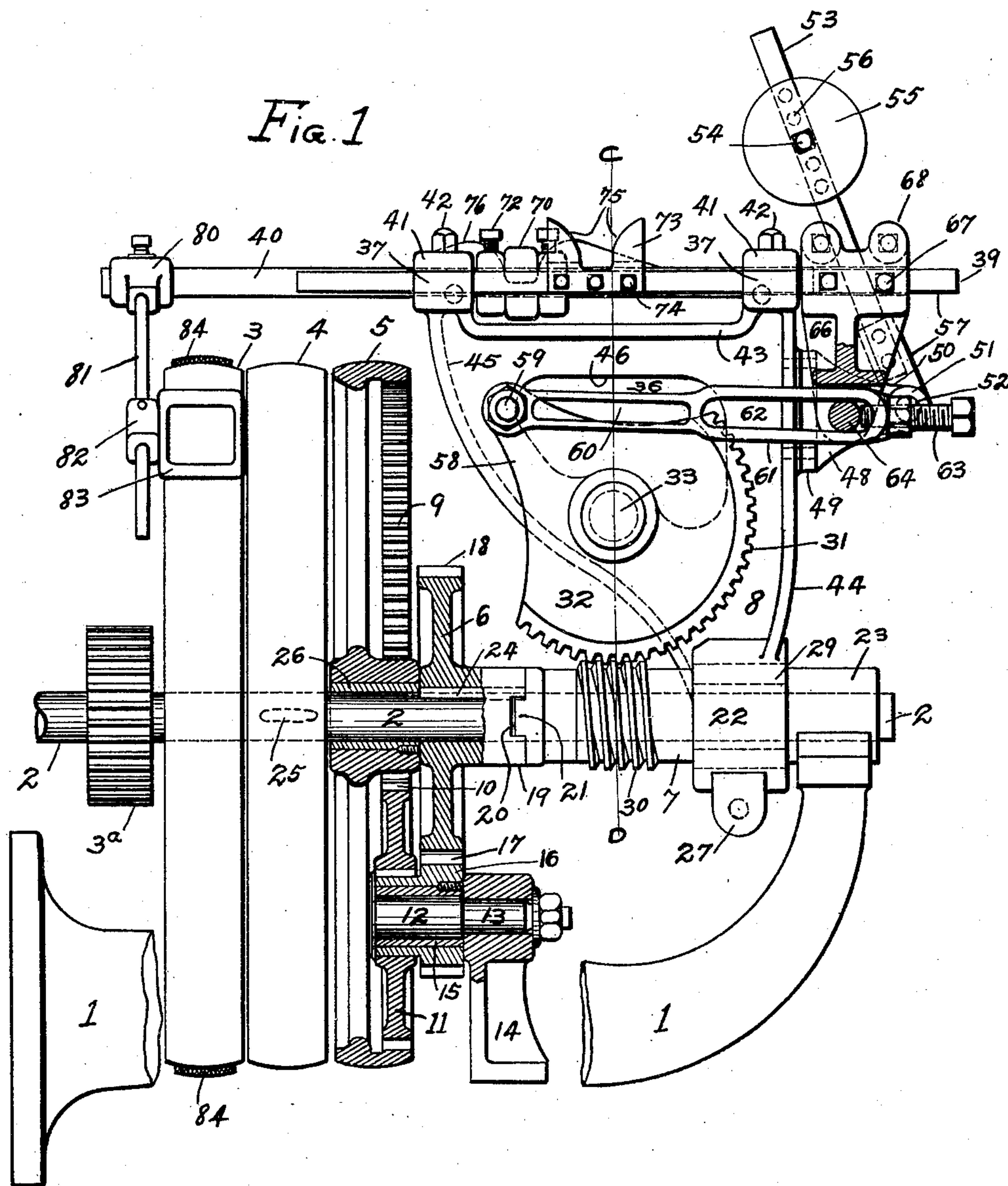


E. HIXON & P. D. MURRIN.
BELT SHIFTING MECHANISM.
APPLICATION FILED APR. 8, 1909.

976,655.

Patented Nov. 22, 1910.

