March 30, 1948. H. P. McGOVERN 2,438,509

MANUFACTURE OF CARDBOARD BOXES

Filed Jan. 5, 1945 4 Sheets-Sheet 1

Fig. 1

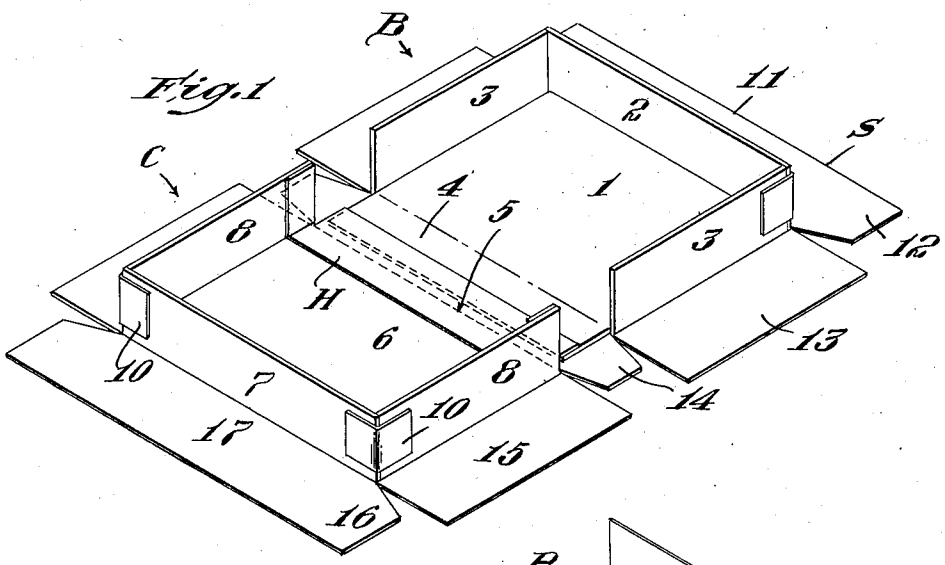


Fig. 2

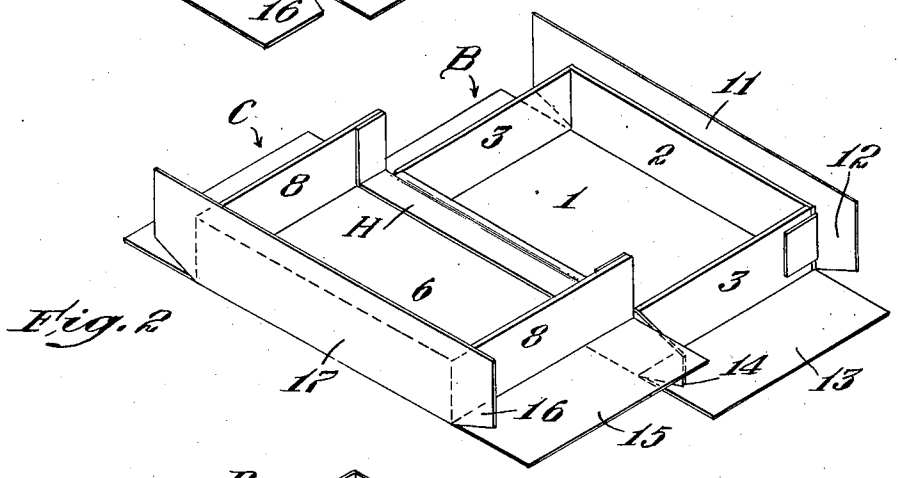
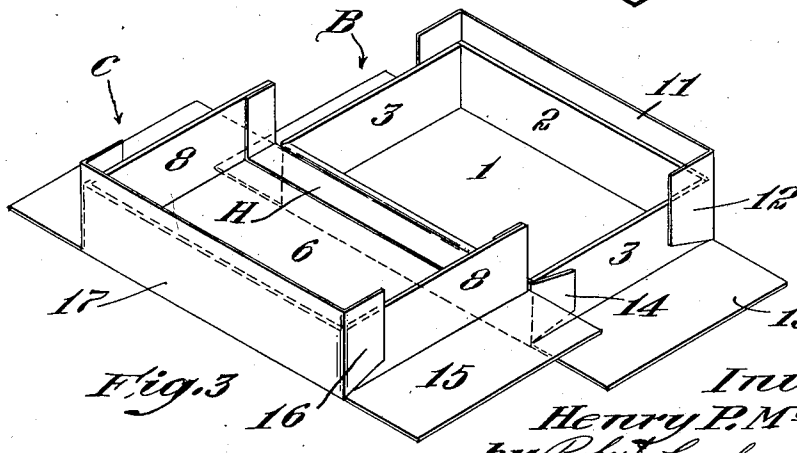


