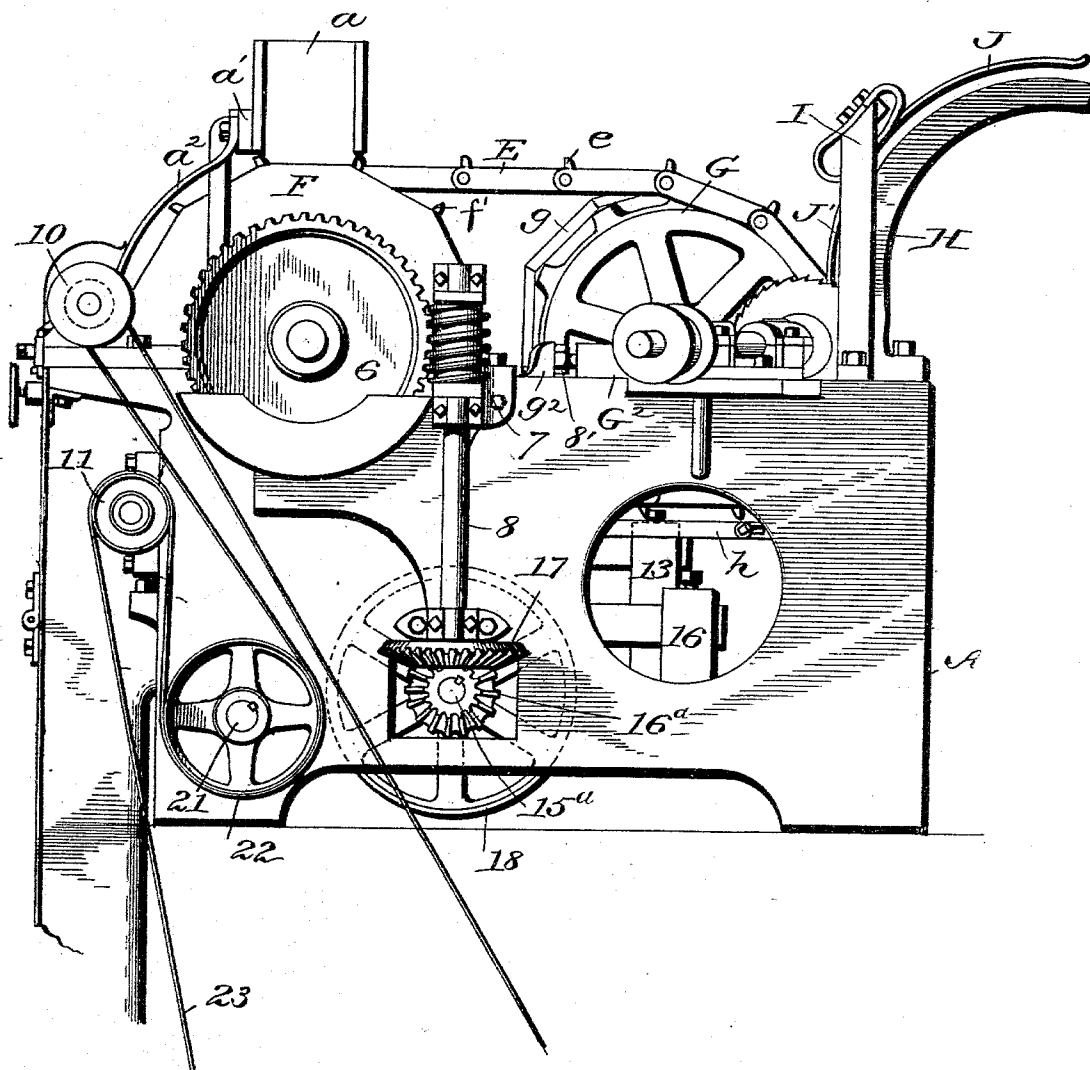


(No Model.)

4 Sheets—Sheet 1.

J. PLEUKHARP & W. K. LIGGETT.
STAVE ROUNDING, GROZING, AND CHAMFERING MACHINE.
No. 511,028. Patented Dec. 19, 1893.

Fig. 7.



