BEST AVAILABLE COP

No. 778,805. PATENTED DEC. 27, 1904.

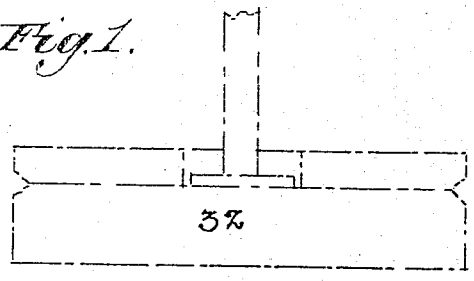
P. S. SMITH.

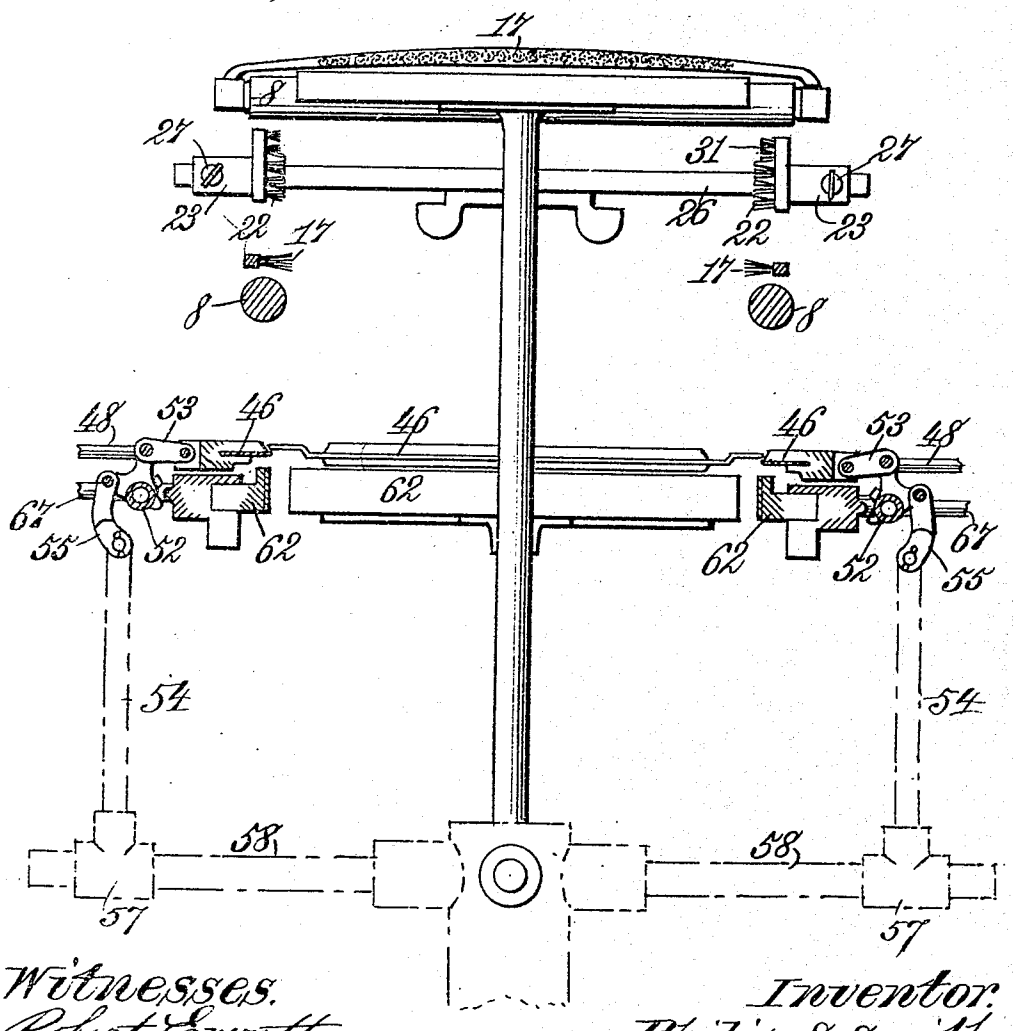
BOX COVERING MACHINE.

APPLICATION FILED APR. 14, 1903.

4 SHEETS—SHEET 1.

Fig. 1.





Witnesses.
Robert Ewalt.
John E. Burch.

Inventor.
Philip S. Smith.
By J. Scanville Meyers
Atty.

BEST AVAILABLE COP

No. 778,805. PATENTED DEC. 27, 1904.

P. S. SMITH.

BOX COVERING MACHINE.

APPLICATION FILED APR. 14, 1903.

4 SHEETS—SHEET 2.

Fig. 2.

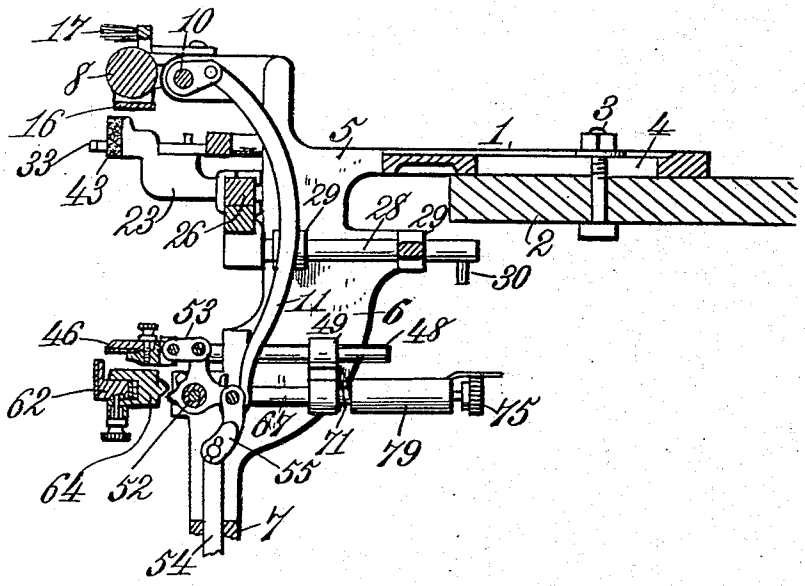
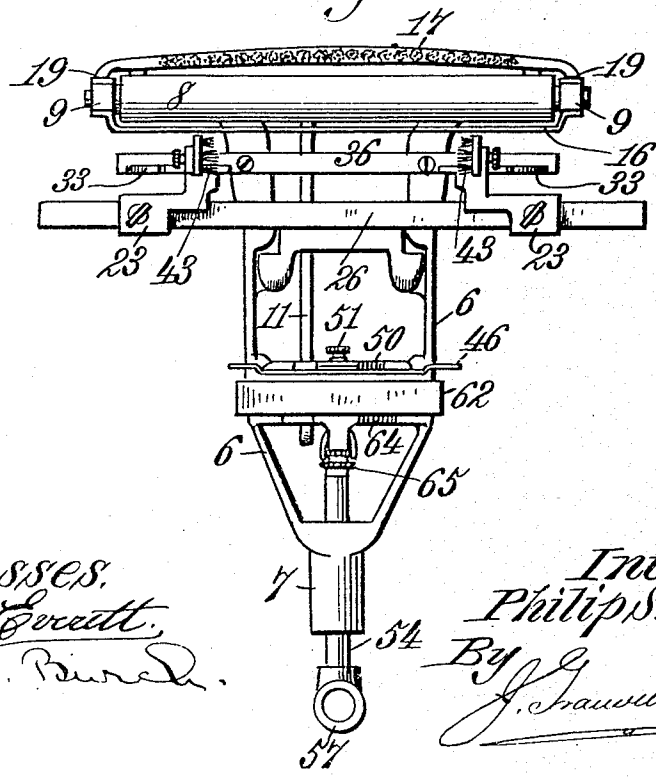


