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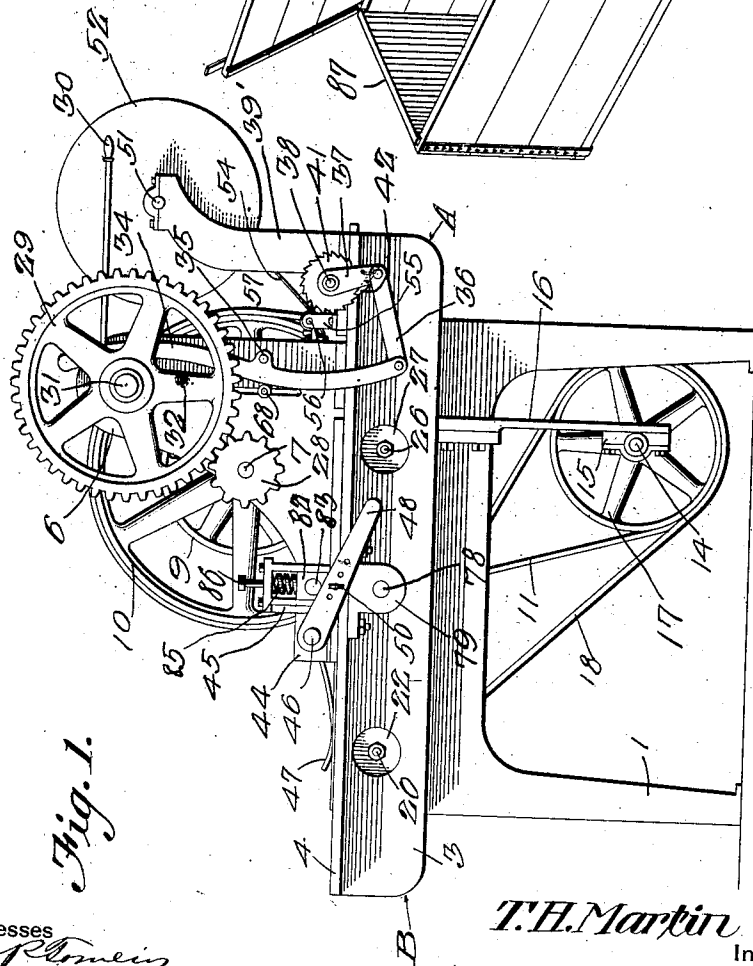
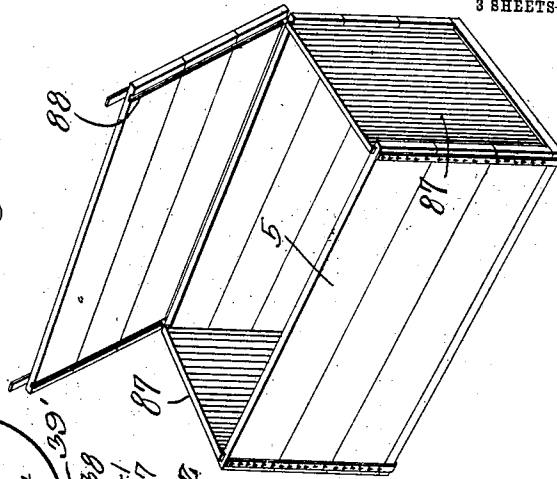


Fig. 1.

