Jan. 14, 1936. W. K. ANDREW ET AL 2,027,664

APPARATUS AND METHOD FOR SETTING UP CONTAINERS

Filed July 1, 1935 3 Sheets-Sheet 1

Fig. 1

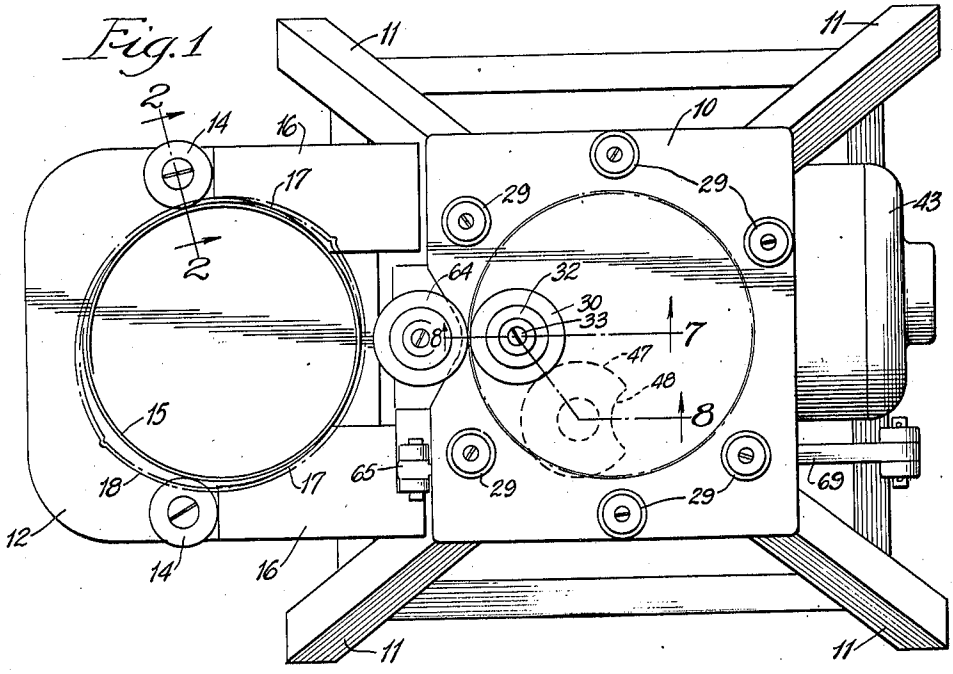


Fig. 2

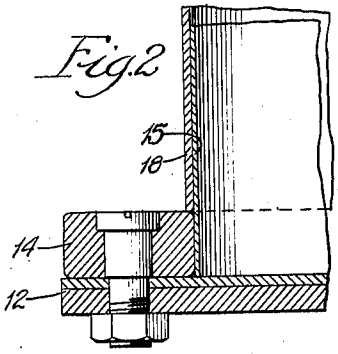


Fig. 3

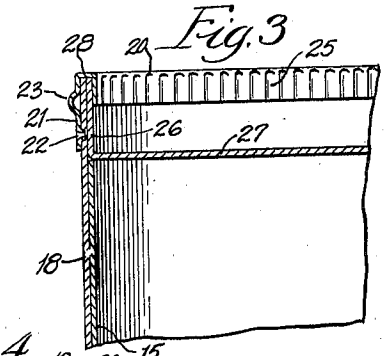


Fig. 4

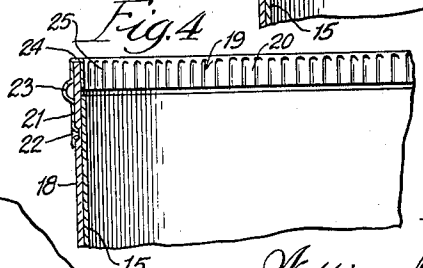
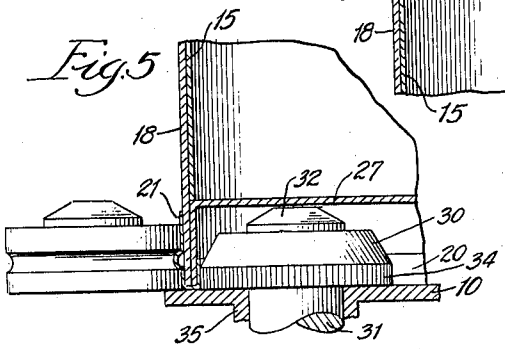


