

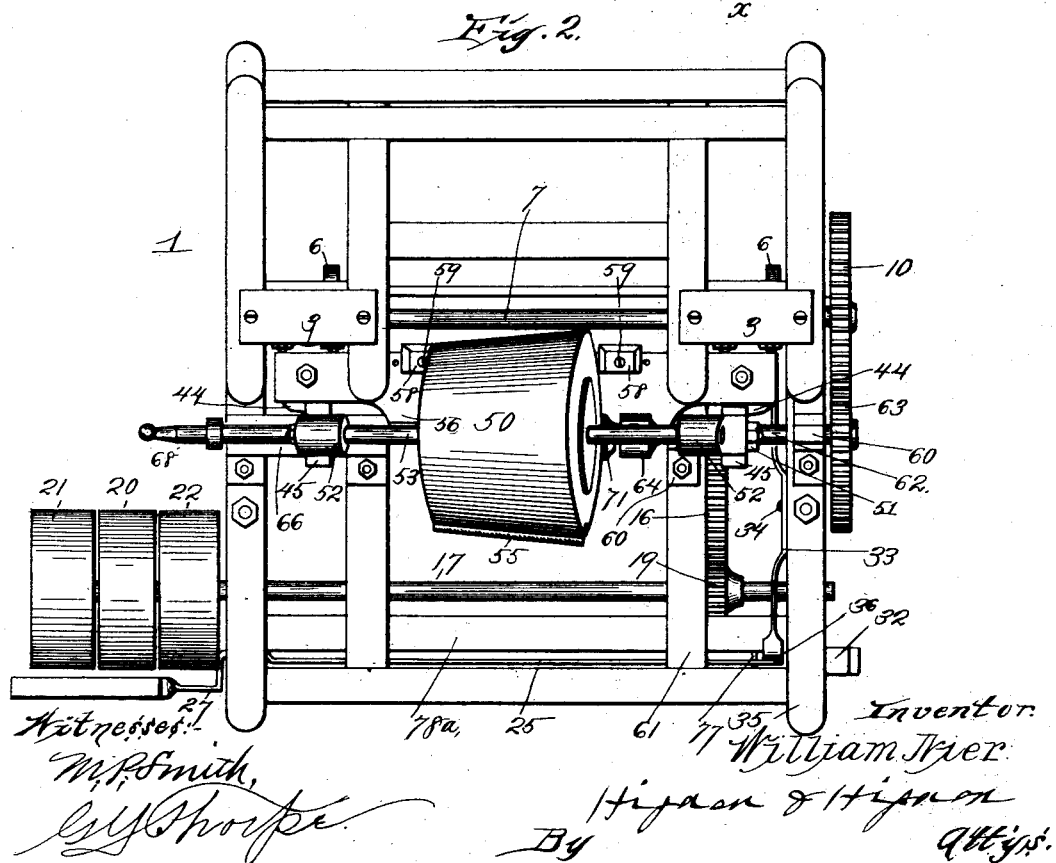
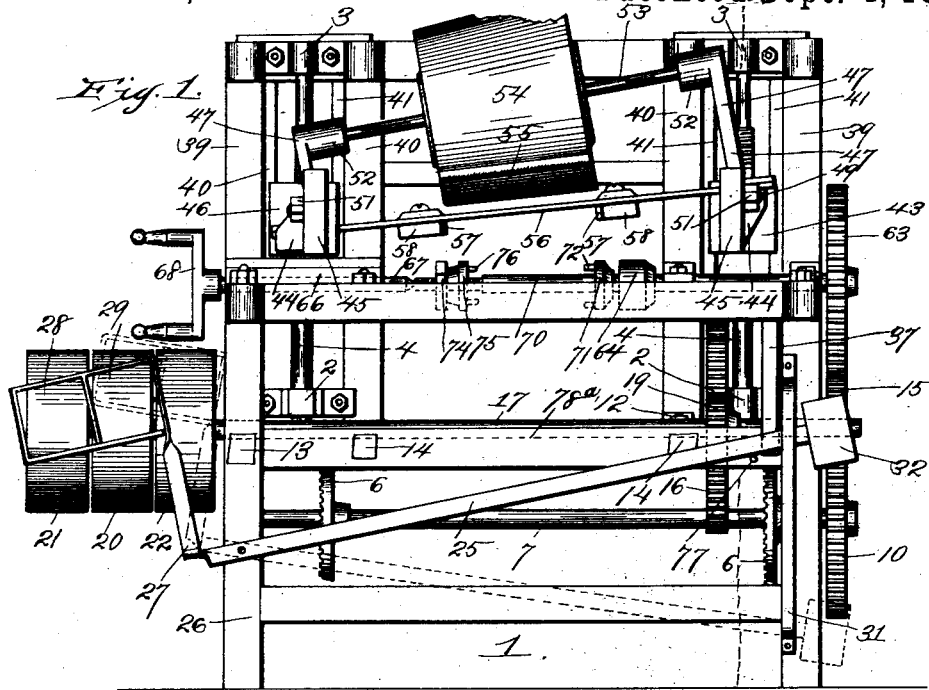
(No Model.)

