No. 678,022. Patented July 9, 1901.

W. E. NICHOLS.

HEAD CUTTING MACHINE.

(Application filed Aug. 16, 1900.)

(No Model.) 4 Sheets—Sheet 1.

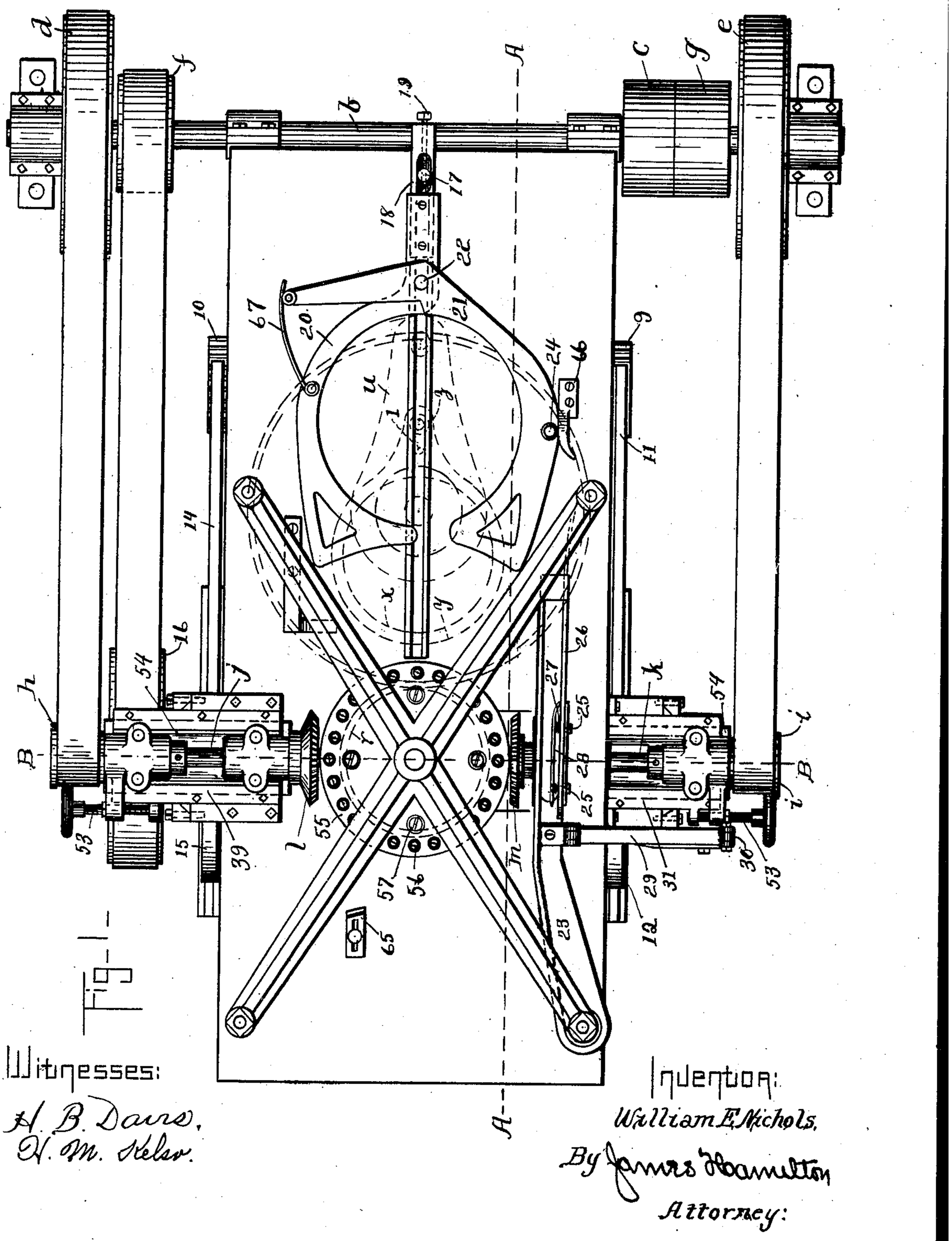

Fig. 1.

Witnesses:
H. B. Davis.
H. M. Kelsey.

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(No Model.) 4 Sheets—Sheet 2.

