March 9, 1926. 1,575,741

I. A. DELINE

APPARATUS FOR FORMING AND CLAMPING PAPER BOXES IN THE PROCESS OF MANUFACTURE

Filed Oct. 17, 1925 4 Sheets-Sheet 1

Fig. 1.

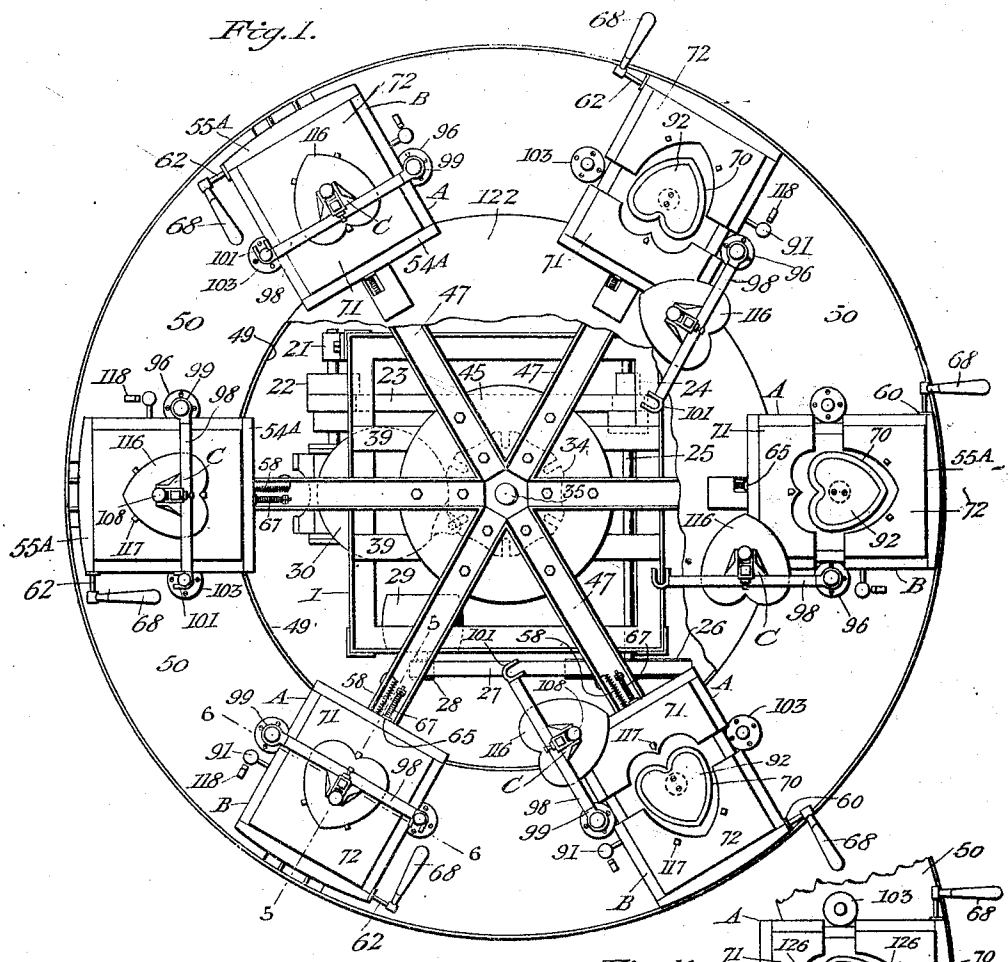


Fig. 14.

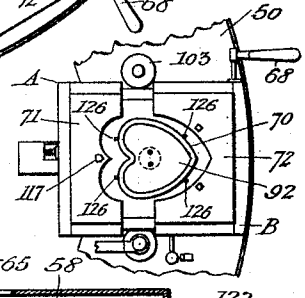
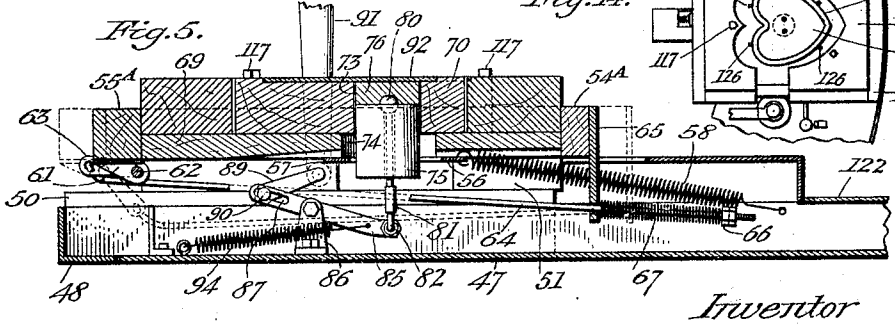


Fig. 5.



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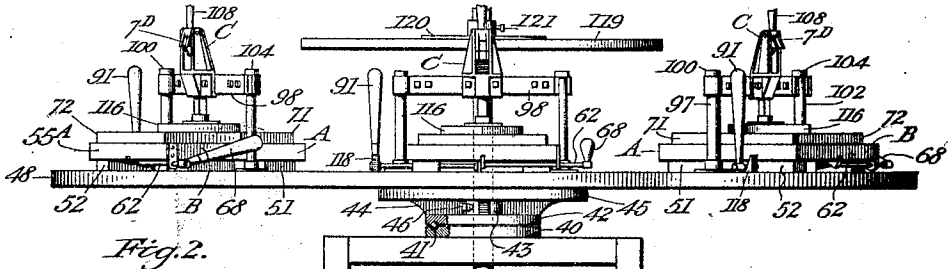
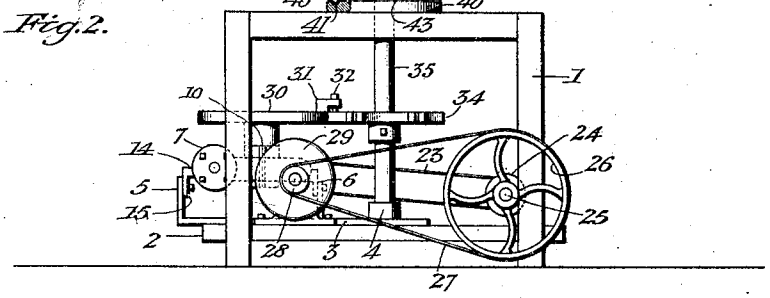


Fig. 2.