Fig. 5



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Fig. 6

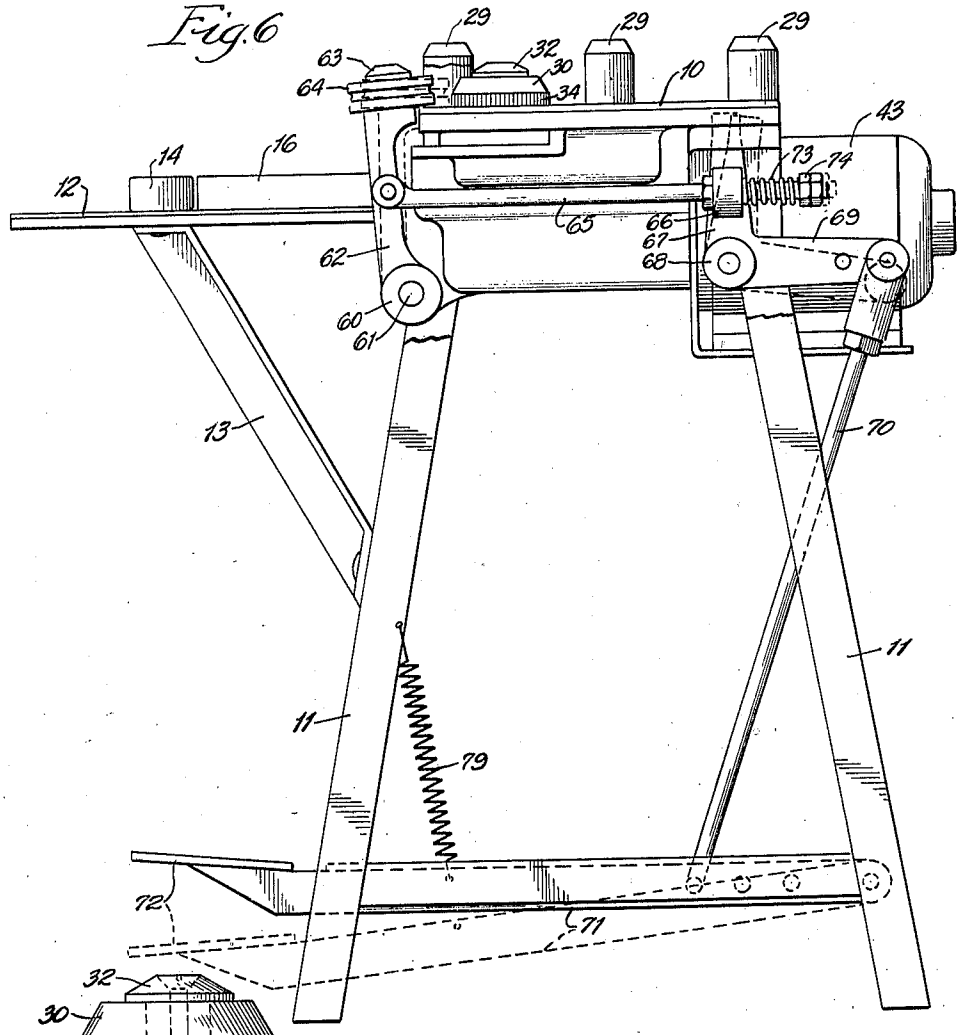
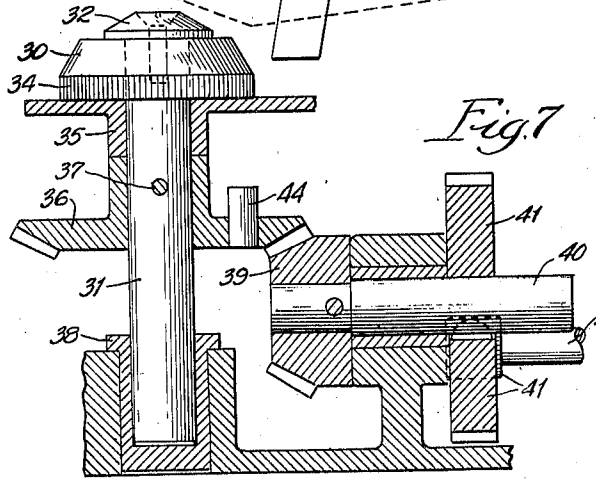