3 Sheets—Sheet 1.

W. NIER.
STAVE CUTTING MACHINE.

No. 525,613.

Patented Sept. 4, 1894.



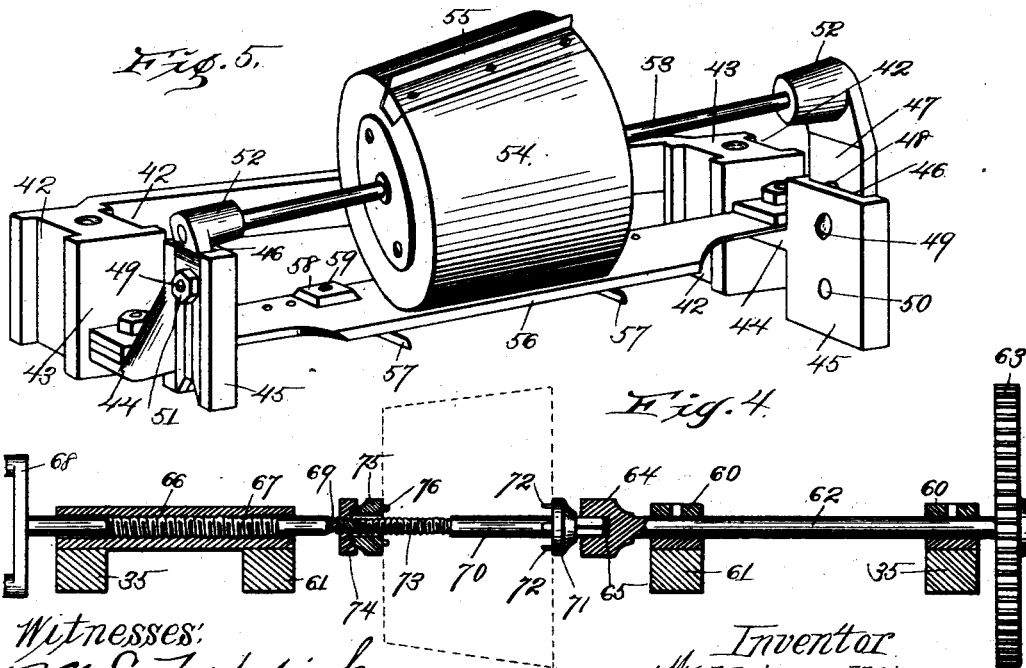
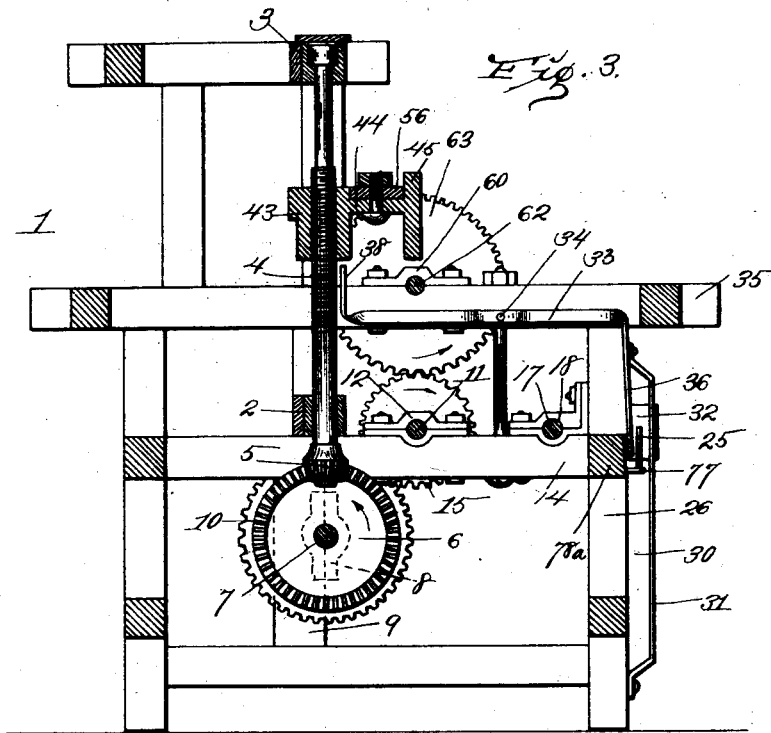
(No Model.)

