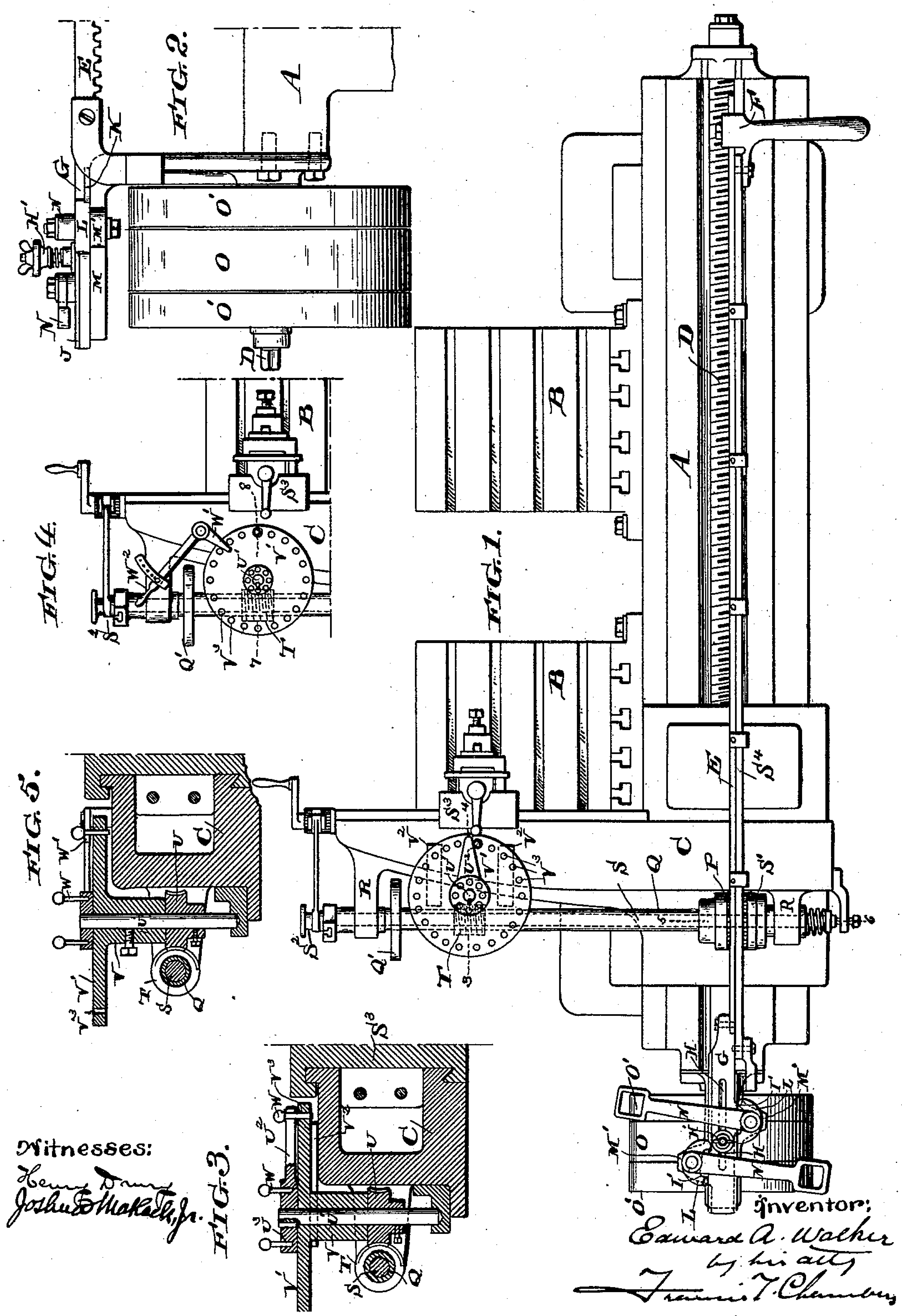
(No Model.) 2 Sheets—Sheet 1.

E. A. WALKER.

BELT SHIFTER.

No. 472,745. Patented Apr. 12, 1892.



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(No Model.) 2 Sheets—Sheet 2.

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FIG. 6.