Fig. 7



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APPARATUS AND METHOD FOR SETTING UP CONTAINERS

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Fig. 8

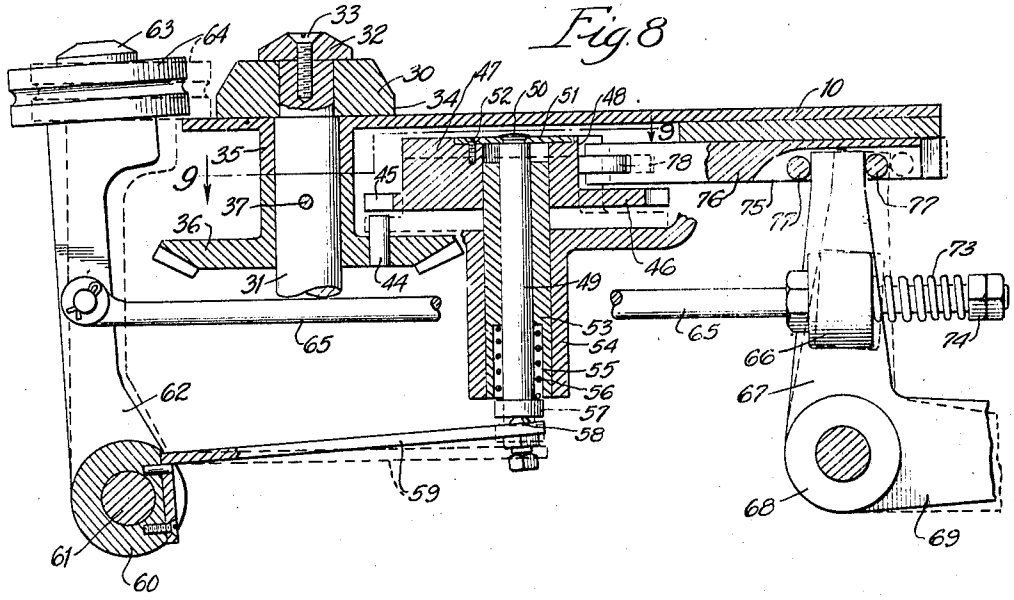
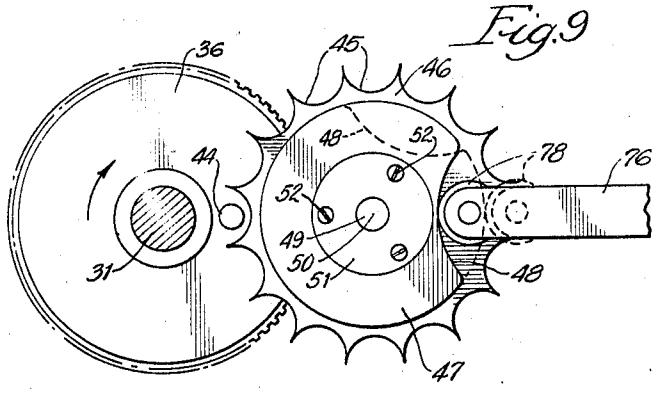


Fig. 9



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Fig. 8

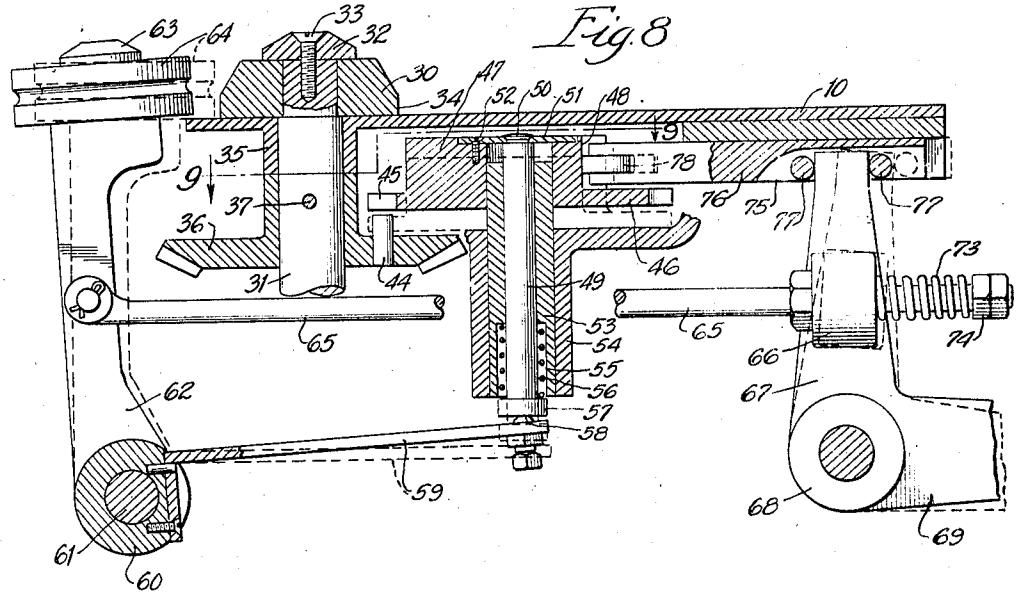
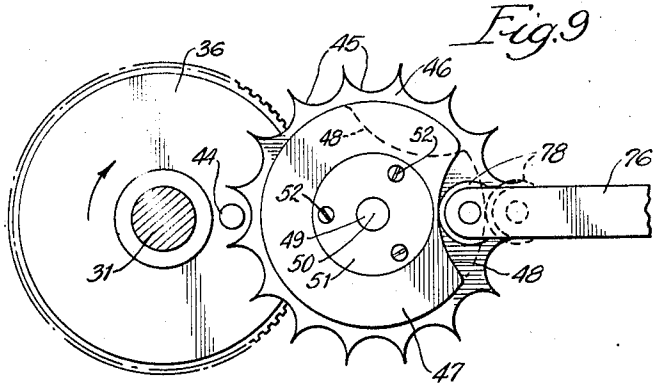