3 Sheets—Sheet 2.

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Patented Sept. 4, 1894.



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Attys.

(No Model.)

3 Sheets—Sheet 3.

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Fig. 10.

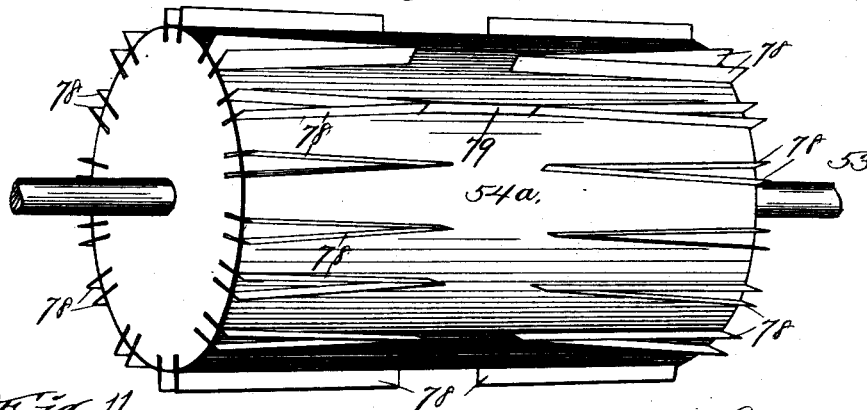


Fig. 11.

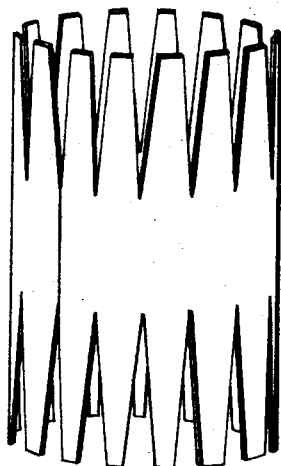


Fig. 9.

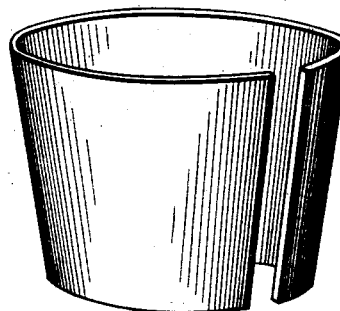


Fig. 8.

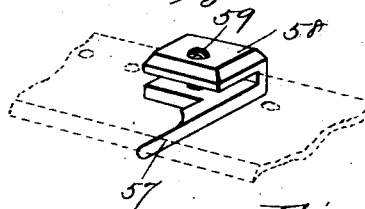


Fig. 6.

