

G. C. SMITH & O. A. KRAFT.

BELT SHIFTER.

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964,127.

Patented July 12, 1910.

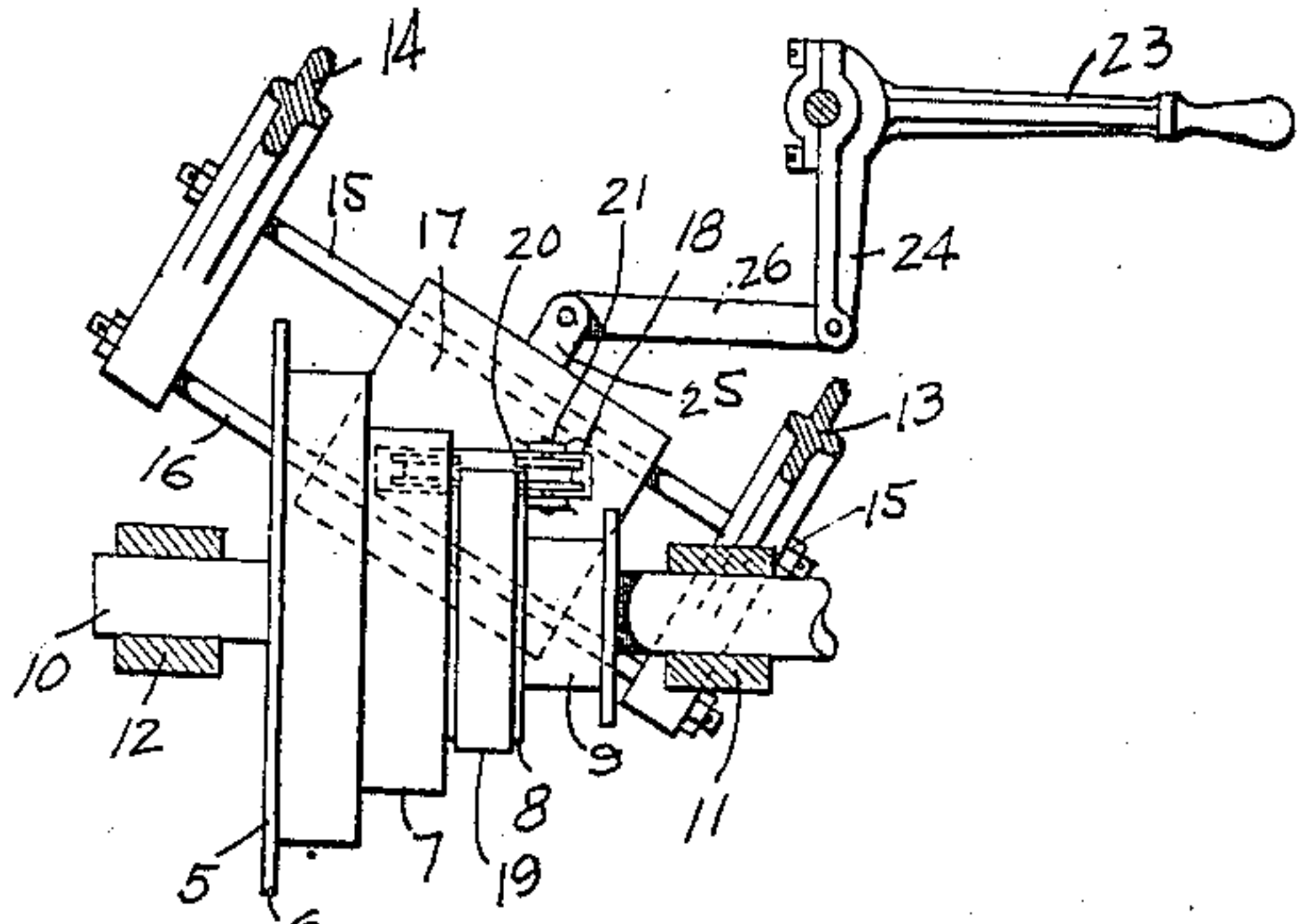


Fig. 1.

