May 1, 1951 R. B. CARTWRIGHT ET AL 2,551,527

APPARATUS FOR CLOSING AND SEALING CONTAINERS

Filed May 26, 1948 4 Sheets-Sheet 1

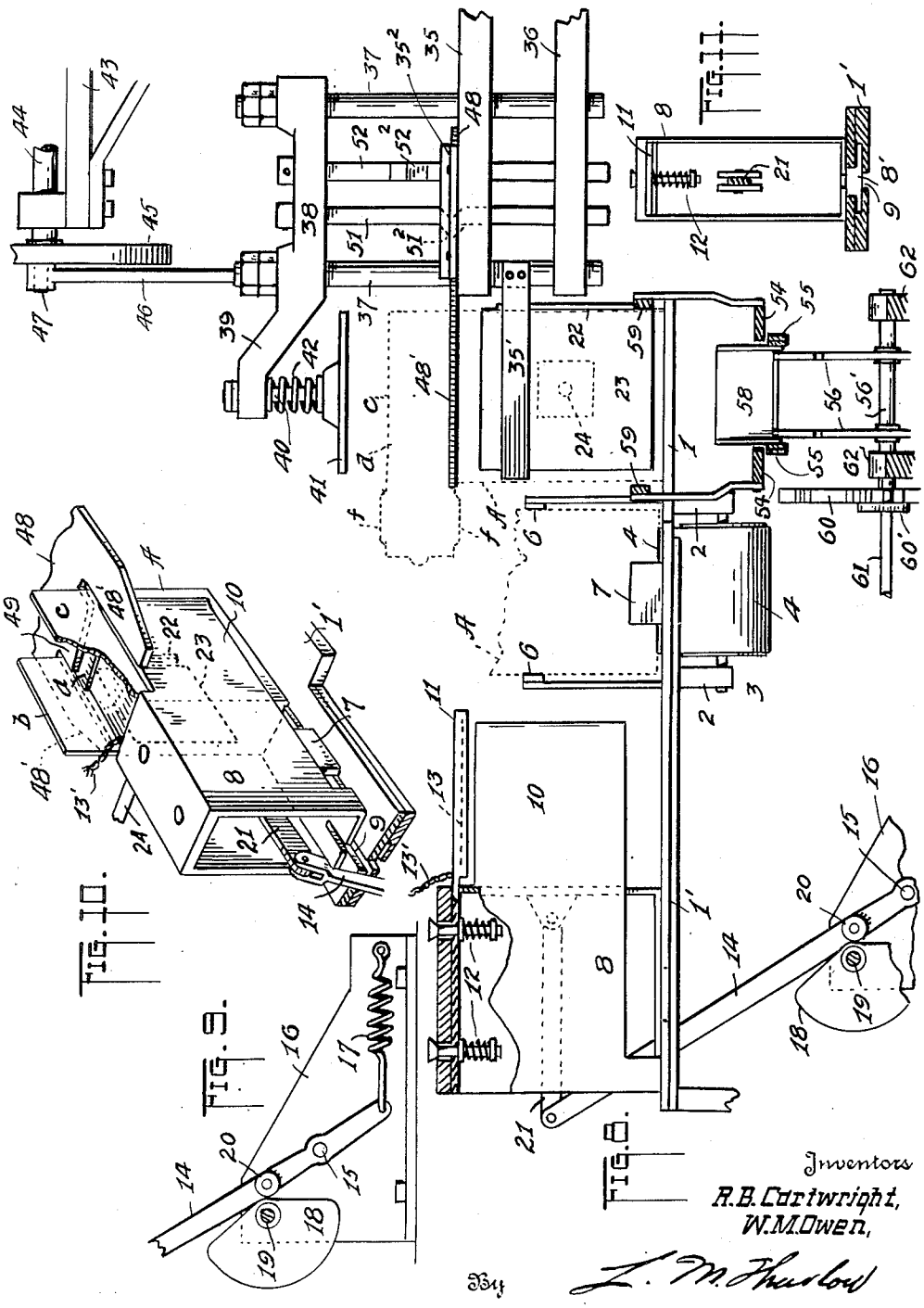


FIG. 11.

FIG. 10.

FIG. 9.

