

(No Model.)

3 Sheets—Sheet 1.

W. H. BROWNFIELD.
BLIND STILE MORTISER AND BORER.

No. 500,278.

Patented June 27, 1893.

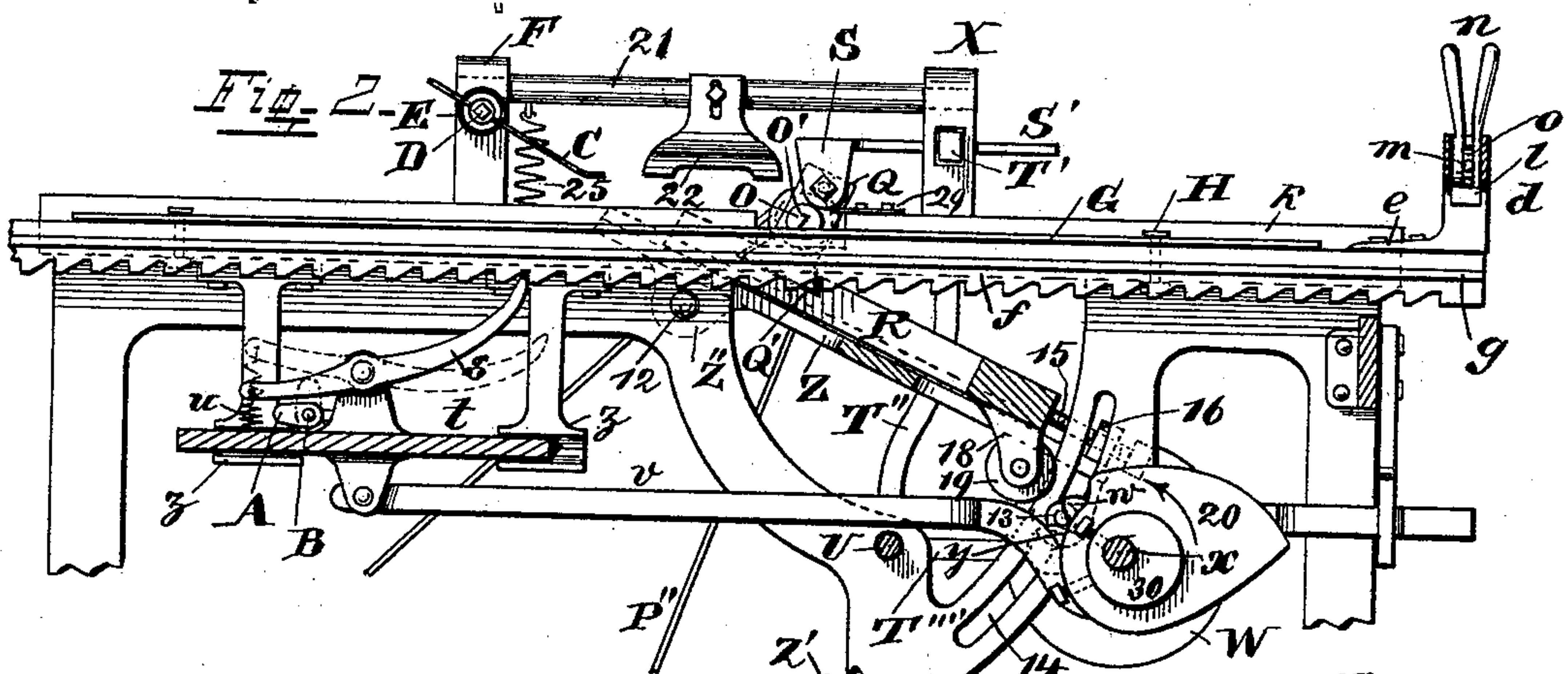
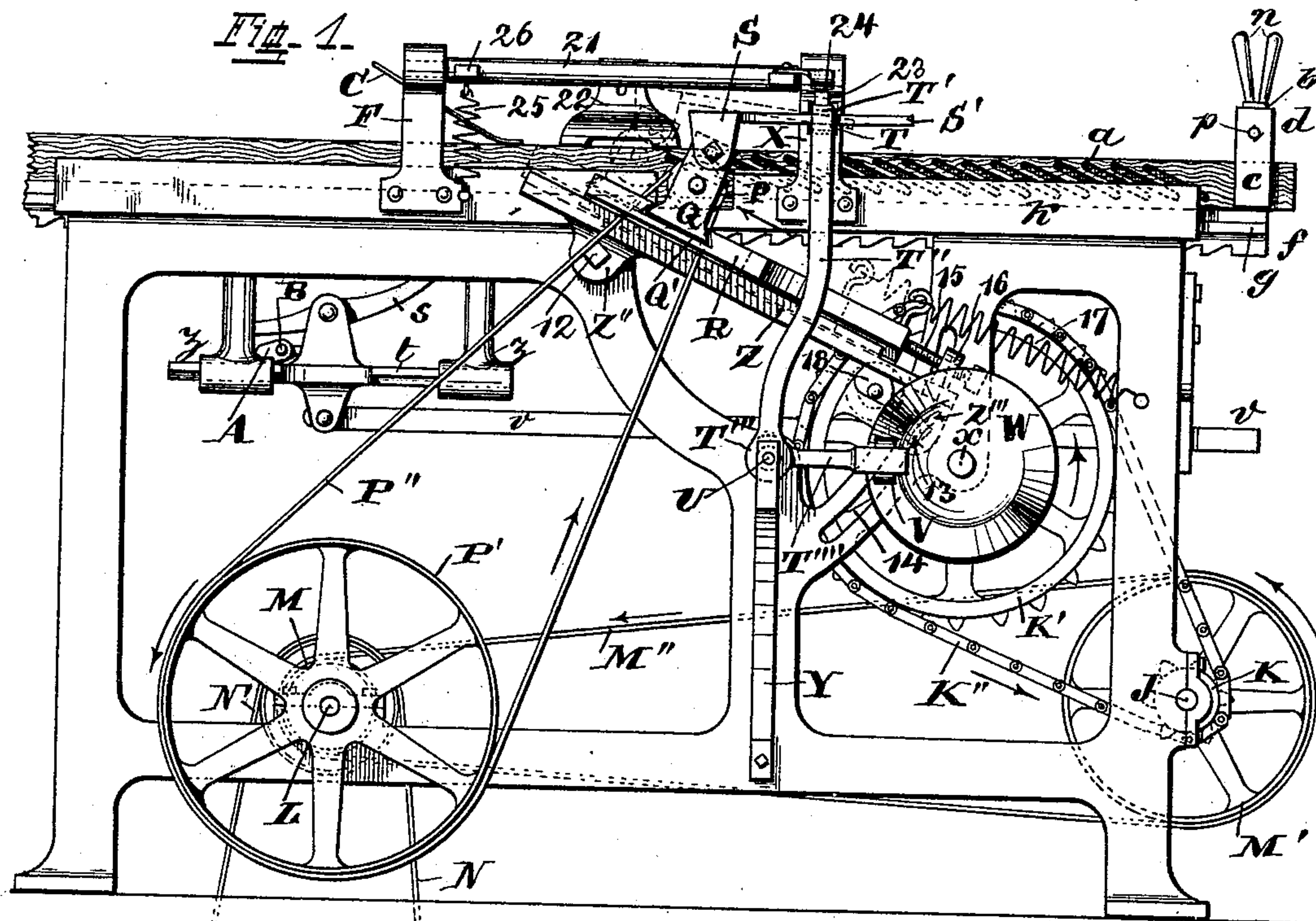
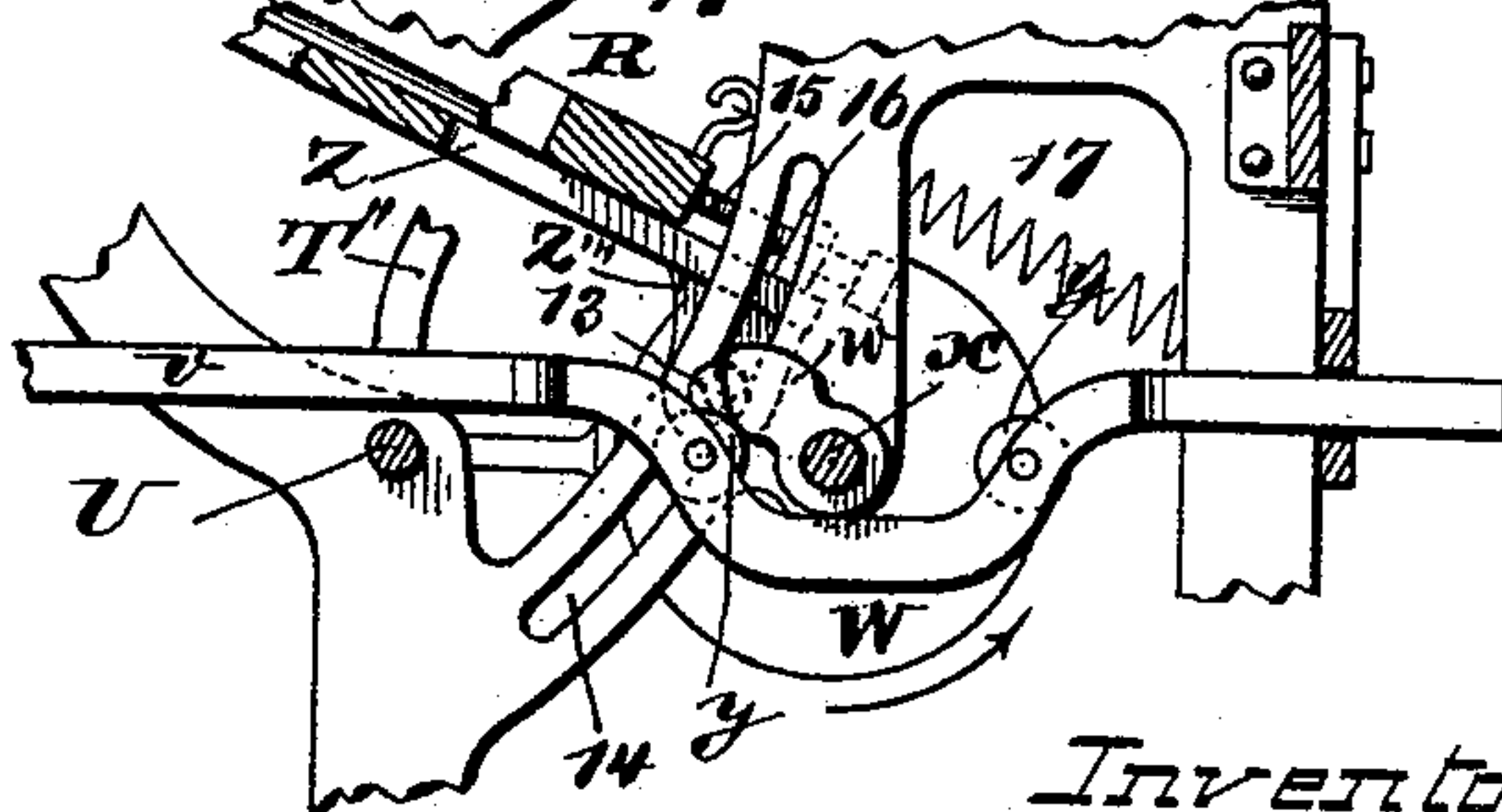


Fig. 3.