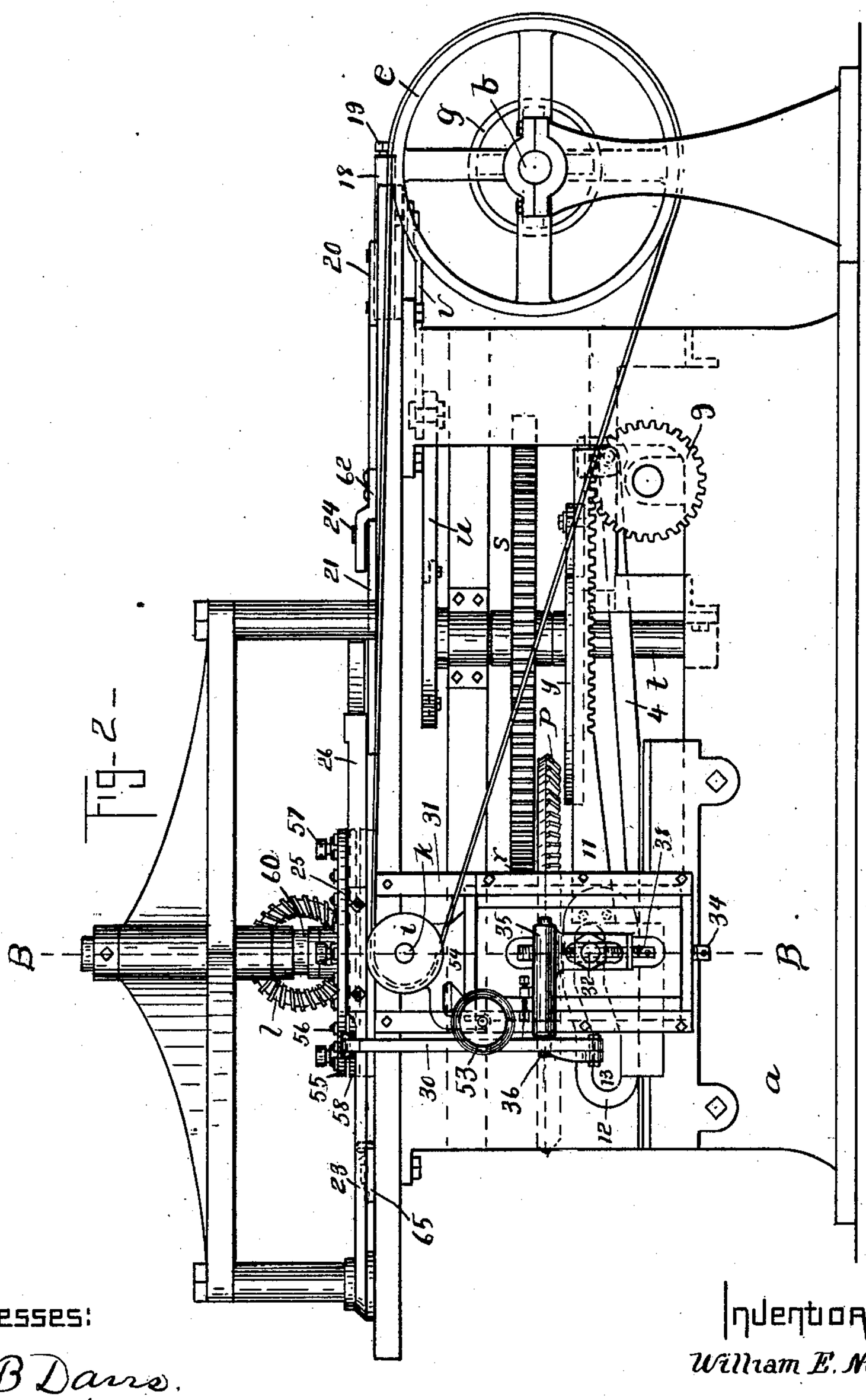

Fig. 2.

Witnesses:
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(No Model.) 4 Sheets—Sheet 3.

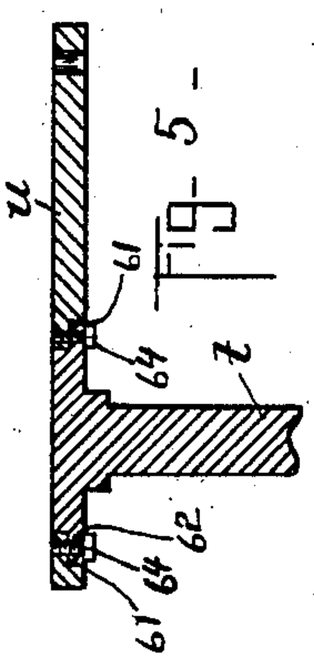

Fig. 5.

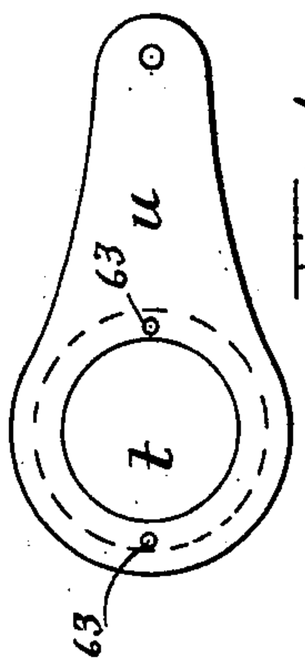

Fig. 6.

Fig. 3.

