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C. G. GROTNES

BARREL MAKING MACHINE

Filed Sept. 12, 1921

3 Sheets-Sheet 1

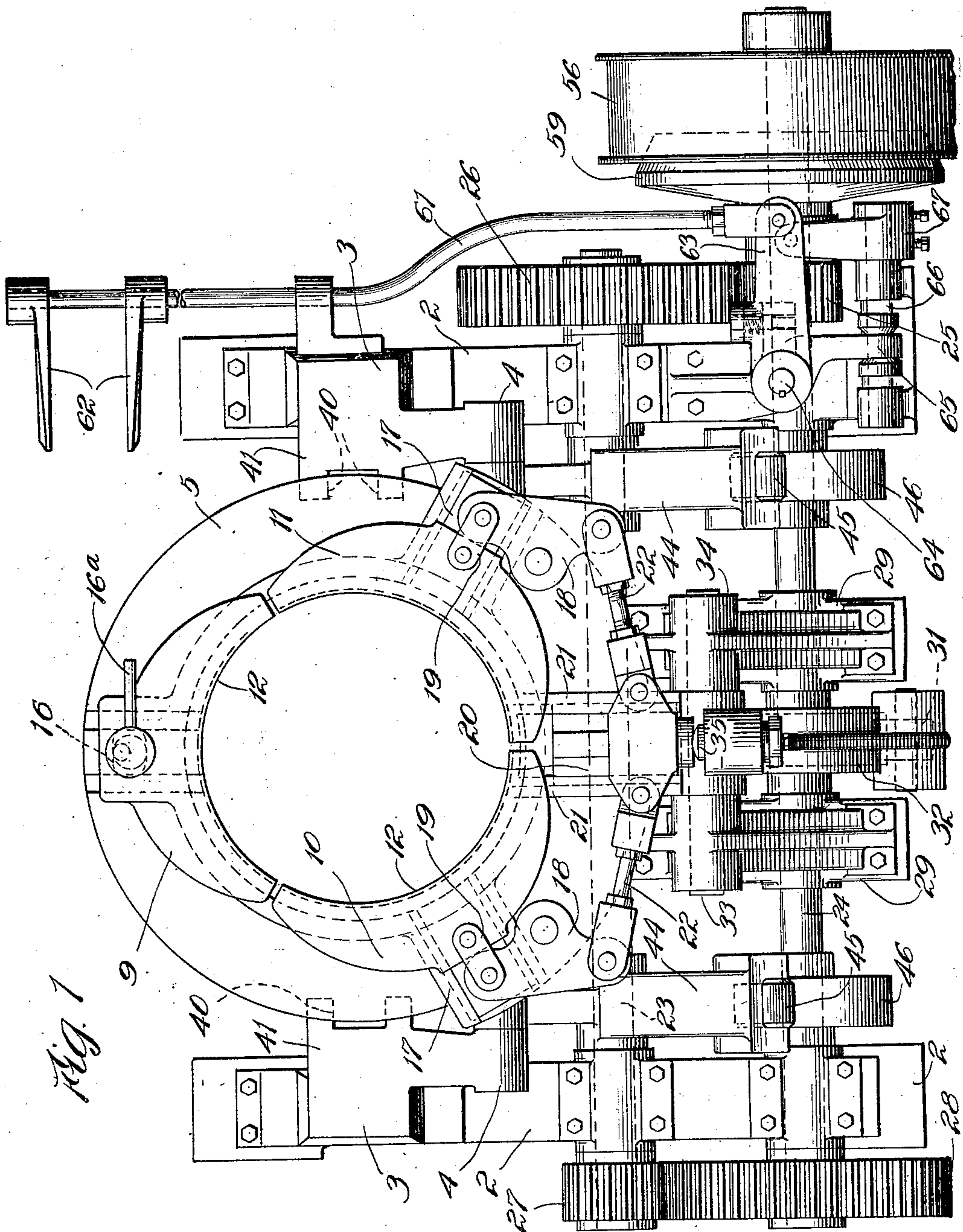