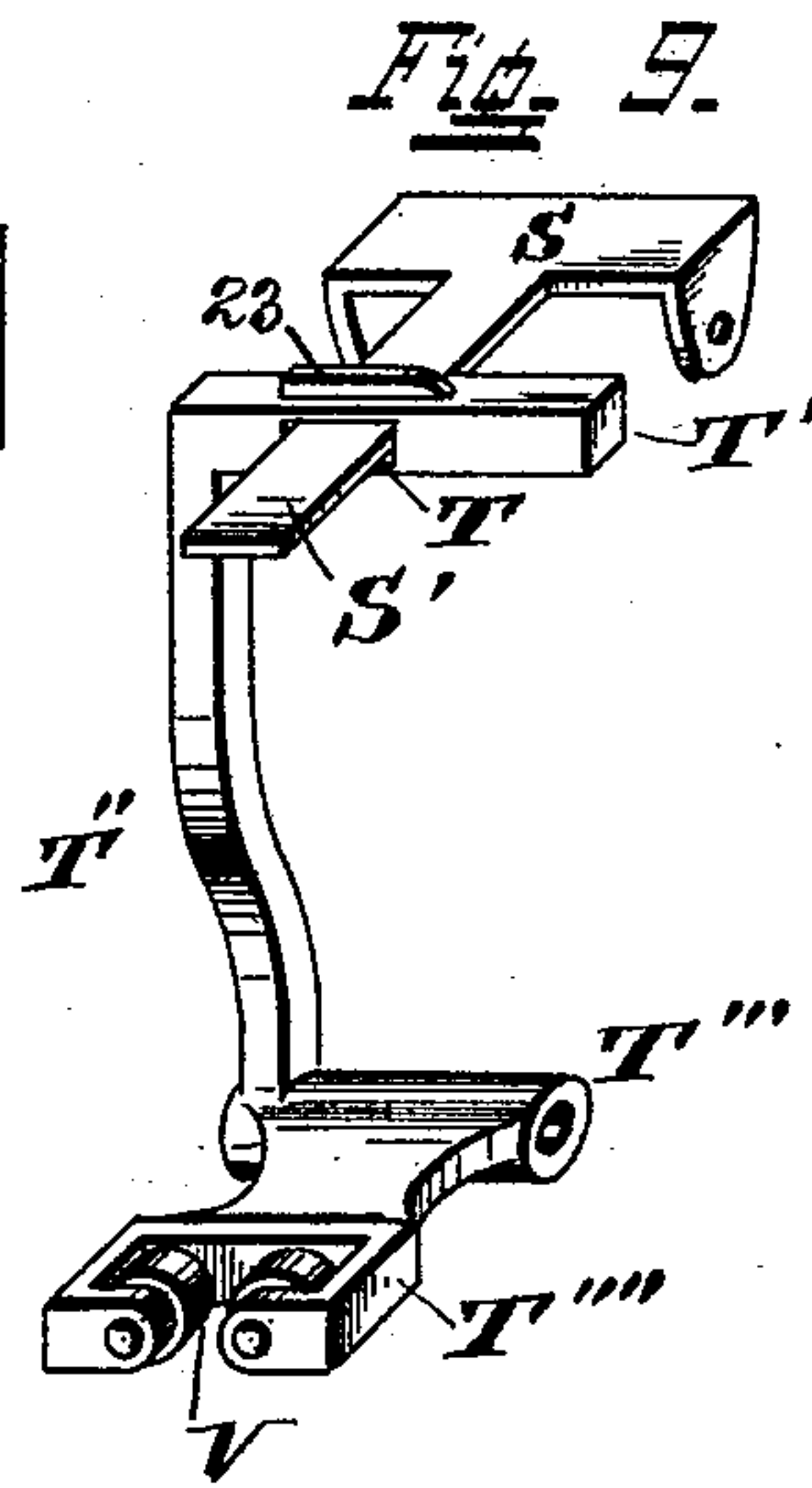
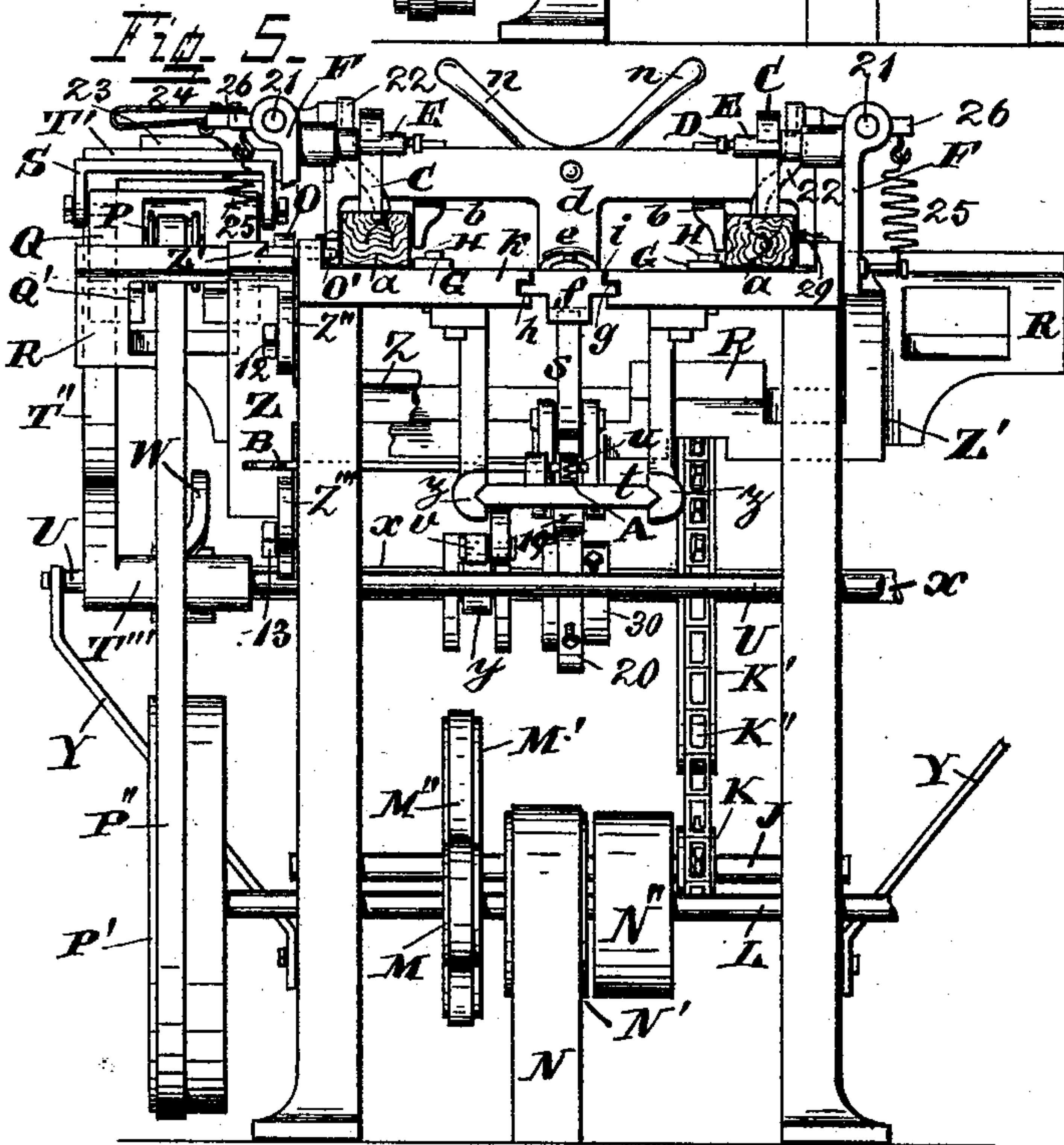