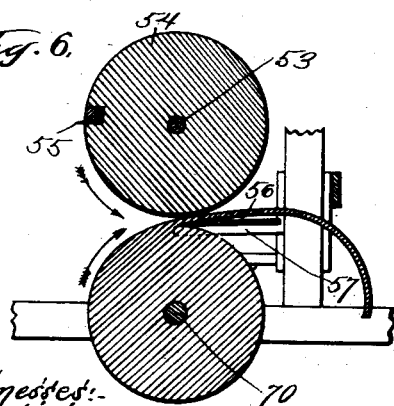
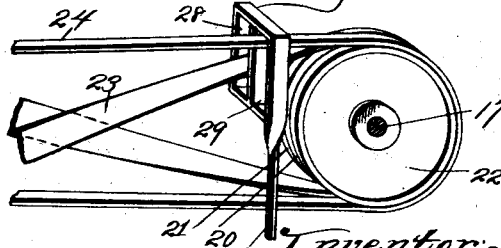


Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM NIER, OF KANSAS CITY, MISSOURI, ASSIGNOR OF ONE-HALF TO JAMES ARMSTRONG, J. J. ARMSTRONG, AND CHAS. M. CRAVENS, OF SAME PLACE.

STAVE-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 525,613, dated September 4, 1894.

Application filed October 17, 1893. Serial No. 488,426. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM NIER, of Kansas City, Jackson county, Missouri, have invented certain new and useful Improvements in Stave-Cutting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to continuous stave cutting machines, and has for its object to produce mechanism whereby the cutting knife and form-block will be automatically moved toward the block from which the stave is cut; means to reverse the operation automatically, so that the knife and form-block shall be moved away from the shaft carrying the block from which the staves are cut; means to cut the staves at the proper length, and a proper width; and finally to generally improve the construction of the above mentioned class of machinery.

With these objects in view, my invention consists in certain peculiar and novel features of construction and combinations of parts, as will be hereinafter described and claimed.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1, represents a front view of the machine. Fig. 2, is a plan view of the same. Fig. 3, is a vertical sectional view taken on the line $x-x$ of Fig. 1. Fig. 4, is a vertical sectional view of the mechanism which carries the block, from which the stave is cut. Fig. 5, is a detail perspective view of the slidable bearings, the cutting knife, and the form-block, carried by said bearings. Fig. 6, is a vertical sectional view showing the form-block, and the knife as cutting a stave from the block below. Fig. 7, is a detail perspective view showing the actuating belts, the pulleys, and a portion of the lever for transferring the belts from one pulley to another. Fig. 8, is a detail perspective view of one of the vertical or edge-cut blades, and showing a portion of the cutting knife in dotted lines. Fig. 9, is a detail perspective view of a continuous stave. Fig. 10, is a detail perspective view of a modified form of form-block. Fig. 11, is a detail perspective view of a continu-

ous stave which is cut from a block, by the cutting knife acting in conjunction with the form-block shown in Fig. 10.

In the said drawings, 1 designates the supporting frame-work of the machine, which may be constructed as shown or in any other suitable manner. Arranged vertically near each side of the frame-work, and journaled at its opposite ends in bearings 2 and 3, is a worm-shaft 4, and keyed or otherwise rigidly mounted upon the lower end of each worm-shaft, is a beveled pinion 5; these beveled pinions meshing with the similar bevel gear-wheels 6 mounted upon the horizontal and transversely extending shaft 7 which is journaled near its ends in bearings 8—8, secured to the vertical beams 9, of the framework. At one end of the framework, the shaft 7, projects and carries rigidly thereon, the gear wheel 10. A short shaft 11, is arranged parallel with the shaft 7, and is journaled near its ends in bearings 12, carried by the longitudinally extending and parallel beams 13 and 14 of the framework, and this shaft carries upon its outer end, the gear pinion 15, meshing with the gear wheel 10, and also carries near its inner end the larger gear wheel 16.