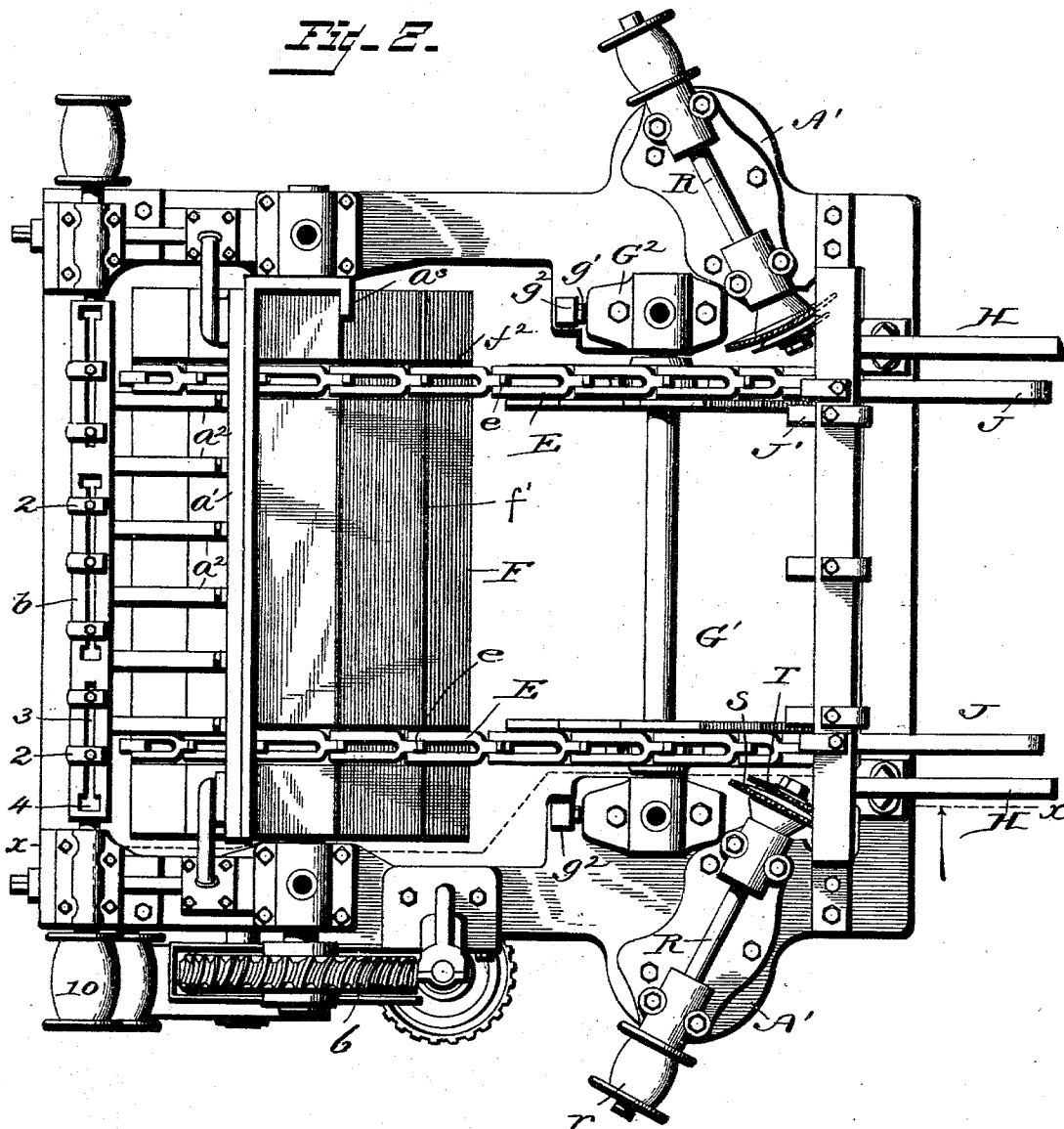
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(No Model.)

