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C. E. CALLOCH & H. C. DELCROIX.

CLUTCH SPECIALLY ADAPTED FOR CABLE DRIVING PULLEYS.

No. 542,143. Patented July 2, 1895.

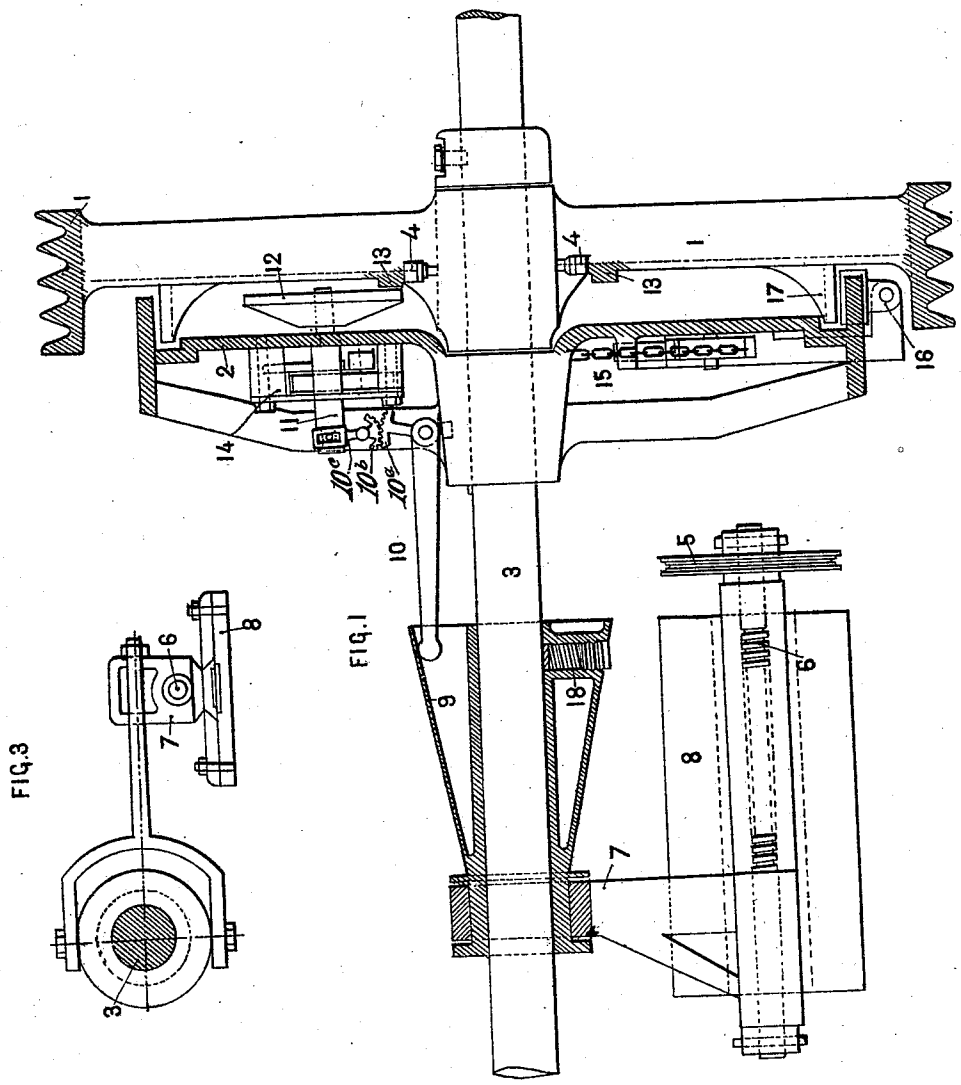

FIG. 1

FIG. 3

Witnesses.