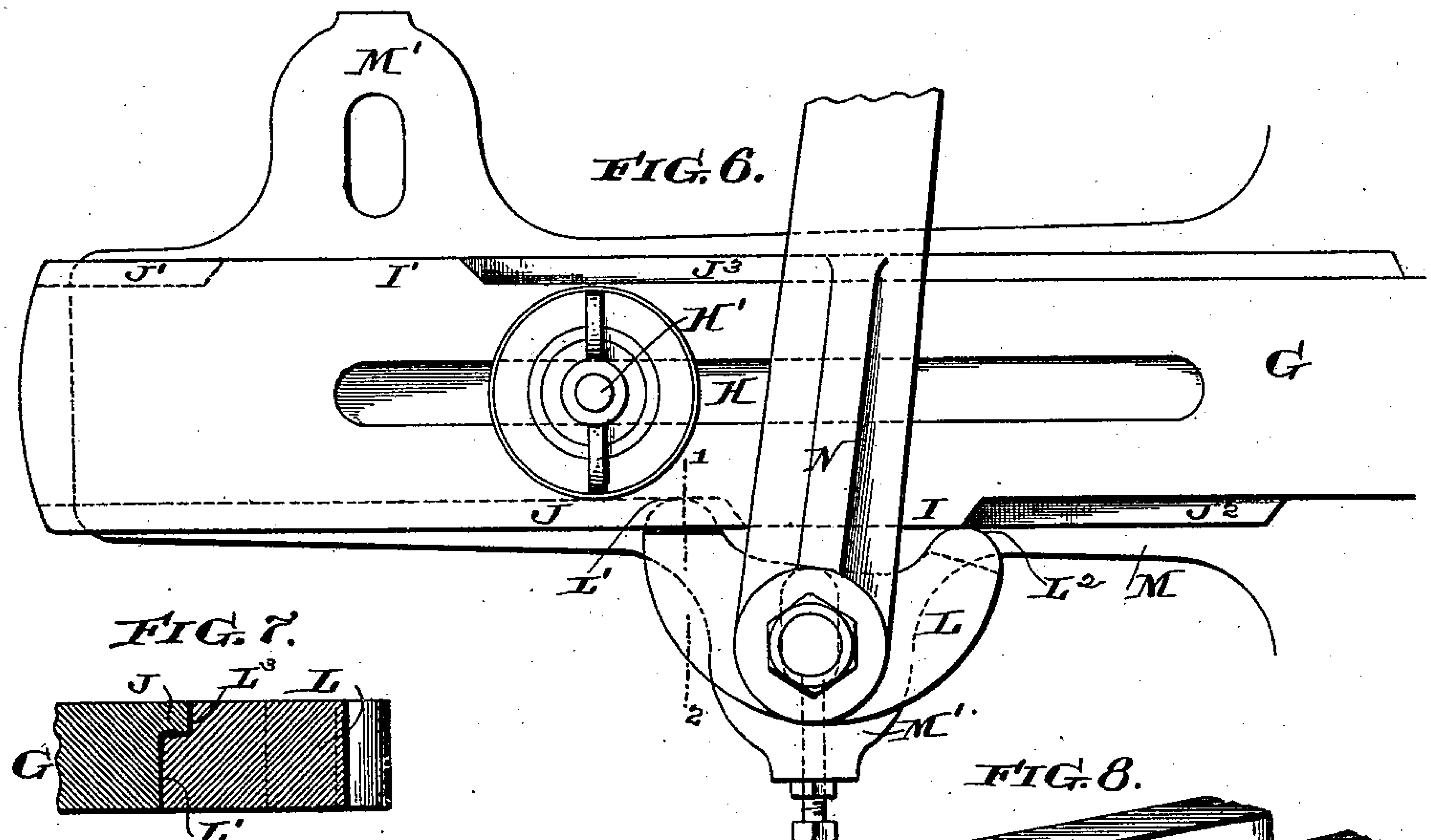


FIG. 7.

FIG. 8.

