No. 659,488. Patented Oct. 9, 1900.

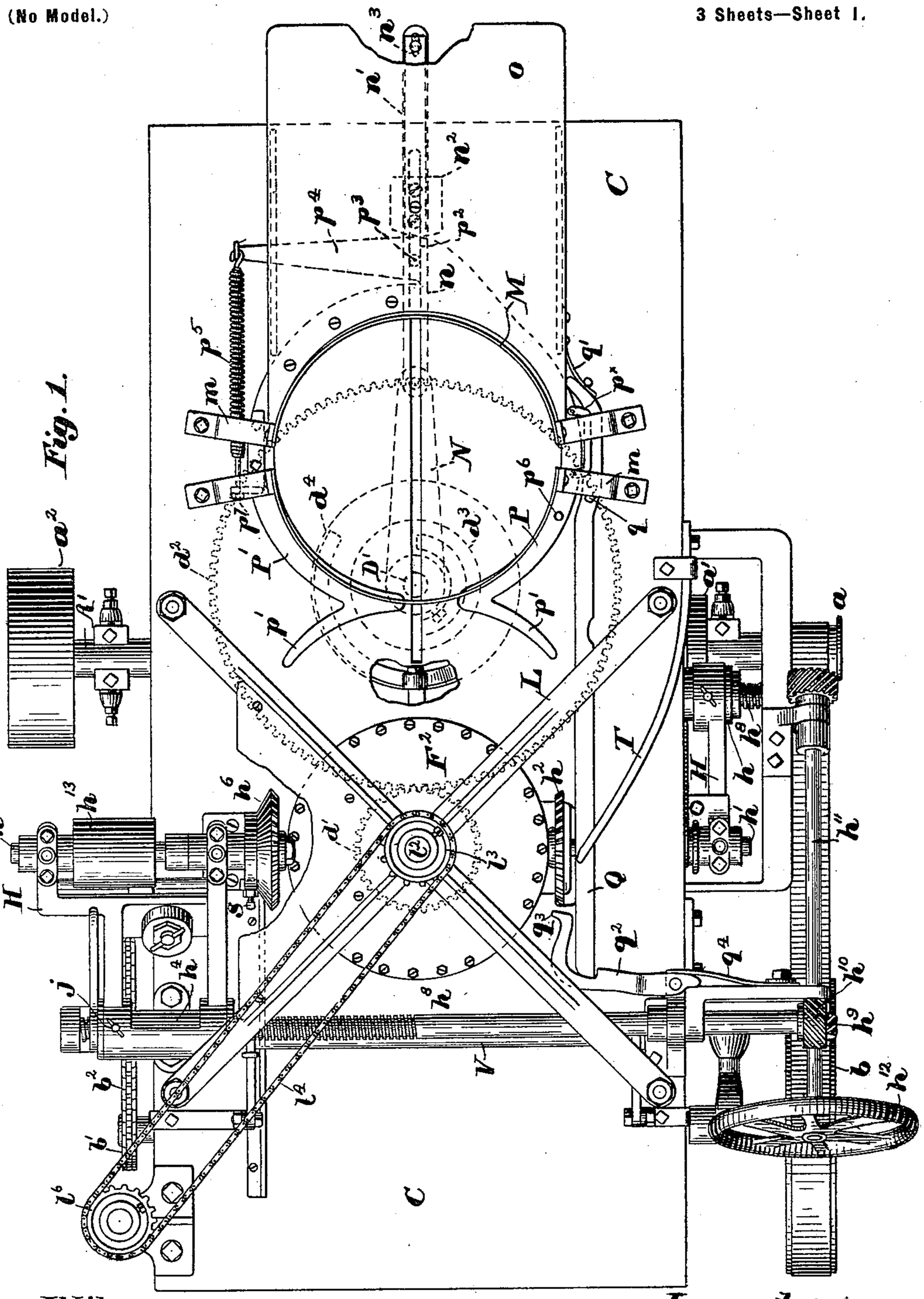
W. E. NICHOLS.

HEAD CUTTING MACHINE.

(Application filed Nov. 20, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



Witnesses:
Walter E. Lombard
E. A. Allen.

Inventor:
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(No Model.) 3 Sheets—Sheet 2.

