No. 742,015. PATENTED OCT. 20, 1903.

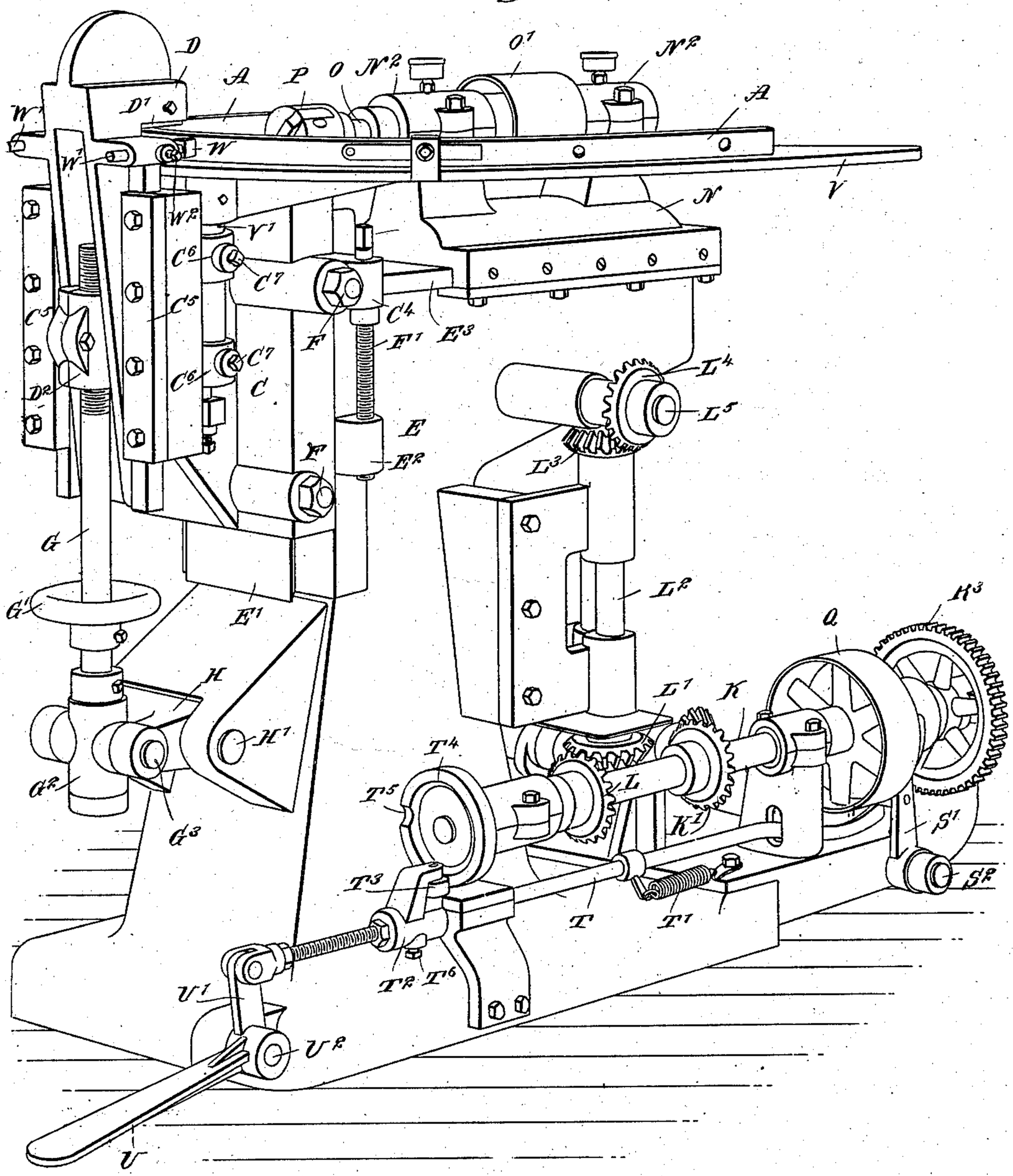
G. A. ENSIGN.

FELLY COMPRESSING AND BORING MACHINE.

APPLICATION FILED OCT. 9, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.