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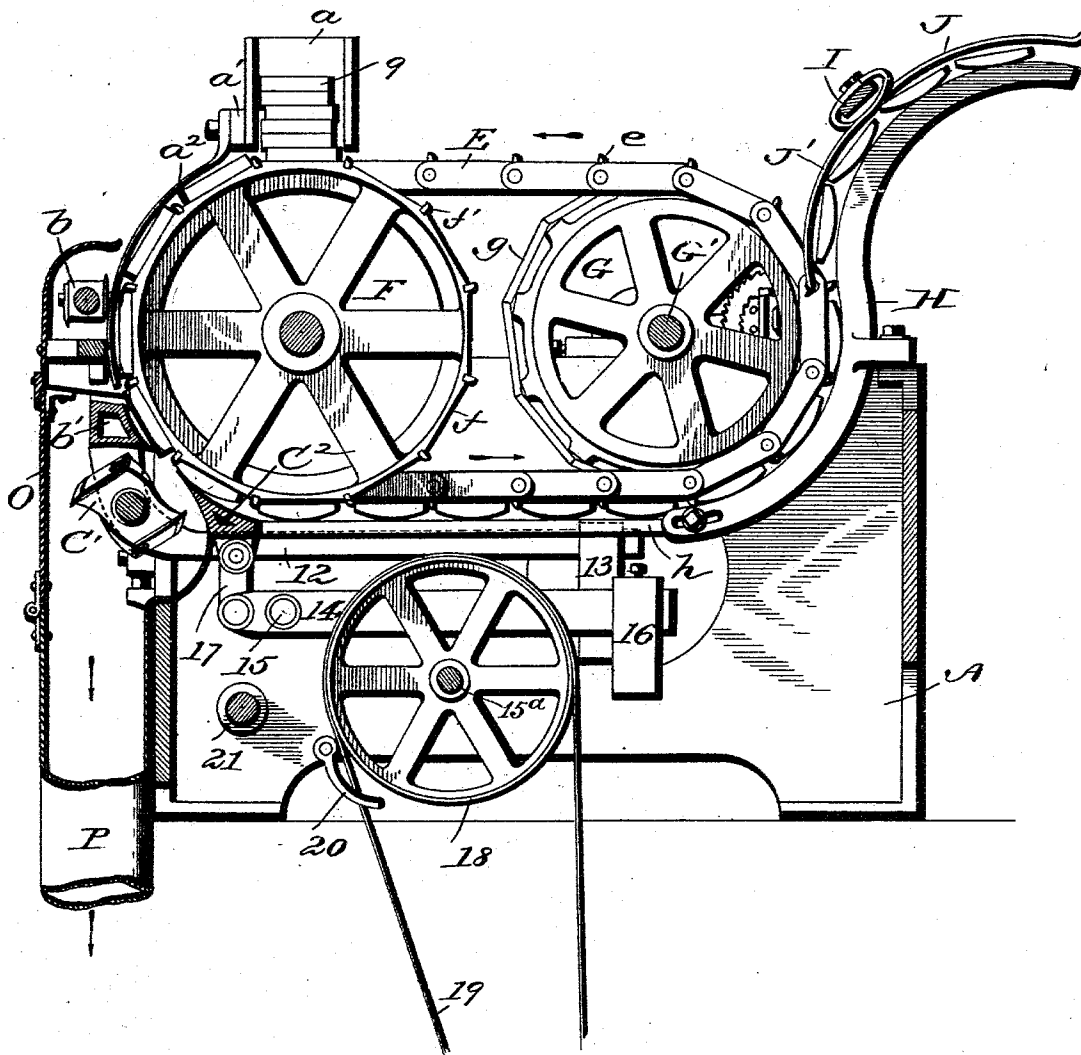
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Fig. 3.