Witnesses:
H. B. Davis.
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W. E. NICHOLS.

HEAD CUTTING MACHINE.

(Application filed Aug. 16, 1900.)

(No Model.) 4 Sheets—Sheet 4.

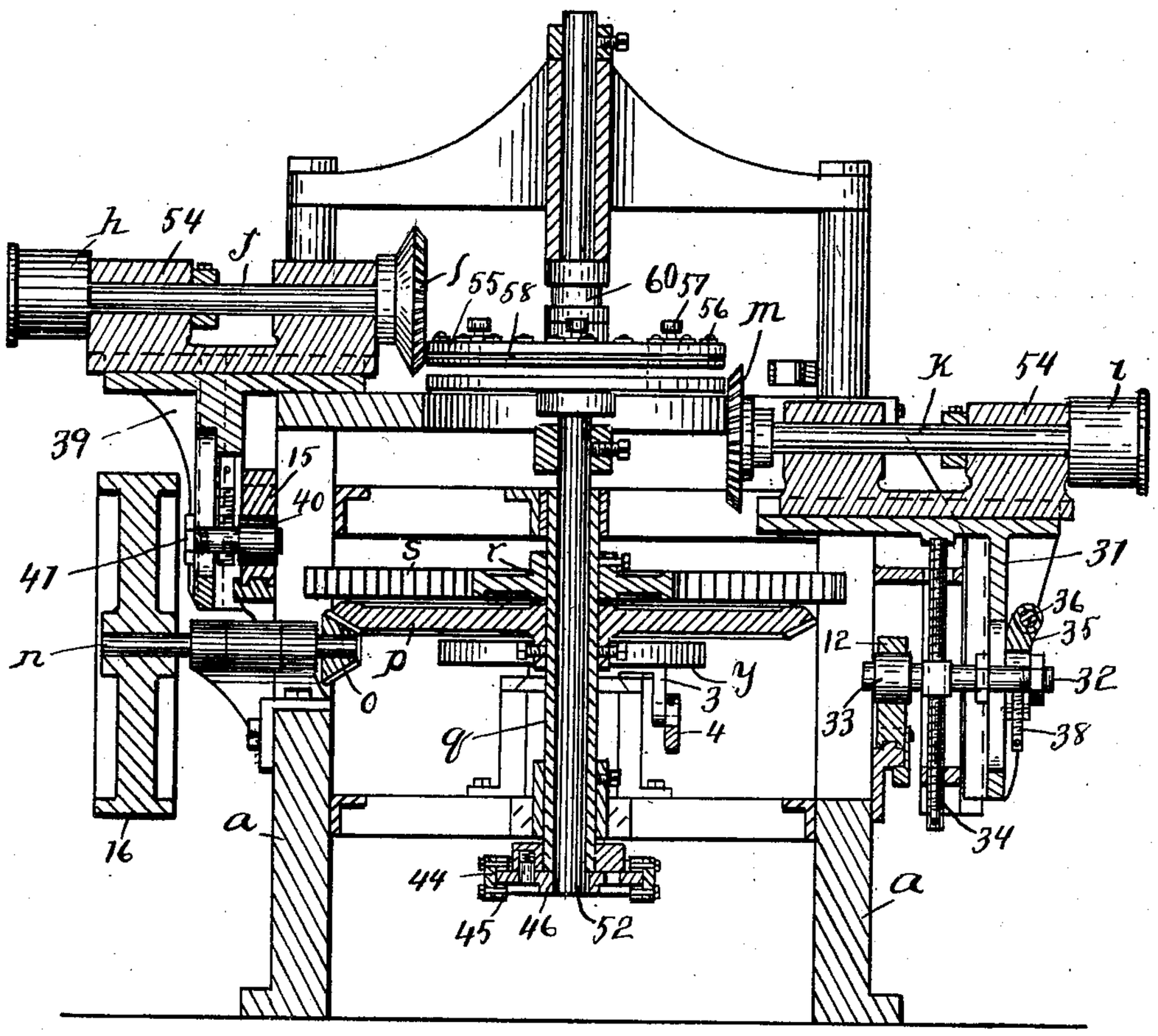

Fig- 4 -

