

(No Model.)

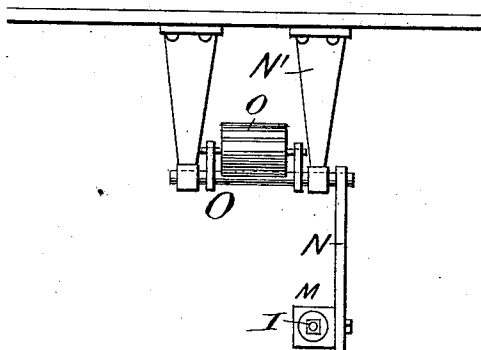
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J. CANNING.  
BELT SHIFTER.

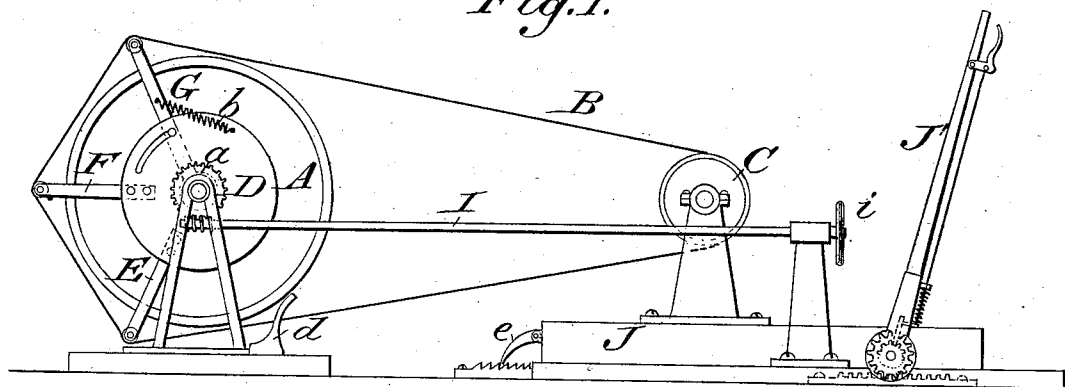
No. 367,891.

Patented Aug. 9, 1887.

*Fig. 6.*



*Fig. 1.*



Witnesses

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By *his* Attorney *John E. Parker*

