(No Model.)

# E. W. RHONE.

## FRICTION PULLEY.

No. 386,719. Patented July 24, 1888.

Fig. 1.

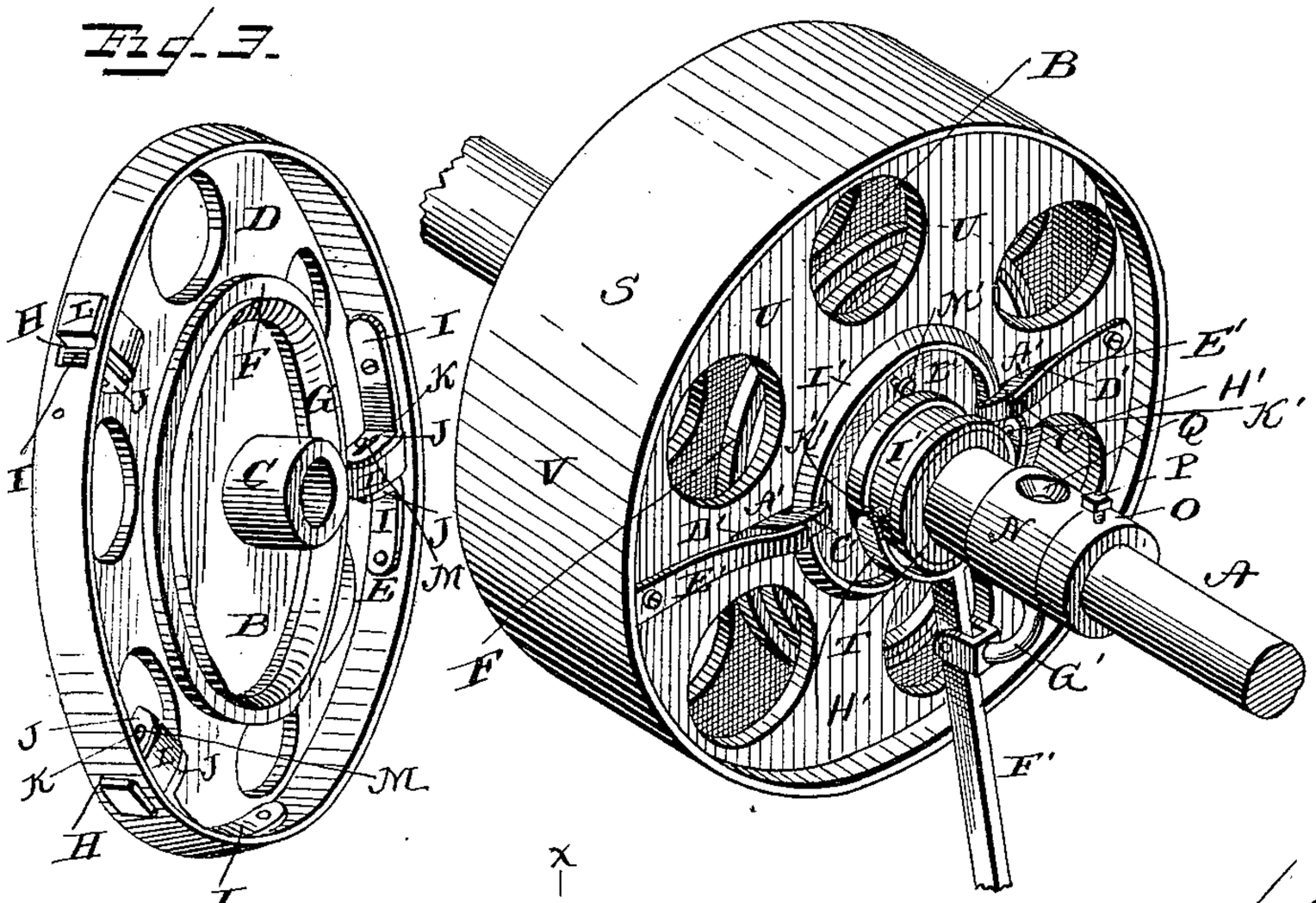



Fig. 2.

