rotate. Under this condition, the fixed pinion 10 by rotating the planet gears in the opposite direction to the direction of rotation of the driving shaft and the pinions 23, 23 meshing with the internal gear 31, which is now locked against rotation, will travel around said internal gear in the direction of rotation of the driving shaft, thus driving the pinion 9 and the sprocket wheel 8 in a forward direction and at a speed equal to the speed given thereto by the rotation of the planet gears 24, 24 plus the speed at which the drum 15 is rotating around the shaft 5.

The mechanism employed in reversing the direction of rotation of the driving sprocket 8 embraces a drum 35 which is rigidly secured to the outer end of the sleeve 13 and is surrounded by a brake band 36 independently controlled in the manner hereinbefore mentioned. When said drum 35 is locked against rotation the sleeve 13, together with the pinion 14, will be locked against rotation. Now with the drums 15 and 30 free to rotate it will be seen that as the driving pinion 10 rotates the planet group, the secondary gears 23, 23 of said group being in mesh with the now stationary pinion 14 the drum 15 will be carried around the shaft 5 in the opposite direction to the direction of rotation of said shaft and the pinion 9 together with the sprocket wheel 8 will be driven in a reverse direction around the shaft 5 at a speed equal to that of the rotation of the drum 15 around the shaft minus the speed at which the rotation of the gears 24, 24 of the planet system tend to drive the pinion 9 in a forward direction.

In order to drive the sprocket wheel in the same direction and at the same speed as the rotation of the motor shaft there is provided a friction clutch mechanism of any convenient form. The particular form of clutch illustrated embraces a collar 40 which is secured to the shaft 5 adjacent to the drum 35 and is provided with oppositely disposed bracket arms 41, 41. Pivotally supported at the outer end of each arm is a lever 42, the inner end of which is adapted to engage a friction disk 43 to press it against the face of the drum 35, while the other end thereof is adapted to be engaged by a tapered sliding collar 44. Said collar is moved inwardly toward the drum 35 to swing the inner ends of the lever arms 42, 42 toward each other and press the friction disk 43 against said drum. Under such conditions the drum 35 will be caused to rotate with the motor shaft and on account of the difference in diameter between the gears 10 and 14, which are now rotating with the shaft 5, there will be no rotation of the planet gears about their respective axes, but they will be carried bodily around the motor shaft at the same speed as said motor shaft, and consequently drive the pinion 9 and sprocket wheel 8 at the full speed of the motor shaft.

I claim as my invention:—

1. In a transmission gearing, in combination with a driving shaft, a driving gear keyed thereto, a driven gear loosely journaled thereon, means for driving said driven gear at different speeds from the driving gear embracing two drums rotatively mounted upon said shaft adjacent to each other, an internal gear on one of said drums, planetary gears carried by the other of said drums and comprising a primary gear in mesh with said driving gear, a secondary gear in mesh with said driven gear, and a third gear in mesh with said internal gear, together with means for separately locking said drums against rotation.

2. In a transmission gearing, in combination with a driving shaft, a driving gear keyed thereto, a driven gear loosely mounted thereon, low and medium speed drums rotatively mounted upon said shaft, an internal gear affixed to the medium speed drum near one margin thereof, a reduced portion on said low speed drum extending into said medium speed drum, said reduced portion comprising horizontal and vertical parts, a disk secured to the outer face of said low speed drum, diametrically opposed shafts supported within said drum, planetary gears mounted upon said shafts each comprising a primary gear in mesh with the driving gear, a secondary gear in mesh with said driven gear, and a third gear which projects through an aperture in the reduced portion of the low speed drum and meshes with the internal gear of the medium speed drum, and means for separately locking said drums against rotation.

In testimony that I claim the foregoing as my invention, I affix my signature in the presence of two witnesses, this 27th day of May A. D. 1909.

SEMPLE S. SCOTT.

Witnesses:
CLARENCE E. MEHLHOPE,
GEORGE R. WILKINS.