

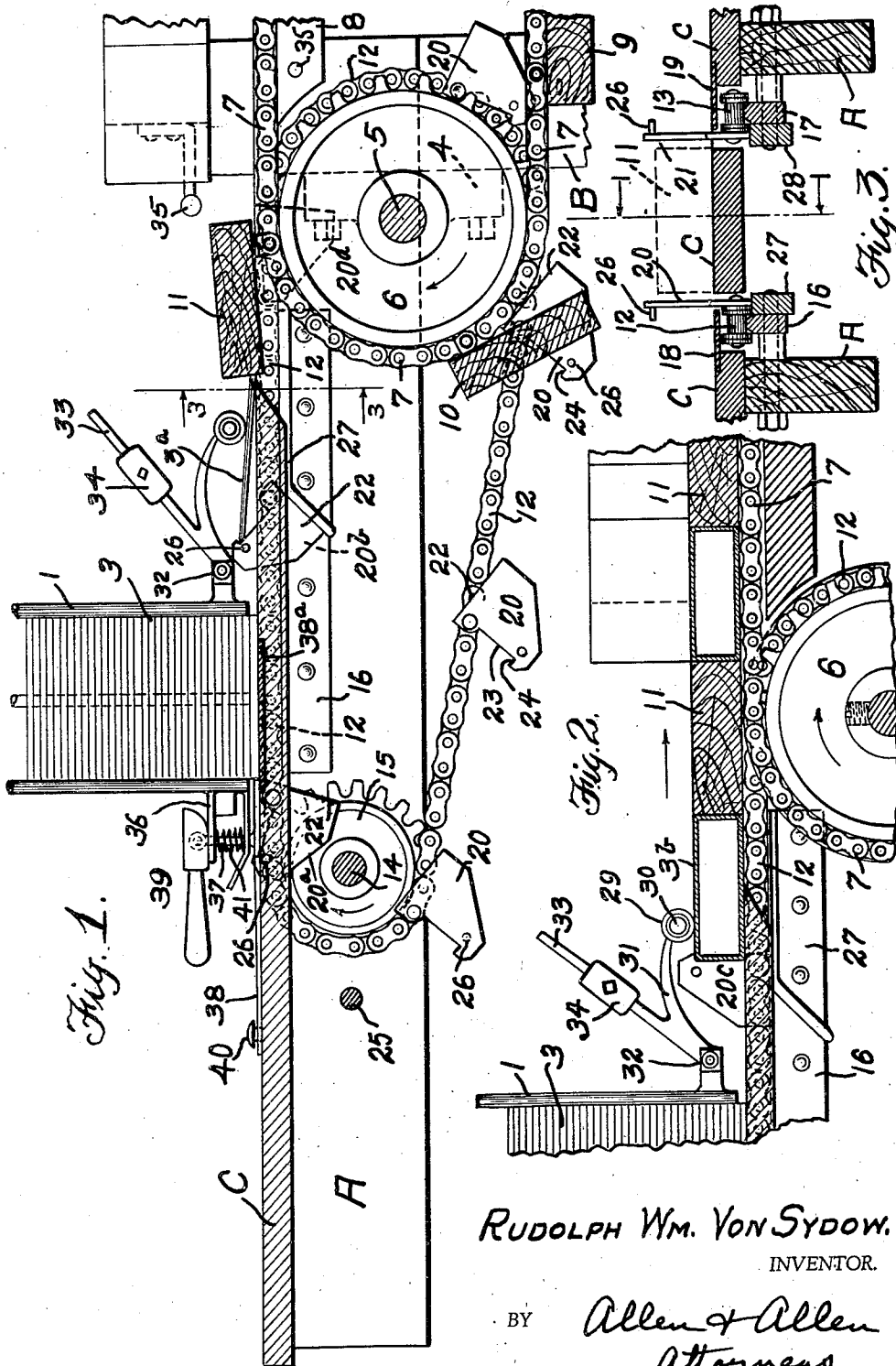
Oct. 21, 1947.

R. W. VON SYDOW

2,429,536

MEANS FOR ERECTING AND POSITIONING CARTONS

Filed Oct. 27, 1943



RUDOLPH Wm. VON SYDOW.
INVENTOR.

