

G. K. ATKINSON.

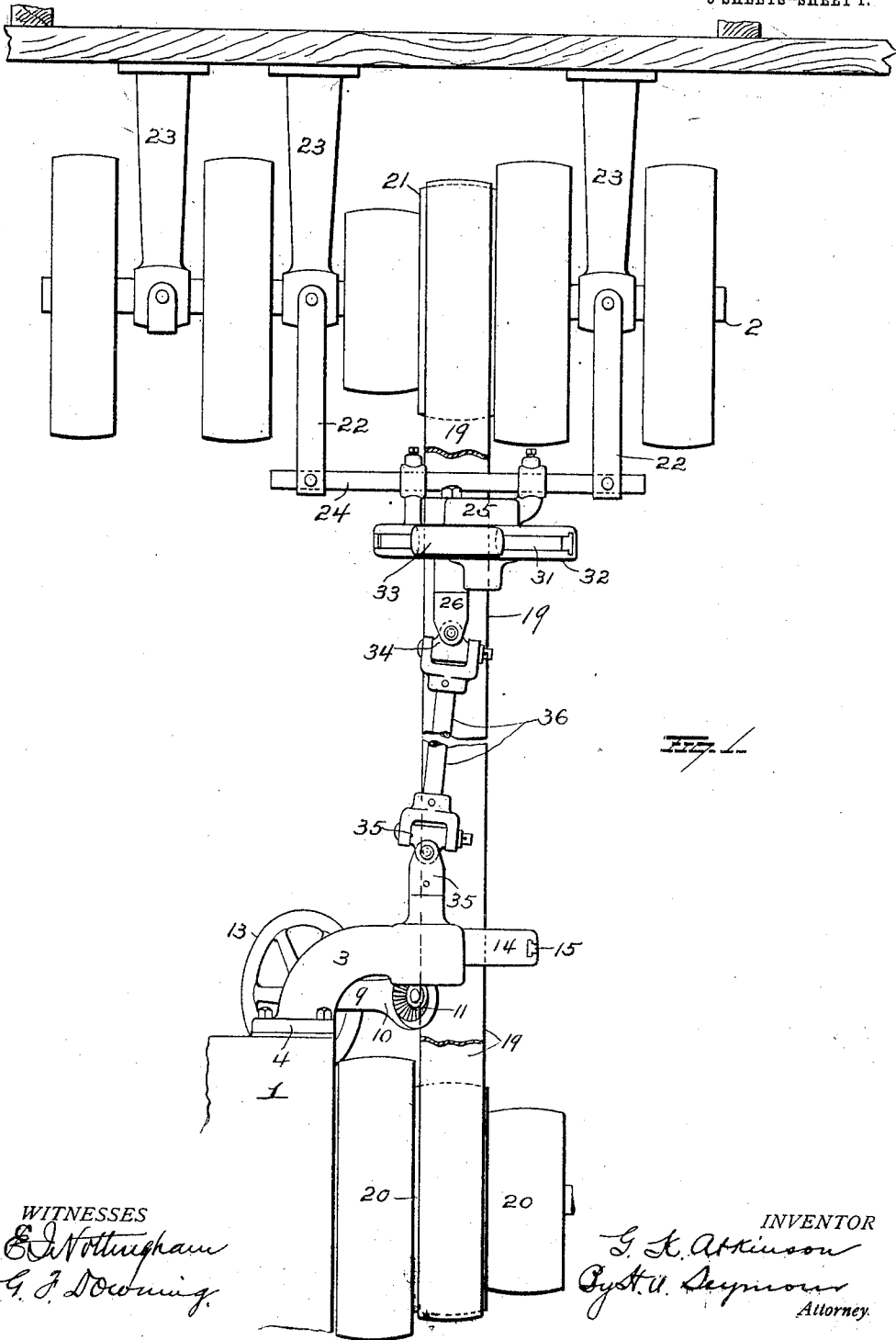
BELT SHIFTER.

APPLICATION FILED JUNE 5, 1911. RENEWED AUG. 22, 1912.

1,056,485.

