No. 707,396. Patented Aug. 19, 1902.

J. DARLING & C. C. ELLENBERGER, JR.

REVERSING PULLEY MECHANISM.

(Application filed June 21, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

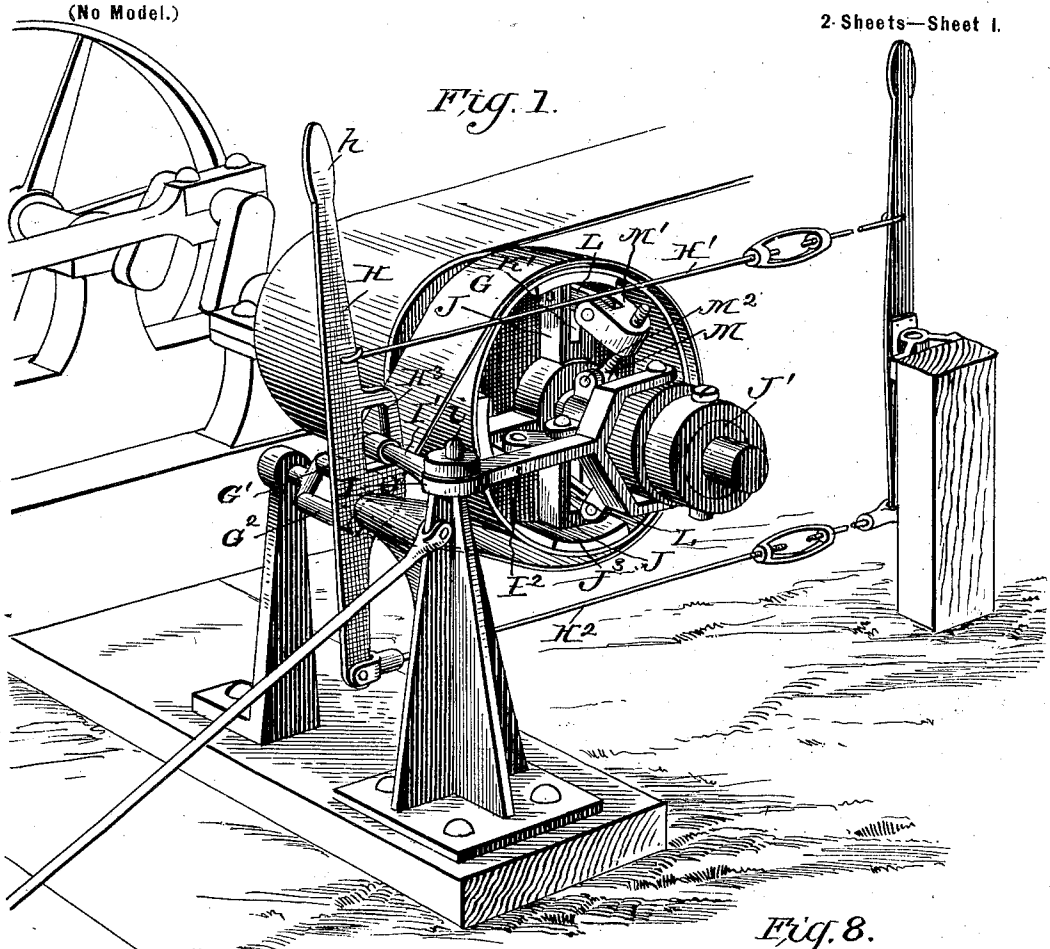


Fig. 8.

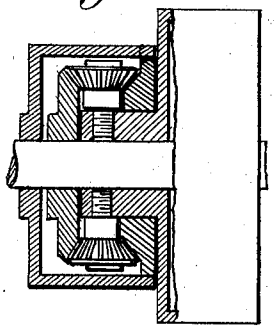


Fig. 2.

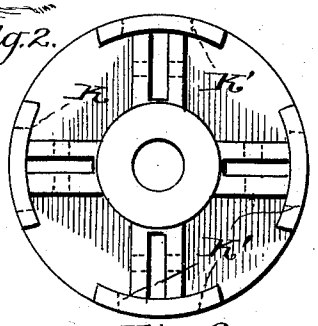


Fig. 9.

