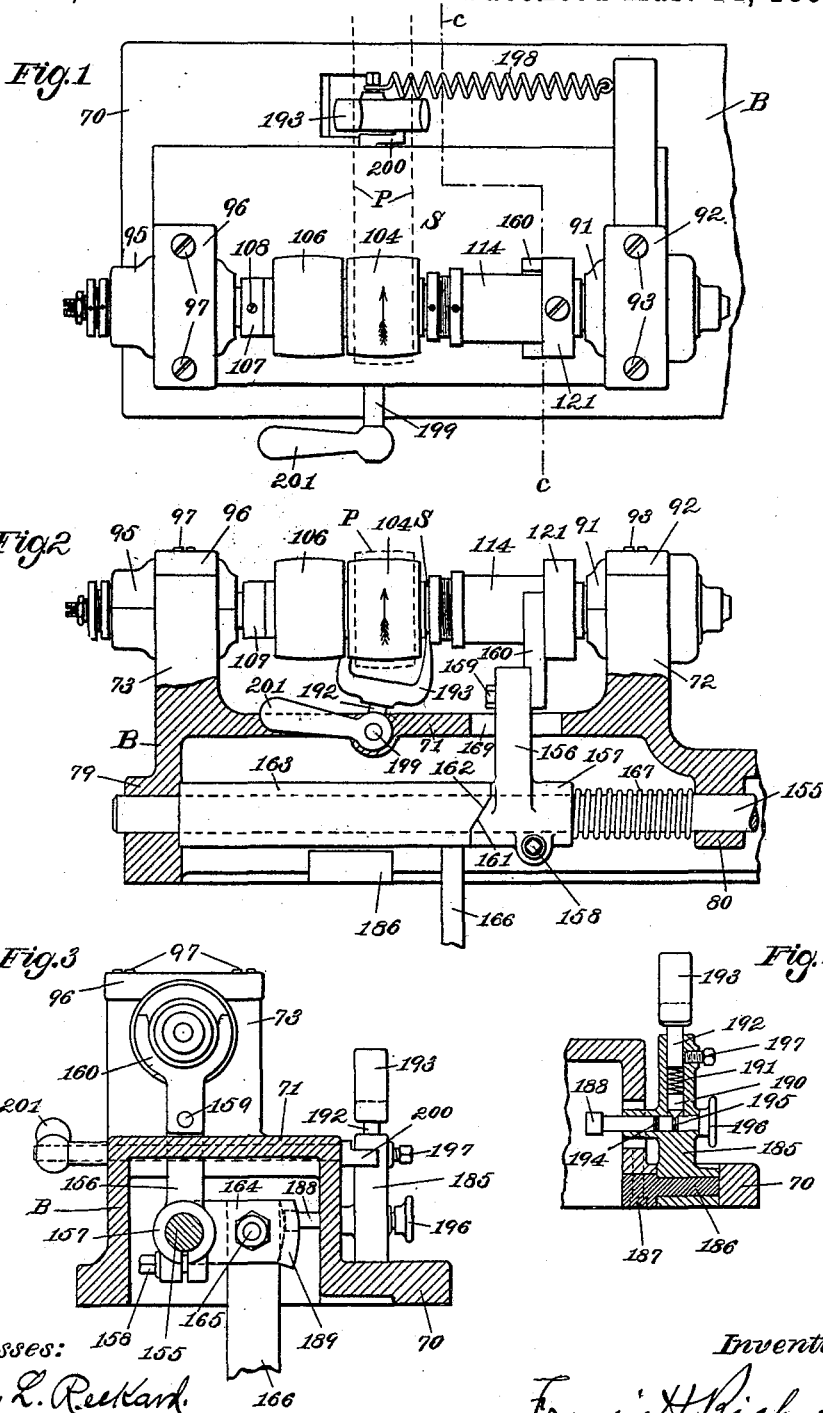


(No Model.)

F. H. RICHARDS.  
BELT SHIFTING APPARATUS.

No. 493,409.

Patented Mar. 14, 1893.



# UNITED STATES PATENT OFFICE.

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## BELT-SHIFTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 493,409, dated March 14, 1893.

Original application filed February 15, 1892, Serial No. 421,522. Divided and this application filed July 30, 1892. Serial No. 441,709. (No model.)

*To all whom it may concern:*

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Belt-Shifting Apparatus, of which the following is a specification.

This invention relates to a belt-shifting apparatus for use in lathes and other machines of that class; the object being to furnish an apparatus of that class in which the belt may be shifted at different times by independent means.

The invention consists in the features and combinations hereinafter more fully set forth and claimed.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view of a portion of a turning-machine furnished with my improved belt-shifting device. Fig. 2 is a side elevation of the same, partly in section. Fig. 3 is a transverse section in line *c c* of Fig. 1, showing the parts at the left hand of said line. Fig. 4 is a sectional view of some of the details shown in Fig. 3.