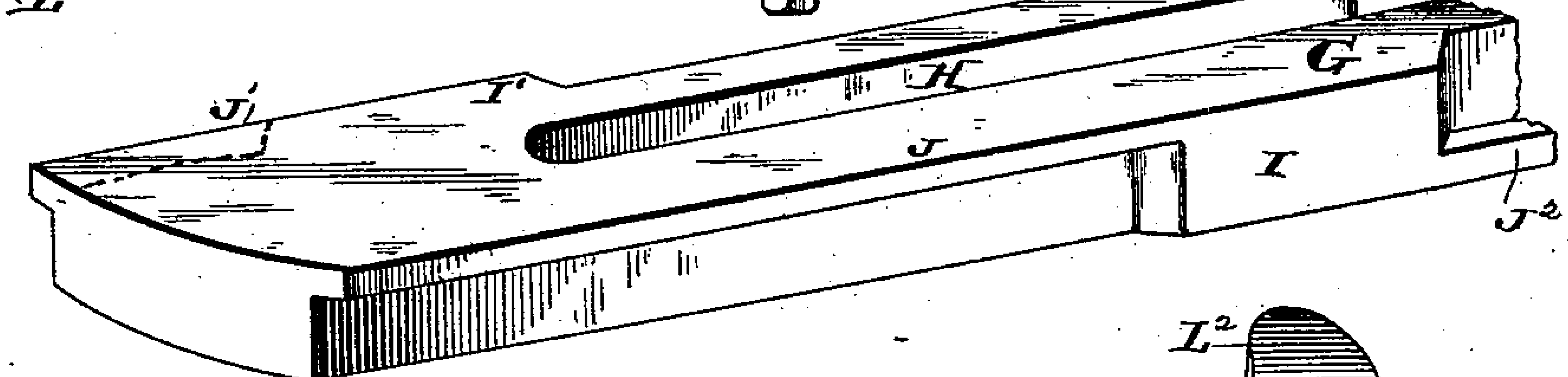


FIG. 10.

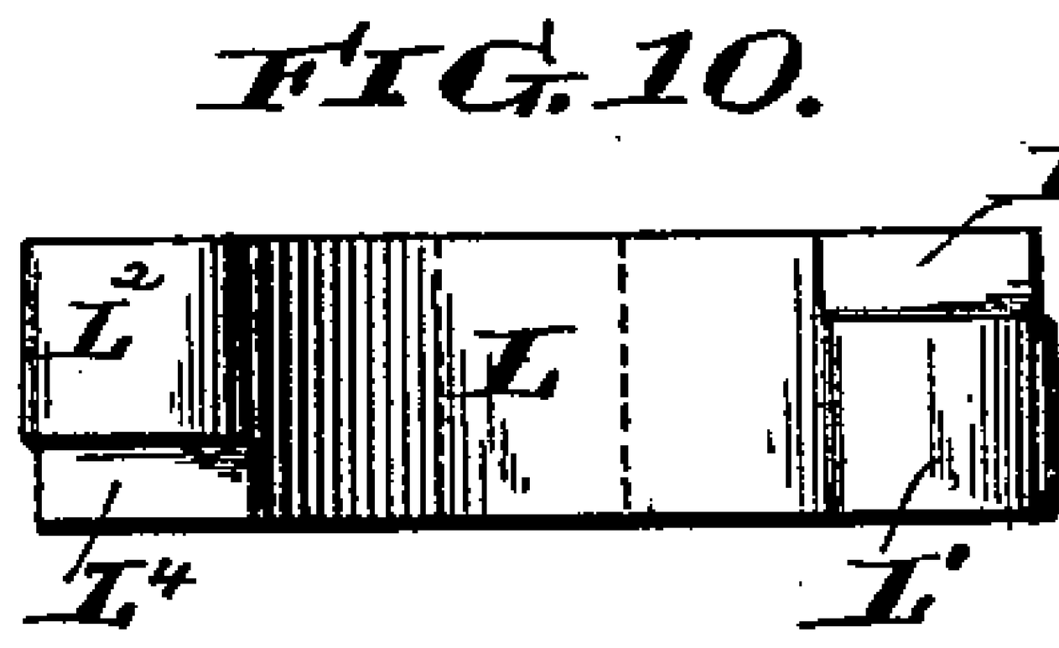


FIG. 9.