Fig. 9



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Patented Jan. 14, 1936 2,027,664

UNITED STATES PATENT OFFICE

2,027,664

APPARATUS AND METHOD FOR SETTING UP CONTAINERS

William K. Andrew, Wauwatosa, and Ronald I. Drake, Appleton, Wis., assignors to Marathon Paper Mills Company, Rothschild, Wis., a corporation of Wisconsin

Application July 1, 1935, Serial No. 29,224

16 Claims. (Cl. 153—1)

The machine of the present invention is designed to set up and apply binding strips to cylindrical containers having a body formed of paperboard, and having metallic reinforcing strips at each end to reinforce the margins of the body.

In the shipment of ice cream or similar commodities in bulk, it is a frequent practice to ship the same in cylindrical containers intended for a single use only. Such containers are furnished to the jobber in collapsed or knock-down condition to reduce packing space, and are erected for use by expanding the body of the container and applying the metallic binding strips to each end thereof and inserting the bottom, after which the container is ready for use.

The present invention is designed to facilitate the expanding of the containers into cylindrical form and to provide means for crimping the binding strips around the margins of the container, so that after the strips have been thus applied the container will retain its cylindrical formation and afford a firm, strong and rigid receptacle for the intended purpose.

Further objects and details will appear from a description of the invention in conjunction with the accompanying drawings, wherein,—

Figure 1 is a plan view of the machine;

Fig. 2 is an enlarged fragmental detail of the erecting platform, taken on line 2—2 of Fig. 1;

Fig. 3 is a fragmental section of a container showing the bottom inverted and with the binding strip crimped thereon;

Fig. 4 is a similar view showing the top of a container having the binding strip crimped thereon;

Fig. 5 is a detail showing the crimping and compression rolls in action;

Fig. 6 is a side elevation of the entire machine;

Fig. 7 is an enlarged detail, taken on line 7 of Fig. 1;

Fig. 8 is an enlarged detail, taken on line 8 of Fig. 1; and

Fig. 9 is a sectional plan view of a portion of the machine, taken on line 9—9 of Fig. 8.

The machine as a whole comprises a square bed plate 10, which is supported at a convenient elevation on diverging legs 11 extending from the corners of the bed plate. On the front side of the bed plate is an erecting table 12 which is supported by a brace 13. The erecting table is designed to facilitate the compression of a split mandrel adapted to be inserted within the body of a container for the purpose of expanding the same from flattened or knock-down condition into the cylindrical condition in preparation for the application of the metallic binding strips.

The erecting table is provided on its upper surface with a pair of rollers 14 which are spaced from one another to an extent slightly less than the normal diameter of a split cylindrical mandrel 15, so that when the mandrel is forced between the rollers it will tend to compress the same and cause the free edges to overlap in the manner indicated in full lines in Fig. 1.

Behind the rollers 14 are located positioning blocks 16, each of which is conically rounded on its inner corner 17 to afford separated stops for contacting the wall of the mandrel and holding it in properly spaced position between the rollers 14. With the mandrel thus compressed, a container wall 18, which is shipped in flatwise or folded condition, is spread by hand and slipped upon the mandrel until the margins of the container rests upon the positioning blocks 16, after which the expanded container with the mandrel within it is removed from the erecting table in preparation for the application and crimping of the binding strips.

The mandrel, upon being released from the rollers 14 and the blocks 16, tends to expand within the container and thus bring it to truly cylindrical shape. The mandrel is of a less length than the container, so that when it is positioned at one end of the container it will expose a portion of the container wall beyond the mandrel, as indicated in Figs. 3, 4 and 5. Either end of the container may be thus exposed by shifting the position of the mandrel within the cylindrical body of the container.

With the edge of the container thus exposed, a binding ring is applied, which ring is preferably of the form shown in the Ronald I. Drake application, Serial No. 5,926, filed February 11, 1935, although the binding ring may be otherwise configured. The binding ring, if intended for the top of the container, may be in the form shown in Fig. 4, in which the ring 19 is of channel formation, having an inner lip 20 and an outer lip 21 of greater width than the inner lip.

