No. 744,122. PATENTED NOV. 17, 1903.

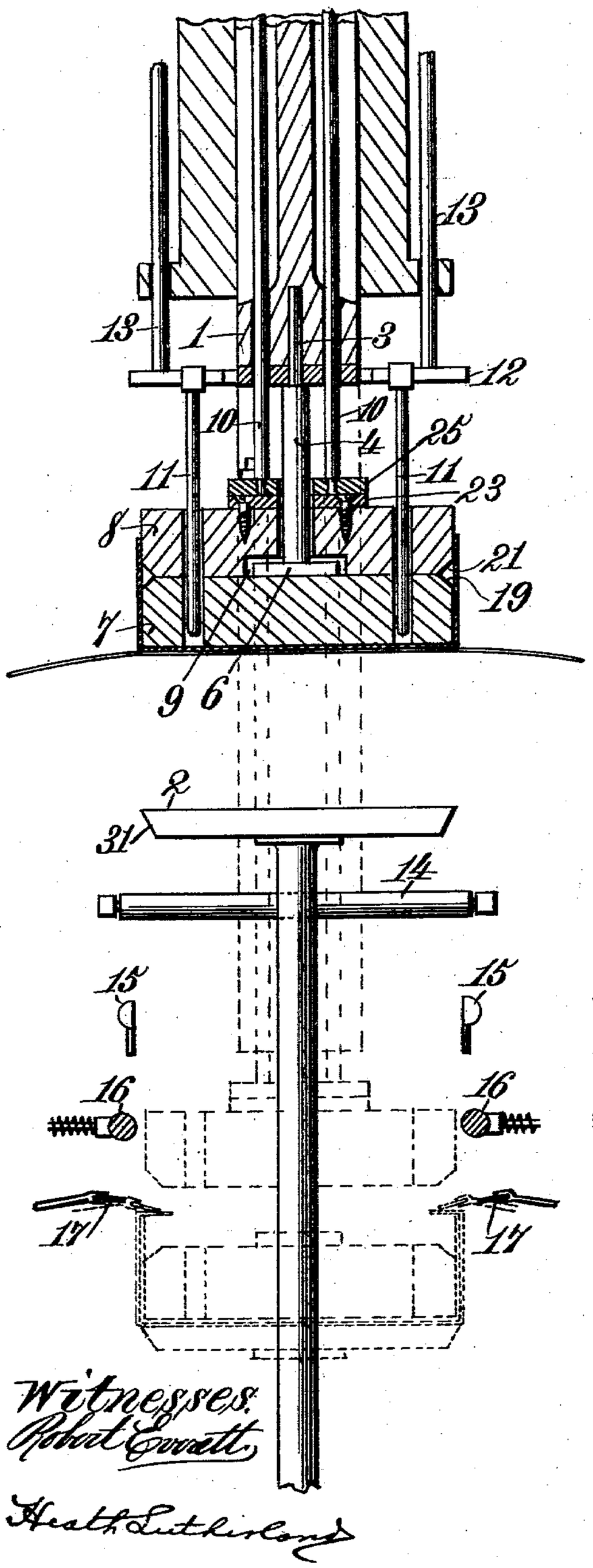
P. S. SMITH.

BOX COVERING MACHINE.

APPLICATION FILED JUNE 23, 1902.

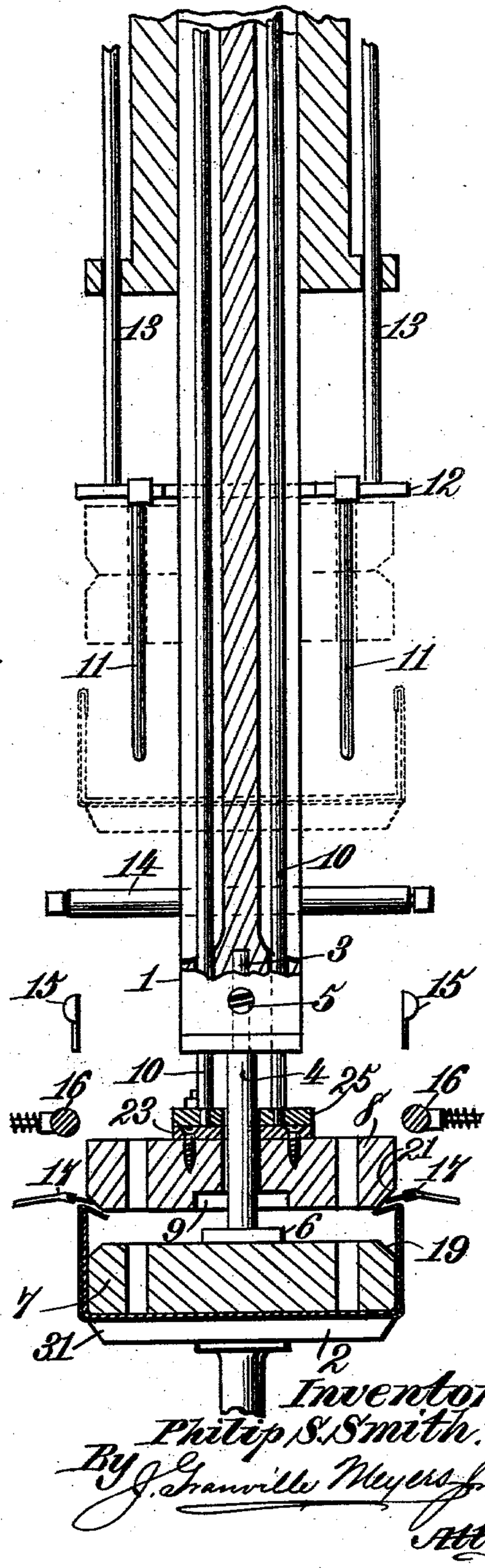
NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.