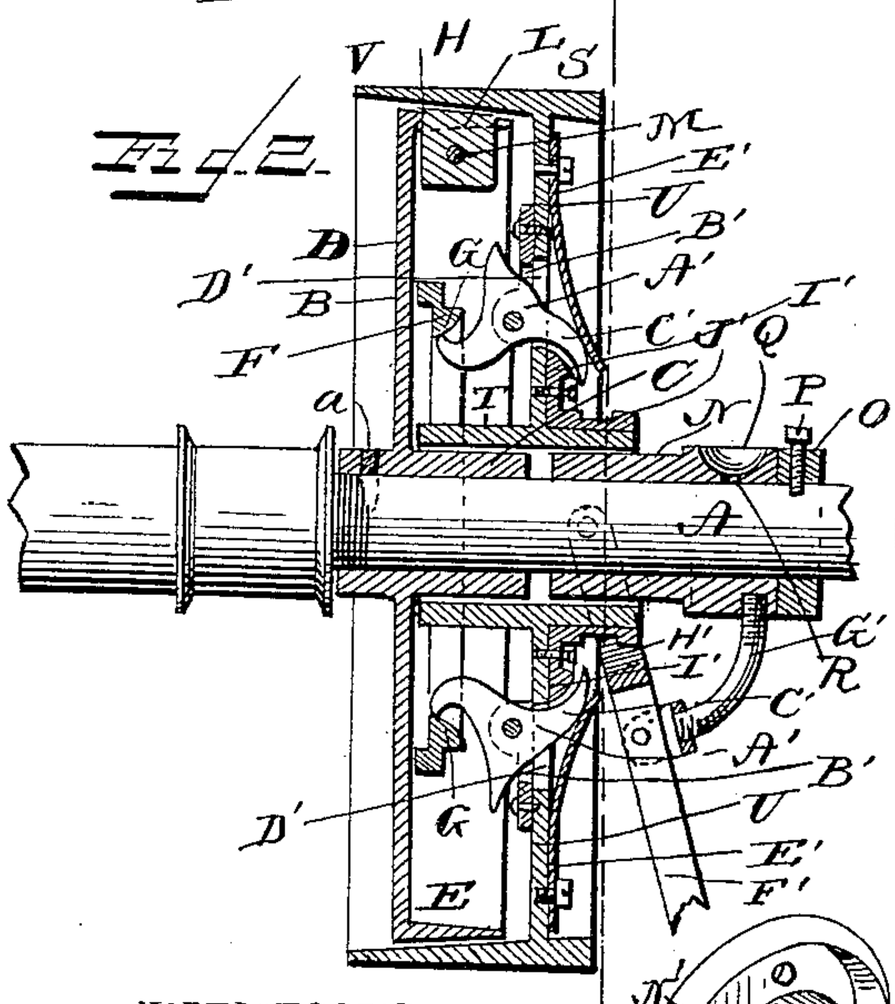



Fig. 3.




Fig. 4.

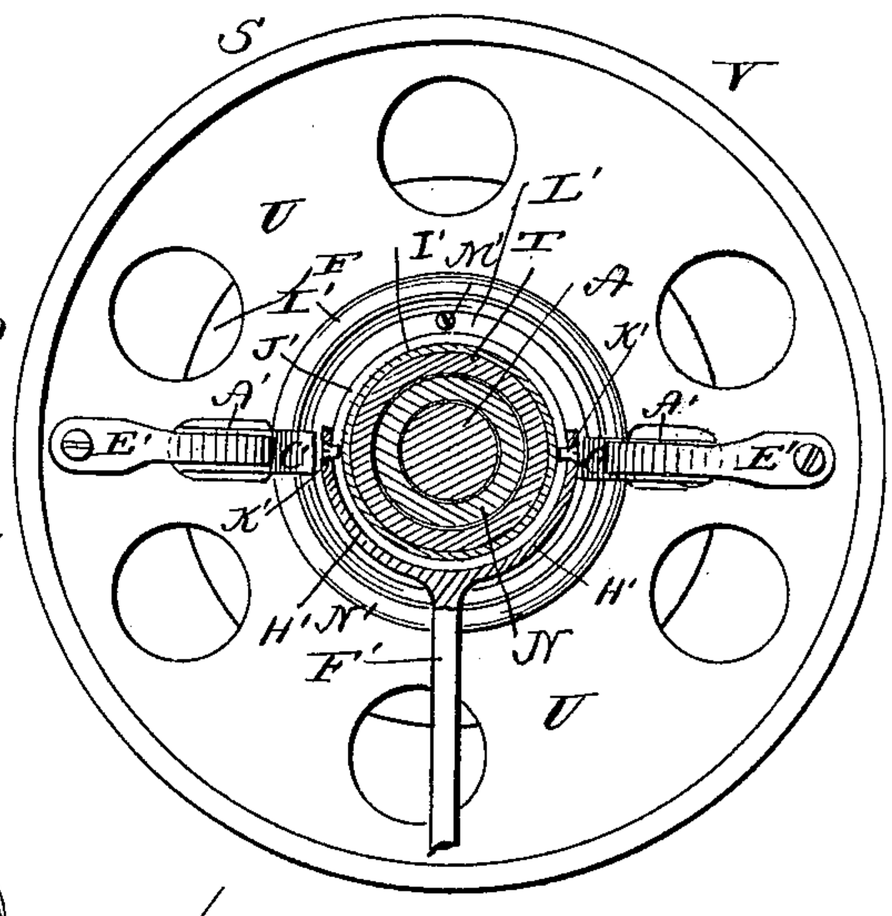
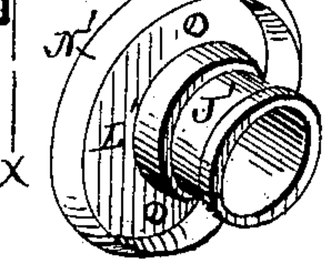