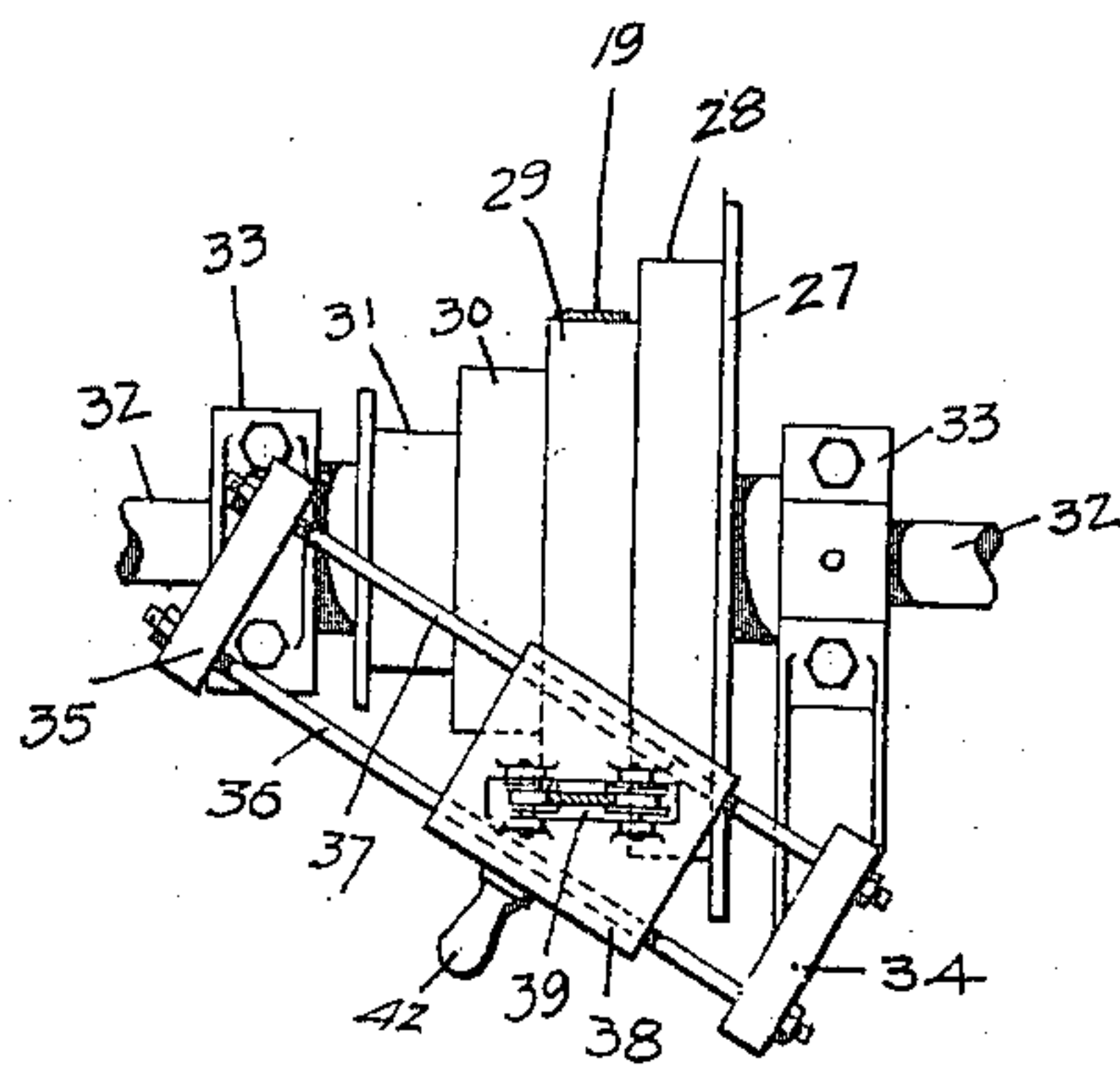


Fig. 3.