Witnesses:
Robt Ewatt
Heath Sutherland

Fig. 2.




Inventor:
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Atty.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3

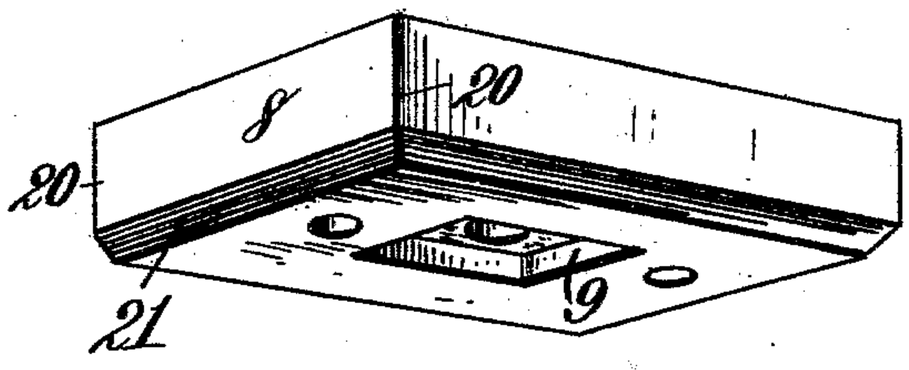
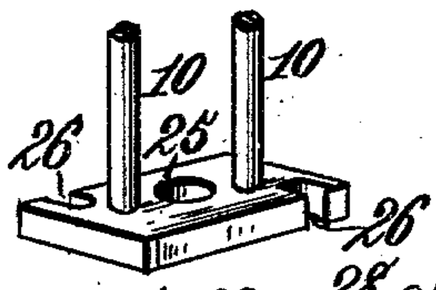



Fig. 4.



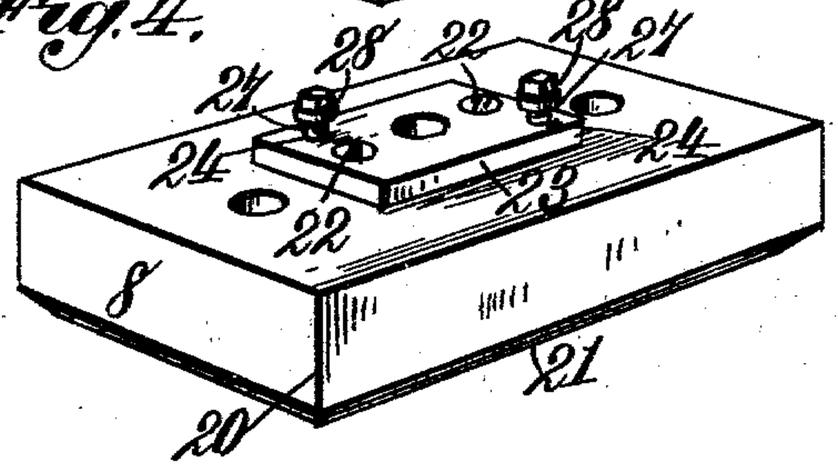
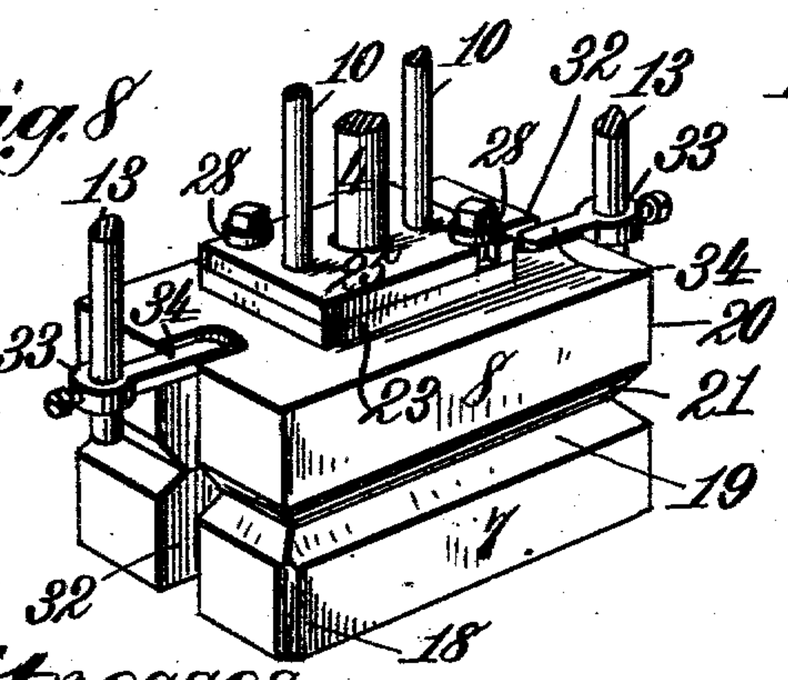