Similar characters designate like parts in all the figures.

My improved belt-shifting apparatus is especially designed for use in clock-lathes and turning-machines of that class in which it is required to actuate the belt-shifter sometimes by hand and at other times from the clutch-actuating treadle-shaft.

This application is a division of my prior application Serial No. 421,522, filed February 15, 1892, and in which my present improvements are shown applied to an improved turning-machine belonging to the class generally known as "clock-lathes."

In the accompanying drawings I have shown a portion only of a turning-machine, furnished with my improved belt-shifting device, of which the framework is designated in a general way by B, and the base, or bottom-plate, thereof by 70. At the forward side and left-hand end of the framework, there rises from the bed-plate the head-block for the live spindle, or "lathe-spindle" of the machine; which

block has the forward upright 72 and the rearward upright 73, for the spindle-bearings 91 and 95, respectively. For holding said bearings, or boxes, in place, said uprights are shown provided with the usual caps, 92 and 96, respectively, these caps being held in place by the usual cap-screws, 93 and 97, respectively. The head-block being shown elevated from the level of the bed-plate 70, and formed hollow, as will be understood by comparison of Figs. 2 and 3, there is provided within said block a space convenient for receiving certain details of the mechanism which are hereinafter described. Access to the said head-block space is had through the opening in the plate 70, of the full size of said space. The upper plate of said block is designated by 71, and the head-block may be formed integral with the framework, as indicated in the drawings of my aforesaid application, or, it may consist of a separate piece (not herein shown) fixed to the base of the framework after the manner of an ordinary lathe-head.

The lathe-spindle, which is designated in a general way by S and is usually denominated "the live spindle," is a (usually hollow) spindle journaled in the two-part spindle-bearings 91 and 95, that are carried, as hereinbefore described and as will be understood from the drawings, by the uprights 72 and 73, respectively. For the purpose of driving the spindle S and for starting and stopping said spindle, this is shown provided with the fixed pulley 104 secured thereto by means of a suitable set-screw, not shown; and with the loose pulley 106 held in place on the spindle by the collar 107 and set-screw 108. The lathe-spindle S is intended to be driven by an ordinary belt or band, P, applied to the fixed pulley 104, and shown by dotted lines in Figs. 1 and 2; and for stopping and starting the spindle a belt-shifting apparatus is provided for shifting the belt from the fixed pulley 104 to the loose pulley 106, and vice versa, as may be required. This improved belt-shifting apparatus may be described in detail as follows: The belt-shifter arm, 185, is pivotally supported on a stud, 186, which is shown fixed in a recess or opening in the bed of the machine, by means of a screw, 187, shown in dotted

lines in Fig. 4. Said arm 185 is provided with a longitudinally-shiftable pin, 188, adjustable in said arm; the inner end of said pin, when this is in its forward position, engages a cam or shifter actuator, 189, which is formed on the arm, 164, of the sleeve 163, which is operated by means of a treadle (not shown) carried by the treadle-rod 166. The arm 185 is bored to receive a detent-pin, 190, a detent-spring, 191, and the shank, 192, of the shipper-fork 193. The cam-pin 188 has formed thereon two detent-grooves, 194 and 195 respectively, in which the pointed end of the detent-pin 190 is adapted to engage. Said cam-pin 188 is also shown provided with a knob or handle, 196, by means of which it may be thrown into or out of engagement with the shipper-actuating cam 189. When it is required to operate the shipper-arm by means of the cam 189, the cam-pin 188 is set in the position shown in Figs. 3 and 4, with the detent-pin 190 engaging the groove 195 of said pin. When it is desired to operate the shifter-arm by means of the hand apparatus hereinafter described, the operator by means of the knob 196 pulls the cam-pin 188 backward, thereby disengaging said pin from the cam 189; owing to the form of the detent-grooves 194 and 195, and the form of the pointed end of the detent-pin 190, said cam-pin may be drawn outward from the position shown in Fig. 4, the pin 190 receding against the power of the spring 191, the tension of which is or may be regulated by means of the shipper-shank 192, which is adjustably fixed in the arm 185 by means of a set-screw, 197. When the pin 188 has been drawn back so as to stand free of the cam 189, said detent-pin snaps into engagement with notch 194.

As shown in Fig. 1, a spring, 198, is provided to normally hold the shipper-arm in the position shown in Figs. 1 and 2, so that the spindle-driving belt or band P shall normally run on the fixed pulley, 104, of the lathe-spindle.