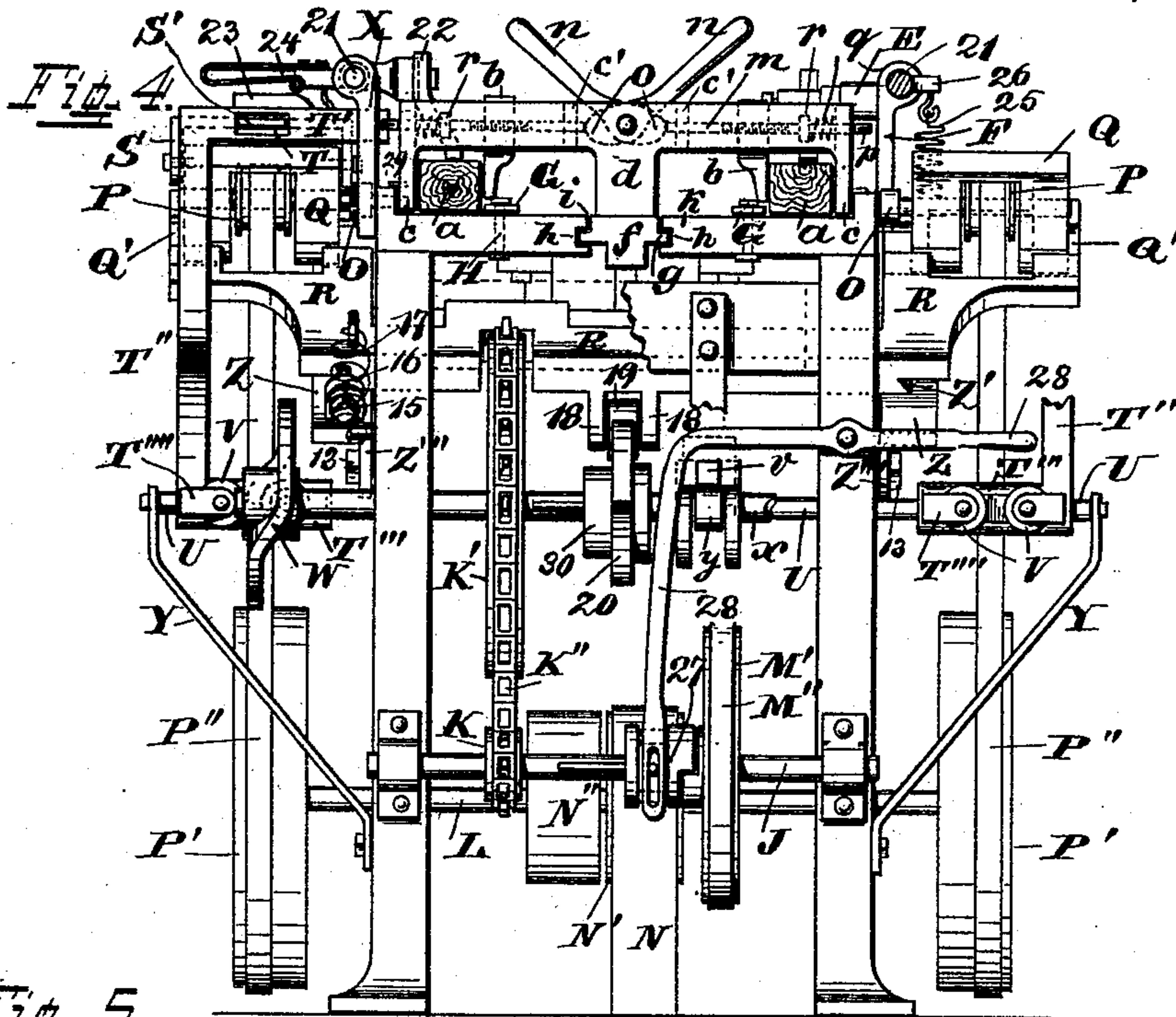
Attest
Chas. V. Haight:
Harry Byrne.