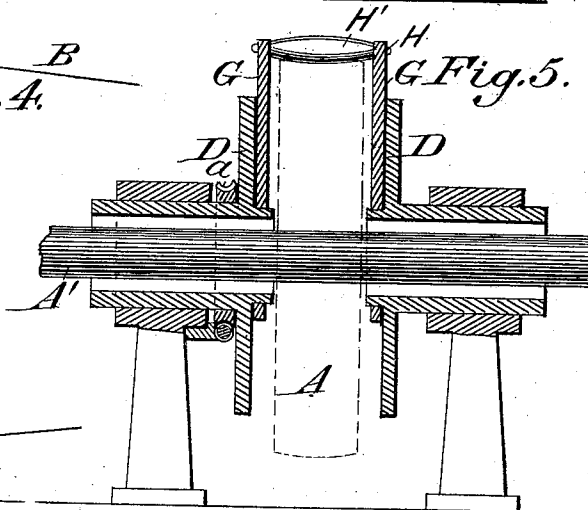
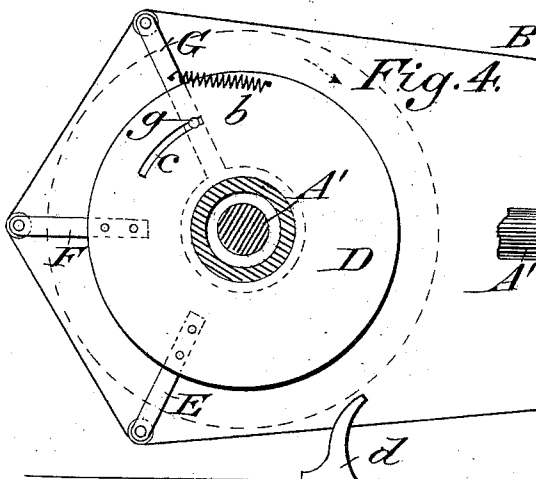
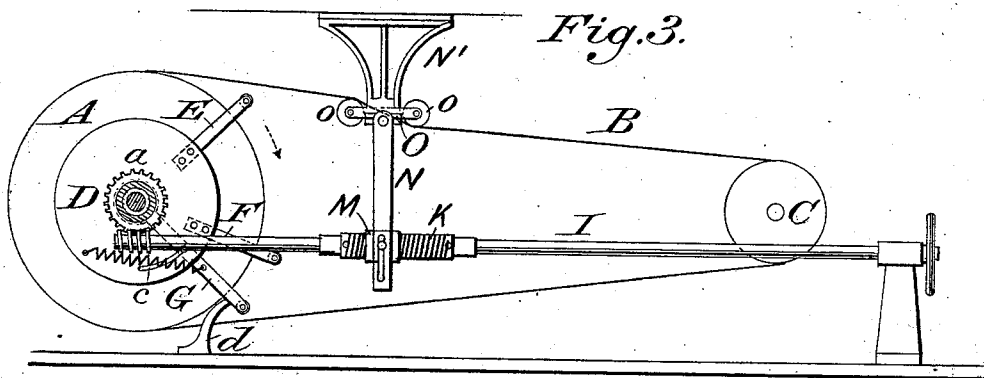
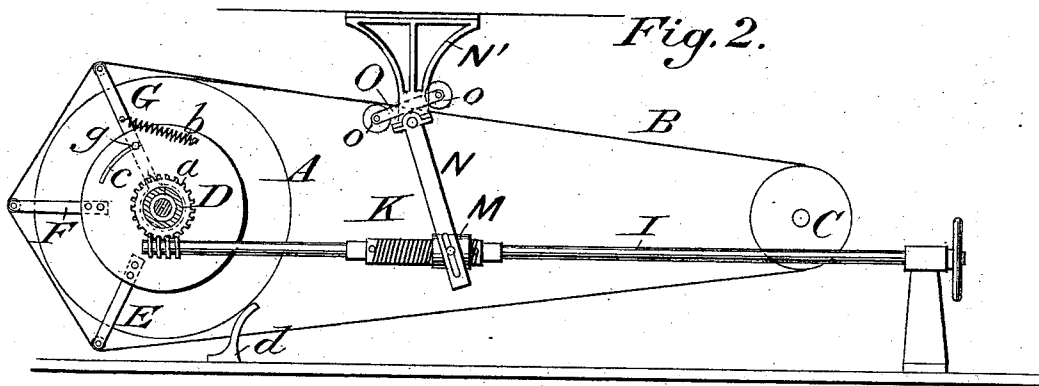
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2 Sheets—Sheet 2.

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# UNITED STATES PATENT OFFICE.

JAMES CANNING, OF MONTPELIER, VERMONT.

## BELT-SHIFTER.

SPECIFICATION forming part of Letters Patent No. 367,891, dated August 9, 1887.

Application filed January 17, 1887. Serial No. 224,584. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES CANNING, a citizen of the United States, residing at Montpelier, in the county of Washington and State of Vermont, have invented certain new and useful Improvements in Belt-Shifters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of devices known as "belt-shifters," the object thereof being to provide improved mechanism for throwing the driving-belt on or off the driving-pulley in such a manner as to start or stop, without the aid of a loose pulley, the machine which is driven by the belt; and the invention consists in the construction, arrangement, and combination of parts substantially as will be hereinafter described, and then more particularly pointed out in the claims.