Fig. 8




Witnesses.
Robt Ewell.
Keith Litherland

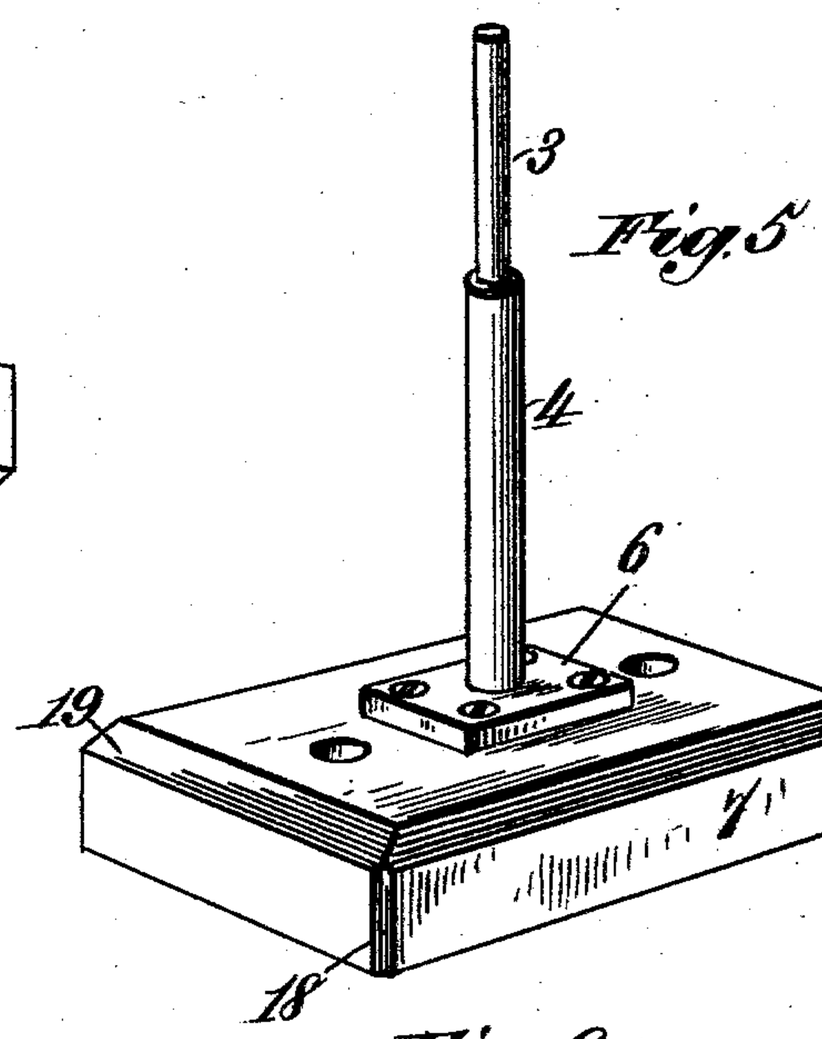
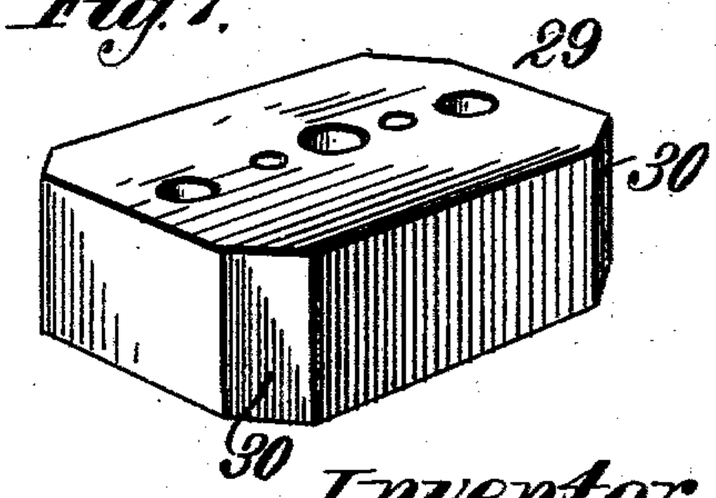



Fig. 5

Fig. 6




Fig. 7.

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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 9.