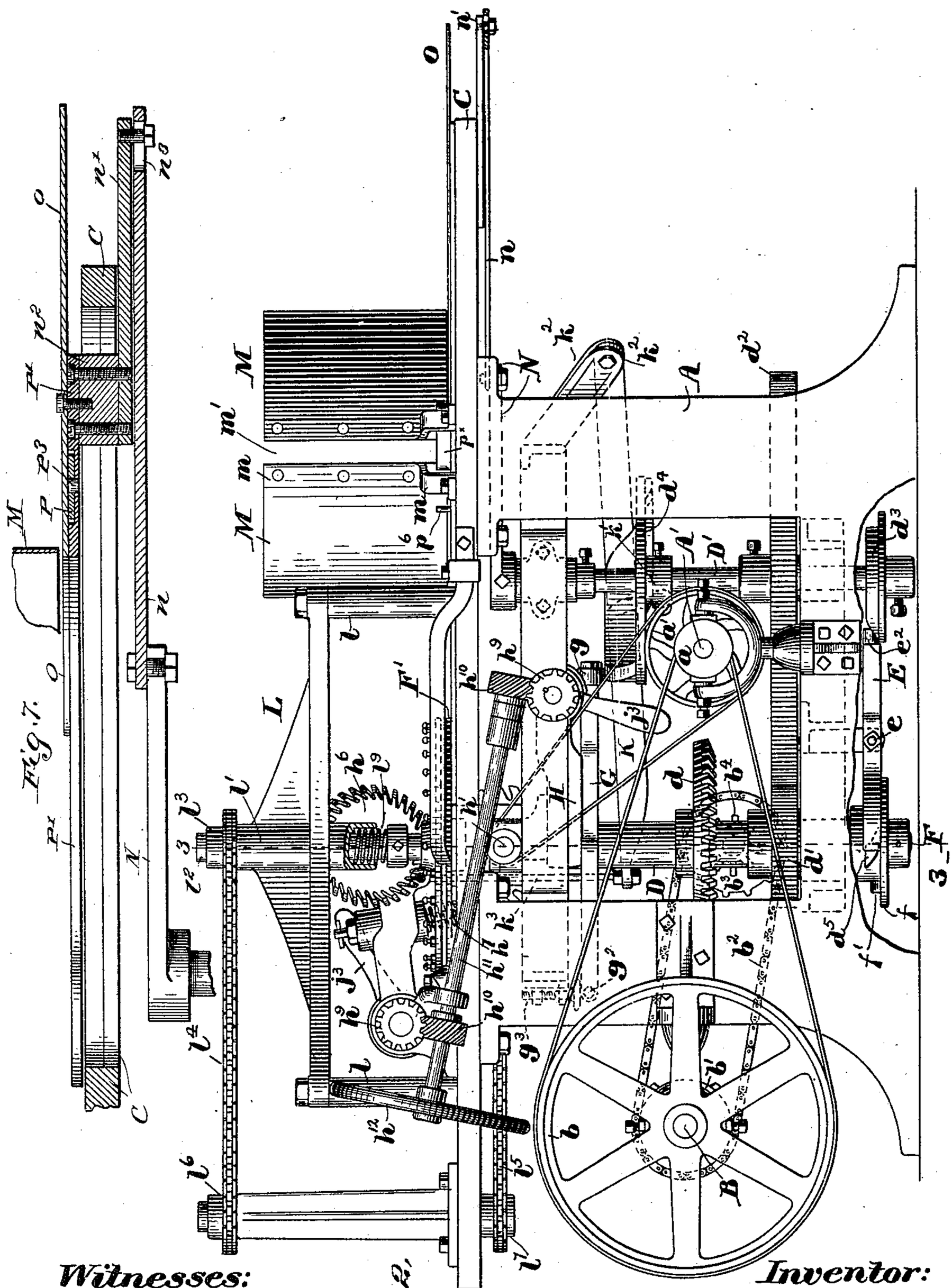

Fig. 2.

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Fig. 6.

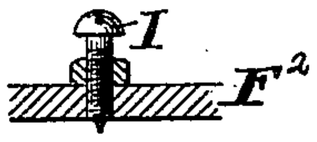


Fig. 4.