Fig. 3



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MANUFACTURE OF CARDBOARD BOXES

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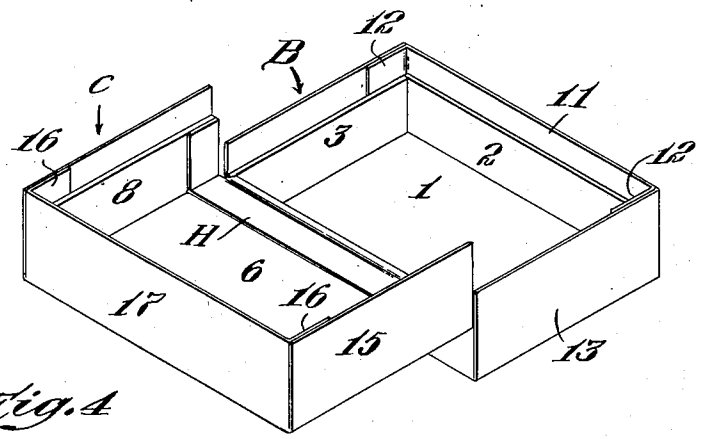


Fig. 4

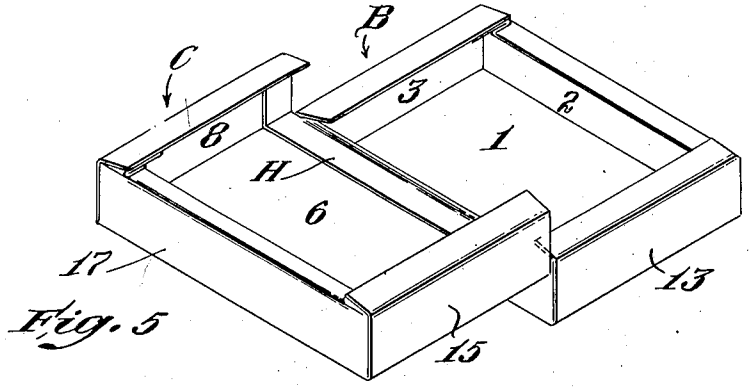


Fig. 5

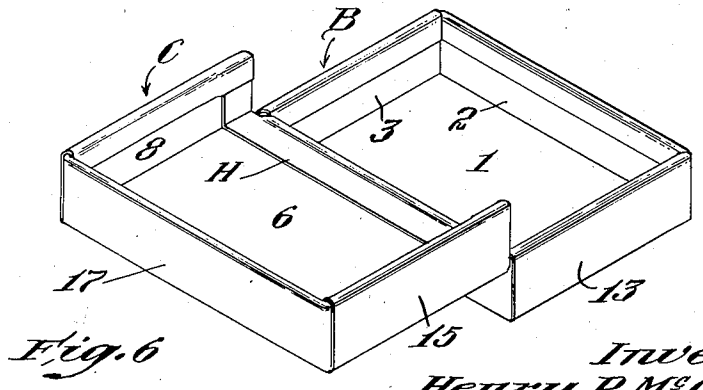


Fig. 6

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MANUFACTURE OF CARDBOARD BOXES