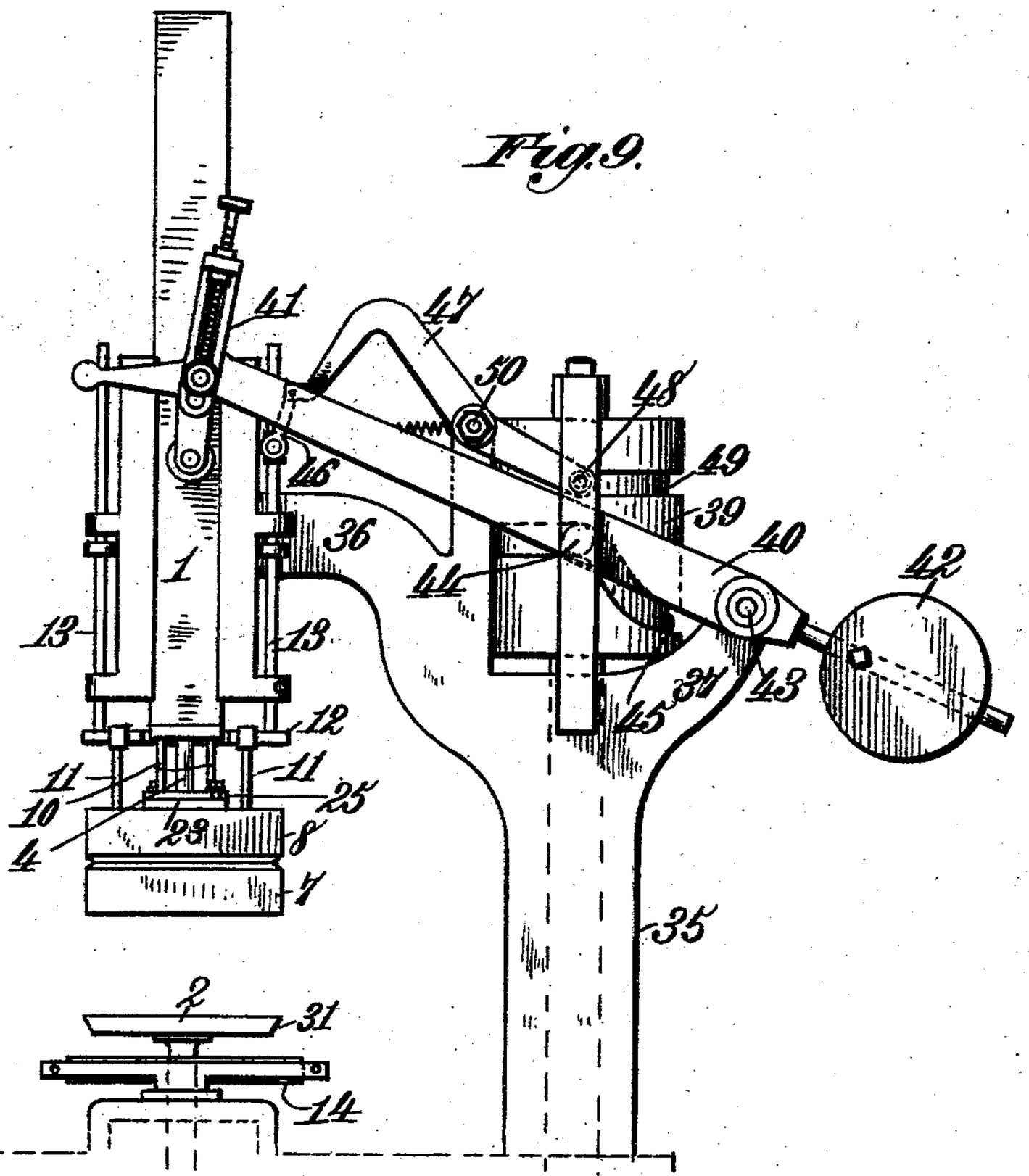
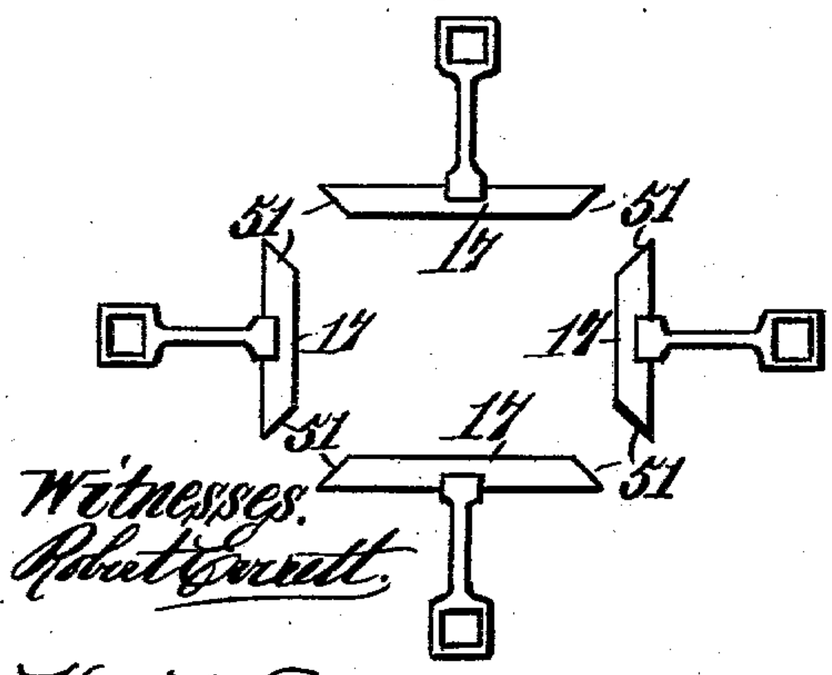



Fig. 10

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No. 744,122. Patented November 17, 1903.

# UNITED STATES PATENT OFFICE.

PHILIP S. SMITH, OF PHILADELPHIA, PENNSYLVANIA.

## BOX-COVERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 744,122, dated November 17, 1903.

Application filed June 23, 1902. Serial No. 112,791. (No model.)

*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.