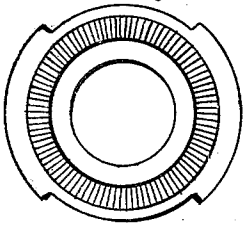
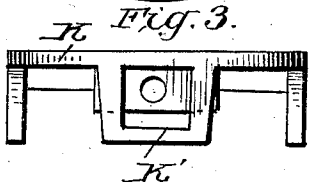


Fig. 3.



WITNESSES:

Jos. A. Ryan

Percy B. Turpin

INVENTORS

Joseph Darling.

Charles C. Ellenberger Jr.

BY Munn & Co.

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 4

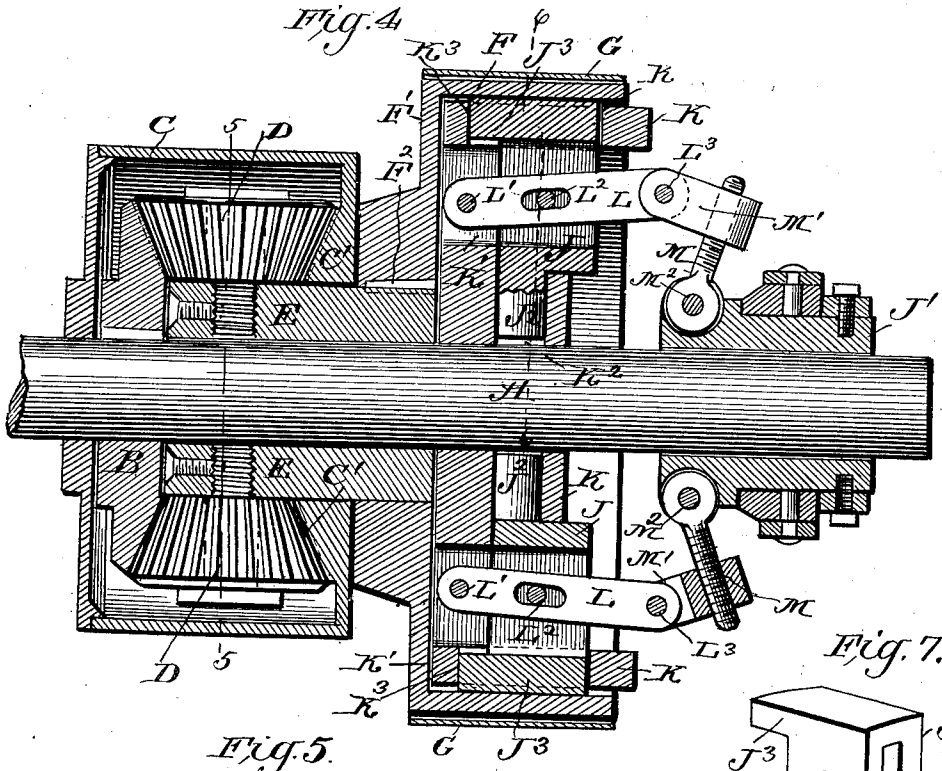


Fig. 5.

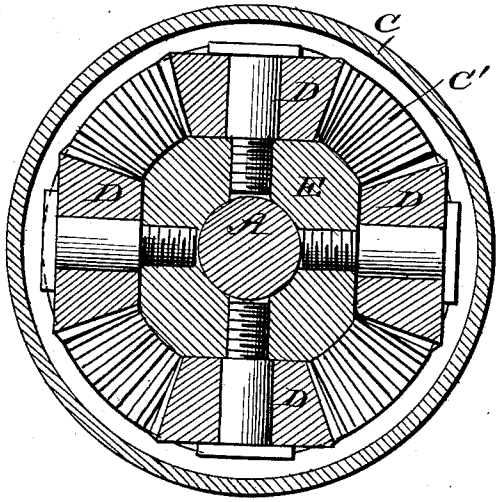


Fig. 7.