3 SHEETS—SHEET 1.



Witnesses
F. J. J. J. J.
F. F. Clement.

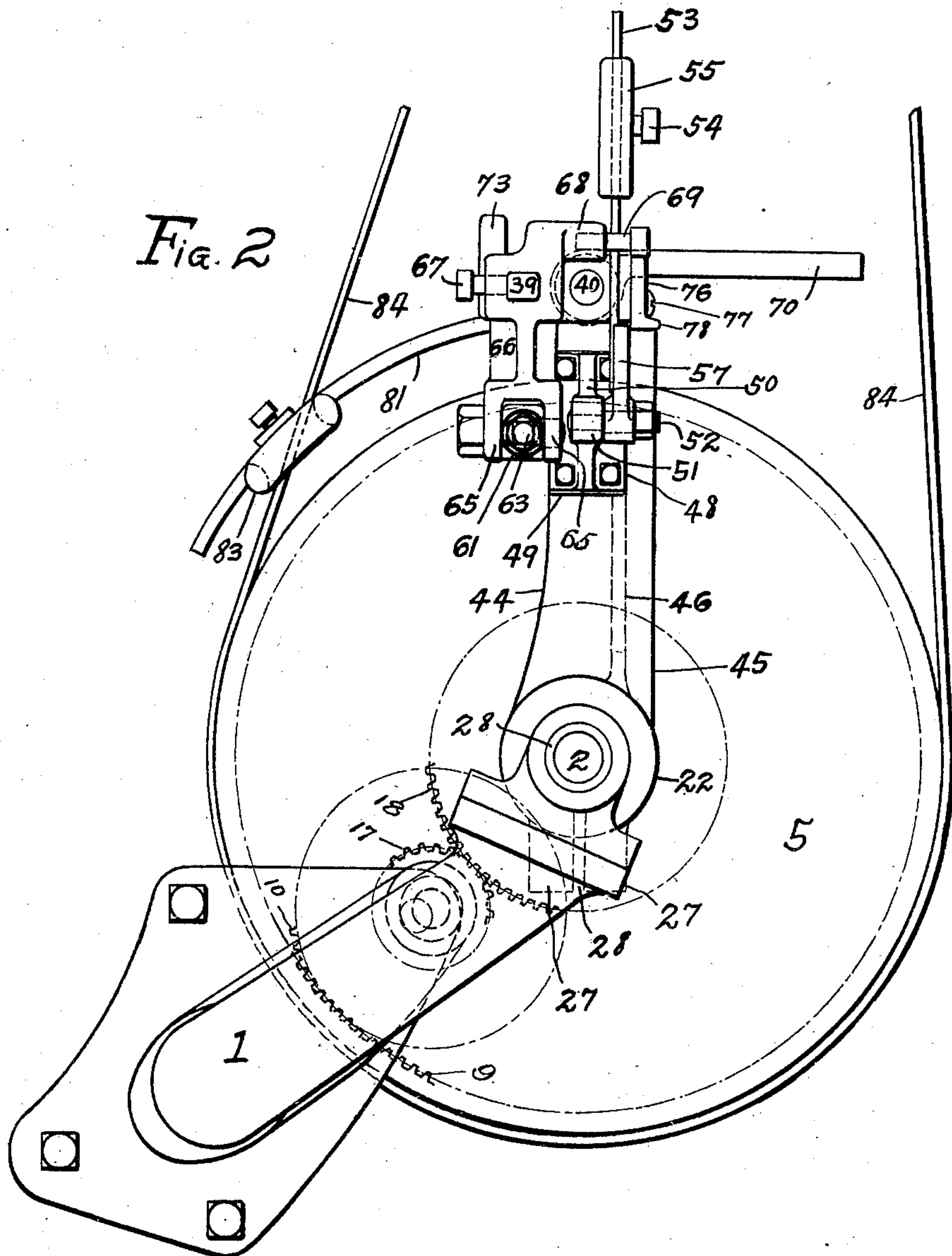
Inventors
Edward Hixon
Philip D. Murrin
By Mason F. Lawrence
their Attorneys

E. HIXON & P. D. MURRIN.
BELT SHIFTING MECHANISM.
APPLICATION FILED APR. 8, 1909.

976,655.

