July 26, 1955 L. TRIOLO 2,713,813

SIDE-WALL ROLLER FOR BOX WRAPPING MACHINES

Filed April 12, 1954 5 Sheets-Sheet 1

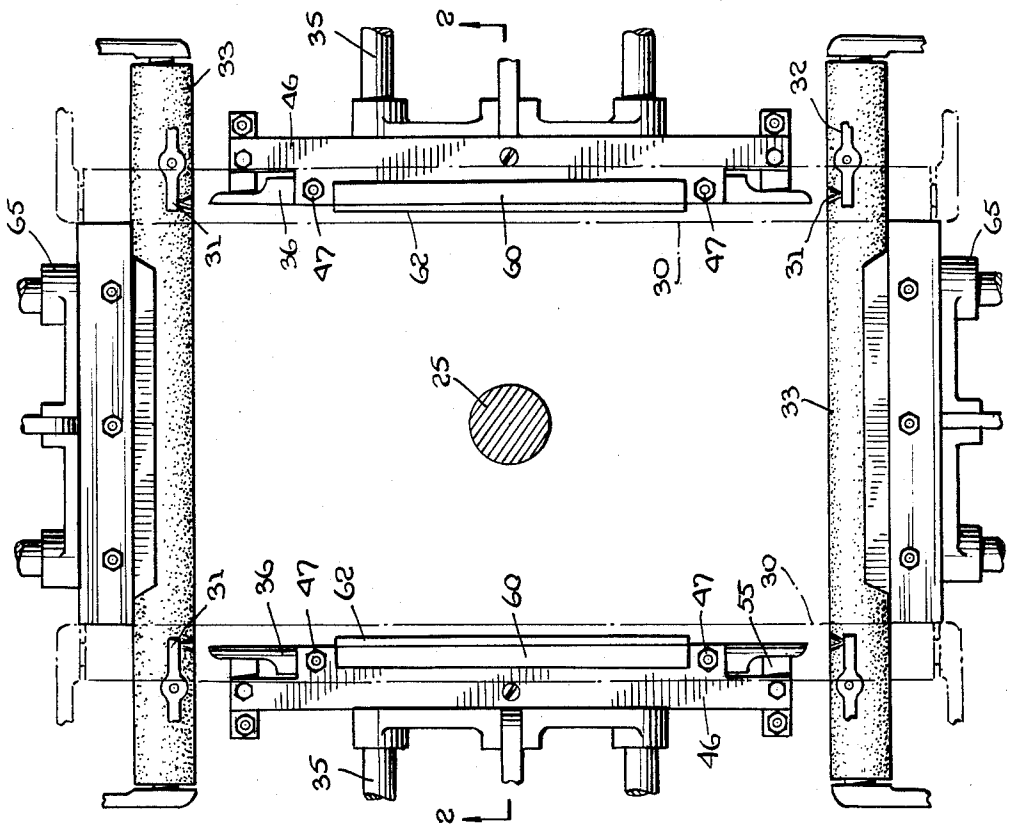


Fig. 1.

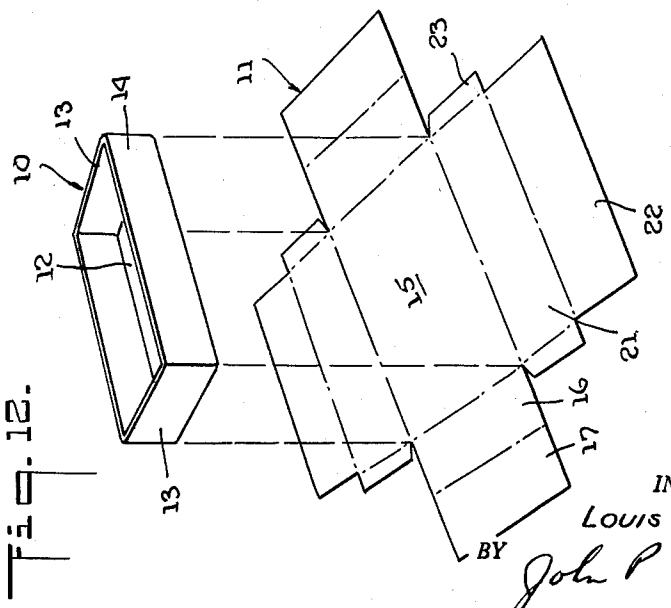


Fig. 12.