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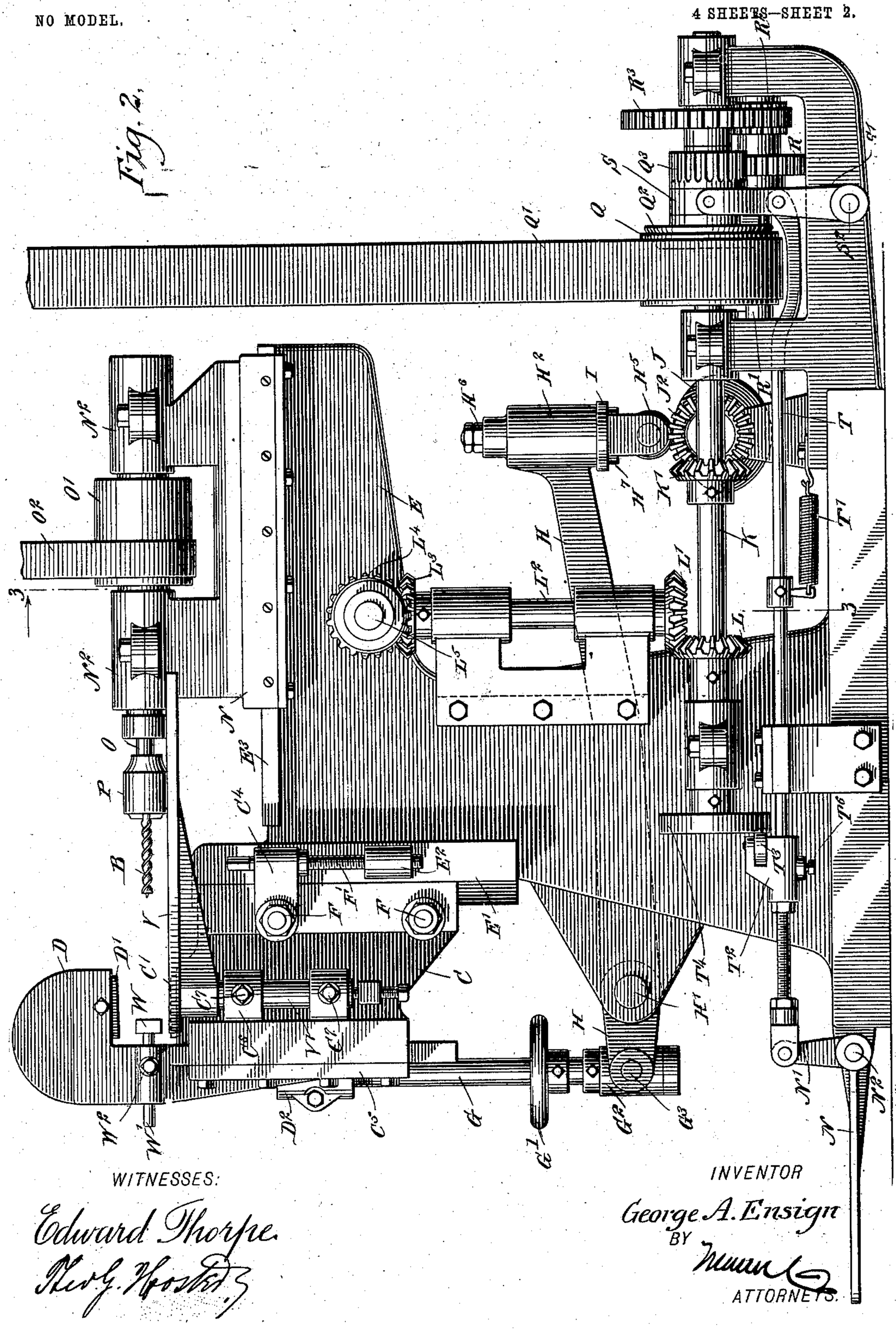
NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.



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NO MODEL. 4 SHEETS—SHEET 3.

