E. C. THORSCHMIDT.

STAVE CUTTING MACHINE.

APPLICATION FILED MAY 13, 1911.

1,036,747.

Patented Aug. 27, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

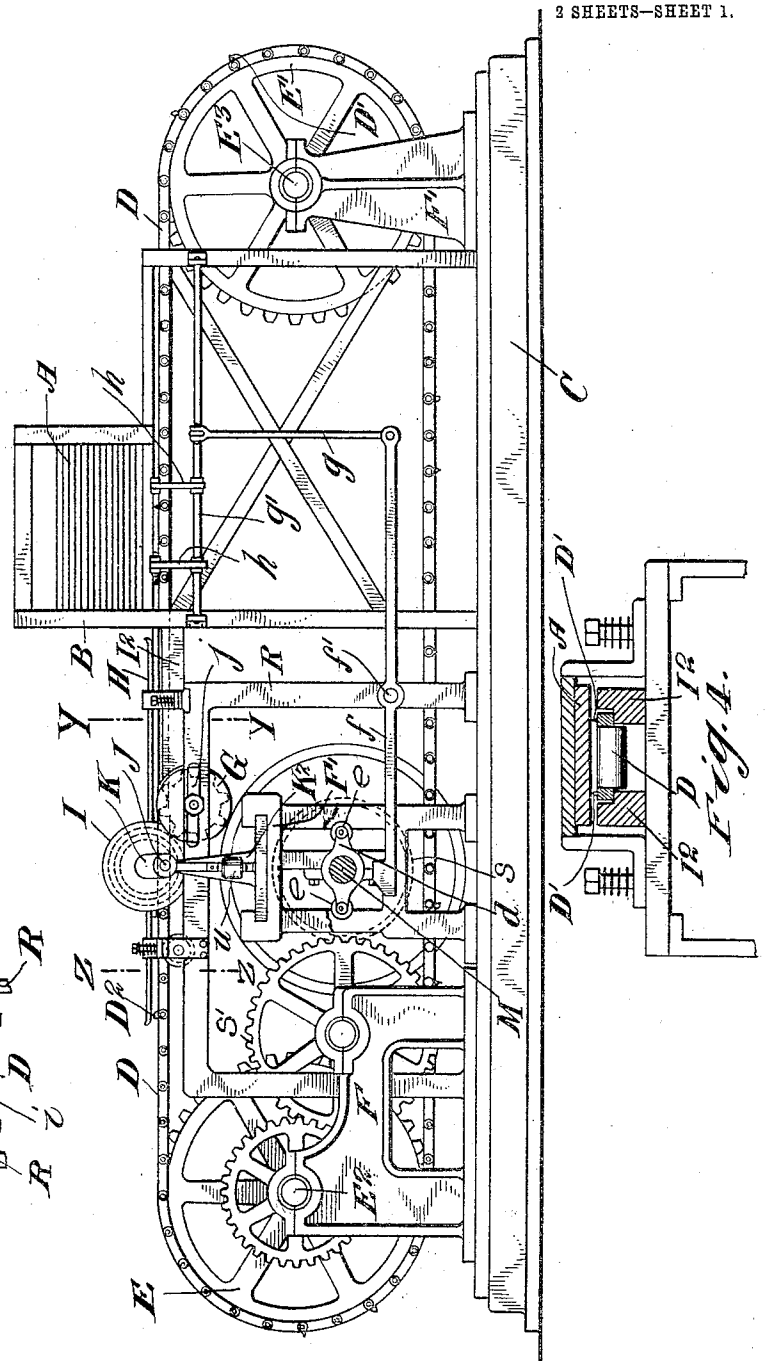

Fig. 3.

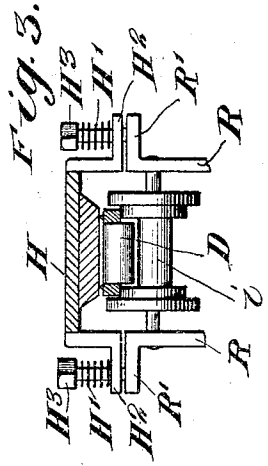

Fig. 4.