This invention relates to certain new and useful improvements in box-covering machines of the type shown and described in the patent to Smith and Bullock, No. 588,887, dated August 24, 1897, and in the two patents granted to myself on December 21, 1901, and January 14, 1902, and respectively numbered 690,377, and 691,329.

My present invention has for its prime object to improve the construction and render more efficient the operation of the form-blocks and the box support or platen shown in said patents; and to these ends it consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figures 1 and 2 are diagrammatic sectional views of a part of a box-covering machine constructed in accordance with my invention and showing the improved form-block and platen, the two views showing the parts in different positions. Fig. 3 is a detail perspective view viewed from the under side of the fold-in block. Fig. 4 is a similar view of said block viewed from the upper side and the means for attaching the block to its actuating-rods. Fig. 5 is a detail perspective view of the presser-block. Fig. 6 is a top plan view thereof. Fig. 7 is a perspective view of a form-block made in a single piece and designed to be used in connection with a "non-tuck-in" machine. Fig. 8 is a detail perspective view of a form-block employed for covering small boxes and showing a modified stripping device. Fig. 9 is a view in side elevation of one form of mechanism for imparting a reciprocating movement to the form-block relative to the covering devices. Fig. 10 is a plan view of the edge-tuck-in fingers.

Preliminary to a detailed description of the present invention it should be briefly explained that the machines shown in the patents above referred to comprise a form-block carried by a vertically-reciprocating plunger, on which the box to be covered is fitted; suitable rolls, between which the form-block and box are moved and which operate to affix the covering-blank to the sides and ends of the box; means for turning in the end flaps of the covering-blank; a platen for pressing the bottom of the box against the form-block, and means for stripping the finished box from the form-block. In my said Patent No. 691,329 I also show means for tucking in the edges of the cover-blank over the edges of the box and folding them down against the inner sides of the box and, as the machine in its best or perfected form is exhibited in the last-named patent, such form of machine will more particularly hereinafter be referred to in explaining the operation of the improved form-blocks forming the subject-matter of the present invention, though I wish it to be understood that the invention hereinafter described and claimed may be applied to any box-covering machine of the general type before referred to. In order that the present invention may be the more readily understood, therefore, I have shown in Fig. 1 of the drawings in a diagrammatic manner a sufficient portion of the machine patented to me on the 14th day of January, 1902, with my improved two-part form-block applied thereto and before proceeding to a detail description of the present invention will explain briefly such portion of the machine. Referring to said figure of the drawings, the numeral 1 indicates a plunger, which is caused to reciprocate vertically in a true rectilinear direction by suitable mechanism for the purpose. Arranged beneath the plunger is a platen 2, which is normally held slightly above the uppermost of the covering devices, but which yields with an upward pressure when forced downward by the descending box and form-block. A socket is formed in the lower end of the plunger 1, in which is adjustably fitted a tenon 3, formed on the upper end of a rod 4, said tenon being vertically adjustable in the socket and held in its adjusted position by a set-screw 5. (See Fig. 2.) The lower end of the rod 4 has rigidly fixed thereon a plate 6. The numerals 7 and 8 indicate the two-part form-block,

which for the present need only be described as consisting of two rectangular blocks of the same width and length and superimposed one on the other, the numeral 7 indicating the lower block, termed by me a "presser-block," and the numeral 8 the upper block, termed by me a "fold-in" block. The rod 4 passes loosely through the center of the fold-in block 8, and the plate 6 is rigidly fastened centrally to the upper side of the presser-block 7 by screws, said plate being adapted to lie in a recess 9, formed in the under side of the fold-in block when the two blocks are brought together. By these means the presser-block is rigidly attached to the plunger, and hence must follow the movements of the latter. Movable vertically in and independently of the plunger 1 are two rods 10, which are firmly attached at their lower ends to the upper side of the fold-in block 8 in the manner hereinafter described, suitable means being provided for temporarily arresting the downward movement of said rods during one portion of the descent of the plunger and presser-block, whereby at such time the presser-block and fold-in block are slightly separated. At all other times said blocks move together in unison as one block. Each of said blocks is provided with a plurality of vertical apertures, the apertures in one block registering with those in the other, and movably fitted in said apertures are stripper-rods 11, which are adjustably attached at their upper ends to a yoke 12, which in turn is secured to the lower ends of two vertically-movable rods 13. Normally the rods 11 are sheathed in the blocks 7 and 8, but suitable means are in practice provided for projecting said rods below the bottom of the presser-block to strip the finished box therefrom.