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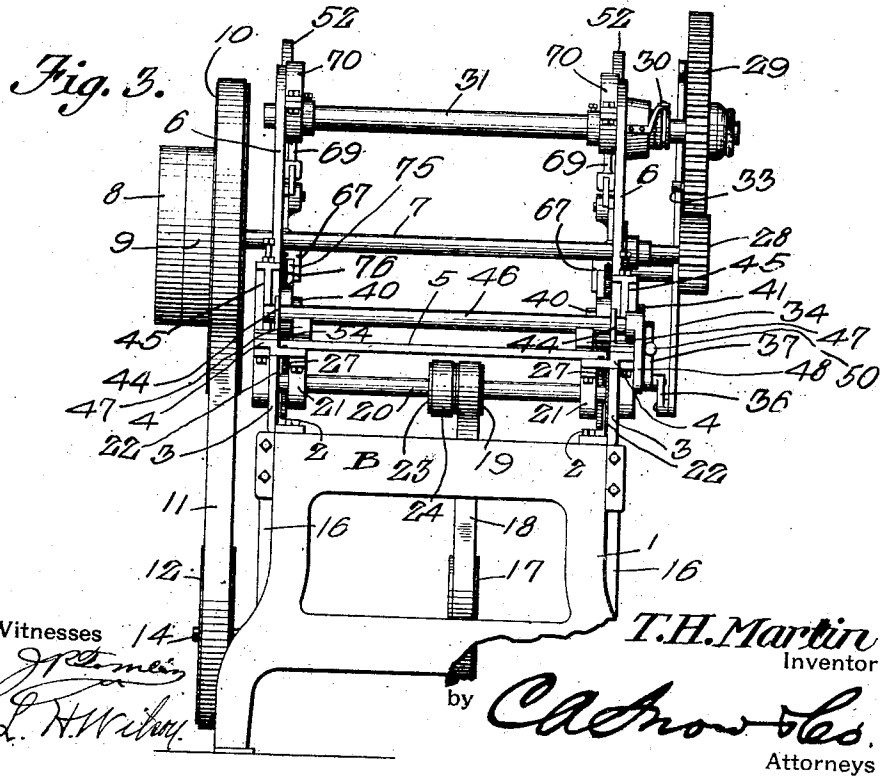
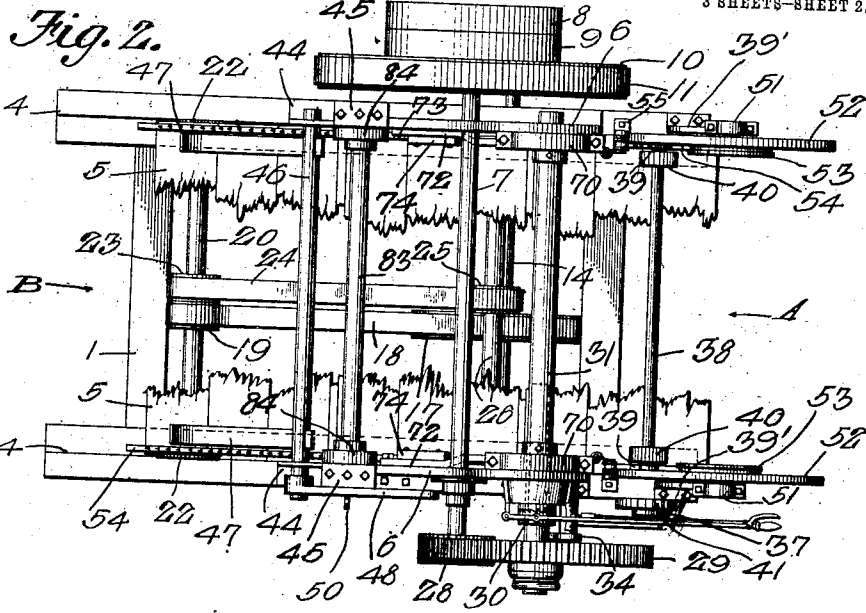
by

Chenoweth
Attorneys

1,044,066.

Patented Nov. 12, 1912.