Arranged near the front end of the machine, and extending transversely thereof is a shaft 17, and this shaft is journaled in bearings 18, carried by the similar and parallel beams 13 of the framework, one of these beams being located at each side thereof. This shaft carries a gear-pinion 19 meshing with the gear-wheel 16, and upon one end a fast pulley 20 and a pair of loose pulleys 21 and 22; these pulleys being arranged adjacent to the opposite sides of the intermediate or fast pulley. When the machine is cutting a stave, as hereinafter explained, a cross belt 23 connects the outermost loose pulley 21, with a pulley upon the counter-shaft (not shown) from which motion is derived, and a belt 24, connects the fast pulley 20, to a pulley upon said counter-shaft. A lever 25, extending transversely of the machine, and pivoted to the front leg 26 of the framework, adjacent to the pulleys referred to, is bent upwardly at 27, outward of said pivotal point, and is also bent at its upper end to form a pair of rectangular openings, 28 and 29,

which equal or are greater in width than the belts 23 and 24, which respectively, pass through said openings as clearly shown in Fig. 7. The opposite end of this lever, which is adapted to operate in a vertical slot 30, 5 supported by the face of the other front supporting leg 26 of the framework, and a guide-strip 31, secured thereto, carries a weight 32, the object of which will be hereinafter explained. Extending from the front toward 10 the rear of the machine, is a tripping lever 33 which is pivoted about midway its length at 34 to the inner side of the horizontal beam 35 of the framework, which is above the weighted end of the lever 25. This lever 33 is bent at 36 vertically downward to form the arm 37 which is adapted to move or operate in a vertical plane at the front of the machine, and inward of the lever 25, for a purpose to be hereinafter explained, and the rear end of said lever is bent upwardly to form the vertical arm 38 adjacent to the worm shaft at the corresponding side of the machine. Secured to the inner side of the 25 standards 39 and 40 at each side of the machine, is a pair of guide rails or tracks 41, and these guide tracks are embraced by the vertically grooved sides 42, of the bearing block 43, which is operatively mounted upon its corresponding worm shaft, so as to move 30 upwardly and downwardly thereon, accordingly as the worm shaft is operated, and for a purpose to be presently explained.

Projecting forwardly from each bearing 35 block 43 is an arm 44, and this arm terminates at its free end in a vertical plate 45 which is grooved at 46 in its outer face to embrace the opposite edges of an adjustable plate 47; this plate 47 being slotted or notched at 48 40 to receive the clamping bolt 49 passing through one or another of a series of apertures or holes 50 formed through the vertical plate 45, and this bolt is engaged at its opposite end by a clamping nut 51, which bearing against the adjacent or outer face of the plate 47, secures it firmly at any point of adjustment desired. The plates 47, just described are provided upon their inner and opposite faces with the cylindrical hubs or enlargements 52, which provide a bearing for 50 the opposite ends of the form-block carrying the shaft 53. The form-block carried by this shaft is a counter-part of the continuous stave which is cut from the block below as hereinafter referred to, and may be of any preferred form, so as to cut a continuous stave to form a tub, a barrel, a bucket or any other article which is composed usually of a series of staves secured together by hoops or rings. 60 In the drawings I have shown two form-blocks, one shown at 54, being adapted to cut a continuous stave to form a tub, and the other shown at 54^a being adapted to cut a continuous stave to form a barrel.

65 It will be noticed by reference to Figs. 1 and 5 that the bearing plate 47 at one end is adjusted to a higher horizontal plane, than the

plate 46, and such plates 46 and 47 have their hubs 52 angularly projected to form proper bearings for the shaft 53 which is thereby 70 held in an inclined position. The form block 54, is provided with the blade or knife 55 which projects outwardly therefrom, a distance about equal to the thickness of the stave to be cut, and this knife extends from one side 75 of the form-block to the other. Arranged parallel with the adjacent face or periphery of the form-block 54, which is frustum-shape, and a little to the rear, is the cutting knife or blade 56, and the opposite ends of this 80 cutting knife or blade are bolted firmly upon the arms 44 of the bearing blocks. In order that the stave, in height, when formed into a tub, shall correspond to the distance between the side faces of the form-block 54, I provide 85 a pair of edge-cut blades or knives 57; these knives being arranged vertical, and below the blade or knife 56, so as to cut the stave to the proper length as hereinafter explained. These blades or knives 57 are carried by or 90 formed integral with bifurcated bearing plates or blocks 58, which embrace the upper and lower faces, and rear edge of, and are carried by the cutting knife 56, so as to be adjustable longitudinally thereon, and are 95 adapted to be firmly and rigidly secured at any desired point adjusted by means of screw-bolts 59 which pass through said bearing blocks or plates and also through one or another of a series of perforations or holes 100 formed in the cutting knife or blade 56.