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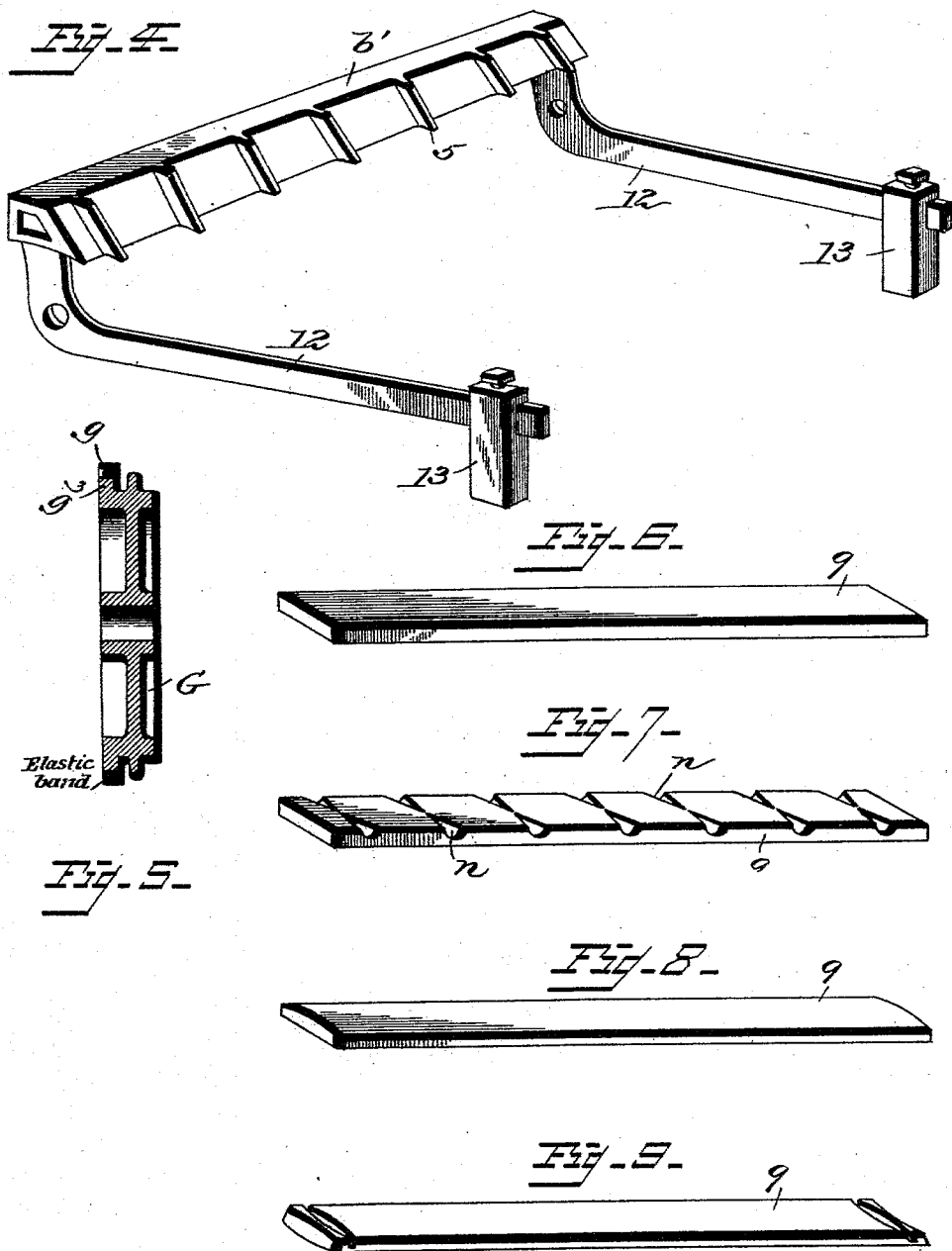
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UNITED STATES PATENT OFFICE.

JAMES PLEUKHARP AND WILLIAM K. LIGGETT, OF COLUMBUS, OHIO, ASSIGN-
ORS TO THE PLEUKHARP BARREL MACHINE COMPANY.

STAVE ROUNDING, CROZING, AND CHAMFERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 511,028, dated December 19, 1893.

Application filed May 28, 1892. Serial No. 434,786. (No model.)

To all whom it may concern:

Be it known that we, JAMES PLEUKHARP and WILLIAM K. LIGGETT, citizens of the United States, residing at Columbus, in the county of Franklin, State of Ohio, have invented certain new and useful Improvements in Stave Rounding, Crozing, and Chamfering Machines; and we do hereby 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 appertains to make and use the same.

This invention relates to an improvement in that class of machinery which is designed to facilitate the formation and completion of stave blanks in the manufacture of standard barrels.

The invention is especially designed to provide a machine for the production of staves having undercut croze and used in the formation of the standard barrels patented in the United States to James Pleukharp and William K. Liggett, May 9, 1893, No. 496,953.

The invention aims to provide in one organization instrumentalities for rounding one side of stave blanks and crozing and chamfering the same and performing the several operations at different times but in one continuous process thereby obviating more than one handling of the blanks which is necessary to place them in a hopper, from which they are automatically taken by an endless carrier and conveyed to two sets of cutters, one set notching the opposite edges of the blanks and the other set removing that portion of the blank between the said notches and rounding the blank. The blank is then presented to crozing and chamfering cutters which even the blanks, making them all one length, and will form the proper croze and chamfer.