Patented Nov. 22, 1910.

3 SHEETS—SHEET 2.



Witnesses
F. J. Gordon Jr.
F. F. Clement.

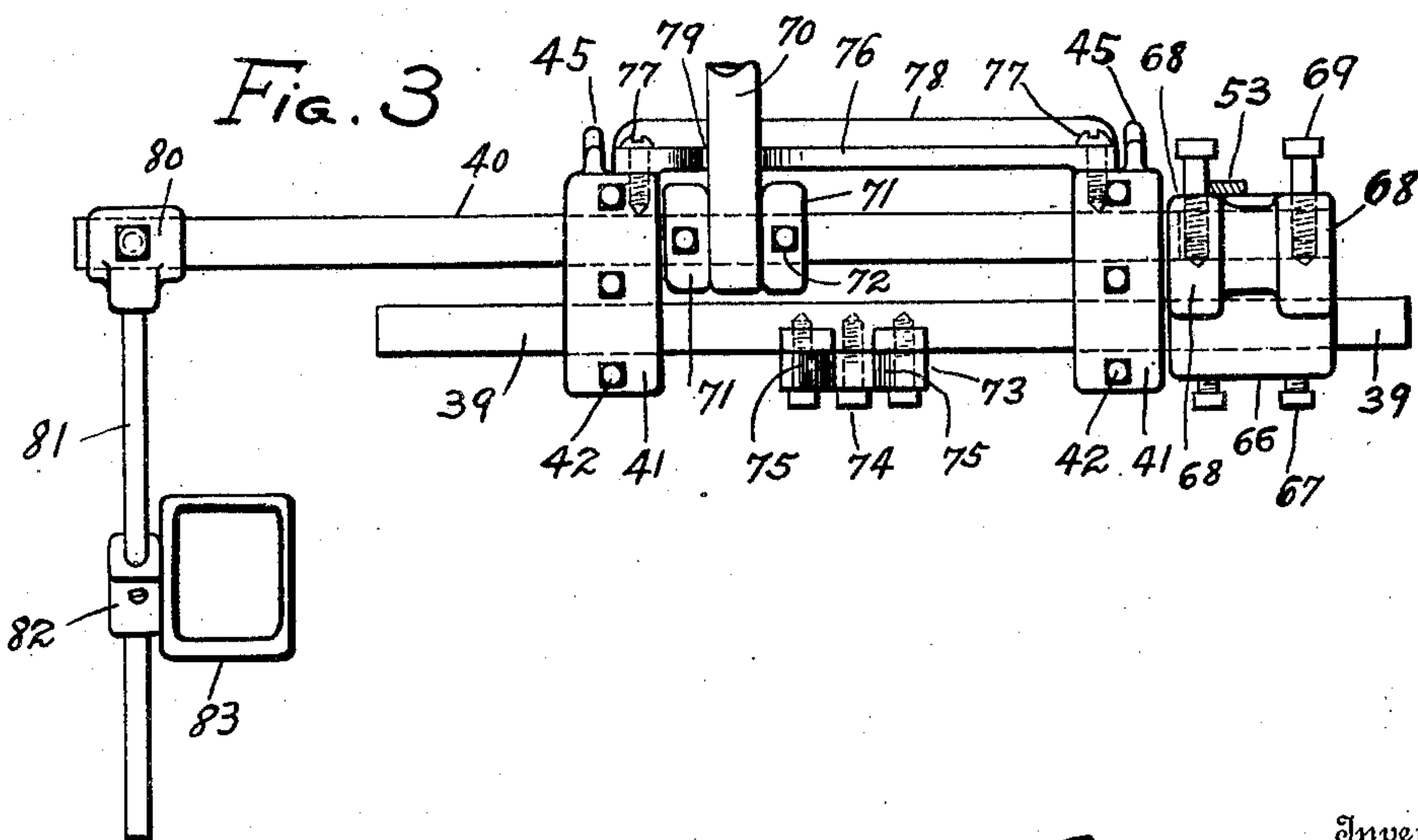