Arranged vertically beneath the form-block carrying shaft 53, parallel with and above the short shaft 11, and journaled in bearings 60 upon the beams 35 and 61 of one end of the framework, is a power shaft 62. This shaft carries upon its outwardly projecting end a large gear wheel 63 which meshes with the gear pinion 15 of the power shaft 11. The opposite or inner end of the shaft 62 is 105 formed with an enlargement or head 64 provided with a squared socket 65 which is longitudinally aligned with the shaft 62.

Longitudinally aligned with the shaft 62, and operatively mounted in the elongated 115 bearing box 66, which is mounted and secured at its opposite ends upon the horizontal beams 35, and 61, of the opposite side of the framework, is an adjusting screw 67, which is provided with a handle or lever portion 68, at its 120 outer end, and is formed with a conical point 69, at its inner end which engages the conical recess in the end of the detachable shaft 70, the opposite square end of which, engages the correspondingly squared recess 65, of the 125 shaft 62. Adjacent to its squared end the shaft 70 is provided with a collar or enlargement 71 provided with inwardly projecting points or prongs 72. The shaft 70 is screw threaded for a suitable distance as shown at 130 73, and engaging said screw threaded portion is a nut 74, which fits against the outer or adjacent face of a collar or disk 75 loosely mounted upon the shaft 70 so as to be moved

thereon when the nut 74, is operated for a purpose to be presently explained, and this collar or disk 75, is provided with a series of inwardly projecting points or prongs 76.

5 When it is desired to set the machine in operation, the shaft 70 by withdrawing the adjusting screw 67 is removed from position, and the nut 74, and collar 75, are removed. A block which is provided with a central bore

10 or passage, is now slipped upon the shaft 70, the collar 75, is slipped upon the end of the shaft, and the nut 74, is screwed thereon so as to force the points or prongs 72, and 76, of the collars 71, and 75, respectively, to penetrate the adjacent faces of the block, as shown

15 in dotted lines, Fig. 4. This block is a counter-part or duplicate of the form-block 54, but may be of greater length if desired. The shaft 70 carrying the block, is now secured

20 again in position and is supported by the screw 67, and shaft 62. The lever 25 now, should it be down, is operated to the position shown in Fig. 1, and is supported thereat by the pin 77, projecting outwardly from the face

25 of the horizontal and transversely extending beam 78^a of the framework, and against the outer face of the depending arm 37 of the lever 33. By thus operating the shaft 25, the belts 23, and 24, respectively, are shifted onto the pulleys 28, and 29, respectively, and immediately

30 this takes place motion is imparted to the fast-pulley from the counter-shaft through the medium of the belt 24, and is in turn communicated from the gear pinion 19, to the

35 gear wheel 16, and from the pinion 15, to the gear wheel 63, which rotates the block carried by the shaft 70 in the direction of the arrow, Fig. 6, and this block through its frictional connection with the form-block 54, which is

40 adjusted downward upon the block carried by the shaft 70, causes said form-block also to revolve at a corresponding speed and in the direction of its arrow Fig. 6. Simultaneously with the operation of the gear wheel

45 63, the gear pinion 15, also rotates the gear wheel 10, of shaft 7, and the beveled gears 6, mounted upon said shaft, and meshing with the beveled pinions 5, cause the worm-shafts 4, to operate, and move the slide-bearings 43,

50 downward. This downward movement of the bearing blocks 43, carries the cutting knife or plate and the form-block downward at a speed proportionate to the decreasing size of the block carried by the shaft 70, because as

55 soon as the blocks begin to rotate, the knife 56 starts to cut a continuous stave from the said block, as shown clearly in Fig. 6, and once in every revolution of the form-block 54, the knife 55 carried thereby severs the stave

60 or shaving from the lower block, which passes to the rear and is caught and conveyed in any suitable manner from the machine. After the bearing blocks have moved downward a sufficient distance, and the block from

65 which the shavings or staves have been cut is too small for further service, one of said bearing boxes comes in contact with the up-

wardly projecting arm 38, and depresses the rear end of the projecting lever 33, and this movement causes the front end of said lever