Fig. 3.



Witnesses.
Robert Everett.
John E. Burch.

Inventor
Philip S. Smith.
By J. Granville Meyers
Atty.

BEST AVAILABLE COP

No. 778,805. PATENTED DEC. 27, 1904.

P. S. SMITH.

BOX COVERING MACHINE.

APPLICATION FILED APR. 14, 1903.

4 SHEETS—SHEET 3.

Fig. 4.

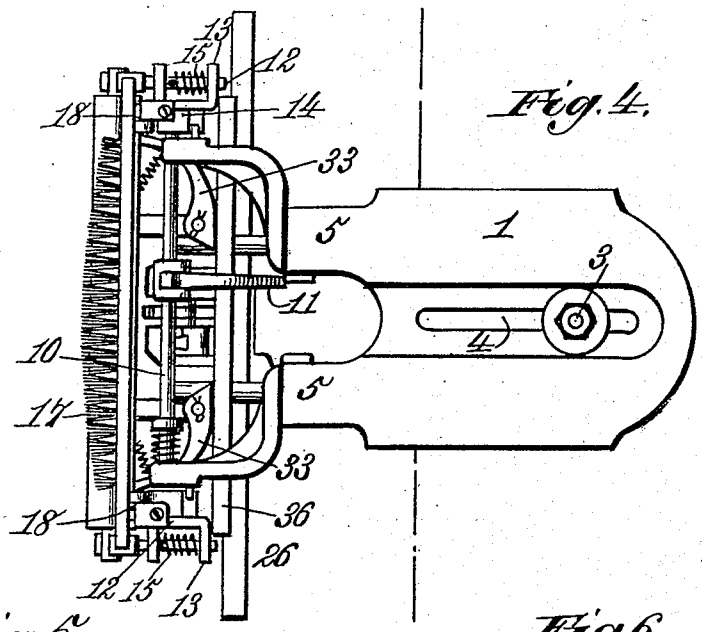


Fig. 5.

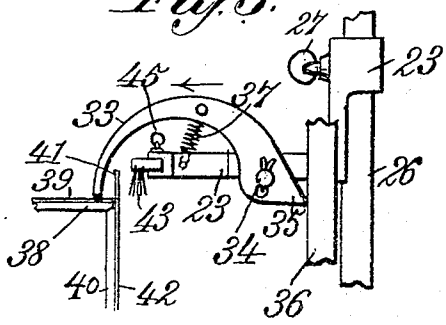


Fig. 6.

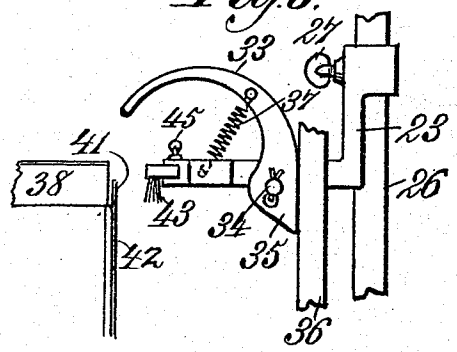


Fig. 7.

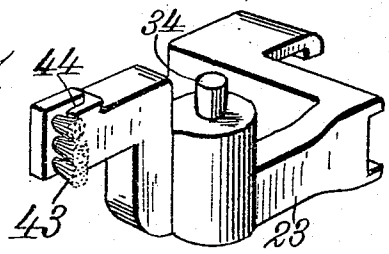
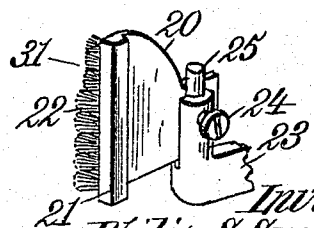


Fig. 8.



Witnesses.
Robert Everett.
John E. Burch.

Inventor.
Philip S. Smith.
By J. Snowville Meyers
Att'y.

BEST AVAILABLE COP

No. 778,805. PATENTED DEC. 27, 1904.

P. S. SMITH.

BOX COVERING MACHINE.

APPLICATION FILED APR. 14, 1903.

4 SHEETS—SHEET 4.

Fig. 9.

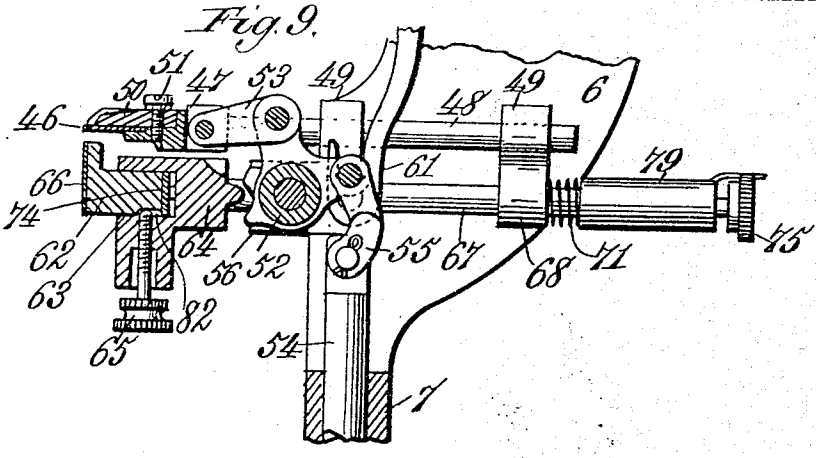


Fig. 10.

