No. 676,203.

Patented June 11, 1901.

C. A. RAFTER.

BARREL MACHINE.

(No Model.)

Application filed Dec. 20, 1899.)

5 Sheets—Sheet 1

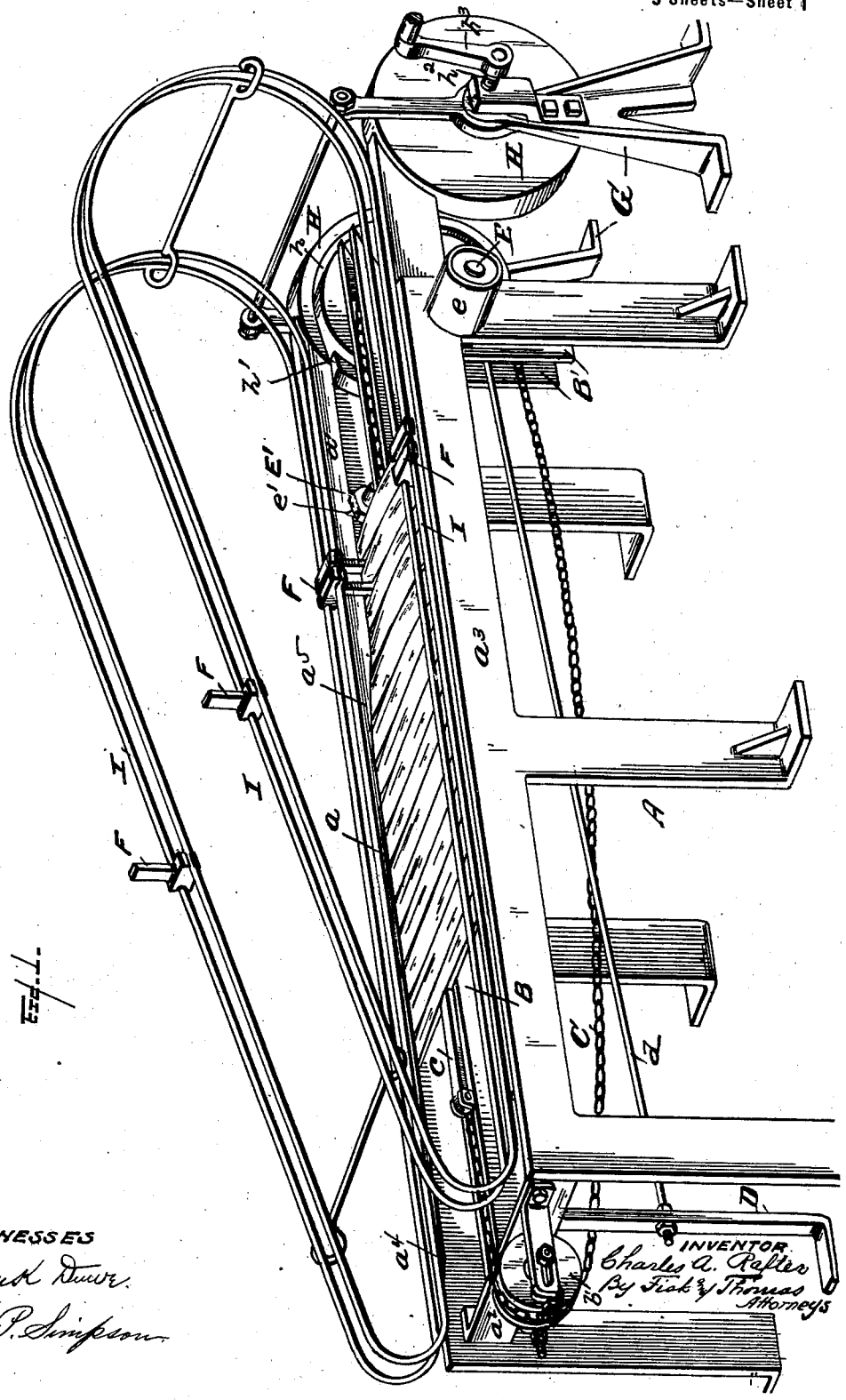

Fig. 1.