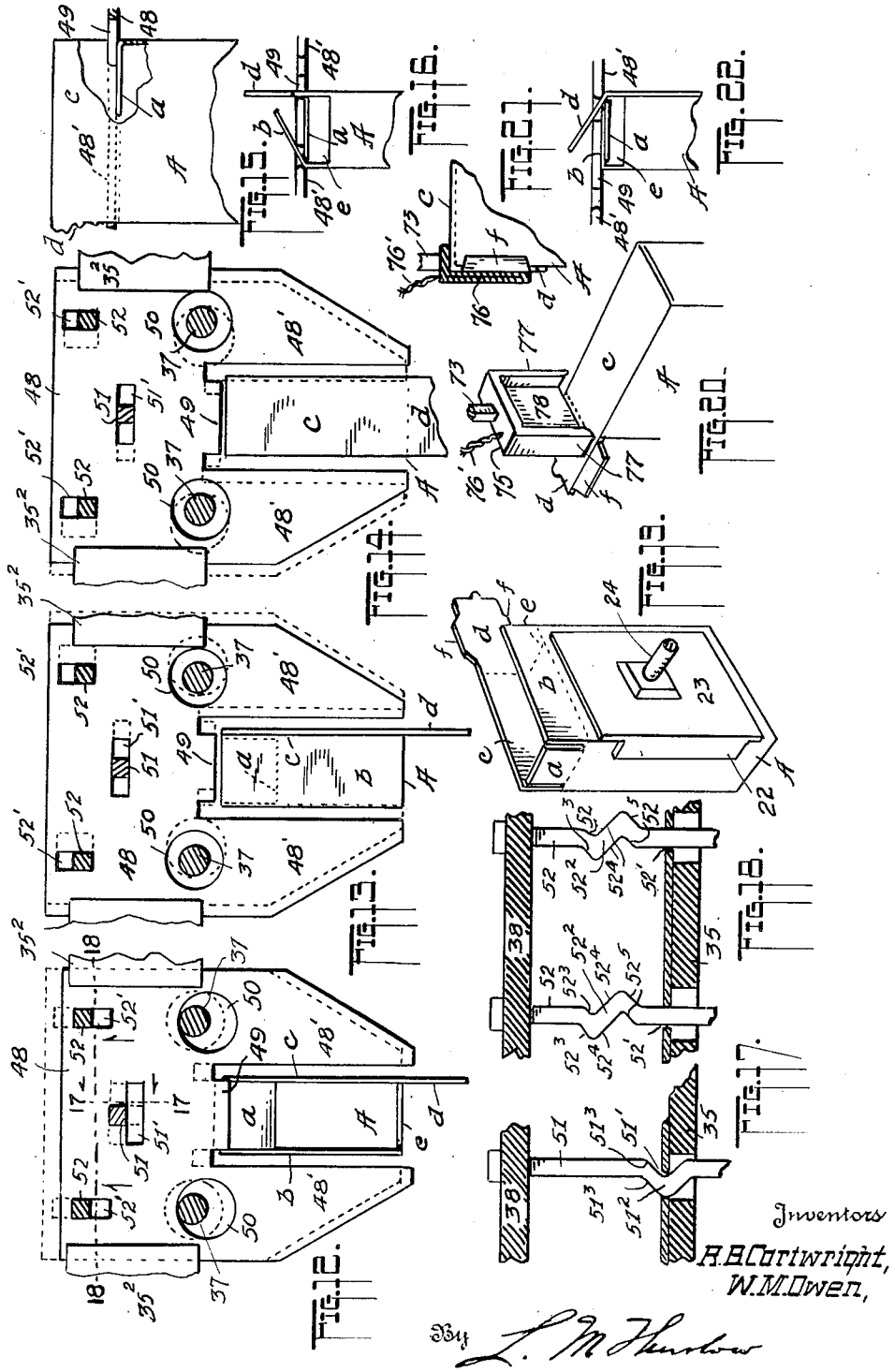
FIG. 8.

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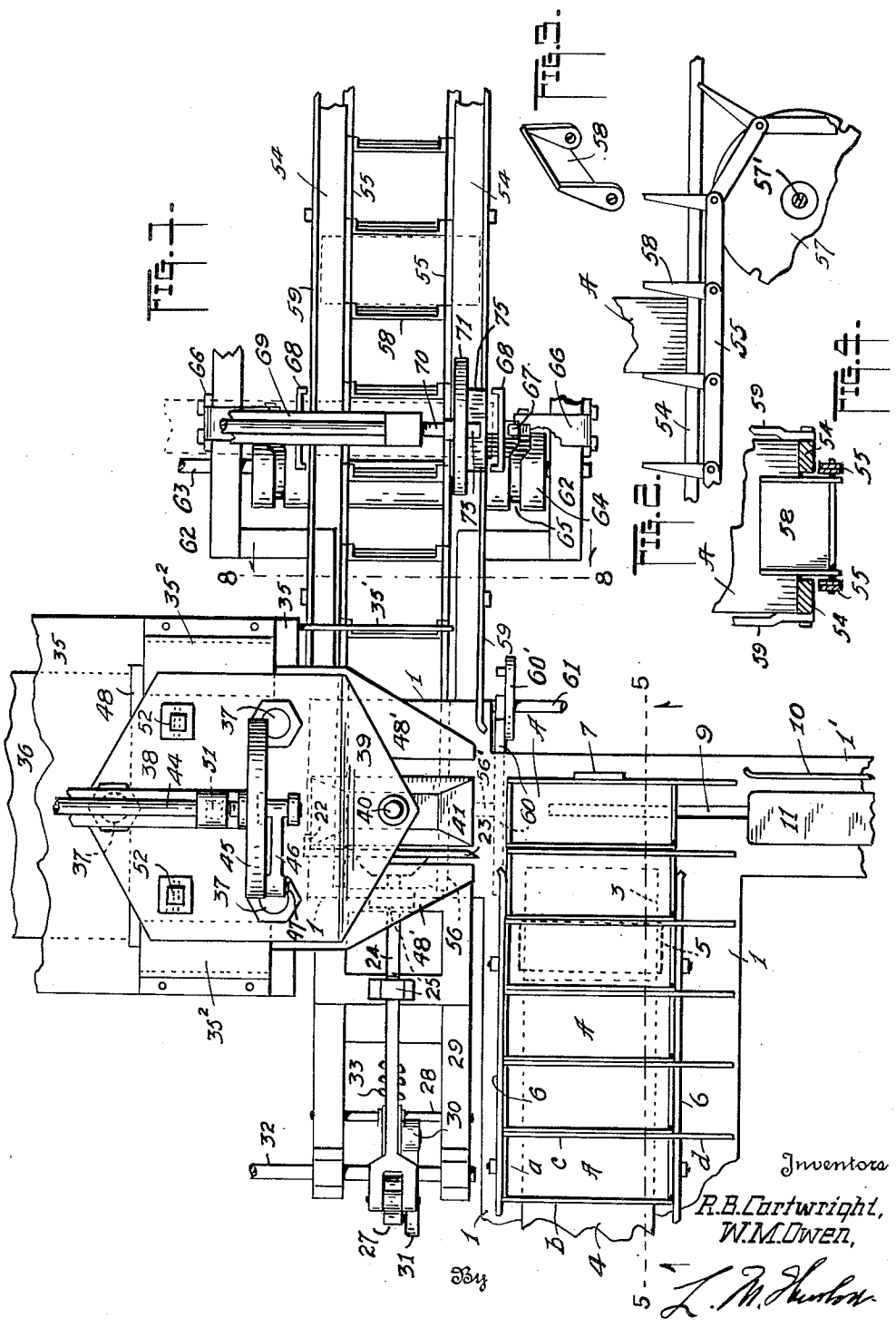
Filed May 26, 1948 4 Sheets-Sheet 2