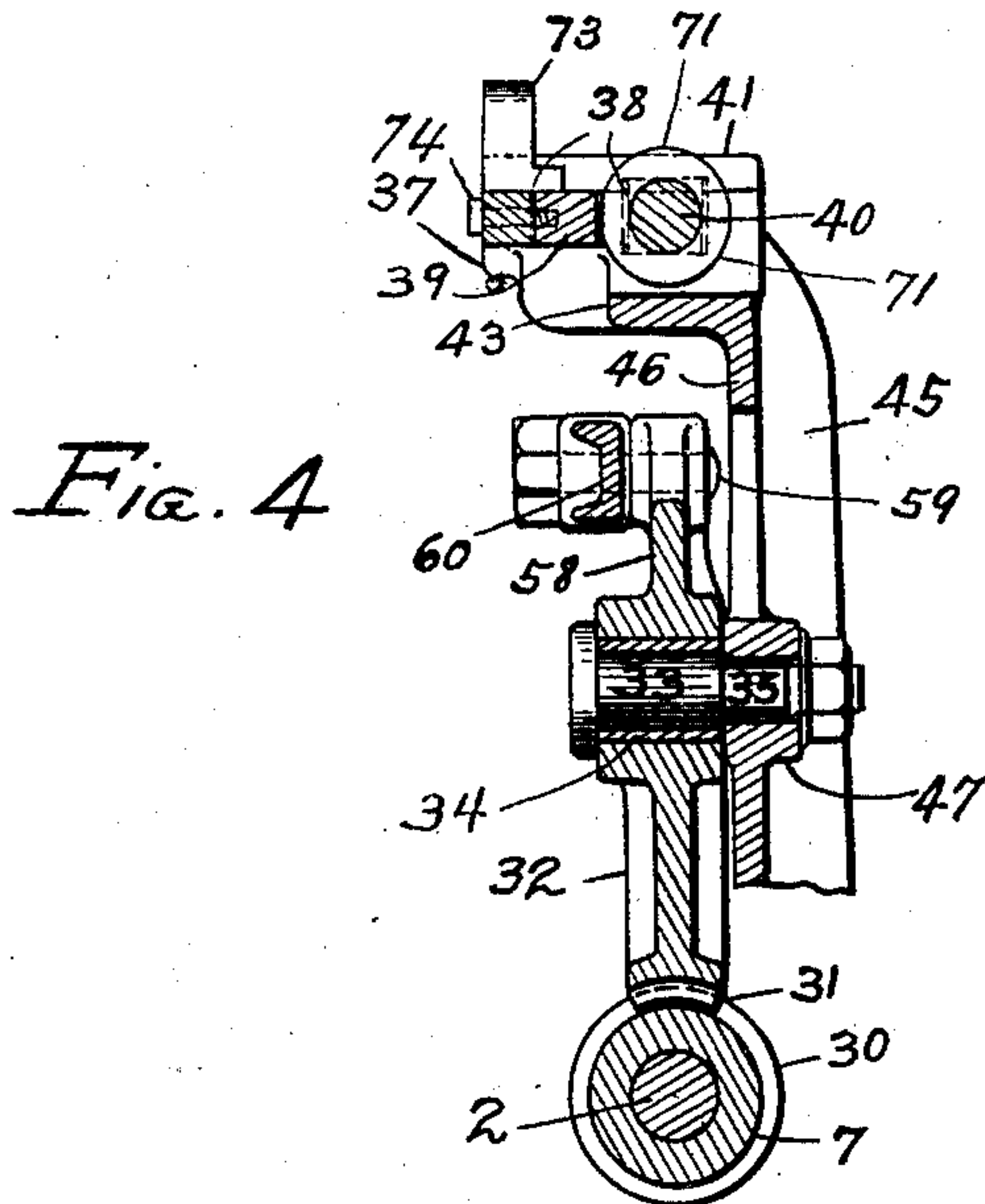
Inventors
Edward Hixon
Philip D. Murrin
By Mason F. Lawrence
their Attorneys