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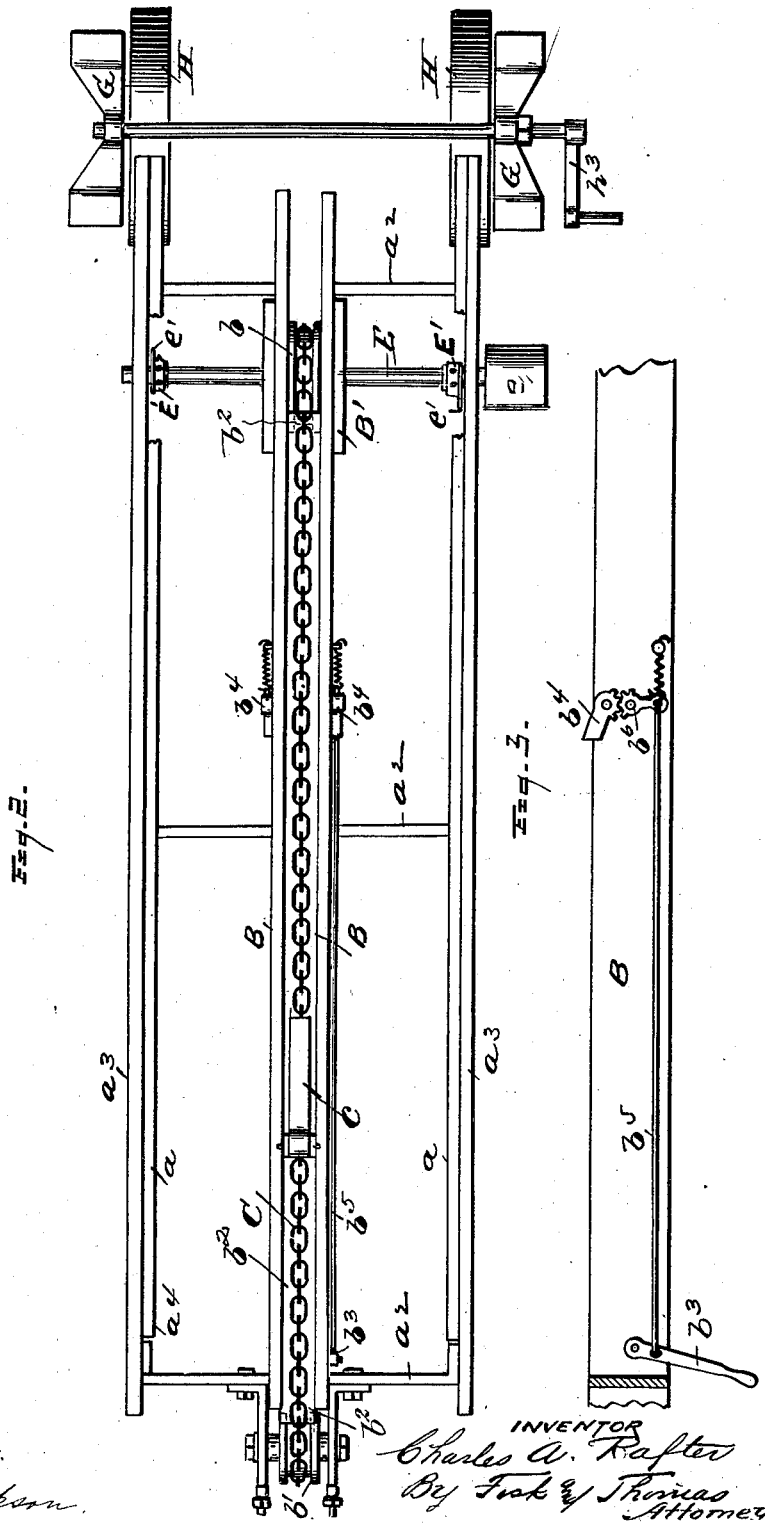

Fig. 2.

Fig. 3.