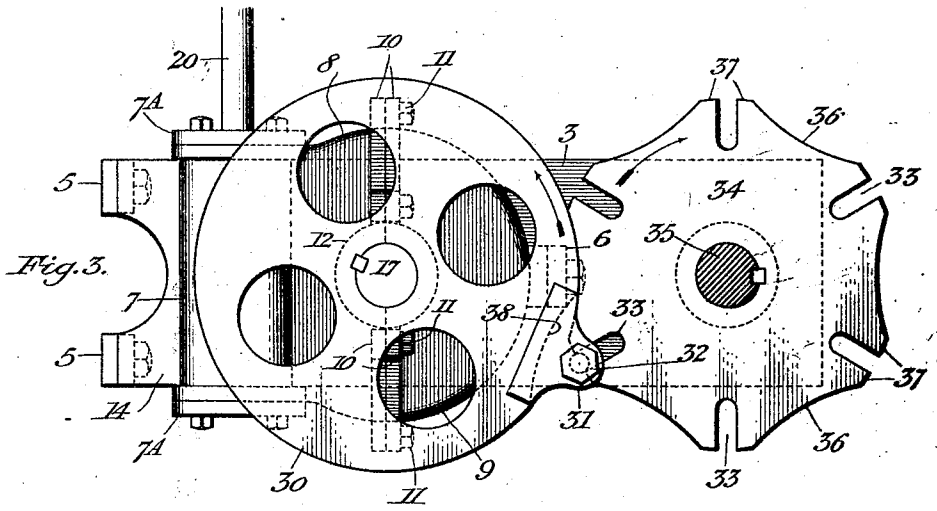
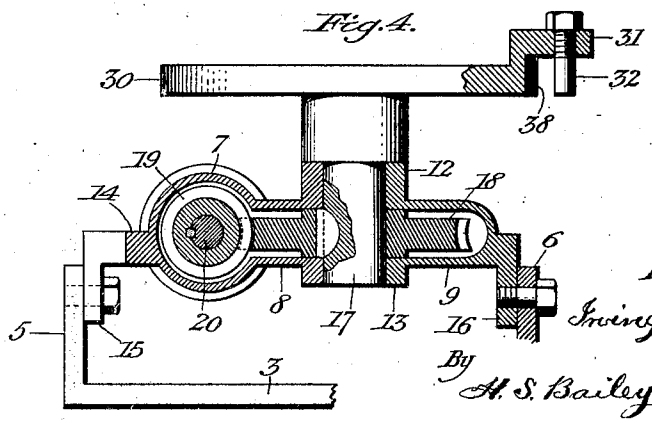


Fig. 3.

Fig. 4.



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Fig. 6.

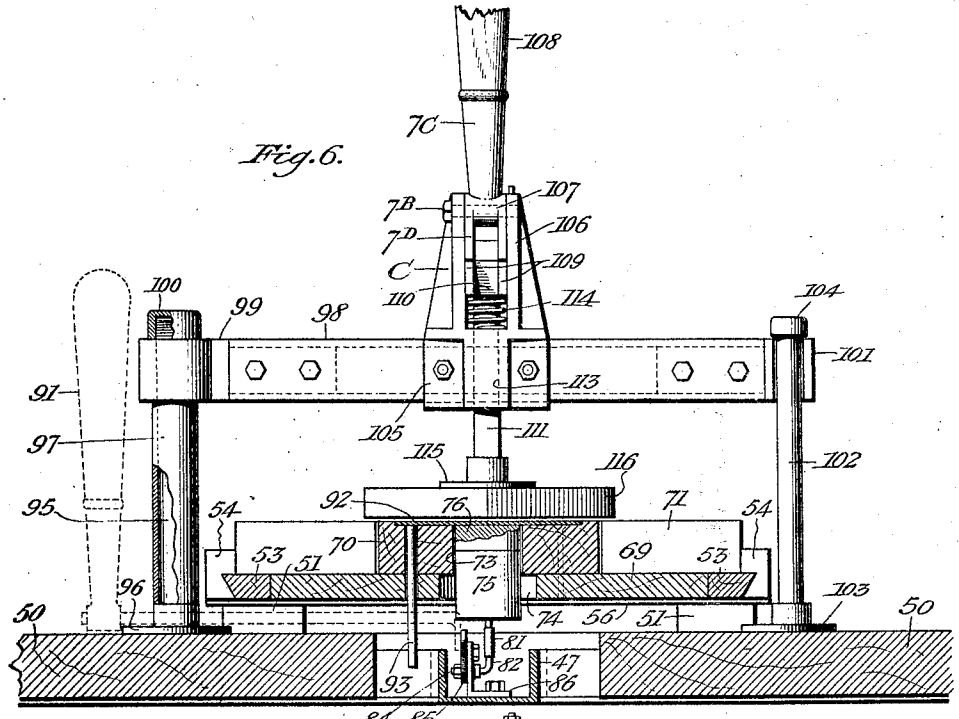
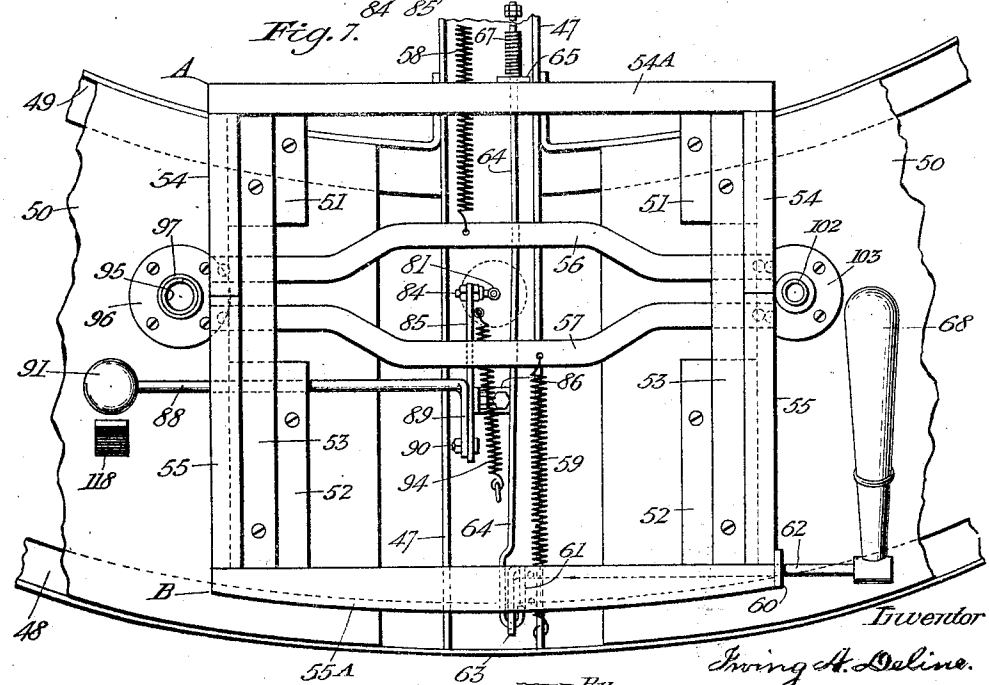


Fig. 7.