E. HIXON & P. D. MURRIN.
BELT SHIFTING MECHANISM.
APPLICATION FILED APR. 8, 1909.

976,655.

Patented Nov. 22, 1910.

3 SHEETS—SHEET 3.



Witnesses

F. J. Gerdone Jr
F. Y. Clement

Inventors

Edward Hixon
Philip D. Murrin

By Mason Francis Lawrence
their Attorneys

UNITED STATES PATENT OFFICE.

EDWARD HIXON AND PHILIP D. MURRIN, OF CHICAGO, ILLINOIS.

BELT-SHIFTING MECHANISM.

976,655.

Specification of Letters Patent.

Patented Nov. 22, 1910.

Application filed April 8, 1909. Serial No. 488,732.

To all whom it may concern:

Be it known that we, EDWARD HIXON and PHILIP D. MURRIN, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Belt-Shifting Mechanism; and we 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 an automatic belt shifter, and has for its purpose to provide means for reversing the direction of operation of a shaft.

With this and other objects in view the invention comprises certain novel constructions, combinations and arrangements of parts as will be hereinafter more fully described and pointed out.

In the accompanying drawings—Figure 1 represents a side elevation of the improved machine partly in section and embodying the invention. Fig. 2 is an end elevation of the structure shown in Fig. 1. Fig. 3 is a top plan view of the shifting mechanism together with attachments. Fig. 4 is a sectional elevation on line C—D of Fig. 1.

In automatic belt shifting mechanisms the most desirable object to be accomplished is the construction of a machine which, when set in motion, will continuously shift a belt on two or more pulleys, working automatically from one to the other and thereby reversing a single shaft at regular and given periods of time, which shaft may be connected up with various machines as desired, such as washing machines used in laundries, planers, shapers and lathes. These various objects have been accomplished in the construction and arrangement of parts herewith set forth to a greater extent of proficiency than in other machines with the same end in view.

Referring more particularly to the drawings, 1 represents a bracket or base partly broken away which is adapted to be bolted or otherwise secured to any desired construction. The purpose of the bracket or base 1 is to form a support for the main shaft 2 which carries a sprocket 3^a adapted to connect up in any approved manner with various classes of machines. The shaft 2 is designed to support pulleys 3, 4 and 5 as well as a gear wheel 6, a worm 7 and a bracket

8. The pulleys 3 and 5 are loosely mounted on the shaft 2 and the pulley 4 is made rigid with the same.

On the inner periphery of the pulley 5 are formed gear teeth 9 which are adapted to mesh with the teeth 10 of the gear wheel 11, the gear wheel 11 being mounted within the pulley 5 and upon a shaft 12 having a reduced portion 13 seated in a journal bracket 14 which bracket may be supported in any approved manner. Upon the shaft 12 is mounted a bushing 15 and upon the bushing 15 is rigidly mounted a pinion 16 which projects into and is keyed with the gear wheel 11. The pinion 16 is provided with teeth 17 which mesh with teeth 18 on the outer periphery of the gear wheel 6. The gear wheel 6 is provided with a hub-like projection 19 which is formed at its outer end with slots 20 into which fit corresponding projections 21 carried by the worm 7. The outer end of the worm 7 is seated against a bushing 29 located in the sleeve-like portion 22 of the bracket 8. The shaft 2 passes therethrough and forms a support for the bracket 8 and all of its attachments. The outer end of the shaft 2 is journaled in and supported by the box 23 of the bracket or base 1. The gear wheel 6 is made rigid with the shaft 2 by means of a key 24. The pulley 4 is also made rigid with the shaft 2 by means of a key 25. The pulley 5 is forced on a bushing 26 which is loosely mounted on the shaft 2. The sleeve portion 22 of the bracket 8 is provided with downwardly projecting lugs 27 which are spaced apart with an opening 28 formed between the same, which opening extends through the wall of the sleeve 22 to a bushing 29 upon which the sleeve 22 is mounted. The object of the opening 28 is to provide clearance between the projecting lugs 27 to allow the same to be drawn together for the purpose of tightly clamping the bushing 29 which is mounted on the shaft 2.