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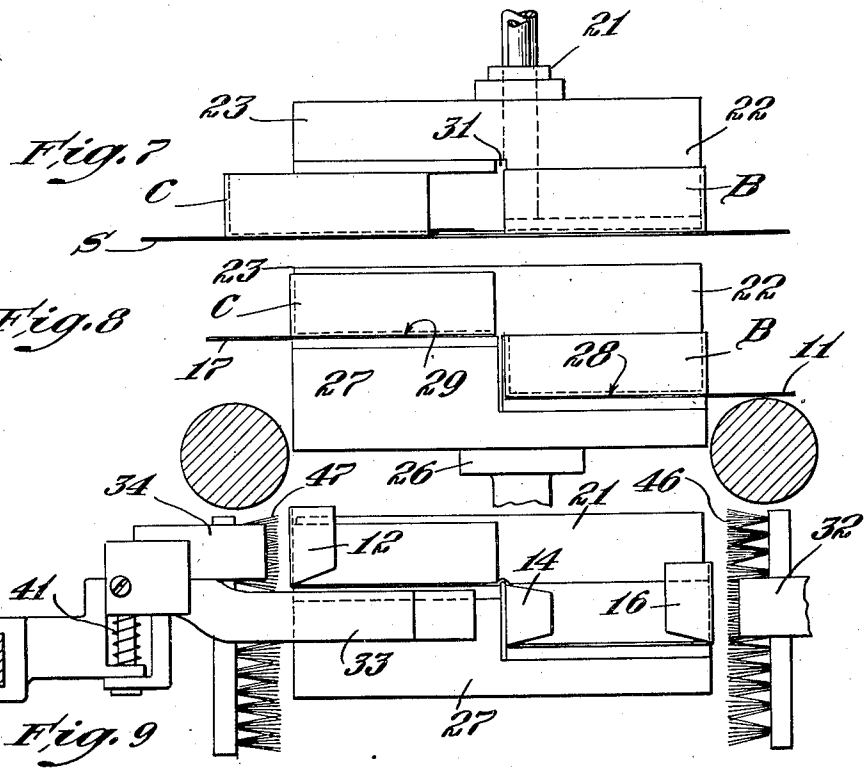


Fig. 7

Fig. 8

Fig. 9

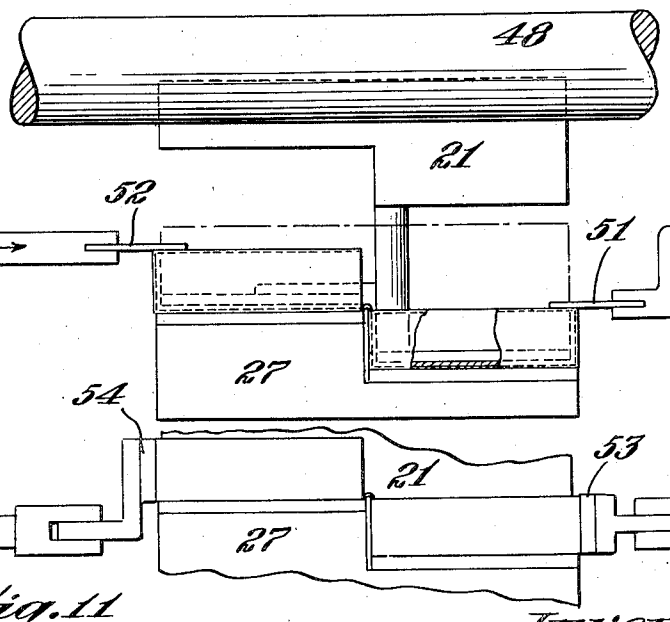


Fig. 10

Fig. 11

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MANUFACTURE OF CARDBOARD BOXES

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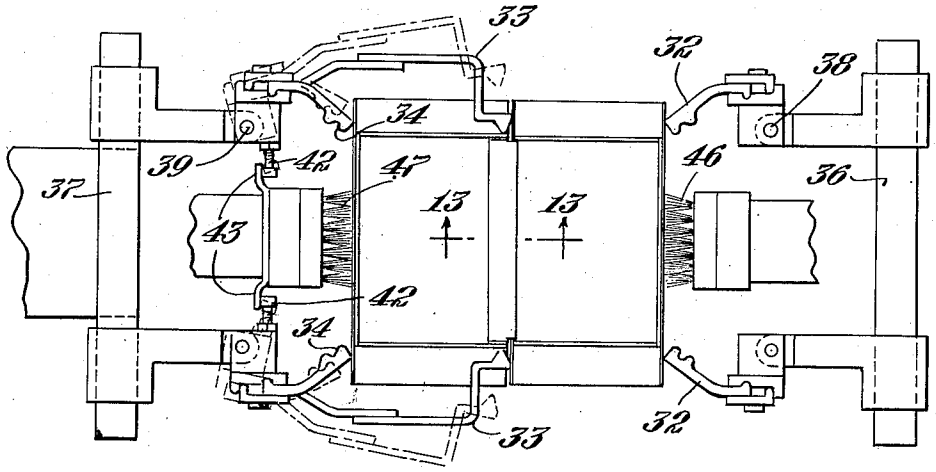