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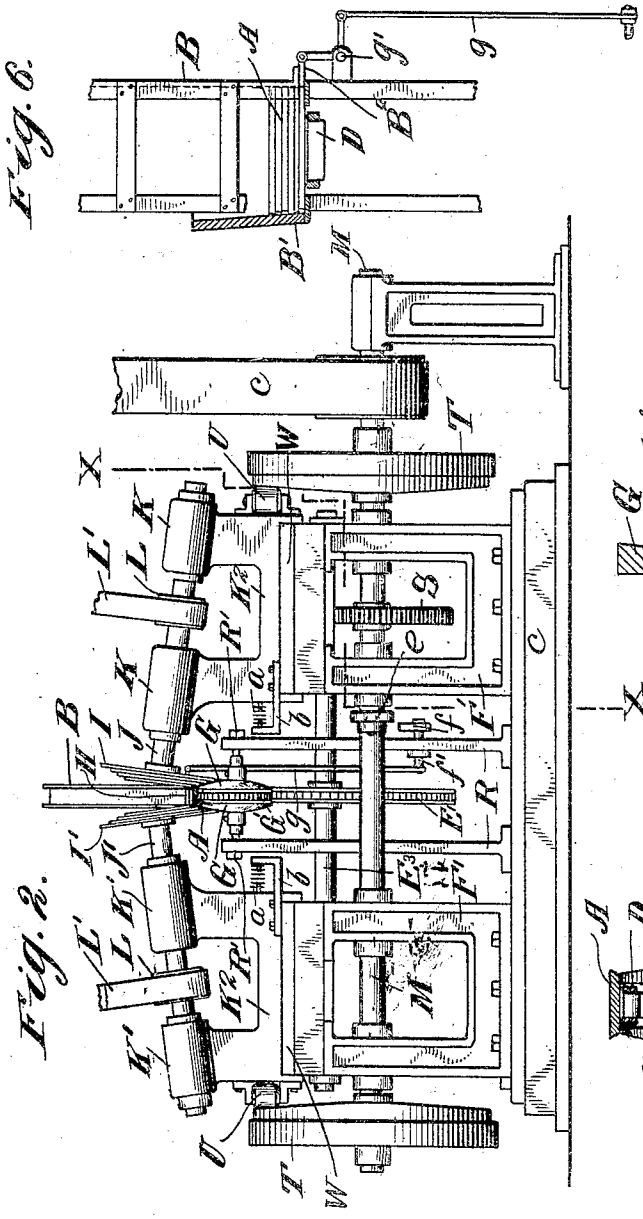

Fig. 2.

Fig. 6.

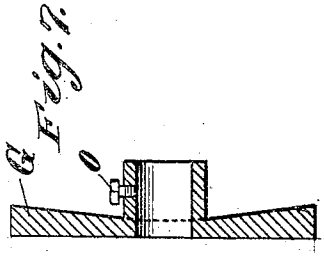

Fig. 7.

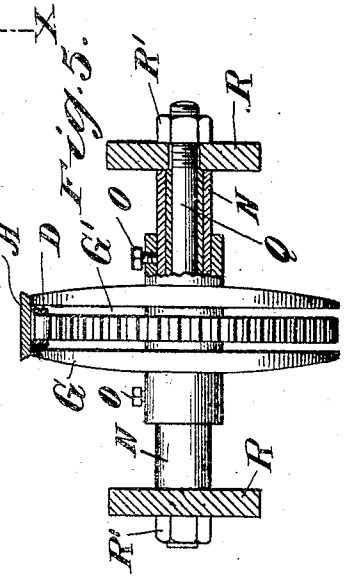

Fig. 5.

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UNITED STATES PATENT OFFICE.

ERNEST C. THORSCHMIDT, OF NEW YORK, N. Y.

STAVE-CUTTING MACHINE.

1,036,747. Specification of Letters Patent. Patented Aug. 27, 1912.

Application filed May 13, 1911. Serial No. 626,926.

To all whom it may concern:

Be it known that I, ERNEST C. THORSCHMIDT, a citizen of the United States, and a resident of New York city, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Stave-Cutting Machines, of which the following is a specification.

My invention relates to stave-cutting machines and the object of my invention is to provide an improved stave-cutting machine by means of which the edges of the staves may be more perfectly formed, and to provide a more simple and perfect machine than that recently patented to me and issued September 21st, 1909, Number 934,769.

The present machine embodies many of the elements of construction disclosed in the patent above referred to, but some of the elements shown in said patent have been dispensed with and the machine as a whole is reduced in cost of construction and is designed to form the staves without danger of injuring the saws where the material to be removed from the stave is wider than the width or thickness of the saw blade.