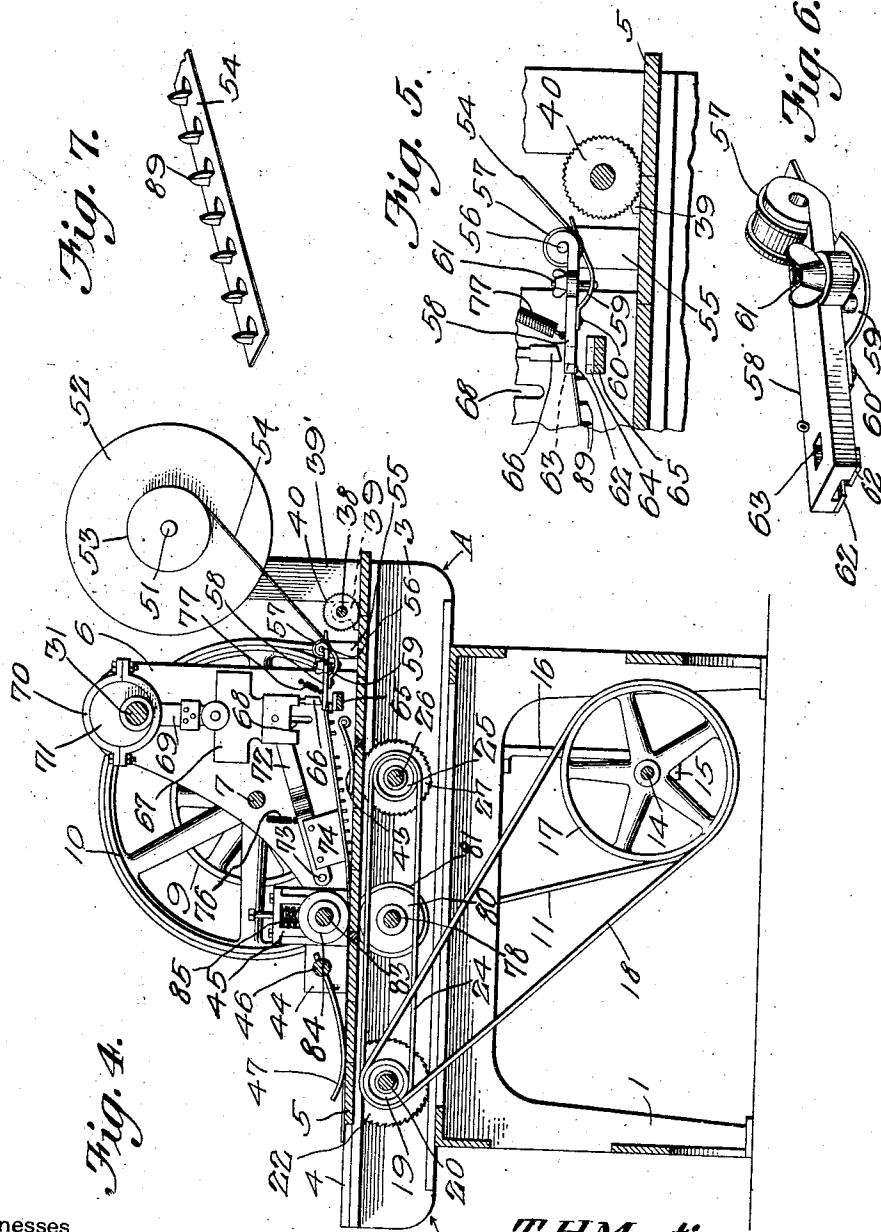
3 SHEETS-SHEET 2.



1,044,066.

Patented Nov. 12, 1912.

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Witnesses

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UNITED STATES PATENT OFFICE.

THOMAS H. MARTIN, OF TACOMA, WASHINGTON.

BOX-MAKING MACHINE.

1,044,066.

Specification of Letters Patent.

Patented Nov. 12, 1912.

Application filed June 21, 1911. Serial No. 634,453.

To all whom it may concern:

Be it known that I, THOMAS H. MARTIN, a citizen of the United States, residing at Tacoma, in the county of Pierce and State of Washington, have invented a new and useful Box-Making Machine, of which the following is a specification.

The device forming the subject matter of this application, is a machine for binding together, with spaced bands, the side-forming members of a box, or other receptacle, the finished material coming from the machine in the form of a flat blank, which latter is disposed in tubular form, to form the sides of a box, the staves of a barrel or the like.

Presupposing, without prejudice, that the machine is to be employed for the fashioning of a box, the side-forming blanks or shooks are fed by hand or otherwise, into one end of the machine. Mechanism is provided for feeding the shooks through the machine, and as they are fed through the machine, their ends are trimmed off, so that they are all of equal length. During the progress of the shooks through the machine, they are grooved in their lower faces, transversely, and adjacent their ends, to receive the ends of the finished box. While the shooks are passing through the machine, spaced bands are applied to the upper faces of the shooks, adjacent the ends thereof. Tongues are struck from these bands, the tongues are pressed through the shooks, and clenched upon the shooks.