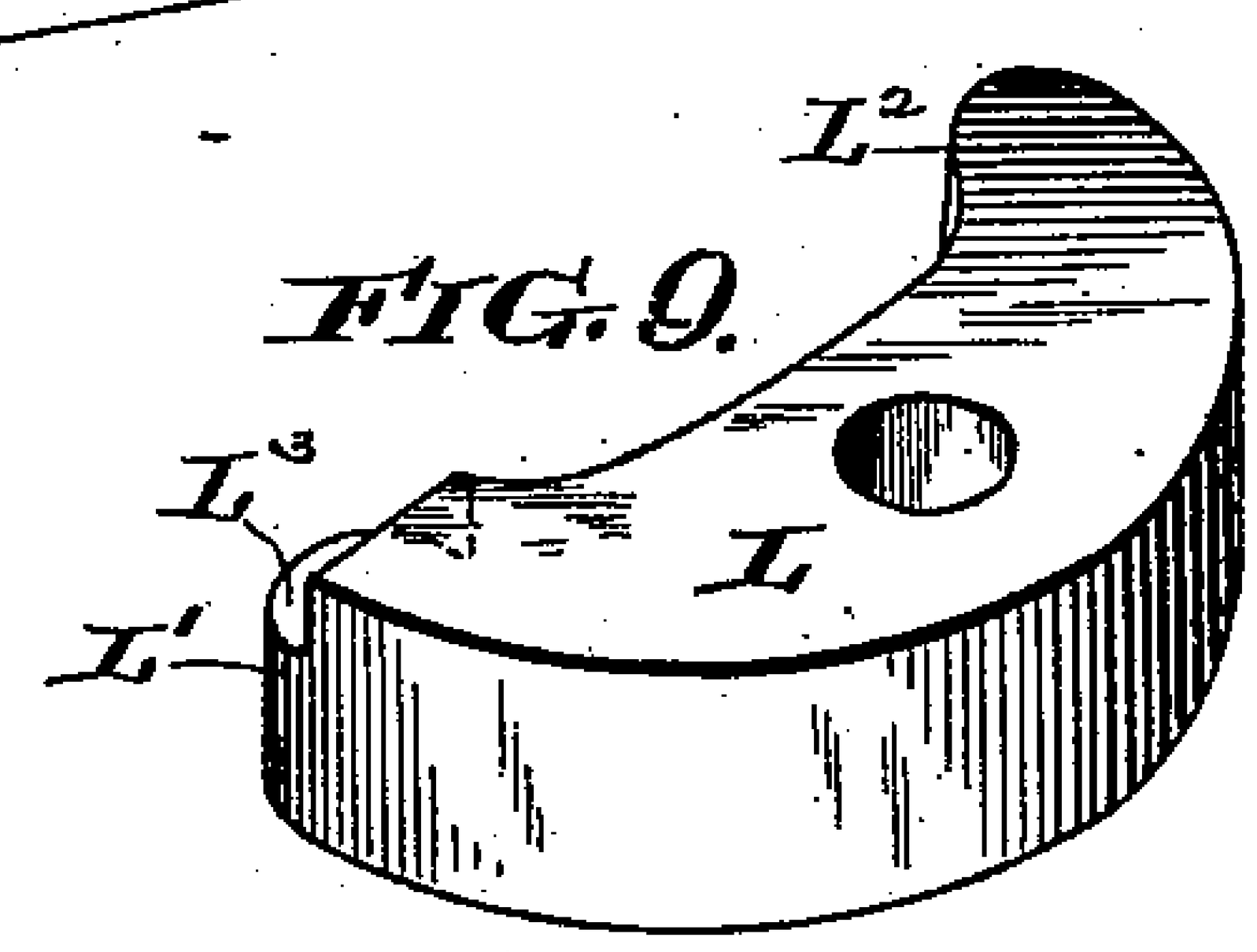
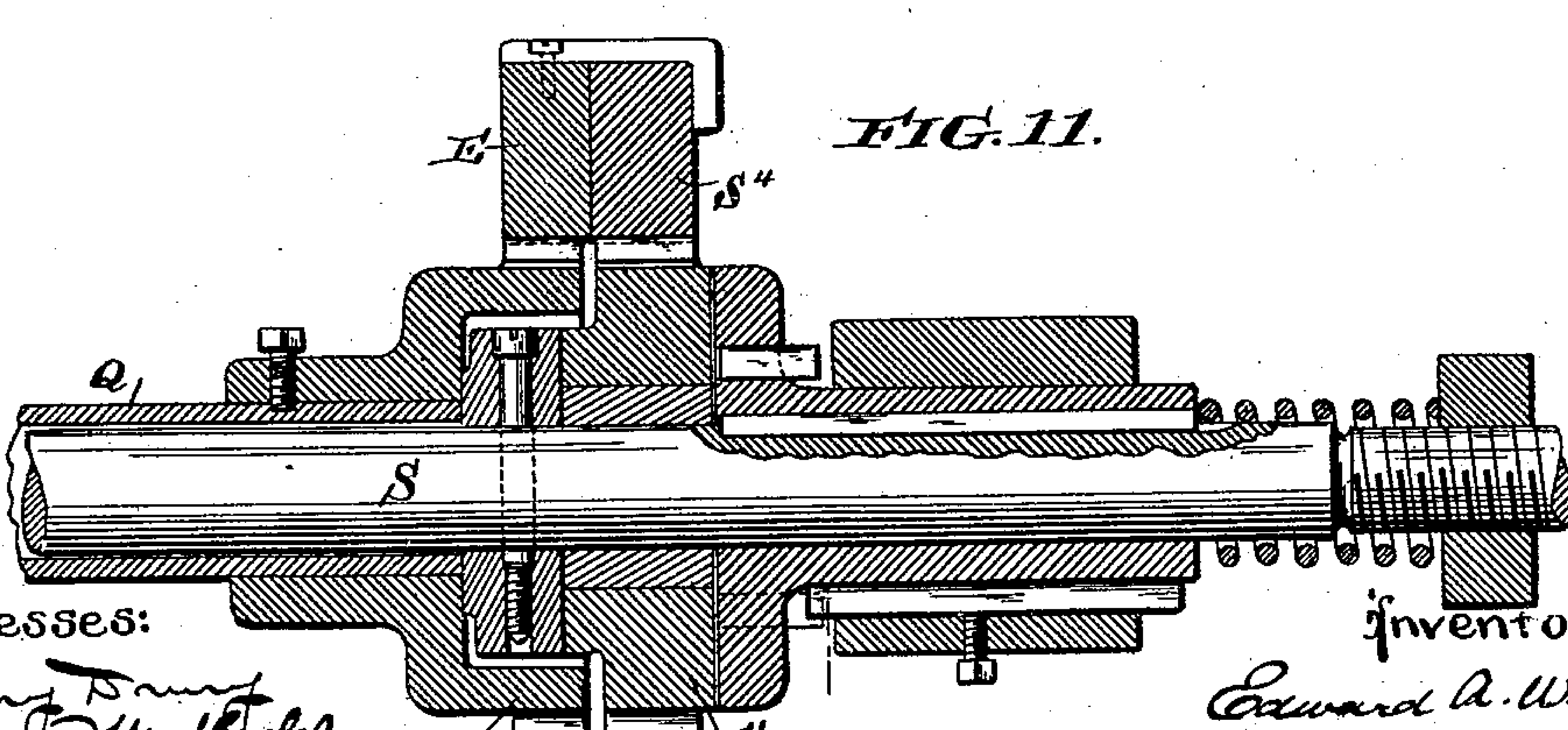