May 1, 1951 R. B. CARTWRIGHT ET AL 2,551,527

APPARATUS FOR CLOSING AND SEALING CONTAINERS

Filed May 26, 1948 4 Sheets-Sheet 3



May 1, 1951 R. B. CARTWRIGHT ET AL 2,551,527

APPARATUS FOR CLOSING AND SEALING CONTAINERS

Filed May 26, 1948 4 Sheets-Sheet 4

FIG. 5.

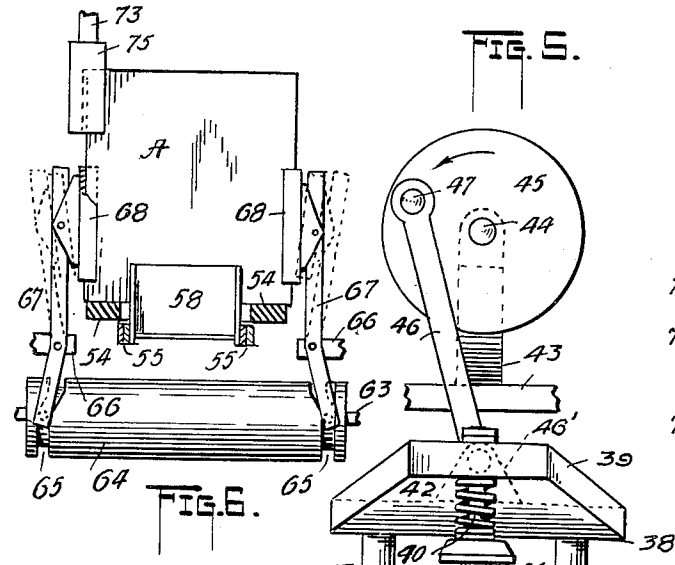


FIG. 7.

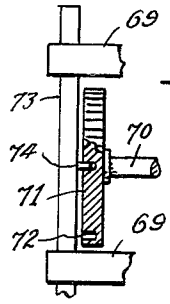
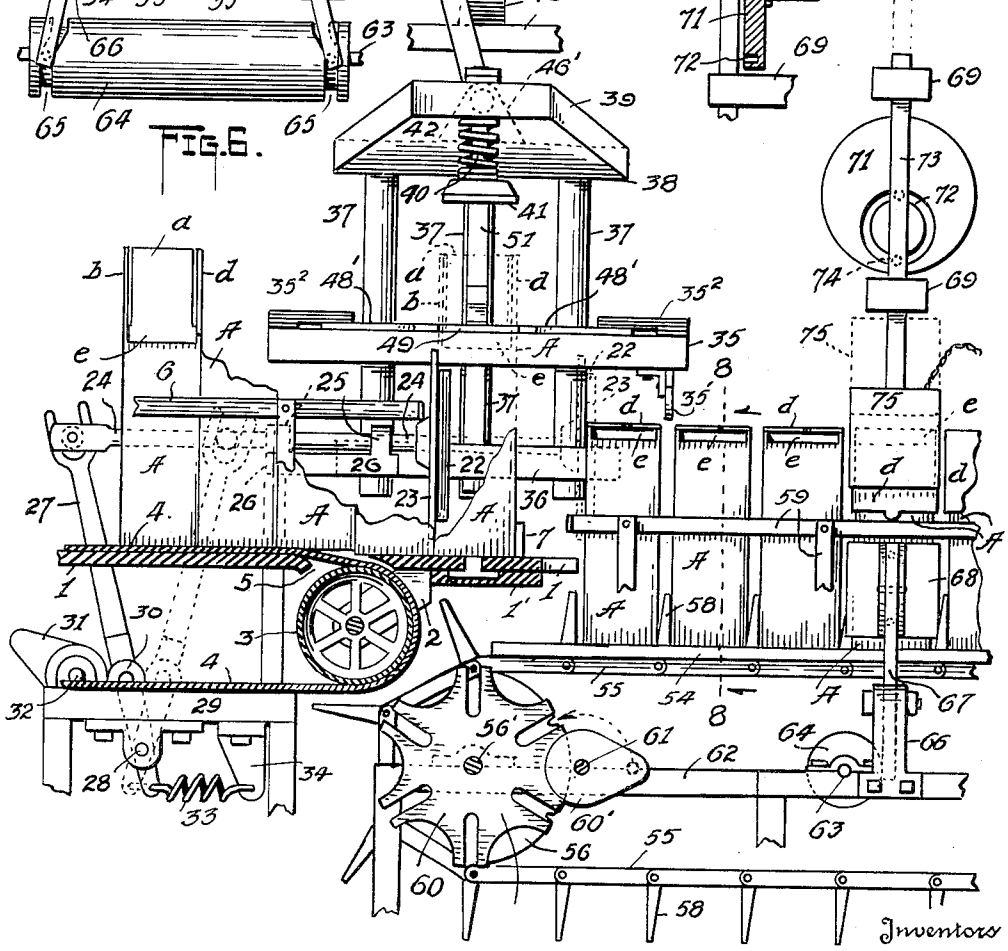


FIG. 6.



