No. 865,138. PATENTED SEPT. 3, 1907

E. P. WARNER.

POWER TRANSMISSION DEVICE.

APPLICATION FILED SEPT. 4, 1906.

Fig. 1.

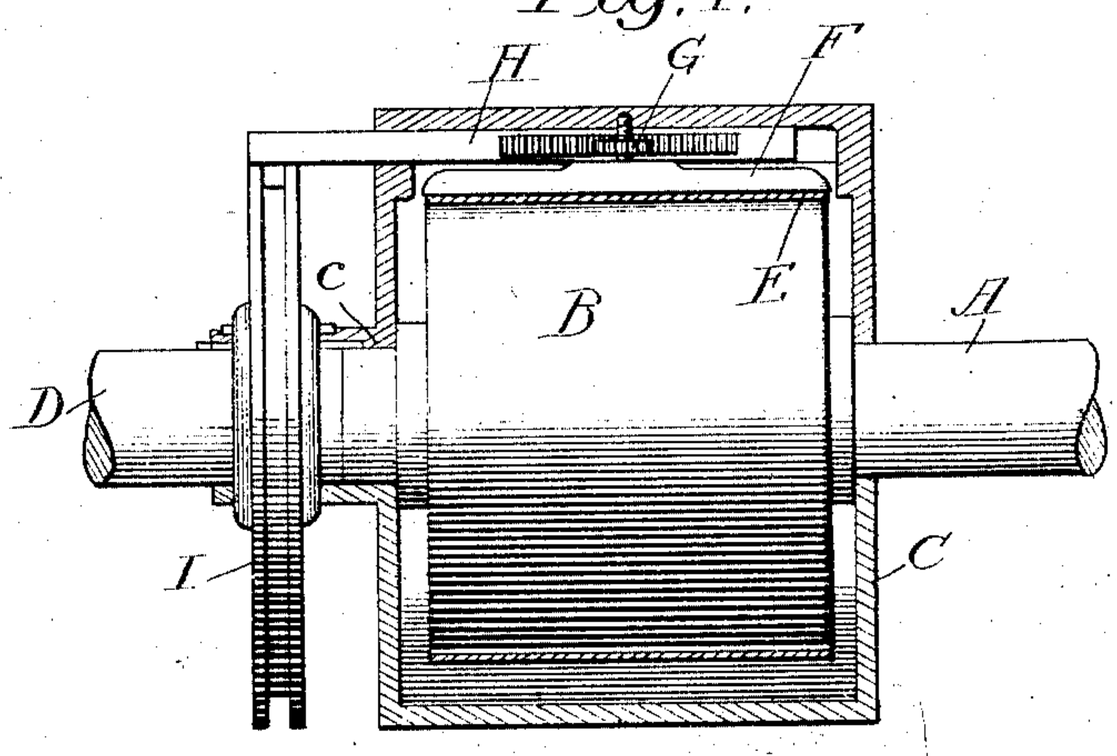


Fig. 2.