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SIDE-WALL ROLLER FOR BOX WRAPPING MACHINES

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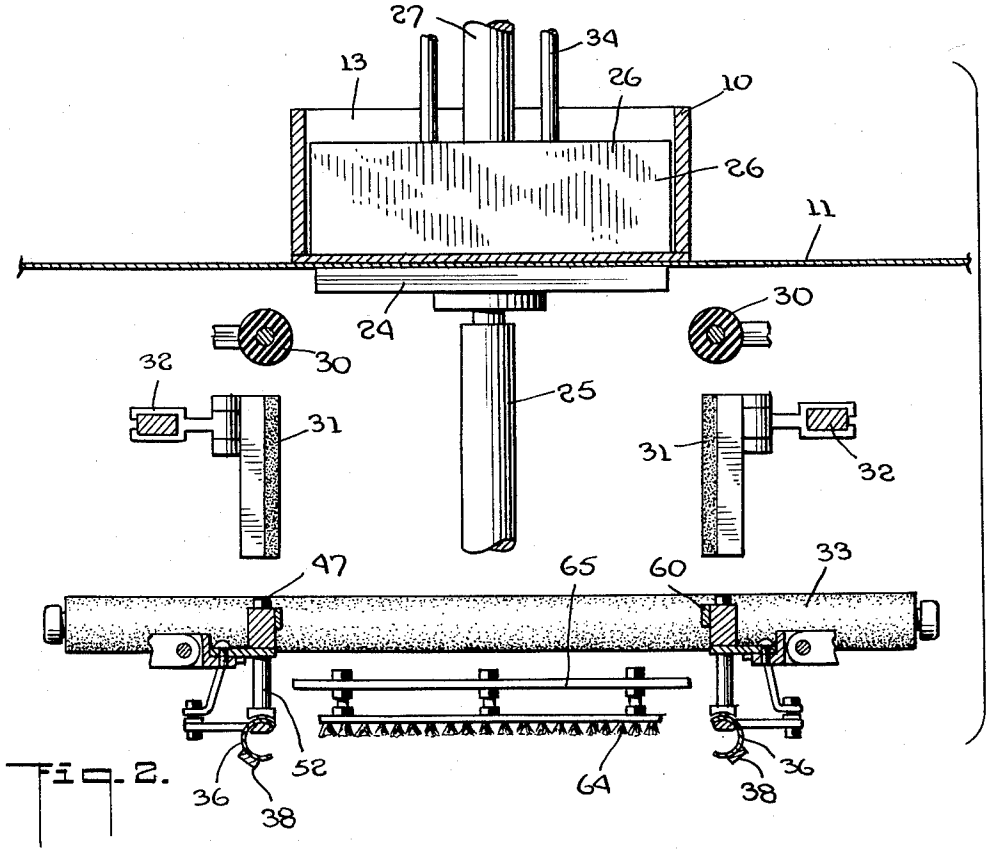
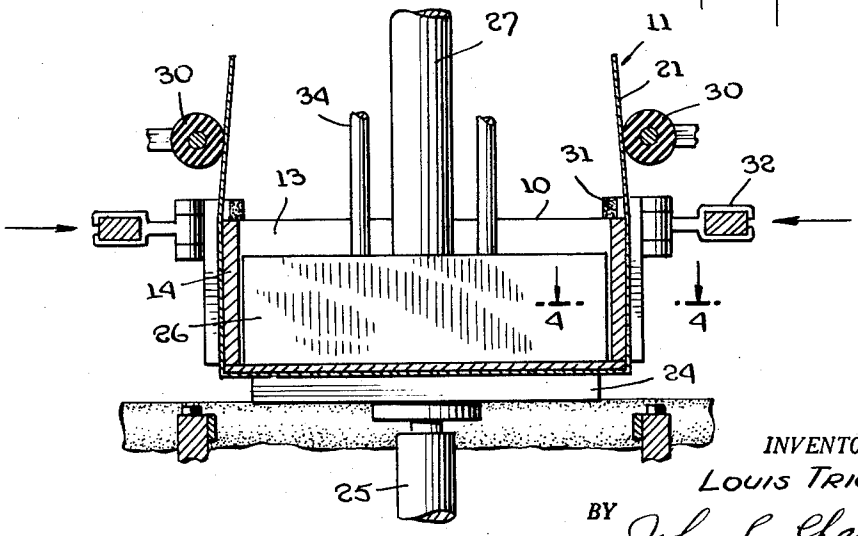


Fig. 2.