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Fig. 8.

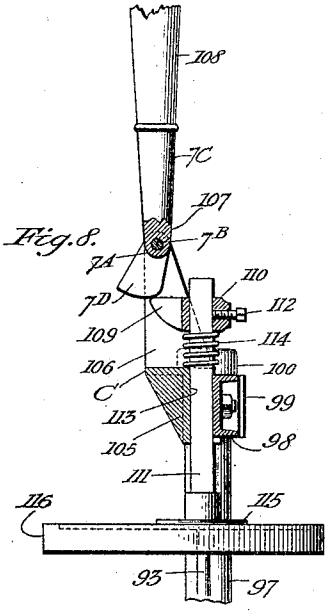


Fig. 9.

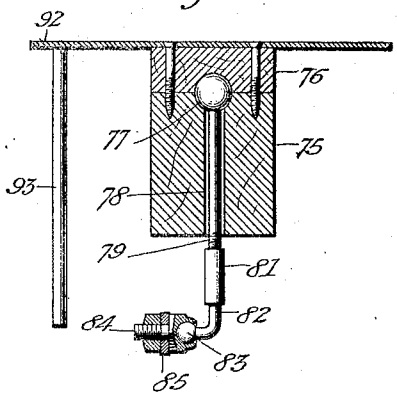


Fig. 10.

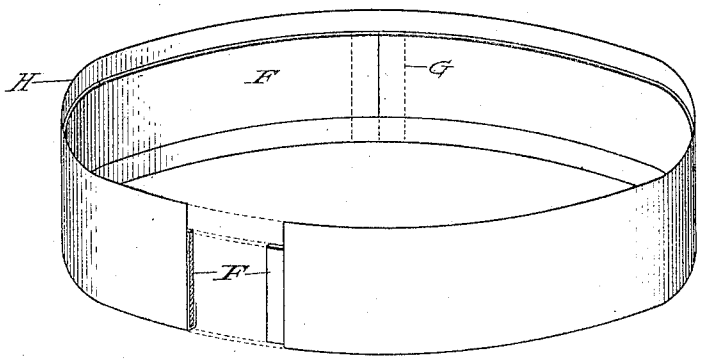


Fig. 11.

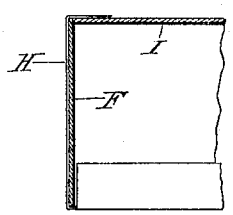


Fig. 12.

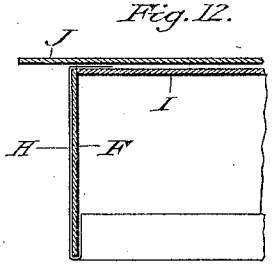
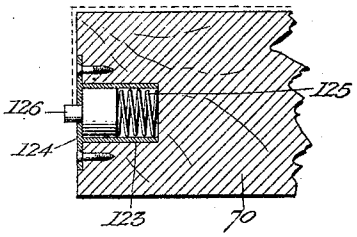


Fig. 13.



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Patented Mar. 9, 1926. 1,575,741

UNITED STATES PATENT OFFICE.

IRVING A. DELINE, OF DENVER, COLORADO.

APPARATUS FOR FORMING AND CLAMPING PAPER BOXES IN THE PROCESS OF MANUFACTURE.

Application filed October 17, 1925. Serial No. 63,069.

To all whom it may concern:

Be it known that I, IRVING A. DELINE, a citizen of the United States of America, residing at the city and county of Denver, and State of Colorado, have invented a new and useful Apparatus for Forming and Clamping Paper Boxes in the Process of Manufacture, of which the following is a specification.

My invention relates to improvements in apparatus for forming and clamping paper boxes in the process of manufacture.

The object of the invention is to provide a rotatable support having a circular series of mechanisms thereon for forming and clamping the bands of paste board boxes in order to enable the ordinary tops or bottoms as the case may be, to be secured thereto, and then, the extension tops or bottoms; said support having an intermittent rotary movement, thereby permitting an attendant to accomplish the first stage of the work on each of a series of boxes in successive order, while the support is at rest, the second stage of the work commencing with the first box of the series when the support has made a complete rotation.

Further to provide a circular table having an intermittent rotary movement and provided with an endless series of mechanisms for forming the band portions of paste board boxes into any one of a variety of shapes, and clamping said band portions while the bottoms or tops, as the case may be, and then the extensions are secured thereto by an attendant during one complete rotation of the table; the extension bottoms or tops being adhesively secured to the original bottoms or tops and clamped thereon, the boxes being removed in successive order upon the next rotation of the table.

Further, to provide a rotary series of band forming and clamping devices, each of which comprises a form of any desired outline and manually operated dies which conform to the shape of the form and which are adapted to clamp a band around said form and hold said band while the usual bottom or top is secured thereto, and while an extension bottom or top is secured to the usual bottom or top, means being provided for clamping said extension bottom or top in place, and holding the same until the last box of the series is completed, all the parts being thus held in accurate relation until the adhesive material is set.

These and other objects which will hereinafter appear, are accomplished by the apparatus illustrated in the accompinying drawings in which:

Fig. 1, is a plan view of the improved box band-forming and clamping apparatus constructed in accordance with my invention, a part being omitted and a part being broken away for clearer illustrations.

Fig. 2, is a side view of the same.

Fig. 3, is a plan view—enlarged—of the mechanism for imparting an intermittent rotary movement to the table which supports the band forming and clamping devices.

Fig. 4, is a sectional elevation of the driving member of the table rotating mechanism shown in Fig. 3, and the worm gearing for retarding the same.

Fig. 5, is a longitudinal sectional view—enlarged—through one of the band forming and clamping mechanisms, on the line 5—5 of Fig. 1 the extension bottom clamp being omitted.

Fig. 6, is a transverse sectional view thereof on the line 6—6 of Fig. 1.

Fig. 7, is a plan view of the mechanism for operating the band forming and clamping dies.

Fig. 8, is a vertical sectional view of the operating and locking device for the extension bottom clamping block.

