No. 782,350. PATENTED FEB. 14, 1905.

J. H. MOORE.

DEVICE FOR SHIFTING THE BELTS OF MACHINERY.

APPLICATION FILED MAR. 28, 1904.

2 SHEETS—SHEET 1.

Fig. 2.

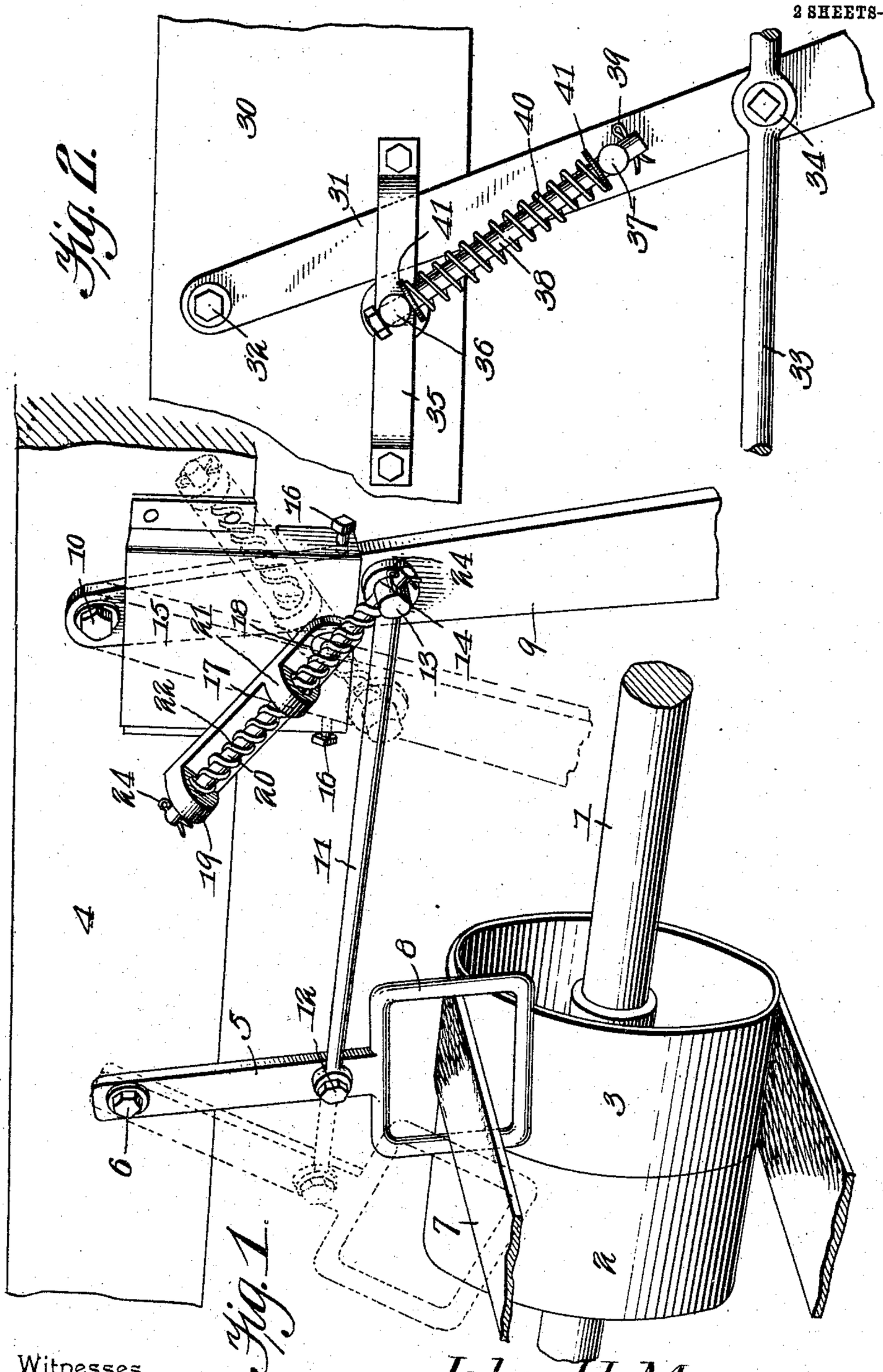

Fig. 1.