Fig. 1

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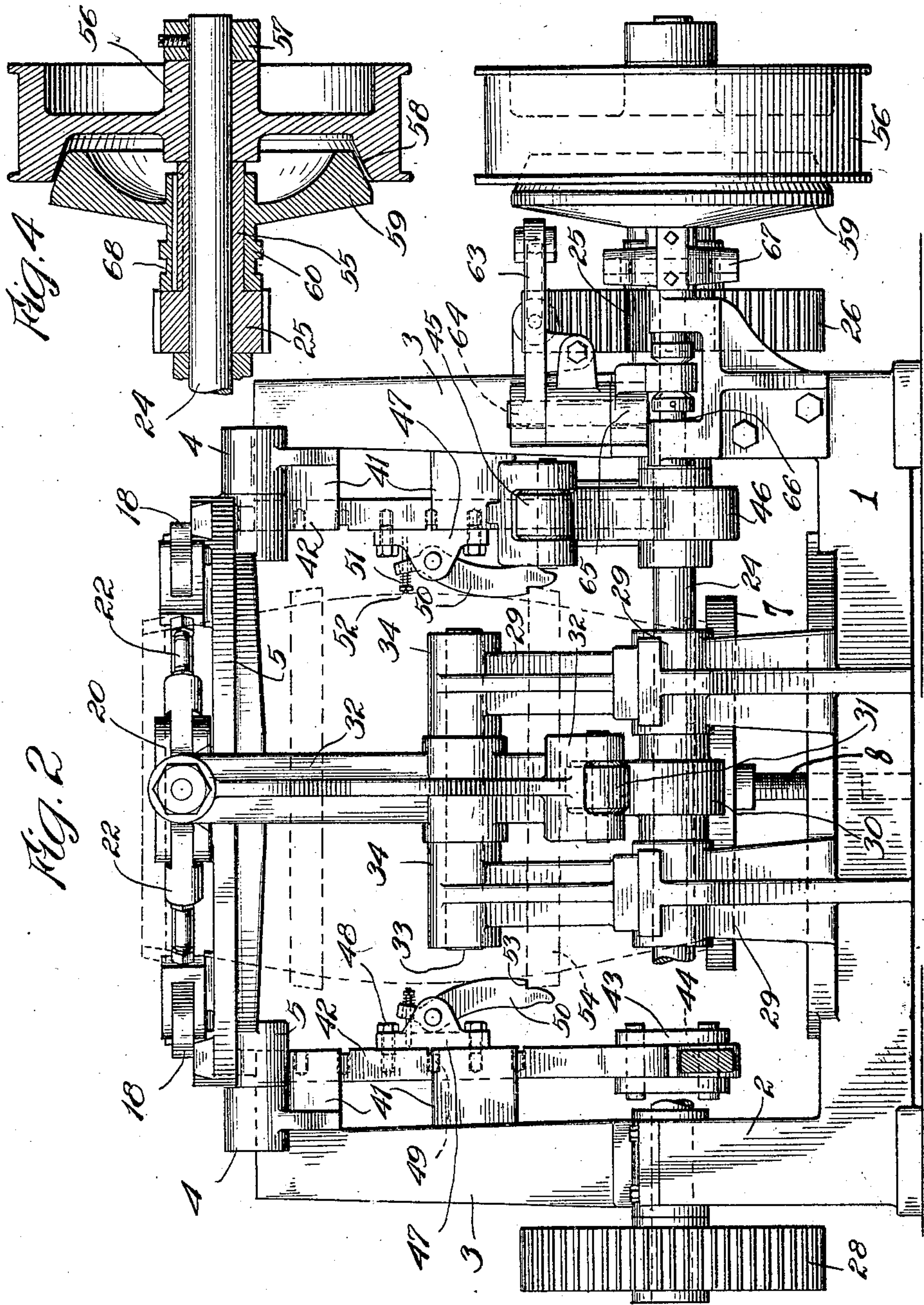
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3 Sheets-Sheet 2