Fig. 9, is a sectional view through the plunger for removing the finished boxes from the block.

Fig. 10 is a prospective view of a band and strip surrounding the same as they appear before being placed in the former.

Fig. 11, is a sectional view showing the band united to the usual top or bottom by the bent-over portion of the strip,

Fig. 12, is a sectional view showing the extension top or bottom secured to the usual top or bottom.

Fig. 13 is a fragmentary sectional view of a modification of the box-band-receiving form, and

Fig. 14, is a detail plan view showing the modified forms in connection with the band clamping dies.

Referring to the accompanying drawings: The numeral 1 indicates a supporting struc-

ture which is made up of connected rectangular side, end and top frames, a platform 2, being supported on the lower members of opposite side frames, as shown in Fig. 2. Upon the platform 2, is secured a metal base plate 3, having a bearing socket 4 near its inner end, vertical brackets or uprights 5 on its outer end and a vertical upright 6 intermediate of its ends. To the uprights 5 and 6 is bolted a gear housing; comprising a horizontal hollow cylindrical part 7, having a flat hollow extension 8 to which is bolted a hollow semi-circular cap 9, the extension 8 and the cap 9 having registering bolt flanges 10 which are connected by bolts 11 as shown in Fig. 3. Axial hubs 12 and 13 are formed in opposite sides of the flat part of the housing; one half of each hub being formed on the extension 8, and the other half on the cap 9.

The cylindrical part 7 of the housing is formed with a horizontal projection 14 having depending lugs 15 which are bolted to the uprights 5 and the cap 9 is formed with a depending lug 16 which is bolted to the upright 6 as clearly shown in Fig. 4, a short shaft 17 is mounted in the hubs 12 and 13 and on the lower portion of this shaft is keyed or otherwise secured, a worm gear 18 which is enclosed by the extension 8 and its cap 9 and this gear meshes with a worm pinion 19 in the cylindrical housing 7, which pinion is secured upon a shaft 20 which is journaled in caps 7^A which are bolted to the ends of the cylinder 7.

The shaft 20 extends beyond one end of the cylinder 7 and its end portion is mounted in a bearing 21 which is bolted to the adjacent side of the supporting structure 1. A stepped belt wheel 22 is secured upon the shaft 20 and this wheel is connected by a belt 23, with a stepped pulley 24 which is secured upon a shaft 25 which is mounted in bearings secured to the opposite side of structure 1 from the shaft 20. The shaft 25 has a belt wheel 26 secured upon one end thereof, which is connected by a belt 27 with a small pulley 28 on the shaft of an electric motor 29 which is bolted to the platform 2.

Thus, power from the motor 29 is communicated by the belt 27 to the wheel 26, the shaft 25 and stepped pulley 24 and thence by belt 23 to wheel 22 on the shaft 20 and thence by worm pinion 19 and worm gear 18 to the shaft 17.

Upon the upper portion of the shaft 17 is secured a disk or wheel 30 having a hub which rests on the hub 12 of the gear housing 8—9. The disk 30 has formed thereon or secured thereto a short, radial arm or lug 31 which extends slightly beyond the circumferential edge of the disk, the under side of the lug being slightly above the upper side of the disk, as clearly shown in Fig. 4. The lug 31 has a hole in which is threaded or otherwise secured, a bolt or pin 32 which, upon each rotation of the disk 30, enters one of a series of radial slots or recesses 33 in the edge portion of a disk 34 which is secured upon a vertical shaft 35, the lower end of which is mounted in the socket bearing 4 of the base plate 3. There are six radial slots 33 in the disk 34, and upon each rotation of the disk 30, the pin 32 enters one of the slots 33 and turns the disk 34, one sixth of a complete rotation before the pin 32 passes out of this slot; the next succeeding slot 33 being in position to receive the pin when it intersects the circular path described by the open end of said slot. The purpose of the intermittent rotation of the disk 34 will hereinafter appear. The circumferential paths of the disks 30 and 34 intersect or overlap each other, as will be seen by reference to Fig. 3, and as both disks are on the same plane, this arrangement is provided for by inwardly curving the edge portions of the disks 34 between each two slots 33 in arcs 36 having the same radius as the circumference of the disk 30, so that the edge of the disk 30 will ride successively in the arcs 36, as the disk 34 is rotated by the disk 30. The edge portion 37 of the disk 34, on each side of the slots 33, represent the greatest diameter of the disk 34 and these portions of the disks 34 intersect or overlap the circumferential path of the disk 30 as each slot 33 approaches and passes a line drawn through the axial centers of the disks, and therefore, the edge of the disk 30 is inwardly curved at 38 on an arc whose center is on a line which passes through the axial centers of the disk 30 and pin 32; thus the edge portion of the disk 34, having the greatest diameter ride in the curve 38 on each partial rotation of the disk 34 by the disk 30.

Upon the top of the support 1 is secured a pair of parallel bars 39 upon which rests a circular metal plate 40 which is bolted to said bars and is provided with an axial hole through which the shaft 35 passes. The plate 40 is provided with a circular ball race which is supplied with balls 41 upon which rests a plate 42 also having a ball race. The plate 42 is integrally connected by a hub 43, and ribs 44 with a larger plate 45 which constitutes the base plate for a circular table, to be presently described and the shaft 35 extends through an axial opening in the hub 43 and a suitable distance above the base plate 45 for a purpose which will later appear. A set screw 46 in the hub 43 is screwed against the shaft 35 and thus rigidly secures the base plate 45 and its plate 42 to the said shaft 35.

To the top face of the base plate 45 are bolted a series of radial bars 47, preferably

channel bars and six in number as shown in Fig. 1, and the outer ends of these channel bars are connected by a circular angle bar 48, as shown in Figures 1 and 7, the circular bar 48 being about seven feet in diameter.

The radial bars 47 are further connected by segmental angle bars 49 which are concentric with the circular bar 48 and a suitable distance from the same, and upon the horizontal members of the bars 48 and 49 are secured segmental table sections 50 in the form of wooden blocks which together make up a ring-like table which supports the box forming and clamping mechanisms which will now be described.

There are preferably six of these mechanisms and as they are identical in construction a description of one will suffice. Upon the table sections 50, on each side of each of the radial channel bars 47 are secured transverse wooden strips 51 and 52, the strips of each pair being in the same direct line but separated by a space as shown, and upon each pair of strips is secured a guide rail 53, said guide rails being parallel as shown. The outer edges of the guide rails are beveled as shown in Fig. 6, and upon these beveled edges are slidably mounted the side bars 54 and 55 of two frames A and B which are movable back and forth with respect to each other, and which together form a rectangular frame.