Inventor
William H. Brownfield
by Chas. Spengel Atty.

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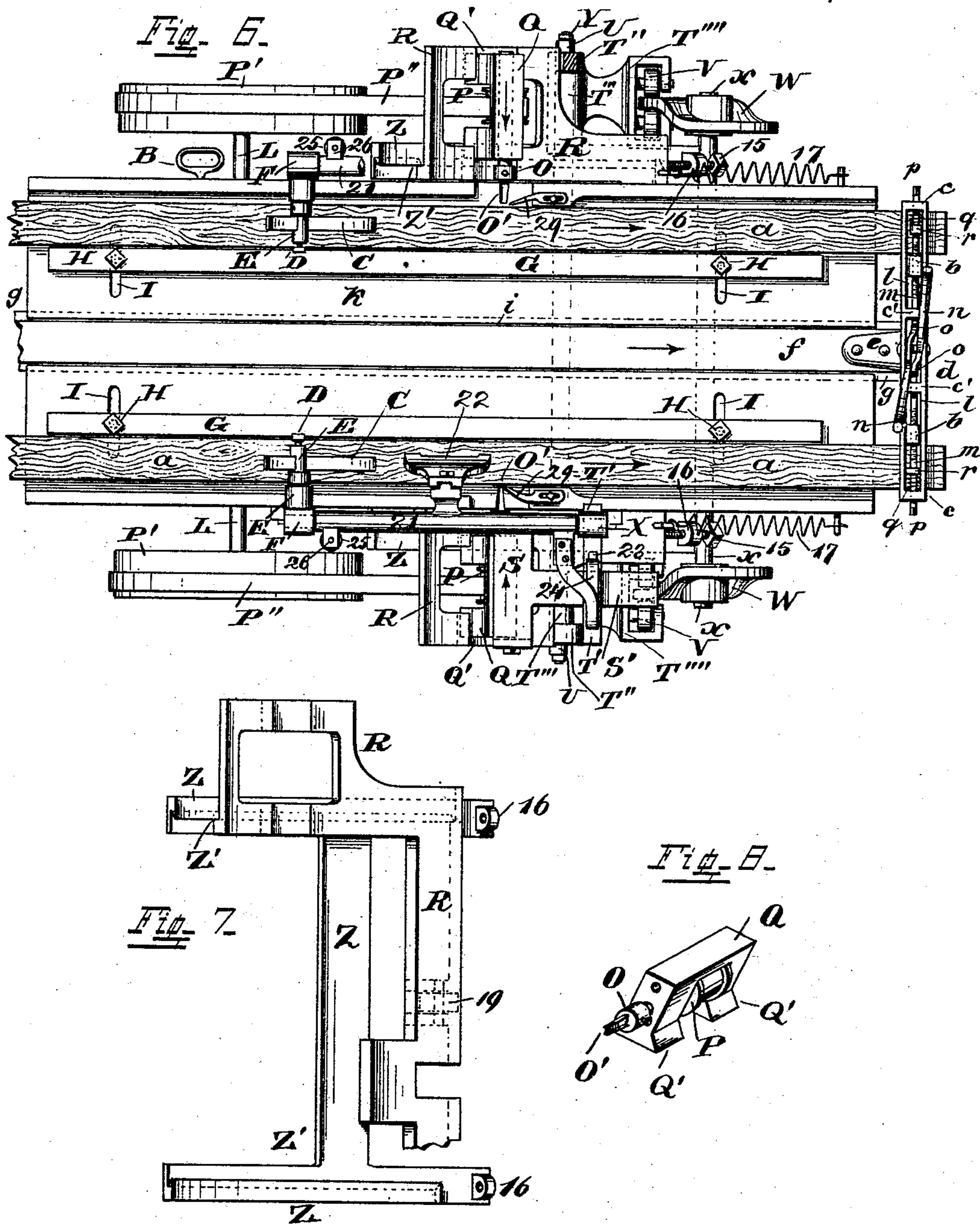
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Attest
Chas V. Haight.
Harry Payne.

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UNITED STATES PATENT OFFICE.

WILLIAM H. BROWNFIELD, OF DAYTON, ASSIGNOR OF ONE-HALF TO LOUIS K. MARTY, OF HIGHLANDS, KENTUCKY.

BLIND-STILE MORTISER AND BORER.

SPECIFICATION forming part of Letters Patent No. 500,278, dated June 27, 1893.

Application filed July 9, 1892. Serial No. 439,478. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BROWNFIELD, a citizen of the United States, residing at Dayton, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Blind-Stile Mortisers and Borers; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

The subject of this invention is a machine for cutting or boring into the stiles of shutters the mortises or holes for the ends of the slats which enter said stiles. In outside shutters where the slats are generally stationary, mortises are used, while in inside shutters, where the slats are rolling, holes are bored into the shutter-stiles to receive the pivots on which the slats revolve. The machine is so arranged, that the two stiles of a shutter, that is its right and left one are mortised or bored at once, whereby a perfect evenness of the work, especially as to the distance between the mortises or holes is attained.

Among the novel features of my invention are the construction which leaves the work (stile) always visible while being acted upon, the means whereby the mortises are being cleared of the chips and the means whereby the length, depth and angle of the mortises are regulated.