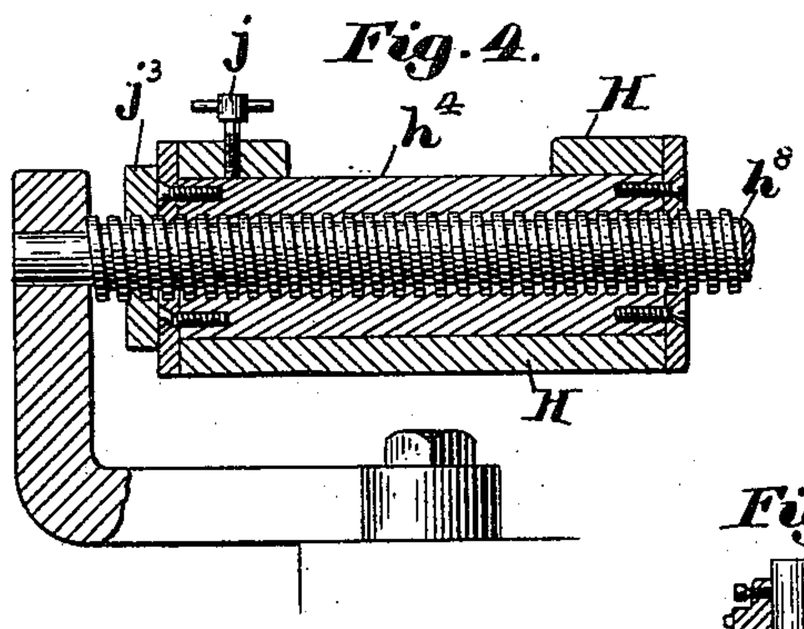


Fig. 5.

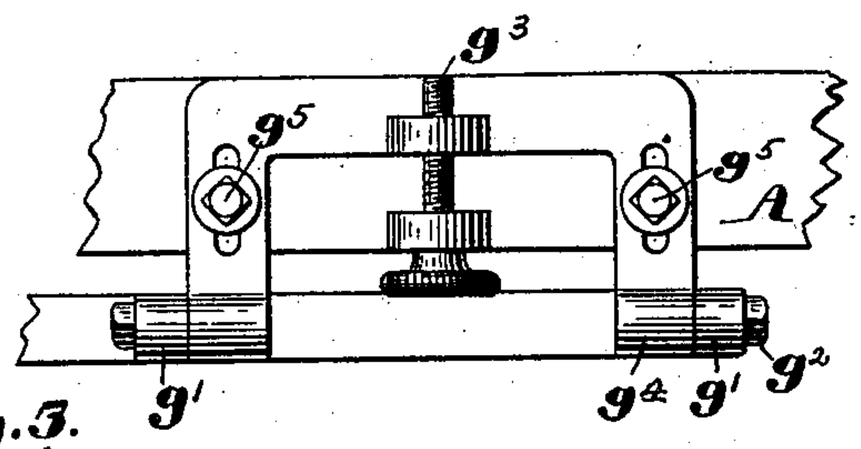
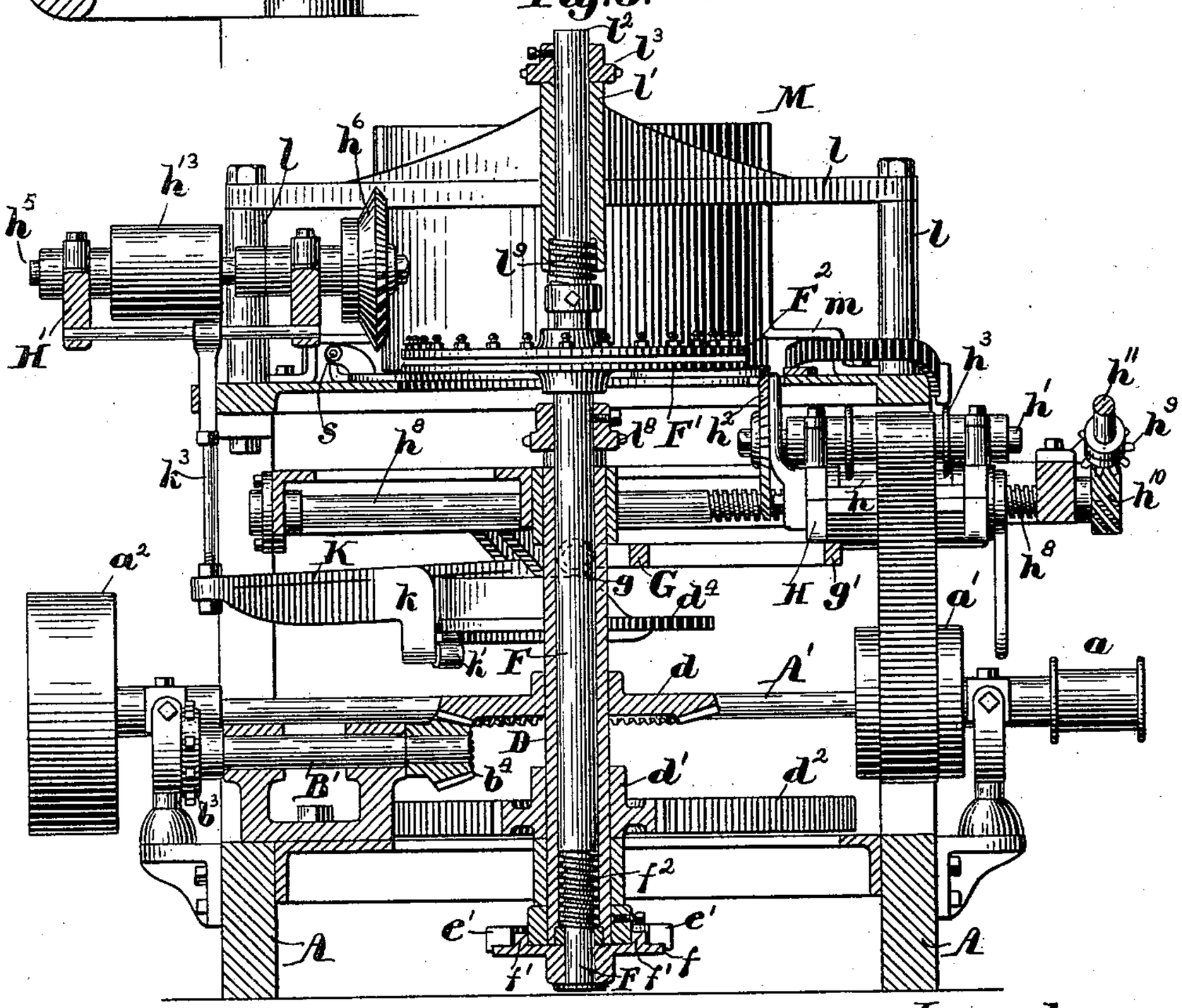