The outer lip is provided at recurrent intervals with inwardly struck burrs 22 adapted to be forced into the material on the container wall, and is provided with a circumferential reinforcing bead 23. The inner and outer lips are connected by an arch 24 giving to the strip a channel formation of the proper width to embrace the edge of the cylindrical container. The inner lip is preferably provided with vertically reduced corrugations 25, which not only stiffen the rim but

afford a corrugated biting surface for contact with the inner margin of the container wall.

The binding strip shown in Fig. 3 is adapted to embrace not only the rim of the container wall but also a flange 26 on the bottom 27, for which reason the arch 28 is made broader than in Fig. 4, but in other respects the structure is the same. With the strip applied to the margin of the container wall, the wall is supported upon the plate 10 within the space circumscribed by a series of rollers 29, which as shown in the present instance are six in number, and surround the position occupied by the container and serve to restrict the same during the rotating movements imparted to the container during the process of crimping the binding strip thereon. As shown, the rollers are spaced away from the position normally occupied by the container so as to allow considerable freedom of movement thereto, but in the event the whipping or sidewise movement of the container becomes excessive, the rollers afford anti-friction contact points for preventing undue movement.

The crimping is effected by a crimping roller 30 which is mounted upon a vertical shaft 31 and held in place by a washer 32 and screw 33. The upper portion of the roller 30 is beveled, while the lower portion 34 is cylindrical and serrated to afford a biting grip against the inner lip of the binding strip. The shaft 31 is journaled within an annular flange 35, and the shaft carries a bevel pinion 36 which is secured to the shaft by a pin 37. The lower end of the shaft is carried within a thrust bearing 38, and the pinion 36 meshes with a driving pinion 39 carried by a transmission shaft 40, which through suitable reduction gearing 41 is entrained with a motor shaft 42 driven by a motor 43 carried by the frame of the machine.

The bevel pinion 36 is provided with an upwardly extending pin 44 which is adapted to coact with the concave notches 45 of a star wheel 46 which is formed integrally with a disk shaped cam 47 of generally cylindrical configuration provided with a depression 48 on one side. The star wheel is normally lifted above the upper end of the pin 44 as indicated in full lines in Fig. 8, but is adjustable to the position indicated in dotted lines to coact with the pin in a manner presently to be described.

The star wheel with the associated cam is carried by an adjustable pintle 49 having a head 50 which is entered through a plate 51 secured by screws 52 to the top of the cam. The pintle 49 is slidable within a bushing 53 rigidly held within a sleeve 54 depending from the frame of the machine (see Fig. 8). The bushing 53 is provided with a counter bore 55 which receives a coil spring 56 bearing against a head 57 at the lower end of the pintle, which head is contacted by a hardened boss 58 on the end of an arm 59 extending inwardly from a journal head 60 carried by a fixed pivot pin 61 outwardly projecting from the bottom of the machine (see Fig. 6).

The journal head 60 carries an arm 62 having at its upper end a pin 63 which journals a grooved idle compression roll 64 which coacts with the crimping roll 30 when the idle roll is drawn inwardly to the position shown in dotted lines in Fig. 8. The idle roll is thrown into crimping position by the action of a draw rod 65, one end of which is pivoted to the arm 62 and the opposite end of which is entered through a boss 66 on the vertical arm 67 of a bell crank lever 68, the horizontal arm 69 of which has pivoted thereto the upper end of a treadle rod 70, the lower end of which is pivoted to a treadle arm 71 pivoted at its rear end to one of the legs of the frame, and provided at its forward end with a foot treadle 72.

The draw rod 65 beyond the lug 66 is encircled by a coil spring 73 which bears against a nut 74 on the end of the draw rod, the spring affording a cushion for imparting movement from the bell crank to the draw rod. The upper end of the bell crank arm 67 is entered within a recess 75 on the under side of a slide bar 76 and is held in position within said recess by contact with hardened cross pins 77. The slide bar 76 at its inner end carries a roller 78 which bears against the cam 47.

Operation

In operation, with the foot treadle elevated by the tension of a spring 79, the parts will occupy the position shown in full lines in Fig. 6, with the compression roll retracted from the crimping roll to afford an easy entrance for the rim of the container with the binding strip applied thereto. Such entrance is facilitated by the beveling of the upper surface of the crimping roll. After the edge of the container wall has been positioned, the operator depresses the foot treadle 72, which draws down the bell crank into the position shown in dotted lines, and this in turn imparts a pull to the draw rod 65, which serves to swing the arm 62 inwardly through the medium of the cushioning spring 73, which action draws the compression roll 64 into compressive relation with respect to the crimping roll.