Fig. 3,

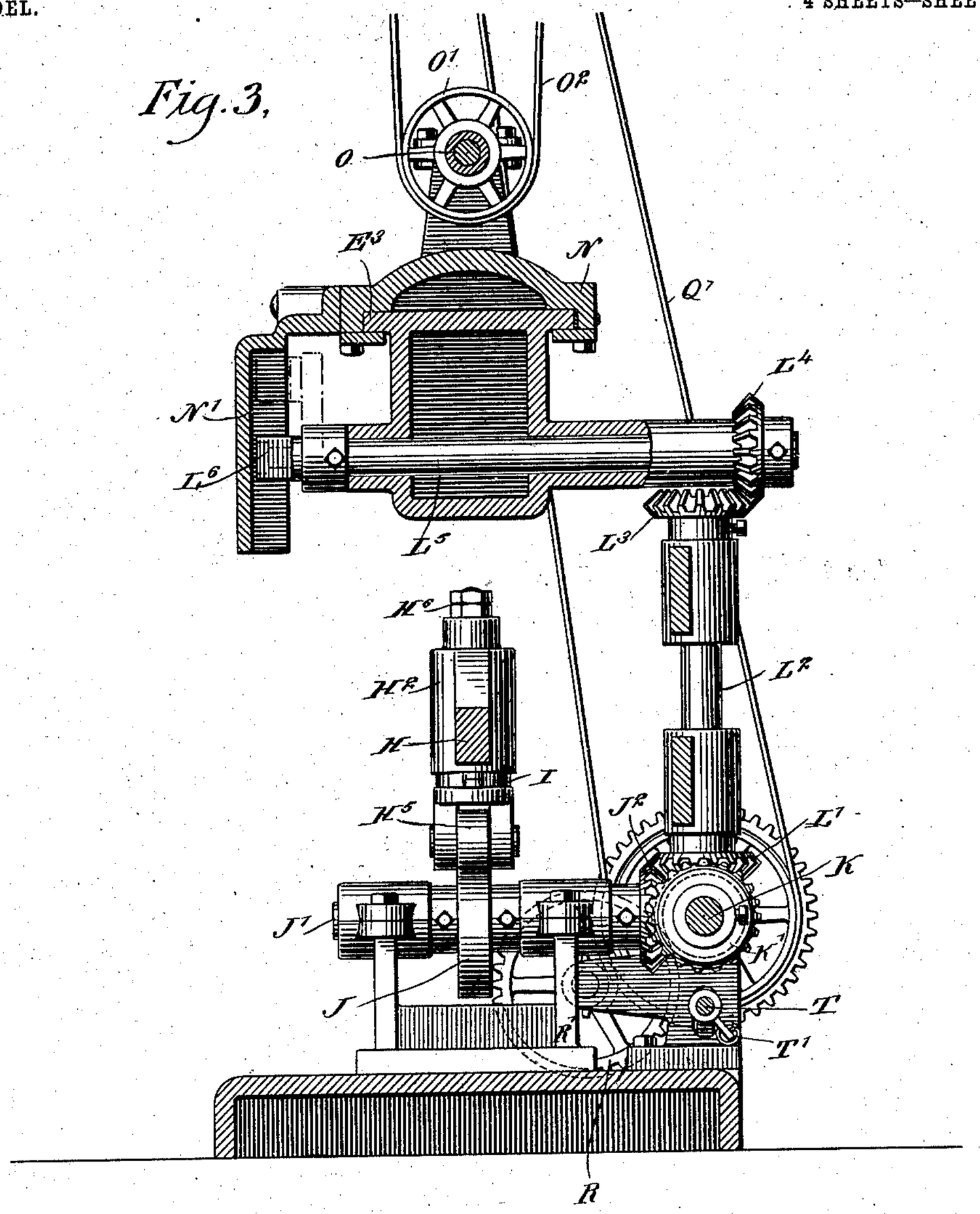


Fig. 4,

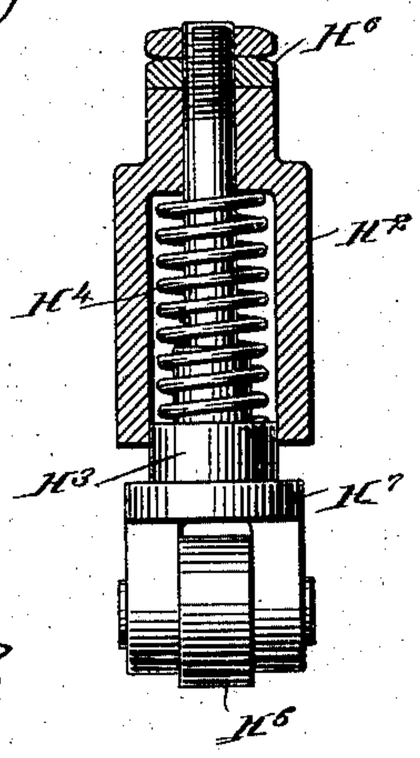
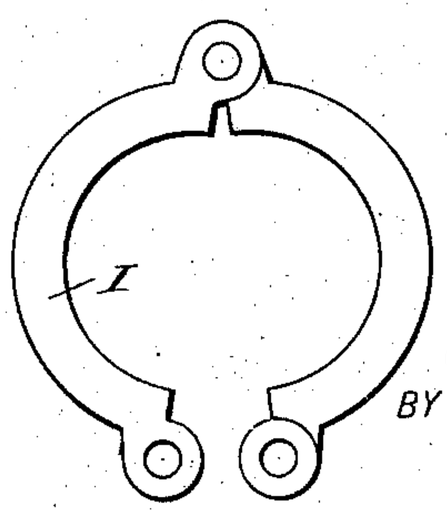


Fig. 5,



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APPLICATION FILED OCT. 9, 1902.

NO MODEL. 4 SHEETS—SHEET 4.