The side bars 54 of the frame A are connected at their rear ends by a wooden bar 54^A and at their forward ends by a metal bar 56 which is secured to the under edges of the bars 54 and lies beneath the guide rails 53. The rear ends of the side bars 55 of the frame B are connected by a metal bar 57 which also lies beneath the guide rails 53 and the intermediate portions of these two bars are offset from the end portions so as to leave a space of considerable width between the middle portions of the two bars when the frames are in closed position to permit the lower portion of a box removing plunger to extend down between them, as will herein after appear.

The front ends of the side bars 55 of the frame B are connected by a wooden bar 55^A, and the inner faces of the two side bars 54 of the frame A and the two side bars 55 of the frame B are beveled and undercut to engage the correspondingly beveled edges of the guide rails 53 and by this arrangement the frames A and B are limited to a horizontal sliding movement on the guide rails 53.

The inner ends of the strips or blocks 51 and 52 form stops which define the outward movements of the frames A and B, the bar 56 of the frame A being engaged by the blocks 51 while the bars 57 of the frame B is engaged by the blocks 52.

The frames are slid toward and away from each other in the following manner:—

A contraction coil spring 58 is secured at its inner end to the bar 56 and at its outer end to the channel bar 47, and a similar coil spring 59 is secured at its inner end to the bar 57 and at its outer end to the channel bar 47, and these springs tend to draw the frames apart or away from each other. A bracket 60 is secured upon the right hand end of the cross bar 55^A of the frame B, and a bracket 61 is secured to the under side of this bar and centrally of its length. A rod 62 is rotatably supported in the brackets 60 and 61 and the inner end of this rod terminates in a short right angled portion or lever arm 63 to which one end of a rod 64 is pivotally attached. This rod extends rearward and through and beyond an abutment plate 65 which is secured upon the cross bar 54^A of the frame A and its free end is threaded and provided with a nut 66. A coil spring 67 surrounds this rod between the abutment plate 65 and the nut 66, and this nut may be adjusted to vary the tension on the spring, the position of the nut being maintained by a jam nut, as shown in Fig. 5. Upon the outer end portion of the rod 62 is secured an operating handle 68 which inclines in a direction substantially opposite that of the lever arm 63 on the inner end of the said rod 62, so that when the handle is turned to point inward, the lever arm 63 points outward, as clearly shown in Fig. 7.

In this position of the lever arm 63, the rod 64 is drawn upon, the coil spring 67 is under compression and the frames A and B are locked in closed relation. The manner in which the frames are moved from an open position, as shown by the three clamping units on the right side of Fig. 1; to a closed position, as shown by the three units on the left side of Fig. 1, is as follows:—As the operating handle 68 is swung forward, the rod 62 is thereby turned, and the lever arm 63 on the end of this rod draws on the rod 64 and the nut 66 is forced against the spring 67, which is thereby forced against the abutment plate 65, this exerting an inward pull on the frame A which is held at the limit of its outward movement by its spring 58. The frame B is also held at the limit of its outward position by its spring 59, but as the handle 68, is moved forward the lever arm 63 fulcrums on the end of the rod 64, and further movement of the handle forces the frame B inward until it is stopped by the adjacent ends of the guide rails 53; the bearings 60 and 61 for the rod 62, then become a fulcrum for the lever arm 63 which then draws the rod 64 forward, thereby forcing its spring 67 against the abutment plate 65, and thus sliding the frame A inward until it is stopped by the adjacent ends of the guide rails 53.

As the handle 68 is further turned, the

spring 67 is compressed between the abutment 65 and the nut 66 on the rod 64, and serves to lock the frames in closed position as the end of the lever arm turns to the position when the line of pull on the rod 64 is shifted from below to above the center of the operating rod 62, when the lever arm 63 engages the under side of the cross bar 55A of the frame B and is held there-against by the pressure of the spring 67 on the nut 66. To open the frames, or slide them apart, the handle 68 is swung in the opposite direction, or outward and the instant the outer end of the lever arm 63, passes below the center of the operating rod 62, the pressure on the spring 67 is released and the frame A is first slid outward under the action of its spring 58, followed by the frame B under the action of its spring 59.

A board 69 is placed between the guide rails 53 and is secured to blocks 51 and 52. Upon this board is secured by screws, a block 70 which may be of any desired shape such as round, square, hexagonal, heart-shaped, etc., the block in the present instance being heart-shaped. This block determines the shape of box and therefore it is removably secured to the board 69, so that the other blocks may be employed for any one of a variety of styles of boxes.

Cooperating with the block 70 is a pair of formers or dies, which taken together are of the same shape or outline as the block, and one of these dies 71 is removably secured to the frame A and the other die 72 is removably secured to the frame B. Thus, when the frame is open, the dies are moved away from the block 70 and when the frame is closed, the dies engage the block, or rather the box band which surrounds the said block, and presses the band against the block, at all points, as will be later more fully described. The blocks 70 is formed with a circular aperture 73, which registers with a circular aperture 74 in the boards 69, these apertures accommodating a plunger 75 for removing a completed box from the block. The plunger 75 is in the form of a cylindrical wooden body provided with a cap 76 of the same diameter which is secured thereto. A spherical recess 77 is formed half in the cap and half in the body, and an axial hole 78 of less diameter than the spherical recess is bored through the body and intersects the half part of the spherical recess 77 therein. Before the cap 76 is secured to the plunger a stem 79 is passed down through the axial hole 78, and this stem has a ball 80 on its upper end which fits loosely in the spherical recess 77, when the cap is secured to the plunger. The lower end of the stem 79 is screwed into a sleeve 81 in the lower end of which is secured a short rod 82 having a portion bent at right angles thereto, the end of which terminates in a ball 83 which enters a socket in the head of a bolt 84 which is secured to one end of a lever 85. The lever 85, is pivotally secured, intermediate of its length to a bracket 86 which is bolted to the bottom of the adjacent radial channel bar 47 which extends beneath the slidable frames A and B, as shown in the drawings.

The other end portion of the lever 85 is provided with a slot 87. A horizontal rod 88 passes through a hole in the left hand block 52 and its inner end portion is bent at right angles as shown at 89 to form a lever arm, and a bolt 90 passes through the end of this lever arm and loosely through the slot 87 in the lever 85. The outer end of the rod 88 is provided with a vertically disposed handle 91 which when drawn upon, turns the rod 88 the lever end 89 of which rocks the lever 85 thereby raising the plunger 75 to remove a finished box from the block 70, as will hereinafter appear.