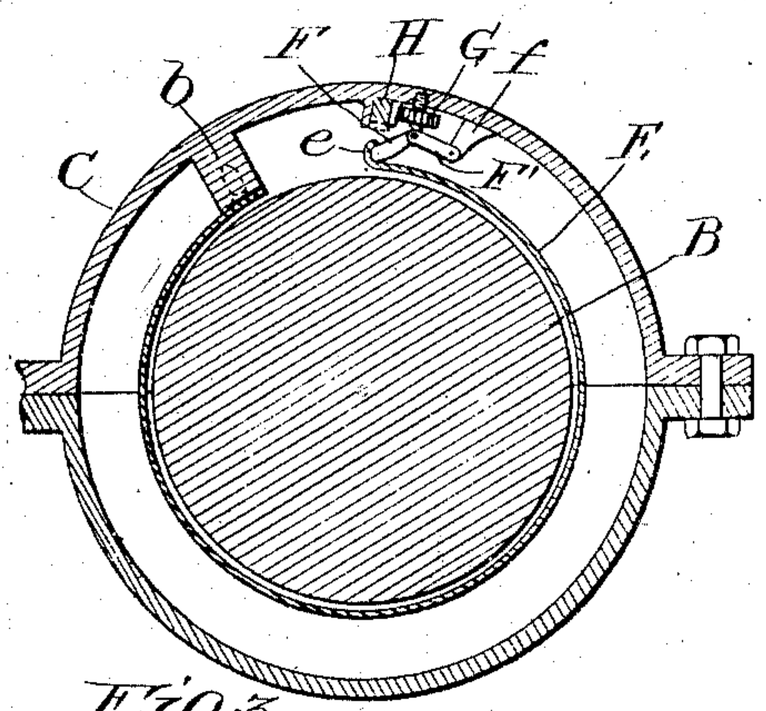


Fig. 3.

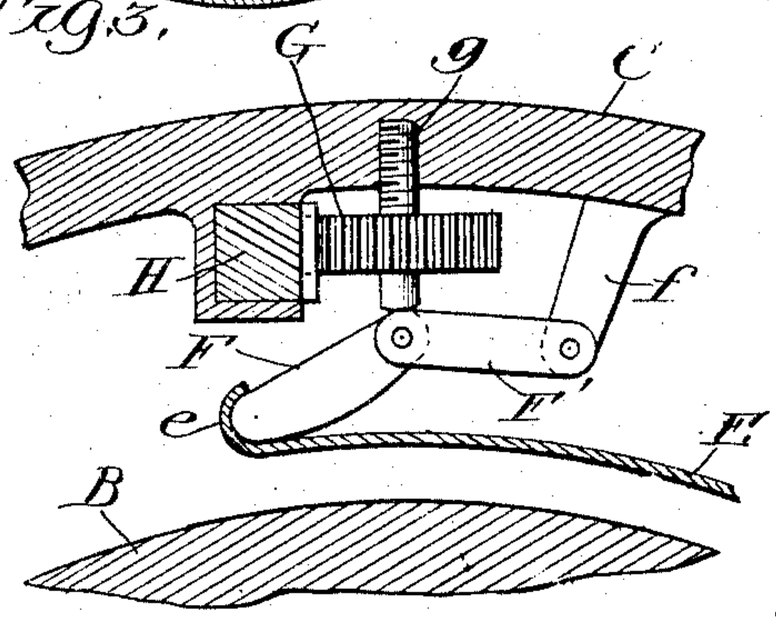
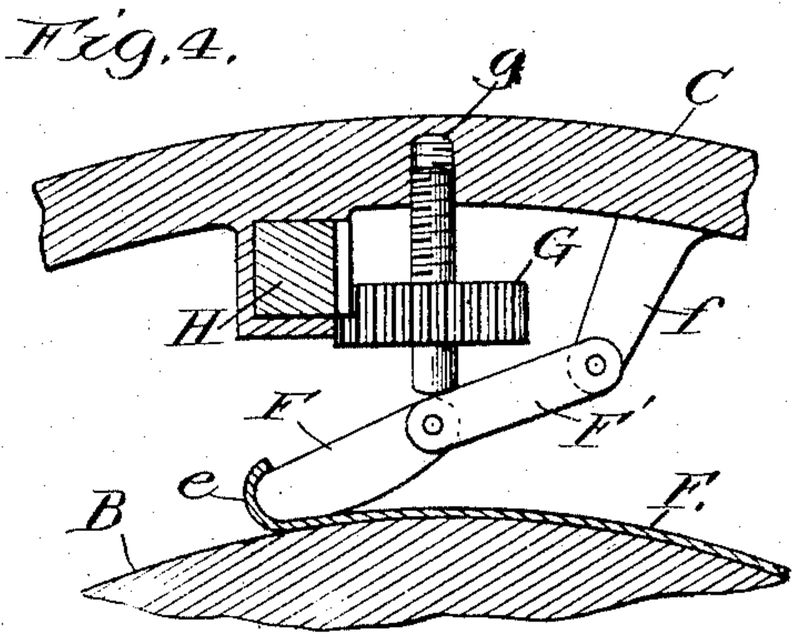


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDWARD PERCY WARNER, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WARNER CLUTCH COMPANY, A CORPORATION OF ILLINOIS.