Fig. 3.



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SIDE-WALL ROLLER FOR BOX WRAPPING MACHINES

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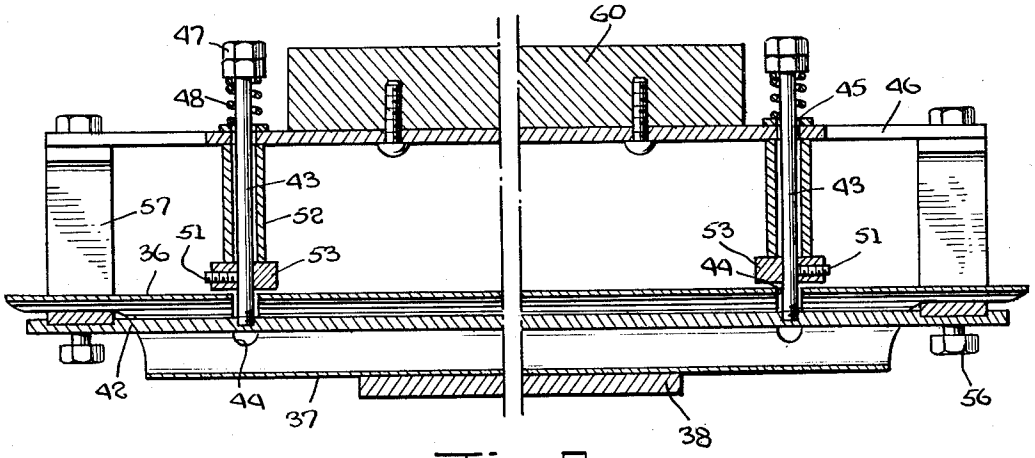


Fig. 9.

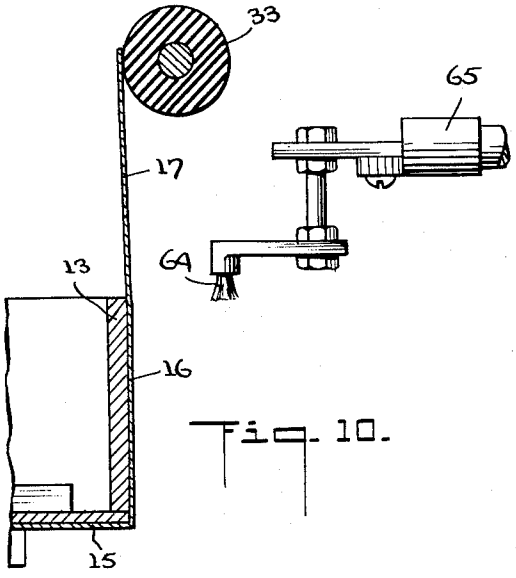


Fig. 10.

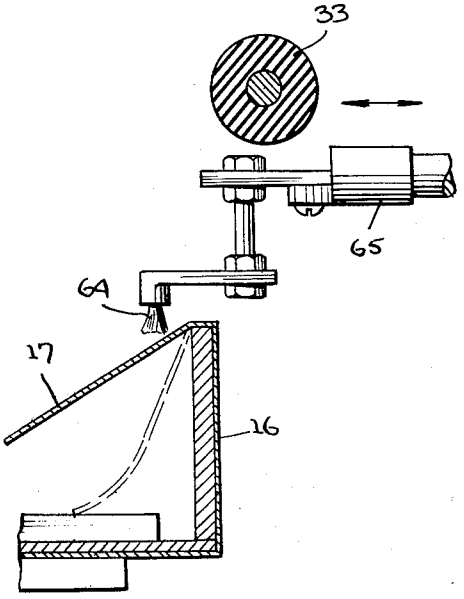


Fig. 11.

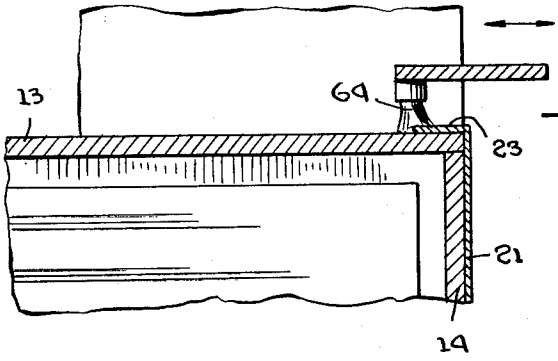


Fig. 4.