70 to move vertically upward and outward and to trip or throw the lever 25, from its supporting pin 77. Immediately this is accomplished, the lever 25 by gravity is pivotally operated, and the belts 24, and 23, are shifted

75 respectively, upon the pulleys 20, and 22, and the cross-belt immediately causes the fast-pulley 20 to reverse its movement, and therefore the movement of the intermediate mechanism, so that the movement of the worm-

80 shafts shall be reversed, and the bearing boxes 43 moved upward. While the boxes are moved upward, a new block is placed in position upon the shaft 70, and as soon as the bearing boxes 43, reach the required position, the lever 25 is again operated to shift

85 the belts 24, and 23, upon the pulleys 20, and 21, respectively, as before. It will be seen that by reason of the edge-cut knives 57, that the continuous stave will be of the proper

90 width, whether the block is longer than the form-block or not.

When it is desired to cut a continuous stave to form a barrel, the bearing plates 47, are adjusted so as to horizontally support the

95 shaft 53 carrying the form-block 54^a, and the knife 56, is also arranged horizontally, parallel therewith, and at the desired distance to form a stave of the proper thickness, from the periphery of the block 54^a. The form-

100 block 54^a being a perfect cylinder in form, a continuous stave, which is rectangular in the blank, will be formed, and in order to form a barrel of the usual tapering form at each end, it is necessary to cut a series of V-shaped

105 notches in the longitudinal margins of said stave, so that the ends may be compressed as will be readily understood, and to accomplish this the form block 54^a is provided with

110 two series of blades 78; these blades 78 being arranged in pairs which converge to a point from the outer margins of the form-block toward its center, as shown clearly in Fig. 10. In order to sever the continuous strip at the

115 proper length, a longitudinally extending plate or knife 79, connects the inner ends of a pair of the oppositely disposed blades or knives 78.

From the above description, it will be seen that I have provided a continuous stave cutting machine, which is comparatively simple

120 and inexpensive of construction, positive and reliable in operation, and which is under the perfect control of an operator.

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

125

1. A continuous stave cutting machine comprising a supporting frame, a revolving head block shaft and head block journaled thereon,

130 a reciprocating carrier, a rotary form block having radially projecting cutters and adjustably held on such carrier, a worm shaft operating mechanism connected with the carrier,

held for reverse revolutions, and automatic devices for shifting the screw operating mechanism operated by the carrier at the end of its innermost movement all substantially as shown and for the purposes described.

2. A continuous stave cutting machine, comprising a suitable framework, a shaft mounted thereon having a squared socket, an adjusting screw also mounted upon the framework, a detachable shaft having a squared end engaging the socket of the first mentioned shaft, and finding a bearing upon the inner end of the adjusting screw, a pronged disk or collar rigidly mounted upon said shaft, and a slidable pronged disk or collar also mounted upon said shaft, and a clamping nut engaging the shaft at the outer side of said collar, in combination with a block adapted to be mounted upon said shaft, and rigidly clamped between the pronged disks or collars, and means to operate said block carrying shaft, in combination with movable bearings, a knife carried thereby, a form-block also carried by said bearings, and a knife carried by said form block, substantially as set forth.

3. A stave cutting machine comprising a main frame, a head block journaled thereon, a carriage held to reciprocate on the frame to

and from the head block mechanism substantially as shown for reciprocating such carriage, and a rotary former or cutter block, mounted on the carrier, and independently adjustable to or from the head block all substantially as and for the purposes shown and described.

4. In a stave cutting machine essentially as described, the combination with worm shaft operating devices, of a reciprocating carrier, having end boxes having internally threaded screw ways, forwardly projecting arms 44, a fixed or stave cutting blade held on such arms, trimmer blades adjustably held on fixed blade, said arms 44 terminating in guide members 45, the boxes 52 adjustably held in such guides the shaft 53 journaled in the boxes 52 and the former or cutter block held on the shaft 53 to turn therewith all substantially as shown and for the purposes specified.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM NIER.

Witnesses:

MAUD FITZPATRICK,
G. Y. THORPE.