The invention consists of the organization which hereinafter will be more particularly set forth and claimed, and which is shown in the accompanying drawings forming part of this specification, and in which—

Figure 1 is a side elevation of a machine embodying our invention. Fig. 2 is a plan view of the organized machine. Fig. 3 is a vertical section about on the line X X of Fig. 2 looking in the direction of the arrow, parts

being broken away to better show the details of construction and the relative arrangements of the parts. Fig. 4 is a perspective view of the upper pressure bar, showing the levers attached thereto and the weights on the said levers for yieldingly holding the pressure bar to the work. Fig. 5 is a cross section of a pulley at the delivery end of the machine over which the carrier passes, and which is provided with an elastic rim. Fig. 6 is a detail view of a stave blank. Fig. 7 is a view of the blank after being operated on by the first set of cutters. Fig. 8 is a view of the blank after being operated on by the second set of cutters. Fig. 9 is a detail view of the completed stave.

The frame A for supporting the operating parts of the machine, may be of any suitable construction being preferably closed in on four sides. The drum F located at the receiving end of the machine, is journaled at its ends on the side portions of the frame and one of its journals is extended and provided with the worm wheel 6 which meshes with a corresponding worm thread 7 on a shaft 8. This drum is provided with a series of faces *f* which approximate and correspond with the width of the stave blanks 9. These faces *f* extend from one end of the drum to the other end and are separated by ribs *f'* which project slightly from the drum and are designed to engage with the rear edge of the stave blanks and carry them forward to the separate set of cutters *b* and *C'*. Near each end of the drum F an annular groove or channel *f*² is formed to receive the chains composing the endless carrier E and which are of sufficient depth to permit the upper edges of the said chains to come flush with the faces *f* of the drum, thereby permitting the stave blanks to be wholly supported by the said drum when operated on by the cutters *b* and *C'* so there can be no sag or give to the said blanks when operated on by the said cutters. The ribs *f'* are only about one-third the thickness of the stave blanks and are straight on their front or active side so as to engage with the stave blanks and carry them forward in a positive manner to the cutters *b* and *C'*.

The support for the delivery end of the car-

rier E is composed of a shaft G' and pulleys G mounted on the said shaft near the ends thereof. The shaft G' is mounted at its ends in bearings G^2 which are adjustable on the frame A by means of set screws g' so as to take up wear in the chains comprising the carrier E. The set screws g' obtain a purchase against stops or lugs g^2 projected vertically from the frame A. Each of the pulleys G is provided with sprockets which engage with the links which comprise the chain of the carrier E and with an annular rim g^3 on which is fitted an elastic band g , the combined thickness of the elastic band g and the rim g^3 being about equal to the depth of the chains composing the carrier E so that the stave blanks will be held firmly against the lower portion of the guide H which is located at the delivery end of the machine.

The carrier E is composed of two endless chains which pass around and are supported at their ends by the drum F and pulleys G. The links composing these chains are about equal in length to the width of the stave blanks and have projections e which are designed to carry the stave blanks forward after they leave the cutter C' to the chamfering and crozing cutters. The links of said chains are held so that the projections e will be preserved in co-incident relation by means of sprocket teeth on the pulleys G and the sides at the inner end of the channels or grooves f^2 .

A track h is provided beneath the lower portion of the carrier E to support the stave blanks when traveling from the drum F to the pulleys G after being operated on by the cutter C' . A guide H, preferable ogee shaped, is provided at the delivery end of the machine to hold the stave blanks against the lower portions of the pulleys G, and the upper portion curves away from the said pulleys G to properly deliver the stave blanks after being finished. The lower portion of this guide H, conforms to the pulley G and is arranged at a proper distance therefrom to snugly comprise the stave blanks between it and the said pulleys G. A cross bar I located opposite the upper portion of the guide H and suitably connected with the frame A by having its ends bent down and bolted to the said frame, forms a support for spring arms J J'. These arms J J' are secured at their inner ends to the cross bar I and extend in opposite directions therefrom and conform to the shape of the upper portion of the guide H. The stave blanks pass between the guide H and the arms J J' as most clearly shown in Fig. 3. In the preferable form of construction the arms J J' are bolted to the upper side of the cross bar I and are bent around the edges and beneath the same, thereby forming a yielding portion between the said guide H and the cross bar I.

The cutter head b is provided with a series of cutters 2 which are located at intervals apart, and which in the operation of the machine are designed to form the notches n in

the opposite edges of the stave blank 9, as shown most clearly in Fig. 7. This cutter head is provided with slots 3 which have enlargement 4 for the purpose of receiving the head of the bolt which secures the cutters 2 to the said cutter head. The journal of the cutter head b is projected beyond the side of the frame A and provided with a band pulley 10.