The construction of this machine is described and pointed out in the following specification and claims and illustrated in the accompanying three sheets of drawings, in which—

Figure 1, is a side-elevation of the same, showing the stiles in position while being mortised. Fig. 2, is a view similar to the preceding one, but showing parts more remote from the spectator, the line of view or section being taken near the center of the machine and the lower parts of it, as well as the work have been omitted. Fig. 3, is a view similar to Fig. 2, but taken at a plane still more remote, respectively back of the center and showing only such parts as are hidden in the preceding

figure. Fig. 4, is a front-view of the machine, that is that end where the operator is supposed to stand. In order to show other parts farther back more clearly, some parts nearest the spectator, at the upper right side have been omitted. Fig. 5, is a rear-view of the machine with parts of it near the upper right side omitted for the same reason as in the preceding figure. Fig. 6, is a top-view of the machine, parts on the right side of it (upper side of the figure as it appears in the drawings), omitted for same reasons as given for Figs. 4, and 5. Fig. 7, is a detail top-view of the swinging and sliding frames as they appear below the top of the machine. Parts of the sliding frame are broken away. Fig. 8, is a perspective view of one of the cutter-heads and its supporting frame. It is shown inclined, which is the position it occupies when in place. Fig. 9, is a perspective view of the frame which shifts the cutter-head and its frame.

What particular parts have been omitted in some of the figures, will be more readily understood after the following specification has been read.

The position of the parts of the machine as shown, is the one when the feed-mechanism is at rest and the bits of the cutter-heads are about to enter the work.

The machine is comprised in general of a feed-mechanism, to which the work (stile) is temporarily secured and by which it is intermittently advanced, means which guide the work while so advancing, means which hold it tightly while being acted upon, a cutting-mechanism, means to cause the knives of the latter in a longitudinal or endwise direction to enter and leave the work, means to cause the knives of the cutter-heads, after entering to advance and return in a lateral direction through a distance equal to the length of the mortise to be cut and mechanism whereby the position of these means and the extent of their movements are regulated.

a, a, are the stiles to be mortised and held by clamps *b, b,* to the downwardly projecting ends *c, c,* of a frame *d,* which is provided with a base *e,* whereby it is connected to the feed-rack *f.* This latter has feathers *g, g,* which occupy grooves *h, h,* in the sides of slot *i,*

passing lengthwise through the top *k*, of the machine and whereby the feed-rack is kept in position. Clamps *b, b*, move in slots *l, l*, and are held in position within frame *d*, by rods *m, m*, which pass through the ends *c, c'*, of frame *d*.

n, n, are two levers pivoted to frame *d*, and provided with eccentric cams *o, o*, which when coming in contact with the inner ends of rods *m, m*, move clamps *b, b*, against the work and hold the same tightly between them and the ends *c, c*, of frame *d*. A part of rods *m*, which passes through clamps *b*, is screw-threaded, so that by turning rods *m*, using their projecting ends *p, p*, to do so, the position of clamps *b*, may be adjusted to the width of the work.

q, q, are springs confined between the ends *c, c*, of frame *d*, and collars *r, r*, secured to rods *m*, and serve to throw jaws *b*, open for the purpose of releasing the work, when levers *n, n*, have been moved toward each other whereby eccentric cams *o, o*, release the ends of rods *m, m*.

s, is a pawl pivotally secured to a slide *t*, its upper end engaging with rack *f*, and held in operative contact therewith by a spring *u*, secured to slide *t*. It advances the feed-rack *f*, by the reciprocatory motion which is transmitted to slide *t*, by a connecting rod *v*, connected to its underside and actuated by a cam *w*, on shaft *x*. To lessen the friction, rollers *y, y*, are provided at the points where cam *w*, comes in contact with connecting-rod *v*. Slide *t*, is guided by bearings *z, z*, depending from the under side of the top of the machine.

To permit a quick return of the feed-rack to the starting point after a stile has been finished, pawl *s* is thrown out of contact with the rack by means of a cam *A*, operated by a rod *B*, from the side of the machine.

While the work is being fed forward it is held in position and guided by springs *C*, secured by screws *D*, to arms *E*, reaching out from brackets *F*, and by guides *G*, adjustably secured by bolts *H*, passing through slots *I*, in the top *k*, of the machine.

Shaft *x*, derives its motion from shaft *J*, by means of sprocket-wheels *K, K'*, and sprocket-chain *K''*, while shaft *J*, is driven from shaft *L*, by means of pulleys *M, M'*, and belt *M''*.

Power is supplied to the machine by means of belt *N*, and pulley *N'*, the latter secured to shaft *L*. *N''* is a loose pulley also on shaft *L*, upon which belt *N* may be shifted in case it becomes desirable to stop the machine.

O, O, are the cutter-heads provided with bits or knives *O', O'*, and driven by pulleys *P, P, P', P'*, and belts *P'', P''*, the latter pulleys secured upon shaft *L*. The shafts upon which cutter-heads *O, O*, and pulleys *P, P*, are mounted revolve in frames *Q*, which are provided with dove-tails *Q', Q'*, which fit into a correspondingly cut-out frame *R*.

S is a yoke which fits over the tops of frames *Q*, and is pivotally secured to them. These yokes have tails *S', S'*, which pass into

slots *T, T*, in the upper arms *T', T'*, of shifting-frames *T'', T''*, which latter are provided below with sleeves *T''', T'''*, which sleeves fit onto a rod *U*, by which these shifting frames are supported. Rod *U* passes preferably clear through the machine projecting to either side of it and is rigidly secured to the machine-frame. From sleeves *T'''*, there project double-bearings *T''', T'''* which carry rollers *V*, the faces of which are some distance apart, which distance or space is occupied by cams *W, W*, mounted upon shaft *x*. Shifting-frames *T'', T''*, are further supported by brackets *X, X*, into a slot of which arms *T'* pass. The outer ends of rod *U* are preferably supported and steadied by brackets *Y, Y*. Frame *R*, rests on a frame *Z*, to which it is dovetailed as shown at *Z'*. The shape of these frames is most plainly shown in Fig. 7, each consisting substantially of two wings which are located and extend beyond the machine-frame to either side and which are united to each other by a connecting branch forming also a part of each frame and reaching from wing to wing across the machine-frame. The wings of the upper or sliding frame *R*, are open as shown between the dovetailed parts of it to permit belts *P''*, to pass.