FIG. 11.



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UNITED STATES PATENT OFFICE.

EDWARD A. WALKER, OF PHILADELPHIA, PENNSYLVANIA.

BELT-SHIFTER.

SPECIFICATION forming part of Letters Patent No. 472,745, dated April 12, 1892.

Application filed April 29, 1891. Serial No. 390,975. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. WALKER, of the city and county of Philadelphia, State of Pennsylvania, have invented a certain new and useful Improvement in Belt-Shifting Mechanism, of which the following is a true and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to devices used for shifting belts from fast to loose pulleys, and vice versa, and has for its object the improvement of such devices, particularly as applied to the class of planing-machines in which the work is held stationary and the cutting-tool carried on a reciprocating wheel actuated by the belts to which the shifting device is applied.

My invention will be best understood as described in connection with the drawings, in which it is illustrated, and in which—

Figure 1 is a plan view of a planing-machine provided with my improvements; Fig. 2, an enlarged view in elevation showing the shifting mechanism immediately adjacent to the pulleys. Fig. 3 is a sectional elevation taken on the line 3 4 of Fig. 1; Fig. 4, a plan view showing a modification of the device especially illustrated in Fig. 3; Fig. 5, a cross-sectional elevation on the line 7 8 of Fig. 4. Fig. 6 is a plan view, on an enlarged scale, of the shipper-slide and one of the shifting-levers; Fig. 7, a cross-section on the line 1 2 of Fig. 6; Fig. 8, a perspective view of a part of the shipper-slide; Fig. 9, a perspective view of one of the lugs attached to the end of the shifter-bar; Fig. 10, an elevation of the face of the said lug, and Fig. 11 a cross-sectional view on the line 5 6 of Fig. 1.