Upon the cap of the plunger is secured a thin metal plate 92, which is slightly smaller than the block 70 but of the same shape or outline and this plate rests in a recess in the top of the block so as to be flush with the top surface of the block. This plate is of such size that it bears against the greater portion of a box bottom or top when the plunger is operated, thus facilitating the removal of the box or cover, as the case may be, from the block 70.

A vertical depending guide rod 93 is secured to the plate 92 and this rod extends down loosely through a hole in the block 70 and the board 69 and prevents the plunger from turning on the ball 77, which supports it. The ball and socket connection between the plunger and the rod 79, and between the angle rod 82 and the lever 85, permits an automatic adjustment of the plunger on its axis, with respect to the box bottom, thereby permitting the plate 92 to bear squarely against the box bottom and thus remove the box from the block by a direct vertical push, by which binding of the box band upon the block is prevented.

A spring 94 is secured at one end to the bottom of channel bar 47, and at its other end to the forward portion of the rock lever 85, and this spring normally holds the plunger in an inoperative position, or so that the plate 92 rests in the recess in the top of the block 70.

On the left side of each frame A—B is a vertical standard 95 in the form of a section of tubing which is secured at its lower end in the hub portion of a circular plate 96 which is secured to the table, the standard being close to the frame and in line with the inner ends of the frame members when they are in closed position. A tube or sleeve 97 of less length than the standard 95 is placed over the said standard so as to rest on the

hub of the plate 96; and a horizontal bar 98 is pivotally mounted on the standard in the following manner: This bar is preferably in the form of a channel bar upon one end of which is bolted a hinge member 99 having a hole through which the standard 95 passes, the hinge member resting on the upper end of the sleeve 97. A cap or nut 100 is screwed on the upper end of the standard to hold the bar thereon but permit the free swinging movement of the bar on the standard. The opposite end of the bar has a casting 101 bolted thereon, the outer end of which is yoke-shaped and is adapted to engage the upper portion of a standard 102, in the form of a tube which is secured at its lower end in the hub portion of a plate 103 which is secured to the table; this standard being close to the frame A—B and diametrically opposite the standard 95. A cap 104 is screwed upon the upper end of the standard 102, and is adapted to engage or nearly engage the yoke-shaped casting 101, when the bar 98 is in the position shown in Fig. 6, and thus cooperate with the cap 100 on the standard 95 in holding the bar against upward movement. A bracket C is bolted to the bar 98, midway of its length and this bracket comprises a body portion 105 having an upright bifurcated member 106 in the upper ends of which is pivotally mounted the cam portion 107 of a vertically disposed lever 108. The cam portion 107, comprises a hub 7^A through which a pivot bolt 7^B passes which also passes through the upper ends of the bifurcated member 106, a socket member 7^C to receive a handle, and the cam 7^D, which is in the form of twin parallel members which depend from the hub 7^A and which are curved on their lower ends to provide cam surfaces.

These cam surfaces are adapted to engage the upper horizontal edges of twin projections 109 on an abutment member 110 having a square opening extending vertically through the same through which passes a square presser bar 111 to which the abutment member is adjustably secured by a set screw 112.

The presser bar 111 is slidably mounted in a corresponding guideway 113 in the body 105 of the bracket C which is open on the side of the body next the swinging bar 98, so that the said swinging bar confines the presser bar in its guideway, as will be understood by reference to Fig. 8. A coil spring 114 surrounds the presser bar and is interposed between the under side of the abutment member 110 and the top of the body portion 105 of the bracket.

Upon the lower end of the presser bar 111 is secured the hub portion of a circular plate 115 which in turn is secured to a presser block 116 which is of the same size and design as the extension bottoms or tops employed, these tops or bottoms extending about one half an inch beyond the circumferential edge of the ordinary or regular bottoms and tops.

When the lever 108 is pulled forward, the cam surfaces of the members 7^D ride on the projections 109 of the abutment 110 and the presser block 116 is thereby forced down upon an extension bottom or top, as the case may be to clamp the same to the usual bottom and hold it under pressure during a complete rotation of the table, during which period the glue or other adhesive becomes set and the bottom or top is prevented from warping.

The die blocks 71 and 72 have secured thereon guides 117 of slight thickness which are adapted to center the extension top or bottom with respect to the block 70 when the extension is placed thereon, as will later appear.

The operation of forming and clamping a box band, and securing thereto the regular bottom and then the extension bottom in connection with the improved machine above described, is as follows, the word "extension" being used as applicable to either the top or bottom of the box as the operation is the same in either case. The bands F are cut in lengths to exactly conform to the outline of the block 70, whatever the shape of the block may be, and the ends of the band are connected by a narrow strip of tape G, so that the band is in the form of a ring. A strip H is then glued to the band, through the instrumentality of a suitable stripping machine, which is not illustrated as it forms no part of the present invention, and this strip is preferably about an inch wider than the band and extends a half inch beyond each edge of the band. One edge portion of this strip is bent over the edge of the band and adhered to the inner face of the band but the other edge of the strip is left unfolded as shown in Fig. 10 and the band is then ready to be placed on the forming block 70.

The mechanism for rotating the table is set in motion and this mechanism can be governed to intermittently move the table after such intervals that the periods when the table is at rest will be of sufficient duration to enable the attendant to perform the necessary work in the production of a box. The attendant first swings the bar 98 back to the position shown in any one of the mechanisms on the right side of Fig. 1, so that the presser block 116 will be out of the way and the handle 68 is pulled forward to permit the frames A and B to slide apart. The regular bottom I is then placed on the block 70 and the band is placed around this said block with the unfolded edge of the strip H uppermost, and is pressed down until it rests upon the board 69, the band being about one

sixteenth of an inch wider than the thickness of the block 70 so as to surround the bottom I as shown by Fig. 12. The attendant then swings the handle 68 inward whereby the dies or formers 71 and 72 are moved inward against the band and clamp the same against the block 70 with a resilient pressure. The unfolded portion of the strip H is then folded down upon the bottom I, thereby securing the bottom to the band. Glue is then applied to the bottom I around the edge portion thereof or to the extension J as may be found most practicable, and the extension J is placed upon the bottom I, the guides 117 centering it so that it will be concentric with the band F, but will extend a half inch beyond the same at all points.