Fig. 12

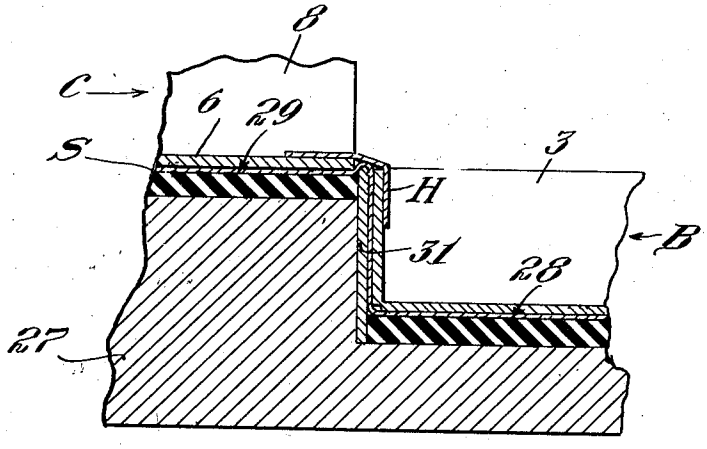


Fig. 13

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UNITED STATES PATENT OFFICE

2,438,509

MANUFACTURE OF CARDBOARD BOXES

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Application January 5, 1945, Serial No. 571,450

8 Claims. (Cl. 93—54.2)

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This invention relates to boxes of the type comprising a hinged cover and a covering of paper or other sheet material on the outside of the cardboard.

Objects of the invention are to provide a machine for making such boxes which is simple and economical in construction, which utilizes standard parts with few exceptions and which is durable and reliable in use.

The present invention involves a method and machine for making cardboard boxes of the type comprising a bottom, front, back and two sides fast together at all four corners of the box, a cover comprising a top, front and sides fast together at the corners, and a sheet of material covering the outer surfaces of both the box and the cover with tabs overlapping the corners, the sheet hinging the box and cover together with the upper edge of the aforesaid back juxtaposed to the rear edge of the aforesaid top. According to the present invention the apparatus comprises a head carrying two forms disposed in offset planes to fit into the box and cover simultaneously when the cover is open 180°, in combination with means for moving the head along a predetermined path extending in a direction parallel to the aforesaid sides and means distributed along the aforesaid path for wiping the margins of the sheet along the aforesaid sides and fronts and thence over the edges while the box and cover are disposed in offset planes. Said planes are preferably horizontal planes vertically offset to be at different levels. Preferably the wiping mechanism comprises means at a rest position along said path for wiping the tabs around the corners of the box and cover, this means including a pair of wipers movable in the plane of the cover for wiping tabs from the front of the cover around to the sides of the cover and a second pair of wipers movable in the offset plane of the box for wiping tabs from the back of the box around to the sides of the box, together with means farther along the path for wiping the margins of the sheet over the edges of the box and cover. In the preferred embodiment the tab wiping means comprises a pair of short wipers movable in the plane of the cover and a pair of long wipers movable in the offset plane of the box, a holder for the long and short wipers, means for advancing and retracting the holder along a second path extending transversely of the aforesaid path, and means for moving the long wipers away from the box transversely of each of the paths after they have wiped their tabs as aforesaid.

For the purpose of illustration a typical embodiment is shown in the accompanying drawings, in which

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Figs. 1 to 6 inclusive show a typical box in different stages of assembly;

Figs. 7 to 11 inclusive are elevations, more or less diagrammatic, showing the apparatus in different positions;

Fig. 12 is a top plan view of the mechanism shown in Fig. 9; and

Fig. 13 is a section on line 13—13 of Fig. 12.