A is the bed of the planer; B B, the work-holding tables secured to one side of the said bed, as shown; C, the traveling carriage which carries the cutting-tool and which is engaged with a screw D, working in a slot of table A, and to the projecting end of which screw are secured the fast pulley O and the loose pulleys O′ O′.

E is a belt-shifting rod provided with a rack on its under face supported at one end in a bearing in the end of the bracket F and attached at its other end to the shipper-slide G, which rests on a plate or bracket M, secured to the end of the machine, and is held in position thereon by means of a guide-pin H′, passing through a slot H in the shipper-slide and secured to the bracket M. The edges of the shipper-slide G are provided, as usual, with projections or cam-faces I and I′, and shifting bars or levers N N are pivotally connected to brackets M′, extending from the edge of the plate or bracket M. To the end of the bars or levers N are attached crescent-shaped lugs L L, which are actuated by the cams I and I′ in the usual and well-known way, causing the shifter-bars N to move backward and forward when the shipper-slide is moved, the bars N of course controlling the position of the straight and cross belts and causing them to pass from a loose to the fast pulley, as may be desired.

In devices such as are above described trouble is found at times owing to the shipper-slide moving too far, so as to let both ends of the crescent-shaped lugs L pass to one side of its actuating-cam I or I′. When this occurs, the shifting-bars are permitted to make improper and undesirable movements, with the result of throwing belts on which are intended to be off and otherwise interfering with the proper action of the machine. To overcome this difficulty I have devised what I may call the first part of my invention, which consists in providing on the edge of the shipper-slide a flange of less breadth than the shipper-slide, extending along the edge of the same flush with the outer surface of the cam, and for use in connection with a shipper-slide so constructed I form the lug L with a recess, as L^3, at one end, formed so as to clear the flange J, permitting the end, as L′, to rest against the surface proper of the shipper-slide. The corresponding edge at the other end of the lug is not recessed or cut away, and consequently when the shipper-slide is drawn back so that both of the ends L′ and L^2 are on one side of the cam the end L^2 will rest on the flange J, and the lug and its attached shifting-bar are thus held in the same position as when the end L^2 is resting upon the cam I. Preferably two flanges are used in connection with each cam, the one extending along the top edge of the shipper-slide, as J, and the other extending in the opposite direction along its lower edge, as shown at J^2.

With this construction the lug L is recessed at diagonally-opposite corners, as is best shown at L^3 and L^4, Fig. 10. J′ and J^3 are corresponding flanges on the opposite side of the slide.

Referring now to the movable carriage C and the parts connected therewith, S is a feed-shaft journaled in the lugs R R of the carriage and having journaled upon it a spur-wheel S′, which is engaged with the teeth of a stationary rack, (indicated at S^4,) said rack being supported alongside of the movable rack E, as indicated in the drawings. The spur-wheel S′ is held to the shaft S by a friction-clutch, and is connected by the movable crank-pin S^2 and the usual gearing with a head S^3, which holds the cutting-tool of the planer. Journaled on the shaft S is a sleeve-shaft Q, to the inner end of which is attached a gear-wheel P, which is engaged with the rack-bar E, and to the outer end of which is attached the hand-wheel Q′. As the carriage C is fed along the bed A by the rotating screw-shaft D, the stationary rack E causes the gear-wheel P and shaft Q to revolve, and the operator when he desires to stop or reverse the machine can do so by simply holding the wheel Q′, thus stopping the revolution of the gear P, which as the carriage C continues to advance moves the rack-bar E and the shipper-slide G, which, acting in the way described, moves the shifting-bars N and changes the belts upon the pulleys.

So far as above described the mechanism indicated forms no part of my present invention, and is fully shown and described in my pending applications for Letters Patent—namely, in two filed on October 1, 1890, numbered, respectively, 366,776 and 366,777, and one filed on April 18, 1891, and numbered 389,422. I have therefore not thought it necessary or desirable to describe minutely these parts of the machine.