The worm 27 is provided with teeth 30 which engage teeth 31 on the outer periphery of the worm wheel segments 32. The segment 32 is pivoted to a shaft 33 which is journaled in the supporting bracket 8. The shaft 33 is mounted in a bushing 34 and has a reduced portion 35 seated in a boss 47 which is made integral with the web portion 46 of the bracket 8. The bracket 8 is provided with an opening 36 for the purpose of lightening its construction. The

bracket 8 is also provided at the top with two extensions 37 and within the extensions 37 are formed grooves 38 which act to support and guide rods 39 and 40. Seated on top of the extensions 37 and over the rods 39 and 40 is provided a detachable plate 41 secured to the extensions 37 by means of studs 42 which plates are for the purpose of holding the rods 39 and 40 in position and also for the purpose of allowing the rods 39 and 40 to be easily removed from the grooves 38.

The bracket 8 is provided on one side with ribs 43 and 44 and on the opposite side with a rib 45 all of which ribs connect the web 46 of the bracket 8 to the sleeve portion 22 and to the extensions 37.

To the rib portion 44 of the bracket 8 is secured by means of bolts, another bracket 48 having a base 49 and an extension 50. Upon the extension 50 is provided a threaded boss 51 in which is secured the bolt 52 and upon which bolt is mounted an arm 57 to which arm is secured a lever 53. To the lever 53 is attached an adjustable weight 55 secured by means of a bolt 54 operating in holes 56 to give the weight 55 any desired position on the lever.

The worm segment 32 which is pivotally mounted on the shaft 33 is provided with an extension 58 and in the end of the extension 58 is seated a pin 59 to which is pivoted one end of a pitman 60 having an extended link portion 61 provided with a slot 62. Within one end of the extended portion 61 is positioned a threaded stud 63 for the purpose of providing means to adjust the length of the slots 62 to regulate the travel of the segment 32 which in turn regulates the number of revolutions the shaft 2 will make before it reverses. The pitman 60 is supported partly by the pin 59 and partly by another pin 64 which is seated within the two-spaced arm projection 65 of the bracket 66. The pitman 60 operates forward and backward between the arm projections 65 of the bracket 66, the link portion 61 sliding upon the pin 64. The rod 39 passes through a slot in the bracket 66 and is rigidly connected to the bracket by means of studs 67. Above the rod 39 the bracket 66 is provided with spaced circular projections 68 into the ends of which are secured studs 69 spaced apart and projecting horizontally from the circular portion 68 of the bracket 66.

The lever 53 and weight 55 operate through the arc of a circle between the studs 69 with the studs acting as forward and back stops to regulate the amount of travel of the lever 53 and weight 55, both of which operate automatically to prevent the belt from centering on the two pulleys 4 and 5 which are designed to run in opposite directions.

Upon the rod 40 and between the exten-

sions 37 is pivotally mounted a pawl 70 which is held against lateral movement by means of collars 71 mounted on the shaft 40 and rigidly connected to the same by means of studs 72.

Upon the rod 39 is mounted a catch 73 rigidly connected to the rod by means of studs 74. The catch 73 is provided with beveled projections 75 between which and by which the pawl 70 is held against lateral movement. When the pawl 70 is within the catch 73 the rod 40 is thereby held against lateral movement.

To the extensions 37 of the bracket 8 are secured the ends of a latch bar 76 held in position by screw bolts 77. At the bottom of the latch bar 76 is provided a rib 78 and at one end of the latch bar 76 and in the upstanding flange of the same is provided a notch 79 within which the pawl 70 is to be positioned when it is desired to throw the belt on the idler 3 and when the belt is in this position the machine connected therewith is thrown out of operation.

To one end of the rod 40 is rigidly connected a collar 80 which carries a projecting rod 81 and upon which rod is slidably mounted a sleeve 82 to which is attached a belt guide 83 through which a belt 84 is run and by which the belt 84 is shifted from one pulley to another by the automatic operation of the rod 40 and its coacting parts.