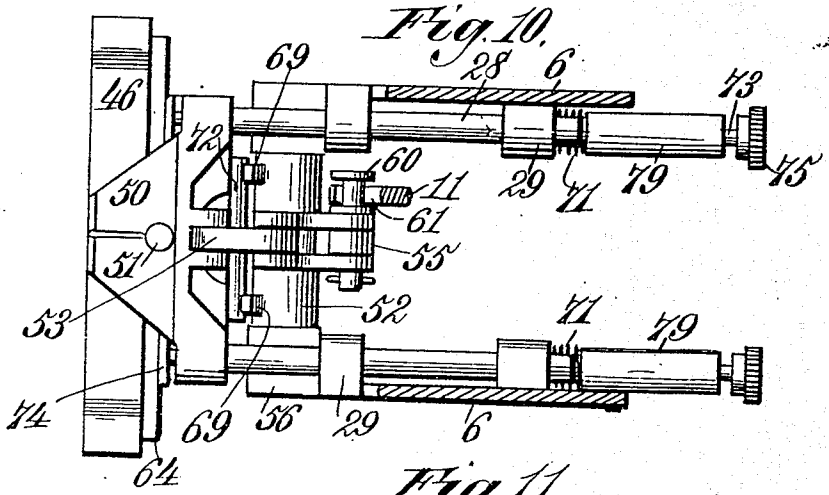


Fig. 11.

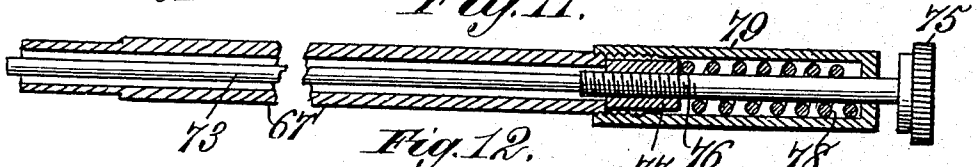


Fig. 12.

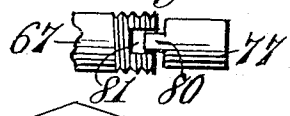


Fig. 13.

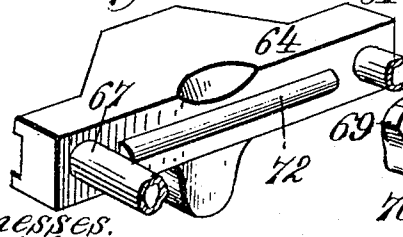
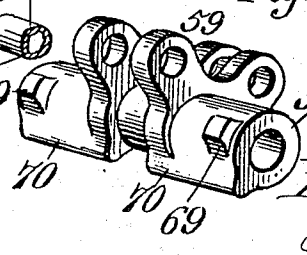


Fig. 14.



Witnesses.
Robt Everett.
John C. Burch

Inventor:
Philip S. Smith.
By J. Stanwill Mayo & Co
Att'y.

BEST AVAILABLE COP

No. 778,805. Patented December 27, 1904.

UNITED STATES PATENT OFFICE.

PHILIP S. SMITH, OF PHILADELPHIA, PENNSYLVANIA.

BOX-COVERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 778,805, dated December 27, 1904.

Application filed April 14, 1903. Serial No. 152,540.

To all whom it may concern:

Be it known that I, PHILIP S. SMITH, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Box-Covering Machines, of which the following is a specification.

My present invention relates to box-covering machines of the type shown and described in my prior Letters Patent, No. 691,329, dated January 14, 1902, and has for its objects to provide certain improvements in machines of this class in order to render the same more reliable and perfect in operation.

As the present invention relates mainly to improvements on my said prior patented machine, I have deemed it necessary to show only such improvements and their coöperative parts; but for the sake of clearness I will describe in a general way the operation of the machine and then give a detailed description of the improvements sought to be covered and protected herein.

According to my invention paper boxes are covered with a single blank comprising a body portion having integral side and end flaps. The blank is first coated on one face with glue, and the bottom of the box is then centered on the glued side of the body portion of said blank, which causes the latter to adhere thereto, this operation in the present instance being carried out by hand. The box, with its blank attached to the bottom thereof, is then placed upon a two-part separable form-block carried by a reciprocating plunger, which latter is caused to move up and down between covering devices that act to fold flaps of the covering-blank up against the sides and ends of the box and firmly affix them thereto and then tuck the ends of the flaps over the edges of and down into the box. These several steps or operations are carried out in substantially the order named, and the finished box is finally ejected from the machine.

It is the purpose of the present invention to simplify and improve certain parts of the covering mechanism and their coöperative parts, and these improvements may be briefly described as follows: first, to provide means for engaging with and sweeping or wiping the flaps of the blank over the sides and ends of the box prior to the action of the covering-rollers in order to press out all air-bubbles, blisters, or creases and wrinkles, thus insuring a perfectly-smooth application of the blank; secondly, to provide an improved form of end-turn-in wing that will not mar or rupture the covering-blank; thirdly, to provide means for lifting the ends of non-stayed boxes and holding said ends in an upright position ready to receive the ends of the glued flaps of the covering-blank, thus enabling the machine to cover boxes that have not been stayed at the corners, and this I believe to be broadly new and consider the same one of the salient features of the present invention; fourthly, to provide a novel form of support or holder for the edge-tuck-in fingers and novel means for moving said fingers to and from each other in horizontal planes, so as to neatly fold the projecting edges of the covering-blank over the edges of the box; fifthly, to provide a novel presser-block having a soft or yielding face that will not deface or impress the box; sixthly, to provide novel operating mechanism for actuating the presser-blocks, the edge-tuck-in fingers, and the tilting covering devices or rollers.

The invention has for its further objects to provide certain other novel features, all of which will be more clearly defined in the following detailed description and then pointed out in the appended claims.