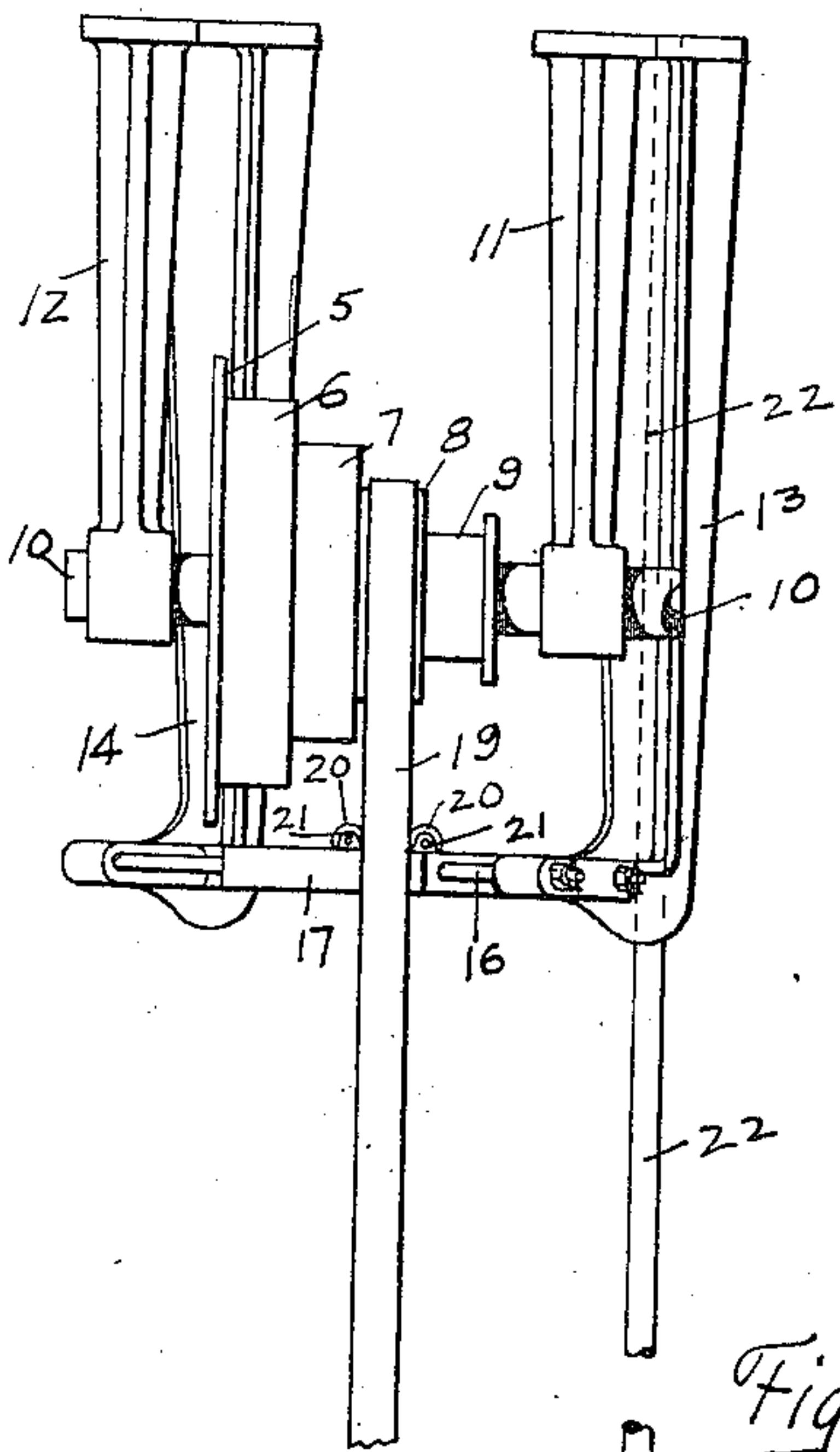


Fig. 2.