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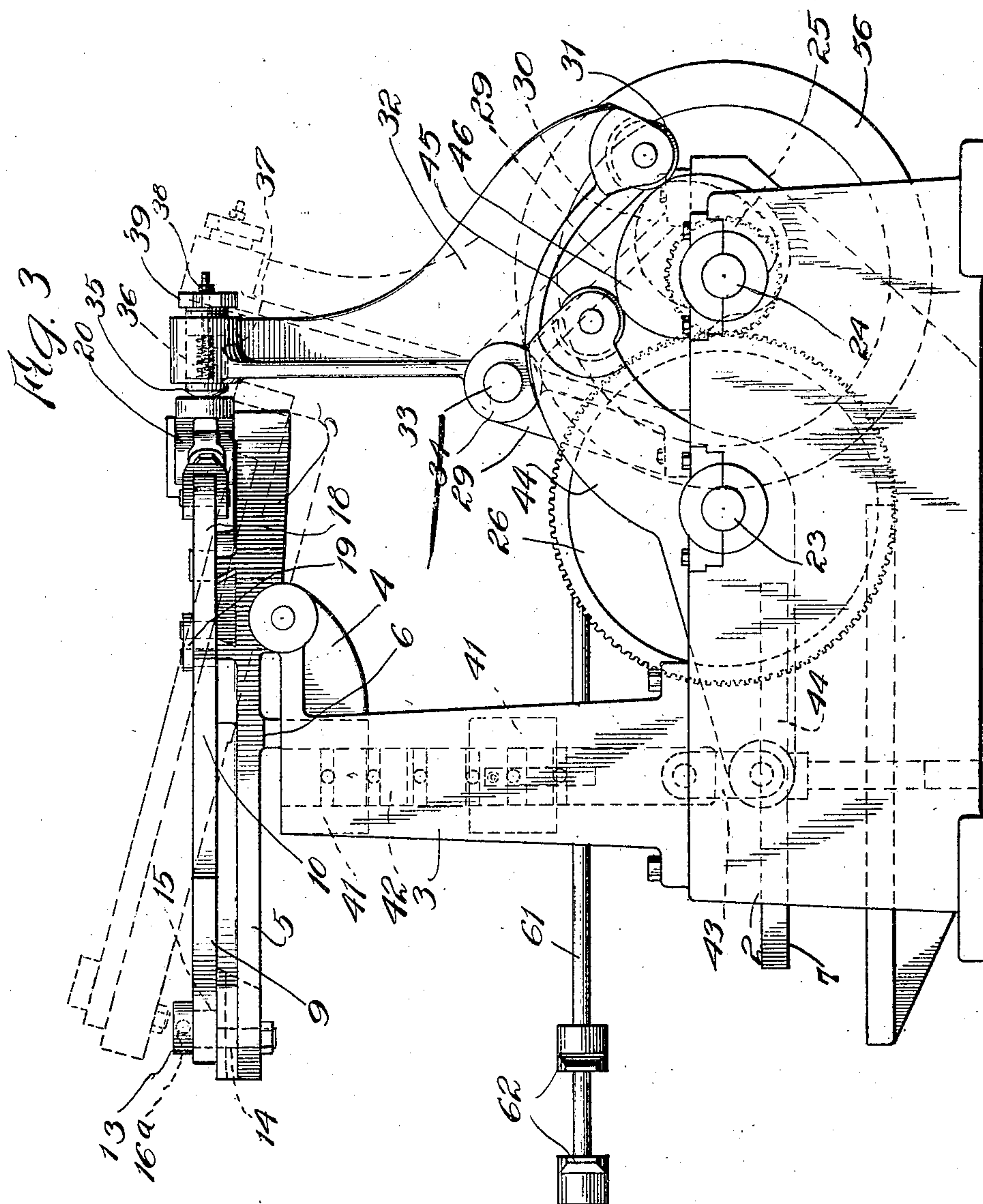
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BARREL MAKING MACHINE

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

CHARLES G. GROTNES, OF CHICAGO, ILLINOIS.