Fig. 6,

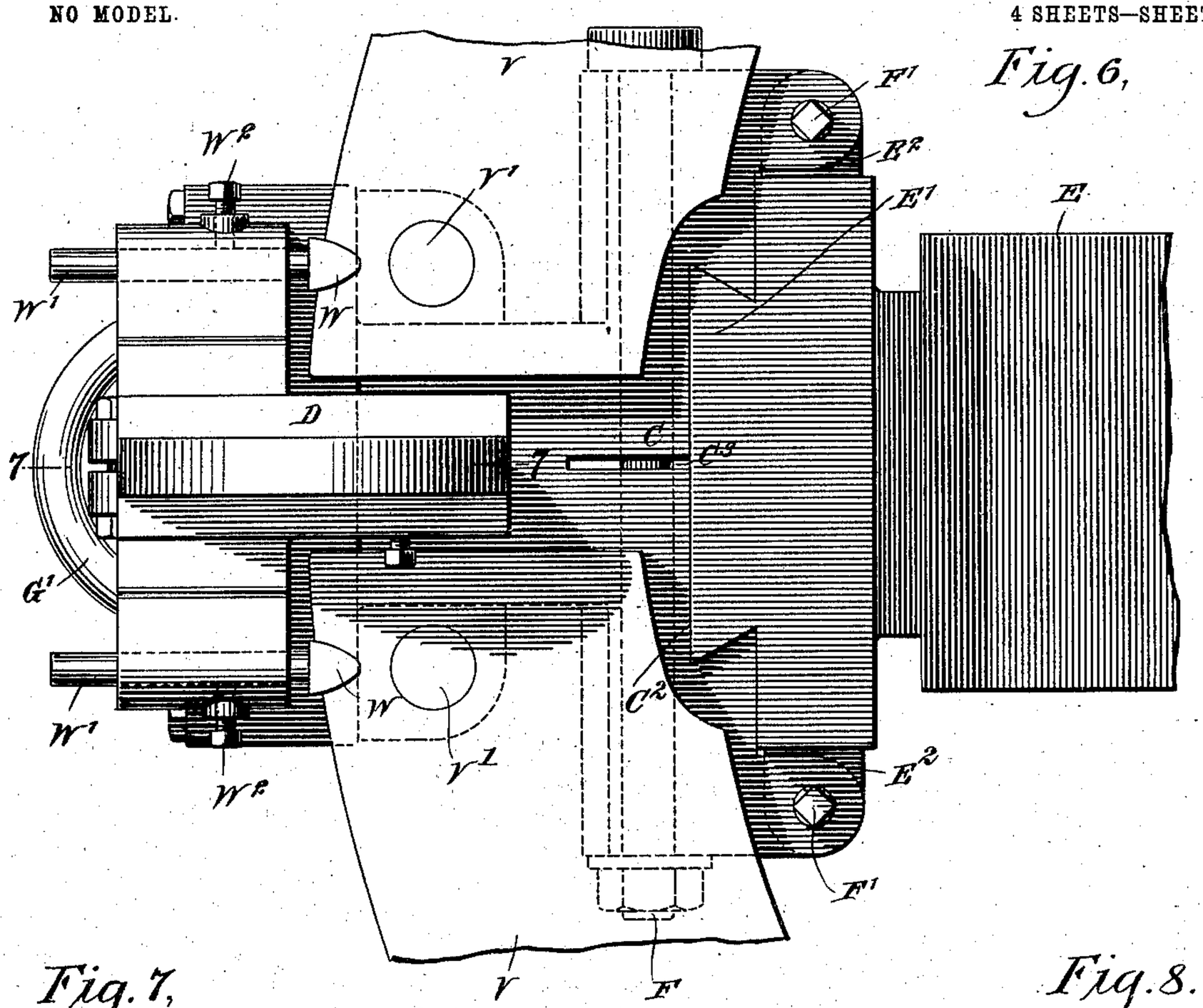


Fig. 7,

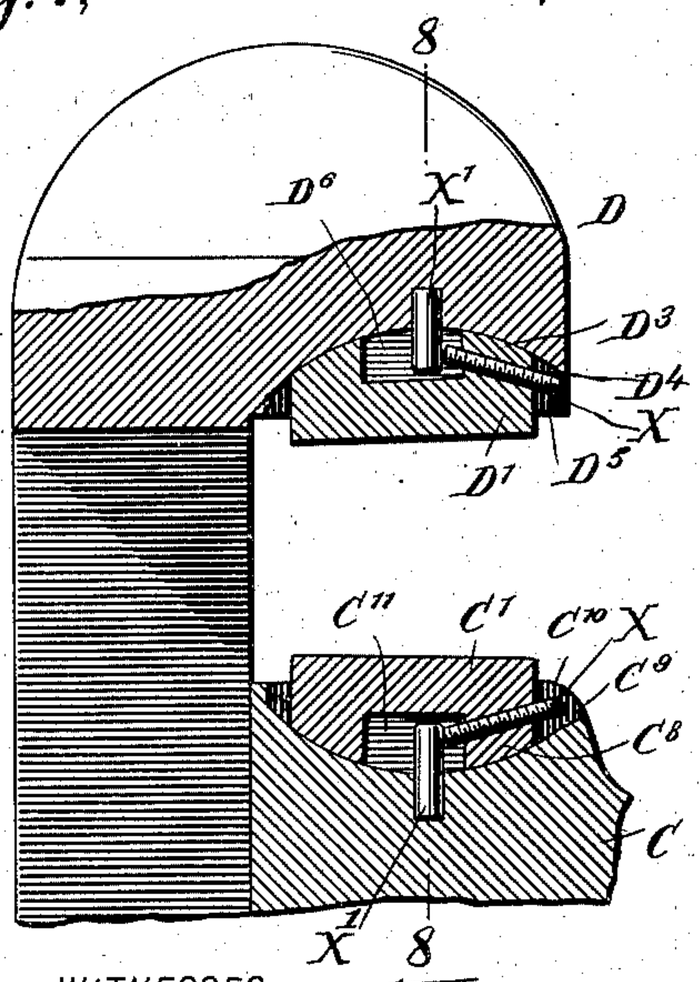


Fig. 8.