The crimping roll is constantly rotating through the train of connections with the motor, and, as soon as pressure is established, the serrated crimping roll will not only tightly crimp the binding strip against the rim of the container, but will also cause the container to rotate, thus progressively bringing every portion of the binding strip into the bite of the rolls.

The crimping operation, if performed on a strip of the character shown in Figs. 3 and 4, will press the inner and outer lips toward one another and cause the burrs 22 to bite into the fiber of the container wall, and cause the inner corrugated lip to impinge tightly against the inner surface of the container wall, or the flange on the bottom, as the case may be.

The operation thus initiated also serves to pull down the star wheel 46 into position to coact with the pin 44 on the bevel pinion 36. This is effected by the downward movement of the arm 59 which allows the pintle 49 to move downwardly under the pressure of the coil spring 56.

The movement of the foot treadle also draws back the slide bar 76 through the action of the bell crank lever arm 67, which retracts the roller 78 from the depression 48 in the cam 47, so that after the star wheel has been initially moved by the engagement of the pin 44, the elevated portion of the cam will be presented to the roller 78, which permits the operator to remove his foot from the foot treadle and serves to retain the parts in operating relationship, since the return movement of the foot treadle will be prevented by the engagement of the roller with the cam.

The operation thus initiated will continue until the star wheel, by intermittent movements, has completed a cycle of rotation, which again brings the cam depression into registry with the slide plate roller and permits the restoration of the parts to inactive position, thus terminating the

crimping operation. After one end of the container has been thus crimped, the container can be inverted and the mandrel shifted to present the other end of the container for the performance of a similar operation.

The mechanism is one which permits the expanding of the containers to be easily, uniformly and rapidly performed by the operator, and permits the crimping to proceed after being once initiated, so that the operator, during the performance of the crimping operation on one of the containers, may center his attention on the expanding of the next container in preparation for the crimping operation, it being desirable to employ duplicate mandrels, so that, while one of the mandrels is employed in the crimping operation, the other may be utilized in preparing the next succeeding container.

Although the invention has been described with considerable particularity as to detail, it is not the intention, unless otherwise indicated in the claims, to limit the same to the specific details shown, since modifications therein may be introduced without departing from the spirit of the invention.

We claim:

1. In a machine of the class described, the combination of a bed plate for supporting the end of a container with a binding strip applied thereto, a crimping roll extending above the bed plate, said crimping roll acting upon the inner surface of the binding strip applied to the margin of the container, a compression roll in spaced relation to the crimping roll and in position to act upon the outer surface of the binding strip, and means for drawing in the compression roll toward the crimping roll to cause biting impingement of the rolls on opposite sides of the binding strip.

2. In a machine of the class described, the combination of a bed plate adapted to support the end of a container, a plurality of positioning members surrounding the position to be occupied by the container on the bed plate and spaced away from the position normally occupied by the container so as to permit freedom of movement thereof, a crimping roll extending above the bed plate and presenting its periphery outwardly in position to act upon the inner surface of a binding strip applied to the margin of the container, a compression roll in spaced relation to the crimping roll and in position to act upon the outer surface of the binding strip, and means for drawing in the compression roll toward the crimping roll to cause biting impingement of the rolls on opposite sides of the binding strip.

3. In a machine of the class described, the combination of a bed plate adapted to support the end of a container, a crimping roll extending above the bed plate and presenting its periphery outwardly in position to act upon the inner surface of a binding strip applied to the margin of the container, a compression roll in spaced relation to the crimping roll and in position to act upon the outer surface of the binding strip, and means for drawing in the compression roll toward the crimping roll to cause biting impingement of the rolls on opposite sides of the binding strip, said means including a swinging arm upon which the compression roll is mounted, a draw rod connected to said arm, and an operating treadle and connections for imparting movements from the treadle to the draw rod.

4. In a machine of the class described, the combination of a bed plate adapted to support the end of a container, a plurality of positioning members surrounding the position to be occupied by the container on the bed plate, a crimping roll extending above the bed plate and presenting its periphery outwardly in position to act upon the inner surface of a binding strip applied to the margin of the container, a compression roll in spaced relation to the crimping roll and in position to act upon the outer surface of the binding strip, and means for drawing in the compression roll toward the crimping roll to cause biting impingement of the rolls on opposite sides of the binding strip, and means including a swinging arm upon which the compression roll is mounted, a draw rod connected to said arm, and an operating treadle and connections for imparting movements from the treadle to the draw rod.