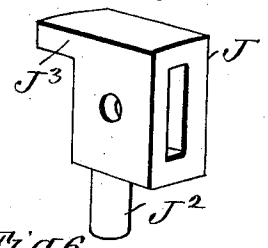
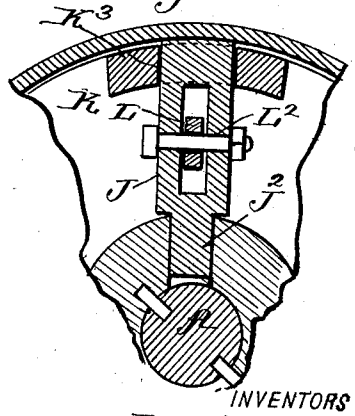


Fig. 6.



WITNESSES:

Jos. A. Ryan

Percy B. Turpin

INVENTORS

Joseph Darling.

Charles C. Ellenberger Jr.

BY Munn & Co.

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOSEPH DARLING, OF CHICORA, AND CHARLES C. ELLENBERGER, JR., OF PEACHVILLE, PENNSYLVANIA.

REVERSING-PULLEY MECHANISM.

SPECIFICATION forming part of Letters Patent No. 707,396, dated August 19, 1902.

Application filed June 21, 1901. Serial No. 65,448. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH DARLING, residing at Chicora, and CHARLES C. ELLENBERGER, Jr., residing at Peachville, in the county of Butler and State of Pennsylvania, citizens of the United States, have made certain new and useful Improvements in Reversing-Pulley Mechanism, of which the following is a specification.

This invention is an improvement in reversing-pulleys, and has for an object to provide in connection with a shaft which may be operated continuously in one direction a pulley operated by the movement of said shaft and which may be caused to turn in the same direction as the shaft or in a reverse direction, as may be desired.

The invention also has for an object to so construct and arrange the mechanism for effecting the reversal of the pulley that it may operate as a clutch to permit the engine to run freely in starting up the same or at other times, as may be desired.

The invention consists in certain novel constructions and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the drawings, Figure 1 is a perspective view of our invention as in use. Fig. 2 is a face view of the body section or carrier of the clutch. Fig. 3 is a top plan view of said body or carrier. Fig. 4 is a vertical longitudinal section of the apparatus, with the clutch-blocks thrown out, in engagement with the inner surface of the drum. Fig. 5 is a cross-sectional view on about line 5 5 of Fig. 4. Fig. 6 is a detail section on about line 6 6 of Fig. 4. Fig. 7 is a detail perspective view of one of the clutch-blocks, and Fig. 8 shows a somewhat-different construction of the clutch-drum.

While the reversing-pulley herein described is especially designed and adapted for use in connection with non-reversible engines, such as many forms of gas-engines, and for drawing the tubing and rods of oil-wells, it is manifest the invention may be used in connection with any form of engine or driving power and for other purposes, such as in automobiles or various forms of machines in which it is desired to operate a driving-wheel at one time in one direction and at another time in the reverse direction.

In carrying out our invention we employ the shaft A, which may be provided with a crank, as shown in Fig. 1, for connection with the engine, or may be otherwise driven, as desired. On this shaft we key a bevel-gear B, so it turns at all times with the shaft. We employ this gear B in connection with other gearing for reversing the motion of the shaft and causing the pulley or wheel C to turn in certain operations in a direction reverse to that of the shaft A. In doing this we construct the pulley or wheel C with a bevel-gear C′, concentric with the gear B, and provide intermediate bevel-pinions D, which are meshed with both gears B and C′. These pinions D are carried by a support E, to which they are journaled. This support is loose upon the shaft A, so the shaft can turn freely within the support E, and means are provided whereby such support can be held from moving with the shaft or can be caused to move with the shaft, as desired.