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FIG. 2

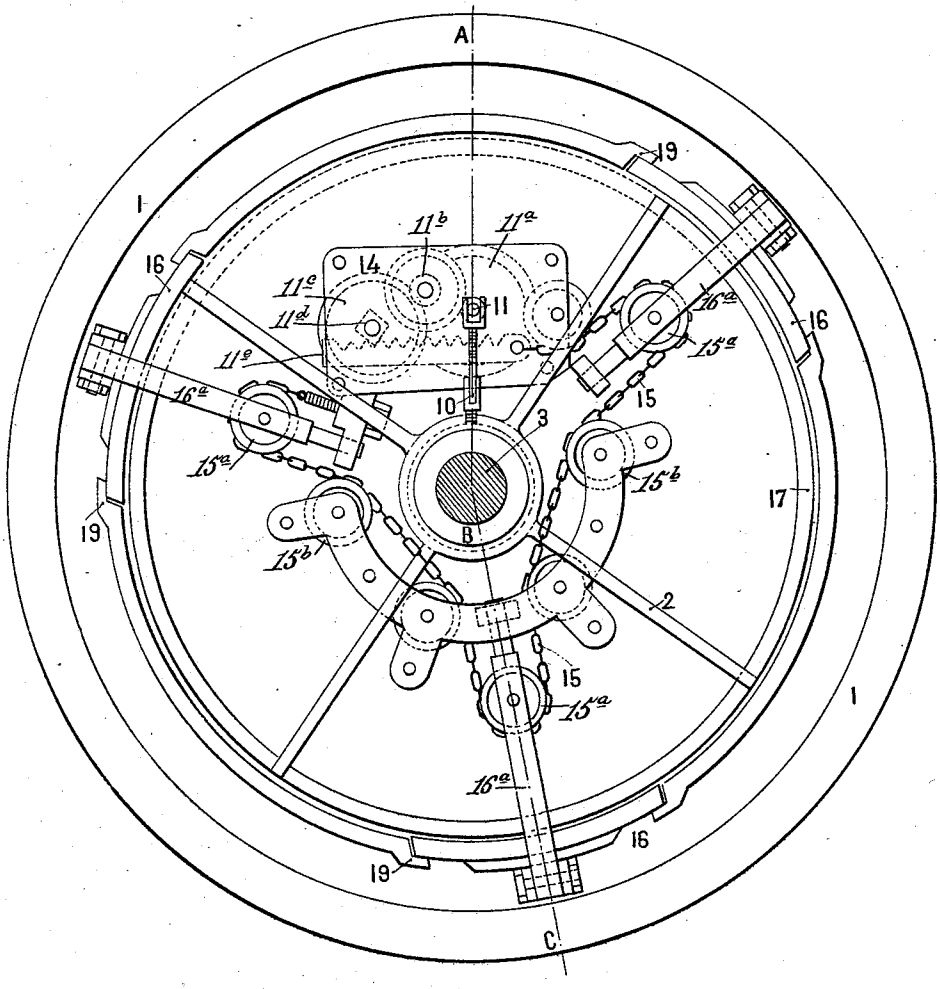

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FIG. 5.

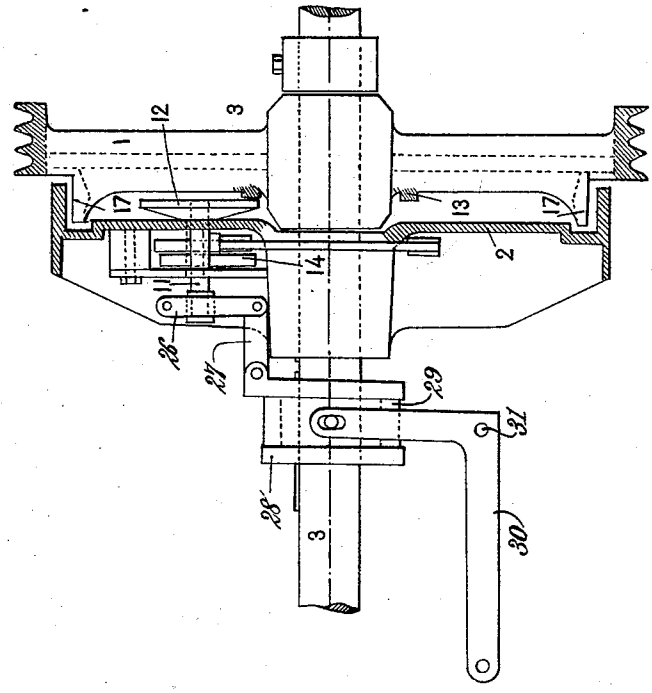
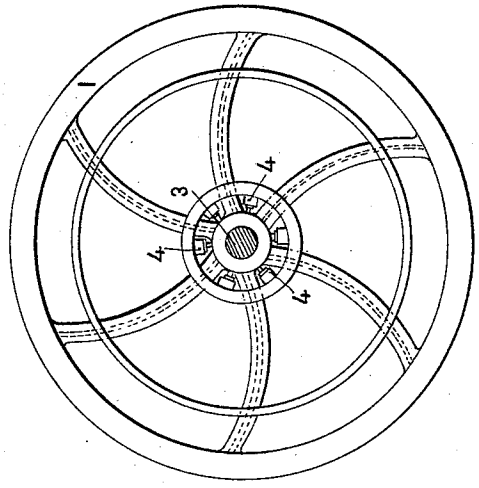


FIG. 4.