5. In a machine of the class described, the combination of a bed plate adapted to support the end of a container, a crimping roll extending above the bed plate and presenting its periphery outwardly in position to act upon the inner surface of a binding strip applied to the margin of the container, a compression roll in spaced relation to the crimping roll and in position to act upon the outer surface of the binding strip, and means for drawing in the compression roll toward the crimping roll to cause biting impingement of the rolls on opposite sides of the binding strip, said means including a swinging arm upon which the compression roll is mounted, a draw rod connected to said arm, and an operating treadle and connections for imparting movements from the treadle to the draw rod, means for constantly rotating the crimping roll, a cam adapted to be rotated by said means, and a member actuated by said cam and in engagement with the treadle connections for maintaining the parts in operative relationship during a cycle of movement of the cam and preventing restoration of the treadle during said period.

6. In a machine of the class described, the combination of a bed plate adapted to support the end of a container, a plurality of positioning members surrounding the position to be occupied by the container on the bed plate, a crimping roll extending above the bed plate and presenting its periphery outwardly in position to act upon the inner surface of a binding strip applied to the margin of the container, a compression roll in spaced relation to the crimping roll and in position to act upon the outer surface of the binding strip, and means for drawing in the compression roll toward the crimping roll to cause biting impingement of the rolls on opposite sides of the binding strip, and means including a swinging arm upon which the compression roll is mounted, a draw rod connected to said arm, and an operating treadle and connections for imparting movements from the treadle to the draw rod, means for constantly rotating the crimping roll, a cam adapted to be rotated by said means, and a member actuated by said cam and in engagement with said treadle connections for maintaining the parts in operative relationship during a cycle of movement of the cam and preventing restoration of the treadle during said period.

7. In a machine of the class described, the combination of a bed plate adapted to support the end of a container, a crimping roll extending above the bed plate and presenting its periphery outwardly in position to act upon the inner surface of a binding strip applied to the margin of the container, a compression roll in spaced relation to the crimping roll and in position to act

upon the outer surface of the binding strip, and means for drawing in the compression roll toward the crimping roll to cause biting impingement of the rolls on opposite sides of the binding strip, said means including a swinging arm upon which the compression roll is mounted, a draw rod connected to said arm, and an operating treadle and connections for imparting movements from the treadle to the draw rod, means for constantly rotating the crimping roll, a pin revolvable with said means, a star wheel adapted to be intermittently engaged by said pin, means associated with the treadle connections for bringing the star wheel into cooperative relationship with said pin when the rolls are brought into crimping relationship, a cam carried by the star wheel, and a member coacting with said cam and adapted during the operative period to prevent restoration of the treadle connections and maintain the parts in operative relation during a cycle of movement of the cam.

8. In a machine of the class described, the combination of a bed plate adapted to support the end of a container, a plurality of positioning members surrounding the position to be occupied by the container on the bed plate, a crimping roll extending above the bed plate and presenting its periphery outwardly in position to act upon the inner surface of a binding strip applied to the margin of the container, a compression roll in spaced relation to the crimping roll and in position to act upon the outer surface of the binding strip, and means for drawing in the compression roll toward the crimping roll to cause biting impingement of the rolls on opposite sides of the binding strip, and means including a swinging arm upon which the compression roll is mounted, a draw rod connected to said arm, and an operating treadle and connections for imparting movements from the treadle to the draw rod, means for constantly rotating the crimping roll, a pin revolvable with said means, a star wheel adapted to be intermittently engaged by said pin, means associated with the treadle connections for bringing the star wheel into cooperative relation with said pin when the rolls are brought into crimping relationship, a cam carried by the star wheel, and a member coacting with said cam and adapted during the operative period to prevent restoration of the treadle connections and maintain the parts in operative relation during a cycle of movement of the cam.

9. In a machine of the class described, the combination of a bed plate adapted to support the end of a container, a crimping roll extending above the bed plate and presenting its periphery outwardly in position to act upon the inner surface of a binding strip applied to the margin of the container, a compression roll in spaced relation to the crimping roll and in position to act upon the outer surface of the binding strip, and means for drawing in the compression roll toward the crimping roll to cause biting impingement of the rolls on opposite sides of the binding strip, said means including a swinging arm upon which the compression roll is mounted, a draw rod connected to said arm, and an operating treadle and connections for imparting movements from the treadle to the draw rod, means for constantly rotating the crimping roll, a pin revolvably carried by said means, a star wheel, a mounting for said star wheel, adapted to afford adjustment to bring the star wheel into or out of operative relation to said pin, said mounting being actuated by the treadle connections and adapted to bring the star wheel and pin into coacting relation when the rolls are brought into crimping relation, a cam carried by said star wheel, and a member in engagement with the treadle connections and actuated by said cam and adapted to be maintained by the cam in position to prevent restoration of the treadle connections after the operation has been initiated and until the cam has completed its cycle of movement.