The invention aims to provide mechanism for holding the bands which are to be applied to the shooks, mechanism for striking tongues from the shooks, means for embedding the tongues in the shooks, and for clenching them upon the shooks, and structures adapted to guide the bands and the shooks through the machine.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings,—Figure 1 shows the invention in side elevation; Fig. 2 is a top

plan, parts being removed for the sake of clearness in illustration; Fig. 3 is an end elevation; Fig. 4 is a vertical longitudinal section; Fig. 5 is a sectional detail enlarged from Fig. 4; Fig. 6 is a perspective of one of the guide arms for the binding strips which unite the shooks; and Fig. 7 is a fragmental perspective of one of the completed binding bands whereby the shooks are connected. Fig. 8 is a perspective of the completed box.

In the following description, that end of the structure to which the reference character A is applied, will be considered the forward end of the machine, that end of the structure to which the reference character B is applied, being considered as the rear end of the machine.

In carrying out the invention there is provided a supporting structure, including a base 1, of any desired form. Secured as denoted by the numeral 2 in Fig. 3, to the upper face of the base 1, are side members 3, which may be connected with the base 1 adjustably, so as to be spaced apart by different distances. The side members 3 carry, upon their upper edges, guides 4, extended the full length of the machine, from the front end of the machine to the rear end thereof. The shooks which are to form the box blanks, rest upon these guides 4, the shooks being denoted by the numeral 5. The shooks 5 are fed into the machine, upon the guides 4, adjacent the forward end of the machine, mechanism being provided for advancing the shooks along the guides 4, from the forward end of the machine toward the rear end thereof.

Carried by the guide members 4, or secured rigidly, in any other desired manner to the supporting structure, are spaced, upright standards 6, located relatively near to the forward end of the machine. Journaled for rotation in the standards 6, and extended transversely of the machine, is a shaft 7, carrying at one end, and beyond one of the standards 6, pulleys 8 and 9, one of which is loose, and the other of which is fixed. The pulleys 8 and 9 are to be considered as typical of any suitable means for rotating the shaft 7. The shaft 7 carries also, a pulley 10, about which is trained a belt 11, passed about a pulley 12, secured to one end of a shaft 14, journaled for rotation in bearings 15, carried by the lower

ends of depending, frame-supported hangers 16. Secured to the shaft 14, adjacent the longitudinal center of the base 1, is a pulley 17, about which is trained a belt 18, passed about a superposed pulley 19, carried by a transverse shaft 20, journaled for rotation in bearings 21, preferably secured to the guide members 4. Secured to the shaft 20, adjacent the side members 3, and operating through slots in the guides 4, are circular trimming saws 22. Secured to the shaft 20 is a pulley 23, about which is trained a belt 24, passed about a pulley 25, carried by a shaft 26, disposed transversely of the machine and supported for rotation similarly to the shaft 20. Secured to the shaft 26, adjacent the sides of the machine, are circular grooving saws 27. The grooving saws 27 are located nearer together than are the trimming saws 22, the grooving saws being located between the planes in which the trimming saws are located.

When the shaft 7 is rotated, the pulley 10, through the instrumentality of the belt 11 and the pulley 12, will rotate the shaft 14, the shaft 14, through the medium of the pulley 17 and the belt 18, causing a rotation of the shaft 20, and a consequent rotation of the trimming saws 22. The shaft 20, through the cooperation of the pulley 23, the belt 24, and the pulley 25, will cause a rotation of the shaft 26, the shaft 26 carrying with it, in its rotation, the grooving saws 27.

From the foregoing, it will be seen that if the box shooks 5 are placed upon the guides 4, adjacent the forward end of the machine, and fed through the machine toward the rear end of the machine, the saws 27 will groove the lower faces of the shooks 5, transversely, and adjacent the ends of the shooks. When the shooks 5 encounter the trimming saws 22, the ends of the shooks will be cut off, the shooks emerging from the machine, in uniform lengths.