Fig. 5.

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# UNITED STATES PATENT OFFICE.

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## FRICTION-PULLEY.

SPECIFICATION forming part of Letters Patent No. 386,719, dated July 24, 1888.

Application filed November 21, 1887. Serial No. 255,778. (No model.)

*To all whom it may concern:*

Be it known that I, EZRA WESLEY RHONE, a citizen of the United States, and a resident of Wilcox, in the county of Elk and State of Pennsylvania, have invented certain new and useful Improvements in Friction-Pulleys; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a perspective view of my new and improved friction-pulley, taken from the outer side of the band-pulley. Fig. 2 is a central vertical sectional view of the same. Fig. 3 is a perspective view of the fixed pulley, taken from the inner side thereof. Fig. 4 is a vertical sectional view taken on the plane indicated by line *x x* of Fig. 2, and Fig. 5 is a detail view of the grooved collar with its flange-plate.

The same letters of reference indicate corresponding parts in all the figures.

My invention consists in a new and improved friction-pulley, which will be hereinafter fully described and claimed.

Referring to the several parts by letter, A indicates a continuously-revolving shaft, upon which my invention is shown as mounted in operative position.

B indicates the fixed pulley, which is secured upon the shaft A, so as to revolve continuously therewith, by means of a screw, *a*, or by a key, in the usual manner. This wheel or fixed pulley is formed with the long central hub, C, which projects along the shaft A from the inner side of the pulley, as shown in the sectional view Fig. 2 of the drawings, and with the radial spokes D and the outer inwardly-projecting periphery or rim, E, the inner side of which rim may be straight; but its outer side is beveled or inclined inwardly, as shown in the sectional view Fig. 2 of the drawings, this inclination being preferably about one-fourth of an inch to an inch in width, for the reason hereinafter specified. This fixed pulley has formed or cast on its inner side an annular flange or ring, F, the inner edge, G, of which projects in, forming an annular shoulder, which is beveled on both sides, as shown in Fig. 2. The rim E of this fixed pulley is formed with three openings, H H H, of suitable size and placed equidistant from each other. To the inner side of this rim of the pulley are secured to each side of each of the said openings springs I I, one on each side of each opening. The free adjacent ends J J of each pair of springs are bent in at right angles to each other, and between these inwardly-bent free ends, which are formed with the longitudinal slots K K, is secured adjustably a wooden friction-block, L, the outer end of which projects through that opening H in the rim of the pulley. This projecting outer end of each of the said three friction-blocks is slightly curved to conform to the curvature of the pulley-rim, and the blocks are held in position adjustably by means of a bolt or screw, M, which passes through the longitudinal slots K K and through the wooden block. By forming the free parallel ends of the pairs of springs with these longitudinal slots, through which the securing bolt or screw passes, it will be seen that as the wooden friction-blocks become worn in use by friction they can be adjusted outward to take up wear.

N indicates a sleeve, which is mounted upon the shaft A at the inner end of the hub of the fixed pulley, the inner end of this sleeve being in close proximity to the inner end of the fixed pulley-hub. A ring, O, is secured by a set-screw, P, upon the shaft A at the outer end of this sleeve N, and serves to hold this sleeve in position in the shaft and prevent its slipping thereon. Within the upper side of the outer end portion of this sleeve N is a small oil-cup, Q, of ordinary construction, which communicates through an aperture, R, in the sleeve N with the interior of the said sleeve, and thus lubricates the shaft A not only inside of the sleeve N, but the oil will also run along the shaft within the sleeve N until it reaches the inner end of the hub of the fixed pulley, when it will lubricate the bearing of the inner end of the hub of the movable or belt pulley.

S indicates the loose pulley or belt-pulley. The hub T of this pulley fits upon the sleeve N, upon which it slides when thrown into or out of adjustment, and this pulley is formed, like the fixed pulley, with the spokes U, and is also formed with the rim or periphery V.