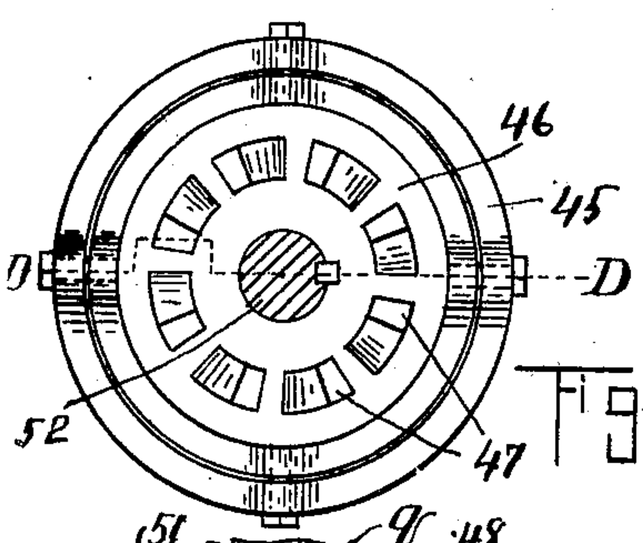

Fig- 9 -

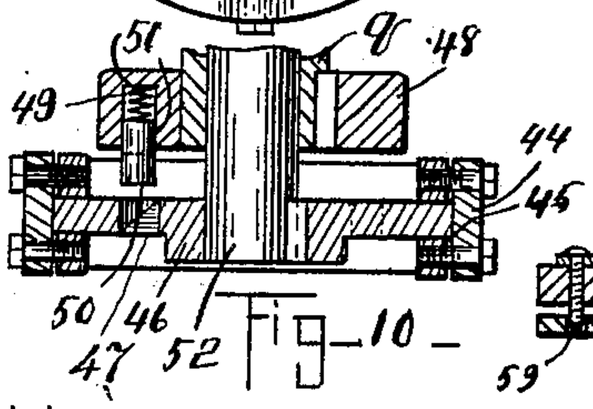

Fig- 10 -

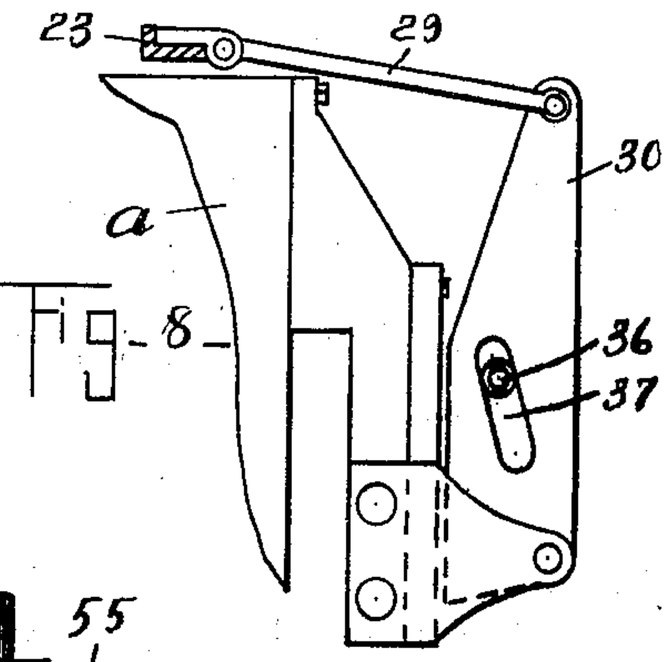

Fig- 8 -

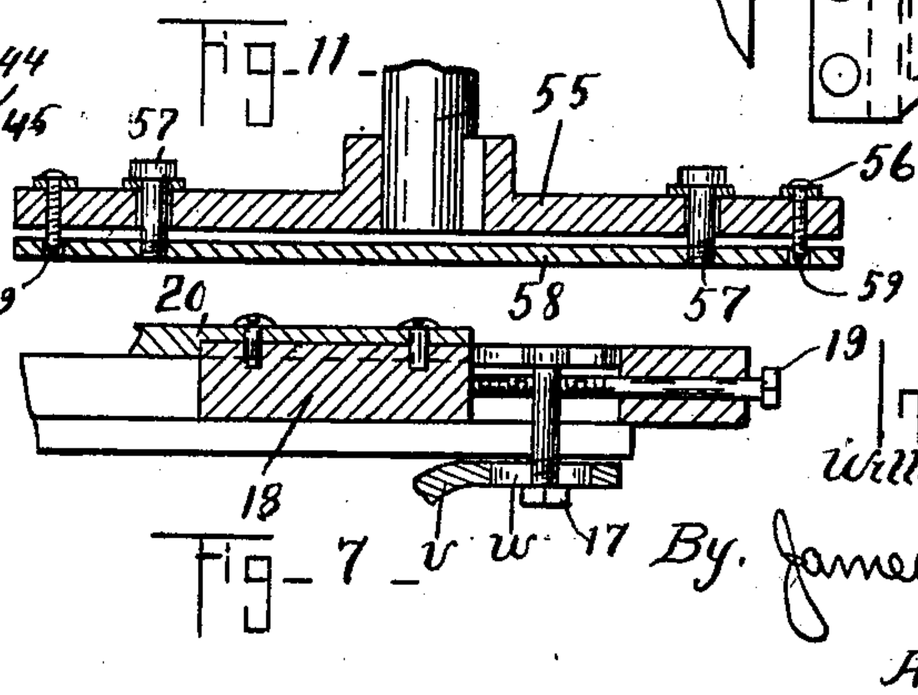

Fig- 11 -

Fig- 7 -

Witnesses:
H. B. Davis.
H. M. Helen.