Referring first to Figs. 1 to 6, the illustration comprises a box B, a cover C, a hinge H and a covering S of sheet material. The box comprises a bottom 1, front 2, sides 3, and a back 4, and the cover C comprises a top 6, a front 7 and sides 8. As disclosed in my copending application Serial No. 571,449, filed on even date herewith and which has become abandoned, the box and cover have a gap therebetween at the hinge line 5. While the box and cover may be formed from a single piece of cardboard and the gap provided by cutting a groove in the outer side of the cardboard, leaving a stratum of cardboard to serve as a hinge, as disclosed in the aforesaid application, preferably the box and cover are formed from separate pieces of cardboard with a space between the upper edge at the back of the box and the rear edge of the top of the cover, as shown in Fig. 13. The outer surfaces of the box and cover are covered with a single piece of paper or other suitable sheet material having the same configuration as that of the combined box and cover blanks except for the extensions 11 to 17 inclusive to be folded over the edges and corners of the box and cover, the extensions being folded in the following manner: 11 over the front 2 of the box, 12 around the front corners of the box, 13 over the sides 3 of the box, 14 around the rear corners of the box, 15 over the sides 8 of the cover, 16 around the front corners of the cover and 17 over the front of the cover. Before the cover S is applied the sides and fronts of the box cover are preferably secured in upright position by the corner stays 10 and the hinge H is glued in place as shown in Fig. 1. Then after glue has been applied over the entire surface of the sheet S the box and cover are applied in the position shown in Fig. 1. Then the back 4 is swung into upright position, raising the cover to a level somewhat higher than that of the box, and the margins 11 and 17 of the covering material are wiped up along the fronts 2 and 7, leaving the parts in the positions shown in Fig. 2. The next step consists in wiping the flaps 12, 14 and 16 around the corners of the box and cover

to the positions shown in Fig. 3. The next step involves wiping the side extensions 13 and 15 upwardly along the sides of the box and cover to the positions shown in Fig. 4. Then the upwardly projecting margins of the sheet S are wiped inwardly to the positions shown in Fig. 5, after which the inwardly projecting margins are wiped downwardly to the positions shown in Fig. 6.

The apparatus for assembling the box comprises a vertically reciprocating head 21 carrying two forms 22 and 23 adapted to fit into the box and cover respectively when the cover is opened 180°. Underneath the head 21 is a plunger 26 carrying a platform 27 having rubber surfaces 28 and 29 at different levels to seat against the box and cover respectively when the latter are fitted on the forms 22 and 23. With the head 21 lifted away from the plunger the box, in the condition shown in Fig. 1, is applied to the head as shown in Fig. 7. Then when the head 21 descends to the position shown in Fig. 8 the box and cover are clamped between the head and platform with the forms 22 and 23 fitting snugly into the box and cover respectively. As shown in Fig. 7 there is a space 31 between the two forms and as shown in Fig. 13 the platform 27 carries a blade 31 which projects into this space to loop the covering materials into the gap between the juxtaposed edges of the box and cover.

After the box has been clamped between the head 21 and the platform 27, the head and platform descend together from the position shown in Fig. 8 to the position shown in Fig. 9. In passing from the upper to the lower position the margins 11 and 17 of the covering sheet S are wiped up along the front sides of the box and cover respectively, from the positions shown in Figs. 1 and 8 to those shown in Figs. 2 and 9.

At the station shown in Fig. 9 the flaps 12, 14 and 16 are wiped around the corners of the box and cover by three pairs of wipers 32, 33 and 34 which reciprocate horizontally, wipers 32 advancing to the left and retracting to the right and wipers 33 and 34 advancing to the right and retracting to the left. The wipers 32 are mounted on a holder 36 (Fig. 12) and the wipers 33 and 34 are mounted on a holder 37, the wipers being pivotally mounted on the holders by means of vertical pivot pins 38 and 39 to swing from the inner operative positions shown in full lines to their outer inoperative positions shown in broken lines (Figs. 9 and 12), springs 41 (Fig. 9) urging the wipers to their inner operative positions. The pivoted supports for the wipers 33 and 34 carry pins 42 (Fig. 12) and stationary stops 43 project into the path of these pins so that, as the holder 37 retracts, the pins 42 strike the stops 43 to swing the wipers from their operative positions to the inoperative positions shown in broken lines so that the long wipers 33 do not rub on the box as the box moves vertically past this station. Mounted between the wipers 32 is a brush 46 which holds the margin 11 of covering sheet S against the front 2 of the box, and mounted between the wipers 34 is a similar brush 47 for holding the margin 17 against the outer face of the front 7 of the cover.