Frame *Z* is held in position on the machine-frame by lugs *Z'', Z'''*, on the underside of each one of its wings, through which lugs bolts 12, and 13, pass. The angle of inclination of frame *Z*, and with it frame *R*, may be varied by the adjustment of bolts 13, which pass through slots 14, 14, on either side of the machine-frame, the upper bolt 12, forming the pivot on which frame *Z*, swings during such adjustment. Frame *R*, is prevented from sliding off of frame *Z*, by screws 15, 15, secured in lugs 16, 16, of frame *Z*. It is held normally against these screws by springs 17, 17, passing from frame *R*, to some convenient point at either side of the machine-frame. The break or bend in the connecting branch of frame *R*, is merely for the purpose of clearing the sprocket-wheel *K'*. From the under side of this branch of frame *R*, depend two lugs 18, 18, forming bearings for a roller 19, which at intervals is acted upon by a cam 20, on shaft *x*, and whereby frame *R*, is caused to slide upwardly on frame *Z*, being pulled back again to its normal position by springs 17, after the cam 20, has passed and cleared roller 19. Brackets *F, X, F, X*, on each side form bearings for rods 21, 21, to which vertically adjustable and vertically acting clamps 22, 22, are secured which hold the work down to the top of the machine, while the cutting is done. These clamps are closed by cams 23, 23, secured to arms *T', T'*, of shifting frames *T'', T''*, which act against spring-levers 24, 24, secured to and projecting from rods 21, 21. The clamps are opened by the action of springs 25, 25, secured to rearward projections 26, 26, on rods 21, 21, and connecting to the machine-frame.

27, is a clutch operated by a hand-lever 28,

by which the motion of all parts of the machine driven from shaft J, may be stopped.

The different parts of the machine operate as follows proceeding in their description from the position they occupy as shown in the drawings. The revolving motion of the cutter-head O, is constant and it is therefore always ready to cut as soon as it enters the wood which is about to take place now. The knives 10 O', O', of the cutter-heads are caused to enter the work through the action of cams W, W, which are so shaped as to shift frames T'', T'', inwardly which frames then carry with them yokes S, S, and cutter-head frames 15 Q, Q, which are all connected to said frames T'', T''. While being so shifted, frames T'', T'' are guided by their sleeves T''', T''', which slide on the ends of rod U, and by their arms T', which slide in brackets X while cutter-head frame Q, is guided by its dove-tailed portions Q', Q', which slide in correspondingly cut-out portions of the wings of frame R. The knives while so entering in a longitudinal direction are first cutting or boring a hole 25 until they have reached the required depth after which they advance laterally and upwardly, being caused to do so by cam 20, on shaft x, which by acting against roller 19, on frame R, causes this latter frame with the cutter-head frames to slide up on frame Z. During this movement, frame R, is guided by dove-tails Z', on which latter it moves back again owing to the action of springs 17, after the mortise has been formed and after cam 20 35 has cleared roller 19. While so returning to its normal position, frame R, carries with it the cutter heads, the knives thereon passing through the same path back and thereby clearing the mortise of the chips. When shifting-frame T'' moves inwardly just previous to the cutting, cam 23, on arm T', passes under spring-lever 24 and by lifting it causes rod 21, to bring clamp 22, hard down onto the work which latter is tightly held by said clamp 45 until the mortise is cut. By this time cam W, has come around again and is ready to act upon rollers V, V, for the purpose of shifting frame T'', outwardly which through the intervention of yokes S, carries the cutter-head 50 frames with it, the knives leaving the work again in a longitudinal direction. While frames T'', move thus outwardly, cams 23, on arms T', liberate spring levers 24, and enable springs 25, with the aid of projections 26, and 55 rods 21, to release the work from clamps 22, so as to permit the same of being fed forward. While a mortise is thus cut as described, pawl s, on slide t, has been moved back by connecting-rod v, one of the rollers y on which 60 has been acted upon by a cam w, on shaft x, and is in a position to feed rack f, with the work forward, the moment the cutters have left the latter, and clamps 22, release the same. The forward movement of pawls, and 65 slide t, is accomplished by the same means in substantially the same manner as their movement first described, only in reverse order.