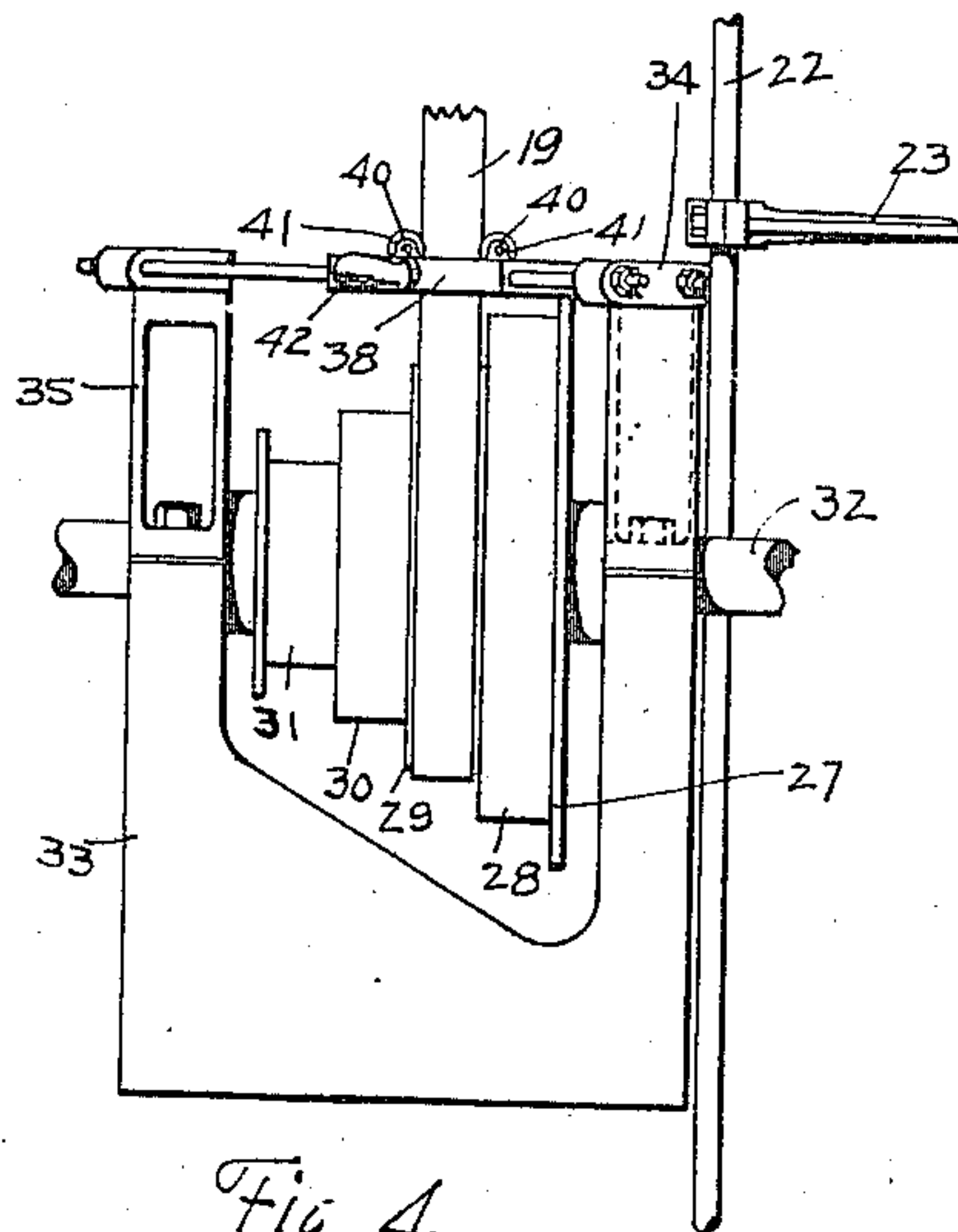


Fig. 4.

WITNESSES:

Chas. W. Stauffer
Ethel A. Kelly

INVENTORS
George C. Smith
Oscar A. Kraft
BY J. W. Ellis
ATTORNEY

UNITED STATES PATENT OFFICE.

GEORGE C. SMITH AND OSCAR A. KRAFT, OF BUFFALO, NEW YORK.

BELT-SHIFTER.

964,127.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, GEORGE C. SMITH and OSCAR A. KRAFT, citizens of the United States, and residents of Buffalo, county of Erie, and State of New York, have invented certain new and useful Improvements in Belt-Shifters, of which the following is a full, clear, and exact description.

Our invention provides a means for a simple and efficient belt shifter which is so adapted that the operator can shift the driving belt from one pair of steps on the cone pulley to another pair without having to do so by hand.

The invention consists of the novel devices and combinations hereinafter described and specifically defined in the claims and the many advantages resulting from the use of the invention will be evident to those skilled in the art.