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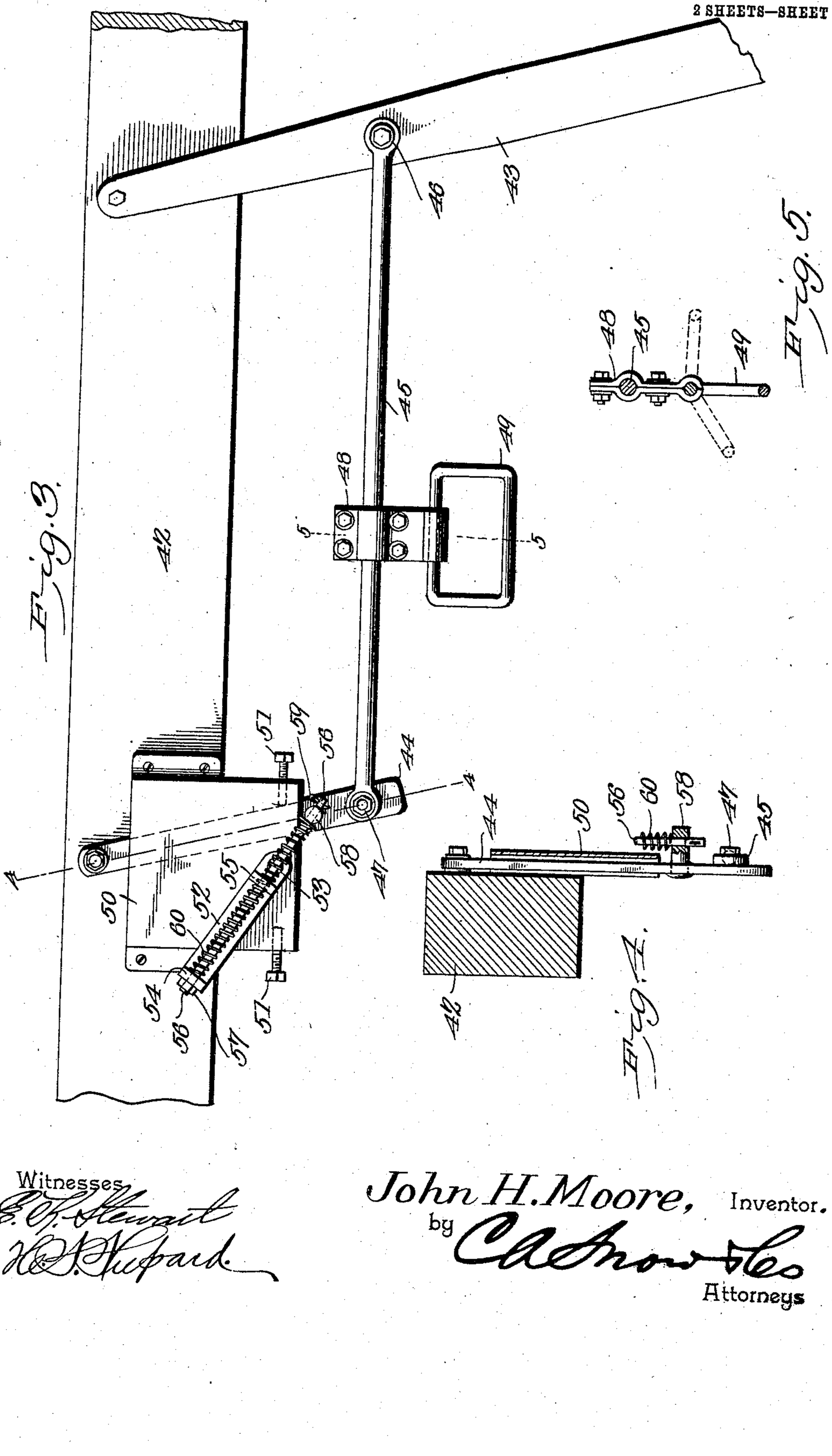

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No. 782,350. Patented February 14, 1905.

UNITED STATES PATENT OFFICE.