Patented Mar. 18, 1913

5 SHEETS—SHEET 1.



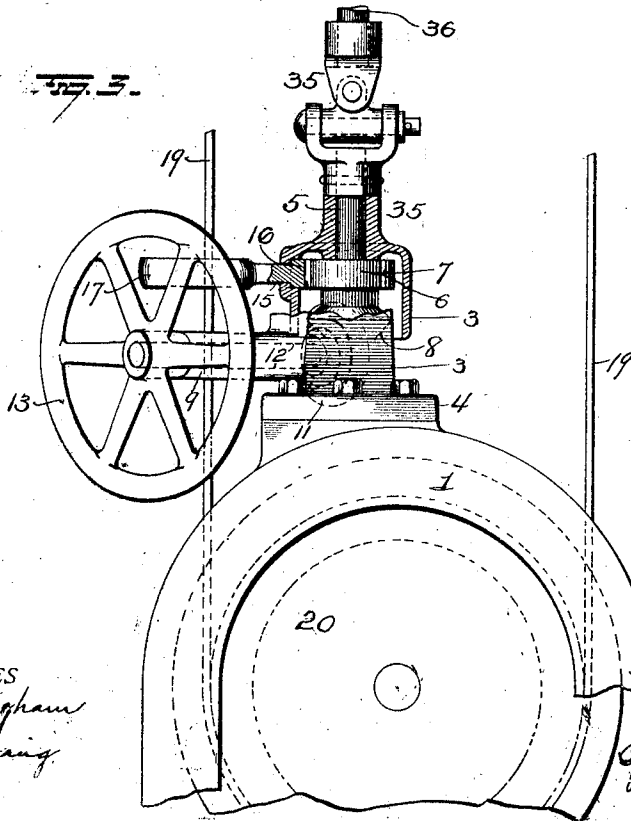
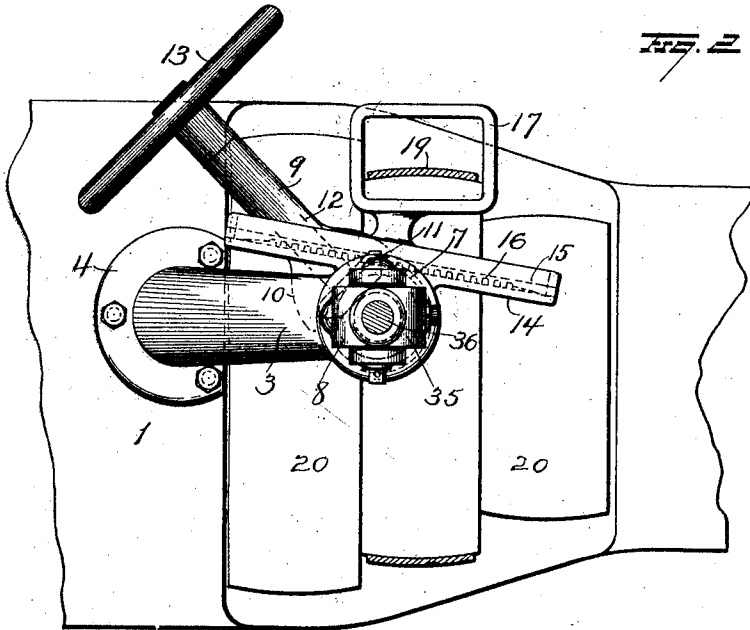
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