Referring to the drawings which form a part of this specification, Figure 1 is a sectional side elevation of the machine on line X—X of Fig. 2. Fig. 2 is a front end elevation of the same. Fig. 3 is a cross sectional view through a portion of the press-plate and stave taken on line Z—Z of Fig. 1. Fig. 4 is a cross sectional view through the endless chain, the press-plate and the guide for the said chain, taken on line Y—Y of Fig. 1. Fig. 5 is an end view of the stave supporting cam-shaped flanges which support the edges of the staves while they are being sawed, the intermediate wheel serving to guide and carry the endless chain which carries the staves. Fig. 6 is an end view of the stave holder shown on a larger scale than is shown in Fig. 2. Fig. 7 is a cross sectional view of one of the cam plate flanges shown in Fig. 5.

The several blanks A of rectangular shape are stacked in a suitable rack B supported on a base C on which the machine is mounted. The lowermost stave blank A of the stack of staves in the rack B is forced against the guide-plate B′ by the two slides B^2—B^2 which are spaced apart from each other nearly the length of the blanks, with the object of placing the blanks in perfect position on the carrier D which is made in the form of an endless sprocket chain and passes through the bottom of the rack B directly under the lowermost stave blank A, the said endless carrier D being provided with two upwardly extending sharpened spikes D′ mounted on one portion of the carrier and a knife edge portion D^2 mounted on another portion of the carrier at a distance from the spikes D′ somewhat less than the length of a stave blank. The knife portion D^2 is of less height than the thickness of a stave blank and serves to prevent the end of the blank with which it engages from moving laterally on the carrier while the opposite end of the stave blank is held firmly on to the spikes D′ by the presser-plate H, the knife portion D^2 and spikes D′ serving as lugs to carry the stave forward under the presser bar H. The carrier is driven by sprocket wheels E and E′ having their shafts E^2 and E^3 journaled in suitable bearings arranged on standards F and F′ attached to the base C. As the stave blank is carried forward by the carrier it passes under one end of the presser plate H which is located adjacent the front of the casing B. The presser-plate H is normally held closely above the top of the carrier D and is permitted to move upward against the pressure of the springs H′ which bear against the flanges H^2 of the presser-plate, the construction of which will be more fully set forth hereinafter, and the said stave blank is then carried forward and cut into a stave by a plurality of circular saws I and I′ located on opposite sides of the carrier D.

The side edges of the stave are supported on the circumferential edges of the cam-shaped circular plates G—G, one each of which is located on the opposite sides of a supporting sprocket wheel G′, which sprocket wheel engages with the chain carrier D. The saws I and I′ are assembled together in gangs, each gang comprising two or more saws of relatively different diameters mounted respectively on the ends of arbors J and J′, which are journaled in suitable bearings arranged in slides K and K′ which are formed in similar castings K^2 which castings are adapted to move from and toward each other to cause the saws I and I′ to give the desired shape to the side edges of the stave blanks, when forming a stave, that is, to cut the side edges of the stave with a view to make the middle of the

stave widest, gradually narrowing to the ends. In order to give the desired bevel to the side edges of the stave, the saws I and I′ are inclined toward each other as plainly indicated in Fig. 2, it being, however, understood that the axis of the arbors J and J′ are arranged in the same transverse plane. The arbors J and J′ are provided with pulleys L connected by belts L′ with other machinery for imparting a rotary motion to the saws I and I′ independently of the motion given to the main driving shaft M.

The machine may be adjusted to form staves of different widths. The stock to be removed from each side of the stave blank may be wider than the width of a single saw blade. To provide means for supporting the edges of the blanks properly while the saws are forming the stave and to provide proper means for removing the stock from the blank without tearing the edges of the stave or injuring the saws, constitute the most important features of my improved machine.

In order to properly support the edges of the blank A as they are acted on by the saws, the cam-shaped plates G—G are each formed with a smooth outer face at their circumference and the width of each of said faces varies from the point at which it is widest to the point which is narrowest which points are located 90 degrees from each other, circumferentially, so that as the blank is formed into a stave the narrowest portion of the stave would be supported by the narrowest portion of the cam face, and as the blank is advanced, the cam is rotated in proper ratio to present a gradually broadening surface to support the gradually widening surface of the stave until the middle of the stave contacts with and passes over the widest face of the cam when the reverse movement takes place and the face of the cam gradually narrows at the point of support as the stave is being completed. To accomplish this function properly the stave blank is cut to a definite length which length corresponds to one half the distance around the circumference of the cam so that at each revolution of the cam, two stave blanks are formed into staves and to effect this, the cams are driven by the sprocket chain carrier D, the cams being mounted on and fastened to the sleeve N by set screws O—O and in adjustable relation thereto both laterally and circumferentially, the sleeve N being free to rotate on the sleeve P, through which the shaft Q extends at each end, the ends of the shaft Q resting in the frame R, and the nuts R′ serving to clamp said frame against the ends of the sleeve P. The chain carrier engages the sprocket wheel G′ to rotate same, and the chain in turn is driven from the main shaft M by a chain of gears S, S′ and S^2, the last of which is mounted on the shaft E^2 and drives the same.