All the parts constructed as above described are shown in my said Patent No. 691,329, and the operation of the same is as follows: The covering to be applied to the box is cut into a blank of suitable shape and size, and said blank is pasted on its upper side. Before placing the box on the form-block it is placed bottom downward centrally on the blank, and the box, with the blank attached to its bottom, is slipped onto the two-part form-block. The operator then sets in motion the proper mechanism to cause the plunger and two-part form-block to descend. As the form-block, with the box thereon, descends it meets the platen 2, and the bottom of the box and the blank are pressed between the presser-block and the platen, and the blank is thereby firmly affixed to the bottom of the box. As the form-block and box continue to descend they force the platen downward and pass between two parallel yielding rolls 14, which operate to affix the side flaps of the blank to the sides of the box. After passing down between said rolls the form-block continues to descend until the box arrives between two oppositely-arranged sets of end-turn-in devices 15, when the downward movement of the form-block is momentarily arrested, while the said end-turn-in devices are caused by suitable mechanism to sweep across the ends of the box and turn in the ends of the side flaps of the blank and fold them against the ends of the box. The form-block then moves down again with the box, the end-turn-in devices recede, and the box is carried down between another pair of parallel yielding rolls 16, arranged at right angles to the rolls 14, which operate to affix the end flaps of the blank to the ends of the box. The blank is now attached to the bottom, sides, and ends of the box, the edges of the blank projecting vertically above the upper edges of the box. The form-block continues to descend, carrying the box down between edge-tuck-in devices 17; but before the bottom of the upper or fold-in block 8 arrives opposite the edge-tuck-in devices the movement of the rods 10 is stopped, thus arresting the descent of the fold-in block 8, and, as the presser-block 7 continues to descend for a slight distance farther, said blocks are slightly separated, and then both are momentarily brought to a state of rest. The edge-tuck-in devices are now caused by suitable mechanism to simultaneously move inward toward one another, folding or tucking in the projecting edges of the blank horizontally over the upper edges of the box. After this has been accomplished the rods 10 are released, permitting the fold-in block 8 to drop and rest by gravity on said edge-tuck-in devices, whereupon the latter are retracted and the fold-in block 8 moves down within the box onto the presser-block 7 and folds down the previously-tucked-in edges of the blank against the interior of the sides and ends of the box, completing the box. The form-block carrying the finished box now ascends, the platen 2 rising with it, and as these parts ascend the rods 13 are caused to descend, and by the time the platen 2 has reached the limit of its upward movement the rods 13 will have caused the stripper-rods 11 to engage the bottom of the box and hold the latter on the platen. The form-block, however, continues to ascend and is raised out of the box, or, in other words, the box is stripped off the form-block and left resting on the platen.

The foregoing is a general description of that part of the machine shown in my said Patent No. 691,329, to which the present invention relates.

For the purpose of increasing the efficiency and the ease and smoothness of operation of the form-block and to facilitate the stripping of the box therefrom and also to improve the operation of the platen said form-block and platen are constructed as follows:

As before explained, the two-part form-block comprises two rectangular blocks 7 and 8 exactly equal in length and width and superimposed one upon the other. The lower or presser block 7 is beveled or cut away at its four vertical corners or edges at angles of

approximately forty-five degrees, as indicated at 18. The upper edges of said block 7 are also beveled or cut away, as indicated at 19. The vertical beveled or, in other words, each of said vertical corners or edges of the upper block 8 is right-angular in shape, as indicated at 20; but the lower edges of said block are beveled, as indicated at 21, in manner similar to the beveled edges 19 of the presser-block. In the operation of the machine when the blocks 7 and 8 are separated, thereby withdrawing the box from the fold-in block 8, the edge-tuck-in devices advance and tuck the edges of the blank over the upper edges of the box, as before described. The fold-in block is then lowered onto the edge-tuck-in devices, and as the latter are retracted the beveled lower portion of said block, having the shape of an inverted truncated pyramid, slides down past said edge-tuck-in devices, thereby engaging the tucked-in edges of the blank with certainty before the latter have the slightest opportunity of curling back. In the machine before referred to presser devices are employed for pressing the sides and ends of the box against the presser-block 7, and such presser devices have a slight tendency to press in the upper edges of the box; but the beveled edges 21 of the fold-in block, as the latter descends, tend to wedge the edges of the box back and said block freely glides into the box, wiping the tucked-in edges of the blank neatly and accurately down within the box and against the inner portions of the sides and ends thereof, and at the same time the square sharp corners 20 force the tucked-in edges of the blank neatly and squarely into the corners of the box. By cutting away the vertical corners of the presser-block 7, as at 18, and beveling its upper edges, as at 19, said block is withdrawn from the box with ease to strip the box from the block without any liability of scraping off, ruffing up, or otherwise marring the previously-pasted-down edges of the blank, either at the corners of the box or intermediate the corners, and also permits of the box being stripped from the block without danger of breaking or weakening the corners of the former.