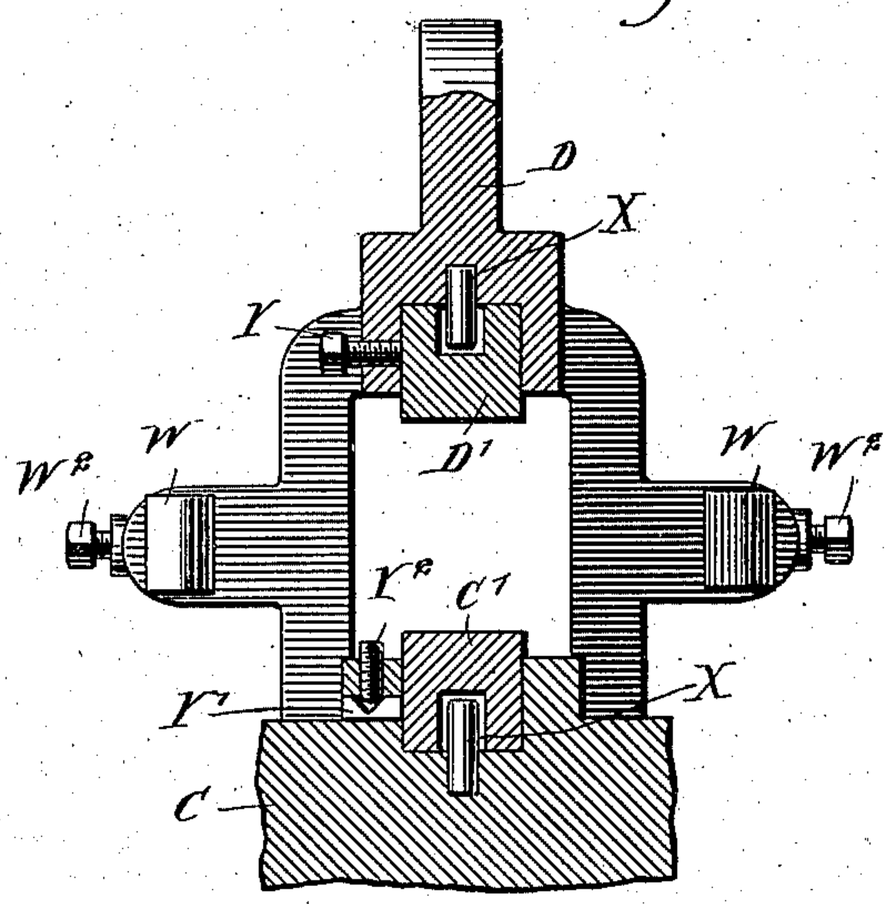
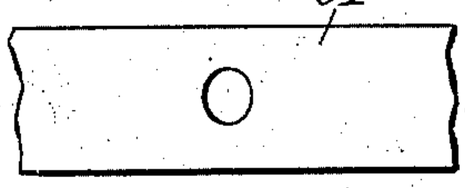


Fig. 9.



WITNESSES:

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ATTORNEYS.

No. 742,015. Patented October 20, 1903.

UNITED STATES PATENT OFFICE.

GEORGE A. ENSIGN, OF DEFIANCE, OHIO, ASSIGNOR TO DEFIANCE MACHINE WORKS, OF DEFIANCE, OHIO.

FELLY COMPRESSING AND BORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 742,015, dated October 20, 1903.

Application filed October 9, 1902. Serial No. 126,467. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. ENSIGN, a citizen of the United States, and a resident of Defiance, in the county of Defiance and State of Ohio, have invented a new and Improved Felly Compressing and Boring Machine, of which the following is a full, clear, and exact description.

The invention relates to woodworking machinery; and its object is to provide a new and improved felly compressing and boring machine arranged to form oblong spoke-holes in the felly, to prevent checking and splitting thereof, and to allow convenient adjustment for fellies of different sizes.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a perspective view of the improvement. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional front elevation of the same on the line 3 3 of Fig. 2. Fig. 4 is an enlarged sectional elevation of one end of the power-lever for the compression device. Fig. 5 is a plan view of the sectional ring for changing the action of the power-lever from positive compression to spring resistance. Fig. 6 is an enlarged plan view of the compressing device. Fig. 7 is an enlarged transverse section of the same on the line 7 7 of Fig. 6. Fig. 8 is a sectional elevation of the same on the line 8 8 of Fig. 7; and Fig. 9 is a side elevation of a felly, showing the elongated spoke-hole.