The cutter head C' is approximately of a spiral form, as indicated most clearly in Fig. 3 so that the cutters thereof will operate by a shear or draw cut and effect a smooth and even cutting. This cutter is arranged below the cutter b and is designed to remove that portion of the blank left between the notches n and produce a curved surface on one side of the blank as shown most clearly in Fig. 8. The journal of the cutter head C' is extended and provided with a band pulley 11.

A pressure bar b' is arranged between the cutter heads b and C' , and is designed to press the stave blank against the drum F while the same is passing to the cutter C' . This pressure bar b' is preferably formed of cast metal and is hollow, and is provided on the face opposite the drum with a series of ribs 5 which correspond in number and position with the cutters 2 on the cutter head b so as to enter the notches n formed in the stave blank 9, thereby holding the said stave blank firmly and preventing any vibration or longitudinal movement thereof. Elbow levers 12 projecting from the pressure bar b' and mounted in line with or on the shaft of the cutter head C' , have weights 13 at their outer ends which serve to force the pressure bar b' against the stave blank with a proper degree of pressure. The levers 14 pivotally supported at 15, and having weights 16 at their outer ends, are connected at their inner ends with the pressure bar C^2 by means of links 17. The pressure bar C^2 is similar in construction to the pressure bar b' and is located below the said pressure bar b' and opposite the cutter C' . The stave blank is held against the drum while being operated on by the cutter C' by means of the said pressure bars b' and C^2 .

The hopper a for receiving the stave blanks, is located directly above the drum F and is closed at its rear side and one end, only. A portion a^3 extends from the said closed end of the hopper parallel with the closed side thereof for a short distance, and is designed to facilitate the proper feeding or supplying of the stave blanks to the said hopper. A space is left between the upper portion of the drum F and the lower edge of the hopper to permit the free passage of the stave blanks from the said hopper when engaged by the ribs f' on the said drum. A cross bar a' contiguous to the rear side of the hopper a forms a support for a series of spring guards a^2 which are attached thereto at their upper ends and have their lower ends extending to within a short distance of the pressure bar b' , and

which are designed to hold the stave blanks in position between the drum F while passing from the said hopper *a* to the cutter *b*.

The cutters *b* and *C'* are inclosed within a housing O which is in communication with a suction fan of any ordinary construction by means of a conveyer P for the purpose of removing all the cuttings and conveying them away from the machine to a convenient place.

A horizontal shaft 15^a parallel with the drum F and located near the lower end of the frame A, is provided with a bevel pinion 16^a which meshes with a bevel gear wheel 17 on the vertical shaft 8, and is provided with a band wheel 18 which receives its motion from any suitable source of power by means of an endless belt 19. This belt 19 is moved in the well known way to throw the machine in and out of gear by means of a shipper 20 of ordinary construction. A shaft 21 having an idle pulley 22 is provided for a belt 23 to pass around and give proper direction thereto. This belt 23 is driven by any suitable motive power and after passing around the idle pulley 22 passes around the pulleys 10 and 11 to drive the pulleys *b* and *C'*.

The mandrels R carrying the chamfering and crozing cutters, are set at an angle to the carrier E and incline in opposite directions. Band pulleys *r* are provided at the outer ends of the mandrels R to receive the belt, not shown, by means of which the said mandrels are rotated. The chamfering cutter F is dished and the crozing cutter T is correspondingly dished and the two cutters are secured to the inner ends of the said mandrels. The chamfering and crozing cutters operate on the stave blanks at a point about opposite the middle of the guide H and about in the plane of the shaft G'.

In the operation of the machine the stave blanks are fed by hand to the hopper *j* and are taken one at a time from the bottom of the pile by means of the ribs *f'* on the drum F and carried, first to the cutter *b* which forms the notches *n* in the opposite edges thereof, and then to the cutter *C'* which rounds one face of the said blank, and from this cutter the blanks are carried by means of the carrier E to the crozing and chamfering cutters and from thence to the delivery end of the machine.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In an organized machine for rounding one face of stave blanks and chamfering and crozing the same, the combination of a cutter having the blades arranged at intervals in its length to notch the blanks, a second cutter to remove that portion of the blank between the said notches, crozing and chamfering cutters, and feeding mechanism to carry the blanks in a curved path to the notching and rounding cutters, and to the crozing and chamfering cutters, whereby the blanks will first be notched in opposite edges, have the portion

removed between the notches and then crozed and chamfered, substantially as set forth.