The inner projecting part of this rim V is about twice the width of the inwardly-projecting rim of the fixed pulley, and, while the outer side of the rim of this movable pulley is nearly straight, the inner side thereof is beveled, inclined outward, the pitch of this inclination being about one-fourth of an inch to the inch of width. The object of giving such a sharp pitch or inclination to the meeting faces of the rims of the fixed and moving pulleys is to enable the pulleys to be brought together or moved apart out of frictional contact without having to move the sliding band-pulley S too far to one side, as will be readily understood.

The shaft A revolves continuously, carrying with it the fixed pulley B, while the band-pulley S, when shifted to the side out of engagement, will stand still, the sleeve N also remaining stationary, the shaft A turning within it. Now, when the band-pulley is moved in toward the fixed pulley the inner inclined side of its inwardly-projecting rim will first come into contact with the projecting outer ends of the wooden friction-blocks, which, as before stated, project through the openings K in the rim of the fixed pulley. As the rim of the band-pulley comes into contact with the outer ends of these spring-actuated wooden blocks, the said blocks will yield sufficiently to effectually prevent any jar or shock in starting, the band wheel or pulley being gradually started by these wooden blocks, so that when its beveled rim comes in contact with the beveled rim of the fixed pulley the band-pulley will already be in full motion. As the rim of the band-pulley is forced over the rim of the fixed pulley, the wooden blocks are forced in until the beveled surfaces of the rims of the two pulleys are fully in contact, and by securing the said blocks to and between the ends of the pairs of springs the blocks when forced in will recede directly toward the center of the fixed wheel, so that the full surface of their outer ends will always be exposed to the outer rim—the rim of the band-pulley. When the band-pulley has been moved in so that its rim entirely overlaps the beveled rim of the fixed pulley, the frictional contact will cause the band-wheel to be revolved with the fixed wheel as though the two were solid—a single pulley; and the pressure of the friction-blocks against the inner side of the band-wheel rim will also assist in increasing the friction between the two pulleys at their rims. The band-pulley is locked in this position in contact with the fixed pulley by two (or more, if desired) clamping-hooks, A′ A′, which are centrally pivoted in bearings B′ B′ on the inner side of the band-pulley, with their outer curved ends, C′ C′, projecting through slots D′ D′ to the outer side of the band-pulley. The curved outer ends of these hooks are kept normally pressed into contact with the beveled or rounded projecting edge of a grooved collar, I′, by springs E′, thus holding the inner ends of the hooks normally pressed out, so as to lock the said hooks inside of the annular flange F, which is cast on the inner side of the fixed pulley. The band-pulley is thrown into or out of engagement with the fixed pulley by a hand-lever, F′, which is pivoted to the lower end of a small hanger or bearing, G′, which is secured in the lower side of the sleeve N. The curved arms H′ H′ at the upper end of this lever extend around a collar, I′, which fits around the outside of the outwardly-projecting part of the hub of the band-pulley, and which is formed with an annular groove, J′, in which fit small pins K′ K′, which are on the inner side of the ends of the arms H′ H′, as clearly shown in Fig. 4 of the drawings. The inner end of this grooved collar I′ is formed with an annular flange-plate, L′, which is secured against the outer side of the band-pulley by means of screws or small-headed bolts M′, the heads of which do not fit tightly down against the outer side of the said flange, but stand out a short distance, so as to give the said collar and flange a certain outward movement before the band-pulley is itself moved. The outer annular edge of this flange-plate is formed with a bead or enlargement, N′, against which the outer curved ends of the clamping-hooks A′ A′ are pressed by the springs E′, as before stated. In operation, the band-pulley normally stands out of contact with the fixed pulley, as shown in the sectional view Fig. 2 of the drawings, the hub T of this pulley S being of such length that when it is moved out of contact with the fixed pulley the inner end of its hub T will extend for a short distance over the inner end of the hub of the fixed pulley, while when the belt or band pulley is moved into contact with the fixed pulley the outer end of its hub will still extend over the inner end of the sleeve N, so that the band-pulley can be smoothly and easily moved in or out of engagement without any hitch or stop. When it is desired to move the band-pulley into frictional contact with the fixed pulley, this is done by pulling the lower free end of the shifting-lever F′ out, when the band-pulley will be slid in along the sleeve N and the inner end of the hub of the fixed pulley, the inner beveled side of its rim first coming into contact with the spring-actuated friction-blocks, which, as before described, will start the band-wheel easily and gradually without any jar or shock, so that when its rim comes into contact with the beveled rim of the fixed wheel it will already be in full motion. As the rim of the band-wheel is thus pressed into contact with the rim of the fixed wheel, the rounded inner ends of the clamping-hooks A′ A′ will be pressed past around the inner beveled edge of the locking-ring F, the springs E′ throwing the hooks into their normal positions as soon as they have passed this edge; and it will be seen that by this arrangement as soon as the beveled rims of the two pulleys have been pressed together the spring-actuated clamping-hooks will have automatically locked the sliding pulley to the fixed pulley. The two pulleys will be thus