The felly A to be bored by an auger B is compressed previous to the beginning of the boring and during the boring operation, and after the completion of the boring and the return of the auger B the felly is released from its compression, so that the wood expands back to a normal position and in doing so forms an elongated hole of the round hole bored by the auger B. For the purpose mentioned the felly A is held on a jaw C′, held on the top of a carrier or support C, and above this jaw C′ is arranged a jaw D′, held in a compression-head D, having a vertical reciprocating movement to compress the felly between the jaws C′ and D′ while the boring-auger B advances and bores the hole in a direction at right angles to the line of compression.

The carrier C is provided with a vertically-disposed dovetailed groove C^2, engaging a correspondingly-shaped tongue E′, formed on the front end of a bed E, on which the machine is mounted, and the said carrier C is provided at its middle adjacent to the groove C^2 with a transverse slot C^3 to form two members engaged by clamping-screws F, so as to securely clamp the said members on the dovetail tongue E′ to hold the carrier C in position on the bed E. The carrier C can be adjusted vertically when the clamping-bolts F are loosened by means of screw-rods F′, mounted to turn in lugs C^4, held on opposite sides of the carrier C, (see Figs. 2 and 6,) and the said screw-rods F′ screw in nuts E^2, forming part of the bed E, adjacent to the tongue E′. Now when the clamping-bolts F are loosened and a tool, such as a wrench, is applied on the screw-rods F′ and the latter are turned then the carrier C moves up or down on the tongue E′ of the bed, according to the direction in which the said screw-rods F′ are turned. When the desired adjustment is made—that is, the top of the jaw C′ is brought in the proper position, according to the size of the felly A under treatment—then the clamping-bolts F have their nuts screwed up, so as to securely clamp and fasten the carrier C in position on the bed E.

The compression-head D is mounted to slide vertically in vertically-disposed bearings C^5, formed on the front end of the carrier C, and the said compression-head D is provided with a nut D^2, (see Figs. 1 and 2,) in which screws the upper threaded end of a rod G, provided with a hand-wheel G′ and a head G^2, having trunnions G^3, journaled in the forked outer end of a power-lever H, fulcrumed at H′ on the bed E. The other end of the power-lever H is provided with a head H^2, in which is mounted a bearing H^3, pressed on by a spring H^4 and carrying at its lower end a friction-roller H^5. The downward movement of the

bearing H^3 is limited by nuts H^6, screwing on the upper end of the said bearing and resting on the top of the head H^2, and the upward sliding movement of the said bearing H^3 can be prevented by a sectional ring I, clamped on the bearing H^3, between a shoulder thereof and the lower end of the head H^2, as plainly indicated in Figs. 2 and 3. When the ring I is in position, a positive compression movement is given to the power-lever H, as hereinafter more fully described; but when the said ring I is removed the lever H works with the resistance of the spring H^4 to allow of boring ordinary round holes instead of forming oblong holes, as will be more fully described hereinafter.

The friction-roller H^5 is in contact with the peripheral face of a cam J, secured at one end of a shaft J′ and journaled in suitable bearings on the bed E, and on the said shaft J′ is secured a bevel gear-wheel J^2 in mesh with a bevel gear-wheel K′, fastened on a shaft K, extending longitudinally and journaled in suitable bearings held on the bed E. This shaft K is a driven shaft and is provided with a bevel gear-wheel L in mesh with a bevel gear-wheel L′, held on the lower end of a shaft L^2, journaled in suitable bearings attached to the bed E, and on the upper end of the said shaft L^2 is secured a bevel gear-wheel L^3 in mesh with a bevel gear-wheel L^4, secured on one end of a shaft L^5, extending transversely and journaled in the bed E. (See Figs. 2 and 3.) On this shaft L^5 is secured a crank-arm L^6, engaging a vertically-disposed guideway N′, attached to one side of a carriage N, mounted to slide longitudinally on guideways E^3, formed on top of the bed E immediately in the rear of the tongue E′. The carriage N is provided with bearings N^2, in which is journaled a spindle O, carrying a chuck P for supporting the auger B, and on the said spindle O is secured a pulley O′, over which passes a belt O^2, connected with other machinery, for imparting a rotary motion to the pulley O′, spindle O, chuck P, and auger B. Now when the shaft K is driven then a rotary motion is transmitted by the gear-wheels L L′ to the shaft L^2, which by the gear-wheels L^3 L^4 imparts a rotary motion to the shaft L^5, so that the crank-arm L^6, acting on the vertical guideway N′, imparts a forward-and-backward reciprocating motion to the head N and the parts supported thereon. By this arrangement the auger B is fed forward into the felly to bore a hole and then moved back out of the felly after the hole is bored, it being understood that during this operation a rotary motion is given to the auger B from the pulley O′, driven by the belt O^2. The pulley O′ is of sufficient width to allow the belt to slide over the said pulley during the forward-and-backward movement of the carriage.