Inventor:
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UNITED STATES PATENT OFFICE.

WILLIAM E. NICHOLS, OF WINCHENDON, MASSACHUSETTS.

HEAD-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 678,022, dated July 9, 1901.

Application filed August 16, 1900. Serial No. 27,080½. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. NICHOLS, a citizen of the United States, residing at Winchendon, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Head-Cutting Machines, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a top plan view of my new head-cutting machine. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional view on the line A A, Fig. 1. Fig. 4 is a sectional view on the line B B, Fig. 1; and Figs. 5, 6, 7, 8, 9, 10, and 11 show details of the construction hereinafter referred to and described.

My present invention is an improvement on the head-cutting machine invented by me and described in my pending application, Serial No. 737,618, filed November 20, 1899.

The object of my invention is to simplify the construction, lessen the number of parts, and make the action of the machine more positive.

One feature of my invention is the mechanism employed for moving the cutters into and out of contact with the stock.

A second feature of my invention is the mechanism employed for raising the lower clamp to free the carrier-frame from the barrel-head and for rotating the clamp.

A third feature of my invention is the mechanism employed for throwing the movable arm of the carrier-frame out of the way of the lower cutter.

A fourth feature of my invention is the mechanism employed to regulate the coöperation of the feeding mechanism, the automatic clamping mechanism, and the cutting mechanism.

Other features of my invention are the mechanisms employed for adjusting the travel of the carrier-frame to bring the center of the barrel-head in the axis of the rotary clamps, for adjusting the position of the crank-arm on the crank-shaft, and for adjusting the depth of cut made by the cutters.

My invention consists in the combinations hereinafter described and claimed.

In the drawings illustrating the principle of my invention and the best mode now known to me of applying that principle, *a* is the supporting-frame of the machine, in which is journaled the main shaft *b*. Fast upon this shaft are the pulleys *c*, *d*, *e*, and *f*, and loose on said shaft *b* is the pulley *g*. (See Fig. 1.) Pulley *c* receives the power from the driving-belt and transmits it through shaft *b* to the pulleys *d* and *e*, which are belt-connected with pulleys *h* and *i*, fast on the shafts *j* and *k* of the cutters *l* and *m*, respectively. Journaled in the rear part of the frame is a shaft *n*, mounted fast upon which is a pulley 16, belt-connected with pulley *f*. Fast upon the inner end of this shaft *n* is a bevel-pinion *o*, (see Fig. 4,) which meshes with a bevel-gear *p*, fast upon a rotary sleeve *q*. The motion of the rotation communicated to this sleeve *q* is transmitted to a shaft *t* by means of a pinion *r*, fast upon sleeve *q* and intermeshing with a spur-gear *s*, fast upon sleeve *t*. Upon the upper end of shaft *t* is mounted a crank-arm *u*, (see Figs. 2, 5, and 6,) to which is pivoted at one end a link *v*, the other end of which is slotted at *w*. (See Fig. 7.) Fast upon the same shaft *t* is an eccentric *x*, which works in an eccentric-strap *y*, provided with a boss *z*. (See Fig. 3.) This boss *z* is slotted at 1 to receive a bolt 2, which connects the strap *y* to the rack 3. A link 4 is pivoted at one end to the rack 3 and at the other end to the slide 5, formed with a curved slot 6. The rack 3 engages a pinion 7, fast upon the shaft 8. Mounted on this shaft 8, one on each side of the machine, (see Fig. 1,) are the pinions 9 and 10, which mesh, respectively, with the racks 11 and 14. The rack 11 is pivoted to the slide 12, formed with the curved slot 13, (see Fig. 2,) and the rack 14 is pivoted to a slide 15, formed with a curved slot the reverse of slot 13 in slide 12. A bolt 17 engages the slot *w* in the link *v*, and thereby connects the link *v* to the carrier-frame extension 18. (See Fig. 7.) The bolt 17 is engaged by the adjusting-screw 19, by means of which the initial position of the bolt 17 in the slot *w* may be controlled. The carrier-frame is made up of two parts—a stationary member 20 and a movable arm 21, pivoted on the stationary member 20 at 22. (See Fig. 1.) The stationary member 20 is bolted to the carrier-frame extension 18, as shown in Fig. 7.

Pivoted on the bed of the machine, at one side thereof, is a lever 23, (see Fig. 1,) forked

at its free end to receive a lug 24 upon the arm 21 of the carrier-frame. Screws 25 25 pass through one of the fingers 26 of this forked lever 23 and are encircled by spiral springs 27 27, to which is secured the strap 28. A link 29 connects the lever 23 to a lever 30, pivoted in the frame of the machine. (See Fig. 8.)