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(No Model.) 4 Sheets—Sheet 4.

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CLUTCH SPECIALLY ADAPTED FOR CABLE DRIVING PULLEYS.

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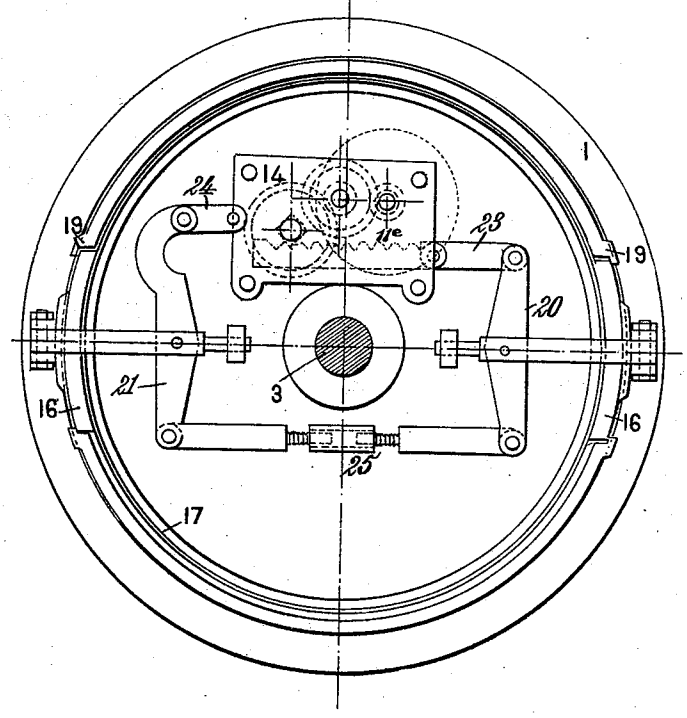
FIG. 6



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UNITED STATES PATENT OFFICE

CHARLES EMILE CALLOCH AND HENRI CHARLES DELCROIX, OF LA FLÈCHE, FRANCE.

CLUTCH SPECIALLY ADAPTED FOR CABLE-DRIVING PULLEYS.

SPECIFICATION forming part of Letters Patent No. 542,143, dated July 2, 1895.

Application filed January 8, 1895. Serial No. 534,241. (No model.)

To all whom it may concern:

Be it known that we, CHARLES EMILE CALLOCH and HENRI CHARLES DELCROIX, citizens of France, and residents of La Flèche, in the Department of the Sarthe, France, have invented a new and useful Improvement in Clutches Specially Adapted for Cable-Driving Pulleys, of which the following is a specification.

Our invention relates to an improved fast and loose pulley, and has for its object to provide improved clutch mechanism, by means of which the fast and loose pulleys are locked into operative engagement with one another gradually, and when so locked together are automatically maintained in operative engagement until disengaged by hand; and to these ends our invention consists in the features and in the novel construction and arrangement of parts hereinafter fully described, and afterward definitely pointed out in the claims following the description, due reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a longitudinal central section of our improved device. Fig. 2 is a front elevation of the clutch mechanism for locking together the fast and loose pulley. Fig. 3 is an end view of the shifting mechanism for throwing the clutch mechanism into and out of operation. Fig. 4 is a front elevation, on a reduced scale, of the loose pulley; and Figs. 5 and 6 are respectively a longitudinal section and a front elevation of a modification.

Referring to Figs. 1 to 4 of the drawings, 1 indicates the loose pulley and 2 the fast pulley, the pulley 2 being rigidly affixed to the driving-shaft 3 and the pulley 1 being loosely journaled thereon, said pulley being arranged in close juxtaposition to but not in actual contact with one another, as is more clearly shown in Fig. 1 of the drawings.

Arranged in fixed bearings on a bearing-plate 8 is a feed-screw 6, provided at one end with a belt-wheel 5, about which may be passed an operating cord or belt that extends to within convenient reach of the operator in attendance upon the machinery designed to be driven from the shaft 3, and the other end of said screw 6 is tapped through a sliding yoke 7, adapted to be reciprocated back and forth in suitable bearings in the plate 8. Said yoke 7 at its free end embraces the grooved end of a hollow cone 9 loosely journaled on the shaft 3 and operates to move said cone back and forth upon said shaft, for the purpose hereinafter described.