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UNITED STATES PATENT OFFICE

2,551,527

APPARATUS FOR CLOSING AND SEALING CONTAINERS

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Application May 26, 1948, Serial No. 29,216

12 Claims. (Cl. 93—2)

1

This invention pertains to a method of and apparatus for closing and sealing paper containers.

More particularly the invention resides in a method and apparatus for closing the flaps of a paper container for cereals, and the like, in packaging plants, and sealing said flaps by pressure, in certain instances, aided by the application of heat.

An object is to operate upon the flaps of a container of such type of that forming the subject of patent application Serial No. 1,860, filed January 12, 1948, by Robert B. Cartwright which involves certain of the usual top flaps of a container, one of said flaps having an extension adapted to be folded down upon one of the narrow sides of such container to serve as a closure for an opening in that side adjacent the top thereof through and from which opening the contents of the container may be discharged.

As distinguished from the more common practice of merely folding down the flaps one upon another, and trusting that a tight sealing of such container has come about, the purpose herein is to introduce through an opening in a wall of the container a pressure resisting member upon which the flaps are folded, and applying pressure upon the flaps at said member preferably in the presence of heat by which a suitable substance previously applied to the flaps is caused to soften whereby the said flaps are positively made to adhere to each other in a perfect seal, followed by causing an extension of one of the flaps to be made to adhere to the wall of the container having the named opening, and to overlie and seal said opening, also preferably by application of heat to bring about positive adherence of such extension.

That the present method, and the apparatus for carrying out the method may be fully understood reference is had to the accompanying drawings forming part hereof.

Figure 1 is a plan of the apparatus.

Figure 2 is a side elevation of part of a conveyor shown in Figure 1.

Figure 3 shows in perspective a conveyor-flight shown in Figures 1 and 2.

Figure 4 is a transverse section of a conveyor of Figure 2.

Figure 5 is a front elevation of the apparatus of Figure 1, in part section, taken on line 5—5 of that figure.

Figure 6 is an elevation of a structure illustrated in Figure 5 as viewed from the right of that figure.

Figure 7 is an elevation in part section of a

2

structure shown in Figure 5 also viewed from the right thereof.

Figure 8 is an end elevation of the apparatus in part section, produced on line 8—8 of Figures 1 and 5.

Figure 9 is an elevation of a detail of parts shown in Figure 8.

Figure 10 shows in perspective certain structures shown in Figure 8.

Figure 11 is a front elevation in part section of parts shown in Figures 8 and 10.

Figure 12 is a plan of a shift-plate shown in Figures 1 and 8 together with other parts shown in section.

Figures 13 and 14 are duplicates of Figure 12 in order to show different positions of the shift-plate from the position of the said plate in that figure.

Figure 15 is a side elevation of a container or box showing the shift-plate of Figures 12, 13, and 14 therewith, seen edgewise.

Figure 16 is a front elevation of a box, in part, showing the shift-plate of Figure 15 therewith.

Figure 17 is a side elevation of a cam rod produced on line 17—17 of Figure 12.

Figure 18 is a front elevation of two other cam rods produced on lines 18—18 also of Figure 12.

Figure 19 is a perspective of a container or box, and a ram portion included therewith.

Figure 20 is a perspective of a container or box, together with an operating member shown in Figure 5.

Figure 21 is a side elevation of a portion of a container and an operating member of Figure 20 shown therewith in section, and

Figure 22 is an elevation similar to Figure 16 but showing a shift-plate in a different position from that in the latter figure.

In several of the figures of the drawing the numeral 1 denotes a suitably supported bed-plate. Supported by and beneath the same in bearings 2, but one of which is shown, is a pulley 3 over which travels a belt 4 serving as a conveyor, said belt moving through a slot 5, in this instance, see Figure 5, in said bed-plate 1. Said belt 4 may receive upon it a series of containers or boxes A to be moved toward the right in the figure named, these being held in line by suitably mounted guides 6 paralleling the belt-edges, a leading box of the series adapted to abut a stop 7 on said bed-plate, Figures 1 and 5.

Mounted on an extension 1' of the bed-plate 1 is a carriage 8, see Figures 8 and 10, adapted to travel rearward in a direction at a right angle to the travel of said belt 4 and to be carried into

abutment with a box A stationed at the stop 7 to advance said box rearwardly of and beyond the position of said belt 4, said carriage having an extension 8' beneath it to move along and to be guided in a slot 9 in the bed-plate 1, see Figures 1 and 11.

In Figures 8 and 11 it will be noted that extending from one side of the carriage 8 is a plate 10. Also, that a plate 11 lies beneath the top of the carriage and extends from the latter toward the box A while at said stop 7 as in Figure 1, and as in Figure 10.

Within the box said plate 11 may be yieldingly supported, if desired, for permitting a vertical movement limited by a spring structure 12 of a well known arrangement, and within the portion of the plate 11 so extending from the carriage may be an electrically headed element suggested at 13 in Figure 8.

Below the carriage, in this instance, Figure 8, is a lever 14, pivotally mounted at 15 on a support 16, a spring 17 being connected at one end to the lever below its pivot, as in Figure 9, the other end of said spring having a fixed position on said support. Said spring is constantly under strain and thus maintains the lever in a forward position above its pivot 15 and against a cam 18 mounted on a shaft 19 journaled in said support 16. In this position, of course, the carriage is also maintained in the forward position shown in Figure 8. A roller 20 is in position to be engaged by the cam and the latter in its rotation will swing the lever to the right, or rearwardly, to an opposite position from that shown to thus move the carriage through the medium of a link 21 pivotally connected to and between said carriage and lever.