In starting and operating the device shown in the accompanying drawings the belt 84 is shifted from the idle pulley 3 by means of the rod 40 and pawl 70 to the pulley 4 which is rigid with the shaft 2. The gear wheel 3^a being also rigid with the shaft 2 and connected to the machine which is to be run in different directions will drive the machine in one direction only as long as the belt remains on the pulley 4. As soon as the belt is moved to the keyed pulley 4 the shaft 2 is set in motion and also the gear wheel 6 which is keyed to the same shaft. Although the pulley 5 is loosely mounted on the shaft 2 it begins to rotate as soon as the shaft is set in motion but in an opposite direction to the rotation of the pulley 4. This is caused by the gear wheel 6 meshing with the pinion 16 which is keyed to a gear wheel 11 which in turn meshes with the inner periphery of the pulley 5 to operate the same in a different direction from that of the pulley 4. When the shaft 2 is rotating in a given direction the worm 7 is always rotating in the same direction, and worm 7, meshing with the segment 32, moves the same and its cooperating parts to reverse the shaft 2. If the worm 7 is engaged with one end of the segment 32, when the worm begins to rotate the segment will begin to revolve on the shaft 33 and thereby move the pin 59, the pinion 60, and its link extension 61 until the stud 63 comes in contact with the pin 64

of the bracket 66. At this point the bracket 66 will be moved, which in turn will move the rod 39 and the rod 39 being connected to the rod 40 by means of the pawl 70 will cause the rod 40 to be moved to shift the belt from one pulley to another.

To prevent the belt from centering on the pulleys 4 and 5 the bracket 66 is so positioned in relation to the lever 53 and weight 55 as to cause the same to act at the proper time to push the rods 39 and 40 either forward or backward for the purpose of throwing the belt off of a dead center position on the pulleys 4 and 5.

What we claim is:—

1. In a shaft reversing mechanism, the combination of a belt, a shaft, an idler mounted on said shaft to engage said belt when said shaft is not in motion, a pulley rigidly mounted on the said shaft, another pulley loosely mounted on said shaft, a gear wheel rigidly mounted on said shaft, a pinion meshing with said gear wheel, another gear wheel rigidly connected with said pinion and meshing with said loosely mounted pulley, and means connected with the said shaft for moving said belt from one of said pulleys to another.

2. In a shaft reversing mechanism the combination of a belt, a shaft, an idler mounted on said shaft, a pulley loosely mounted on said shaft, a pulley rigidly mounted on said shaft, a gear wheel keyed to said shaft adjacent said loosely mounted pulley, and means connecting said loosely mounted pulley and said gear wheel to rotate said shaft in an opposite direction from the rotation of said rigidly mounted pulley, and means for shifting said belt from said idler to each of said pulleys and back to said idler.

3. In a shaft reversing mechanism the combination of a belt, a shaft, a pulley rigidly mounted on said shaft, a second pulley loosely mounted on said shaft, a gear wheel keyed to said shaft adjacent said loosely mounted pulley, and means connecting said

loosely mounted pulley and said gear wheel to rotate said shaft in an opposite direction from the rotation of said rigidly mounted pulley, an idler loosely mounted on said shaft, a worm mounted on said shaft, an oscillatory gear connected with said worm and means connected with said oscillatory gear for shifting said belt from each of said pulleys to the other.

4. In a belt shifting mechanism the combination with a revolving shaft, an idler mounted on the shaft, and a belt for rotating the same, of a rod for shifting said belt, a pulley rigidly mounted on said shaft, a second pulley loosely mounted on said shaft, for rotating said shaft in a reverse direction from the rotation of said rigidly mounted pulley when moved by said belt, a gear wheel rigidly mounted on said shaft adjacent said loosely mounted pulley, and means connecting said gear wheel with said loosely mounted pulley to rotate said shaft, means for connecting said rod with said rotating shaft whereby power is conveyed from one pulley to the other, a belt guide, and means connecting said belt guide with said rod whereby said belt is shifted from one of said pulleys to the other upon movement of said rod.

5. In a belt shifting mechanism, a shaft, a system of pulleys mounted thereon, a belt connected with one of said pulleys, a supporting bracket mounted on said shaft, a rod mounted in said supporting bracket and connected with said belt, a counterweight carried by said supporting bracket, and connected with said rod, said counterweight being adapted to move the said belt from a dead center point between two of said pulleys on movement of said rod.

In testimony whereof we affix our signatures in presence of two witnesses.

EDWARD HIXON.
PHILIP D. MURRIN.

Witnesses:

H. BAUZENMACHER,
PETE THILL.