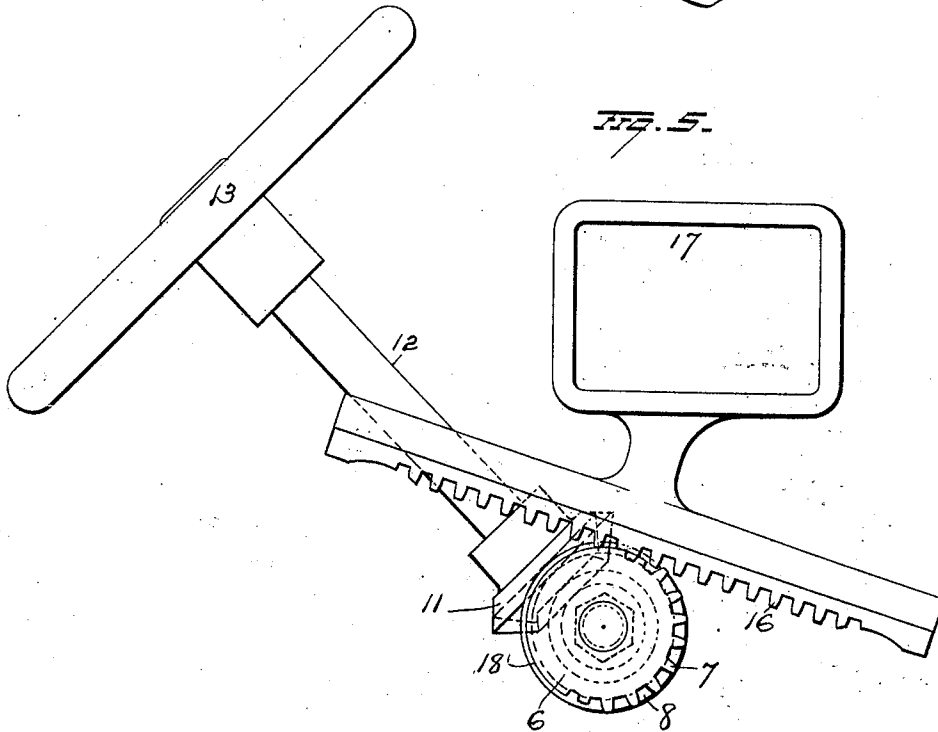
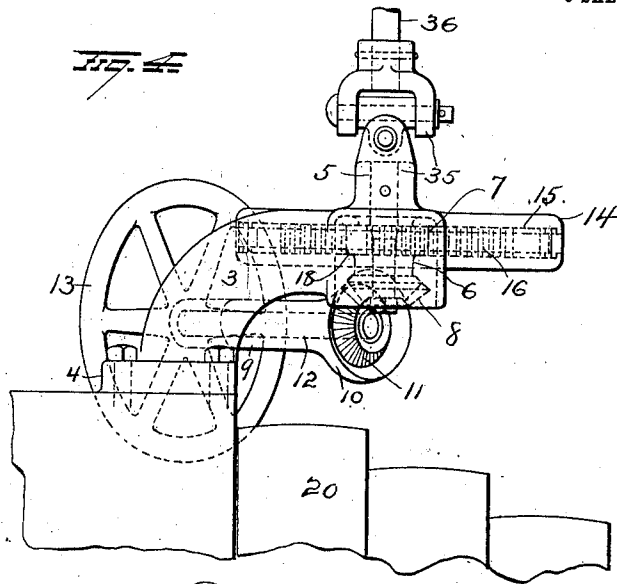
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6 SHEETS—SHEET 3.