The full rearward movement to the said opposite position, due to said cam 18, results in abutting the carriage 8 with a box or container A at the stop 7, carrying said box to an extreme rearward position shown in Figures 5 and 8 in broken lines, see also Figure 10, wherein the rear side of said box may abut a flange 22 of a plate 23 carried by a rod 24 which will be termed a "ram" herein. The plate 23 and its flange 22 are clearly shown in Figures 1, 5 and 8. As may be seen in said Figure 5 the rod 24 constitutes a part of the ram and is mounted slidably in supports 25 surmounting a frame portion 26, the normal position of the plate 23 thereof being as shown in said figure to receive said box A. The end of the rod opposite the end carrying said plate is adapted to be engaged and shifted by a lever 27 pivoted at 28 on a supporting frame 29 and above said pivot said lever carries a roller 30 adjacent which is a cam 31 carried by a shaft 32 journaled on said supporting frame. A spring 33 connected to and between the lower extension of the lever and a part 34 serves to hold the roller 30 against said cam. Naturally, in the rotation of the cam the lever will shift the ram and project the plate 23 to the broken line position in said Figure 5 where it lies just above the edge of the bed-plate 1.

The front surface of the plate 23 is in line with a broad side of the box A and receives the same slidably as said box moves against the flange 22. The carriage 8 abuts the front narrow box wall of the box, while the plate 10 of the carriage receives against it the other broad side of the same. Thus, the box is firmly clamped in the position shown in Figure 10.

Rearward of the structure just described are two spaced supporting members 35 and 36 as

parts of the framing of the apparatus, a stop member 35' being affixed to the member 35 to parallel the said plate 23. Shiftable through said members 35, 36 are vertical rods 37, see Figures 1 and 8.

Surmounting said rods and fixed thereto is a plate 38 having a forward extension 39. Shiftable vertically through the extension is a rod 40 carrying a pressure plate 41, a spring 42 encircling the pin being under compression between said extension 39 and said plate 41. Journaled on a support 43, as part of the frame work of the apparatus, is a shaft 44 with a rotatable disc 45 fixed thereto as in Figures 5 and 8. A pitman 46 at one end engages a wrist pin 47 on the disc, the other end of said pitman having pivotal connection with said plate 38 as in said Figure 5 at 46'. Rotation of the disc will result in the vertical travel of the plate and said rods 37 with respect to the members 35 and 36 described.

Mounted on the upper surface of the member 35 is what will be termed a "shift-plate" 48 shown in plan in Figures 1, 12, 13 and 14. Said plate includes two spaced extensions 48', while at their places of junction with the main portion 48, and lying between them, is a forwardly extending abutment or tongue 49 spaced from both extensions, it being observed that said shift-plate is provided with openings 50 of considerable spread at the position of the rods 37 in order that the plates may be shifted without hindrance by the latter.

Secured upon the member 35 at opposite edges thereof, as in Figures 1, 3 and 8, are keepers 35^2 which hold the shift-plate upon said member while permitting the same to freely shift thereunder.

Affixed at their upper ends to, and depending from the plate 38, are three cam-rods, see Figures 12, 13 and 14, also Figures 17 and 18. One of these is identified at 51 which is adapted to move vertically through a slot 51' in the shift-plate and through the member 35 supporting the latter. This slot, which is relatively long and narrow, lies lengthwise in a transverse position in respect to said shift-plate. The other two cam-rods denoted at 52 are spaced from each other, and each likewise extends through a slot 52' in said shift-plate, these two slots paralleling each other in their lengths and lie at right angles to the longest measurement of the named slot 51' and lengthwise of the said plate.

The cam-rod 51 may be a flat member, or rectangular in cross section as shown in Figure 12, this likewise being true of the rods 52. Said rod 51 has a cam portion 51^2 formed therewith having opposite surfaces 51^3 downwardly inclined at an angle toward the position of the extension 48' of the shift-plate, and thence are rearwardly and downwardly inclined forming a V, the plane of which lies transversely of the slot 51'. The two rods 52 are identical in form, each having a double cam portion 52^2 substantially in the form of a Z the planes of which lie at right angles to the longest measurement of a slot 52', providing opposite downwardly inclined surfaces 52^3 extending in one direction, these merging into opposite surfaces 52^4 downwardly inclined in an opposite direction, then merging into opposite downwardly inclined surfaces 52^5.

In Figures 17 and 18 it is evident that in either direction of vertical movements of the rod 51 through the seat 51' the shift-plate will be engaged and shifted in one or both directions de-

pending upon the distance the cam is shifted therethrough. Also, that the vertical movement of the double cams 52^2 of the two rods **52** through the plate in one direction will shift the said plate first in one direction and then in an opposite direction, i. e., in a downward movement of the rods the plate in Figure 18 will be moved to the right, and then to the left.

At this junction it is to be stated that Figures 13 and 14 are provided as duplicates of Figure 12 in order to show two different positions of the shift-plate (broken lines) in the lateral shift of said plate, said Figure 12 showing in broken lines a forward shift as distinguished from said Figures 13, 14. These movements of the plate occur in closing the flaps of a box A, as will appear. Also, it is well to bring out the disposal of the box-flaps for the particular purpose of the folding operations to be explained. By reference to Figures 1, 5 and 19, for example, the box A includes a flap *a* surmounting the rear narrow wall of the box, while *b* denotes the flap for a broad side of the latter, as in common practice, whereas the flap *c* for the opposite broad side has an integral extension *d* adapted to be folded down upon the narrow front wall of the box, and to cover a recess *e* in that wall, said extension preferably having a flap *f* at each longitudinal edge. Immediately following the operations on the flaps the box or container is released, since the cam **18** at the lever **14** that shifts the carriage **8** reaches such a position in its rotation as to permit the spring **17**, Figure 9, to return said carriage to the position in Figure 8 ready for the next box-shifting step.