Fig. 3.



Witnesses:

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E. A. Allen.

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. 659,488, dated October 9, 1900.

Application filed November 20, 1899. Serial No. 737,618. (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 plan view of my new turning-machine. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional elevation on line 3 3, Fig. 2. Figs. 4, 5, and 6 show details hereinafter referred to. Fig. 7 is a detail showing the connection between the link and the carrier-frame.

My invention relates to machines for cutting heads for barrels, kegs, and the like, for cutting bottoms and lids for pails and the like, and in general for cutting round or circular heads for either slack or tight packages.

One object of my invention is to provide a machine which shall do its work with the greatest rapidity, and thereby give a greatly-increased production over any machine of its kind heretofore known.

Another object of my invention is to provide a machine of the kind named with mechanism which automatically feeds the heads from a hopper to the cutters one head at a time, and thereby avoids the slowness of feeding the heads by hand.

A third object of my invention is to provide a machine that is especially adapted to turn anew round heads which from any reason need to be turned again, as by reason of being warped from long storage.

One feature of my invention is the fitting of the machine with two separate cutters, one above the stock and the other below it. These cutters are thrown into operation at the same time, and their line of movement is at practically right angles to the plane of the stock, thereby insuring a beveled face which is truly plane.

A second feature of my invention is the automatic feeding mechanism. The stock is built up in a pile and placed in a hopper, from which the heads are fed one by one to the clamping-disks.

A third feature of my invention is the carrier, which is adapted to hold together the pieces which go to make up the head. This carrier is preferably shaped at its rear end so that it pushes off the pieces which make up the head turned just before.

A fourth feature of my invention is the positive driving connection between the clamping-disks. The two clamping-disks are so mechanically connected that the rotation of one drives the other at the same speed. In machines heretofore constructed one of the clamping-disks has been driven by the friction between it and the rotating stock, which is supported by the clamping-disk that is driven from the shafting. In such machines as the positively-driven disk approaches its coöperating disk the rotating stock is brought into contact with the stationary disk, with the result that the stock is thrown from between the disks.

Other features of my invention will be mentioned in the description which follows.

In the drawings illustrating the principle of my invention and the best mode now known to me of applying that principle, (see Fig. 3,) A is the frame of the machine, in which is journaled the shaft A′, fast upon which are the pulleys a, a', and a^2, the latter being the driving-pulley of the machine. The pulley a is belt-connected with the pulley b, (see Fig. 2,) fast upon the shaft B of which is the sprocket-wheel b', connected by the sprocket-chain b^2 with the sprocket-wheel b^3, (see Figs. 2 and 3,) fast on shaft B′. On the end of this shaft B′ is a bevel-gear b^4, which meshes with a bevel-gear d, which is fast upon an upright hollow shaft or sleeve D. Mounted on this sleeve D just below the bevel-gear d is a pinion d', which meshes with a spur-gear d^2, which is mounted upon the upright shaft D′ between the cam-disk d^3 and the double cam-disk d^4. Pivoted at e (see Fig. 2) in the frame A is the forked lever E, the forked ends e' of which rest upon a disk f, fast on the lower end of the upright shaft F, which revolves within the hollow shaft or sleeve D and bears upon its upper end the clamping-disk F′. Projecting sidewise from the lower end of hollow shaft D is a lug d^5, which engages with lugs f', projecting from the upper face of the disk f. The other end of the lever E carries a roller e^2, which rests upon the cam-surface of the disk d^3, that so controls the movement