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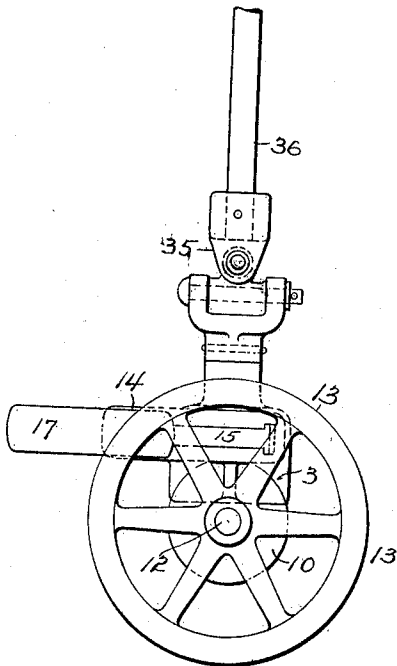


Fig. 5.

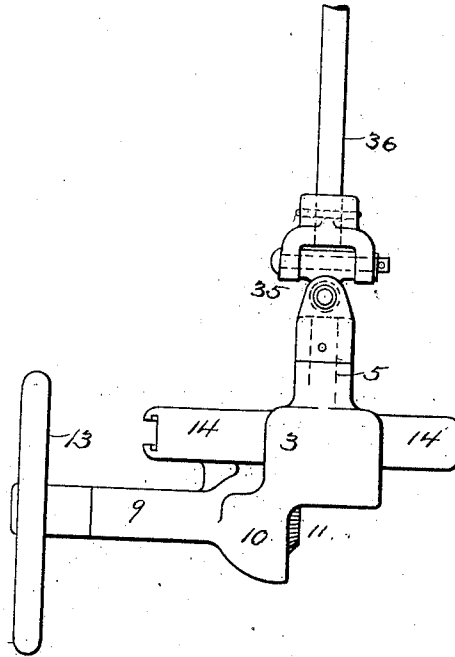
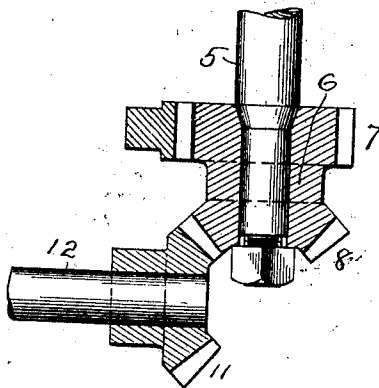


Fig. 7.

Fig. 8.



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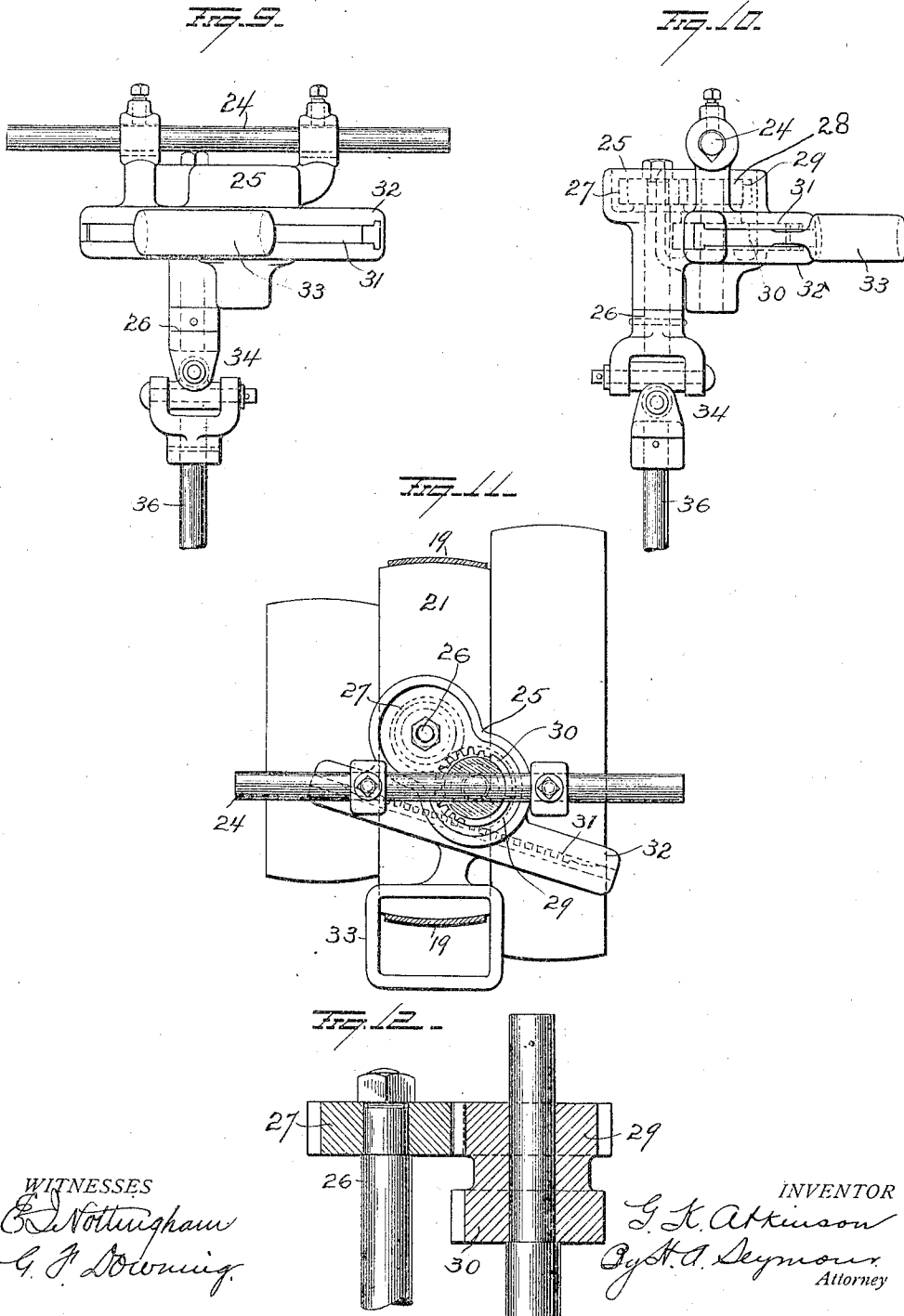
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