JOHN H. MOORE, OF HOOPESTON, ILLINOIS.

DEVICE FOR SHIFTING THE BELTS OF MACHINERY.

SPECIFICATION forming part of Letters Patent No. 782,350, dated February 14, 1905.

Application filed March 28, 1904. Serial No. 200,399.

To all whom it may concern:

Be it known that I, JOHN H. MOORE, a citizen of the United States, residing at Hoopeston, in the county of Vermilion and State of Illinois, have invented a new and useful Device for Shifting the Belts of Machinery, of which the following is a specification.

This invention relates to devices for shifting the belts of machinery; and the principal object of the invention is to provide a simple, inexpensive, durable, and thoroughly-reliable device for shifting a belt from a loose pulley to a fast pulley, and vice versa, which without increasing the effort required for shifting the belt will insure the retention of the belt in proper position upon the pulley to which it is shifted.

With the object above stated and others in view, as will appear when the invention is more fully disclosed, the same consists in a novel construction, combination, and arrangement of parts, as hereinafter fully described and claimed, and illustrated in three slightly-different forms of embodiment in the accompanying drawings, it being understood that changes in the form, proportions, and exact mode of assemblage of the elements exhibited may be made without departing from the spirit of the invention or the sacrifice of its advantages.

In the drawings, Figure 1 is a perspective view of one form of embodiment of the invention, showing the belt-shifter in position to hold the belt upon one of the pulleys and showing in dotted lines the position of the parts of the belt-shifter after the belt has been shifted to the other pulley. Fig. 2 is an elevational view of a slightly-different form of embodiment of the invention, the pulleys and the belt-engaging arm being omitted to save space. Fig. 3 is an elevation of the preferred embodiment of the invention. Fig. 4 is a detail sectional view taken through the tension device and adjacent parts on the line 4 4 of Fig. 3. Fig. 5 is a detail sectional view on the line 5 5 of Fig. 3, illustrating the adjustment of the belt-engaging device.

Referring to the drawings, in which the several parts are indicated by suitable characters of reference throughout the several views, 1 indicates an ordinary piece of shafting having mounted thereon a fast pulley 2 and a loose pulley 3, which are arranged side by side in the usual manner. Above the piece of shafting 1 extends a timber 4, which may be a joist or rafter of the building in which the machinery is erected. Upon the timber 4 and substantially above the narrow space between the pulleys 2 and 3 a belt-engaging arm 5 is pivotally mounted by means of a bolt 6 or other suitable fastening means. The belt-engaging arm 5 extends downward in the embodiment of the invention shown in Fig. 1 to engage a belt 7, arranged for travel over the pulleys; but it is to be understood that the belt-shifting arm is always to be arranged in a plane substantially at right angles to that in which the belt travels and that the plane of the arm will accordingly be determined by the position of the belt. The belt-engaging arm 5 is provided at its free end with a substantially rectangular or square loop 8, which is preferably formed with round sides, as shown, to prevent injury to the edges of the belt from contact with the sides of the loop.

The operating-lever by means of which the shifting of the belt is effected is indicated at 9 and is pivotally mounted at 10 upon the timber 4. The lever extends downward and is held parallel with the belt-engaging arm 5 by a connecting-rod 11, which is pivotally connected at its ends with both the arm 5 and the lever 9, the points of attachment of the connecting-rod to the arm 5 and the lever 9 being located at about equal distances from the pivotal points about which the arm and lever swing. The connecting-rod may be attached to both the belt-engaging arm and the operating-lever by any suitable pivots, as the bolt 12, by which it is attached to the belt-engaging arm and the stud 13, which passes through an eye 14 in the end of the rod attached to the operating-lever. The stud 13 must be free to turn in an opening provided therefor in the operating-lever for reasons which will presently appear. The swing of the lever 9 in shifting the belt from one pulley to another is limited by a box or casing 15, secured upon the timber 4 by screws or

other suitable fastening means and forming a guide for the swinging movement of the operating-lever. In the lower portion of the box or casing 15 set-screws 16 are mounted at opposite sides, and by the adjustment of these screws the throw of the lever may be accurately limited.