The cutter *m* and its shaft *k* are adjustably mounted in a vertically-slidable carriage 31, (see Figs. 4 and 2,) slotted to permit the passage of the bolt 32. A boss 33 upon this bolt 32 travels in the slot 13 in slide 12. The horizontal reciprocations of the slide 12 thus causes the vertical reciprocation of the carriage 31 to move the cutter *m* into and out of contact with the stock. A capstan-screw 34 engages an ear upon the bolt 32 and serves to adjust the height of the cutter *m* above the bolt 32. The slot in the carriage 31 permits this relative movement. A bracket 35 is bolted to the carriage 31, and mounted in this bracket 35 is a pin 36, which engages in a slot 37 in the lever 30. (See Figs. 8, 4, and 2.) An adjusting-screw 38 serves to regulate the height of the pin 36 in the slot 37 and thereby the throw of the lever 30.

The cutter *l* and its shaft *j* are adjustably mounted in a slidable carriage 39, similar to the mounting of the cutter *m* and its shaft *k*. (See Fig. 4.) This carriage 39 is controlled by the slotted slide 15 through the bolt 41 and its boss 40. Within the slot 6 in the slide 5 (see Fig. 3) travels a lug 42, fast upon a carriage 43, to the lower end of which carriage is pivotally secured one end of a lever 44. (See Figs. 9 and 10, Fig. 10 being a sectional view on line D D of Fig. 9.) The middle portion 45 of this lever 44 is ring-shaped and carries, free to revolve within it, a disk 46, which is formed with apertures 47, having inclined walls. Fast upon the lower end of the sleeve *q* is a ring 48, in a socket 49 in which is secured a pin 50, beveled at lower end. The spring 51 tends to force the pin 50 out of the socket 49. (See Fig. 10.) The disk 46 is fast to the clamp-shaft 52, which rotates intermittently with the sleeve *q*. When the slide 5 reciprocates horizontally, the carriage 43 reciprocates vertically, thereby raising and lowering the lever 44 with its disk 46 and throwing the disk 46 into and out of engagement with the pin 50, carried by the revolving ring 48, fast upon sleeve *q*. Thus the lower clamp is moved up and down and caused to rotate intermittently.

To adjust the cutters in order to vary the diameter of the head, adjusting-screws 53 53 are provided. The cutter-shafts *j* and *k* are mounted in slides 54 54, which are carried by the carriages 31 and 39 and are transversely slidable therein. (See Figs. 2 and 4.) The upper clamp 55 (see Fig. 11) is fitted with screw-teeth 56. Bolts 57, which have a sliding fit in clamp 55, screw into a disk 58, provided with apertures 59, into which the teeth 56 enter. This disk 58 masks the teeth 56 as the pieces of barrel-head are fed between the clamps and prevents the pieces of barrel-head from being engaged by the teeth and thrown out of place. When the lower clamp moves up, the disk 58 unmasks the teeth 56 sufficiently to allow them to bite the wood and hold it securely while it is rotated during the cutting operation. An elastic washer 60 permits the upper clamp to yield whenever variations in the thickness of the stock requires it.

The operation of my new machine is as follows: Power being applied to the pulley *c*, the cutters *l* and *m* are set in rotation by the transmission of the power through the belting connecting the pulleys *d* and *h* and *e* and *i*. (See Fig. 1.) The shaft *n* is also set in rotation by the power transmitted through the belting connecting pulleys *f* and 16. (See Fig. 1.) Through pinion *o* and gear *p* the sleeve *q* is set in rotation, and through pinion *r* and gear *s* the rotation of the sleeve *q* causes the rotation of the shaft *t* and the crank-arm *u* and the eccentric *x*, which are fast upon the shaft *t*. (See Figs. 4 and 2.) Thus while the pulley *c* rotates, the cutters *l* and *m*, the sleeve *q*, and the shaft *t* are in a state of constant rotation. The rotation of the crank-arm *u* drives the carrier-frame 20 21 toward and from the clamps, and the slot *w* in the link *v* (see Fig. 7) permits the carrier-frame to dwell while the pieces of barrel-head are removed from within the frame by the upward movement of the lower clamp and at the other end of its travel, while the carrier-frame receives the pieces of barrel-head. (See Fig. 2.) The rotation of the eccentric *x* reciprocates the eccentric-strap *y* and through the bolt 2 reciprocates the rack 3, thereby rocking the pinion 7, shaft 8, and pinions 9 and 10, fast on shaft 8. (See Fig. 3.) The reciprocating motion of rack 3 is transmitted through link 4 to the slide 5, and the horizontal reciprocating motion of slide 5 causes through slot 6 and lug 42 the carriage 43 to rise and fall, thus raising and lowering the lever 44, disk 46, and clamp-shaft 52 and throwing the disk 46 into engagement with the rotating sleeve *q* through pin 50. Should the pin 50 meet the wall of the aperture 47 near the top thereof, the bevel-face of the pin 50 and the spring 51 allow the pin 50 to yield and engage the succeeding aperture. The reciprocation of the rack 3 rocks the shaft 8 through pinion 7 and through pinions 9 and 10 and racks 11 and 14 causes the slides 12 and 15 to reciprocate. The reciprocation of slide 15 causes the carriage 39 to slide down and up vertically, and thereby to bring the rotating cutter *l* into and out of contact with the upper side of the rotating stock. Likewise the reciprocation of the slide 12 causes the carriage 31 to slide up and down, and thereby to bring the rotating cutter *m* into and out of contact with the lower side of the rotating stock. The upward movement of the carriage 31 clears the movable arm 21 of the carrier-frame out of the way