BARREL-MAKING MACHINE.

Application filed September 12, 1921. Serial No. 500,142.

The invention relates to barrel-making machinery and more particularly to a machine for heading up wooden barrels and for removing form or truss rings used in the manufacture of the barrel.

In the making up of barrels, particularly heavy barrels for containing liquids, it is customary to assemble the staves, in the earlier process of manufacture and seasoning, within heavy iron or steel truss rings or hoops including a hoop at each end of the barrel and a pair of bilge hoops around the center portion of the barrel. In the final process of manufacture it becomes necessary to remove these temporary form rings and substitute therefor the ordinary barrel hoops, and by reason of the tightness required in the joints between the staves and the stress occurring in the bending of the latter, the truss rings are driven on with great force and are difficult to remove for the substitution of the ordinary hoops.

It is an object of this invention to provide a machine by which the end portions of the staves about the head of the barrel may be compressed sufficiently to permit the ready removal of the truss rings and their replacement by permanent hoops.

It is a further object to provide for the simultaneous dislodgment from the center portion of the barrel of the bilge truss rings.

A further object is to so construct the operating parts as to permit the emplacement and removal of the barrels from the machine with great facility and economy of time and effort.

A further object is to provide a machine for the purposes described which is of a very simple and durable construction, and adjustably adapted to operate upon barrels of various sizes with equal facility.

Other objects and advantages will be apparent in the following description of a preferred embodiment of my invention which I have illustrated in the accompanying drawings.

Referring to the drawings, Figure 1 represents a plan view of the complete machine. Fig. 2 represents a rear elevation of the machine. Fig. 3 represents a side elevation and Fig. 4 a fragmentary sectional view of the clutch and driving mechanism.

The frame of the machine may be variously constructed, but in my preferred embodiment

I have illustrated a main frame having a base 1 constructed with lateral upright portions 2 upon which latter are mounted a pair of upright standards 3. The upper ends of the standards are formed with L-shaped rearward extensions 4 in which latter is horizontally pivoted at each side a head frame 5. The pivots are located in the head frame structure a substantial distance rearwardly of the center portion thereof, which permits the front portion of the head to be swung upwardly. When in horizontal position the head frame 5 rests forwardly of its pivots upon the upper ends of the standards 3, as at 6.

Located centrally between the upright portions 2 of the base is a horizontal table 7 which may be mounted with any suitable means for raising and lowering the level of the table, as by hand screws 8. The table 7 is adapted to receive a barrel standing on end and extending upwardly through the head frame 5 when the latter is in lowered position, the upper end of the barrel being in position to be grasped by clamping devices hereinafter described.

The swinging head frame 5 carries on its upper surface a plurality of clamping jaws, of which I have illustrated herein the three jaws 9, 10 and 11 mounted in ways on the head frame and arranged to slide radially to and from the center of the opening in the head wherein the barrel is received. The inner faces 12 of the clamping jaws are formed with circular peripheries of a suitable radius to effect substantially continuous contact with the barrel being clamped thereby.

In my present embodiment one of the jaws 9 is adapted to be manually moved on its radial ways by means of an eccentric pin 13 having its lower portion 14 journaled in the head frame and an eccentric portion 15 operatively extending through a transverse slot bearing 16 in the jaw 9. The jaw 9 thus may be withdrawn to clear the opening in the head frame when placing a barrel to be operated upon. A handle 16^a is provided by which to rotate the pin.

The other two jaws 10 and 11 are also radially slidable in similar ways 17 formed in the upper surface of the head frame 5, and are positioned with respect to each other and the jaw 9 so that their inner peripheries when normally closed jointly describe a circle of

the diameter of the end of the barrel to be operated upon.