In the accompanying drawings, which form a part hereof, and in which the same reference character designates the same part in each of the views in which it occurs, Figure 1 is a broken vertical section of a portion of a machine embodying my invention. Fig. 2 is a vertical sectional view of a slide provided with its operative mechanism. Fig. 3 is a front view of the same. Fig. 4 is a top plan view. Figs. 5 and 6 are plan views of the end lifters for unstayed boxes, showing the same in two positions. Figs. 7 and 8 are perspective views of the end-turn-in wing. Fig. 9 is a vertical sectional view of the edge-tuck-in

BEST AVAILABLE COP

mechanism. Fig. 10 is a top plan view of the same. Figs. 11, 12, 13, and 14 are detail views of some of the parts of the same.

In the class of machines to which this invention applies the mechanism for directly applying the cover to the different sides or walls of the box are substantial duplicates of each other, and as this invention relates more particularly to that mechanism only one set of such mechanism is shown, and the description in referring to said set will be equally applicable to all of the sets.

Referring more particularly to the drawings, 1 designates a plate which is secured to the top 2 of the machine in any suitable manner, as by means of a bolt 3, which passes down through a slot 4. This plate is substantially similar to the ones shown and described in my former patent and are preferably four in number or one for each side of the box to be covered. Two arms 5, forming a yoke, extend forward and laterally upward from the top of the plate and support the pressing mechanism, while two hangers 6 depend from the bottom for supporting the other mechanism and are joined together at their lower end by a projection or boss 7.

A covering device, in the present instance a roller 8, is mounted in tilting or pivoted bearings 9, so as to be moved into or out of the path of movement of the box by means of a spring-actuated rock-shaft 10 and link 11, substantially similar to what is shown in my former patent, although I prefer to form the bearings for the journals of the roller substantially U-shaped and have them open upward, so that the roller will be supported therein by gravity. The bearings are made movable toward and from the path of the box independently of the swinging movement imparted to them by the rock-shaft by means of stems 12, which project through bearings 13, formed in the blocks 14 at the ends of the rock-shaft 10. A spring 15 fits on each stem 12 and normally forces the bearing and the roller forward, but permit of a limited movement to the rear to secure the desired amount of pressure against the side of the form-block and the box. The bearings 9 are kept from rotating on the stems 12 by means of a flat plate or bar 16, which is secured at its ends thereto with its forward edge almost in contact with the lower face of the roller.

In applying the covering-blank to the sides of a box it is desirable that means be provided for applying the paper substantially at a central point and gradually extending the pressure to the top and ends of the box in advance of the pressure to be applied by the roller 8, so as to apply the paper smoothly and uniformly to the box without the formation of air-bubbles or wrinkles. An effective manner of applying this preliminary pressure is by a yielding surface, as a brush 17, which may be mounted above or in advance of the roller 8, so that as the box passes the brush the latter will act to lift and wipe or sweep a flap of the covering-blank up against a wall of the box in a smooth and even manner. The brush is preferably mounted in position by means of hinges 18, so as to be swung into and out of position for permitting the insertion of the roller into or its removal from the bearings. It may be supported in its operative position by having its ends turned down, as shown at 19, to rest on top of the bearings 9. The brush is slightly higher at the central portion and projects slightly forward, as shown, so that the preliminary pressure is applied to the side of the box near its bottom and substantially midway of its ends, and is then gradually extended to the top and ends as the box is moved downward in the process of being covered. One means for accomplishing this is by bowing the head of the brush slightly upward at its center and forming the bristles at the center longer than the others and gradually decreasing their length toward the ends. This will cause the preliminary pressure or wiping action of the brush to be applied so gradually and uniformly that the cover-blank will be applied uniformly at all points and the air will be gradually forced out at the top and ends, thereby preventing the formation of air-bubbles.

Instead of forming the end-tuck-in wings flexible with a rigid face it is desirable that they be provided with a yielding operative face, so as to avoid tearing or damaging the moist cover-blank in applying it to the ends of the box. One means for accomplishing this purpose is by forming the wing 20 from a metal plate, which may be rigid or yielding, and providing its outer or free end with a head 21, in which are secured bristles 22, to form a brush for engaging with and folding in the end of the side flap of the cover. The wing is adjustably mounted in a bracket 23 by means of a set-screw 24, which engages with a stem 25 on the wing. There are two pairs of brackets, one pair for each end of the box, and they are each adjustably mounted on two laterally-reciprocating bars 26 by means of a set-screw 27, the bars being supported by means of rods 28, which work in guides or bearings 29 in the hangers 6. One of the rods is provided with a pin 30, which is adapted to engage with a movable part of the operating mechanism (not shown) for giving the wings the desired movement at the proper time. To secure the best results, it is found desirable to form the face of the brush or other yielding surface of the turn-in wing in two vertical planes, as by cutting away a portion thereof, (as the upper bristles,) and making them a trifle shorter than the remaining bristles, as shown at 31. This cut-away portion is so arranged as to extend from the top of the box upward and act as a support or backing for the portion of the cover that

BEST AVAILABLE COP

.h are mounted to move longitudinally ›rated lugs or bearings 49 on the hang- A nose 50 is arranged to clamp the ›y means of a screw 51, and the point nose, which is preferably beveled, is ›d out nearly to the forward edge of ger, whereby the upper portion of the ›lock 32 will be prevented from resting ınd wearing or damaging the finger he block is separated, as described in mer patent.

ciprocatory motion is imparted to the ı finger by a substantially L-shaped haft 52, which is connected thereto by 53, and a vertically-reciprocating rod or ;er 54, which is connected with the rock- by a link 55. The rock-shaft is prefer- in the form of a sleeve or cylinder and is nted upon a suitable bearing 56, and the ger 54 is mounted in the boss or projec- 7 and provided at its lower end with ns, as an eye 57, for the reception of a ›ber 58, which receives motion from the operating mechanism. (Not shown.) By forming the arms of the L-shaped lever as wings 59 and arranging them in pairs the links can be mounted between them, whereby a very substantial construction is secured and the finger is moved back and forth in a positive manner. If desired, one of the pivots between the shaft and the plunger can be extended, as shown at 60, with which the lower end of the link 11 can engage, whereby the side covering-roller 8 and the brush 17 will be thrown back out of the path of the ascending box when the plunger 54 descends to withdraw the tuck-in fingers 46, and the form-block, with the completed box, is started on its upward movement by the appropriate machinery, which, however, is not shown.