The mechanism whereby the shooks 5 are fed into the machine will now be described. The shaft 7 carries, adjacent one end, a pinion 28, meshing into a larger pinion 29, operatively connected by means of clutch mechanism 30 of any desired construction, with a shaft 31, journaled for rotation in the standards 6, above and in front of the shaft 7. Journaled as shown at 32 (see Fig. 1) upon the pinion 29, is an inwardly projecting roller 33 (see Fig. 3), the roller 33 being adapted to bear against the edge of an upright lever 34, fulcrumed intermediate its ends at 35 (see Fig. 1) upon one of the standards 6. To the lower end of the lever 34 is pivoted a forwardly extended link 36, the forward end of which is pivoted to a depending arm 37, loose upon a shaft 38, disposed transversely of the machine and preferably journaled for rotation in standards

39, secured to the supporting structure, adjacent the forward end of the machine. Secured to the shaft 38, and located between the standards 39, are toothed, friction wheels 40, adapted to engage the shooks 5, to feed the same into the machine. The shaft 38 carries, adjacent one end, a ratchet wheel 41, adapted to be engaged by a pawl 42 (see Fig. 1), the pawl 42 being pivoted upon the arm 37.

The operation of the feeding mechanism, as hereinbefore described, is as follows: When the shaft 7 is rotated, the intermeshing pinions 28 and 29 will cause a rotation of the shaft 31, the roller 33 upon the pinion 29 engaging the lever 34 and tilting the same. When the lever 34 is tilted, the link 36 will tilt the arm 37, the pawl 42 engaging the ratchet wheel 41, and causing a rotation of the shaft 38, whereby the toothed friction wheels 40 will be rotated, urging the shooks 5 into the machine. For a purpose to be described hereinafter, it is necessary that an intermittent rotation be imparted to the friction wheels 40, and it will be seen that the engagement between the lever 34 and the pinion 29 is such that this intermittent rotation of the friction wheels 40 will be secured.

Means are provided whereby the box shooks 5 are held down upon the guides 4, for engagement with the trimming saws 22 and with the grooving saws 27. To effect these ends, spring fingers 43, one of which appears in Fig. 4, are secured adjacent their forward ends to the standards 6, the rear ends of the fingers 43 holding the shooks 5 down upon the guides, above the grooving saws 27. Journaled for rotation in rearward extensions 44 of guides 45 (having functions to be described hereinafter), is a transverse shaft 46, having rearwardly extended spring fingers 47, adapted to press the shooks 5 downwardly upon the guides 4, in the vicinity of the trimming saws 22. In order to adjust the tension with which the fingers 47 bear upon the shooks 5, an arm 48 is secured to the shaft 46, adjacent one end thereof. In this arm 48 there are a series of openings, in which may be mounted successively, a pin 50, which, entering suitable openings in the supporting structure, serve to hold the shaft 46 against rotation.

Mechanism is provided for holding the bands wherewith the box shooks 5 are connected, and for guiding these bands through the machine. This mechanism includes a pair of rotatable reels 52, journaled as at 51, upon the standards 39', adjacent the upper ends of the standards. The reels are provided with outstanding, grooved treads 53, upon which are wound bands 54, which ultimately unite the box shooks 5. Fixed to and rising from the supporting structure, adja-

cent the forward end of the machine, are standards 55 (see particularly Fig. 5), upon which are journaled as at 56, grooved wheels 57, located in common vertical planes with the treads 53 of the reels 52. Spanning the wheels 57, and pivoted upon the journaling elements 56 of the wheels 57, are rearwardly extended guide arms 58. Springs 59, extended longitudinally of the guide arms 58, are secured at their rear ends, as shown at 60, to the guide arms, the forward ends and the springs 59 bearing against the treads of the wheels 57. The tension of the springs 59 is adjusted by means of nut and bolt connections 61 between the intermediate portions of the springs 59 and the guide arms 58. The guide arms 58 are preferably channel members, carrying upon their depending flanges, inwardly projecting plates 62. The bands 54 are extended along the treads of the wheels 57, and through the guide arms 58, and the springs 59 act as friction brakes, bearing against the bands 54, to limit the movement of these bands from the forward end of the machine toward the rear end thereof. In the guide arms 58 there are openings 63, having functions which will be described hereinafter.