of lever E as to draw down against the tension of the spring f^2 the shaft F, thereby disengaging that one of the lugs f' which is in engagement with the lug d^5. Resting upon the upper cam-surface of the disk d^4 is the roller g, carried by the forked lever G, the forked ends g' of which are pivoted at g^2 to the frame g^4, secured to the frame of the machine by the clamping-bolts g^5 and adjustable thereon by means of the screw g^3. An adjusting-screw g^3 serves to adjust vertically the pivotal point of support of the lever G. Resting upon one of the forks g' of the lever G is a swinging frame H, one end of which fulcrums about the sleeve h (see Fig. 4, which is a sectional view,) and the other end of which carries a shaft h', fast upon which are the lower rotary cutter h^2 and the pulley h^3, which is belt-connected with the pulley a'. (See Figs. 2 and 3.) Projecting sidewise from the lever K is the arm k, which carries a roller k', that is pressed against the lower cam-surface of the disk d^4. The lever K is pivoted at one end on a shaft carried by the forks k^2 k^2, projecting obliquely downward and outward from the frame A. Adjustably secured to the free end of lever K is a pull-rod k^3, the upper end of which is fast to the swinging frame H', which is free to rotate at one end on the sleeve h^4 and carries at the other end a shaft h^5. Fast upon the shaft h^5 is the upper rotary cutter h^6 and the pulley h^{13}. A spring h^7 tends to force the frame H' upward and the upper rotary cutter h^6 out of engagement with the work. The sleeves h and h^4 are screw-threaded on their interior to receive the adjusting-screw shafts h^8 h^8, (see Fig. 4,) upon the ends of which are the screw-gears h^9 h^9, Figs. 1, 2, and 3, meshing with screw-gears h^{10} h^{10}, fast upon the shaft h^{11}, controlled by the hand-wheel h^{12}. Secured to the standards l is the horizontal frame L, which carries a bearing l' for the upright shaft l^2. Fast to the lower end of the shaft l^2 is the upper clamping-disk F^2, and fast to its upper end is the sprocket-wheel l^3, which is driven by the shaft F through the sprocket-chains l^4 l^5 and sprocket-wheels l^6, l^7, and l^8. The spring l^9 forces the upper clamping-disk F^2 downward.

Secured to the bed-plate C of the machine by stay-supports m is the hopper M, made up of two cylindrical pieces separated at the sides by the slot m'. The bed-plate C is slotted at one end to receive the lug n^2, secured to the sliding bar n', which through the link n is connected to the crank-arm N, fast upon the shaft D'. The carrier is made up of two semicircular pieces P P', both of which are provided at their rear ends with curved fingers p'. Projecting forwardly from the front end of the piece P' is an arm which carries the lug n^2, and to this piece P' is secured a thin sheet of metal O, which I call a "supporting-plate." The piece P is pivoted on the stud p^3 on the arm p^2 and is provided with a sidewise-projecting arm p^4, to which is secured one end of a spring p^5, the other end of which is secured to a lug projecting from the piece P'. Pivoted at q to bed-plate C is the lever Q, one end of which is pressed inward by the spring q' and the other end of which is engaged by the catch q^2.