By forming the lower end of the link 11 as a hook 61, as shown in Fig. 9, the movement of the pivot extension 60 will only actuate the link, and thereby the roller and brush, when the extension is at or near the lower limit of its movement. It will also permit of the ready disengagement of the link from the extension.

During the operation of folding in the upper edges of the cover-blank, as above described, and while withdrawing the edge-tuck-in fingers it is desirable that pressure be applied to the sides of the box, which is done by means of the pressure-blocks 62. Each of these blocks is held in its seat 63 in the head 64 by means of the set-screw 65, and its face is preferably made yielding or elastic, as by means of a facing 66 of rubber or other suitable elastic material. This will prevent any possible injury being done to the cover, and by making the block substantially L-shaped in cross-section a broad bearing-surface is secured, which can be extended up nearly to the [illegible] corner. The presser-blocks are arranged to [illegible] horizontal plane parallel with the plane of the tuck-in fingers, which is very conveniently done by providing each head with one or more rods 67, which are arranged to slide in perforated bosses 68 upon the hangers 6. Motion is imparted to the blocks in one direction by means of cams 69 and 70 on the rock-shaft 52 and in the opposite direction by springs 71, mounted upon the rear end of the rods 67. There are two sets of cams on the rock-shaft, which are so arranged relatively to each other that as the rock-shaft is being rocked to move the tuck-in finger forward the first set of cams 69 will engage with a projection 72 on the rear of the head 64 and move the pressure-block into engagement with the side of the box just prior to the engagement of the finger with the projecting portion of the cover. The pressure is then relaxed a trifle and again applied just as the finger passes over the edge of the box and until the finger is moved inward as far as it will go. On the return or outward movement of the finger the pressure is continued until just as the finger is being disengaged from the top of the box, when it is relaxed and the finger and pressure-block move outward a short distance in unison or simultaneously with each other. Immediately upon the disengagement of the finger from the edge of the box and just after the upper part of the form-block has entered the box and carried the edges of the cover-blank down against the inside of the box the pressure is again applied by the cams 70, which will cause the sides of the box and the edge of the cover to be firmly clamped between the form-block and the pressure-block and the operation of applying the cover to the box is completed. The further descent of the plunger 54 will carry the cams 70 past the projection 72, which will release the pressure and permit the springs 71 to withdraw the pressure-blocks from engagement with the sides of the box, and thereby permit of the completed box being carried upward with the form-block, from which it may be removed in the manner described in my former patent.

In addition to providing the face of the pressure-block with a yielding surface it is also desirable to yieldingly support the block in its mountings and to make the yielding support adjustable. This can be done by forming the rods 67 hollow and inserting a longitudinally-movable rod 73 in each one thereof, the rear end of said rods 67 being preferably extended to the rear of the hangers 6, so as to be easily accessible to the attendant in adjusting the pressure on the block. The forward end of each of the rods 73 preferably engages with a plate 74 at the back of the pressure-block 62, and the rear end is provided with a head 75 for rotating it. The intermediate portion of the rod is screw-threaded, as shown at 76, which engages with a nut 77 for moving the rod longitudinally. A spring 78 fits between the rear end of the nut and the head of a barrel 79, which loosely

BEST AVAILABLE COP

extends above the top of the box and supports it without forcing it over the edge of the box, while the longer bristles are applying a greater pressure to the remaining portion of the cover below the edge and applying it fast to the ends of the box.

As above described, the mechanism for applying the cover to the sides and ends of the box is more particularly applicable to what is known as "stayed work"—that is, boxes to which a reinforcing-piece has been applied and which must necessarily be done before the box is covered. The process of applying this reinforcing-piece to each corner of the box requires a separate handling of the box besides the additional cost of the material used in making the reinforce—generally of cloth or other suitable tough material. By covering the box with a piece of material which has a portion extending around from the side onto the end and another portion fastened over this folded portion it is found that the reinforce may be dispensed with without detriment to the strength and stability of the box, thereby affecting a saving of material and labor. In accomplishing this object the blank for the box is centered upon the cover-blank in the same manner as described in my former patent for centering the box, and then as the plunger carries the two blanks downward the sides are first folded upward and covered by means of the rollers 8 and then the ends; but before the turn-in wings and end rollers are operated a lifter, as a horn 33, is caused to engage with each end of the unstayed box-blank and move them up into engagement with the form-block, which will cause their ends to engage with the ends of the sides of the box. While being held in this position by the horns the tuck-in wings are operated, which will cause the end portions of the cover-blank to be folded around and over the joint formed between the ends of the box thus held in engagement with each other, after which the horn is retracted and the ends of the cover-blank are applied in the same manner as would be done with a stayed box, as above described.

The horn is pivotally mounted on the bracket 23 by means of a pintle 34 and has its free end curved outward, so as to engage with the end of the blank in advance of the turn-in wing, as shown in Fig. 5. The heel 35 of the horn is adapted to engage with a stop, as a bar 36, when the turn-in wings are retracted by the withdrawal of the bar 26. A spring 37 is secured to the bracket 23 at one end and to the horn intermediate the length of its curved portion at the other end, so that when the horn is in its inoperative position, as shown in Fig. 6, the spring will be placed under tension. Standing in this position as the form-block and blank descends, as soon as the turn-in wings move forward the heel of the horn moves away from the stop and the free end is drawn around by the spring and caused to engage with the end 38 of the blar normally stands at an incline abov 39 of the cover and forces it into a position with its ends in engagement ends of the sides 40 of the box be turn-in wings reach the projecting pc of the side 42 of the cover-blank, as in Fig. 5. The continued inward mc of the brackets and turn-in wings wi the free end of each horn to slide in ment with the end of the box and in position until the ends have been by the engagement therewith of th lapping portion of the sides of the On the outward movement of the brac heel of the horn will be caused to engag its stop 36, which will cause its free swing out away from the path of mov of the box, in which position it will be until another box is brought into positi be acted upon. The further descent o plunger with the box will cause the en the cover to be folded up over the inf portions 41 of the sides of the cover in the same manner as above described for the stayed work. In this form of bracket and turn-in wing the brush 43 may be secured in a vertical slot 44 by means of a set-screw 45. By making the brackets removable and interchangeable the machine may be quickly adapted for non-stayed or stayed work by simply securing the proper structure upon the bar 26.