POWER-TRANSMISSION DEVICE.

No. 865,138. Specification of Letters Patent. Patented Sept. 3, 1907.

Application filed September 4, 1906. Serial No. 333,244.

To all whom it may concern:

Be it known that I, EDWARD PERCY WARNER, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Power-Transmission Devices, of which the following is a full, clear, and exact specification.

My invention relates to means for transmitting the power and motion of the drive-shaft of an engine or other motor to the driven-shaft of any suitable mechanism, such, for example, as the driven-shaft of an automobile.

The object of this invention is to provide an easily operated device for performing this function in an effective manner so that the initial engagement between the driving and driven elements will not cause a sudden jerk to the latter. In order to overcome the tendency of the machine to move forward suddenly I provide suitable connecting means for these respective parts by the use of which the power and motion of the revolving motor-shaft is taken up with the increasing of the friction between them until the entire strength of the former is positively transmitted to the latter and caused to move coincident therewith. This I accomplish by the means hereinafter fully described in the specification and as more particularly pointed out in the claims.

In the drawings:—Figure 1 is a front elevation of my improvement having the surrounding shell and friction-band in section for the purpose of clearer illustration. Fig. 2 is a transverse sectional view of the same. Figs. 3 and 4 are enlarged detail views showing the manner of engaging the power-shaft and the driven-shaft.

Referring to the drawings, A represents the power-shaft of a motor or engine that is preferably extended beyond its bearings and on the outer end it is provided with an enlarged drum or head B. This drum B is adapted to revolve freely within a hollow cylindrical shell or casing C when the transmission device is not connected therewith, and said shell is formed, preferably, of two oppositely-disposed correspondingly-shaped sections bolted together. This shell is provided with an elongated bearing-boss *c* on one of its ends into which is keyed or otherwise secured a driven-shaft D, that may correspond in its operation and function to the driving-shaft of an automobile or like vehicle, or the driving-shaft of any kind of a machine.

Securely mounted in any suitable manner to a boss *b* on the interior of the shell C is a belt E, preferably of sheet metal, that is so shaped that it remains substantially concentric with and surrounds the drum B although normally out of contact therewith. A slight space is left between this belt and the drum, so that the latter can revolve freely therein. The tightening of said belt around the drum will produce friction between the parts, and, as this friction is increased, the shell C and shaft D will begin to revolve therewith with gradually increasing velocity in proportion to the amount of friction produced. In order to accomplish this result without causing a sudden starting of the machine, it is necessary that only a relatively small amount of friction be produced at first, but the same may be gradually increased until the belt is tightly clamped against the drum. The free end of the belt E is preferably bent outward to form a slight hook or lip *e*, that is engaged by a toggle-joint consisting of links F, F′, extending transversely across the width of the drum. Link F′ has one end secured to a suitable boss *f* projecting into the interior of the shell and its opposite end is connected to link F, while the latter link F has the edge of its free end rounded to engage the hooked end *e* of the belt. A pinion G is mounted in a screw-threaded bearing *g* in the shell, and has the upper end of its spindle screw-threaded and tapped into said bearing, while the lower portion of the spindle engages the links of the toggle at their joint, as shown.

