No. 623,898. Patented Apr. 25, 1899.

G. S. GILMAN.

REVERSING MECHANISM.

(Application filed Sept. 16, 1898.)

(No Model.) 3 Sheets—Sheet 1.

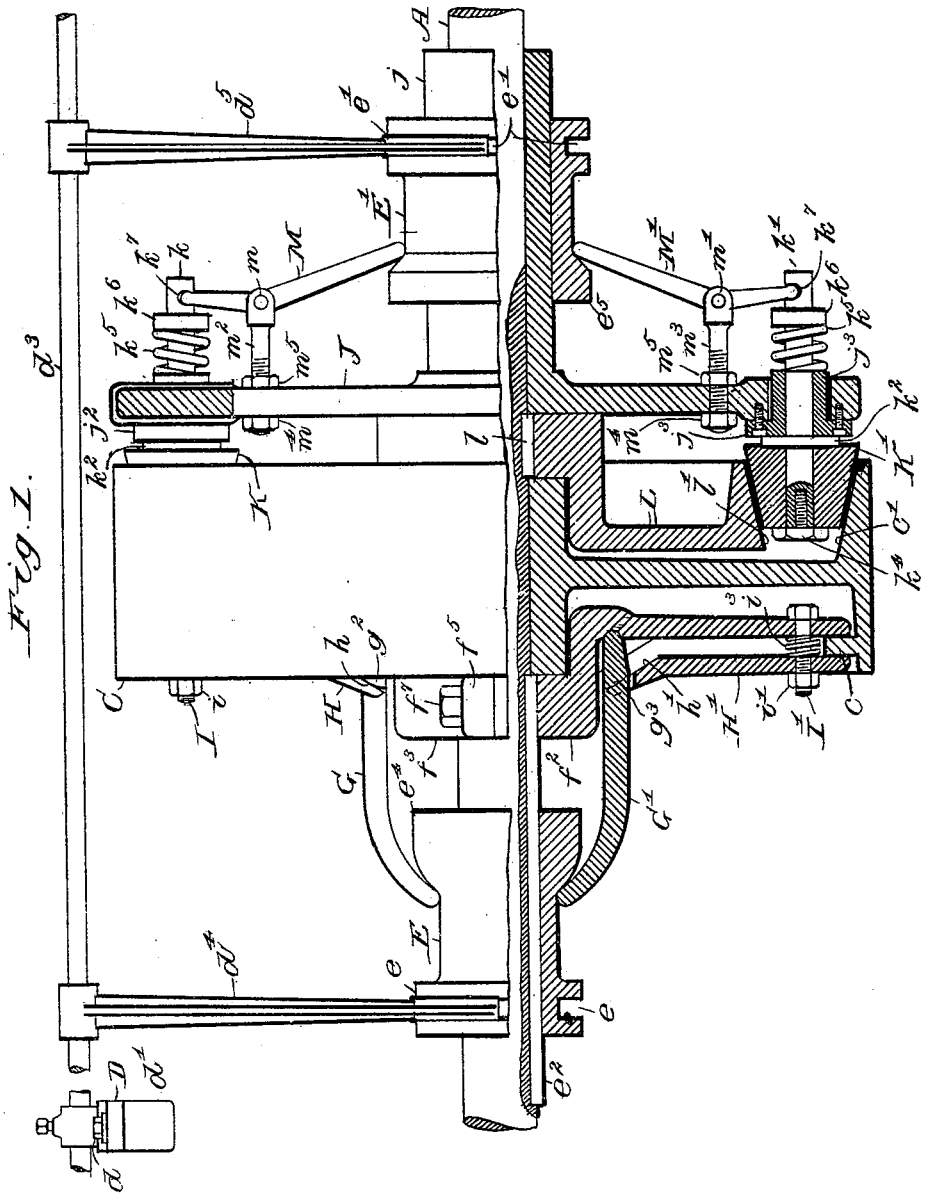

Fig. 1.

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Fig. 2.