Mounted on the main shaft M are cams T—T respectively, the faces of which press against friction rollers U—U respectively, which rollers are fastened to the outer ends of the castings K^2—K^2 (constituting slides for carrying the saws), to move said castings or slides toward each other in unison, said castings being mounted in guides W—W formed in or mounted in the standards F′—F′ respectively and springs *a*—*a* to move the castings apart, which are interposed between the opposite ends of said castings and brackets *b*—*b* respectively, which brackets are fastened to the standards, as shown. The main shaft is driven by the belt *c*.

Mounted on the main shaft M is a casting *d* provided with two oppositely extending arms of the same length and each carrying a roller *e* which, as the shaft M is rotated, contacts with and depresses one end of a lever *f* which lever is fulcrumed at *f*′ and connected to the frame R, and the opposite end of the lever is connected to an upwardly extending rod *g* which in turn is connected to a lever which operates the rod *g*′ which in turn carries the arms *h*—*h* which drive the slides B^2—B^2 to position the stave blanks on the carrier D.

Supported on the frame R adjacent the rack B and extending to the cam-shaped plates G—G, is a guide I^2 for guiding and supporting the chain carrier D and the form of which is clearly shown in Fig. 4.

The presser-plate H is yieldingly supported on the frame R by bolts H^3 and springs H′, the bolts passing through the springs and flanges H^2 and secured to the flanges R′. A supporting guide roller *i* is carried by the frame R to support the carrier at this point of its travel. The frame R is provided with a slot *j* to permit the adjustment of the cam-shaped plates G—G relative to the cutting edges of the saws.

The operation of the machine is as follows: When the shaft M is rotated it drives the endless chain carrier D from the rack toward the saws. The casting *d* mounted on the shaft M is rotated and the roller *e* operates the lever *f* and rods *g*—*g*′ and arms *h*—*h* and slides B^2—B^2, which drive the lowest blank A against the guide-plate B′ to insure the blank being in proper alined relation to the carrier D. Then the knife edge D^2 engages the rear end of the lowermost blank A held in the stave rack B and pushes said blank out from underneath the pile thus carrying it forward and forcing it between the presser-plate (which presses the blank on to the spikes D′—D′) and above the narrowest portion of the face of the cam-shaped plates G—G at which in-

stant the two opposite saws having the greatest diameter begin to cut the extreme outer edges of the blank to remove the stock and after these saws have begun their work, and as the blank is moved forward, the next two opposite saws take up their work of removing the excessive stock from the edges of the blank, and so on, successively, the next pair of saws are brought into operation, the last or inner pair making the finishing cut, and by this arrangement, the excessive stock is removed without permitting any one of the saws from making a slot in the blank, and by each saw cutting away a portion of the blank equal to the thickness of the saw, the blank is not broken or torn in being formed. The saws are driven at a high rate of speed, to trim the side edges of the stave blank to a stave of the usual form, at the same time giving the side edges the necessary bevel, as indicated in Fig. 5. The cams T—T act to force the saws toward each other in proper timed relation, and the springs *a*—*a* act to force the saws farther apart as the cams permit, and this movement of the saws is synchronous with the movement of the cam-plates G—G to permit the edges of the blanks to be supported as the stave is formed, by the proper width of the face of the said cams being presented to the corresponding width of the stave, and proper relative position of the gangs of saws which are positioned by the cams T—T.

The cams T—T and plates G—G are made double throw, so that two staves are fed forward past the saws I and I′ by the endless carrier D, during one revolution of the shaft M on which the said cams are mounted. The spikes D′ and D′ and knife edge D^2 prevent any lateral movement of the stave blank as it is being formed and is an improvement over the type of lugs used in my former patent above referred to.

Having thus described my invention, I claim as new:

1. A stave-cutting machine having an endless carrier for the stave blank, circular saws arranged on opposite sides of said carrier, and inclined toward each other, means for moving said saws to and from each other, cam-shaped circular plates arranged adjacent said saws and carrier to support the edges of the blanks, and means for rotating said plates in unison with the movement of said saws to and from each other in the act of forming a stave.