As the turn-in wings are located directly below and are caused to reciprocate back and forth beneath the rollers 8 and as these wings are vertically adjustable, it will be apparent that if they are adjusted too high their upper edges will engage with the rollers. It has been found that if the wings in their back-and-forth movement do engage with the rollers they will very soon cut and injure them, (the rubber rollers,) and to avoid this and to protect the rollers against rupture I have mounted a guard-plate 16 below each of the two side rollers, said plate being secured at its ends to the under side of the bearings 9. In this manner any injury to the rollers by an improper or careless adjustment of the wings is avoided. The guards could be formed otherwise than as a plate, and they could be otherwise secured than to the bearings of the roller; but I have found this manner of forming and mounting the guards effectual.

After the cover-blank has been applied to the outer surface of the sides and ends of the box the box is carried down into position to have the projecting edge portions of the blank turned in over the top edge of the box, which is done by the edge-tuck-in fingers 46. To secure the most satisfactory results, the fingers are each moved in a horizontal plane or in a plane substantially at right angles to the vertical plane of the sides of the box. This may be accomplished by providing the head 47 of the fing with one or

BEST AVAILABLE COP

surrounds the nut and spring. The forward end of the nut 77 is shouldered, as by means of a tongue 80, to engage with the rear end of the rod 67, which is slotted, as at 81, to prevent its rotation, and the forward end of the barrel is interiorly screw-threaded and engages with the rear end of the rod 67. The forward end of the barrel also forms a shoulder against which the spring 71 engages for normally forcing the rod and the pressure-block to the rear, the other end of said spring engaging with one of the bosses 68 through which the rod 67 projects. By rigidly connecting the forward ends of the rods 67 with the head 64 it is evident that the plate 74 may be yieldingly supported, so as to permit of the desired amount of rearward movement of the pressure-block, the under face of the block being provided with a slightly-elongated recess 82 for the reception of the set-screw 65.

I have herein shown and described a single embodiment of each of the several improvements forming the subject of this invention; but I do not wish to be understood as limiting myself to the specific means shown, as various other means may be employed without departing from the spirit of the invention. Likewise I have described my improvements as being applied to a type of machine wherein a reciprocating plunger is caused to move back and forth between a set of covering devices; but it will be obvious that these improvements could be applied to other types of machines, such, for instance, as where the box-support is stationary and the covering devices themselves mounted to move to and from the box-support.

What I claim, and desire to secure by Letters Patent, is—

1. In a box-covering machine, means for supporting and carrying a box to be covered, means for moving said supporting means and the box in a right line, wiping devices each having a flexible portion projecting in the path of movement of the side and end walls of the box and operating to sweep the covering material against said walls to preliminarily apply the same thereto, and mechanism for completing the covering operation.

2. In a box-covering machine, a vertically-reciprocatory form for supporting and carrying a box to be covered, wiping devices each having a flexible portion projecting in the path of movement of the side and end walls of the box and operating to sweep over the covering material and lay it smoothly against said walls, mechanism for permanently affixing the covering material to the box after the said wiping devices have acted, and means for actuating the reciprocatory form to carry the box through the wiping devices and said mechanism.

3. In a box-covering machine, a box-support for holding a box to be covered, means for folding the covering material against the wall of the box, and means for causing a relative movement between the box-support and the folding means, said latter-named means being constructed to engage the covering material during such relative movement, first at a point intermediate the opposite ends of the box-wall and press the same thereagainst and then gradually acting laterally and upward from said point.

4. In a box-covering machine, means for folding the covering material against the wall of a box, said means having inclined surfaces extending substantially from the center thereof.

5. In a box-covering machine, upwardly-bowed means for folding the covering material up against the wall of a box, the surface of said means being inclined to the rear from the center toward each end.

6. In a box-covering machine, means for folding the covering material against the wall of a box, said means comprising a head provided with a yielding extension for engaging the covering material, said extension projecting farther upward and forward at the center than at either end.

7. In a box-covering machine, means for folding the covering material up against the wall of a box, said means comprising a head, and bristles secured therein in the arc of a circle, the bristles at the center being longer than those at either end.

8. In a box-covering machine, the combination with means for supporting and carrying a box to be covered, of covering mechanism operating to permanently apply the covering material to the side and end walls of the box, means for carrying the support with the box thereon through said covering mechanism, and devices located in the path of movement of said box-support serving to engage the covering material and wipe it against the side and end walls of the box prior to the action of said mechanism.

9. In a box-covering machine, means for pressing covering material against the exterior of the box, and a brush mounted in advance of said means for preliminarily applying said material to the box-wall prior to the action of said means, the central portion of said brush being longer than the ends and standing in substantially the same vertical plane above the face of the pressing means.

10. In a box-covering machine, a roller for applying the covering material to the box, and removable mechanism above said roller for applying a preliminary pressure to said material.

11. In a box-covering machine, mechanism provided with upwardly-opening U-shaped bearings, a roller removably mounted in said bearings, and means hinged to said mechanism above said roller for applying a preliminary pressure to the covering material.

 BEST AVAILABLE COP

12. In a box-covering machine, mechanism provided with U-shaped bearings, a roller removably mounted in said bearings, a brush-head hinged to said mechanism with its ends arranged to rest on said bearings when in an operative position, bristles in said head, the central ones of which are longer than the end ones and extend out substantially even with the operative face of said roller.

13. In a box-covering machine, movable mechanism provided with means for applying a preliminary and a main pressure to the covering material, and means for moving said mechanism into and out of an operative position.

14. In a box-covering machine, a plate, a rock-shaft mounted therein and having a bearing at each end, a roller and a brush supported by said bearings, and means for rocking the shaft to throw the brush into and out of an operative position.

15. In a box-covering machine, covering mechanism and end-turn-in wings adjacent thereto, and a guard between the covering mechanism and said wings.

16. In a box-covering machine a covering-roller and end-turn-in wings adjacent thereto, and a plate between the roller and said wings.

17. In a box-covering machine, mechanism provided with bearings and end-turn-in wings, a roller in said bearings, and a plate between the roller and said wings, the ends of said plate being secured to the bearings of the roller.

18. In a box-covering machine, a roller mounted to be swung into and out of operative position, end-turn-in wings adjustably mounted below said roller, and a guard between the roller and said wings.

19. In a box-covering machine, a turn-in device comprising a wing having a plurality of operating-faces offset one from another.

20. In a box-covering machine, a turn-in device comprising a wing having a plurality of operating-faces of yielding material, said faces occupying two parallel planes offset from each other.