In my said pending applications for Letters Patent the automatic reversal of the movements of the carriage C are effected in the usual way by means of adjustable lugs fastened on the bar E and stops secured to the frame of the machine. With this familiar arrangement, however, I have observed that some time and trouble are required in adjusting the stop-lugs to vary the movement or travel of the carriage, and also that the machine is subjected to undesirable severe strains, owing to the suddenness with which the motion of the carriage is reversed, and to overcome these difficulties I have devised the stop or reversing device which I am about to describe.

I secure to the shaft Q, near its outer end, a worm T, and engage said worm with the counter-shaft U′, supported on the carriage C by means of a worm-wheel U, secured to said shaft, and I then provide stop mechanism to act upon the shaft U, by which its motion is arrested at each end of a determined angular movement. It is obvious, of course, that the shaft U being near the end of the carriage at which the operator stands, the stops acting on the shaft U′ can be readily adjusted and changed by the operator while the machine is in motion and without requiring him to leave the position in which he should be to watch and control the work. It is also obvious that by acting through the worm-gears described the stops in arresting the motion of the pinion P and rack E will act more gradual and with less shock than the ordinary stops above mentioned, the motion of the shaft U′ being so gradual that nothing in the nature of a blow or shock could take place when its motion is arrested.

The stop mechanism used in connection with the shaft U′ may be of any convenient description, a good plan being that indicated in Figs. 1 and 3, in which a disk V′ is shown as supported by a sleeve V, surrounding shaft U′, and by plates V^2, connected with the disk and with the carriage C. The shaft U′ passes through the disk V′, which has a row of holes or perforations V^3 around its periphery, and to the top of shaft U′ is attached a finger U^2, which moves over the face of the disk as the shaft revolves. By placing pins W in the holes V^3 on each side of the finger U^2 the said finger is arrested and through it the shaft U′ and its connected mechanism, which of course results in the shifting of the belts by the mechanism described and the reversal of the motion of the carriage C and of the shaft U′. I have indicated perforations U^3 in the hub of the finger U^2 as convenient places for holding the pins W, of which a few extra ones may conveniently be on hand when the said pins are not in use.

What is, mechanically speaking, much the same device is illustrated in the modification of Figs. 4 and 5, in which construction the disk V′ is attached to and rotates with the shaft U′, while a stationary stop-finger W′ is attached to the frame of the carriage, so as to project over the line of holes in the disk V′. As shown, the finger W′ is pivotally attached to the carriage and is provided with a lever-arm W^2, by which it can be moved away from its operative position at will.

I have hereinbefore described the use of a worm and worm-wheel for gearing together the shafts Q and V′, and such gear is, I believe, the best for the purpose; but it is of course obvious that other well-known gear-trains may be used in place of the worm and worm-wheel, and in a broader sense the plan illustrated is to be taken as merely showing one of the many well-known equivalent devices for engaging two shafts.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a belt-shifting device, the shipper-slide G, having projections I I′ upon its edges, and a flange or flanges, as J, extending from one or both of said projections, as described,

in combination with shifter-levers N, having actuating-lugs L arranged, as specified, with respect to projections I I′, one end of the lug being recessed, as at L^3, to clear the flange J and the opposite end adapted to ride on said flange, all substantially as specified, and so as to hold the shifter-arm in proper position when the shipper-slide moves too far.

2. In a belt-shifter, the combination of the shipper-slide G and its actuating-rack E, the shaft Q, journaled on a movable carriage, a gear-wheel P, attached to said shaft and engaged with rack E, a counter-shaft U′, gearing connecting-shafts Q and U′, so that the latter will be driven by the former, and adjustable stop mechanism arranged to arrest the motion of shaft U′ at determined points and by arresting the motion of shaft Q and gear P to move the rack E and attached shipper-slide.

3. In a belt-shifter, the combination of the shipper-slide G and its actuating-rack E, the shaft Q, journaled on a movable carriage, a gear-wheel P, attached to said shaft and engaged with rack E, a worm T, secured to shaft Q, a shaft U′, having a worm-wheel U engaged with worm T, and adjustable stop mechanism arranged to arrest the motion of shaft U′ at determined points and by arresting the motion of shaft Q and gear P to move the rack E and attached shipper-slide.

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