At the rearward side of the apparatus at a position below the level of the bed-plate **1**, in this instance for convenience, is suitably mounted a pair of plates **54** as the bottom of a conveyor, these being spaced apart as in Figures 4 and 8.

Beneath said plates is a chain conveyor **55** carried on sprocket wheels **56** and **57** on shafts **56'**, **57'**, respectively, see Figures 2 and 5, for example. Mounted at spaced intervals on the conveyor chain are flights **58** which travel between the spaced plates **54**. Suitably supported above the latter are members **59** which serve to guide the boxes A as urged along by the flights **58**, it being noted in Figures 1 and 8 that the previously mentioned stop-member **35'** overhangs said conveyor **55**.

The conveyor flights in operation are made to advance toward the right, as viewed in Figures 1 and 6, in a step-by-step manner. As one form of mechanism suitable for this intermittent action the well known "Geneva" arrangement is employed as shown at **60**, **60'** in Figure 5, a shaft **61** serving for operating the part **60'** thereof, said shaft being suitably mounted on a part of a supporting frame **62**, the part **60** being affixed to the shaft **56'**. Also, on the frame **62** is journaled a shaft **63** carrying a rotatable member **64** which, as shown in Figures 1 and 6, is provided near each end with a cam-groove **65**. Secured to the named frame **62** adjacent each end of the member **64** is a bracket **66** pivoted on each of which is a lever-arm **67** each of whose upper ends carries, pivotally, a U-shaped clamping member **68** adapted to receive into it a box A mounted on the conveyor structure **54**, **55** described. The lower ends of the lever-arms engage in any approved manner in the grooves **65** of the member **64**, it being evident that as the latter rotates the clamping members **68** will alternately be engaged with a box A and removed therefrom. The shaft **63** carrying the member **64** is adapted to rotates the latter continuously, or at spaced intervals as will be understood in the description of the operation of the apparatus. In Figures 5 and 7 the numeral **69** denotes two spaced members as parts of the general frame-work of the apparatus. Between these members a shaft **70** is supported, affixed to which is a disc **71** in one of whose faces is a circular groove **72** lying between the center of disc rotation and the periphery of said disc. Slidable vertically through the members **69** is a rod **73** which lies closely adjacent the disc-face, this carrying a roller **74** to engage in said groove **72**. Suspended from the lower end of the rod **73** is a member **75**, see Figures 1, 5, 20 and 21. This member is adapted to be heated by an electrically heated element as suggested at **76**, a conductor of the electric current being indicated at **76'**, as in Figures 20 and 21. Said member **75** has two spaced portions or cheeks **77** and an inner depressed surface **78**. In the lowering of the member **75** the said surface **78** lies at such a position with respect to a box A as to cause the extension *d* of the flap *c* to be carried down snugly upon the narrow front side of said box, while the named cheeks will engage and carry the tabs *f* of said extension *d* against the two opposite broad sides of said box, the application of heat, meanwhile, softening any such suitable coating with which the flap portions may be provided, resulting in the close adherence of the portions to each other. The surface **78** of the member **75** as well as the cheeks or flanges closely approach the dimensions of the box side so that in the engagement of said member in its shifting movement against the flap *d* a snug fitting results, and sufficient pressure is thereby created in insure tight sealing.

During action of the mechanism last described, the clamping members **68** first engage a box A to hold it securely, this being followed by the depression of the member **75** to operate upon the flap-extension *d*, these actions occurring at and timed to each stopping of box travel by the conveyor.

The various structures herein have been described throughout in detail as to their forms, though equivalent structures may be as readily employed where the required results in action can be realized.

Operation

The container or boxes A carried by the belt **4** are those that have been previously filled with the material to be stored, it being presupposed that the flaps *a*, *b*, *c* and *d* have been so treated with a material suitable, as to be made to adhere to each other, the said flaps all having erect positions as suggested in Figures 5, 8 and 19.

In the present instance the belt **4** may be continuously in motion to shift the boxes toward the right in Figure 5, the urging of said boxes being due to friction as they rest on said belt, the leading box upon meeting the stop **7** naturally causing interruption of the travel of the balance thereof.

At the time the apparatus is set in motion with a box at said stop **7** the cam **18** carried by the shaft **19**, Figures 8 and 9, swings the lever **14** to the right and thus shifting the carriage **8** against the lodged box A to move it rearwardly against the flange **22** of the plate **23** of the ram structure. Said box is now imprisoned and rigidly

held between the carriage 8 and said flange 22, and between said plate 23 and the plate 10 of said carriage as before stated.

Since the box flaps are all upright the two side flaps *b* and *c* have entered the space between the extensions 48' of the shift-plate 48. At this time said shift-plate is in an extreme forward position as held by the cam-rod 51, Figure 17, and therefore, the rear flap *a* of the box has been engaged at its fold-line by the tongue 49 as the box is forced thereagainst, said plate forcing said flap down to its "closed" position as in Figures 10 and 15. As this action takes place the plate 48 cannot abut and buckle the named flaps *b* and *c* from the fact that since the tongue is spaced from the extensions as in Figures 12, 13 and 14, said flaps are received into the edges of said tongue.

During the time the carriage 8 had moved to engage the box the heated plate portion 11 of said carriage had entered said box just beneath the position where the box flaps will lie in their folded-down positions. Therefore, the said flap *a* now lies upon said heated plate.