A mechanism is provided for punching tongues from the bands 54. This punching mechanism preferably includes dies 64, carried by a frame-supported, transverse bar 65. The dies 64 are adapted to receive punches 66, carried by vertically reciprocating plungers 67, slidably connected, in any desired manner, as indicated at 68, with the standards 6. Pivoted to the upper ends of the plungers 67, are pitmen 69, connected with straps 70, embracing eccentrics 71, secured to the shaft 31.

At this point it may be explained that when the shooks 5 are urged through the machine by the friction wheels 40, the shooks 5 will carry with them, adjacent their ends, the bands 54, the bands 54 moving longitudinally along the lower faces of the guide arms 58, under the wheels 57, against which they are thrust by the springs 59, the bands 54 being reeled off the rotatable members 52. When the shaft 31 is rotated, the pitmen 69 will elevate and lower the plungers 67, causing the punches 66 to move through the openings 63 in the guide arms 58, the punches entering the dies 64. The bands 54 which are located between the punches 66 and the dies 64 will be engaged by the punches, the punches forming, in the bands 54, depending tongues 89. Obviously, the movement of the bands 54 must be stopped, while the punches 66 are passing through the bands, and it is for this purpose, that an intermittent motion is imparted to the friction wheels 40, as hereinbefore described. In order to lift the tongues which are formed in the bands 54, out of the dies 64,

springs 77 are united with the guide arms 58, and with the standards 6. These retractile springs 77 serve to elevate the free, rear ends of the guide arms 58, thereby raising the tongues which are formed upon the bands 54, out of the dies 64, and permitting each band to be advanced farther, so that another tongue may be punched therefrom.

A mechanism is provided for embedding the tongues 89 of the bands in the box shooks 5. This mechanism may be of any desired construction. Preferably however, it consists of presser bars 72, fulcrumed as shown at 73, upon the standards 6, the presser bars 72 carrying hammer heads 74, adapted to engage the bands 54, and to embed the tongues of the bands, initially, in the shooks 5. As denoted by the numeral 75, and as seen in Fig. 3, the forward ends of the presser bars 72 are engaged loosely with the plungers 67, so that when the plungers 67 descend, the forward ends of the presser bars 72 will be depressed, thrusting the hammer heads 74 against the bands 54, and embedding the tongues thereof in the box shooks 5. The elevation of the free, forward ends of the presser bars 72, is effected by means of retractile springs 76, the lower ends of which are connected with the presser bars, the upper ends of the springs being connected with the standards 6.

A mechanism is provided for embedding the tongues 89 finally in the box shooks 5, and for clenching the lower ends of the tongues, against the box shooks. This mechanism embraces a transverse shaft 78, journaled for rotation in bearings 79 (see Fig. 1), preferably carried by the side members 3. The shaft 78 carries spaced clenching wheels 80 having flanges 81, adapted to enter the grooves formed in the box shooks 5, by the grooving saws 27. Bearing blocks 82 are slidably mounted in the guides 45, these bearing blocks carrying for rotation, a shaft 83, carrying presser wheels 84, alined with the clencher wheels 80, and cooperating therewith. The wheels 84 and 80 are maintained in cooperation, through the medium of springs 85, located within the guides 45, and bearing against the blocks 82, the tension of the springs 85 being adjusted by means of screws 86 threaded into the upper portions of the guides 45. The bands 54 will be engaged by the presser wheels 84, and be thrust downwardly upon the shooks 5, the tongues which are upon the bands being thrust through the shooks, whereupon the clencher wheels 80, will engage the protruding ends of the tongues, and bend the same over upon the shooks 5.

A completed box, the sides of which are connected by the machine hereinbefore described, appears in Fig. 8. Referring to Fig. 8, it will be understood that the grooving saws 27 serve to form the grooves 88 in

the shooks 5, into which grooves, the end walls 87 of the box are thrust. Noting Fig. 7, the bands 54 are shown as provided with the finished tongues 89 which are formed by the action of the punch 66. These tongues 89 are preferably concaved slightly, as shown.