The operation of my machine is as follows: The barrel-heads are built up in a pile and preferably tied together, the pieces forming a complete barrel-head forming one layer of the pile. The pile is placed in the hopper M, and the string exposed through the side slots m' is cut. Power is applied to the pulley a^2, and through the pulleys a and b, sprocket-wheels b' and b^3, bevel-gears b^4 and d, and pinion d' and gear d^2 the power is transmitted to the shaft D', thereby turning the crank-arm N and moving the carrier P P', by means of the link n and slide-bar n', toward the knives. The upper surface of the barrel-head comes about flush with the upper surface of the carrier, and as the carrier moves toward the clamps the thin sheet of metal O is moved under the pile of barrel-heads and prevents more than one barrel-head being fed at the same time. In its movement toward the clamps the carrier-piece P bears against the lever Q, and thus holds together the pieces which go to make up the barrel-head. When the carrier-piece P has nearly reached the limit of its travel and the barrel-head is in position over the clamping-disk F', a cam $p^\times$, fast on the side of the carrier-piece P, engages a flat spring T, which thereby presses the pieces of barrel-head tightly together. At about the same time the stud p^6 strikes the end q^3 of the catch q^2 and forces it back against the tension of the spring q^4. The lever Q being thus released, the spring q' acts upon one end of the lever Q to move its other end outwardly just beyond the notch in the catch q^2. The barrel-head being properly centered over the clamping-disk F', the cam-roller e^2 enters the hollow of the cam d^4, and the shaft F, carrying the clamping-disk F', is forced upwardly by the spring f^2, thereby disengaging the stock from the carrier to permit its return. The barrel-head is thus securely held between the clamping-disks F' F^2, the spring l^9 yielding where there is a variation in thickness of the barrel-heads. Screwed into the clamping-disk F^2, near the edge thereof, are the sharp-pointed screws I, (see Fig. 6,) the points of which project from the lower face of the clamping-disk F^2 and enter the barrel-head pieces to hold them securely in place. When the shaft F is forced upward by the spring f^2, the lug d^5 on the revolving sleeve D engages one of the lugs f' on the disk f, and thereby communicates motion of rotation to the shaft F, and through the sprocket-wheels l^8, l^7, l^6, and l^3 and sprocket-chains l^5 and l^4 a motion of rotation to the shaft l^2. The clamping-disks F' F^2 are thus rotated together, with the barrel-head between them. The carrier P' P is reciprocated, and the cam $p^\times$ having cleared

the spring T the spring p^5 acts to swing the carrier-piece P and the lever Q outwardly out of the way of the lower rotary cutter h^2, which has been raised into cutting position, for the cam-roller g rises on the raised portion of the upper cam-surface of the disk d^4, and the forked end of the lever G is raised, carrying with it the frame H and the lower rotary cutter h^2, which is thus brought into contact with the stock. At the same time the cam-roller k' rides on the raised portion of the lower cam-surface of the disk d^4, and through the pull-rod k^3 the lever K draws down the swinging frame H and brings the upper rotary cutter h^6 into contact with the stock. The cut being finished, the cam-rollers g and k' sink into the depressions of the respective cam-surfaces with which they contact, the upper rotary cutter h^6 is forced upward out of contact with the stock by the spring h^7, and the lower rotary cutter h^2 sinks by virtue of its weight downward out of contact with the work. The cam d^3 through the lever E draws down the shaft F and clamping-disk F'. On the next return of the carrier P P' the fingers p' push the finished barrel-head off the clamping-disk. In order to center the barrel-head with accuracy, an adjustable stop S is provided. This stop S is a screw-bolt, against which the lug p^7 strikes when the barrel-head is accurately centered over the clamping-disk F'. The slot n^3 in the link n permits the carrier to dwell at both ends of its stroke. (See Fig. 7.) This permits the rotary clamps to free the carrier from the barrel-head before the carrier starts on its return stroke. It also permits the carrier to dwell while under the hopper.

In order to adjust the cutters for barrel-heads of different diameters, the screws j (see Fig. 4) are tightened, thereby securing the pivotal ends of the swinging frames H H' to the sleeves h h^4. The check-nuts j^2 are loosened by turning the arms j^3 thereof. The hand-wheel h^{12} is then turned and the screw-shafts rotate, carrying the frames H H' and the cutters h^2 h^6, mounted thereon, into the desired position. The screws j are then loosened and the check-nuts j^2 are tightened.

To prevent the carrier from being forced upward by the clamping-disk F' in case the latter should through accident come up prematurely, the fingers p' engage under a transversely-extending bar V. (See Fig. 1.)

So far as known to me I am the first to provide mechanism which operatively connects one clamping-disk with its coacting disk. This insures the two disks rotating together at the same speed and obviates any tendency toward throwing the stock from between the disks when the stock is being clamped between them.

In order to cut lids which need beveling on one side only, one of the cutters is thrown out of operation. The advantage of having the cutters mounted separately will be now obvious.

I do not desire to be understood as limiting myself to the precise construction herein shown. The shape of the hopper and the carrier may, for instance, be changed. Where warped heads are to be turned anew, a round hopper and ring-shaped carrier would preferably be used; but where new heads are to be cut from square stock the shape of the hopper and the carrier would preferably be made to conform to that of the stock.

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

What I claim is--

1. In a head-cutting machine, a carrier-frame adapted to inclose and carry a barrel-head, and made up of a stationary member; a movable member pivoted on said stationary member; a spring, one end of which is secured to the stationary member and the other end of which is secured to the movable member.