The means employed to hold the operating-lever in such position as to keep the belt upon one pulley or the other consists of a pivoted tension device, so arranged as to oppose the movement of the operating-lever from either of the limits of its movement toward the point midway between said limits. This tension device consists of a pivoted support and a spring carried by the pivoted support and arranged between a stud on the operating-lever and one end of the pivoted support. In the form of the invention illustrated in Fig. 1 the tension includes a pivoted supporting member 17, which turns on a pivot 18, arranged just midway between the two set-screws 16, which limit the throw of the operating-lever. The supporting member 17 is provided at its free end with a lug 19, having a small aperture therein for the passage of a rod 20 and is also provided near its pivoted end with a lug 21 with a larger aperture, which permits the passage of the rod 20 and a spring 22, which is coiled about the rod and has its ends in engagement with the lug 19 and the stud 13, which is also provided with an aperture for the passage of the rod. The rod 20 is held in position by means of cotter-pins 24, extending transversely through the ends thereof, and it serves to hold the spring 22 against bending out of its normal position of alinement with the lugs 19 and 21 and the stud 13. The rod also serves to swing the pivoted supporting member from the position indicated in solid lines to that shown in dotted lines, and vice versa, when the operating-lever is shifted. The tension of the spring 22, which is coiled about the rod 20 and has its ends in engagement with the lug 19 and the stud 13, must be sufficient to hold the operating-lever at the limits of its throw, but must not be much greater than is required for that purpose, as any increase in the tension of the spring above that must oppose a needless resistance to the movement of the operating-lever.

The operation of the belt-shifting device as above described will be readily understood from the description and from an inspection of the drawings. When it is desired to shift the belt from pulley 3 to pulley 2 or the reverse, the operating-lever is pushed in the direction in which the belt is to move, and as the pivotal point about which the tension device turns is considerably nearer the stud 13 than the bolt 10, by which the operating-lever is suspended, there is a gradual compression of the spring 22 as the operating-lever approaches the middle point of its swing. After passing the middle point the spring begins to expand, and if the operating-lever is released the expansion of the spring will throw the lever to the position indicated in dotted lines and will hold it in that position until the force exerted upon the spring is overcome by an operative swinging the lever back to its original position.

In Fig. 2 I have illustrated a slightly-different form of embodiment of the invention, which is of less expensive construction, but acts upon exactly the same principle as that already described.

Referring to Fig. 2, 30 indicates the supporting-timber upon which the operating-lever 31 is pivotally supported by means of a bolt 32. The connecting-rod which extends to the belt-engaging arm is shown at 33, and this arm is adjustably secured in a stud 34, mounted for free turning movement in the operating-lever. The throw of the operating-lever is limited by a guide 35, consisting of a strap of metal bent to form a loop within which the lever plays and having the ends thereof securely fastened to the supporting-timber 30. Midway between the ends of the guide-loop 35 a stud 36 is rotatably mounted, and intermediate the pivotal point of the operating-lever and the stud 34, to which the connecting-rod is attached, a stud 37, similar to the stud 36, is mounted for free turning movement. The studs 36 and 37 are transversely pierced for the reception of a headed rod or bolt 38, which is secured in position by means of a cotter-pin 39, extending transversely through the bolt at the end which is not headed. Coiled around the bolt 38 is a compression-spring 40, the ends of which engage washers 41, carried by the rod or bolt and contacting with the transversely-pierced studs in which the bolt or rod is secured. The operation of this form of the invention is manifestly precisely similar to that already described. The swing of the rod in either direction is opposed by the compression of the spring 40, because the center about which the lever oscillates is farther from the stud 37 than the stud 36, about which the tension device oscillates. After passing the middle of its swing the movement of the lever is assisted by the expansion of the spring, whether the lever be moved to the right or to the left, and when the lever has reached either limit of its swing it will be held there by the action of the spring until forcibly swung out of that position against the tension of the spring.