of the rising cutter *m* in this way: The stud 24 is engaged in the fork of the lever 23 and the pin 36 in lever 30. Through lever 30 and link 29 the upward movement of the pin 36 causes the lever 23 to move outwardly, carrying the arm 21 out of the way of the rising cutter *m*. The upward movement of the carriage 43 causes the clamp-shaft 52 to be raised, thereby freeing the carrier-frame of the pieces of barrel-head, clamping them securely, and rotating them to the cutters as the disk 46 on the clamp-shaft 52 engages the pin 50 on the rotating sleeve *q*. The same movement of the rack 3 toward the clamp-shaft 52 thus frees the carrier-frame from the inclosed barrel-head and clamps and rotates the stock and brings the cutter into contact with the stock. The cutters must be kept in contact with the stock during its rotation, and the stock must be rotated until the cutting operation is completed. This requires a pause between the reciprocations of the rack 3. The requirement is met by providing the boss *z* on the eccentric-strap *y* with a slot 1. The rack 3 will not be moved during the interval required for the bolt 2 to travel the length of the slot 1. Similarly the slot *w* in link *v* permits the carrier-frame to pause while the lower clamp frees it from the inclosed barrel-head.

It is a matter of importance that all the parts should act in unison and that the pieces of barrel-head should be fed between the clamps so as to bring the center of the barrel-head in the axis of the rotary clamp-shaft 52 when that shaft 52 is moved upward to clamp and rotate the barrel-head. To provide for the adjustment necessitated by this requirement, the flange 61 on the upper end of shaft *t* (see Figs. 5 and 6) is provided with a series of bolt-holes 62 at small intervals, which register with bolt-holes 63 in the crank-arm *u*. Bolts 64 pass through these holes 62 63 and secure the crank-arm *u* to the shaft *t*. To adjust the angular position of the crank-arm *u* on the shaft *t*, the bolts 64 are withdrawn and the crank-arm *u* turned to the desired position. The bolts are then replaced, the bolt-holes registering in the new position. To give a fine adjustment, the adjusting-screw 19 is turned, thereby adjusting the bolt 17 in the slot *w* in link *v*.

A stop 65 prevents the carrier-frame 20 21 from being carried too far to the rear by the momentum of the moving parts, and thus insures the center of the barrel-head being brought accurately in the axis of the rotary clamp-shaft 52.

It is evident that the particular construction herein described may be departed from without departing from the spirit of my invention. For example, in those parts connected by a lug on one fitting into a slot in the other the construction is susceptible of inversion.

I desire to be understood as claiming my invention in the broadest legally-permissible manner.

What I claim is—

1. In a rotary clamping mechanism the combination of a supporting-frame; a pair of cooperating clamps rotatably mounted in said frame; the upper one of said clamps being provided with teeth and formed with bolt-holes; a plate suspended from said upper clamp by bolts which are slidable in said bolt-holes; said plate being apertured for the passage of said teeth; said bolts; and mechanism for moving the lower clamp toward the upper and for rotating the clamps.

2. In a head-cutting machine, the combination of a clamping mechanism; a slide connected to said clamping mechanism by a lug on one engaging a cam-slot in the other, the reciprocations of said slide throwing the clamping mechanism into and out of engagement; means operatively connecting said slide with a driving mechanism which reciprocates said slide; and said driving mechanism connected to said connecting means by a lug on one engaging an elongated slot in the other, thereby permitting said clamping mechanism to rest while the lug traverses said elongated slot.

3. In a head-cutting machine, the combination of a clamping mechanism; a slide connected to said clamping mechanism by a lug on one engaging a cam-slot in the other; a cutting mechanism; a slide connected to said cutting mechanism by a lug on one engaging a cam-slot in the other; means operatively connecting said slides with a rock-shaft; said rock-shaft; and a driving mechanism which oscillates said rock-shaft to clamp the stock and throw the cutting mechanism into contact therewith.

4. In a mechanism for moving an arm of the carrier-frame out of the way of the cutter, the combination of a cutter-carriage; mechanism for reciprocating said cutter-carriage; a carrier-frame having a movable arm; a lever which engages said movable arm; and mechanism operatively connecting said lever and said cutter-carriage.