2. In a head-cutting machine, a carrier-frame adapted to inclose and carry a barrel-head, and made up of a stationary member; a movable member pivoted on said stationary member; a spring, one end of which is secured to the stationary member and the other end of which is secured to the movable member; said stationary member and movable member being formed with ears adapted to push the finished barrel-head from between the clamps.

3. In a head-cutting machine, the combination of a carrier-frame adapted to inclose and carry a barrel-head, and made up of a stationary member; a movable member pivoted on said stationary member; and a spring controlling said movable member; with mechanism for reciprocating said carrier; and mechanism for engaging and pressing said movable member to press the inclosed pieces of barrel-head close together as they are brought between the clamps.

4. In a head-cutting machine, the combination of a carrier-frame adapted to inclose and carry a barrel-head, and made up of a stationary member; a movable member pivoted on said stationary member; and a spring controlling said movable member; with mechanism for reciprocating said carrier; a projection on said movable member; and a spring, mounted on the machine-frame, which engages said projection to press the movable member and the inclosed pieces of barrel-head close together as the pieces of barrel-head are brought between the clamps.

5. In a head-cutting machine, the combination of a carrier-frame adapted to inclose and carry a barrel-head and made up of a stationary member; a movable member pivoted on said stationary member; and a spring fast to the stationary member and controlling the movable member; mechanism for reciprocating said carrier-frame to feed the inclosed barrel-head to the clamps; and mechanism which holds the movable member in place

against the tension of the spring during the feeding movement of the carrier-frame.

6. In a head-cutting machine, the combination of a carrier-frame adapted to inclose and carry a barrel-head and made up of a stationary member; a movable member pivoted on said stationary member; and a spring fast to the statiouary member and controlling the movable member; mechanism for reciprocating said carrier-frame to feed the inclosed barrel-head to the clamps; a lever which presses against and guides the movable member in place against the tension of the spring during the feeding movement of the carrier-frame; and mechanism for holding said lever in place.

7. In a head-cutting machine, the combination of a carrier-frame comprising a stationary member, a movable member pivoted on said stationary member, and a spring controlling said movable member; mechanism for reciprocating said carrier-frame to feed the barrel-heads to the clamps; retaining mechanism which holds said movable member in place against the tension of said spring; releasing mechanism for throwing said retaining mechanism out of action to permit the spring to force the movable arm out of the way of the cutter on the return movement of the carrier-frame; and restoring mechanism for throwing the retaining mechanism into place after the movable arm has passed, on its return movement, by the cutter.

8. In a head-cutting machine, the combination of a carrier-frame comprising a stationary member, a movable member pivoted on said stationary member, and a spring controlling said movable member; mechanism for reciprocating said carrier-frame to feed the barrel-heads to the clamps; a retaining-lever which presses and guides the movable member in place during the feeding movement of the carrier; a catch which holds one end of said lever in place against the tension of a spring controlling the other end and which is released by engagement with the carrier-frame at the end of its feeding movement, thereby permitting the carrier-frame spring to force its movable member out of the way of the cutter; and a projection on the front end of said retaining-lever which engages the movable member to restore the retaining-lever to its locked position on return movement of the carrier-frame.

9. In a head-cutting machine, a reciprocating feeding mechanism comprising a crank-shaft; a crank-arm mounted on said crank-shaft; a link connecting said arm with a carrier-frame; said carrier-frame adapted to inclose and carry a barrel-head; and a driving mechanism which rotates the crank-shaft and thereby drives the carrier-frame to place the inclosed barrel-head between the clamps and draws back the carrier-frame after the barrel-head is removed from within the carrier-frame.

10. In a head-cutting machine, a reciprocating feeding mechanism comprising a crank-shaft; a crank-arm mounted on said crank-shaft; a link connecting said arm with a carrier-frame; said link being slotted to receive a lug from said carrier-frame, thereby permitting the carrier-frame to dwell while the barrel-head is removed from within the carrier-frame; and a driving mechanism which rotates the crank-shaft and thereby drives the carrier-frame to place the barrel-head between the clamps and draws back the carrier-frame after the barrel-head is removed from within the carrier-frame.

11. In a head-cutting machine, a reciprocating feeding mechanism comprising a carrier-frame adapted to inclose and carry a barrel-head; mechanism for reciprocating said carrier-frame to bring the inclosed barrel-head between the clamps; means for permitting lost motion in reciprocating said carrier-frame; and a stop which engages said carrier-frame to adjust the center of the inclosed barrel-head properly upon the clamps.