After the wipers 32, 33 and 34 advance to wipe the flaps 12, 14 and 16 into position and then retract to clear the box, the head 21 and platform 27 carry the box down to the station illustrated in Fig. 10. In passing from one station to the other the margins 13 and 15 are wiped up along the sides of the box and cover over the flaps 12, 14 and 16 by means of rollers 48. After carrying the box to the new station the head 21 returns upwardly to the position shown in Fig. 10, whereupon wipers such as shown at 51 and 52 move in to wipe the margins of the covers to the positions shown in Fig. 5. After the wipers 51 and 52 retract the head 21 descends to wipe the inwardly projecting margins of the sheet S along the inside of the box and cover to the positions shown in Fig. 6. Then the head 21 and platform 27 again descend together to the station shown in Fig. 11 where pressure pads such as indicated at 53 and 54 move in to press the covering sheet S against the sides and fronts of the box and cover, thereby insuring that they adhere firmly. After the pads 53 and 54 retract the head 21 and platform 27 return to the positions shown in Figs. 7 and 8, whereupon the finished box may be removed. In rising from the lowermost to the uppermost position all of the wipers, including the wipers 33, are in retracted position so as not to engage the box.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. For making cardboard boxes of the type comprising a bottom, front, back and two sides fast together at all four corners of the box, a cover comprising a top, front and sides fast together at the corners, and a sheet of material covering the outer surfaces of both the box and the cover with tabs to cover the corners, the sheet hinging the box and cover together with the upper edge of said back juxtaposed to the rear edge of said top so that when the cover is open 180° said bottom and the top of the cover are in parallel planes offset by the depth of the back of the box, apparatus comprising a head carrying two offset forms having their faces disposed in said offset planes to fit into the box and cover simultaneously when the cover is open 180°, means for moving the head along a predetermined path extending in a direction parallel to said sides, and means distributed along said path for wiping the margins of said sheet along said sides and fronts and thence over said edges while the box and cover are disposed in offset planes.

2. For making cardboard boxes of the type comprising a bottom, front, back and two sides fast together at all four corners of the box, a cover comprising a top, front and two sides fast together at the corners, and a sheet of material covering the outer surfaces of both the box and the cover with tabs to cover the corners, the sheet hinging the box and cover together with the upper edge of said back juxtaposed to the rear edge of said top, apparatus comprising a head carrying two forms disposed in offset planes to fit into the box and cover simultaneously when the cover is open 180°, means for moving the head along a predetermined path extending in a direction parallel to said sides, means along said path for wiping margins of said sheet along said fronts as the head advances to a rest position, means at said position for wiping said tabs around the corners of the box and cover, said last means including a pair of wipers movable in the plane of the cover for wiping tabs from the front of the cover around to the sides of the cover and a second pair of wipers movable in the offset plane of the box for wiping tabs from the back of the box around to the sides of the box, and means farther along

said path for wiping the margins of the sheet over the edges of the box and cover.

3. For making cardboard boxes of the type comprising a bottom, front, back and two sides fast together at all four corners of the box, a cover comprising a top, front and two sides fast together at the corners, and a sheet of material covering the outer surfaces of both the box and the cover with tabs to cover the corners, the sheet hinging the box and cover together with the upper edge of said back juxtaposed to the rear edge of said top, apparatus comprising a head carrying two forms disposed in offset planes to fit into the box and cover simultaneously when the cover is open 180°, means for moving the head along a predetermined path extending in a direction parallel to said sides, means along said path for wiping margins of said sheet along said fronts as the head advances to a rest position, means at said position for wiping said tabs around the corners of the box and cover, said last means including a pair of short wipers movable in the plane of the cover for wiping tabs from the front of the cover around to the sides of the cover and a pair of long wipers movable in the offset plane of the box for wiping tabs from the back of the box around to the sides of the box, and a holder for said long and short wipers, means for advancing and retracting the holder along a second path extending transversely of said path, and means for moving the long wipers away from the box transversely of each of said paths after they have wiped their tabs as aforesaid.