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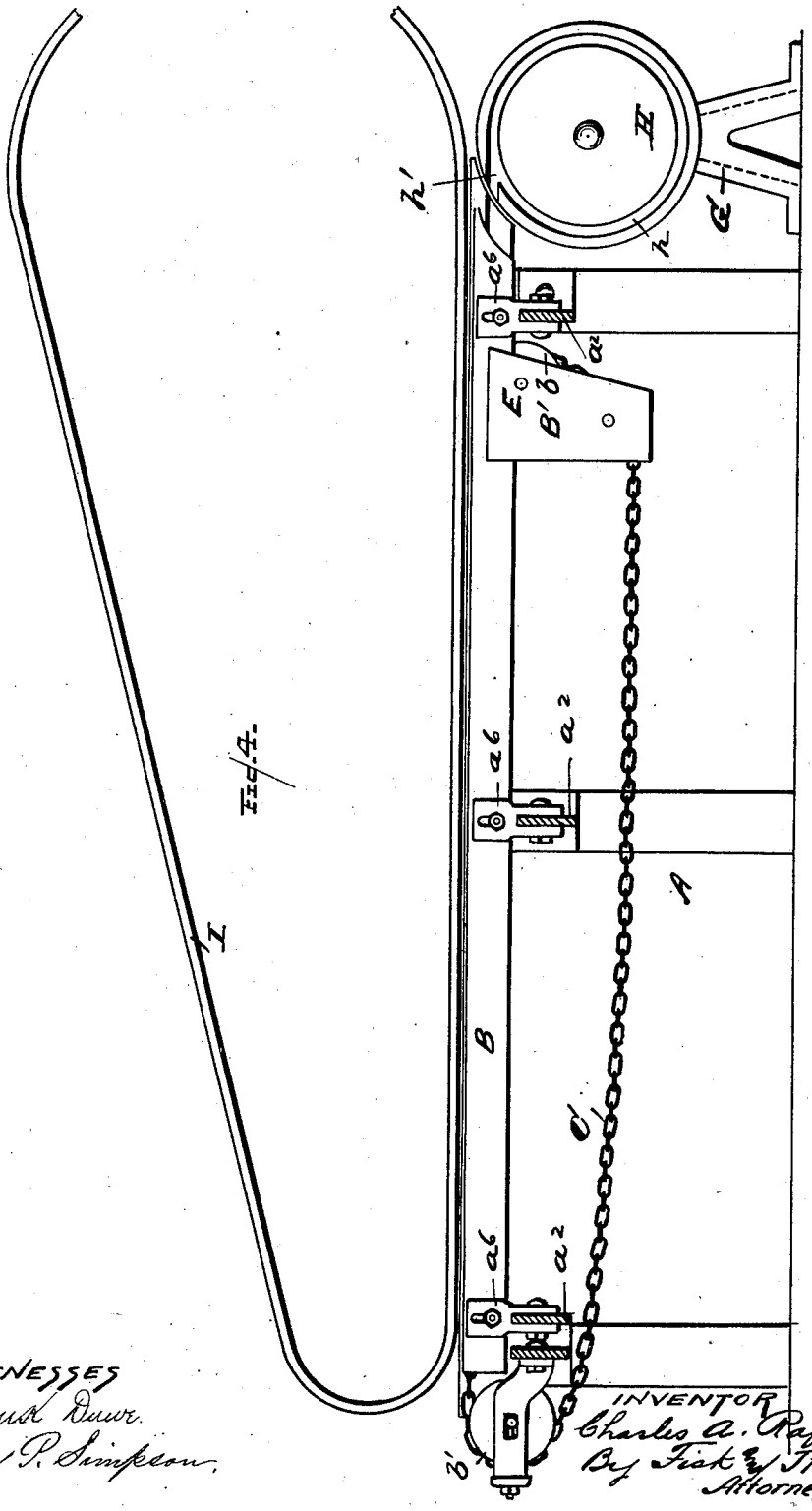

Fig. 4.

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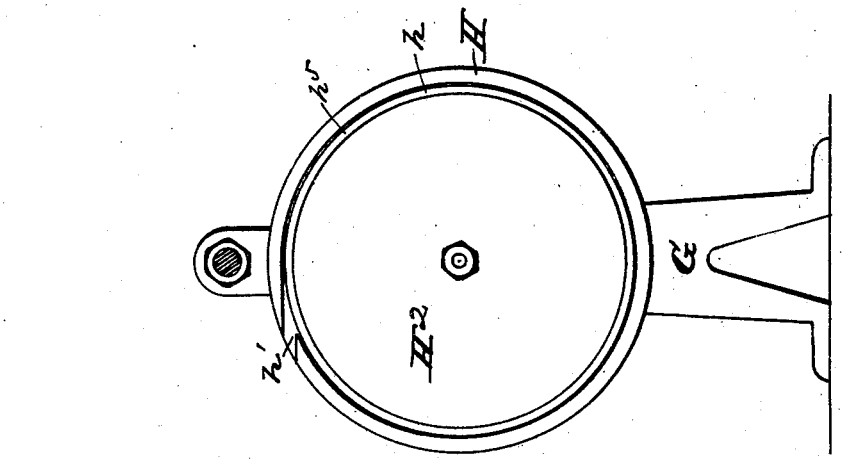

Fig. 6.