The apparatus for operating the shipper-arm or band-shifter by hand consists of a rod or shaft, 199, journaled in a suitable bearing in the part 71 of the head-block, and provided at its rearward end with a crank, 200, engaging the right-hand side of the shipper-arm 185; and at its opposite end provided with a handle, as 201, by means of which the operator may rotate said shaft. In Figs. 1, 2 and 3, the shipper-handle and shipper-arm are shown in the normal positions for running the spindle. To throw the shipper-arm over toward the left-hand in Figs. 1 and 2, and thus throw the belt onto the loose pulley, 106, of the spindle, the operator grasps the handle 201 and carries it over toward the right-hand in said figures. This operates the crank or shifter-retractor 200 to throw the shipper-arm toward the left-hand in said figures, thus shipping the belt or band P from the driving pulley 104 onto the loose pulley 106. On throwing the handle 201 over in the reverse

direction to its first or normal position, the spring 198 returns the shipper-arm to its position shown in Figs. 1 and 2, thus re-shipping the belt from the loose pulley onto the driving pulley.

For operating the belt-shifter and the chuck-actuating sleeve 114, and also to provide a means for retracting the so-called "dead" spindle of the lathe, I have provided a treadle-apparatus which, in the preferred form thereof, is constructed and arranged as follows: The cam-shaft, or treadle-shaft, 155, is journaled in the bearings 79 and 80 formed on the bed B, (as best illustrated in Fig. 2,) and is fitted for sliding movement in its bearings. A chuck-actuating arm, 156, is fitted onto said shaft by means of its hub, 157, which is split on one side thereof and is clamped to the shaft by means of the clamp-screw 158, in a well-known manner. The arm 156 extends upward through an opening, 169, in the top-plate 71, and has fixed to its upper end (by means of the screw 159, or otherwise) a fork, 160, which engages one side of the collar, or flange, 121, of the sliding sleeve 114. This sleeve is, or may be, such a one as usually carried on the spindles of clock-lathes, for connecting with the usual split-chuck of those lathes, for actuating the same. A suitable spring (not herein shown) is usually provided for retracting said sleeve, in a well-known manner. The part 160 of the arm 156 bears against the flange 121 of the sleeve 114, for the purpose of sliding forward that sleeve toward the right hand in Figs. 1 and 2. The hub 157 has a cam-face, 161, engaging a corresponding cam-face, 162, on the treadle-cam or sleeve 163; which sleeve is fitted for rocking movement on the shaft 155. An arm, 164, formed on the sleeve 163, extends rearward therefrom and has attached thereto (by means of a bolt, 165, or otherwise) a treadle-rod, 166, connecting said arm with an ordinary treadle not herein shown. By means of these devices the operator is enabled to turn the sleeve 163 on the shaft 155, and thus, through the said cam-faces, to force the arm 156 and the cam-shaft 155 to which it is adjustably fixed, toward the right-hand in Fig. 2. A spiral push-spring, 167, is carried on shaft 155, one end thereof butting against the middle bearing 80, and the opposite end against the hub, 157, of the arm 156; this spring acts to return said arm 156 and shaft 155 (and, through the cam-faces, the sleeve 163) to place on the release of the treadle. The arm 164 extends rearward of the treadle-rod 166, and has formed thereon the cam 189 for operating the belt-shifter, as hereinbefore described.

Having thus described my invention, I claim—

1. In a turning-machine, the combination with the spindle having the fixed and loose pulleys, of the belt-shifter provided with the retractible cam-pin, the cam 189 adapted to have a reciprocatory movement, and to bear against said pin, a spring normally holding

the shifter toward the cam, and means for re-  
tracting, detaining and advancing the cam-  
pin, whereby the belt-shifter may be thrown  
into engagement or out of engagement with  
said cam, substantially as described.

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2. In a turning-machine, the combination  
with a belt-shifter substantially as described,  
of the reciprocatory cam operating to throw  
the shifter from the fixed pulley toward the  
loose pulley, a spring normally throwing the  
shifter from the loose pulley toward the fixed  
pulley, and shifter retractor substantially as  
described for locking the belt-shifter in its  
loose-pulley position independently of the  
movement of said cam, substantially as de-  
scribed and for the purpose specified.

3. In a turning-machine, the combination

with the shifter-actuating cam, and with the  
shifter-arm 185, of the sliding pin 188, the de-  
tent engaging said pin, and means for shift- 20  
ing said pin from and into engagement with  
said cam, substantially as described.

4. In a turning-machine, the combination  
with a shifter-actuator and with the shifter-  
arm 185, of the sliding pin 188, the detent 25  
190, the spring 191, the belt-shifter having  
the stem 192, and means for adjustably fixing  
said stem in the arm, whereby said belt-shifter  
is held in place, and whereby said spring may  
be adjusted, substantially as described.

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Witnesses:

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