10. In a machine of the class described, the combination of a bed plate adapted to support the end of a container, a plurality of positioning members surrounding the position to be occupied by the container on the bed plate, a crimping roll extending above the bed plate and presenting its periphery outwardly in position to act upon the inner surface of a binding strip applied to the margin of the container, a compression roll in spaced relation to the crimping roll and in position to act upon the outer surface of the binding strip, and means for drawing in the compression roll toward the crimping roll to cause biting impingement of the rolls on opposite sides of the binding strip, and means including a swinging arm upon which the compression roll is mounted, a draw rod connected to said arm, and an operating treadle and connections for imparting movements from the treadle to the draw rod, means for constantly rotating the crimping roll, a pin revolvably carried by said means, a star wheel, a mounting for said star wheel, adapted to afford adjustment to bring the star wheel into or our of operative relation to said pin, said mounting being actuated by the treadle connections and adapted to bring the star wheel and pin into coacting relation when the rolls are brought into crimping relation, a cam carried by said star wheel, and a member in engagement with the treadle connections and actuated by said cam and adapted to be maintained by the cam in position to prevent restoration of the treadle connections after the operation has been initiated and until the cam has completed its cycle of movement.

11. In a machine of the class described, the combination of a bed plate, rolls associated with the bed plate and positioned to engage opposite sides of a binding strip on the rim of a container positioned upon said bed plate, one of said rolls being adjustable with respect to the other, means for driving one of the rolls and means for moving the other roll into coacting relation therewith, said last mentioned means including connections adapted to be momentarily actuated by the operator, and means actuated by the driven roll for preventing restoration of the parts to non-operative position during a cycle of crimping operations.

12. In a machine of the class described, the combination of a bed plate, rolls associated with the bed plate and positioned to engage opposite sides of a binding strip on the rim of a container positioned upon said bed plate, one of said rolls being adjustable with respect to the other, means for driving one of the rolls and means for moving the other roll into coacting relation therewith, said last mentioned means including connections adapted to be momentarily actuated by the operator, and means actuated by the driven roll for preventing restoration of the parts to non-operative position during a cycle of crimping operations, said means including a star wheel adapted to be brought into coacting relation with the

driving means when the operation is initiated, a cam associated with the star wheel, and means actuated by the cam for preventing restoration of the parts to non-operative position during a cycle of movement of the cam.

13. In a machine of the class described, the combination of a bed plate, rolls associated with the bed plate and positioned to engage opposite sides of a binding strip on the rim of a container positioned upon said bed plate, one of said rolls being adjustable with respect to the other, means for driving one of the rolls and means for moving the other roll into coating relation therewith, said last mentioned means including connections adapted to be momentarily actuated by the operator, and means actuated by the driven roll for preventing restoration of the parts to non-operative position during a cycle of crimping operations, said means including a star wheel and a mounting therefor, actuated by movements of the roll moving means to bring the star wheel into coacting relation with the roll driving means when the rolls are adjusted to crimping position, a pin revolvably carried by the roll driving means and adapted to recurrently engage the star wheel and impart progressive movements thereto, a cam carried by the star wheel, a roller engaging said cam, and a slide plate upon which the roller is mounted, said slide plate engaging the roll moving connections and adapted, after the star wheel has been initially moved, to prevent restoration of the parts to non-operative position by contact of the cam with the slide plate roller during a cycle of movement of the cam.

14. In a machine of the class described, the combination of a bed plate, crimping rolls carried by the bed plate, one of said rolls being positively driven, an erecting platform extending outwardly from the bed plate, and a pair of spaced members adapted to compress a mandrel inserted therebetween to permit the body of a container to be fitted upon the mandrel in preparation for the crimping of a binding strip.

15. In a machine of the class described, the combination of a bed plate, crimping rolls carried by the bed plate, one of said rolls being positively driven, an erecting platform extending outwardly from the bed plate, a pair of spaced members adapted to compress a mandrel inserted therebetween to permit the body of a container to be fitted upon the mandrel in preparation for the crimping of a binding strip, and stop blocks in contiguous relation to said spaced members and rounded on their inner corners to embrace the contacting portions of the mandrel.

16. The method of applying a binding strip to the margin of a cylindrical container, which consists in compressing a split expansible mandrel by externally applied pressure, fitting a container upon the mandrel, releasing the mandrel from compressive action to permit expansion thereof within the container, exposing a margin of the container beyond the mandrel, applying a channelled binding strip to said margin, rotatably applying crimping pressure to a given portion of said binding strip on the exterior and interior thereof, and imparting rotation to the container by the application of said rotatably applied crimping pressure to cause each portion of the strip to be subjected to crimping pressure.

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