Another and preferred form of my invention has been shown in Figs. 3, 4, and 5 of the drawings, wherein the tension device has been transferred from the operating-lever to a supplemental lever or link and provision has been made for adjusting the position of the belt-engaging device, so as to accommodate the entire apparatus to any direction of belt. In explanation of this embodiment of the in-

vention, 42 designates a timber or other support upon which is fulcrumed the usual operating-lever 43, and at a suitable distance from the operating-lever is a shorter supplemental lever or link 44, which is fulcrumed to the support, preferably in horizontal alinement with the fulcrum of the operating-lever. Extending between these two levers is a connecting-rod 45, the opposite ends of which are pivotally connected to the operating-lever and the supplemental lever, as at 46 and 47, respectively, so as to work endwise in a substantially horizontal plane during simultaneous swinging movements of the two levers. Upon the connecting-rod 45 is a clamp or bracket 48, which is normally fixed to the rod and also capable of being adjusted longitudinally thereof, and this clamp or bracket carries a loop or link 49, designed to embrace a belt in the same manner as illustrated in Fig. 1 of the drawings. In addition to being shiftable longitudinally upon the connecting-rod, the loop may be adjustably turned about the bracket as an axis, so as to accommodate the belt-engaging loop to vertical, horizontal, or inclined belts without altering the position of any of the other parts of the apparatus. As hereinbefore indicated, the tension device has been shifted from the operating-lever 43 to the supplemental lever 44; but otherwise its structure is substantially the same as that shown in Fig. 1 and comprises a guide or casing 50 carried by the timber 42 and embracing the intermediate portion of the supplemental lever 44, there being suitable set-screws 51 piercing opposite sides of the guide and in the path of the supplemental lever to limit the swing thereof in opposite directions. Upon the outer or front face of the guide 50 is a pivotal supporting member or rock-bar 52, which is pivotally connected near its lower end, as at 53, to the guide 50. Upon the front side of the bar 52 are perforate ears 54 and 55, through which works an endwise-slidable rod 56, the upper end of which is provided with a suitable head or stop 57 to engage the upper side of the ear 54 and prevent downward displacement of the rod. The lower end of the rod works through a lug or projection 58, pivotally carried by the supplemental lever 44 at a point between the connecting-rod 45 and the bottom of the guide 50. A cotter-pin 59 or other suitable stop is provided upon the lower end of the rod 56 and below the bearing projection 58. Embracing the rod 56 is a helical spring 60, the intermediate portion of which passes loosely through the perforate ear 55, and its ends bear against the upper ear 54 and the bearing projection 58, respectively. In the operation of this latter embodiment of the invention the controlling-lever 43 is swung to shift the position of the belt-engaging member 49 against the yieldable resistance of the tension device, and when the rock-bar of the latter passes its vertical and intermediate position the tension of the spring 60 will be sufficient to throw the controlling-lever 43 to its opposite limit without further manual manipulation thereof, and the belt-engaging device 49 will be held at its opposite limit by the tension of said spring.

The essential difference between the tension device shown in Figs. 3 and 4 and that shown in Fig. 1 resides in the fact that the stud 13 forms a common pivotal connection between the connecting-rod 11, the spring-pressed rod 20, and the controlling-lever 9, while in the form shown in Fig. 3 a separate stud or bearing 58 is provided for the spring-actuated rod; but it will of course be apparent that the spring-actuated rod 56 could be passed through the pivot 47 and the latter mounted to turn within the supplemental lever 44. Either of these arrangements may be employed; but it is preferred to provide a separate bearing 58 for the spring-pressed rod, for the reason that the latter and the connecting-rod 45 may then be assembled and removed independently of one another.

From the foregoing description of the different forms of embodiment of my invention it will be clearly seen that in each form the construction is extremely simple, there is no complicated mechanism which can be readily deranged, the parts may be readily replaced if injured, and the device is of such character that its operation may be relied upon at all times.

Having thus described the construction and operation of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a belt-shifting device, the combination with belt-engaging devices, of a lever connected therewith, and a pivoted tension device connected with said lever to automatically force said lever in either direction from the middle point of its swing.

2. In a belt-shifting device, the combination with belt-engaging means, of a lever connected therewith, means for limiting the throw of said lever, and a double-acting tension device mounted independently of the lever and connected with said lever to hold it at either limit of its throw.

3. In a belt-shifting device, the combination with belt-engaging means, of a lever, a guide in which said lever swings, and a double-acting tension device mounted upon said guide independently of the lever and connected with said lever to automatically force the lever in either direction from the middle point of its swing.