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SIDE-WALL ROLLER FOR BOX WRAPPING MACHINES

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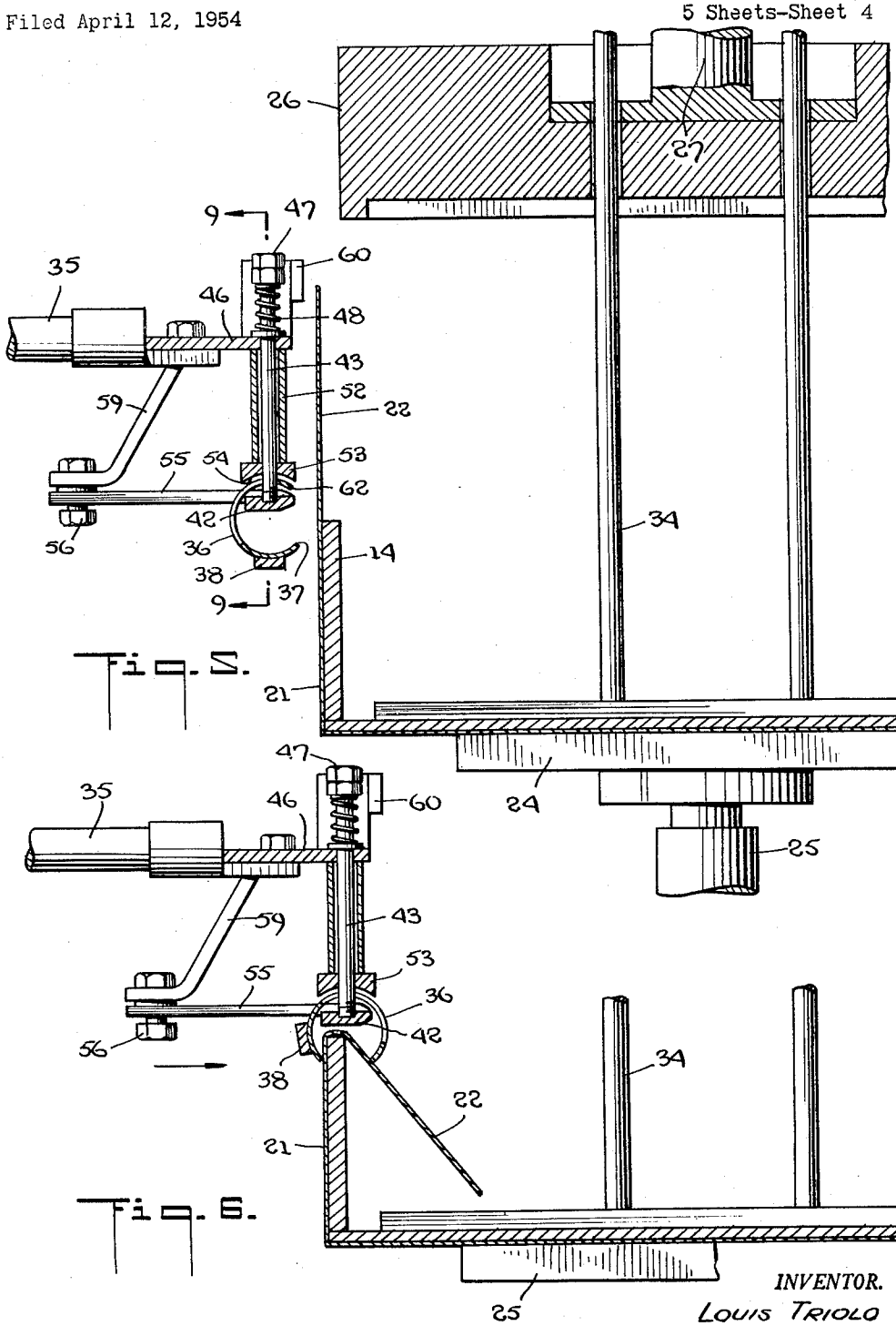


Fig. 5.

Fig. 6.