It being noted that the pulley C has a gear-ring C′, and that the shaft has a gear B, and that such gears are connected by the pinions D, it is evident that if the support E be held from turning with the shaft the turning of such shaft will operate to move the pulley C in a reverse direction to that of the shaft; also, that in case the support E is clutched to the shaft the gears B, C′, and D will operate to cause the pulley to turn in the same direction as the shaft when the latter is revolved. It will further be understood that if the support E be left free, so that it is not held positively to turn with or independently of the shaft A, the turning of the latter will not operate to drive the pulley C with any degree of force in either direction. With this general understanding of the operation of the wheel or pulley C either in one or the other direction we will proceed to a description of the mechanism by which the support for the pinions may be held from turning with the shaft or may be caused to turn with such shaft or may be left free, as desired. In carrying out this feature of our invention we provide, in connection with the support E, clutch and brake mechanism, the former op-

erating for securing the support so it will turn with the shaft A and the latter serving to hold the support from turning with the shaft, while if neither the clutch nor the brake mechanism is operated to secure either of said results the support E will be left in a neutral condition. In securing the desired results we provide a drum F in connection with the support E and fast therewith. In the construction shown in Fig. 4 the drum F has its end plate F′ keyed at F^2 to the inner end of the support E, this being preferable in some instances for convenience in assembling the parts. In Fig. 8, however, the drum and the support E are made integral, and this construction may be preferred in some instances, especially when it is desired to assemble the parts from the outer end of the support E, and so shorten the apparatus. The drum F is operated upon both by the clutch mechanism and by the brake. The brake is preferably in the form of a band-brake whose band G fits around the outer side of the drum F and has its ends G′ and G^2 connected with the lever H on opposite sides of the pivot of the latter, so the lever when rocked at its upper end toward the shaft A will cause the brake-band to grip tightly upon the drum. This lever H has its end above its pivot connected by a rod H′ with a lever which may be adjacent to the derrick or other mechanism for supporting the pump-rods, &c., the lower end of the lever H being connected by a similar rod H^2, so the lever H can be operated from any distant point desired, such lever being also provided with a handle *h*, so it can be directly operated by hand whenever desired. The lever H is also arranged to operate the clutch mechanism, being to this end provided with a slot H^3, in which operates one arm I′ of a bell-crank lever I, which rocks on a pivot *i* and has its arm I^2 provided with a yoke engaging with the sliding collar J′ of the clutch mechanism. The clutch mechanism includes a body or carrier K, operating within the drum F and having radial openings K′ for the clutch-blocks J, which may be moved radially outward to engage within the drum F. These clutch-blocks are suitably guided in the carrier K, preferably by providing the blocks with studs J^2 at their inner ends, operating in sockets K^2 in the carrier K, while the outer ends of the blocks J are extended at J^3 and seat in recesses K^3 in the carrier K, as will be understood from Figs. 4 and 7. Lever-links L are pivoted at L′ to the body K, are engaged at L^2 with the clutch-blocks, and have their outer ends at L^3 connected with the short arms M′ of the rockers M, which are pivoted at M^2 to the sliding collar J′ of the clutch. The arms M′ are preferably connected adjustably with the rockers M by threading them thereon, as best shown in Fig. 4, so the parts can be adjusted to any desired degree. When the parts are in position, as shown at Fig. 4, the clutch-blocks are forced outward within the drum F in such manner as to key the said drum to the shaft, the body or carrier K being secured to the shaft A in any suitable manner. When in the position shown in Fig. 4, the parts L and M operate somewhat after the fashion of a toggle, and the pivot L^3 is thrown outward in such manner as to break the joint and lock the parts in the position shown in the said Fig. 4 from accidental displacement.