Pivoted in a suitable bearing formed on the hub of the fast pulley 2 is a bell-crank lever 10, the longer arm of which is adapted to be engaged by the inner wall of the hollow cone 10, while its shorter arm is provided at its extremity with a toothed segment 10^a, that engages a similar segment 10^b, formed on one end of a pivoted lever 10^c. The other end of the lever 10^c is forked, as more clearly shown in Fig. 2, and engages one end of a lengthwise movable and rotary shaft 11, that at its other end has rigidly secured thereto a friction-disk 12. Said friction-disk 12 is adapted to be moved into operative engagement with an annulus 13 formed on the face of the loose pulley 1, by which it is rotated, as will more fully hereinafter appear and as is best shown in Fig. 1.

Rigidly mounted on the shaft 11 is a gear-wheel 11^a, which operates to drive a gear-wheel 11^b, and the latter in turn drives a gear-wheel 11^c, and mounted on the shaft of the latter gear-wheel is a toothed wheel 11^d, that meshes with a rack-bar 11^e, suitably supported in a casing 14, that carries said gear-wheels and shaft 11. Secured to one end of the rack-bar 11^e is a chain 15, that passes about pulleys 15^a, journaled in the inner ends of brake-rods 16^a, adapted to be moved radially in bearings carried by the fast pulley 2, the other end of said chain being connected by any approved fastening to the said fast pulley.

Suitable guide-pulleys 15^b are journaled to the fast pulley 2 at suitable points to properly guide the chain. Carried upon the outer ends of the brake-rods 16^a are segmental brake-shoes 16, that are arranged within suitable apertures formed in the peripheral flange of the fast pulley 2 and that are adapted to be moved radially inward to engage an annular flange 17 carried by the loose pulley 1, and said brake-shoes are prevented from having an undue outward movement by lips 19, that

are formed on the said peripheral flange of the fast pulley and which overlap the opposite ends of the brake-shoes. As shown in Figs. 1 to 4, said brake-shoes are three in number, and as thus constructed the device is more especially designed to be used in connection with driving mechanism of ten horse-power and over, and the operation thereof is as follows:

About the loose pulley 1 pass the cables which extend either directly to the machinery to be driven, or to said machinery by intermediate mechanism, and from the shifter-wheel 5 extends a belt or cord into proximity to the machinery to be driven. It will be understood that the fast pulley 2 rotates continuously with the driven shaft 3, and let it be assumed that the loose pulley 1 is in a state of rest. To drive the fast pulley the shifter belt or cord is operated to rotate the feed-screw 6 in its bearings in the proper direction to move the yoke 7 to the right, and as the yoke 7 is thus moved it carries with it the cone 9, which engages the longer end of the bell-crank 10 and rocks the latter upon its pivot, and as the latter rocks the segment 10^a, meshing with the segment 10^b, oscillates the lever 10^c upon its pivot and shifts the shaft 11 longitudinally, bringing the friction-disk 12 into operative engagement with the annulus 13 on the loose pulley 1. The pulley 1 being stationary and the friction-disk revolving with the pulley 2, said disk will be rotated as it is revolved in contact with the annulus 13, and through the train of gearing before described will reciprocate the rack-bar 11^c in the proper direction to draw upon the chain 15. As the chain 15 is thus drawn up it, acts to draw the brake-rods 16^a radially inward and thus force the brake-shoes into contact with the annular flange 17 on the loose pulley 1. As soon as the brake-shoes are applied with sufficient force to said annular flange to prevent them from sliding thereon, the friction-disk 12 ceases to rotate about its own axis and both the fast and loose pulleys revolve in unison.

When the driven machinery is in full operation, the feed-screw is turned back slightly to cause the yoke 7 to move a very short distance away from the end of the cone 9 and thus remove said yoke from out of frictional engagement with said cone, and the cone is then held in place upon the shaft 3 by a coiled spring 18, carried by the cone and bearing upon said shaft with sufficient force to prevent longitudinal movement of the cone thereon.

To arrest the movement of the loose pulley the feed-screw 6 is turned so as to move the hollow cone 9 back out of engagement with the lever 10, when said lever will be immediately thrown out by centrifugal force and move the friction-disk 12 out of engagement with the annulus 13. There being now nothing to hold the train of gearing and the rack-bar, the brake-shoes are thrown out of engagement with the flange 17 by centrifugal force, thus releasing the loose pulley, which will then come to a state of rest. The brake-shoes, when thus released, are prevented from being thrown out unduly by centrifugal force by means of the overlapping lips 19 before described, which operate to hold them parallel with the annular flange 17.