In the annexed drawings, illustrating my invention, Figure 1 is a longitudinal side elevation of my improved belt-shifting device, shown as applied to a driving-pulley and its belt, the latter being off the pulley. Fig. 2 is a similar view showing a different mode of slackening and tightening the belt, so that the elevating-arms may act thereon. Fig. 3 is a similar view showing the position of the belt when tightened and on the pulley. Fig. 4 is a detail longitudinal sectional view of the pulley and its shifting mechanism. Fig. 5 is a transverse section of the same, the driving-pulley being shown in dotted lines. Fig. 6 is an end view of the device shown in Figs. 2 and 3 for tightening the belt.

Like letters of reference designate like parts.

A represents an ordinary driving-pulley, and A' its shaft.

B denotes the driving-belt, and C the pulley to which the belt communicates power from the driving-pulley A, for the purpose of actuating the machinery with which it may be connected.

Alongside the driving-pulley is situated a spider having radial arms or spokes. This spider may be suspended loosely on the shaft, as in Fig. 1, or upheld by means of independent hangers with hollow hubs that do not touch the shaft, as shown in Fig. 5. Said spider is made of any convenient and suitable form and

construction. A preferable form is shown in the drawings, wherein it consists of disks D, situated adjacent to the driving-pulley and concentric therewith. To these disks the radiating arms E, F, and G are secured. Any number of the arms may be employed, as desired, it generally being found best to have them located along the peripheries of the disks for about half their length. The oppositely-located arms on the two disks are connected together at their extremities by means of rods H, which preferably carry rollers H', the rods serving as spindles for the rollers, and the rollers extending across the face of the driving-pulley at a convenient distance therefrom, said distance being regulated, as desired, by the predetermined length of the radial arms that carry the rollers.

The spider is rotated about its axis by means of a horizontal worm-shaft, I, having a hand-wheel, *i*, and meshing with a gear, *a*, secured to the outer side of one of the disks D. The operator, by turning the hand-wheel, rotates the disks and carries the radial arms from a position where they are between the upper and lower parts of the belts and out of contact with them, as in Fig. 3, to a position where they rest beneath and in contact with the belt, (see Figs. 1, 2, and 4,) and thus elevate the same from the driving-pulley, so that the latter may revolve without touching the belt, and they also operate vice versa.

It is found in practice that the ordinary extent of space between the upper and lower portions of the driving-belt is hardly large enough to contain out of contact with said belt the arms and their rollers when in the full extended position that they occupy when raising the belt off the pulley. It therefore becomes necessary to make one or more of these arms movable toward the others and to associate with them such accompanying devices as may be necessary to cause said movable arms to move toward the others, and all the arms thus to be contracted into a narrower space at the time when they cease to elevate the belt and pass into a state of rest between the upper and lower portions of the belt, and also to expand the movable arm or arms and widen the distances between them to the proper extent, when once more the devices come into play in elevating the belt.

In the drawings, the arms G are represented as being movable. Their inner ends are provided with a collar or circular rim that surrounds the hub of the spider, as shown in Fig. 5. The disks D are provided with curved slots *c*, through which pass studs or pins *g* on the arms G. The slots *c* determine the range of movement of the arms G. Springs *b*, fastened to the arms G and to the disks D, serve to hold the arms so that the pins *g* will normally be in the end of the slots farthest from the next arm, F. The operation of contracting and expanding the spider-arms will therefore be as follows: Suppose the spider to be in the position shown in Fig. 4, where it is acting to hold the belt off the pulley. The radiating arms will then all be substantially equidistant from each other. Now, suppose the spider is rotated in the direction shown by the arrow in Fig. 4. In this rotation the arm G will strike a stop, *d*, placed in its path of movement by being secured to some suitable object and projecting close to the periphery of the disk. The stop will bar the further progress of the arm G, but the disks will continue their rotation until the farther end of the slot *c* has come in contact with the pin *g* and the spring *b* has been extended. The arms will now be huddled together sufficiently to lie easily between the upper and lower portions of the driving-belt and out of contact therewith, as shown in Fig. 3. When the spider is moved out of this position to take its place beneath the belts again, the springs *b* will pull the arms G into position, where all the arms will be equidistant, as before. In carrying out my invention, however, it becomes necessary to devise means for slackening the belt, so that the spider may have opportunity to lift it from the pulley, for the elasticity of the belt is insufficient to permit the spider with its rollers to pass beneath it and remove it from contact with the pulley-face. It is obvious that very many different devices may be employed for the purpose. I have here shown two ways to serve as examples.