After the feed-motion is finished, cams W, shift frames T'', and the cutter-heads inwardly again, clamps 22, close down once more upon 70 the work and the next mortise is cut in the same manner as already described. When a pair of stiles has been finished they are released from frame d, which holds them to the feed-rack, by levers n, which are moved toward each other, whereupon rods m, liberate 75 clamps b, which are thrown open by the action of springs q, on said rods which carry the clamps with them. The upper part of the machine is next stopped by hand-lever 28, 80 and clutch 27, pawl s, is disconnected from the feed-rack by cam A, which is turned up by rod B, and the now liberated feed-rack is returned to the starting point for the purpose of the insertion of new work. To make this 85 latter more convenient, a pointer 29, is provided, against which a mark, on the wood, indicating the place where the first mortise is to be started, may be brought. The width and depth of the mortises is regulated by the size 90 and length of the cutters or bits. Their length is dependent on the extent of the movement of frame R, on frame Z, which may be regulated by screws 15, 15, in lugs 16, 16. It is 95 against these screws that frame R, returns after every action of cam 20, and from this adjustable position wherever it may be, frame R, is actuated by cam 20. It follows from this also that the starting point of the mortise may be adjusted and if screws 15, 15, 100 are screwed farther out of lugs 16, 16, frame R, with the cutter-heads slides lower down on frame Z, when as a consequence the knives start the mortise in a lower position and cause the same to be longer. The reverse takes 105 place when screws 15, 15, are screwed farther into lugs 16, 16, whereby frame R, is caused to start its rising movement from a higher position. This adjustment may be augmented, especially in cases where it is not desirable to 110 change the starting point of the mortise, by making the eccentricity of cam 20, changeable, for which purpose a hub 30, is provided upon which cam 20, may be adjusted. The degree of inclination of the mortise to the 115 stile is adjusted by adjusting frame Z, on which frame R, with the cutter heads is supported. The degree of inclination of this frame, which is pivoted at 12, is adjusted by screws 13, 13, passing through slots 14, 14, on 120 either side of the machine.

When this machine is to be used for boring circular holes only, the height at which the knives of the cutter-heads should enter the wood is determined first by adjusting the position of frame R, on frame Z, by means of 125 screws 15, 15, after which cam 20, is shifted sidewise so as not to act upon roller 19, on frame R, whereby this latter remains stationary upon frame Z, and the cutter-heads reciprocate longitudinally only, their lateral reciprocatory movement with frame R, on frame Z, which produces the mortise, being omitted. 130 In all other respects the operation of the ma-

chine is the same as for cutting mortises. Among the modifications to which this construction is susceptible is a reversal of the operation of levers n, n , which may be attained
 5 by having the projecting eccentric cams o, o , on the other side of each lever n . In such case levers n, n , would be moved toward each other for the purpose of closing clamps b, b , and thrown apart for the purpose of releasing
 10 the work. The machine could be so constructed as to have only one cutter-head and do only half the work. Such would, however, be of no advantage.

Having described my invention, I claim as
 15 new—

1. In a blind-stile mortiser and borer, the combination of means to hold, feed and guide the work, a rotating cutter-head, a frame Q on which it is mounted, a frame R , on which the
 20 cutter-head frame Q is supported, means to reciprocate the cutter-head frame longitudinally, and means to reciprocate frame R , at right angles to the movement of the cutter-head frame, all as substantially shown and
 25 described.

2. In a blind-stile mortiser and borer, the combination of means to hold, feed and guide the work, a rotating cutter-head, a frame Q on which it is supported, a frame R , on which
 30 the cutter-head frame Q is supported, means to reciprocate the cutter-head frame longitudinally, means to reciprocate frame R , at right angles to the movement of the cutter-head frame, and means to adjust the latter
 35 vertically, all as substantially shown and described.

3. In a blind-stile mortiser and borer, the combination of means to hold, feed and guide the work, a rotating cutter-head, a frame on
 40 which it is mounted, a frame R , on which the cutter-head frame is supported, means to reciprocate the cutter-head longitudinally, means to reciprocate frame R , at right angles to the movement of the cutter-head and an
 45 adjustable frame Z , on which frame R , is supported, all as substantially shown and described.

4. In a blind-stile mortiser and borer, the combination of mechanism to hold, guide and
 50 feed the work while acted upon, a rotating cutter-head, a frame Q within which it is mounted, a yoke S , pivotally connected to the cutter-head frame Q , a shifting frame T'' connecting with said yoke, means to guide and
 55 support the shifting-frame, a cam whereby it is actuated and means whereby the height at which the cutter-head reciprocates and en-

ters the wood is vertically adjusted, all as substantially shown and described.

5. In a blind-stile mortiser and borer, the
 60 combination of mechanism to hold, guide and feed the work, a rotating cutter-head, a frame R , on which it is supported, a pivoted frame Z , on which frame R , is supported, means to reciprocate the cutter-head and frame R , at
 65 right angles to each other, an adjustable stop whereby the extent of movement of one frame on the other is limited and means to adjust the position of the free end of frame Z , all as substantially shown and described.

6. In a blind-stile mortiser and borer, the combination of mechanism to hold, guide and feed the work, a rotating cutter-head, a frame
 70 R , supporting it, a pivoted frame Z , supporting frame R , means to adjust the position of these frames, a yoke S , and shifting frame connected with each other and with the cutter-head, a cam operatively connected with the shifting frame, a cam for actuating frame,
 75 R , and means operating the cams, all as substantially shown and described.

7. In a blind-stile mortiser and borer, the combination of a rotating cutter-head, mechanism to feed and guide the work, a clamp
 80 22 , supported on a pivot, a cam 23 , for actuating the latter, means operatively connecting it to this pivot a frame T'' , which carries cam 23 , and a cam which shifts this frame, all as substantially shown and described.

8. In a blind stile mortiser and borer, the
 90 combination of a rotating cutter-head, mechanism to feed and guide the work, a clamp 22 , a rod supported in bearings to which said clamp is secured, a spring-lever 24 , secured to this rod, a cam 23 , acting on this spring-
 95 lever, means to counter-act its action upon rod 21 , and a reciprocating frame T'' , which carries cam 23 all as substantially shown and described.

9. In a feed-mechanism, the combination of
 100 a feed-rack, means to guide it, a frame d , secured to it, clamps b , mounted on rods m , and by them secured to frame d , cams o , engaging with rods m , for the purpose of closing
 105 clamps b , levers n , for actuating cams o , and collars r , and springs q , for throwing the clamps open when released by cams o , all as substantially shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. BROWNFIELD.

Witnesses:

ALFRED N. DAVIES,
 C. SPENGEL.