The operation of the device has been dealt with step by step, in connection with the several constituent mechanisms of the machine. A brief résumé of the operation of the structure may, with profit, however, be given at this point. In practical operation, the box shooks 5 are placed upon the guides 4, adjacent the forward end of the machine, the shooks being spaced apart, as may be necessary to permit the ultimate folding of the blank into the form shown in Fig. 8. The friction wheels 40 will urge the shooks 5 forwardly, the grooves 88 being formed by the grooving saws 27, and the ends of the shooks 5 being trimmed off by the trimming saws 22. The shooks 5, when advanced, as hereinbefore described, will carry with them the bands 54, the punches 66 striking the tongues 89 from the bands 54, the bands 54 ultimately coming into contact with the shooks 5, and the hammers 74 setting the tongues 89 initially, into the shooks 5. Subsequently, the shooks 5 will pass between the presser wheels 84 and the clencher wheels 80, whereupon the tongues 89 will be thrust entirely through the shooks 5, and be clenched over, as hereinbefore set forth.

Having thus described the invention, what is claimed is:—

1. In a metal-bound-box-blank machine, a supporting structure; a punch movably mounted upon the supporting structure and operating to form tongues in the band; mechanism for advancing the box material along the supporting structure; percussive means for driving the tongues into the box material; and means for clenched the tongues upon the box material after the driving operation has been completed.

2. In a metal-bound-box-blank machine, a supporting structure; a punching member movably mounted upon the supporting structure and operating to form tongues in the band; mechanism for advancing the box material along the supporting structure; and a tiltable element connected directly with the punching member and operable thereby to drive the tongues into the box material.

3. In a metal-bound-box-blank machine, a supporting structure; a punch mounted upon the supporting structure for right line movement and operating to form tongues in the band; a rotatable member mounted upon the supporting structure, and engaging the box material to advance the same; means for reciprocating the punch; means for imparting step by step movement to the

rotatable member; and means independent of the rotatable member for embedding the tongues in the box material.

4. In a metal-bound-box-blank machine, a revoluble band holder; a pivotally mounted guide arm along which the band passes; a fixed die; a reciprocating punch cooperating with the die to form a tongue in the band; means for elevating the guide arm, to lift the tongue out of the die; means for embedding the tongue in the box material; and step by step mechanism for advancing the box material.

5. In a metal-bound-box-blank machine, a supporting structure; a guide arm pivoted thereon along which a band is adapted to pass; a punch mounted for reciprocation upon the supporting structure and adapted to fashion a tongue in the band; a die fixed upon the supporting structure and cooperating with the punch; means for elevating the guide arm, to lift the tongue free from the die; means for advancing the box material along the supporting structure; and means for embedding the tongue in the box material.

6. In a metal-bound-box-blank machine, a supporting structure; a guide arm pivoted thereto; a wheel having a common pivotal mounting with the guide arm, the wheel and the guide arm being adapted to receive a band; spring means on the arm for pressing the band against the wheel; a die fixed to the supporting structure; a punch mounted for reciprocation upon the supporting structure and cooperating with the die to form a tongue in the band; means for operating the guide arm to lift the tongue free from the die; means for advancing the box material along the supporting structure; and means for embedding the tongue in the box material.

7. In a metal-bound-box-blank machine, a supporting structure; a guide arm pivoted thereto and along which a band is adapted to pass; a punch mounted for reciprocation upon the supporting structure and adapted to form a tongue in the band; a die with which the punch cooperates; means for actuating the guide arm to lift the tongue free from the die; means for advancing the box material along the supporting structure; and spaced rollers journaled upon the supporting structure between which rollers the box material and the band is adapted to pass to embed the tongue in the box material.

8. In a metal-bound-box-blank machine, a supporting structure; a shaft journaled for rotation thereon and provided with means for advancing the box material along the supporting structure; pawl and ratchet mechanism for operating the shaft; a lever fulcrumed intermediate its ends upon the supporting structure and operatively connected at one end with the pawl and ratchet

mechanism; a second shaft journaled for rotation in the supporting structure and having an eccentric element engaging the other end of the lever to actuate the same; means for applying a band to the box material; a punch operatively connected with the second shaft and adapted to fashion a tongue in the band; and means for embedding the tongue in the box material.