4. In a belt-shifting device, the combination with belt-engaging means, of a pivoted lever connected therewith, and a pivoted tension device mounted independently of and pivotally connected with said lever, the pivotal

support of said tension device being between the pivotal point of the lever and the point of attachment of the tension device to the lever.

5. In a belt-shifting device, the combination with belt-engaging means, of a pivoted lever, and a double-acting tension device connected with said lever and comprising a pivoted supporting structure mounted independently of the lever, and a spring carried by said pivoted supporting structure and engaging said lever to automatically force the lever in either direction from the middle point of its swing.

6. In a belt-shifting device, the combination with belt-engaging means, of a pivoted lever connected therewith, devices for limiting the throw of said lever, and a double-acting tension device operating upon the belt-engaging means and mounted independently of the lever between said devices for limiting the throw of the lever.

7. In a belt-shifting device, the combination of a shiftable belt-engaging member, controlling means for shifting said member, and tension means to automatically throw said member to either of its limits from an intermediate point and to yieldably hold the belt-engaging member at its opposite limits.

8. In a belt-shifting device, the combination of a shiftable belt-engaging member, manually-operated controlling means for shifting the belt-engaging member, and tension means for automatically continuing the shifting movement of the belt-engaging device in opposite directions from its middle portion without further operation of the controlling device and for yieldably holding the belt-engaging device at its opposite limits.

9. In a belt-shifting device, the combination of a shiftable belt-engaging member, controlling means for shifting said member, and a rocking tension device mounted independently of the belt-engaging member capable of continuing the movement of said member to either of its limits from its middle position.

10. In a belt-shifting device, the combination of a shiftable belt-engaging member, controlling means therefor including a lever, and a tension device pivotally supported independently of the lever and having a slidable connection therewith to automatically throw the lever and the belt-engaging member past their middle positions.

11. In a belt-shifting device, the combination of a shiftable belt-engaging member, controlling means therefor including a lever, a rotatable bearing carried by the lever, and a tension device pivotally supported independently of the lever and having a guide member slidable through the bearing and a tension-spring carried by the guide member and engaging the bearing.

12. In a belt-shifting device, the combination of a shiftable belt-engaging member, a controlling-lever, a supplemental lever, a connecting-rod between the two levers, the belt-engaging member being carried by the connecting-rod, and a tension device connected to the supplemental lever to yieldably hold the latter at its opposite limits and capable of continuing the movement of said supplemental lever past its middle position without further manipulation of the controlling-lever.

13. In a belt-shifting device, the combination of a controlling-lever, a supplementary lever, a connecting-rod extending between the two levers, a belt-engaging member carried by the connecting-rod, a guide embracing the lever and having opposite stops to limit the swing thereof, and a tension device pivotally supported upon the guide and connected to the supplemental lever to automatically swing the latter past its middle point and to yieldably hold the same at its opposite limits.

14. In a belt-shifting device, the combination of a controlling-lever, a supplemental lever, a connecting-rod extending between the levers, and a belt-engaging member adjustably carried by the connecting-rod.

15. In a belt-shifting device, the combination of a controlling-lever, a supplemental lever, a connecting-rod extending between the levers, and a belt-engaging member carried by the connecting-rod and adjustable longitudinally thereon.

16. In a belt-shifting device, the combination of a controlling-lever, a supplemental lever, a connecting-rod extending between the levers, and a belt-engaging member carried by the connecting-rod and rotatably adjustable upon the latter.

17. In a belt-shifting device, the combination of a controlling-lever, a supplemental lever, a connecting-rod extending between the levers, and a belt-engaging member carried by the connecting-rod and adjustable longitudinally and also rotatably thereon.

18. In a belt-shifting device, the combination with a shiftable belt-engaging member, of a lever connected thereto, and a tension device pivotally supported independently of the lever and having a slidable connection with said lever, the tension device being provided with a spring having one end fixed and its opposite end engaging the pivotal connection between the tension device and the lever to compress the spring during the initial half-swing of said lever.

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

JOHN H. MOORE.

Witnesses:
JOHN D. MILLER,
D. D. GILMAN.