GEORGE K. ATKINSON, OF CINCINNATI, OHIO.

BELT-SHIFTER.

1,056,485.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed June 5, 1911. Serial No. 631,361. Renewed August 22, 1912. Serial No. 716,566.

To all whom it may concern:

Be it known that I, GEORGE K. ATKINSON, of Cincinnati, in the county of Hamilton and State of Ohio, 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 improvements in belt shifters, one object of the invention being to construct belt shifting mechanism in such manner that a belt can be shifted over a cone of pulleys on a driving shaft and also over a train of pulleys on a shaft of the machine to be driven, with the use of a single manually operable means.

A further object is to simplify and enhance the efficiency, as well as the accuracy in operation, of mechanism for shifting belts on cones of pulleys.

With these and other objects in view the invention consists in certain novel features of construction and combinations of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in elevation showing the general arrangement of my improvements. Fig. 2 is an enlarged plan view of a portion of the head stock of a lathe showing the application of my improvements thereto. Fig. 3 is an end elevation of the structure shown in Fig. 2. Fig. 4 is a rear elevation of the structure shown in Fig. 2. Fig. 5 is an enlarged view showing the devices which directly shift the belt. Fig. 6 is an end view of a portion of the shifter. Fig. 7 is a side elevation of the same. Fig. 8 is a detail sectional view showing the gearing in that portion of the shifter which is mounted on the head stock of the lathe, and Figs. 9, 10, 11 and 12 are views of that portion of the shifting mechanism for moving the belt over the cone of pulleys on the driving shaft.

My improvements are adaptable for use in shifting belts which transmit motion from pulleys on the driving or counter shaft to the pulleys on the driving shaft of a machine of any character and it is particularly well adapted for shifting driving belts for lathes. I have therefore shown the improvements as applied to a lathe.

1 represents a portion of the head stock

of a lathe and 2 a suspended driving shaft which may be a counter-shaft driven from any suitable source of power.

A frame 3 is provided with a suitable flange 4 which is securely bolted to the head stock 1 of the lathe. The frame 3 affords a mounting for a shaft 5 to which a sleeve 6 is attached and this sleeve is provided at one end with teeth to form a pinion 7 and at the other end with teeth so disposed as to form a beveled pinion 8. The frame 3 is made with a tubular arm or extension 9 having a cup shaped portion 10 at one end which constitutes a housing for a beveled pinion 11 secured to a shaft 12 mounted in said tubular arm or extension 9. The shaft 12 projects beyond the free end of the arm or extension 9 and has secured thereto, an operating wheel 13 for turning said shaft and causing the bevel pinion 11 to impart motion to the bevel pinion 8 and consequently to the pinion 7. The frame 3 is provided with an inclined portion 14 having guide-ways 15 for a rack-bar 16, with which latter the pinion 7 meshes. The rack-bar 16 is provided with an integral loop 17 through which the belt to be shifted passes.

For reasons which will be hereinafter explained, the teeth of the pinion 7 are made throughout approximately one half of the periphery of said pinion, the other half of said periphery being plain as shown at 18, Fig. 5, so that said pinion 7 is, in effect, a segmental gear, and the teeth at the central portion of the rack-bar 16 are rounded or beveled sufficiently to permit this plain portion 18 of the segmental pinion 7 to pass freely.