2. In a stave rounding machine the combination of a cutter having knives at intervals in its length, feeding mechanism to carry the blanks in a curved path so that the cutter will notch the opposite edges of the blanks, substantially as specified, and a pressure bar having a series of transverse projections to correspond in number and position with the knives on the said cutter head, to enter the said notches formed in the blanks to hold the latter firmly against vibratory or longitudinal movement, substantially as set forth.

3. In a stave rounding machine the combination of a drum for feeding the stave blanks, a cutter located beneath the said drum, pressure bars, one arranged on each side of the cutter, pivotally supported and adapted to move away from the drum, and weighted levers connected with the said pressure bars to yieldingly hold the same in a normal position, substantially as set forth.

4. In a stave rounding machine the combination of a stave blank feeding drum, a hopper located above the said drum, a cutter *b* located about opposite the center of the drum, yielding guards conforming to the drum and extending between the hopper and the cutter *b*, a second cutter *C'* beneath the cutter *b*, a pressure bar *b'* between the vertically disposed cutters *b* and *C'*, and a pressure bar *C''*, substantially as and for the purpose described.

5. In a stave rounding machine, the combination with the vertically disposed cutter heads *b* and *C'* constructed to round one face of the blank staves, of a housing inclosing the said cutter heads and adapted to be connected through a suitable conveyer with a suction fan, substantially as and for the purpose set forth.

6. In a stave rounding machine, the combination with a guide H and a carrier, of a pulley supporting the said carrier and provided with an annular rim, and an elastic band surrounding the said rim, substantially as and for the purpose set forth.

7. In a stave rounding machine, the combination with a guide H, and an endless carrier comprising a chain, of a pulley to support the said chain provided with sprocket teeth to engage with the links of said chains, and having a rim, and an elastic band fitted around said rim, substantially as set forth.

8. In a machine of the herein described character, the combination with a drum having a series of faces, and having projections between the said faces, of a hopper located above the said drum and closed on one side and end, only, and having a space between the said drum and the lower edge of the hopper, substantially as and for the purpose set forth.

9. The combination with an endless carrier, and supports for the said carrier, of a track beneath the lower portion of the said carrier, and ogee shaped guide forming a continuation

of the said track, and spring arms JJ' conforming to the upper portion of the said ogee shaped guide H, and extending in opposite direction from an intermediate support, the outer ends of the said arms being free, substantially as and for the purpose set forth.

10. The combination with the drum F having grooves formed therein near each end, and a hopper, of an endless carrier composed of chains which are adapted to travel in the said grooves and come flush with the face of the said drum, and provided with projections which are adapted to engage with and carry the stave blanks forward, substantially as set forth.

11. The combination with an endless carrier, supports F and G for the said endless carrier cutters for rounding one face of the stave blanks, the guide H conforming to the support G, and oppositely inclined mandrels arranged within the plane of the support G and provided with chamfering and crozing cutters to operate on the inner or straight side of the said stave blanks in opposition to the guide H, substantially as set forth.

12. A machine of the character hereinbefore set forth comprising the following elements which are combined and arranged to operate substantially in the manner hereinbefore set forth the same consisting of, an endless carrier comprising two endless chains, a drum having a series of faces and having

projections between the faces, and having annular grooves near each end of the drum to receive the said chains, pulleys to support the opposite end of the said chains, each pulley having sprocket teeth, an annular rim, and an elastic band around the said rim, a cutter head to form notches in the opposite edges of the stave blanks, a second cutter to remove that portion of the blank between the notches and round one face of the stave blank, pressure bars, one on each side of the latter cutter and connected with weighted levers which hold the said pressure bars to their work, a track beneath the lower portion of the carrier and ogee shaped guide at the delivery end of the machine, spring arms conforming to the upper portion of the said guide, a hopper to receive the stave blanks, spring guards between said hopper and the first of the two cutters, a housing inclosing the said cutters and adapted to be connected with a suction fan, and mandrels inclining in opposite directions and provided with chamfering and crozing cutters, substantially as and for the purpose set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES PLEUKHARP.

WILLIAM K. LIGGETT.

Witnesses:

JOHN A. MCDOWELL,

EDWARD J. CONVERSE.