12. In a head-cutting machine, an automatic reciprocating feeding mechanism comprising a crank-shaft; a crank-arm mounted upon said shaft; a carrier-frame adapted to inclose and carry a barrel-head; a link connecting said carrier-frame with said crank-arm; a supporting-plate secured to said carrier-frame for supporting the pile of heads in the hopper to permit the reciprocations of the carrier-frame; and a hopper from which the heads are fed by the carrier-frame.

13. In a head-cutting machine, an adjusting mechanism for adjusting the cutters to vary the diameter of the head and comprising a pair of screw-shafts mounted in the supporting-machine frame; sleeves threaded to engage said screw-shafts and mounted thereon, one on one side of the axis of the rotary clamps, the other on the other side of said axis; a cutter-carrying mechanism rotatably mounted on each of said sleeves; means for securing said cutter-carrying mechanisms to their respective sleeves; and stationary mechanism mounted in the machine-frame which engages and rotates said screw-shafts.

14. In a head-cutting machine, a mechanism for throwing the stock and cutters into contact with each other and comprising a driving mechanism; an automatic rotary clamping mechanism; a rotary cam-shaft driven by said driving mechanism; mechanism operatively connecting said rotary cam-shaft and said rotary clamping mechanism to throw the rotary clamping mechanism into and out of engagement with the said driving mechanism; a cutter-carrying mechanism; a cam upon said rotary cam-shaft; and mechanism connecting said cam with the cutter-carrying mechanism by which the cutters are moved into contact with the stock when the stock is rotated to the cutters by the rotary clamping mechanism.

15. In a head-cutting machine, a mechanism for clamping and rotating the pieces of

barrel-head, comprising a pair of rotary clamps mounted on clamp-shafts; and mechanism for throwing one of said clamp-shafts into and out of engagement with the rotating mechanism and clamping the pieces of barrel-head between the clamps; driving mechanism connecting the two coöperating clamp-shafts by which one clamp-shaft positively drives the other to prevent the separation of the pieces comprising the barrel-head when the clamps start to rotate.

16. In a head-cutting machine, a clamp-driving mechanism comprising a rotary sleeve; driving mechanism which rotates said sleeve; a clamp-shaft having a clamp at one end; mechanism which throws said clamp-shaft into and out of engagement with said rotary sleeve and clamps the barrel-head between said clamp and its coöperating clamp; driving mechanism on said clamp-shaft by which the shaft of the coöperating clamp is driven uniformly with the other to obviate the separation of the pieces comprising the barrel-head when the clamps start to rotate.

17. A head-cutting machine made up of a supporting-frame; driving mechanism; a rotary sleeve driven by said driving mechanism; a cam-carrying crank-shaft driven by said rotary sleeve; a reciprocating feeding mechanism comprising a crank-arm mounted on said rotary shaft; a carrier; and mechanism connecting the carrier with the crank-arm by which the carrier is reciprocated to feed the barrel-heads to the clamps; a rotary clamping mechanism comprising a pair of coöperating clamps mounted on the opposing ends of clamp-carrying shafts; a spring for forcing one of said clamp-shafts toward the other to clamp the stock, and thereby throwing the clamp-shaft into engagement with the said rotary sleeve to rotate the stock; a lever, one end of which bears upon the end of the cam-shaft and the other end of which is controlled by a cam on said shaft to draw down the clamp-shaft after the cut is made; and said cam; a cutting mechanism comprising a cam on said shaft; a lever, one end of which is controlled by said cam and the other end of which is connected to a cutter-carrying swing-frame; said frame; a rotary cutter mounted in said frame and brought into contact with the stock by the swinging of said frame by its connected lever during the rotation of the stock.

18. An automatic head-cutting machine made up of a supporting-frame; a driving mechanism; a cam-carrying crank-shaft driven by said driving mechanism; a crank-arm mounted on said shaft; a carrier, for feeding the barrel-heads, connected to said crank-arm and reciprocated by the rotation of said crank-shaft; a hopper from which said barrel-heads are fed by said carrier; a cam fast upon said crank-shaft for controlling the rotary clamping mechanism; mechanism controlled by the rotation of said cam for moving one clamp-shaft toward its coöperating clamp-shaft to clamp the stock after it is fed by the carrier and for throwing said clamp-shafts into engagement with said driving mechanism to rotate the stock to the cutters, and out of engagement therewith after the cut is made; a cam fast upon said cam-shaft for controlling the cutters; mechanism controlled by the rotation of said cam for throwing said cutters into and out of contact with the stock when clamped by said rotary clamping mechanism; and said cutters secured in position on the frame of the machine and brought by said controlling mechanism into and out of contact with the stock.

WILLIAM E. NICHOLS.

In presence of—
FRANK B. SPALTER,
MARK D. SHEDD.