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SIDE-WALL ROLLER FOR BOX WRAPPING MACHINES

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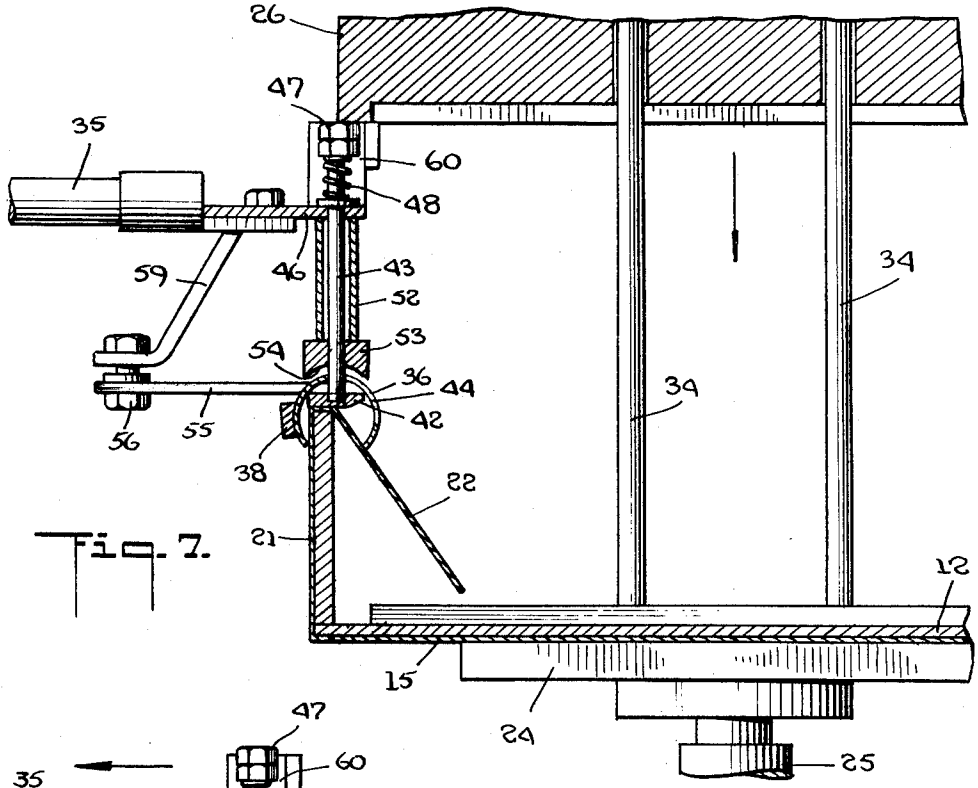


Fig. 7.

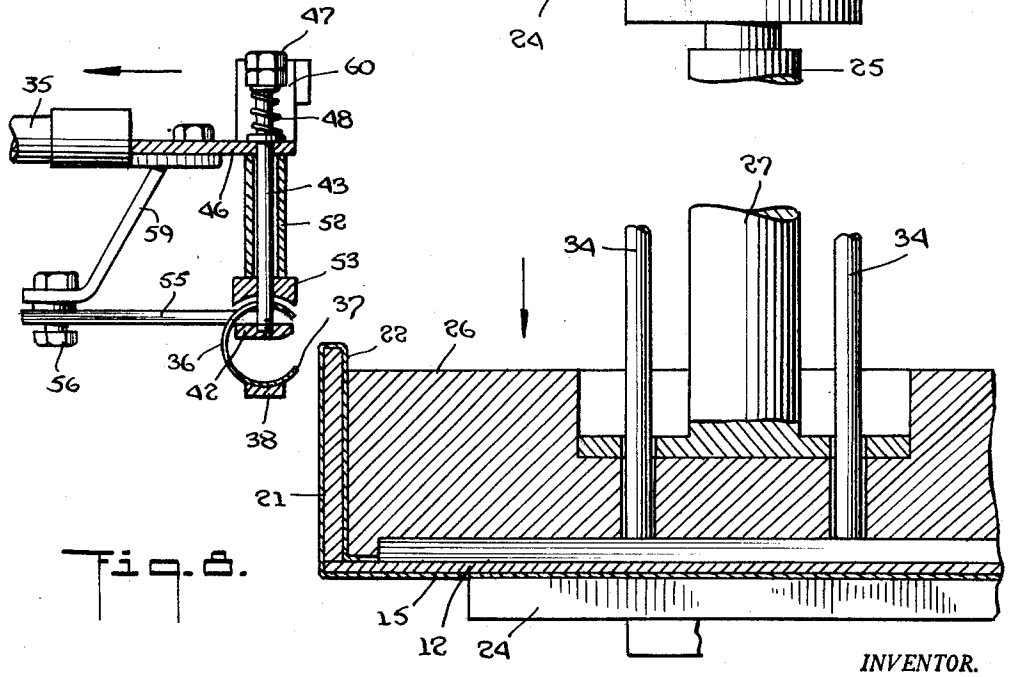


Fig. 8.