In Fig. 1 the machine to be driven is set upon a sliding frame, J, which is arranged to be moved to and fro by a lever, J', and held in any desired position by a pawl and ratchet, *e*. Thus when the operator wishes to stop the machine he throws up the pawl *e* out of engagement with the ratchet and then lays hold of and operates the lever J' and the hand-wheel *i* simultaneously, and hence loosens the belt at the same time that the spider operates thereon to elevate it.

Another method of loosening and tightening the belt is shown in Figs. 2, 3, and 6. Upon the shaft I is placed a threaded sleeve, K, which is adjustable to any point upon the shaft, and is held in place by suitable set-screws. A nut, M, is placed upon the sleeve and is threaded to correspond with it. Pivotal-ly suspended from a hanger, N', that is located in any convenient position, is a vibrat-

ing lever, N, to the upper end of which is secured at right angles the frame O, carrying at either end rollers *o o*, while the lower end of lever N is slotted to receive projecting pins on the nut M. The driving-belt B passes beneath one of the rollers *o* and above the other. Therefore, when the shaft I is revolved, the nut M will pass along on the sleeve K, causing the lever N to vibrate and carry one of the rollers up and the other down in such a manner as to slacken the belt or to tighten it, the loosening and tightening of the belt being correspondent with its shifting. Fig. 2 shows the position of the tightening device when the belt is loosened and off the pulley. Fig. 3 shows its position when the belt is tightened and on the pulley.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is--

1. In a belt-shifter, a rotary spider located adjacent to the driving-pulley, the extremities of its radial arms being provided with devices adapted to pass beneath the belt and lift the same from the pulley, and certain of said arms being movable relatively to the others, substantially as and for the purposes described.

2. In a belt-shifter, the rotary spider composed of arm-carrying disks located on each side of the driving-pulley, and having the extremities of each pair of oppositely-located arms suitably connected, one pair of arms being movable relatively to the others to permit the arms to be supported at the proper time between the upper and lower portions of the driving-belt, in combination with devices for rotating the spiders and for adjusting the movable arms, substantially as described.

3. In a belt-shifter, the combination of the rotary spider consisting of disks D and radial arms secured to said disks, the opposite radial arms of the two disks being connected by roller-carrying rods, the worm-shaft I, meshing with a gear, *a*, on one of the disks for the purpose of rotating the spider, and suitable devices for loosening and tightening the belt correspondingly with the operation of the spider, all substantially as shown and described.

4. In a belt-shifter, the combination of the rotary spider consisting of two disks, D, and radial arms secured to said disks, the oppositely-located arms of the disks being connected, and certain pairs of arms, as G, being movable relatively to the others, the worm-shaft I, meshing with gear *a* on one of the disks, and suitable loosening and tightening mechanism for the belt, substantially as described.

5. In a belt-shifter, a rotary spider consisting of disks D, having slot *c*, the radial arms E F G, secured to said disks and connected by rods H, carrying rollers H', one of said arms, as G, being movable, having a projecting pin that enters the slot *c*, and held in position in said slot by spring *b*, in combination with a stop, *d*, arranged to serve substantially as described.

6. Jointly with a belt-shifter consisting of a spider whose arms lift the belt from the pulley, the belt-loosening mechanism whereby such lifting is permitted, which consists of a vibratory vertical lever, N, pivoted to a suitable hanger, N', and having frame O, with rollers o o, that act upon the belt, said lever being connected with and operated by the shaft I, which causes the spider to revolve, substantially as described. 10

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

JAMES CANNING.

Witnesses:

MELVILLE E. SMILIE,  
WALTER E. BARNEY.