2. A stave-cutting machine having an endless carrier for the stave blank, circular saws arranged on opposite sides of said carrier, and inclined toward each other, means for moving said saws to and from each other, cam-shaped circular plates arranged adjacent said saws and carrier to support the edges of the blanks, and means for rotating said plates through the instrumentality of said carrier.

3. A stave-cutting machine having an endless carrier for the stave blank, circular saws arranged on opposite sides of said carrier, and inclined toward each other, means for moving said saws to and from each other, cam-shaped circular plates arranged adjacent said saws and carrier to support the edges of the blanks, means for rotating said plates, and a presser-plate extending over said carrier adjacent thereto and between said saws for the purpose set forth.

4. A stave-cutting machine comprising two gangs of circular saws, of gradually increasing diameters, the saw of the smallest diameter being nearest the work, a carrier for feeding the stave blank between the saws, slides carrying the said saws, and movable toward and from each other to cause the saw to give the desired shape to the stave blank, and driving means for actuating said carrier and moving the slides in unison.

5. A stave-cutting machine comprising a carrier for the stave blank, a pair of circular saws on opposite sides of the said carrier, and mounted so as to rotate upon axes transverse to the direction of motion of the carrier, a pair of plates arranged adjacent the saws and having surfaces conforming to the shape of the finished stave, said plates being adapted to support the edges of each blank as it passes, said plates being actuated in unison with the blanks, and a presser-plate extending over said plates and between said saws and constructed to press the stave blank firmly on to said plates and carrier and rotatable means for automatically moving the saws to and from the blank as it is carried along by the carrier.

6. A stave-cutting machine comprising a carrier for the stave blank, a pair of circular saws on opposite sides of the said carrier, a single set of plates traveling with the blanks and arranged adjacent the saws to support both edges of each blank as it passes, a presser-plate extending over said plates and between said saws and constructed to press the stave blank firmly on to said plates and carrier, and means for moving said plates by said carrier.

7. A stave-cutting machine comprising a carrier for the stave blank, a pair of circular saws on opposite sides of the said carrier, circular rotating plates arranged adjacent the saws to support the edges of said blank, and a presser-plate extending over said plates and between said saws and constructed to press the stave blank firmly on to said plates and carrier.

8. A stave-cutting machine comprising a carrier for the stave blank, a pair of circular saws on opposite sides of the said carrier, circular rotating plates, each having faces

of varying widths, the variation conforming to the width of the stave which it is designed to support, substantially as set forth, and a presser plate extending over said circular plates and between said saws and constructed to press the stave blank firmly on to said circular plates and carrier.

9. A stave-cutting machine comprising a frame, a rack in which the stave blanks are stacked, an endless carrier supported by said frame, a pair of circular saws on opposite sides of the said carrier, and inclined toward each other, slides in which the arbors of the said saws are journaled, means for actuating the said carrier and the said slides, a pair of circular cam-shaped plates, one of which is located on each side of said carrier adjacent to said saws, means for rotating said plates by said carrier, and means for pressing a stave blank against said cam-shaped plates.

10. A stave-cutting machine comprising a frame, a rack in which the stave blanks are stacked, an endless carrier supported by said frame, a gang of circular saws, each gang comprising saws of different relative diameters, the saws adjacent the stave blank being of smallest diameter and each adjacent saw being of relatively greater diameter, for the purpose set forth, slides in which the arbors of the said saws are journaled, means for actuating said carrier and the said slides, a pair of circular cam-shaped plates, one of which is located on each side of said carrier adjacent to said saws, means for rotating said plates by said carrier, and means for pressing a stave blank against said cam-shaped plates.

11. In a stave cutting machine, stave feeding mechanism, and a jointing mechanism, said jointing mechanism comprising a rotary shaft and a plurality of saws of gradually increasing diameters mounted on said shaft, the saw of smallest diameter being nearest to the work, and means for moving said saws back and forth in a direction transverse to the movement of the work.

12. In a stave cutting machine, a blank carrier, a saw, a rotary support for the blank adjacent the saw, the development of the peripheral surface of said support conforming to the outline of the finished stave, said rotary support being driven at a peripheral speed corresponding to the speed of the stave blank carrier.

Signed at New York city, in the county of New York and State of New York this 12th day of May A. D. 1911.

ERNEST C. THORSCHMIDT.

Witnesses:
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