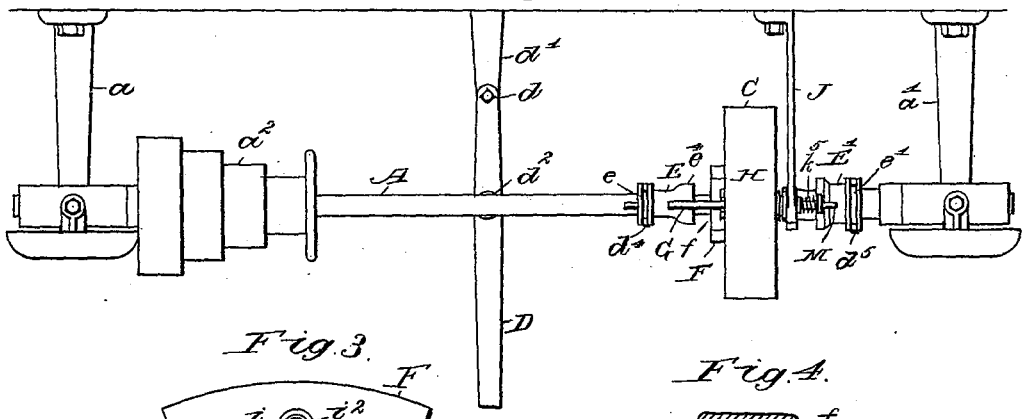


Fig. 3.

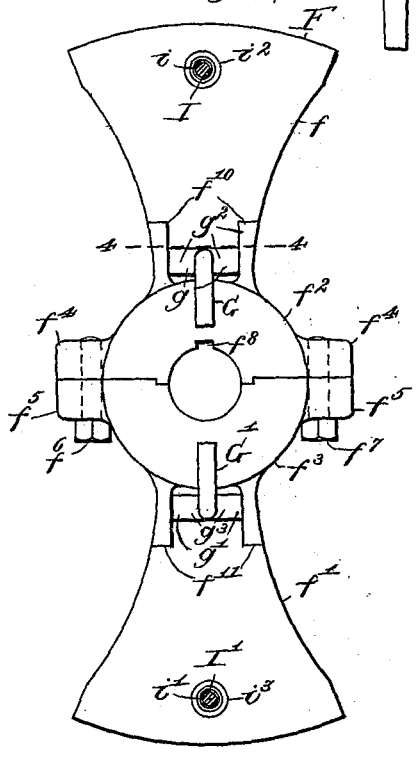


Fig. 4.

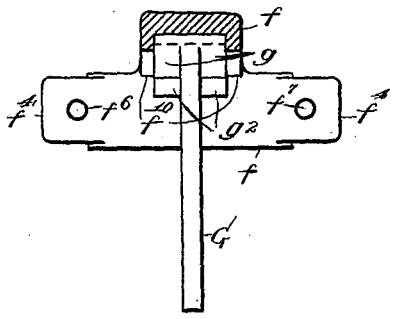
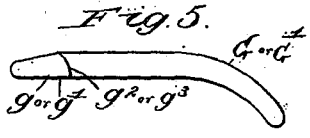


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

Fig. 7.