In Figure 5 the pitman 46 in control of the plate 38 is at a starting position where the named cam-rod 51, Figure 17, holds the position named with respect to the shift-plate, said pitman being in position of descent. At the moment the box A enters its clamped position with the folding down of the flap *a* as described the disc 45, being timed to such occasion, is now rotated counter-clockwise, Figure 5, whereupon the cam 51^2 of the rod 51 is moved downwardly, the rear surface 51^3, of the cam as it descends engaging and forcing the shift-plate rearwardly to the broken line position as in Figure 12, thus moving the tongue 49 of the shift-plate clear of the box as in Figures 13 and 14. At the time of this movement the twin rods 52 are also moving downward so that the position of the rod 51 just above its cam 51^2 lies within the slot 51' the cams 52^2 enter the slots 52'. As descent continues the cam surfaces 52^5 at the right engage and slide the shift-plate toward the right to the broken line position in Figure 13 thus engaging the flap *b*, Figure 16, to close it upon the flap *a*. Further, descent of the cam causes engagement of the cam surface 52 at the left to slide the shift-plate to the left, Figure 14, whereupon said plate meets the flap *c*, folding it upon the flap *b*, see Figure 22. These operations being completed, the pitman 46 moves the plate 38 still further downward thus placing the pressure plate 41 upon the closed flaps with considerable force, the heated plate 11 of the carriage 8 together with the said pressure plate bringing about the adherence of the said flap to each other. During the pressure period, of course, the flaps are entirely exposed to the plate 41, the shift-plate lying free thereof, and said plate 41 has an area of surface only sufficient to cover the flaps without interference.

In this connection it may be stated that since the straight portions of the cam rods during this period lie within the slots therefor, the shift-plate is positively held in neutral position. In the completion of the cycle of movement of the disc 45 to its starting position shown in Figure 5 the cam rods are also lifted and in that travel they, incidently and naturally, move the shift-plate 48 as before, but without effect, no box portion being present, except that the tongue 49 is again projected at the box position at the time of halting of roation of the said disc 45 ready for the next cycle of action.

The employment of dual cam rods 52 is merely that they serve jointly to maintain the shift-plate in a fixed line of travel and steady it.

Sealing having taken place, the cam 31 of the shaft 32 operates the ram 24 to carry the sealed box toward and against the stop member 35' above the conveyor 55—58, this occurring immediately following, however, the removal of the carriage 8 from the box by the lever 14 as said lever is released by the cam 18, Figure 8, as before described. Since the bed plate 1, which has supported the box during operations thereon, is at its edge spaced the thickness of a box A from a vertical plane paralleling the said stop member 35', the projected boxes are each free to fall upon said conveyor, one by one, the flights 58 being spaced to receive them and which flights in their travel are timed to admit a box between any two of them, each and every box as sealed being received in its order as delivered by said ram, all moving along in a step-by-step manner as provided by the general structure or its equivalent.

The spacing of the conveyor below the level of the bed-plate 1 is merely for convenience, in this instance, in providing for said conveyor in a simple manner.

In the sealing-down operation, the flap extension *d* of the flap *c* has, of course, also been lowered to the position shown in Figure 5, but passes beneath the said stop member 35'. In said Figure 5 the several boxes shown are conveniently spaced from each other by the named flights 58 as explained. In the travel of the conveyor each box A is brought to a halted position, in its turn, opposite the previously described folding mechanism for the named extension *d*.

Normally, the heating member 75 is in a raised position clear of the moving line of boxes as suggested in Figure 20. Also, the clamping member 68 carried by the lever arms 67 are normally spaced from the said line of boxes as shown in Figure 1, as to one of them, and as suggested in broken lines in Figure 6. The rate of rotation of the disc 71 and that of the rotating cam member 64 is such, as to timing, that as each box A arrives opposite the mechanism, as in Figures 1 and 5, the said cam member rotates and swings the clamping members into engagement with a box their flanges 63 receiving the box between them and is thus held for a period of time for sealing purposes. During the clamping period the timed heating member is lowered by the rod 73 carrying it from the position shown in Figure 20 to that shown in Figure 5 to thus fold the flap extension *d* down against the front wall of the box, the flanges 77 also closing the tabs *g* upon the box sides, the provided heat, if required, bringing about the proper adherence of the flap extension to the box wall. Where the coating may be of such nature that adhesion of the flaps to each other is possible under any condition where pressure is employed, the use of heat may not be required. As each box is thus completely sealed it moves along the conveyor for disposal.

The various operating units are all timed in proper order one to another in the successive steps described as provided by any usual or well known mechanism.

We claim:

1. Apparatus for folding down the top flaps of a supported rectangular paper container, the same including a supported plate shiftable in its own plane and paralleling the top of said container at the fold lines of said flaps, said

plate having a recess throughout part of its measurement in one direction into which to receive the container, and having an abutment at the terminus of said recess, and mechanism for shifting the plate in opposite directions lying at right angles to each other.

2. Apparatus for folding down the top flaps of a supported rectangular paper container, including a supported plate shiftable in its own plane and in a plane paralleling the top of the container at the fold lines of the flaps, said plate having a pair of extensions spaced from each other to receive the container between them, said extensions adapted to engage opposite wall-flaps of the latter, said plate having an abutment at and between the bases of the extensions and within the recess to engage a flap on another wall of the said container, and mechanism for shifting the plate in directions lying at right angles to each other, and adapted to oscillate said plate in either of said directions.