Referring to the accompanying drawings which illustrate the invention and in which like characters of reference denote like parts in all the different views: Figure 1 is a top plan view of our overhead belt shifter. Fig. 2 is an elevation of the device shown in Fig. 1. Fig. 3 is a top plan view of our belt shifter as adapted for a low down belt cone. Fig. 4 is an elevation of the belt shifter shown in Fig. 3.

Referring first to the device shown in Figs. 1 and 2: 5 is a cone pulley having stepped faces 6, 7, 8 and 9 of different diameters. The cone pulley 5 is carried by the shaft 10 which is suitably supported in the hangers 11 and 12. Auxiliary hangers 13 and 14 carry rods 15 and 16. A block 17 is adapted to travel longitudinally on the rods 15 and 16 which act as guideways for such travel. The auxiliary hangers 13 and 14 and the rods 15 and 16 are angularly arranged with reference to the cone pulley 5 so that the block 17 will, when longitudinally moved over the different faces 6, 7, 8 and 9 of the pulley 5, be always in substantially the same relation to each of these different faces. The block 17 is slotted at 18 and through this slot the belt 19 passes. Arranged to revolve within the slot 18 are idlers 20 one on each side of the belt 19 each of which is carried in suitable bearings 21 on the block 17. The distance between the

auxiliary hangers 13 and 14 is preferably such that when the block 17 is nearest the hanger 14 the belt 19 will be guided directly upon the face 6 of the cone pulley 5 and when the block 17 is nearest the hanger 13 the said belt will be guided upon the face 9 of the cone pulley 5. A rock rod 22 is suitably secured preferably in the ceiling and floor and adapted to be rotated in its upper and lower bearings. To the rock rod 22 is rigidly secured at some convenient height a handle 23. Likewise secured to said rock rod 22 is a lever 24. The handle 23 and the lever 24 act together like a bell crank lever having its fulcrum on the rock rod 22. A strap 25 or other suitable securing means is rigidly secured to the block 17. A link 26 is pivotally secured at one end to the lever 24 and at its other end to the strap 25.

Referring now to the belt shifter shown in Figs. 3 and 4: the cone pulley 27 has faces 28, 29, 30 and 31 of different diameters similar to the faces 6, 7, 8 and 9 of the cone pulley 5. This pulley is carried by the shaft 32 which is supported by a suitable standard 33 secured to the floor. Likewise carried by the standard 33 are auxiliary standards 34 and 35 which are adapted to carry guide rods 36 and 37. A block 38 is adapted to move longitudinally on the guide rods 36 and 37. In this block 38 is provided a slot 39 through which the belt 19 is adapted to travel. In this slot 39 are mounted idlers 40 having bearings 41 carried by the block 38. These idlers 40 like the idlers 20 are so arranged that the belt 19 travels between them and they act as guides to keep the belt 19 on the desired face of the cone pulley 27. The supports 34 and 35 and the guide rods 36 and 37 are so arranged that during the longitudinal travel of the block 38 the slot 39 is always so positioned with reference to the faces of the cone pulley 27 that the belt will be held within the slot and guided over any desired face of the said pulley. A handle 42 provides means for moving the block 38 longitudinally and thus directing the belt 19 onto any desired face of the pulley 27. The distance between the supports 34 and 35 is preferably such that when the block 38 is thrown against the support 34 the

belt 19 will be guided onto the face 28 of the pulley 27. When the block 38 is thrown against the support 35 the belt 19 will be guided upon the face 31 of the pulley 27.

5 Having thus described the several parts of our invention we will now describe its method of operation. As is usual the stepped faces 6, 7, 8 and 9 of the cone pulley 5 and the stepped faces 28, 29, 30 and
10 31 of the cone pulley 27 are reversely arranged and so positioned that the face of largest diameter on the upper cone pulley is substantially in line with the face of smallest diameter on the lower cone pulley.
15 Assuming that it is desired to shift the belt 19 from the face 8 of the cone pulley 5 onto the face 9 of that same pulley and simultaneously shift the said belt from the face 29 to the face 28 of the cone pulley 27:
20 the operator will first grasp the handle 23 and swing it and thereby rotate the rock rod 22 so that the lever 24 is carried to the right of Fig. 1. This will pull upon the link 26 and strap 25 so that the block 17 will
25 travel to the right of Fig. 1. This travel of the block 17 will carry with it the belt 19 which will thus be thrown from the face 8 onto the face 9. The block 17 will be limited in its travel by striking the auxiliary hangers 13 at that point where the belt
30 will be centrally held by means of the block over the face 9 of the pulley 5. The operator will then grasp the handle 42 and throw the block 38 to the right of Figs. 3 and 4 so
35 that the belt 19 will thus be guided onto the face 28 of the cone pulley 27 and the block will be prevented from any further right hand travel by striking against the support 34. When it is desired to change the belt
40 from one stepped face to another of these cone pulleys, it will be evident that the operation for so changing the belt will be substantially the same as that just described.