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SIDE-WALL ROLLER FOR BOX WRAPPING MACHINES

Louis Triolo, Brooklyn, N. Y.

Application April 12, 1954, Serial No. 422,420

3 Claims. (Cl. 93—54.2)

This invention relates to box wrapping machines and relates more particularly to an improvement in existing machines to apply a wrapper for the full depth of the inner side and end walls of the box.

Machines for applying decorative or plain coverings or wrappers to set-up boxes are exceedingly common in the art and they generally include upper and lower forming blocks, each mounted at the lower and upper ends, respectively, of aligned, upper and lower, vertically reciprocating plungers. The wrapper for the bottom, side and end walls is placed, adhesive side up, on the lower forming block and the box with the rigid or semi-rigid side and end walls is placed on the upper block. The latter descends into contact with the lower block and both then descend conjointly, and resilient rollers wrap the wall sections into engagement with the outer walls of the box. The upper block then departs from the box while the latter is held immovable on the lower block and further wiping action occurs to wrap the inner side and end wall sections of the wrapping blank inwardly to cover a part of the inner walls of the box, after which the upper block again enters the box, pressing the inner side wall wrapping sections into firm engagement with these inner surfaces. The covered box is then discharged from the machine.

In all existing machines the depth of covering that can be applied to these inner walls is definitely limited to about ⅞ inch regardless of the height of the side walls. Accordingly, if a box has a wall height of, for example, two inches, the remaining area is not covered and a separate blank must be applied, usually by hand, in order to make the inner wall covering look like one piece. In the cheaper boxes this lower section of the inner side walls is left uncovered and, accordingly, it looks shabby.

The reason for this limitation of depth of inner wall covering is as follows. After the outer side and end wall sections of the covering blank have been applied to the outer side and end walls of the box, brushes mounted on horizontally reciprocating plungers move inwardly and wipe the blank over the tops of the opposed side walls. Next, other similar brushes wipe the blank over the tops of the opposed end walls, after which the upper forming block enters the box to press the inner covering sections against the box walls. If the inner wall covering is any greater than ⅞ inch or thereabouts, the corner sections collide in mid-air and its upper forming block always tears the corner sections of the wrap because of the fact that the inner side wall wrapping sections have not been pressed down sufficiently.

It is an object of the present invention to provide novel rollers for the inner side wall wrapping operation which enter the box and press the inner side wall wraps sufficiently far down to avoid tearing at the corners when the inner end wall portions enter.

Another object of the invention is to provide novel means for mounting these rollers in a semi-floating fashion wherein they are rotatably moved inwardly of the box, not by any positive drive, but rather by mere contact by a portion thereof, with the outer side walls of the box. Reverse rotation to cause the rollers to depart from the box, when they are free to do so, is effected by a simple counterbalancing weight on their under surfaces.

It will thus be apparent that another and very important object of the invention is to provide an improved structure for conventional box wrapping machines which enables the inner walls to be wrapped over their full depth without retarding the normal, high-speed operation of machines of this general character.

In the drawings:

Fig. 1 is a horizontal section taken through a box wrapping machine embodying the present invention and showing in plan view the improved side wall pressing rollers of the present invention.

Fig. 2 is a vertical section taken on line 2—2 of Fig. 1 and showing the two-part forming block in raised position and the unwrapped box and wrapper therefor positioned between the upper and lower forming blocks.

Fig. 3 shows the forming blocks in lowered position and the wrapper applied to the opposed side walls of the box.

Fig. 4 is a broken corner section of the box and showing the brush for wiping in the corner tab of the wrapper.

Fig. 5 is a section taken through the box in its lowermost position and showing the position of the side wall roller assembly before the same moves into operating position.

Fig. 6 is similar to Fig. 5 but shows the side wall rollers after they have entered the box.

Fig. 7 shows the position of the parts after the upper edge of the side wall wrapper has been moved into firm engagement with the upper edge of the side wall of the box.

Fig. 8 shows the position of the parts after the side wall roller assembly has retreated and the upper forming block has moved into place to press the inner side walls of the wrapper against the side walls of the box.