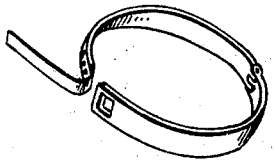

Fig. 7.

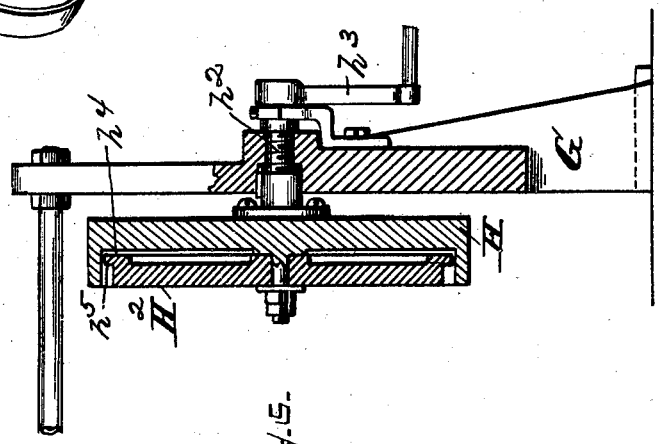

Fig. 5.

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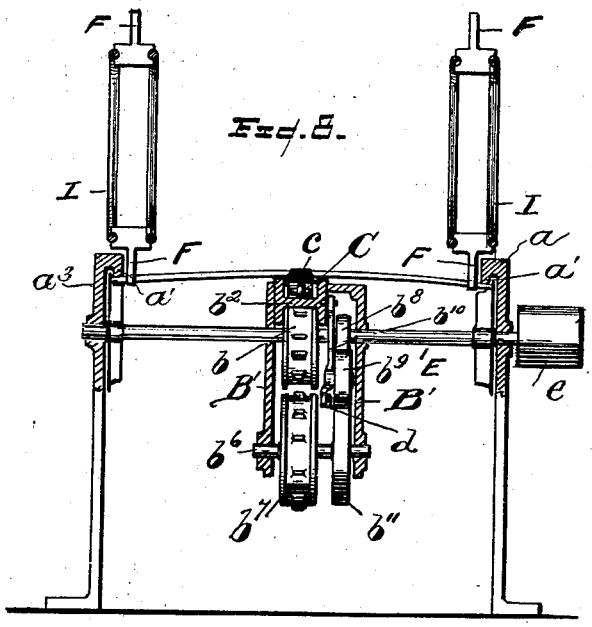

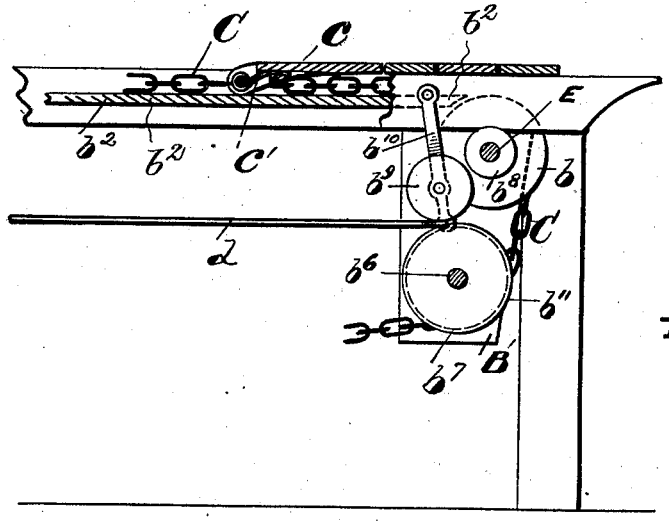

Fig. 9.

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UNITED STATES PATENT OFFICE.

CHARLES A. RAFTER, OF JASPER, MICHIGAN.

BARREL-MACHINE.