It will be evident that our improvement
45 requires no alterations in the hangers or their parts and that the use of our device makes it possible to use a belt running tighter on the cone pulleys than could be otherwise used.

50 Our invention is very simple and inexpensive to build and capable of easy operation. It is moreover adapted to be used with any machine where motion is transmitted by means of cone pulleys having
55 faces of different diameters. By the use of our invention the belt can be always maintained in true central position on the faces of the cone pulleys. If desired, of course, means may be used for locking the
60 rock rod 22 in any predetermined position and for locking the block 38 in any predetermined position, thus making sure that the belt is held on the faces of the cone pul-

leys wherever desired. These locking means, however, we consider unnecessary for
65 use in most cases, since the blocks 17 and 38 may be so arranged upon the guide rods 15 and 16 and 36 and 37 that their longitudinal travel will be only possible when
70 the blocks are actuated by the operator.

Having thus described our invention what we claim is:

1. The combination with an upper or driving stepped cone-pulley, a lower or driven stepped cone-pulley and its bearings
75 and a belt passing around said cone-pulleys; of a bolt shifter comprising supporting brackets at said upper cone-pulley, upper guide rods carried by said brackets and disposed substantially parallel with a line
80 which is drawn across the faces of said upper cone-pulley steps and touching the centers of said steps, an upper guide block slidably mounted on said upper guide rods and provided with a slot disposed at an angle
85 with said guide rods but parallel with the axis of said cone-pulley, a rock rod rotatably mounted near said upper guide rods, a lever and link connection between said upper block and said rock rod, lower guide rods
90 disposed substantially parallel with a line which is drawn across the faces of said lower cone-pulley steps and touching the centers of said steps and carried by the bearing caps of said lower cone-pulley bearings, a lower
95 guide block slidably mounted on said lower guide rods and provided with a slot disposed at an angle with the said guide rods but parallel with the axis of said cone-pulley, means carried by said lower guide block for oper-
100 ating the same and means carried by said rock rod for operating the same, whereby said guide blocks may be moved longitudinally on said guide rods.

2. The combination with an upper or driving stepped cone-pulley, a lower or driven stepped cone-pulley and its bearings and a belt passing around said cone-pulleys; of
105 a belt shifter comprising supporting brackets at said upper cone-pulley, upper guide rods carried by said brackets and disposed substantially parallel with a line which is
110 drawn across the faces of said upper cone-pulley steps and touching the centers of said steps, an upper guide block slidably mounted on said upper guide rods and provided with a slot disposed at an angle with said
115 guide rods but parallel with the axis of said cone-pulley, grooved idlers mounted on said upper guide block and rotatable within the slot of said block, a rock rod rotatably
120 mounted near said upper guide rods, a lever and link connection between said upper block and said rock rod, lower guide rods disposed substantially parallel with a line which is
125 drawn across the faces of said lower cone-

pulley steps and touching the centers of said steps and carried by the bearing caps of said lower cone-pulley bearings, a lower guide block slidably mounted on said lower
5 guide rods and provided with a slot disposed at an angle with the said guide rods but parallel with the axis of said cone-pulley, grooved idlers mounted on said lower guide block and rotatable with the slot of
10 said block, means carried by said lower guide block for operating the same and

means carried by said rock rod for operating the same whereby said guide blocks may be moved longitudinally on said guide rods.

In testimony whereof we have hereunto 15 set our hands in the presence of two witnesses.

GEORGE C. SMITH.
OSCAR A. KRAFT.

Witnesses:

J. WM. ELLIS,
ETHEL A. KELLY.