The belt to be shifted, which is indicated at 19 imparts motion to a cone of pulleys 20 on the driving shaft of the lathe and derives motion from a cone of pulleys 21 on the shaft 2. Links 22 depend from hangers 23 of the shaft 2 adjacent to respective ends of the cone of pulleys 21 and these links support a horizontal bar 24 on which the devices for shifting the belt over the cone of pulleys 21 are supported. In constructing these devices I provide a frame 25 in which a vertical shaft 26 is mounted and this shaft has secured thereto a pinion 27 which meshes with and imparts motion to a pinion 28 on a sleeve 29. The sleeve 29 is also provided with a segmental gear or pinion 30 (integral with said sleeve) which imparts motion to a rack-bar 31 mounted

to move longitudinally in an inclined portion 32 of the frame 25. This rack-bar carries a loop 33 through which the belt to be shifted passes. The segmental gear 30 is the same in construction as the segmental gear 7 and the rack-bar 31 is so constructed in its central portion as to permit the passage of the plain portion of said gear 30, in the same manner as above described in connection with the segmental gear 7 and rack-bar 16, but the segmental gears 7 and 30 are so disposed relatively to each other on their respective shafts that when one is in mesh with its rack-bar the other will move freely with respect to its rack-bar. A universal coupling 34 is secured to the shaft 26 and a similar universal coupling 35 is attached to the shaft 5. These couplings are connected by a vertical shaft 36 so that motion imparted by the hand wheel 13 through the medium of the shaft 12 and gears 11 and 8, will be imparted to the shaft 5 and, through the vertical shaft 36 to the pinion 27 and from the latter to the pinion 28 and segmental gear 30.

In shifting the belt, it is not moved simultaneously over both cones 20 and 21 but it is necessary that the belt shall be shifted first on one cone and then on the other and it should be moved with respect to the largest pulley first. My improvements accomplish these results. It will be seen that when the hand wheel 13 is turned, one of the segmental pinions (the pinion 7 for example) will be caused to impart motion to the rack-bar 16 and, during one half rotation of said segmental gear, the rack-bar will be moved longitudinally a sufficient distance to cause the loop 17 to shift the belt from one pulley to another of the cone 20. During such operation of the segmental gear 7 and rack 16, the plain portion of the segmental gear 30 will be passing the intermediate portion of the rack-bar 31 without imparting any motion to the latter. The continued turning of the hand-wheel 13 so as to complete the single rotation of each of the segmental pinions, the plain portion of the pinion 7 will move past the rack 16 without imparting any motion to the latter but the teeth of the segmental gear 30 will engage teeth of the rack-bar 31 and thus the latter will be moved to shift the belt from one pulley to

another of the cone 21 on the shaft 2. It is apparent that when the hand wheel is rotated in the reverse direction, the belt will be shifted in the reverse direction, first on one cone and then on the other.

Various slight changes might be made in the details of construction of my invention without departing from the spirit thereof or limiting its scope and hence I do not wish to restrict myself to the precise details herein set forth.

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

1. The combination with two sets of pulleys and a belt passing from one set to the other, of two belt shifting mechanisms, a flexible shaft and gearing and manually operated devices for controlling the operation of both shifting mechanisms, each of said mechanisms comprising a rack-bar, provided with a belt shifting loop and a segmental gear for actuating the rack bar, the segmental gear of one belt shifting mechanism being arranged to engage and operate its rack-bar while the segmental gear of the other belt shifting mechanism is out of engagement with its rack bar, substantially as set forth.

2. The combination with two cones of pulleys and a belt passing from one cone to the other, of frames adjacent to said cones, a rack-bar mounted in each frame and provided with a loop to engage said belt, a segmental gear to engage each rack-bar, each rack-bar having an intermediate portion curved concentric to the plain portion of the adjacent segmental gear, said segmental gears being so relatively disposed that when one actuates its rack-bar, the other will move idly with respect to its rack-bar whereby the belt will be shifted first on one cone and then on the other, and a single operating means for actuating both of said segmental gears.

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

GEORGE K. ATKINSON

Witnesses:

GEORGE E. WILLS,
JOSEPH L. LOGAN.