The two jaws 10 and 11 are operatively controlled by means of similar rocker elements or levers 18 respectively connected to the jaws by means of links 19 having pivotal engagement with the jaws and with the adjacent ends of the rockers. The rockers are actuated by a toggle mechanism mounted on the head frame 5, and comprising a sliding cross-head 20 operating in a suitable slideway 21 radially positioned in the head 5. The cross-head 20 is connected at each side with the respective outer ends of the rockers 18 by means of longitudinally adjustable connecting rods 22, the rod connections both with the cross-head and with the rockers being pivoted. The connecting rods 22 are so arranged in relative position that by the inward movement of the cross-head 20 a powerful toggle action is produced which operates the rockers to force the jaws 10 and 11 inwardly upon the barrel end supported within the head frame 5 and rigidly held by the third jaw 9.

For the operation of the toggle mechanism I have provided power transmission means comprising a pair of inter-gearied driven shafts 23 and 24 having their bearings in the lateral upright members 2 of the base, with their ends extending outwardly therefrom, and one of which carries a suitable cam mechanism for the operation of a rocking lever which actuates the cross-head 20. More particularly described as illustrated in my preferred embodiment, a pinion 25 loosely journaled on the outer end of the shaft 24 is driven by clutch controlled power means hereinafter described. The loose pinion 25 meshes with and drives a gear 26 fixed on the outer end of the other shaft 23 which latter carries at its opposite outer end a fixed pinion 27 meshing with a gear 28 fixed on the shaft 24.

The arrangement of gears and shafts here described is to provide sufficient gear reduction in most compact form to give the desired power for the efficient operation of the jaw operating mechanism. The shaft 24 is further supported by intermediate bearings provided in a pair of upright bearing supports 29 formed integrally with the base 1.

Fixed centrally upon the shaft 24 between the bearing supports 29 is a cam member 30 of which the operative periphery is in contact with a roller 31 carried by an upright rocker arm 32 centrally pivoted upon a rocker shaft 33 carried in bearings 34 formed in upward extensions of the two bearing supports 29. The upper end of the rocker arm 32 extends rearwardly and in operative contact with the cross-head 20 of the toggle mechanism. The arrangement of the rocker arm and cam is such that with each revolution of the cam the rocker arm is actuated to force the cross-head 20 inwardly to close the clamping jaws.

Operative contact between the cross-head and the upper end of the rocker arm may be accomplished through a cushioned driving head 35 which is positioned in a recess 36 in the end of the rocker arm and which latter carries therein a compression spring 37 adapted to cushion the force of the inward movement of the rocker arm. A stem 38 upon the head 35 extending through the rear wall of the recess, is engaged by a retaining nut 39. The contacting faces of the driving head 35 and the cross-head 20 are arranged so that the head frame 5 may be swung on its pivots whereby the rearward end of the head frame carrying the toggle mechanism is dropped downwardly out of contact with the rocker arm.

The mechanism for removing the temporary bilge hoops from the barrel when positioned on the platform or table 7, includes a pair of slideways 40 vertically positioned and preferably formed on the inner surfaces of the inwardly projecting portions 41 of the two standards 3. Operating therein respectively are a pair of slides 42 each carrying at its lower end a pair of pivoted links 43 connected to the outer end of one of a pair of horizontal rocker arms 44 centrally bearing and supported on the shaft 23. The rocker arms 44 extend rearwardly carrying at their respective rear extremities rollers 45 having operative contact with the peripheries of a pair of cam members 46 fixed on the shaft 24 and which are arranged to actuate the rocker arms and vertically reciprocate the slides 42 in their respective ways.