21. In a box-covering machine, a turn-in device comprising a support, and a wing detachably mounted on said support, said wing having two parallel operating-faces offset one from the other.

22. In a box-covering machine, a turn-in device comprising a support, a wing detachably mounted on said support and a flexible operating element carried by the wing, the outer end of said element occupying two parallel planes offset from each other.

23. In a box-covering machine, an end-turn-in wing provided with bristles, the upper bristles being shorter than the remaining bristles.

24. In a box-machine, means for supporting an unstayed box-blank and an applied covering-blank, means for folding two side walls of the box-blank and covering-blank in the formation of the box, end-turn-in wings for turning in the said folded ends of the covering-blank against the end walls of box-blanks, and means for engaging the said end walls and holding them in position to complete the box structure, said end-engaging means acting in advance of the turn-in wings.

25. In a box-machine, means for supporting an unstayed box-blank and a superposed covering-blank, means for folding two side walls of the said box-blank and covering-blank in the formation of the box, end-turn-in wings for turning the said folded ends of the covering-blank against the end walls of the box-blank, and means carried by said wings for engaging the said end walls of the box-blank and holding them in position to complete the box structure, said end-engaging means acting in advance of the turn-in wings.

26. In a box-covering machine provided with end-turn-in wings, a pivoted horn mounted to engage with each end of the box-blank in advance of the operation of said wings, said horns serving to hold the ends of the box-blank in position to be engaged by the wings.

27. In a box-covering machine provided with end-turn-in wings, a curved horn pivotally mounted at the rear of each wing, and means for moving the free end of the horn into engagement with the ends of a box in advance of the operation of said wings.

28. In a box-covering machine provided with end-turn-in wings, a spring-actuated horn pivotally mounted at the rear of each wing, and means for engaging with the heel of the horn and moving its free end out of engagement with the end of the box.

29. In a box-covering machine provided with end-turn-in wings, of a horn pivotally mounted at the rear of each wing, a spring for normally forcing the free end of the horn into engagement with the end of a box, and a stop for engaging with the heel of the horn and moving the free end outwardly against the tension of the spring.

30. In a box-covering machine, a laterally-reciprocating bar, end-turn-in wings mounted on said bar, a spring-pressed horn pivotally mounted at the rear of each wing, and a bar for engaging with the heels of said horns and moving each of them outward against the tension of its spring.

31. In a box-covering machine, a clamping-nose, an edge-tuck-in finger removably supported by said nose, and means for moving the same in a right line.

32. In a box-covering machine, a clamping-nose, an edge-tuck-in finger removably supported by said nose, and means for moving the same in a line at right angles to the plane of the side of the box.

33. In a box-covering machine, a two-part clamping-nose, an edge-tuck-in finger removably clamped between the two parts of said

nose, means for exerting clamping action between said parts and the finger, and means for moving said nose with its finger in a right line.

34. In a box-covering machine, an edge-tuck-in finger, a clamping-nose for supporting the finger, longitudinally-movable rods for guiding and supporting the nose, means for moving the nose and finger in a right line, and means for connecting the nose with an element movable at right angles to said rods.

35. In a box-covering machine, a two-part separable form-block, an edge-tuck-in finger movable into a position underneath one of said parts, and a guard for holding said part out of contact with said finger.

36. In a box-covering machine, a two-part separable form-block, an edge-tuck-in finger movable into a position beneath the top part of said block, and a nose extending substantially to the forward edge of said finger for supporting said part and holding it out of engagement with the finger.

37. In a box-covering machine, a two-part separable form-block, an edge-tuck-in finger, a clamping-nose, the forward end of which extends substantially to the forward edge of the finger and is beveled upon its upper surface.

38. In a box-covering machine, a vertically-reciprocatory box-support, a tuck-in finger movable at right angles thereto, and means for moving the said finger to and from the path of movement of said support, comprising a vertically-movable member, and link mechanism for connecting the finger with said member.

39. In a box-covering machine, a vertically-reciprocatory box-support, a tuck-in finger movable in a horizontal plane at right angles thereto, and means for moving said finger to and from the path of movement of said support, comprising a vertically-movable member, and a bell-crank and links connecting the finger with said member.

40. In a box-covering machine, a vertically-reciprocatory box-support, a horizontally-movable tuck-in finger, and means for moving said finger to and from the path of movement of said support, comprising a vertically-reciprocatory member, movable at right angles to the finger, a bell-crank lever mounted between the finger and said member, and links connecting the bell-crank lever with the finger and member, respectively.

41. In a box-covering machine, a horizontally-movable tuck-in finger, a reciprocatory member movable at right angles thereto, a bell-crank lever, the arms of which are formed as wings, and links pivotally mounted between said wings and connected with the finger and said member, respectively.

42. In a box-covering machine, a horizontally-movable tuck-in finger, a vertically-reciprocatory member movable at right angles thereto, a pintle between the finger and said member, a bollow bell-crank lever mounted on said pintle and having its arms formed as wings, and links for connecting said wings with the tuck-in finger and said member, respectively.

43. In a box-covering machine, a plate provided with hangers, the lower ends of which are joined to a perforated boss, a reciprocating plunger mounted in said boss, a tuck-in finger mounted on the hangers to move in a horizontal plane, and means for connecting said finger to said plunger.

44. In a box-covering machine, a plate provided with hangers, the lower ends of which are joined to a perforated boss, a reciprocatory plunger movable in said boss, the lower end of which is provided with an eye, and a horizontally-movable tuck-in finger connected with the upper end of said plunger.

45. In a box-covering machine, a tuck-in finger and pressure mechanism adjacent thereto, and means for moving the finger and mechanism in parallel planes.

46. In a box-covering machine, a tuck-in finger and pressure mechanism movable in parallel planes, and means for moving the finger at a uniform rate of speed and the pressure mechanism at a variable speed.

47. In a box-covering machine, a tuck-in finger and pressure mechanism, and means for moving the finger at a uniform rate of speed and the pressure mechanism at a variable speed, a portion of the movement of the pressure mechanism being synchronous with the movement of the finger.

48. In a box-covering machine, a tuck-in finger and pressure mechanism movable in parallel planes, and means for operating the pressure mechanism twice during each movement of the tuck-in finger.