5. In a mechanism for moving an arm of the carrier-frame out of the way of the cutter, the combination of a cutter-carriage; mechanism for reciprocating said cutter-carriage; a lever reciprocated by said cutter-carriage; a carrier-frame having a movable arm; a lever which engages a stud on the arm of the carrier-frame; and a link connecting said levers.

6. In a mechanism for pressing the pieces of barrel-head together, the combination of a lever; a strap on said lever; a carrier-frame, one arm of which is movable and engages said strap; and mechanism for moving said carrier-frame to feed the pieces of barrel-head and to engage said arm and said strap.

7. The combination of a driving mechanism; a carrier-frame reciprocated by said driving mechanism and connected thereto by a lug on one engaging a slot in the other; cooperating clamps one of which is raised to

clamp the stock and to free the carrier-frame of the barrel-head at the end of its feeding movement; mechanism for raising said clamp; a cutting mechanism; mechanism for throwing said cutting mechanism into contact with the stock when it is clamped; and a screw-and-nut adjusting mechanism for adjusting said carrier-frame to synchronize the end of its feeding movement and the movement of said clamp and cutting mechanism.

8. In a head-cutting machine, a mechanism for moving the cutter into and out of contact with the stock comprising a driving mechanism; an eccentric; an eccentric-strap; mechanism operatively connecting said eccentric-strap with coacting slides; said coacting slides, a lug on one engaging a cam-slot in the other, one of said slides being connected with said eccentric-strap, and the other carrying a cutter; and said cutter.

9. In a head-cutting machine, a mechanism for moving the cutter into contact with the stock and holding the cutter in contact with the stock, said mechanism being made up of the combination of a carriage upon which the cutter is mounted; mechanism for reciprocating said cutter-carriage; a reciprocating member which connects said mechanism with a driving mechanism; said member and said mechanism for reciprocating the cutter-carriage being connected by a lug on one engaging in an elongated slot in the other, thereby permitting the cutter to dwell in contact with the stock while the lug traverses the slot; and said driving mechanism.

10. In a head-cutting machine, a mechanism for moving the cutter into contact with the stock and holding the cutter in contact with the stock during the rotation of the stock comprising a driving mechanism; an eccentric; an eccentric-strap formed with an elongated slot; a rack formed with a lug which engages said slot; mechanism connecting said rack with coacting slides, a lug on one of said slides engaging a cam-slot in the other; and a cutter mounted on one of said slides.

11. In a head-cutting machine, a mechanism for clamping and rotating the stock comprising coacting slides, a lug on one engaging a slot in the other; reciprocating mechanism operatively connected with one of said slides; a lever connected to the other of said slides; a clamp-shaft rotatably mounted in said lever; a rotary mechanism into and out of engagement with which said clamp-shaft is thrown by the reciprocation of said slides; and coöperating clamps.

12. In a head-cutting machine, a mechanism for clamping and rotating the stock comprising a driving mechanism; an intermittently-reciprocating member connected to said driving mechanism by a lug on one engaging an elongated slot in the other; coacting slides, one connected with said intermittently-reciprocating member and the other with a lever; said coacting slides being connected by a lug on one engaging a slot in the other; a clamp-shaft rotatably mounted in said lever; a rotary mechanism into and out of engagement with which said clamp-shaft is thrown by the reciprocations of said slides; and coöperating clamps.

13. A head-cutting machine made up of a supporting-frame; a driving mechanism; a feeding mechanism comprising a carrier-frame; a link connected to said carrier-frame by a lug on one engaging an elongated slot in the other, thereby permitting said carrier-frame to dwell at the ends of its stroke; and mechanism for reciprocating said link; an intermittently-reciprocating member driven by said driving mechanism; a clamp-shaft carriage; a clamp-shaft rotatably mounted in said carriage; coacting clamps; mechanism operatively connecting said clamp-shaft carriage with said intermittently-reciprocating member by which said clamp-shaft is made to clamp and rotate the stock; a rotary member into and out of engagement with which the clamp-shaft is thrown by the reciprocations of said clamp-shaft carriage; a cutter-carriage; a cutter mounted on said carriage; and mechanism operatively connecting said cutter-carriage with said intermittently-reciprocating member by which said cutter is made to contact with the stock when it is clamped and rotated.

14. A head-cutting machine made up of a driving mechanism; a feeding mechanism; mechanism for adjusting said feeding mechanism to place the center of the head in the axis of the clamp-shaft when the clamping mechanism is thrown into operation; an automatic rotary clamping mechanism; mechanism for throwing the cutters into contact with the stock when it is clamped and rotated; and said cutters.

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

WILLIAM E. NICHOLS.

Witnesses:
FRANK B. SPALTER,
HENRY S. ALLEN.