On the inner faces of the slides 42 are mounted in each instance a bracket 47 suitably secured for vertical adjustment of position upon the face of the slides as by means of bolts 48 and a series of bolt holes 49. Pivoted to each of the brackets 47 is a depending dog 50 normally actuated to swing inwardly by means of a compression spring 51 carried by a bolt 52 mounted in the bracket and arranged to effect compression of the spring by the outward swing of the dog. The lower ends of the dogs are each formed with a notch or shoulder 53 suitably arranged to engage a bilge truss ring or temporary hoop carried by a barrel being operated on as illustrated at 54, and with the downward movement of the slide to force the bilge ring from the barrel.

The several cam members operating the clamping jaws and the truss ring removing dogs, are preferably in such relation that the downward movement of the dogs occurs simultaneously with the inward movement of the jaws, and likewise with the opening of the jaws, the dogs are returned to their initial position.

In order to control the operation of the clamping jaws and ring removing mechanism, I have provided a clutch mechanism

which preferably comprises the arrangement illustrated in Fig. 4. The loose pinion 25 is formed with an integral sleeve 55 extending outwardly along the shaft 24 and abutting the inner surface of the hub of a pulley 56, the latter also being mounted for free rotation upon the shaft 24. The pinion and pulley are secured in longitudinal position by means of a collar 57 suitably fastened at the outer end of the shaft 24, the inner surface of the pinion being confined against opposite movement by the outer face of the adjacent shaft bearing. The inner face of the pulley 56 is provided with a cone shaped recess 58 with which is associated a cone clutch 59 of well known construction, which is carried by a sleeve 60 slidably overlying and splined upon the inner sleeve 55. The clutch and its carrying sleeve may be moved longitudinally into driving engagement with the pulley by means of a shifting bar 61 having suitable means to embrace the leg of the operator standing before the machine, preferably constructed as illustrated at 62, and adapted to operate the lever 63 pivoted on the main frame. The latter operates through the pivot pin 64 a shifting lever 65 formed with a yoke embracing the sliding bar 66 which carries at its outer end a yoked element 67 carrying pins suitably positioned to enter in rotative engagement an annular slot 68 formed in the clutch sleeve 60. By a movement of the operator's leg the clutch mechanism is thus conveniently thrown into and out of engagement.

In operation, the head frame 5 is thrown upwardly, a barrel is placed on the table 7 in upright position as illustrated in Fig. 2, and the table adjusted to the desired height, whereupon the head frame is swung downwardly with the barrel extending through the central orifice of the frame with the end truss ring clear of the clamping jaws. The machine is then put in operation until the jaws are securely clamped about the upper end of the barrel whereupon the clutch is released and the end truss ring removed from the barrel while the staves are so compressed. A permanent hoop may then be placed on the barrel and the machine again put in operation to complete the revolution of the cams and release the clamping jaws. Simultaneously with the closing of the jaws the lower bilge ring has been struck from the barrel.

It will now be apparent that I have provided a readily operable and efficient means for replacing the truss rings with permanent hoops with convenience and economy. While I have illustrated and described in detail the preferred embodiment of my invention, it should be understood that in the interpretation of the appended claims it is not intended that they are to be limited to the precise construction and arrangement therein contained as many variations and modifications will

naturally occur to those skilled in the art. I aim in the subjoined claims to cover all such legitimate variations and modifications.

I claim as my invention:

1. A machine of the class described comprising, in combination, a support for a barrel, clamping means operable to compress one end of the barrel to permit removal and replacement of an end hoop, and simultaneously operable means adapted to engage with a bilge hoop located below the mid-portion of the barrel, the last mentioned means being movable in a direction toward said support whereby to remove the bilge hoop.

2. A machine of the class described comprising a main frame having a support for a barrel, a head frame swingably mounted on said main frame and adapted to be normally positioned in encircling relation to one end of said barrel, a plurality of jaws radially slidable on said head frame and having inner peripheries arranged to contact with said barrel, and means for actuating said sliding jaws adapted to permit of the swinging movements of the head frame.