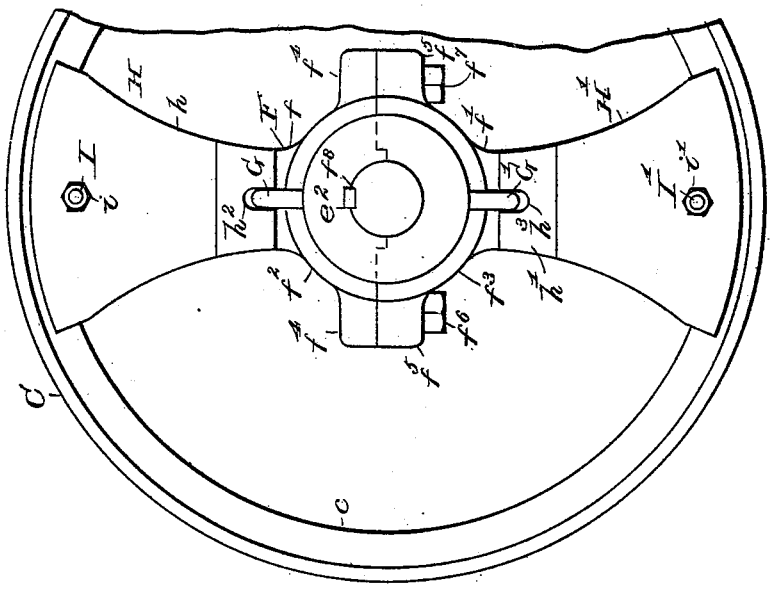
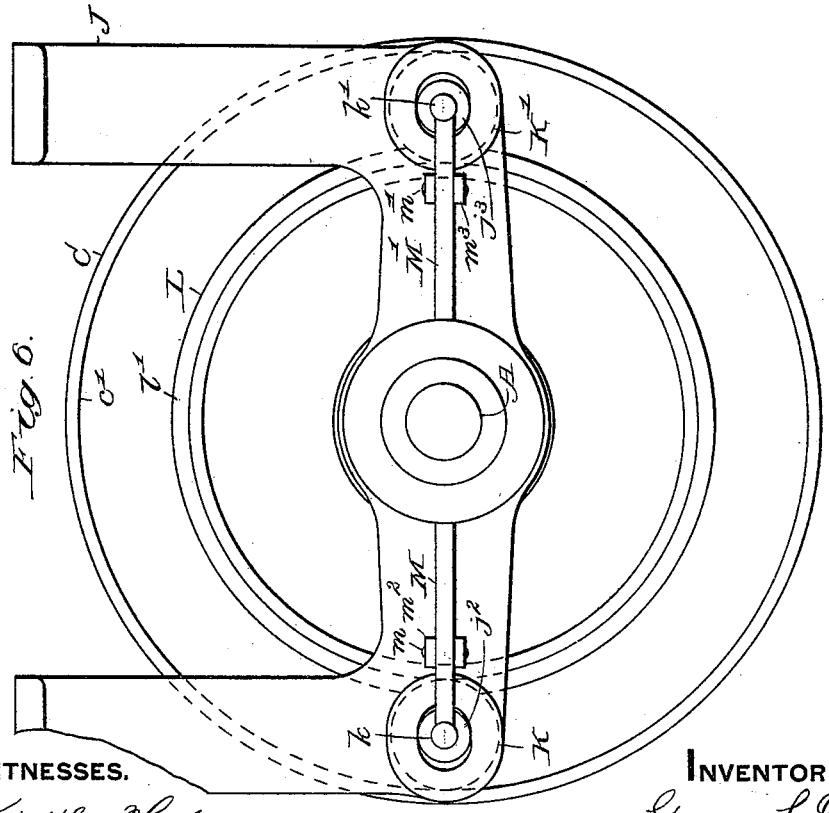


Fig. 6.



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INVENTOR

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His ATTORNEY.

UNITED STATES PATENT OFFICE.

GEORGE S. GILMAN, OF LOWELL, MASSACHUSETTS.

REVERSING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 623,898, dated April 25, 1899.

Application filed September 16, 1898. Serial No. 691,296. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. GILMAN, a citizen of the United States, and a resident of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Reversing Mechanism for Shafting, of which the following is a specification.

My invention relates to reversing mechanism for shafting, the principal object of the same being to do away with belts and pulleys and to enable the shaft to be run in one direction at a greater speed than in the other for the purpose of saving time in operating machines which are run in one direction during their effective movement but require to be turned in the opposite direction after each operation to restore them to position for the next operation, as engine-lathes.

Said invention consists in the devices and combinations hereinafter described and claimed.

In the accompanying drawings, on three sheets, Figure 1 is a plan, partly in central horizontal section, of a counter-shaft, a band-pulley loose thereon, and other parts which form my improved clutch; Fig. 2, a front elevation of the same, showing also shaft-hangers and a cone-pulley on the shaft; Fig. 3, an outside or left side elevation of the inner clamp-piece; Fig. 4, a horizontal section on the line 4 4 in Fig. 3; Fig. 5, an elevation of either side of either of the clamp-levers; Fig. 6, an outer or right side elevation of the driving-pulley and the friction-clutch devices and the supporting means or hanger which supports said devices; Fig. 7, an outer or left side elevation of the clutch shown at the left of the driving-pulley in Fig. 1 and said pulley.

It will be understood that the words "right" and "left" are used hereinbefore and hereinafter only with reference to the positions relatively to the band-pulley the other parts are represented as occupying in Figs. 1 and 2.

A represents in Figs. 1 and 2 a counter-shaft supported in suitable hangers a a', secured to the overhead timbers B or otherwise in any usual manner. The counter-shaft A is driven by a pulley C, loose on said counter-shaft, but causing said counter-shaft to rotate therewith by the clutch mechanism hereinafter described. The pulley C is driven continuously in the same direction in the usual manner by a belt from a main shaft. (Not shown.)