49. In a box-covering machine, a tuck-in finger mounted to move in a horizontal plane, and pressure mechanism, and a bell-crank lever, one portion of said lever being provided with means for operating the finger and another portion provided with means for operating the pressure mechanism.

50. In a box-covering machine, a tuck-in finger and pressure mechanism, a bell-crank lever provided with cams for actuating the pressure mechanism and a link for connecting one of the arms of the lever with said finger.

51. In a box-covering machine, a tuck-in finger and pressure mechanism, yielding mechanism for moving the pressure mechanism out of operative position, and a bell-crank lever connected with the finger and provided with two cams for successively engaging with the pressure mechanism and forcing it into an operative position.

52. A box-covering machine embodying pressure mechanism for applying pressure to opposite sides of a box-wall said pressure mechanism comprising recessed heads, a block mounted in each head, and adjustable spring-

 BEST AVAILABLE COP

actuated rods acting against said blocks and constituting yielding supports therefor.

53. In a box-covering machine, a recessed head, a pressure-block removably mounted therein, a thumb-screw passing through a wall of said head and intersecting the recessed portion thereof to engage the pressure-block, and adjustable spring-actuated rods acting against said block.

54. In a box-covering machine, a head, a pressure-block removably mounted therein, springs for normally forcing said block forward, and means for adjusting the tension of said springs.

55. In a box-covering machine, a recessed head, a pressure-block movably secured in said recess, a plate between the block and the bottom of said recess, and adjustable spring-actuated rods for engaging with said plate.

56. In a box-covering machine, longitudinally-movable rods, a head rigidly secured to the forward ends of said rods, a pressure-block movably mounted in said head, and a longitudinally-movable spring-pressed rod in each of said first-mentioned rods, and means for adjusting the same therein.

57. In a box-covering machine, a head provided with a pressure-block, longitudinally-movable hollow rods rigidly connected therewith, a barrel connected with the rear end of each of said rods, a spring-pressed nut within the barrel and a screw-threaded rod through each of said hollow rods the nut and the barrel, the forward end of which normally forces the block forward and the rear end provided with means for rotating it.

58. In a box-covering machine, a head provided with a pressure-block, hollow rods rigidly secured to said head, the rear end of each rod being screw-threaded and slotted, a barrel engaging with said screw-threaded portion, a spring within the barrel, a nut between the spring and the end of the rod, the forward end of which is provided with a tongue to fit in said slot, and a rod through each of said hollow rods and barrels, the forward end of which normally forces the pressure-block forward and the rear end provided with means for rotating it and the intermediate portion provided with screw-threads for engaging with said nut.

59. In a box-covering machine a plate provided with hangers, bearings on said hangers, longitudinally-movable rods in said bearings, the rear end of each of which is provided with a shoulder, a spring between each shoulder and the bearing adjacent thereto, and pressure mechanism secured to the forward ends of said rods.

60. In a box-covering machine, a plate provided with hangers, perforated bosses on said hangers, longitudinally-movable rods, through said bosses, the rear end of each of which is provided with a barrel, a coiled spring on each rod between the barrel and the adjacent boss, and pressure mechanism secured to the forward ends of said rods.

61. In a box-covering machine, a plate, a pressure-roller pivotally mounted in the upper portion of said plate and a vertically-reciprocating member mounted in the lower portion and a link for connecting the roller and the member.

62. In a box-covering machine, a plate, a pressure-roller pivotally mounted in the upper portion thereof and a tuck-in finger and pressure mechanism in the lower portion, a reciprocating member connected with the pressure-block by means of link mechanism, one of the pivots of which is extended, and a link connected with said extension at one end and with the roller-supporting mechanism at the other.

63. In a box-covering machine, a two-part separable form-block for supporting a box to be covered, side and end-tuck-in fingers arranged at right angles to each other, and means for simultaneously moving said fingers forward in horizontal planes between the two parts of the form-block to fold the edges of the covering material over the upper edges of the box.

64. In a box-covering machine, a two-part separable form-block for supporting a box to be covered, heads arranged at right angles to each other and mounted to move in horizontal planes to and from the form-block, guide-rods for guiding each head, an edge-tuck-in finger removably mounted on each head, and means for simultaneously advancing and retracting the heads and fingers in horizontal planes to tuck the covering material over the upper edges of the box.

65. In a box-covering machine, a two-part separable form-block for supporting a box to be covered, edge-tuck-in mechanism comprising two parallel side-tuck-in fingers and two parallel end-tuck-in fingers arranged at right angles to the side tuck-in fingers, means for simultaneously projecting all said fingers in horizontal planes between the two parts of the form-block to tuck the covering material over the upper edges of the box, and means for simultaneously retracting the said fingers.

66. In a box-covering machine, a tuck-in finger and presser mechanism adjacent thereto, means for advancing and retracting said finger and presser mechanism, and means for imparting a less pressure during the advance of said finger and a greater pressure during the back sweep thereof.

67. In a box-covering machine, a tuck-in finger and presser mechanism adjacent thereto, means for advancing and retracting said finger and presser mechanism in parallel planes, and means for imparting a less pressure during the insweep of the finger and a greater pressure during the back sweep thereof.

68. In a box-covering machine, means for supporting a box to be covered, mechanism for folding and applying the covering mate-

BEST AVAILABLE COP

rial to the side and end walls of the box to affix the same thereto, means for causing a relative movement between the box-supporting means and the covering mechanism, and means operating in advance of said covering mechanism for initially engaging the covering material and wiping it up against the box-walls to smoothly lay the same thereagainst before the said mechanism is brought into operation.

69. In a box-covering machine, in combination with means for applying the covering material to the wall of a box, of means operating in advance of said applying means for smoothly laying the covering material against said box-wall, said second named means being constructed to first engage upon the covering material at a point intermediate the sides of the box-wall and then gradually acting to apply the same laterally and upward from this point.

70. In a box-covering machine, the combination with two pairs of covering devices for applying the covering material to the side and end walls of a box, of means located in advance of and operating prior to the operation of said devices for lifting the covering material up against the box-walls and smoothly laying the same thereagainst.

71. In a box-covering machine, the combination with two pairs of covering-rollers for applying the covering material to the walls of a box, of wiping devices located in advance of and operating prior to the operation of the covering-rollers for wiping the covering material up against the box-walls, whereby to insure a smooth application thereof.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

PHILIP S. SMITH.

Witnesses:
GEO. Z. SUTTON,
WALTER F. HENRY.