In practice a separate two-part form-block has to be made for each size or shape of box that is to be covered, and obviously the two parts 7 and 8 of each form-block must exactly and truly register one with the other, and in order to cause them to so register when in place on the machine great care has heretofore been necessarily employed in setting them in position. In order to permit the blocks 7 and 8 to be secured in place with great accuracy and with ease, I provide the following means: The presser-block 7 is rigidly secured to the rod 4 by the plate 6 in the manner before described, and the fold-in block 8 is secured to the rods 10, as follows: Firmly attached to the upper side of the fold-in block 8 by screws 22 is a plate 23, centrally apertured for the passage therethrough of the rod 4 and provided near two of its diagonal opposite corners with threaded screw-holes 24. Rigidly secured to the lower ends of the rods 10 is a plate 25 of the same dimensions as the plate 23 and also centrally apertured for the passage therethrough of the rod 4. Formed in the edges of the opposite sides of the plate 25 and near two of the diagonally opposite corners thereof are open slots 26, said slots being preferably segment-shaped, as shown, or, in other words, said slots are preferably curved on arcs of a circle having as a center the center of the plate. Screwed into the threaded holes 24 in the plate 23 are machine-screws 27, each provided near its upper end with a collar 28. The slots 26 are slightly greater in width than the diameter of the screws 27, but less than the diameter of the collars 28. In setting the blocks in position on the machine the rod 4 is detached from the plunger 1 and the block 7 is rigidly secured to the plate 6 in the manner before described. The block 8 is then slipped over the rod 4 and the two blocks held in true register with one another, after which the plate 23 is secured to the upper side of the block 8 by screws 22. In screwing the plate to the block the wood-screws have a tendency to slightly draw the plate in one direction or another on the block, and hence if said plate were attached directly to the rods 10 the two blocks 7 and 8 would not register with perfect accuracy; but by the means described after the plate 23 has been secured to the block 8 it is only necessary to insert and secure the rod 4 in the plunger 1, first turning the block 8 slightly about the rod 4 as an axis. After the rod 4 has been secured in the plunger the block 8 is turned, causing the screws 27 to loosely enter the slots 26, the collars 28 riding over the upper side of the plate 25. The block 8 is then adjusted until it accurately registers with the block 7, after which the screws 27 are screwed up tight, causing the collars 28 to firmly clamp the two plates 23 and 25 together and securely locking the block 8 in place relatively to the block 7. The two blocks thereafter act as a single block, excepting during the time they are separated, as before described.

In my Patent No. 690,377 is shown a machine which does not operate to tuck in the edges of the blank over the upper edges of the box, and provision is also made for causing the machine shown in Patent No. 691,329 to operate in the same manner. For machines operating in this manner—that is to say, for making boxes in which the edges of the blank are left projecting above the upper edges of the box to be subsequently folded in by hand—but a single solid block is employed, as shown in Fig. 7 of the drawings. Referring to said figure of the drawings, the numeral 29 indicates a single solid or integral form-block, the vertical edges or corners of which are beveled or cut away, as at 30, whereby the covered box may be stripped from the form-block with ease and without

liability of breaking or weakening the corners of the box. In such a form-block there is no necessity for beveling the upper edges of the block, as the upper edges of the blank when such a block is employed are not folded in, as before explained.

As shown, the sides of the platen 2 are beveled downwardly and inwardly, as at 31—that is to say, said platen is of the shape of an inverted truncated pyramid—whereby as the platen, with the box and form-block seated thereon, descends between the yielding rolls, which operate to affix the side and end flaps of the blank to the sides and ends of the box, the beveled sides and ends of the platen act as wedges to slightly push away the said rolls and facilitate the entrance of the box therebetween.

When the boxes to be covered necessitate the employment of a form-block so small that there is not room for forming the perforations to receive the stripper-rods, before referred to, I form open slots 32 in the vertical sides of the form-block, as shown in Fig. 8, and instead of employing the stripper-rods 11 in the manner before described for stripping off the box I fix collars 33 on said rods, said collars being provided with inwardly-projecting fingers 34, which when the rods 11 are moved downward as the form-block returns to normal position enter the open slots or grooves 32 and engage the upper edges of the box and strip the latter from the form-block as the latter ascends.

For imparting the necessary movements to the form-blocks the following mechanism is preferably provided, the said mechanism being the same as that shown in my Patent No. 691,329, before referred to, for the same purpose. Referring to Fig. 9 of the drawings, the numeral 35 indicates a standard fixed to the frame of the machine and provided at its upper end with brackets 36 and 37. The numeral 38 indicates a vertical shaft which is caused to rotate by any suitable mechanism and has fixed on its upper end a cam 39. Pivoted to the end of the bracket 37 is a lever 40, one end of which is connected to an adjustable link connection 41, which latter in turn is connected to the plunger 1. On the free end of the lever 40 is arranged a weight 42, which serves to counterbalance the weight of the plunger and its connected parts. On the lever 40, between its pivot 43 and the link connection 41, is a friction-roller 44, which engages an endless cam-groove or raceway 45, formed on the periphery of the cylindrical cam 39. It will be evident that as the cam 39 rotates the lever 40 will be oscillated about its pivot and will raise and lower the plunger 1 and the form-block 7 8, carried thereby.

To one of the rods 13, before referred to, is attached one end of a link 46, the other end of which is pivoted to the end of a bent lever 47, that is pivoted intermediate its ends to the bracket 36. On the opposite end of the bent lever 47 is a friction-roller 48, which engages an endless cam-groove or raceway 49, formed in the periphery of the cam 39. As the cam 39 rotates the bent lever is oscillated about its pivot 50 at certain periods of the rotation of said cam and raises and lowers the rods 13 and with them the stripper-rods 11. By such movement of the bent lever 47 the stripper-rods are caused to press against the bottom of the box as the latter rests on the platen 2 when the platen has reached the limit of its upward movement, and as the form-block 7 8 continues to move upward through the medium of the oscillating lever 40 the box is stripped from the form-block, all in the manner hereinbefore described.

As shown in Figs. 1 and 10, the edge-tucking fingers each consists of a flat strip or bar of the same length as the adjacent side of the form-block 7 8. In my said Patent No. 691,329 these fingers are shown as having square ends; but practice has proven that when constructed in this manner unless made and operating with great accuracy the ends of the fingers are apt to interfere with one another. To avoid such a result, I bevel off or miter the ends of the fingers 17 at an angle of forty-five degrees, as at 51, (see Fig. 10,) so that where the fingers are moved inward toward one another to tuck in the edges of the blank over the edges of the box, as before described, should the ends of the fingers abut one another the mitered ends will register with one another and will thus not interfere with the proper operation of said fingers.