Fig. 9 is a section taken on line 9—9 of Fig. 5.

Fig. 10 shows the position of the parts after the end wall roller has moved the end wall of the blank into engagement with the end wall of the box.

Fig. 11 shows the position of the parts after the inner end wall section of the wrapper has been creased inwardly.

Fig. 12 is an exploded perspective view showing the box and the wrapper therefor before the latter has been applied to the box.

Figs. 1, 2 and 3 show the essential operating parts of a conventional box wrapping machine. The machine includes a frame (not shown) supporting all of the moving parts and a cam shaft (not shown) having a plurality of cams for transmitting motion to the moving parts in a timed sequence. The box 10 to be wrapped and the blank 11 forming the wrapper or box covering are shown in Fig. 12 and this box includes a bottom wall 12, end walls 13 and side walls 14. The wrapper includes a base section 15, outer and inner end wall sections 16 and 17 and outer and inner end wall sections 21 and 22, the former having corner tabs or wings 23. The machine includes a two-part forming block having lower and upper sections 24 and 26. The blank having an overall coating of adhesive is first placed on the lower block 24 which is mounted on the upper end of a vertically reciprocating plunger 25, the block being of substantially the same size as the base section of the blank 11. The box is now placed on the upper forming block 26 which is mounted at the lower end of an upper reciprocating plunger 27. The operator now depresses a foot treadle (not shown) starting a cycle of operation. The upper forming block now descends with the operator holding the box against fall-

ing until the block starts its downward travel. The upper block and the box contact the blank and the lower block and the two blocks move downwardly conjointly.

The side walls 21 of the blank first contact resilient rollers 30 after the assembly passes below the position of Fig. 2 and as the box moves downwardly the rollers press the outer side walls of the blank against the box and the parts are now in the position of Fig. 3. Brushes 31 supported by brackets 32 now move inwardly folding corner tabs or wings 23 around the corner sections of the box. The lower block carrying the partly wrapped box now descends while the upper block remains suspended, all preparatory to folding the inner wall-wrapping sections inwardly. During this further downward travel the box is held immovable on the lower block by means of follower rods 34. The further downward travel of the box causes the transverse creasing rollers 33 to fold end walls 16 upwardly and press them against the end walls of the box. In the conventional wrapping machine brushes move the inner side walls inwardly and downwardly forming a crease line, and transverse brushes now move the inner end walls inwardly.

All of the foregoing structure is largely conventional. The improvement of the present invention consists primarily in the provision of an improved type of roller for folding the deep inner side walls inwardly and downwardly and then retracting these rollers before the relatively deep inner end walls are folded downwardly, after which the forming block descends, pressing the inner side and end walls firmly against the walls of the box.

The details of this roller for creasing the inner side walls inwardly and downwardly are shown in Figs. 5 to 9 inclusive. The roller assembly is supported on spaced reciprocating plungers 35 which move inwardly from the position of Fig. 5. The roller 36 is formed from sheet metal and is generally C-shaped in transverse section and constitutes an arc of substantially 270° of a circle.

The roller is loosely supported so that it readily turns merely by contact with the outer side walls of the wrapper as the plungers move inwardly. When the roller is at rest (Figs. 5 and 9) its then lower section 37 is of lesser length than its upper section, which latter extends beyond its supporting frame. When the roller has performed its function (Fig. 7) and it is free to return to starting position a counterbalancing weight 38 on its lower edge performs the function of returning it.

The roller is supported on presser bar 42 which is carried at the lower end of two pins 43 which pass through arcuate slots 44 in the roller and also through openings 45 in an upper supporting plate 46.

The pins carry nuts 47 at their upper ends and springs 48 urge the pins upwardly. Upward movement, however, is limited by spacer bushings 52 which at their lower ends contact spacer blocks 53, whose lower surfaces are concavely curved as shown at 54 to fit the outer periphery of the rollers. These blocks are secured immovable on pins 43 by means of set screws 51 (Fig. 9) and there is at all times sufficient clearance between presser bar 42 and spacer blocks 53 to allow for the free floating movement of the roller. Presser bar 42 is guided for downward travel by means of horizontal brackets 55 and these brackets are loosely mounted at their rear terminals on headed pins 56, the lower head being normally spaced from the lower surface of bars 55. These pins are supported by angle brackets 59 which are secured to the ends of upper supporting plate 46. This plate is further provided with a spacer member 60 on its upper surface and the upper surface of this spacer member is disposed a short distance below the upper ends of pins 43 which support presser bar 42.