4. For making cardboard boxes of the type comprising a bottom, front, back and two sides fast together at all four corners of the box, a cover comprising a top, front and two sides fast together at the corners, and a sheet of material covering the outer surfaces of both the box and the cover with tabs to cover the corners, the sheet hinging the box and cover together with a gap between the upper edge of said back and the rear edge of said top, apparatus comprising a head carrying two forms disposed in offset planes with a space therebetween to fit into the box and cover simultaneously when the cover is open 180°, a blade projecting into said space to loop said sheet into said gap, means for moving the head and blade along a predetermined path extending in a direction parallel to said sides, means along said path for wiping margins of said sheet along said fronts as the head advances to a rest position, means at said position for wiping said tabs around the corners of the box and cover, said last means including a pair of short wipers movable in the plane of the cover for wiping tabs from the front of the cover around to the sides of the cover and a pair of long wipers movable in the offset plane of the box for wiping tabs from the back of the box around to the sides of the box, and a holder for said long and short wipers, means for advancing and retracting the holder along a second path extending transversely of said path, and means for moving the long wipers away from the box transversely of each of said paths after they have wiped their tabs as aforesaid.

5. For making cardboard boxes of the type comprising a bottom, front, back and two sides fast together at all four corners of the box, a cover comprising a top, front and two sides fast together at the corners, and a sheet of material covering the outer surfaces of both the box and the cover with tabs to cover the corners, the sheet hinging the box and cover together with a gap

between the upper edge of said back and the rear edge of said top, apparatus comprising a head carrying two forms disposed in offset planes with a space therebetween to fit into the box and cover simultaneously when the cover is open 180°, a blade projecting into said space to loop said sheet into said gap, means for moving the head and blade along a predetermined path extending in a direction parallel to said sides, means along said path for wiping margins of said sheet along said fronts as the head advances to a rest position, means at said position for wiping said tabs around the corners of the box and cover, said last means including a pair of wipers movable in the plane of the cover for wiping tabs from the front of the cover around to the sides of the cover and a second pair of wipers movable in the offset plane of the box for wiping tabs from the back of the box around to the sides of the box, and means farther along said path for wiping the margins of the sheet over the edges of the box and cover.

6. For making cardboard boxes of the type comprising a bottom, front, back and two sides fast together at all four corners of the box, a cover comprising a top, front and two sides fast together at the corners, and a sheet of material covering the outer surfaces of both the box and the cover with tabs to cover the corners, the sheet hinging the box and cover together with a gap between the upper edge of said back and the rear edge of said top, apparatus comprising a head carrying two forms disposed in offset planes with a space therebetween to fit into the box and cover simultaneously when the cover is open 180°, a blade projecting into said said space to loop said sheet into said gap, means for moving the head and blade from station to station along a predetermined path extending in a direction parallel to said sides, and means distributed along said path for wiping the margins of said sheet along said sides and fronts and thence over the edges of the box and cover.

7. For making cardboard boxes of the type comprising a bottom, front, back and two sides fast together at all four corners of the box, a cover comprising a top, front and two sides fast together at the corners, and a sheet of material covering the outer surfaces of both the box and the cover with tabs to cover the corners, the sheet hinging the box and cover together with a gap between the upper edge of said back and the rear edge of said top so that when the cover is open 180° said bottom and the top of the cover are in parallel planes offset by the depth of the back of the box, apparatus comprising a head carrying two offset forms having their faces disposed in said offset planes with a space therebetween to fit into the box and cover simultaneously when the cover is open 180°, and means for applying said sheet to the box and cover while they are disposed on said forms with said gap therebetween, thereby to provide a space between said edges to facilitate the hinge action of the cover.

8. For making cardboard boxes of the type comprising a bottom, front, back and two sides fast together at all four corners of the box, a cover comprising a top, front and sides fast together at the corners, and a sheet of material covering the outer surfaces of both the box and the cover with tabs to cover the corners, the sheet hinging the box and cover together with the upper edge of said back juxtaposed to the rear edge of said top, apparatus comprising a

head carrying two forms disposed in offset planes to fit into the box and cover simultaneously when the cover is open 180°, a plurality of spaced wiping stations extending along a predetermined path from said head in a direction parallel to said sides, means for moving the head from station to station, means for wiping margins of said sheet along said fronts as the head advances to one station, means at said station for wiping the tabs around the corners of the box and cover, means for wiping margins of said sheet along the sides of the box and cover as the head further advances to another station, and means at said other station for wiping the margins of the sheet over the edges and downwardly along the inside of the box and cover.

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