The shaft A is represented as having fast thereon a cone-pulley a^2, from which a belt may run to the corresponding cone-pulley of a lathe or other machine to drive the same. A shifting lever D is fulcrumed overhead at d on a suitable support d', and between its ends is pivoted at d^2 to a shifting rod d^3, to which are rigidly secured two forks d^4 d^5, the ends of which farthest from said rod d^3 engage grooves e e' in the sleeves E E', respectively. The sleeve E preferably rotates with the shaft A, being splined thereto at e^2, and is provided at its inner end with an enlarged head e^4.

An inner clamp-piece F, having arms f f' secured to or integral with a hub f^2 f^3, rotates with the shaft A, said hub for convenience of removal and replacement being divided diametrically between said arms f f', and the halves f^2 f^3 of said hub having ears f^4 f^5, secured to each other by bolts f^6 f^7, as shown in Figs. 3, 4, and 7. The shaft is caused to rotate with the clamp-piece F by the spline e^2, above mentioned, which enters a key-seat f^8 in the hub of said clamp-piece.

Two clamp-levers G G', Figs. 1, 3, 4, 5, and 7, are fulcrumed in ears f^{10} f^{11} on the outer face of the clamp-piece F on opposite sides of the hub, their free ends resting on opposite sides of the sleeve E between the groove e and the enlargement e^4, so that when said sleeve E is moved away from the pulley C said free ends are thrown outward. The levers G G' are each provided with a pair of lateral wings g g', the edges g^2 g^3 of which farthest from the piece F are beveled, as shown in Figs. 1, 4, and 5.

The outer clamps H H' are loosely secured to the clamp-piece F by bolts I I' and nuts i i', passing through said clamps and the arms f f' of said piece F, near the outer ends of the same, and the expansion of the springs i^2 i^3, surrounding said bolts and compressed between said clamps and clamp-piece, tends to separate the outer ends of said clamps and clamp-piece and to hold them out of contact with an internal annular flange c, with which the rim of the pulley C is provided. The inner ends of the clamps H H' rest on the beveled edges g^2 g^3 of the levers G G' and are them-

selves correspondingly beveled at h h', as shown in Fig. 1, and are slotted at h^2 h^3 to receive loosely the bodies of said levers, as shown in Fig. 7, so that when the sleeve E is moved away from the pulley the enlargement e^4 throws the free ends of the levers G G' farther away from the shaft, causing the inner ends of the clamps H H' to move away from the clamp-piece F and their outer ends to approach the outer ends of the arms f f' of said clamp-piece and to grasp the flange c, thus compelling the shaft A to rotate with the pulley C, the nuts i i' serving as fulcrums for said clamp-pieces. The piece F may be made of cast-iron and yet spring enough to be drawn against the inner face of the flange c when drawn by the leverage of the clamp H H' when the latter are pressed against the outer face of said flange c and strain the bolts I I', as said clamp-piece and clamps are in close proximity to said flange when not in contact therewith. When the sleeve E is again moved to the right in Fig. 1, the free ends of the levers G G' are caused to approach each other by the springs i^2 i^3, which push the clamps away from the clamp-piece F and release the flange c of the driving-pulley. If in thus moving the sleeve E to the right the shifting lever D is swung far enough, the motion of the shaft A will be reversed by other clutch devices operated by the movement of the sleeve E', above mentioned.

The sleeve E' slides freely on a hub j, surrounding the shaft A and secured to or integral with a hanger J, Figs. 1, 2, and 6, said hanger being supported in substantially the same manner as the shaft-hangers a a' are or may be supported. In suitable bearings j^2 j^3, supported in the hanger J on opposite sides of the shaft A and at equal distances from said shaft, slide spindles k k', on which turn loosely cone-rolls K K', arranged between said hanger J and the pulley C and each prevented from moving endwise on its spindle by a collar or shoulder k^3 on said spindle and by the head of a bolt k^4, driven into the end of said spindle. A flanged disk L, splined to the shaft A at l, is arranged between the hanger J and the pulley C and is offset into the annular space around the hub, as shown in Fig. 1, so that the rim of said flanged disk L lies within the rim of said disk C. The outer face of the pulley L and the inner surface of the rim of the pulley C are oppositely beveled at l' and c' at such an angle as to fit the faces of the cone-rolls K K' when the latter are pushed into the space between said bevels l' c', and thus to rotate the said disk L and shaft A in the opposite direction from that of the pulley C. The cone-rolls are normally held out of engagement with the pulley C and disk L by springs (represented as spiral springs k^5 k^5) surrounding the spindles k k' and compressed between the outer ends of the bearings j^2 j^3 and collars k^6 k^6, fixed on said spindles.