In order to drive the shaft K, a friction-clutch pulley Q is mounted to rotate loosely on the said shaft, and the said pulley is connected by a belt Q′ with other machinery. A friction-clutch Q^2 is adapted to engage the clutch-pulley Q, and the hub of the said friction-clutch Q^2 is mounted to rotate loosely on the shaft K and is provided with a gear-wheel Q^3 in mesh with a gear-wheel R, secured on a back shaft R′, carrying a pinion R^2 in mesh with a gear-wheel R^3, secured on the shaft K, so that when the friction-clutch Q^2 is in frictional engagement with the clutch-pulley Q then the rotary motion of the latter is transmitted to the friction-clutch Q^2, which by the gear-wheels Q^3, R, R^2, and R^3 rotates the shaft K.

The hub of the friction-clutch Q^2 is provided with a shifting collar S, engaged by a shifting fork S′, fulcrumed at S^2 on the bed E and pivotally connected with a rod T, mounted to slide in a bearing on the said bed. A spring T′ presses the rod T in the direction of its length to normally hold the shifting fork S′ in a rearmost position to disengage the friction-clutch Q^2 from the friction-clutch pulley Q. On the rod T is secured a head T^2, carrying a friction-roller T^3, traveling on the face of a disk T^4, secured on the forward end of the shaft K, and in the face of the said friction-disk T^4 is formed a notch or recess T^5 (see Fig. 1) for the friction-roller T^3 to drop into to allow the spring T′ to draw the rod T rearwardly and hold the friction-clutch Q^2 out of mesh with the friction-pulley Q.

The forward end of the rod T is pivotally connected with a vertical member U′ of a treadle U, fulcrumed at U^2 on the bed E and adapted to be pressed by the operator to move the rod T forward against the tension of the spring T′ to disengage the friction-roller T^3 from the notch T^5. Now when the rod T is moved forward, as described, then the friction-clutch Q^2 is moved in contact with the friction-pulley Q to cause rotation of the shaft K by the back gearing above described and driven from the pulley Q. It is only necessary for the operator to press the treadle U downward until the shaft K has turned sufficiently to bring the notch T^5 out of engagement with the roller T^3, and when the operator releases the treadle U the friction-roller T^3, traveling on the face of the disk T^4, holds the rod T in a forward position to insure driving of the shaft K by the gearing described until the notch T^5 is reëngaged by the friction-roller T^3, so that the spring T′ draws the shaft T rearwardly to move the friction-clutch Q^2 out of engagement with the friction-clutch pulley Q. The rotation of the shaft K then ceases.

In order to support the portions of the felly A not resting on the jaws C′ D′, I provide segmental tables V, extending on opposite sides of the machine and provided with depending rods V′, held vertically adjustable in lugs C^6, forming part of the carrier C, set-screws C^7 being provided for clamping the rods V′ in the lugs C^6. (See Figs. 1 and 2.)

In order to center the felly relative to the

auger B and while between the jaws C′ and D′, I provide centering-heads W, formed on pins W′, mounted to slide in bearings on the compression-head D and adapted to be secured in the said bearings by set-screws W^2.

In order to accommodate fellies having tapering sides, it is necessary to adjust the jaws C′ and D′ correspondingly, and for this purpose the backs C^8 D^3 of the jaws are segmental and engage the correspondingly-shaped walls C^9 D^4 of recesses C^{10} D^5, formed in the carrier C and compression-head D, respectively, as will be readily understood by reference to Figs. 7 and 8. Set-screws X screw in the jaws C′ D′ against pins X′, held in the carrier C and compression-head D and extending inside elongated recesses C^{11} and D^6, formed in the jaws C′ and D′, respectively. A set-screw Y serves to fasten the jaw D′ in position after the same is adjusted by the set-screw X abutting against the pin X′, and the jaw C′ is fastened in place after being adjusted by its set-screw X by a key Y′, held to slide in the carrier C and forced inwardly against the jaw C′ by a set-screw Y^2, as will be readily understood by reference to Fig. 8.

Now by the arrangement described the jaws C′ and D′ can be adjusted in their bearings in the carrier C and compression-head D, so that their faces stand at angles to each other to correspond to the tapering faces of the felly under treatment.

The operation is as follows: When the friction-roller T^3 is in engagement with the notch T^5 and the shaft K is at a standstill, then the cam J is in the position shown in Fig. 2 to hold the compression-head D in an uppermost position to allow the operator to place the felly A in position between the jaws C′ and D′ and in proper relation to the auger B, the felly being centered by abutting against the centering-heads W, held on opposite sides of the said jaws. The operator now presses the treadle U to cause the rotation of the shaft K, as previously described, so that the cam J is turned and in doing so imparts a swinging motion to the power-lever H to cause the rod G to slide the compression-head D downward, so that its jaw D′ engages the top of the felly to compress the same in a vertical direction—that is, at right angles to the line of movement of the auger B, which now advances with the carriage N, moved forward by the crank-arm L^6, acting on the vertical guideway N′, as previously explained. The auger B now bores a hole in that portion of the felly compressed by the compression-head D between the jaws C′ and D′, and when the hole is bored then the carriage N moves back to its former position, thus withdrawing the auger B from the felly, and when this has taken place the cam J moves back to its previous position to allow the return swinging of the power-lever H and the upward movement of the compression-head D, so that the portion of the felly previously compressed by the said head is now free and reëxpands to its former state, and in doing so the hole bored round by the auger B now becomes elongated, as will be readily understood by reference to Fig. 9. At the time the cam J, power-lever H, and compression-head D, together with the carriage N, return to their normal positions (shown in Fig. 2) then the shaft K has made one revolution and the notch T^5 has again reached the friction-roller T^3, so that the rod T is moved rearwardly to disconnect the friction-clutch Q^2 from the friction-pulley Q to stop the rotation of the shaft K. The operator now shifts the felly to bring it in position for boring the second hole, and then the operator again presses the treadle U, and the above-described operation is repeated.