SPECIFICATION forming part of Letters Patent No. 676,203, dated June 11, 1901.

Application filed December 20, 1899. Serial No. 741,005. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. RAFTER, a citizen of the United States, residing at Jasper, county of Lenawee, State of Michigan, have invented a certain new and useful Improvement in Barrel-Machines; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to improvements in barrel-making machines, and particularly that class of barrel-machines designed for use in assembling the staves, and is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of my invention, showing the staves for a barrel being operated upon by the machine. Fig. 2 is a plan view with the upper parts removed to show the location of the operating parts and the chamfering and crozing devices. Fig. 3 is a detail showing the stop for the staves to limit the number necessary for a barrel. Fig. 4 is a vertical sectional view showing a variation, in which means are provided for raising or lowering the center support for the staves to increase or decrease the bilge. Fig. 5 is a sectional view showing the construction of the barrel-form. Fig. 6 is an inside elevation of the same. Fig. 7 is a view showing the holding-hoops. Fig. 8 is a cross-sectional view showing the main driving-shaft, the crozing and chambering cutters, the friction mechanism for driving the chain, and the blocks for separating the staves; and Fig. 9 is a sectional view showing the chain, the spring-actuated dog, and the driving mechanism for the chain.

In the drawings, A represents the frame of the machine, supported on suitable standards at a sufficient distance above the floor to allow for the driving mechanism below the bed-line of the machine. The upper section of the bed of the frame consists of the side frames a^3 a^3, provided at the upper inner edges with an inset flange a, running nearly the entire length of the frame, and being further provided with a longitudinal cam-guide a', formed integral therewith or bolted to the inside of the frame underneath the flange a. The end of the cam-guide comes about midway of the machine. Midway between the side frames are mounted parallel longitudinal bars B B, set in a vertical position and supported on cross-frames a^2 a^3.

B' B' are supporting-plates depending from the bars B B, between which are supported the clutch mechanism and gears for driving the feeding mechanism of the chain C. This driving mechanism consists of a pulley b^7, fixed to a counter-shaft b^6, the idler b, free on the shaft E, the small friction-pulley b^8 fixed to the shaft E, and the swinging pulley b^9, mounted on the lever b^{10} and arranged to be swung between the friction-pulley b^8 and a large friction-pulley b^{11}, fixed to the counter-shaft, whereby the power from the main shaft is transmitted to the feeding mechanism whenever the operator desires by means of the foot-lever D and the connecting-rod d.

E is the main shaft of the machine, mounted transversely in the frame, and is driven through the small pulley e from the prime motor by means of a belt. The driving mechanism for moving the chain is driven from this shaft.

The relative positions of the longitudinal bars B B and the flanges a a on the inside of the frame are such that the upper edges of the bars B B come below the line drawn between the lower edges of the flanges a a a distance equal to the thickness of the staves, so that a stave placed across the machine between the side frames and on top of the bars B B will pass under the flanges a a. To provide for more readily entering staves in this position, the rear ends of the flanges a a are cut on a bevel from the bottom at a^4. The machine is constructed of such length that the distance from the foot of the incline a^4 to the point a^5 of the cam-guide a' is equal to the maximum circumference of the barrel to be made and of such distance or length that the staves necessary to make a barrel can be entered under the flanges a a and supported on the bars B B.

The entry of a sufficient number of staves to make a barrel into the position described is the first step in the operation of the machine. To prevent the staves so entered in the machine from getting out of position while being moved forward, as hereinafter

described, I employ separating-blocks F and enter one of the blocks at each end and between two adjacent staves. This is made necessary by the fact that the staves are wider at the center than at the ends.

The second step in the operation of the machine consists in moving the series of staves before described forward a distance somewhat greater than the length of the series of staves and by power applied through the traveling chain C. Attached to the chain is a pivoted dog *c*, which is held parallel and close to the chain by means of a spring. The traveling chain comes directly under the staves, and to provide for holding the chain up against the under side of the staves I place a support b^2 between the bars B B, on which the chain travels. After the operator has filled the machine with staves, as before described, he starts the clutch mechanism by means of the foot-lever, which starts the chain and brings the dog *c* around to the front of the machine over the pulley b' and in position to engage with the rear side of the last stave, after which the further movement of the chain will move the entire series of staves forward with all the power necessary. As the ends of the staves come against the cam-guides a' a' the ends are bent downward and the staves thus given a set equal to the bilge of the barrel to be made. This setting down of the ends of the staves constitutes the second step in the operation of the machine.