3. Apparatus for folding down the top flaps of a supported rectangular paper container, including a supported plate shiftable in its own plane and in a plane paralleling the top of the container at the fold lines of the flaps, said plate having a pair of extensions spaced from each other to receive the container between them, said extensions adapted to engage opposite wall-flaps of the latter, said plate having a tongue at and between the bases of the extensions and spaced from each, said tongue adapted to engage a flap on another wall of said container, and mechanism for shifting the plate in two directions lying at right angles to each other.

4. Apparatus for folding down the top flaps of a supported rectangular paper container, including a supported plate shiftable in its own plane and in a plane paralleling the top of the container at the fold lines of the flaps, said plate having a pair of extensions spaced from each other to receive the container between them, said extensions adapted to engage opposite wall-flaps of the latter, said plate having a tongue at and between the bases of the extensions, spaced from each, said tongue adapted to engage a flap on another wall of said container, and reciprocating cam-rods operatively engaging the plate for oscillating the same in one direction, and a cam-rod also operatively engaging the plate to oscillate the same in a direction at right angles to the first said direction.

5. Apparatus for folding down the top flaps of a supported rectangular paper container, including a supported plate shiftable in its own plane and in a plane paralleling the top of the container at the fold lines of the flaps, said plate having a pair of spaced extensions substantially paralleling each other to receive the container between them and for engaging opposite wall-flaps of the latter, said plate having a tongue at and between the bases of the extensions and spaced from each of the same, and mechanism to shift the plate in either of two directions lying at right angles to each other to engage and fold the flaps one upon the other in separate order.

6. The structure recited in claim 5, including mechanism including a pressure plate forced yieldingly upon the flaps when they have been folded upon each other.

7. Apparatus for folding down the top flaps of a supported rectangular paper container, the same including a supported plate shiftable in its own plane and paralleling the top of said container at the fold lines of said flaps, said plate having a pair of spaced extensions to receive the container between them, said extensions adapted to engage opposite wall-flaps of the latter, said plate having a tongue at and between the bases of the extensions and spaced from both, said tongue adapted to engage a flap on another wall of said container, and mechanism for shifting the plate in either of two directions lying at right angles to each other, and a second mechanism including a pressure plate forced yieldingly upon the folded flaps, the two mechanisms being timed one to the other to permit retracting movement of the plate to expose the folded flaps prior to the contact of the said pressure plate with the said flaps.

8. Apparatus for closing a supported rectangular container, said container including top flaps to be folded upon each other, and one of said flaps having a foldable extension adapted to overlie a portion of the outer surface of such container, said apparatus including a supported plate shiftable in its own plane and in a position to engage said flaps at their fold lines and substantially paralleling the side of the container from which said flaps extend, said plate having a pair of spaced extensions paralleling two opposite walls of the container received between them, and said plate having an abutment between the bases of said extensions an edge of which substantially parallels another wall of such container, mechanism for shifting the plate in directions at right angles to each other and to oscillate said plate in either of said directions for engaging the extensions and said abutment with the flaps to fold the same, and means including a member for engaging the named foldable extension of a flap upon the outer side of the container wall.

9. Mechanism for operating upon a supported formed open-top container having flaps extending from and paralleling its side walls, said mechanism including a supported plate adapted to shift in its own plane and parallel to the side of the container from which said flaps extend and adapted to engage the flaps at their fold lines, said plate having a recess therein through and into which the container is received, two opposite walls of the recess paralleling two opposite sides of the latter, and said plate having a tongue less in width than the measurement of the recess between its said two opposite walls, and mechanism operatively engaging the plate adapted to shift the same in one direction to move the tongue a flap for folding the same, said mechanism then adapted to retract said tongue, followed by shifting the plate in a direction substantially at right angles to the first direction of shift thereof for applying said plate to a second flap for folding it, and then adapted to shift the plate in a direction opposite to the direction first shifted for engaging a third flap.

10. Apparatus for folding down the flaps of the walls of a paper container, the same including a mounted plate free to be shifted in its own plane and having spaced extensions projecting from an edge thereof substantially paralleling each other, a tongue at the base of said extensions of less length than the same and extending toward the terminals thereof, said extensions adapted to receive between them the said flaps at substantially their fold line, means to shift the plate in a direction paralleling the length of said extensions, and means to shift the plate substantially at right angles to the first named direction of its move-

ment to engage and fold certain of the flaps to positions at right angles to the plane of the walls carrying them.

11. Apparatus for folding down the flaps of the rear wall and side walls of a rectangular container, the same including a mounted plate free to be shifted in its own plane and having spaced extension projecting from one of its edges substantially paralleling each other, and having a tongue at the base of said extension of less length than the same and extending toward the terminal thereof, said extensions adapted to receive the container flaps between them with the flap of the rear wall thereof coinciding with the position of said tongue, means to shift the plate in a direction to move the tongue to and from the position of the said flap of the rear wall, and in one position of said tongue abutting said flap to cause folding thereof, and means to transmit movements to said plate in a direction substantially at right angles to the first named movement thereof to carry its extension alternately against the flaps of the side walls of the container to fold down the same.

12. Apparatus for folding down the flaps of the rear wall and side walls of a rectangular container, the same including a mounted plate free to be shifted in its own plane and having spaced extensions projecting from an edge thereof substantially paralleling each other and having a tongue at the base of said extension of less length than the same and extending toward the terminal

thereof, said extensions adapted to receive the container flaps between them at their fold lines with the flap of the rear container wall coinciding with the position of said tongue, there being an opening in said plate, a cam member adapted to shift through said opening to impart shifting movement to the plate to and from the position of the said flap of said rear wall of the container, there being a second opening in said plate, a cam member adapted to shift through said opening to impart a direction of movement to said plate at right angles to the first direction of movement of same, the plate in the named movements bringing about the engagement of the plate with the named flaps of the container, and folding down the same.

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