9. In a metal-bound-box-blank machine, a supporting structure; a guide arm pivoted thereto and along which a band is adapted to pass; a fixed die upon the supporting structure; a punch-carrying member mounted for reciprocation upon the supporting structure and cooperating with the die to form a tongue in the band; means for lifting the guide arm to elevate the tongue out of the die; a movable member pivotally connected with the supporting structure and operatively connected with the punch-carrying member, said movable member being adapted to engage the band to force the tongue thereof into the box material; and means for advancing the box material upon the supporting structure.

10. In a metal-bound-box-blank machine, a supporting structure; means for advancing the box material along the supporting structure; a band-holder upon the supporting structure; a punch mounted for reciprocation upon the supporting structure and adapted to fashion a tongue in the band which the holder carries; a tiltable member carried by the supporting structure and operatively connected with the punch, said tiltable member engaging the band to set the tongue initially in the box material; and cooperating rollers upon the supporting structure between which the box material and the band ultimately pass, to effect a final seating of the tongue in the box material.

11. A metal-bound-box-blank machine comprising a supporting structure; means for advancing the box material along the supporting structure; a band holder upon the supporting structure; a pivotally mounted guide arm upon the supporting structure along which the band is adapted to pass; a die carried by the supporting structure; a punch mounted for reciprocation upon the supporting structure and cooperating with the die to form a tongue in the band; means for elevating the guide arm to lift the tongue out of the die; a tiltable member mounted upon the supporting structure and operable by the punch to effect an initial embedding of the tongue in the box material; and cooperating rollers between which the box material and the band pass to effect an ultimate seating of the tongue in the box material.

12. In a metal-bound-box-blank machine, a supporting structure; a guide arm pivoted thereto; a wheel journaled for rotation upon the guide arm, the wheel and the guide arm

being adapted to receive a band; spring means for pressing the band against the wheel; a die fixed to the supporting structure; a punch mounted for reciprocation upon the supporting structure and cooperating with the die to form a tongue in the band; means for operating the guide arm to lift the tongue free from the die; means for advancing the box material along the supporting structure; and means for embedding the tongue in the box material.

13. In a metal-bound-box-blank machine, a supporting structure; a guide arm pivoted thereto and along which a band is adapted to pass; a punch mounted for reciprocation upon the supporting structure and adapted to form a tongue in the band; a die with which the punch cooperates; means for actuating the guide arm to lift the tongue free from the die; means for advancing the box material along the supporting structure; and spaced members upon the supporting structure between which the box material and the band are adapted to pass to embed the tongue in the box material.

14. In a metal-bound-box-blank machine, a supporting structure; a shaft journaled for rotation thereon and provided with means for advancing the box material along the supporting structure; step by step mechanism for operating the shaft; a lever fulcrumed upon the supporting structure and operatively connected with the step by step mechanism; a second shaft journaled for rotation in the supporting structure and having an eccentric element engaged with the lever to actuate the same; means for applying a band to the box material; a punch operatively connected with the second shaft to fashion a tongue in the band; and means for embedding the tongue in the box material.

15. In a metal-bound-box-blank machine, a supporting structure; means for advancing the box material along the supporting structure; a band holder upon the supporting structure; a punch mounted for reciprocation upon the supporting structure and adapted to fashion a tongue in the band which the holder carries; a tiltable member carried by the supporting structure and operatively connected with the punch, said tiltable member engaging the band to set the tongue initially in the box material; and cooperating elements upon the supporting structure between which the box material and the band ultimately pass, to effect a final seating of the tongue in the box material.

16. A metal-bound-box-blank machine comprising a supporting structure; means for advancing the box material along the supporting structure; a band holder upon the supporting structure; a pivotally mounted guide arm upon the supporting structure along which the band is adapted to pass; a die carried by the supporting structure; a

punch mounted for reciprocation upon the supporting structure and cooperating with the die to form a tongue in the band; means for elevating the guide arm to lift the tongue
5 out of the die; a tiltable member mounted upon the supporting structure and operable by the punch to effect an initial embedding of the tongue in the box material; and co-
operating members between which the box
10 material and the band pass to effect an ulti-

mate seating of the tongue in the box material.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

THOMAS H. MARTIN.

Witnesses:

GEO. B. FRYE,

F. J. CARLYLE.