At the rear of the machine is the barrel-former, consisting of the frames G G and the vertical disks H H. These disks are provided on their inner faces with an annular channel *h*, the uppermost point in the channel being on a level with the under sides of the cam-guides a' a'. In the disks and connecting with the annular channel *h* is a horizontal channel h', leading directly from the under side of the cam-guide a' into the annular channels *h* in the disks.

The third step in the operation of the machine consists in forcing the staves forward from and out of the main frame into the former. The ends of the staves are held and guided into the proper position in the former by the channels h' h'. To force these staves forward into this position, the chain continues its movement and the dog *c* forces the staves forward beyond the pulley *b* and into the channel in the disks until the chain no longer forces the dog forward, but draws its rear end down over the pulley and under the machine, automatically releasing it from engagement with the staves. The staves are now assembled between the disks H H in the form of a barrel and with the proper bilge. They are held in this position by a couple of hoops, details of which are shown in Fig. 7. These hoops I preferably make of wood hinged at the under side and arranged to embrace the barrel at each end. The hoops are fastened around the barrel by any suitable means, such as a strap and buckle. When the hoops are in place on the barrel as formed, the disks are drawn apart through the operation of the screw-shaft h^2, operated by the crank h^3, which draws back one of the disks. After the barrels are released from their support the hoops are put on in the usual manner.

To provide for automatically lifting the separating-blocks F F, I support above the machine fixed guides for these blocks, consisting of two wires I I, supported a sufficient distance apart to form ways for supporting and guiding the blocks. These wires are in pairs at each side of the machine and run parallel with the line of staves to the point where the staves are ready to be entered in the disks H H. Beyond this point the wires are bent upward, the construction being such that the separating-blocks are carried forward with the staves until they reach the upward incline of the supporting-wires, when they are automatically lifted out from between the staves and guided upward between the wires by the blocks that follow. A sufficient number of blocks are employed to fill the way to the front, so that all the operator has to do to secure new blocks is to slip them around and under the way and into position at each side of the machine to be entered between the staves. These blocks may be of wood or iron, as preferred.

In addition to assembling the staves into a barrel I provide means for chamfering and crozing the staves as they are moved forward in the machine. To accomplish this, I mount on the main shaft E at each end a cutter or cutters, arranged to cut the under side of the stave to form the chamfer and croze. This operation is performed as the staves are forced forward by the chain and requires no additional handling of the staves and no additional operation. The chamfering and crozing cutters are shown at E'.

Thus my machine assembles the staves, prepares them, and forms them into a barrel in one continuous operation.

The means which I have already described for performing the several operations is sufficient for the purpose and makes a complete machine. In addition to the details described means may, however, be employed for sizing the staves or reducing them to a uniform length, and such means are shown in the drawings in the form of an additional cutter e'. This cutter is fixed on the main shaft outside of the chamfering and crozing device to provide for cutting off the ends of the staves simultaneously with the operation of chamfering and crozing. This cutter may be a part of the chamfering-knife and may be formed by making the knife of a sufficient length to sever the staves. I also provide means for raising and lowering the supporting-bars B B in cases where it is desired to use the machine in manufacturing barrels of different bilge. Where such a construction is used, I support the bars B B in castings or saddles a^6 a^6 instead of directly upon the

cross-frame a^2 a^2. In this construction the saddles a^6 a^6 are supported upon the cross-frames a^2 a^2, and a slotting connection is provided between the frames B B and the saddles, whereby the frames may be raised or lowered to adapt them to increase or decrease the bilge of the barrel.

In Figs. 5 and 6 I show the details of construction of the disks H H and the supporting means and in which I show a construction varying from that before described, consisting of means for reducing the friction of the staves as they travel to their place in the annular channel h. The means I show consist of the supplemental disks H^2 H^2, pivoted at the axis of the disks H H and arranged to revolve over the face or within the disks H H. The bearings for these supplemental disks are at the center and at the outer edges h^4. In this construction the annular channels h h are cut in the outer periphery of the supplemental disks H^2 H^2. This construction is such that as the ends of the barrel-staves enter the annular channels h h the ends of the staves rest against the annular flange h^5, the flange receiving the end thrust of the staves. The end thrust is thus communicated to the annular bearing h^4 between the two disks. By lubricating this last-named bearing the friction attending the movement of the staves into the annular channel, due to the end thrust, is reduced to the minimum. Antifriction-bearings may be provided for reducing this resistance, if desired.