held locked together as long as it is desired that the belt-pulley should revolve. When the belt-pulley is to be stopped, this is easily and rapidly done by pushing in the handle of the shifting-lever F′. The arms at the inner end of this lever will first act on the grooved collar I′, drawing the same outward as far as the screws M′ will permit until the flange of the collar comes against the heads of the said screws, and as the collar is thus independently moved the rounded edge of its flange will raise, force outward the outer ends of the spring-actuated clamping-hooks A′ A′, thus freeing the inner ends of the said hooks from the beveled inner edge of the ring F, as will be readily seen, before the belt-pulley has begun to move outward. As the pull of the lever is continued, the collar, after moving this short space alone to unlock the clamping-hooks, bears against the heads of the screws M′ M′, and the belt-pulley, being thus unlocked from the fixed pulley, will then easily slide out along the collar N, so as to free its rim from all contact with that of the fixed wheel.

From the foregoing description, taken in connection with the accompanying drawings, the construction, operation, and advantages of my invention will be readily understood.

It will be seen that by moving the belt-pulley off on the sleeve N the belt and pulley are entirely stopped when not in use, and as none of the working parts of the belt-pulley are exposed to any part of the machinery in motion it cannot wear, and, therefore, must always remain true; also, by the use of the receding wooden friction-blocks the machinery can be started without any shock and can be put in full motion before the belt-pulley comes in contact with the driver or fixed pulley.

The wooden friction-blocks can be readjusted until entirely worn, and they are the only parts exposed to wear and can be very quickly and cheaply replaced when necessary. As the belt-pulley does not run on the shaft when not in use and the shaft runs not in the said pulley, but in the sleeve N, the pulley is not so liable to wear loose and will thereby remain true longer; also, the pulley can be thrown into and out of gear at a higher rate of speed than formerly, owing to the spring-actuated wooden blocks; also, by applying the friction to the rim of the belt-pulley the amount of friction required is lessened and it is distributed over a larger surface. The number of friction-blocks may be increased for larger wheels.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination, with the fixed pulley having the beveled rim formed with the openings, of the spring-actuated friction-blocks and the movable belt-wheel formed with the beveled rim.

2. The combination of the fixed pulley having the beveled rim formed with the openings, the pairs of springs formed with the longitudinal slots in their bent ends, the wooden friction-blocks, and the movable pulley formed with the beveled rim, substantially as set forth.

3. In a friction-pulley, the combination of a fixed pulley having a projecting rim beveled on its outer side and formed with several openings, a movable pulley having a projecting rim beveled on its inner side, and friction-blocks having their ends pressed by springs out through the said rim openings of the fixed wheel or pulley.

4. The combination of the fixed pulley having the long hub and the beveled rim formed with the openings, the spring-actuated friction-blocks, the sleeve mounted on the shaft, and the movable pulley formed with the long hub and the rim beveled on its inner side.

5. The combination of the fixed pulley having the long hub and formed with the locking-ring on its inner side, and the beveled rim having the openings, the spring-actuated friction-blocks, the sleeve mounted on the shaft, the movable pulley formed with the long hub, slots, and the rim beveled on its inner side, and the clamping-hooks.

6. The combination of the fixed pulley having the long hub and formed with the locking-ring on its inner side, and the beveled rim having the openings, the spring-actuated friction-blocks, the sleeve mounted on the shaft, the movable pulley formed with the long hub, the slots, and bearings, and the rim beveled on its inner side, the grooved collar formed with the perforated flange, the screws arranged as described, and a shifting-lever, and the spring-actuated clamping-hooks, substantially as set forth.

7. The combination of the fixed pulley having the long hub and formed with the locking-ring on its inner side, and with the beveled rim having the openings, the spring-actuated friction-blocks, the sleeve mounted on the shaft and held in place by a ring, and having the aperture near its end and the oil-cup, the movable pulley formed with the long hub, the slots and bearings, and the rim beveled on its inner side, the grooved collar formed with the perforated flange, the screws arranged as described, the lever having the pins on the free ends of its arms, and the spring-actuated clamping-hooks, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

EZRA WESLEY RHONE.

Witnesses:
JNO. B. ALLEN,
JNO. C. NEARING.