In Figs. 1 and 4 the parts are shown with the clutch mechanism engaged with the drum in such manner as to lock the drum to the shaft, and consequently to lock the support E to the shaft, so the pulley or wheel C will be operated by the shaft in the same direction as the shaft. In such position of the parts the brake-band is loose upon the drum. If now it is desired to drive the pulley or wheel C in the reverse direction from the shaft, the lever H may be operated to move its upper end toward the shaft A. This movement will cause the brake-band to bind upon the drum F and will operate the clutch to free the blocks J from engagement with the inner face of the drum. By this means the drum will be held from turning with the shaft, and the support E will also be held from turning, and the shaft will through its gear B, meshing with the pinions D and the latter meshing with the gear-ring C′, operate to turn the pulley C in the reverse direction as desired. It will be noticed that if the lever H be moved just far enough to free the clutch, but not far enough to set the brake, the support E will be left loose upon the shaft A, so the turning of the said shaft will not effect any positive movement of the shaft C. This adjustment of the parts will be found very useful in starting the engine when it is not desired to put the load on the engine until sufficient momentum has been acquired, at which time the load can be gradually applied to the engine by gradually setting the brake when it is desired to turn the pulley in the reverse direction from the shaft or by gradually setting the clutch when it is desired to turn the pulley directly with the shaft. It will thus be noticed the application of the driving power to the pulley C can be stopped and started at any time and be caused to turn the pulley in either direction and can be gradually applied in such manner as to avoid injury to the engine or other parts of the mechanism resulting from sudden jars, as are incident to the starting and stopping of engines in the ordinary manner.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. An apparatus substantially as described comprising the shaft, a wheel or pulley loose on the shaft and having a gear-ring, a gear-wheel fixed to the shaft, intermediate pinions meshing with and connecting the gears of both the shaft and the pulley, a support for the said pinions, such support being loose on

the shaft and provided with a drum, a brake-band encircling the said drum, clutch devices operating within the drum, and a lever connected with and arranged to operate the brake-band, and means whereby the said lever may also operate the clutch devices substantially as set forth.

2. An apparatus substantially as described comprising the shaft, the pulley or wheel thereon and having a gear-ring, a gear-wheel on the shaft, intermediate pinions between said gears, a support for said pinions normally loose on the shaft, a drum in connection with said support, a clutch body or carrier, clutch-blocks movable radially therein lever-links pivoted to the clutch-body, and engaged between their ends with the clutch-blocks, the rockers having arms pivotally connected with the outer ends of the lever-links, and the clutch-collar to which said rockers are jointed substantially as set forth.

3. In an apparatus substantially as described the combination with the shaft and the pulley or wheel of gearing between the said pulley and shaft including intermediate pinions, a support for said pinions, a drum in connection with said support, a brake operating upon said drum, clutch devices operating within the drum, a bell-crank lever having one arm connected with the clutch devices, and a second arm for engagement with the operating-lever and the operating-lever engaged with such arm of the bell-crank lever and connected with and arranged to operate the brake substantially as set forth.

4. In an apparatus substantially as described, the combination of the shaft, the wheel or pulley loose on the shaft and having a gear-ring, a gear-ring fixed on the shaft, intermediate pinions meshing with and connecting the gears, a support for said pinions loose on the shaft and provided with a drum, clutch-blocks operating within the drum a sliding clutch-collar, and links pivoted together and connected respectively with the clutch-blocks and the clutch-collar and arranged for adjustment into locked position when set to throw the clutch-blocks into engagement with the drum, substantially as set forth.

5. As a means for reversing a pulley on a shaft driven in one direction, the combination of the wheel or pulley having a gear-ring, the shaft on which said gear-ring is loosely fitted, an opposite gear-ring fixed to the shaft, said gear-rings being located within the pulley, the bevel gear-wheels between said opposite gears and within the wheel, a support for said bevel-pinions extending at one end within the pulley, a drum on the other end of said support and provided with a brake-surface, the brake operating upon said surface, and the clutch devices operating within the drum, substantially as set forth.

6. The combination of the shaft, the wheel or pulley loose thereon, and having a gear-ring, reversing devices operating in connection with said gear-ring and including a brake-drum, a brake-band operating upon said drum, clutch devices arranged for operation in connection with the drum, a lever connected with the ends of the brake-band, an operating-lever having its arms connecting with the corresponding arms of the first lever, and means for operating the clutch devices from the said first lever, substantially as set forth.

JOSEPH DARLING.
CHAS. C. ELLENBERGER, JR.

Witnesses to the signature of Joseph Darling:
SOLON C. KEMON,
PERRY B. TURPIN.
Witnesses to the signature of Chas. C. Ellenberger, Jr.:
L. P. BELL,
J. C. GAISFORD.