In Figs. 2 and 3 I show a device for stopping the staves at or about the center of the machine, consisting of the pivoted dogs b^4 b^4, arranged to be lifted up in the path of the staves, in combination with suitable means for raising and depressing the dogs operated from the front of the machine. I show a segmental rack between the dogs and the rock-arm b^6, the arm being operated by the lever b^3 through the connecting-rod b^5. The dogs b^2 b^2 are located at the point about where the staves come in contact with the cam for setting down the ends. When the staves for a barrel are being assembled, the dogs are raised in the path of the staves and the staves fed in against them until the bed to a predetermined point is filled, which indicates that staves enough for a barrel have been entered in the machine. By operation of the hand-lever the dogs are then thrown down and the staves move forward, as before described.

It is apparent that variations may be made in the construction of the machine over the form shown and described herein, some of which I will indicate. Instead of forcing down the ends of the staves the center may be lifted, and instead of forcing down the ends of the staves or lifting the center by the forward movement, as described herein, means may be employed for bending the staves after they have been assembled in line in the machine without moving them forward or before they are moved forward.

What I claim is—

1. In a barrel-former, the combination of the frames G G, the disks H H supported between and from said frames and fixed against rotation, the rotatable disks H^2 H^2 provided with a peripheral recessed flange to receive the end thrust of the staves, substantially as described.

2. In a barrel-machine, the combination of a center support for the staves when in line, consisting of parallel bars located at the longitudinal center of the supporting-frame, an endless chain arranged to travel between said bars and immediately under the center of the staves, means for engaging the chain with the staves, spacing-blocks between the ends of the staves to cause the staves to move in line when forced from the center only, and means for returning the spacing-blocks, substantially as described.

3. In a barrel-machine, a center support for the staves when in line consisting of parallel bars located at the longitudinal center of the supporting-frame, an endless chain arranged to travel between said bars and immediately underneath the center of the staves and a dog attached to said chain and arranged to come above the upper edges of the supporting-bars, said dog of a sufficient length to deliver the staves beyond the limit of travel of the chain, substantially as described.

4. In a barrel-machine, means for supporting the staves when in line, an endless chain, a dog attached to the chain and arranged to engage the staves, said dog of sufficient length to move the staves forward of the limit of the movement of the chain and a spring to return the dog to a position to engage a second series of staves when the said dog is disengaged from the first series by the return movement of the chain, substantially as described.

5. In a barrel-former, the combination of the fixed frame G, provided with a socket, the disk H provided with a center extension having a spline-and-groove connection with the socket in the frame G and a screw-shaft arranged to move the disk H to and from the fixed shaft, substantially as described.

6. In a barrel-former, the combination of the supporting-frame, said frame approximately twice the length required to support the staves for a barrel and arranged to receive the staves for a barrel at the forward end of the frame before any of the staves are bent, the spacing-blocks, a cam located forward of the full line of staves and arranged to form the bilge as the whole line of staves is moved forward, substantially as described.

7. The combination of means for supporting a series of staves for a barrel, means for moving forward the staves, and the independent separating-blocks adapted to enter between staves of different widths and carried forward with the staves, substantially as described.

8. The combination of means for supporting a series of staves, means for moving the

staves forward for the purpose described, the independent separating-blocks whereby they may enter between staves of different widths and means for automatically lifting the blocks from between the staves, substantially as described.

9. The combination of means for supporting a series of staves, means for moving the staves forward, the separating-blocks independently adjustable in relation to each other and means for automatically lifting the blocks from between the staves and for returning them, substantially as described.

10. The combination of means for supporting the staves, means for moving them forward, the separating-blocks independently adjustable in relation to each other, and a way for lifting and returning the blocks, substantially as described.

11. In a barrel-machine, the combination of the frame G, G, the disks H, H, supported between and from said frames and fixed against rotation, the rotatable disks H^2, H^2, provided with a peripheral shoulder and an annular flange to receive the end thrust of the staves, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

CHARLES A. RAFTER.

Witnesses:
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FRANK DENOE.