The bar 98 is then swung to the position shown in Fig. 6, when the presser block 116 will be above the extension J and a slight distance from it; the lever 108 is drawn upon and the presser block is forced down upon the extension J in the manner before described, and the said extension is thus clamped against the box bottom and so held until the table makes a complete rotation during which time the glue has become set and this part of the box is completed. The operation is repeated until six half boxes have been completed, when the table will have made a complete rotation, and the first half box of the series is ready to be removed.

The attendant then pushes on the lever 108 which releases the cams 7^D and the presser block 116 is raised from the extension by the spring 114. The bar 98 is swung around so that the presser block will entirely uncover the extension J and the lever 68 is swung outward which permits the frames A and B together with the dies 71 and 72 to slide apart under the action of the springs 58 and 59 respectively.

The lever 91 is then drawn upon to raise the plunger 75, in the manner previously described, and the plunger plate 92 is forced against the bottom I and pushes the half box off the block 70. A stop 118 limits the outward movement of the lever 91.

The shaft 35 to which the table is secured, extends a suitable distance above the table, and a much smaller table 119 is secured thereon. A circular plate 120 is secured to the table 119 having a hub which registers with an axial hole in the table and the shaft 35 passes through the hole in the table and through the hub on the plate 120 and a set screw 121 in the said hub is screwed against the shaft 35 thereby securing the table 119 to the shaft 35. Bottoms, tops and extensions are placed on the table 119 so as to be within easy reach of the attendant.

A circular sheet metal plate 122 rests upon the radial channel bars 47 of the main table and closes the space between the inner ring 49 of the table and the shaft 35, thus hiding the said channel bars as well as the supporting mechanism and thereby adding to the artistic appearance of the table.

In Fig. 13 is shown a modification of the band forming block by means of which a box of less depth than the thickness of the said block can be made without any change in the dies or other parts of the mechanism. In this arrangement a number of holes are bored into the block 70 through its edge surface and into these holes are inserted thimbles 123 which are open on their inner ends, their outer ends being closed by a flange plate 124 having screw holes through which screws are passed which are screwed into the block thus holding the thimble in place, the flanges being flush with the surface of the block and each having a central hole. Before placing the thimbles in the holes, coil springs 125 are placed in the holes, and metal plungers are placed in the thimbles, said plungers having pins 126 which project through the openings in the flange plates 124. The thimbles are then pressed in the holes in the block and secured by screws, as before stated, and the springs 125 will bear on the end walls of the holes in the block and on the ends of the plungers, so that the pins 126 will normally project through the holes in the flange plate 124. In placing the box band around the block 70 the bottom edge of said band will rest upon the pins 126, and when the dies 71 and 72 are slid to engage the band and clamp it against the block, they will at the same time engage the pins 126 which will be pushed in against the action of their springs 125, thus offering no resistance to the clamping action of the dies, The band cannot drop, as the pins when compressed will still project a distance equal to the thickness of the band and thus support the same.

By the former method the ordinary bottom was secured to the band by a narrow strip and then a finishing strip was glued around the band over the first strip, and this finishing strip extended beyond the lower edge only of the band, and was folded around this edge as in the present instance. But by making the strip wide enough to extend beyond each edge of the band, one operation is entirely eliminated, as the finishing strip, which projects beyond each edge of the band, serves to secure the regular bottom to the band, thus eliminating the narrow strip.

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

1. In a machine of the character described, a table having an intermittent rotary movement, a series of mechanisms on said table for forming and clamping box bands for the reception of tops and extensions, and means for clamping said extensions to said tops.

2. In a machine of the character described, a table having an intermittent rotary movement, a series of mechanisms on said table for forming and clamping box bands in order to the attachment thereto of tops and extensions, a movable support cooperatively related to each of said mechanisms and means attached to each support for clamping an extension to a box top.

3. In a machine of the character described, a circular table, means for imparting an intermittent rotary movement thereto, an endless series of box-band receiving forms on said table, movable dies for clamping a band about each form, means for locking the dies for each form in clamping relation, thereby to facilitate the attachment of a top to said band and an extension to said top, a support movable above each form means therein for clamping the tension to the top, and means for centering the extension with respect to the top.

4. In a machine of the character described, a circular table, means for imparting an intermittent rotary movement thereto, an endless series of box-band receiving forms on said table, slidable dies in relation to each form for clamping a band about the same, means for locking said dies in resilient clamping relation thereby to facilitate the attachment of a top to said band and an extension to said top, a support mounted to swing above said form on a horizontal plane, and means thereon for clamping the extension to the top.

5. In a machine of the character described, a circular table, means for imparting an intermittent rotary movement thereto, an endless series of box-band-receiving forms on said table, manually operated slidable spring controlled dies in relation to each form for clamping a band about the same, means for locking said dies in resilient clamping relation, thereby to facilitate the attachment of a top to said band and an extension to said top, a standard on said table adjacent each form, an arm mounted on said standard to swing in a horizontal plane above said form, means supported on said arm for clamping the extension to the top, and holding the same under pressure, means for defining the operative position of said arm, and means on the dies for centering the extension with respect to the top.

6. In a machine of the character described, the combination with a circular table, and means for imparting an intermittent rotary movement thereto, of an endless series of box band forming and clamping mechanisms thereon, each comprising a form, a pair of spring controlled manually operated dies in slidable relation to said form for clamping a box band about said form, means for locking said dies in clamping relation, thereby to facilitate the attachment of a top to said band and an extension to said top, a standard on the table adjacent the form, a bar mounted on said standard to swing on a horizontal plane above said form, a cam operated presser mounted on said bar to clamp said extension upon the top and hold the same under pressure, a stop for said bar to define the position of said presser with relation to said extension, and projections on said dies for centering the extension with respect to the top.

7. In a machine of the character described, the combination with a circular table and means for imparting an intermittent rotary movement thereto, of an endless series of box band forming and clamping mechanisms thereon, each comprising a pair of parallel guideways, a form between said guideways, cooperating spring controlled dies slidably mounted on said guideways and means for closing said dies upon said form and locking them in closed relation to clamp a box band about said form to facilitate the attachment thereto of a top and an extension on said top; a bar mounted to swing on a horizontal plane above said form, a spring-controlled, cam operated pressure on said bar to clamp said extension upon the top and hold the same under pressure, and a stop for said bar to define the position of said pressure with relation to said extension.