After longitudinal pressing rollers 30 have moved outer side wall wrap sections against the outer surface of side walls 14 of the box (Fig. 5) plungers 35 carrying the roller assembly move inwardly and the lower or trailing edges 37 of the rollers contact the side wall of the box.

When trailing edges 37 of the rollers contact the box the rollers turn from the position of Fig. 5 to the position of Fig. 6 and during this movement the leading edge 62 of the roller contacts the inner side wall wrap 22 and moves it downwardly to the position of Fig. 6. The upper forming block 26 now descends and contacts nuts 47 and moves pins 43 and presser bar 42 downwardly until the presser bar contacts the upper edge of the side walls of the box, as shown in Fig. 7. This forms a sufficient crease for the inner edge of the top of the side wall to retain the inner side wall wrap 22 in this downward position. It will be noted from Fig. 6 that this distance of downward travel is very short and downward travel of the upper forming block at this point is limited by spacer member 60. During this downward travel guide bar 55 moves downwardly on supporting pins 56 to the position of Fig. 7.

When this action occurs plungers 35 commence their rearward travel and the rollers return to starting position due to the counterbalancing weight. Just before this rearward travel starts transverse horizontal brushes 64, mounted on plungers 65, move inwardly, creasing the inner end wall wrap 17 over the top of the end wall and moving said wrap section 17 to the position of Fig. 11. As this is occurring the rollers are retreating and when both assemblies are out of the line of travel of the upper forming block the latter now descends into the box. The forming block assembly now raises and the finished box is discharged from the machine.

What I claim is:

1. The combination with a machine for applying a wrapper to opposed inner and outer side walls of a box and provided with vertically reciprocating upper and lower forming blocks and pressing rollers for applying the wrapper to the outer walls of the box, of means for folding the inner side wall sections of the wrapper over the top of the box and downwardly, said means comprising substantially C-shaped elongated rollers presenting upper and lower longitudinal edges when at rest, weights on the lower sections for returning the rollers to said position, said rollers being caused to revolve when their lower edges contact the opposed side walls of the box and their upper edges thereby contact the inner side wrapping sections and move the same inwardly and downwardly, means for supporting said rollers comprising plungers which are movable inwardly towards said side walls, supporting means mounted on said plungers including depressible presser bars upon which the rollers are mounted for free rotation, spacer blocks limiting upward travel of the rollers during their rotation, the upper forming block moving said presser bars downwardly to fold the wrapper sections over the top edges of the box.

2. The combination with a machine for applying a wrapper to inner and outer side walls of a box and provided with vertically reciprocating upper and lower forming blocks and pressing rollers for applying the wrapper to opposed outer walls of the box, of means for folding the inner side wall sections of the wrapper over the top of the box and downwardly, said means comprising elongated hollow rollers which form the arc of less than a complete circle in transverse section and presenting upper and lower longitudinal edges, said rollers being caused to revolve when their lower edges contact the opposed side walls of the box and their upper edges thereby contact the inner side wrapping sections and move the same inwardly and downwardly, means for supporting said rollers comprising plungers which are movable inwardly towards said side walls, supporting means mounted on said plungers including depressible presser bars upon which the rollers are mounted for free rotation, spacer blocks limiting upward travel of the rollers during their rotation, the upper forming block moving said presser bars downwardly to fold the wrapper sections over the

top edges of the box, and weights on the lower surfaces of the rollers for returning them to starting position.

3. The combination with a machine for applying a wrapper to inner and outer side and end walls of a box and provided with vertically reciprocating upper and lower forming blocks and pressing rollers for applying the wrapper to the outer walls of the box, of means for folding the inner side wall sections of the wrapper over the top of the box and downwardly, said means comprising elongated hollow rollers formed of sheet material and which form the arc of about 270° of a circle in transverse section and which are caused to revolve when their lower edges contact the opposed side walls of the box and their upper edges thereby contact the inner side wrapping sections and move the same downwardly, means for supporting said rollers comprising

plungers which are movable inwardly towards said side walls, supporting means mounted on said plungers including depressible presser bars upon which the rollers are mounted in substantially floating relation, spacer blocks limiting upward travel of the rollers during their rotation, the upper forming block moving said presser bars downwardly to fold the wrapper sections over the top edges of the box, and weights on the lower surfaces of the rollers for returning them to starting position.

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