In order to operate this mechanism, a rack-bar H is provided that reciprocates in bearings in the shell and has its teeth engaging with those of the pinion G. The inward movement of rack-bar H will revolve pinion G in its screw-threaded bearing and thereby cause it to be moved outward a slight distance. This movement of the pinion and its spindle presses down on the central joint of the toggle, forcing the opposite ends apart thereby taking up the slack in the belt and bringing the same into frictional contact with the drum. By pushing the rack-bar H farther into the shell the spindle of pinion G forces the ends of the toggle apart to a greater extent and the friction between the drum and belt is proportionately increased until the latter is tight against the drum in which position all of the parts will revolve at the same time with the motor and shaft. Thus it will be observed that by the employment of the above-described mechanism, the friction produced between the drum and belt is regulated to a nicety, and can be increased or reduced with such accuracy that the possibility of a too sudden start of the driven-shaft is positively avoided.

In order to provide means for operating the rack-bar H a suitable disk I is loosely keyed to the outside of bearing-boss *c*, and, although revoluble therewith, it is adapted to be moved back and forth thereon by means of any suitable form of hand or foot-lever.

What I claim is:—

1. A transmission device comprising a power-shaft; a driven-shaft independent thereof; a shell secured to said driven-shaft and inclosing a portion of said power-shaft; a band mounted on the interior of said shell and surrounding said power-shaft; a toggle-joint having one of

its links engaging said shell and the other link engaging the free end of said band; and means for operating said toggle-joint whereby said band is gradually tightened around said power-shaft.

2. A transmission device comprising a power-shaft; a drum mounted thereon; a driven-shaft independent of said power-shaft; a shell secured to said driven-shaft and inclosing said drum; a band mounted on the interior of said shell and surrounding said drum; a toggle-joint having one of its links engaging said shell and the other link engaging the free end of said band; and means for operating said toggle-joint whereby said band is gradually tightened around said drum.

3. A transmission device comprising a power-shaft; a driven-shaft independent thereof; a shell secured to said driven-shaft and inclosing a portion of said power-shaft; a band mounted on the interior of said shell and surrounding said power-shaft; a toggle-joint having one of its links engaging said shell and the other link engaging the free end of said band; a pinion having one end of its spindle screw-threaded and tapped into a bearing in said shell, and the opposite end engaging said toggle; and means for revolving said pinion whereby said toggle is operated to gradually tighten said band around said power-shaft.

4. A transmission device comprising a power-shaft; a drum mounted thereon; a driven-shaft independent of said power-shaft; a shell secured to said driven-shaft and inclosing said drum; a band mounted on the interior of said shell and surrounding said drum; a toggle-joint having one of its links engaging said shell and the other link engaging the free end of said band; a pinion having one end of its spindle screw-threaded and tapped into a bearing in said shell, and the opposite end engaging said toggle; and means for revolving said pinion whereby said toggle is operated to gradually tighten said band around said drum.

5. A transmission device comprising a power-shaft; a driven-shaft independent thereof; a shell secured to said driven-shaft and inclosing a portion of said power-shaft; a band mounted on the interior of said shell and surrounding said power-shaft; a toggle-joint having one of its links engaging said shell and the other link engaging the free end of said band; a pinion having one end of its spindle screw-threaded and tapped into a bearing in said shell, and the opposite end engaging said toggle-joint; and a reciprocal rack-bar adapted to revolve said pinion whereby said toggle is operated to gradually tighten said band around said power-shaft.

6. A transmission device comprising a power-shaft; a drum mounted thereon; a driven-shaft independent of said power-shaft; a shell secured to said driven-shaft and inclosing said drum; a band mounted on the interior of said shell and surrounding said drum; a toggle-joint having one of its links engaging said shell and the other link engaging the free end of said band; a pinion having one end of its spindle screw-threaded and tapped into a bearing in said shell, and the opposite end engaging said toggle; and a reciprocal rack-bar adapted to revolve said pinion whereby said toggle is operated to gradually tighten said band around said drum.

In testimony whereof I have hereunto set my hand this 1st day of September, A. D. 1906.

EDWARD PERCY WARNER

Witnesses:
WALDO B. STONE,
E. K. LUNDY.