The outer ends of levers M M', fulcrumed between their ends at m m' on studs m^2 m^3, enter transverse grooves k^7 k^7 in the spindles k k', while their inner ends rest upon the opposite sides of the sleeve E' and are spread apart by the enlargement e^5 on said sleeve E', passing between them as said sleeve is moved to the right, throwing the outer ends of said levers toward the hanger J and forcing the cone-rolls K K' into engagement, as above described.

The studs m^2 m^3 are adjustable in the hanger J by means of nuts m^4 m^5, turning on threaded portions of said studs on opposite sides of said hanger to enable the levers M M' to be properly adjusted to throw both of the rolls K K' simultaneously into and out of engagement.

By properly moving the shifting lever D the band-pulley C will be out of engagement with both clutching devices and may rotate without turning the shaft A.

I claim as my invention—

1. The combination of a shaft, a pulley, loose thereon and having a rim, a stationary hanger, provided with a hub, loosely surrounding said shaft, a disk, fast on said shaft and having a rim, arranged within the rim of said pulley, the inner face of said first-named rim and the outer face of the other rim being beveled equally in opposite directions, spindles, arranged to slide in said hanger, intermediate cone-rolls, loose on said spindles but movable longitudinally therewith, levers, engaging said spindles, and a sleeve, having an enlargement and movable on said hub, to operate said levers and push said rolls into engagement with said pulley and disk.

2. The combination of a shaft, a pulley, loose thereon and having a rim, a hanger, provided with a hub, surrounding said shaft, a disk, fast on said shaft and having a rim, arranged within the rim of said pulley, the inner face of said first-named rim and the outer face of the other rim being beveled equally in opposite directions, spindles, arranged to slide in said hanger, intermediate cone-rolls, loose on said spindles but movable longitudinally therewith, levers, engaging said spindles, a sleeve, having an enlargement and movable on said hub, to operate said levers and push said cones into engagement with said rims, and springs, to draw said cones out of such engagement.

3. The combination of a shaft, a pulley, loose thereon, a clutch, rotary with said shaft, and adapted to be engaged with and disengaged from said pulley and to cause said shaft to rotate in the same direction with said pulley, a disk, fast on said shaft, and intermediate friction-cones, each adapted to be moved endwise to be engaged with and disengaged from said pulley and disk, to cause said shaft to rotate in the opposite direction from that of said pulley, the axes of said cones being at all times parallel with said shaft.

4. The combination of a shaft, a pulley,

loose thereon and having a rim, a hanger, a disk, fast on said shaft and having a rim, arranged within the rim of said pulley, the inner face of said first-named rim and the outer face of the other rim being beveled equally in opposite directions, spindles, arranged to slide in said hanger, intermediate cone-rolls, loose on said spindles but movable longitudinally therewith, fulcrum-studs, adjustably secured in said hanger, levers, pivoted on said studs and engaging said spindles, a sleeve, having an enlargement and movable longitudinally to operate said levers and push said cones into engagement with said rims, and springs, to draw said cones out of such engagement.

5. The combination of the shaft, a pulley, loose thereon and having a rim, provided with a flange, a clamp-piece, rotary with said shaft and having arms, the outer ends of which are arranged on the inner side of said flange, clamp-levers, fulcrumed on said clamp-piece, outer clamps, loosely connected to said arms and at their outer ends extending on the opposite side of said flange, from said arms, the inner ends of said clamp-pieces being beveled and resting on beveled surfaces with which said levers are provided, and a sleeve, surrounding said shaft between the free end of said levers and movable longitudinally on said shaft, to rock said levers.

In testimony whereof I have affixed my signature in presence of two witnesses.

GEORGE S. GILMAN.

Witnesses:
ALBERT M. MOORE,
DENNIS J. MURPHY.