3. A machine of the class described comprising a main frame having a support for a barrel, a head frame swingably mounted on said main frame and adapted to be positioned in encircling relation to one end of said barrel, a plurality of jaws slidably mounted on said head frame and adapted to laterally clamp the end portion of said barrel, reciprocating means mounted on said main frame in parallel relation to the axis of said barrel adapted to engage and remove a bilge hoop therefrom, and means for actuating said jaws and said reciprocating means.

4. A barrel making machine having a base, a rigid annular frame mounted above the base in spaced relation thereto and having a plurality of radially slidable clamping jaws, levers pivotally connected to certain of said jaws and fulcrumed on said frame, and means for swinging said levers to effect the radial movement of their respective jaws.

5. A machine for making barrels and the like comprising a rigid annular frame adapted to receive the end of a barrel and having a plurality of clamping jaws mounted for radial sliding movement, a pair of levers fulcrumed on the frame and pivotally connected respectively to two of said jaws, and a single toggle mechanism for operating said jaws including a pair of links respectively pivoted to said two levers.

6. A machine for making barrels and the like comprising a plurality of clamping jaws arranged in circular series so as to be adapted to receive the end of a barrel, means for slidably supporting certain of said jaws for radial movement, a lever connected to each of said movable jaws, and a toggle mechanism operatively connected with said levers to actuate said movable jaws.

7. In a machine of the class described, a main frame having a support for a barrel, upright standards on said frame on laterally opposite sides of said support, reciprocating slide members supported on said standards, means adjustably positioned on each of said reciprocating members adapted to engage and longitudinally displace a bilge hoop from said barrel, a driven shaft mounted on said frame, a pair of cams fixed on said shaft, a pair of pivoted levers having operative engagement respectively with said cams, and links connecting said levers and said slide members whereby the latter are reciprocated with the revolution of said cams.

8. In a machine of the class described, a main frame having a support for a barrel, a head frame pivotally mounted on said main frame and adapted to be positioned in encircling relation to one end of said barrel, a plurality of jaws operatively mounted on said head frame, manually operable means for operating certain of said jaws, toggle mechanism for operating the others of said jaws, and driving means for actuating said toggle mechanism.

9. In a machine of the class described, a main frame, a head frame swingably mounted thereon, a plurality of clamping jaws slidably mounted on said head frame, a sliding block carried by said head frame, toggle connections between said block and certain of said jaws, a rocker arm pivoted on said main frame having one end in operative association with said block, a resilient driving member carried in said end of the rocker arm positioned for operative contact with said block, and means for actuating the rocker arm.

10. In a machine of the class described, a main frame having a support for a barrel, a head frame manually swingable thereon to receive one end of a barrel placed on said support, sliding jaws mounted on said head

frame adapted to clamp said barrel end, clutch controlled operating means for said jaws, and means for engaging and disengaging the clutch members in said operating means including a shifting rod having a pair of spaced arms adapted to embrace the leg of an operator positioned before said head frame.

11. A barrel making machine comprising, in combination, a base, means mounted above one end of the base adapted to receive the end of a barrel to compress it, means also mounted upon the base below said compression means adapted to engage with a bilge hoop on the barrel to remove it, a drive shaft horizontally disposed at the opposite end of the base, a pair of cams on said drive shaft, and a pair of levers mounted on said base and respectively operatively associated with said cams, said levers being arranged in substantially perpendicular relation, one of them extending in a general upward direction from the base into operative association with said clamping means and the other extending in a generally horizontal direction below said clamping means into operative association with said hoop-removing means.

12. A machine for making barrels having, in combination, a support, clamping means adapted to receive and compress one end of the barrel placed upon said support, and members movable toward and away from a point approximately centrally of said barrel, said members being adapted in their movement away from the center of the barrel to engage a bilge hoop on the barrel and move it toward the end of the barrel opposite said clamping means to effect its removal therefrom.

In testimony whereof, I have hereunto set my hand.

CHARLES G. GROTNES.