8. In a machine of the character described, a band forming and clamping device, comprising parallel guideways, a form block positioned between said guideways, spring-controlled cooperating dies slidably mounted on said guideways and means for closing said dies upon said form thereby to resiliently clamp a box band about said form to facilitate the attachment thereto of a top and an extension to said top; a standard, a bar hinged at one end to said standard to swing on a horizontal plane above said form, a spring-controlled cam operated presser on said bar to clamp said extension upon the top and hold the same under pressure, a stop for said bar to define the position of said presser with relation to said extension, and means for removing the box from the form, when the dies are opened and the pressure is swung out of operative position.

9. In a machine of the character described, box-band forming and clamping mechanism, comprising parallel guideways, a form block positioned between said guideways, cooperating dies slidably mounted on said guideways and springs for normally holding said dies apart, a lever on one of said dies, a rod connected at one end to said lever, its other end being resiliently connected to the other die, said lever acting to draw upon said rod to close said dies and lock them

in closed position thereby to resiliently clamp a band about said form to facilitate the attachment thereto of a top, and an extension upon the top, means for clamping the extension upon the top and holding the same under pressure, and means for removing the box from the form.

10. In a machine of the character described, box-band forming and clamping mechanism, comprising parallel guideways, a form block positioned between said guideways, cooperating dies slidably mounted on said guideways and springs for normally holding said dies apart, a hand lever on one of said dies an abutment on the other die, a rod connected to said hand lever and extending through and beyond said abutment and having an adjustable nut on its end, a coil spring interposed between said nut and said abutment, said lever being adapted to draw upon said rod to close said dies upon said block and lock them in closed position thereby to resiliently clamp a box band about said form block to facilitate the attachment of a top to said band and an extension to said top, means for clamping said extension upon the top and holding the same under pressure, and a hand operated plunger in said form block for removing the box from the form.

11. In a machine of the character described, the combination with box band forming and clamping mechanism, comprising a form block, cooperating slidable dies and means for closing said dies upon said form block to clamp a box band about the same, thereby to facilitate the attachment of a top to said band and an extension to said top; of means for clamping said extension upon said top and holding the same under pressure, and means for removing the box from the form.

12. In a machine of the character described, the combination with a form, means for clamping a box band about said form to facilitate the attachment of a top to said band and an extension to said top, and means for clamping and holding said extension upon said top; of means for removing a box from said form, comprising a plunger slidably mounted in said form and mechanism including a lever for raising said plunger.

13. In mechanism of the character described, the combination with a form, means for clamping a box band about said form to facilitate the attachment of a top to said band and an extension to said top, and means for clamping and holding said extension upon said top; of means for removing a box from said form, comprising a plunger slidable in a hole in said form, a stem extending into said plunger and having a ball and socket connection therewith, a rock lever connected to said stem, a hand lever for operating said rock lever, and a plate secured to said plunger and adapted to bear against said top.

14. In mechainsm of the character described, the combination with a form, and means for clamping a box band about said form to facilitate the attachment of a top to said band and an extension to said top; of means for clamping said extension upon said top and holding the same under pressure comprising a standard, a bar hinged at one end to said standard to swing on a horizontal plane above said form, a vertical stem slidably mounted on said bar, a presser block on the lower end of said stem, means for forcibly depressing said stem to cause said presser block to engage said extension, a stop for said bar to define the position of the presser block with relation to the extension, and means for removing a box from the form.

15. In mechanism of the character described, the combination with a form and means for clamping a box band about the same to facilitate the attachment of a top to said band and an extension to said top; of means for clamping said extension on the top and holding the same under pressure comprising a standard, an arm hinged at one end to said standard to swing on a horizontal plane above said form, a bracket on said arm, a vertical bar slidably mounted in said bracket having a presser block on its lower end, an adjustable abutment on said bar, a coil spring on said bar between said abutment and a flat part of said bracket, a lever mounted in said bracket having cam portions adapted to engage said abutment thereby to depress and cause said presser block to engage said extension, and means movable in said form for removing a box therefrom.

16. In a machine of the character described, the combination with a circular table, an endless series of mechanisms on said table for forming and clamping box bands in the production of boxes and axial shaft upon which said table is rigidly mounted and a support for said shaft; of an element on said shaft and power-operated means for intermittently engaging said element to impart partial rotation to said shaft.

17. In a machine of the character described, the combination with a support, a vertical shaft mounted in said support, a circular table rigidly secured upon said shaft and an endless series of mechanisms on said table for forming and clamping box bands in the production of boxes; of means for imparting intermittent partial rotations to said table, comprising a disk rigidly secured on said shaft having equidistant radial slots which extend through its edge portion, and a power driven disk having a pin adapted to enter one of said

slots upon each rotation of said power driven disk, and impart a partial rotation to the first disk.

18. In a machine of the character described, the combination with a form, means for clamping a box band about said form, to facilitate the attachment of a top to said band and an extension to said top, and means for clamping the extension to the top and holding the same in clamped relation; of means for removing the finished box from said form, comprising a vertical plunger mounted in said form, an axial stem which extends into said plunger and has a ball and socket connected therewith, a rock lever, a right angled member on the lower end of the stem which has a ball and socket connection with one end of said rock lever, a rock shaft having a right angled end in slidable engagement with the other end of said rock lever, the other end of said rock shaft having an operating hand lever thereon, and an extended plate on the top end of said plunger which is adapted to engage said box top.

19. In a machine of the character described, mechanism for forming and clamping box bands in the production of boxes, comprising parallel guideways cooperating frames slidably mounted on said guideways, dies removably secured to said frames and springs for normally holding said frames apart, a form positioned between said dies, a manually operated rock shaft mounted on one of said frames, its inner end terminating in a right angled arm, an abutment plate on the other frame, a pull rod connected at one end to said right angled arm, its opposite end portion extending loosely through and beyond said abutment plate and having an adjustable nut thereon, a coil spring interposed between said nut and said abutment plate; the turning of said rock shaft causing first the inward movement of the frame supporting said rock shaft until its die engages a box band on said form, and then a similar movement of the other frame, whereby said band if formed and clamped to facilitate the attachment of a top to said band and an extension to said top, means for clamping said extension to said top and holding the same in clamped relation and means movable in said form for removing a finished box therefrom.

20. In mechanism of the character described, a form block adapted to receive a box band, said block having retractile supports for said band.

21. In mechanism of the character described, a form block adapted to receive a box band, said block having spring controlled pins which project through the side edge of said block to support the lower edge of said box band.

22. In mechanism of the character described, a form block adapted to receive a box band, said block having holes in its side edge, thimbles in said holes and spring pressed plungers in said thimbles having pins which normally project through the outer wall of said thimbles in position to receive the lower edge of a box band.

In testimony whereof I affix my signature.

IRVING A. DELINE.