When it is desired not to compress the felly, but to use the compression-head D for simply clamping the felly in place during the boring operation by the auger B, it is necessary to remove the ring I from between the collar H^7 and the lower end of the head H^2, (see Fig. 4,) so that the spring H^4 now establishes a yielding connection between the cam J and the power-lever H to cause the compression H D to simply clamp the felly in place without compressing the same.

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

1. A woodworking-machine having a boring device, and a compressing device, for compressing the work and holding it compressed during the boring operation of the said boring device, whereby provision is made for forming oblong holes in the work, as set forth.

2. A woodworking-machine having a boring device for boring a hole in a wooden article, and means for compressing the article in a direction at right angles to that of the line of boring, whereby the expansion of the article to its normal position forms the round hole bored by the boring device into an elongated hole, as set forth.

3. A woodworking-machine having a support for supporting the work, a boring device for boring a hole in the work and a power-operated compression-head opposite the support for compressing the wood while being bored, as set forth.

4. A woodworking-machine having a support for supporting the work, a vertically-reciprocating compression-head opposite the support, a power-lever connected with the reciprocating head for operating the same to compress the wood, and a boring device for boring a hole in the wood while compressed, as set forth.

5. A woodworking-machine having a flat support for supporting the work, a vertically-reciprocating compression-head opposite the support and having a flat working face, a power-lever connected with the said head for operating it to compress the wood, a feed-carriage arranged to move toward and from the

work at right angles to the movement of said head, and a boring device carried by the carriage, as set forth.

6. A woodworking-machine comprising a reciprocating carriage carrying a revoluble boring-spindle, a horizontal support for the work to be bored by the boring-tool carried by said spindle, a vertically-reciprocating compression-head opposite the support, a power-lever connected with the compression-head for operating and causing it to compress the wood while being bored, and means for simultaneously operating the carriage and the power-lever, as set forth.

7. A woodworking-machine comprising a reciprocating carriage carrying a revoluble boring-spindle, a horizontal support for the work to be bored by the boring-tool on the said spindle, a vertically-reciprocating compression-head opposite the said support, a power-lever adjustably connected with the compression-head, a main shaft, and means for operating the said carriage and the power-lever of the said compression-head from said shaft, to synchronously actuate the same, as set forth.

8. A woodworking-machine comprising a support for the work, a reciprocating compression-head, opposite the support, a power-lever, an adjustable connection between the power-lever and the said compression-head, a revoluble cam for imparting a swinging motion to the same, and means whereby a positive or yielding connection may be established between the cam and power-lever, as set forth.

9. A woodworking-machine comprising a support for the work, a reciprocating compression-head, opposite the support, a power-lever, an adjustable connection between the power-lever and the said compression-head, and a revoluble cam acting on the said power-lever, to impart a swinging motion to the same, the said power-lever carrying a spring-supported friction-roller in engagement with the cam, as set forth.

10. A woodworking-machine comprising a support for the work, a reciprocating compression-head, opposite the support, a power-lever, an adjustable connection between the power-lever and the said compression-head, a revoluble cam acting on the said power-lever, to impart a swinging motion to the same, the said power-lever carrying a spring-supported friction-roller in engagement with the cam, and a removable device for rendering the friction-roller non-spring-supported on the power-lever, as set forth.

11. A woodworking-machine comprising a reciprocating carriage, a revoluble boring-spindle carried by the carriage, a reciprocating compression-head, a power-lever connected with the said head, a cam, and a spring-supported friction-roller carried by the power-lever and engaging the cam, as set forth.

12. A woodworking-machine comprising a reciprocating carriage, a revoluble tool-carrying spindle in the carriage, a support for the work, a vertically-reciprocating compression-head opposite the support, a pivoted power-lever having one end pivotally connected with the compression-head, a drive-shaft, means for operating the carriage from said shaft, and a cam on said shaft for operating the power-lever, as set forth.

13. In a woodworking-machine, a support having a recess formed with a segmental wall and provided with a pin projecting from said wall, a jaw having a straight face and a segmental back fitting in the recess of the support, the back of said jaw being recessed to receive the pin of the support, and a set-screw carried by the jaw and engaging the said pin, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE A. ENSIGN.

Witnesses:

JOS. BAUER,

GEO. W. DEATRICK.