In Figs. 5 and 6 we have illustrated a modification, wherein are employed but two brake-shoes, and which is especially designed to be used in connection with a driving-motor of less than ten horse-power. Referring to said figures, the fast and loose pulleys, the friction-disk, the train of gearing actuated by said friction-disk, and the rack-bar operated by the said gearing for applying the brake-shoes are all constructed and arranged in the manner before described, only the means for throwing in and out of action the clutch mechanism and the means for throwing the brake-shoes being slightly modified. In said modification, instead of employing a chain for applying the brake-shoes, we pivot to the brake-rods levers 20 and 21, one of said levers, as 20, being connected to the rack-bar 11^c by a link 23, and the corresponding end of the other lever 21 is likewise connected to the frame 14 by a link 24. The other ends of the said levers are connected together by an adjustable connecting-rod 25. In said modification, also, we have shown means for shifting the disk 12 into and out of engagement with the annulus 13 different from the means before described, and which are constructed as follows: To the fast pulley 2 is pivoted one end of a lever 26, which engages the end of the shaft 11, and at its other end is connected to one end of a link 27, the other end of said link being pivoted to a sleeve 28 feathered upon the driving-shaft 3. A collar 29 encircles said sleeve and is adapted to be shifted with said sleeve longitudinally upon the shaft by means of a bell-cranked shifter-lever 30, pivoted at 31 to a suitable support. To set in motion the loose pulley 1 the shifting lever 30 is operated to throw the sleeve 28 toward the pulley 2, and thus, through the medium of the link 27 and lever 26, force the friction-disk 12 into engagement with the annulus 13 on the loose pulley 1. The disk 12 is thus rotated in the manner heretofore described, and through the train of gearing shifts the rack-bar 11^c in the proper direction to draw the levers 20 and 21 toward each other and thus force the brake-shoes 16 against the annular flange 17 on the loose pulley and cause the fast and loose pulleys to revolve in unison. To throw the loose pulley out of action it is only necessary to oscillate the shifter-lever 30 in the direction opposite to that last described, thus withdrawing the friction-disk 12 from out of contact with the annulus 13, when the brake-shoes 16 will be thrown out of engagement with the flange 17 by centrifugal force and release the loose pulley, which will then come to a state of rest.

In both types of devices above described it

is desirable that the loose pulley, when at rest, at which time the driving-shaft is rotating therein, be supplied with lubricant to reduce the wear and friction and insure the said pulley remaining stationary, and that the supply of said lubricant be cut off when said pulley is rotating with said shaft. To this end we provide the following lubricating devices, reference being had to Figs. 1 and 4.

Arranged upon the hub of the pulley 1 are a plurality of lubricating-cups 4, (six of them being shown in the drawings,) said cups being arranged at uniform distances apart and communicating with the interior of the hub. When the loose pulley is brought to a state of rest, one of said lubricating-cups will rest in an upright position above the shaft 3 and will discharge lubricant down upon said shaft, and the oil in excess, if any, passes into the corresponding lubricating-cup below, passing through suitable grooves provided for the purpose in the hub of the pulley. When the pulley is caused to rotate with the shaft 3, the lubricating-cups cease supplying lubricant, the oil being driven to the upper or outer portions of the cups by centrifugal force.

Having described our invention, what we claim is—

1. The combination with a driving shaft and a fast and loose pulley arranged thereon, of an annular flange carried by said loose pulley, radially movable brake-shoes adapted to engage said flange, an annulus carried by the loose pulley, a friction-disk journaled in the fast pulley and adapted to engage said annulus, a train of gearing driven by said disk and operating to force said brake-shoes against the annular flange on the fast pulley when said disk is rotated, and means for throwing the friction disk into engagement with the said annulus, substantially as described.

2. The combination with a driving shaft and a fast and loose pulley arranged thereon, of an annular flange carried by said loose pulley, radially movable brake-shoes adapted to engage said flange, an annulus carried by the loose pulley, a friction disk journaled in the fast pulley and adapted to engage said annulus, a train of gearing driven by said disk, a reciprocating rack-bar operated by said train, connections between said rack-bar and brake-shoes, and means for throwing said friction disk into engagement with the annulus, substantially as described.

3. The combination with a driving shaft and a fast and loose pulley arranged thereon, of an annular flange carried by said loose pulley, radially movable brake-shoes adapted to engage said flange, an annulus carried by the loose pulley, a friction disk journaled in the fast pulley and adapted to engage said annulus, a train of gearing driven by said disk, a reciprocating rack-bar operated by said train, mechanism actuated by said rack-bar for forcing the brake-shoes into engagement with said annular flange, levers for throwing said friction disk into and out of engagement with the said annulus, a shifting hollow cone for actuating said levers, and means for shifting said cone, substantially as described.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

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HENRI CHARLES DELCROIX.

Witnesses:
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J. O. JONES.