Having described my invention, what I claim is—

1. A form-block for box-covering machines, comprising a rectangular block the vertical edges of which are beveled throughout the thickness of the block.

2. A form-block for box-covering machines, comprising two rectangular blocks superposed one upon the other, the lower block having beveled vertical edges.

3. A form-block for box-covering machines, comprising two rectangular blocks superposed one upon the other, the vertical edges of the lower block being beveled, and the vertical edges of the upper block square.

4. A form-block for box-covering machines, comprising two rectangular blocks superposed one upon the other, the upper and vertical edges of the lower block being beveled.

5. A form-block for box-covering machines, comprising two rectangular blocks superposed one upon the other, the vertical edges of the lower block and the edges of the adjacent faces of both blocks being beveled.

6. A form-block for box-covering machines, comprising two rectangular blocks superposed one upon the other, the vertical edges of the lower block and the edges of the adjacent faces of both blocks being beveled, and the vertical edges of the upper block square.

7. In a box-covering machine, the combination with a reciprocating platen on which the box to be covered is adapted to rest, of yield-

ing presser devices for affixing the side and end flaps of the cover-blank to the sides and ends of the box, said platen being provided with means for spreading apart said presser devices in advance of the box, substantially as described.

8. In a box-covering machine, the combination with a reciprocating platen on which the box to be covered is adapted to rest, of yielding rolls for affixing the sides and ends of the flaps of the cover-blank to the sides and ends of the box, said platen being provided with means for spreading apart said rolls in advance of the box, substantially as described.

9. A form-block for box-covering machines having open vertical grooves extending throughout two of its opposite vertical faces, for the purpose specified.

10. In a box-covering machine, the combination with a form-block having open vertical grooves extending throughout two of its opposite faces, of strippers arranged to project into said grooves to engage the upper edges of the box to strip the latter from the form-block.

11. In a box-covering machine, the combination with a form-block having open vertical grooves extending throughout two of its opposite faces, of movable rods arranged opposite said grooves, and strippers mounted on said rods and arranged to project into said grooves, for the purpose specified.

12. In a box-covering machine, the combination with a form-block having open vertical grooves extending throughout two of its opposite faces, of movable rods arranged opposite said grooves, and collars adjustably mounted on said rods and provided with stripper-fingers arranged to project into said grooves, for the purpose specified.

13. In a box-covering machine, the combination with a plunger-rod, of a presser-block attached to said rod, a fold-in block movably arranged on said rod and normally resting on the presser-block, rods for controlling the movement of the fold-in block independently of the presser-block, and means for adjustably attaching the fold-in block to said rod, substantially as described.

14. In a box-covering machine, the combination with a plunger-rod, of a presser-block attached to said rod, a fold-in block movably arranged on said rod and normally resting on the presser-block, means for controlling the movement of the fold-in block independently of the presser-block, and means for laterally adjusting the fold-in block relatively to the presser-block, substantially as described.

15. In a box-covering machine, the combination with a plunger-rod, of a presser-block attached to said rod, a fold-in block movably arranged on said rod and normally resting on the presser-block, a plate attached centrally to the top of the fold-in block, two screws fitted in the opposite ends of said plate, a rod for controlling the movement of the fold-in block independently of the presser-block, and a plate rigidly attached to said rod and having open-ended slots in its opposite sides arranged to receive said screws, substantially as and for the purpose specified.

16. In a box-covering machine, the combination with a box-support comprising a rectangular block having beveled vertical edges, of covering devices, and means for imparting a relative movement between said box-support and covering devices, substantially as described.

17. In a box-covering machine, the combination with a box-support comprising two rectangular blocks superposed one upon the other, the lower block having beveled vertical edges, of covering devices, and means for imparting a relative movement between said box-support and covering devices, substantially as described.

18. In a box-covering machine, the combination with a box-support comprising two rectangular blocks superposed one upon the other, the upper and vertical edges of the lower block being beveled, of covering devices, and means for imparting a relative movement between said box-support and covering devices, substantially as described.

19. In a box-covering machine, the combination with a box-support comprising two rectangular blocks superposed one upon the other, the edges of the adjacent faces of the blocks being beveled, of covering devices, and means for imparting a relative movement between said box-support and covering devices, substantially as described.

20. In a box-covering machine, the combination with a box-support comprising two rectangular blocks superposed one upon the other, the edges of the adjacent faces of the blocks being beveled, of covering devices including edge-tuck-in fingers for tucking in the edges of the blank between the beveled edges of the blocks, and means for imparting a relative movement between said box-support and covering devices, substantially as described.

21. In a box-covering machine, the combination with a plunger-rod, of a form-block attached to said rod, a fold-in block movably arranged on said rod and normally resting on the form-block, and means for laterally adjusting the fold-in block relatively to the form-block.

22. In a box-covering machine, the combination with a form-block and means for supporting the same, of a fold-in block located above and in alinement with said form-block, means for supporting said fold-in block, and means for laterally adjusting the fold-in block relatively to the form-block and for securing the same in its adjusted position.

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

PHILIP S. SMITH.

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