BY *Allen & Allen*
Attorneys

UNITED STATES PATENT OFFICE

2,429,536

MEANS FOR ERECTING AND POSITIONING CARTONS

Rudolph W. Von Sydow, Middletown, Ohio, as-
signor to The Gardner-Richardson Company,
Middletown, Ohio, a corporation of Ohio

Application October 27, 1943, Serial No. 507,811

9 Claims. (Cl. 93—53)

1

My invention relates to means for withdrawing tubed, collapsible folding cartons from a hopper containing a stack or accumulation thereof, erecting the carton bodies by squaring them up, and positioning them individually between abutments on a conveyor, by which they will be moved through or with respect to various instrumentalities for operating upon them, such as means for setting up end closures on the cartons. In a copending application in the names of Ringler, Sooy and myself, Serial No. 482,806, filed April 12, 1943, a machine is described which operates to withdraw tubed carton blanks from a stack, erect them between blocks on a conveyor, spread bottom seal end closure flaps, insert contents, and close and seal the bottom. During some of these operations, a "click top" top end closure is formed, glued and closed, so that the machine delivers filled cartons with a sealed bottom closure and a closed top closure, ready for use or packing and shipment. The means of the present invention may be thought of as having particular utility in such a machine, by way of exemplary use; but its utility is by no means confined thereto, and applies to any machine or process in which the feeding, erection and positioning of tubular carton bodies forms a part.

Serious problems arise in connection with these operations. The principal object of my invention is the provision of a more perfect and withal a simpler means for feeding the cartons, erecting them, and positioning them with respect to abutment or holding means on a conveyor. It is an object of my invention to combine feeding and erecting means whereby to avoid successive engagement of different operating elements with the trailing edge of a tubed carton. It is an object of my invention to provide a means which not only acts to withdraw an individual blank from a stack or accumulation thereof, but also, in combination with a moving abutment means, will act fully to erect it, so that the act of erection is not dependent upon the coaction of successive abutment means. It is an object of my invention to provide erecting means whereby the tubed carton just prior to erection is positioned slantwise to the conveyor, with its trailing edge elevated above the plane of the conveyor approximately the width of the side wall, so that the squaring up of the carton proceeds without friction and without any substantial sliding of the carton upon the erecting means. It is an object of my invention to provide feeding, erecting and positioning means which are peculiarly positive in their action, and which operate

2

smoothly and without substantial tendency to jam, tear, bend or break the carton bodies. And it is an object of my invention to simplify the mechanism required for these operations, and to eliminate the use of complicated systems of levers, plungers, cams, springs and the like.

These and other objects of my invention, which will be set forth hereinafter or will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain arrangement of parts of which I shall now describe an exemplary embodiment. Reference is made to the drawings wherein:

Figure 1 is a longitudinal sectional view of the feed end of a machine, at which the devices of my invention are employed.

Figure 2 is a similar sectional view of part of the apparatus showing it in a subsequent stage of operation.

Figure 3 is a sectional view taken across the feed end of the machine.

The feed end of a carton machine is frequently built on rails projecting rearwardly from the main machine frame, an upright of which is shown at B, and such an arrangement is here illustrated, although it does not form a limitation upon my invention. A feed table C is supported by the rails A; and on this table is mounted a hopper 1 having vertically arranged pairs of sides to support a stack of the tubed blanks indicated at 3. On the end leg or support B of the machine frame, I have shown mounted a bearing 4 for a shaft 5, on which may be mounted one or more sprockets 6 for the chain 7 (or chains), of a main conveyor, by means of which the cartons are carried through the machine. Unless the cartons have very long bodies, a single chain 7 will suffice. In its travel through the machine, the upper flight of the chain 7 will be supported by a suitable supporting rail 8. At intervals on the chain or chains, blocks 9, 10 and 11 are attached. These blocks form abutments, and are so spaced that an erected carton body may lie between them, as is shown in Figure 2. The shaft 5 may be driven, or the chain 7 may be driven by means of a return sprocket or otherwise.

Blocks similar to those at 9, 10 and 11 are spaced throughout the length of the conveyor 7; and the conveyor carries the erected carton bodies through or past various operating instrumentalities in the remainder of the machine, which do not form limitations on the present invention. For purposes of this invention, the transverse lengths of the abutment blocks will be somewhat less than the length of the carton bodies, so that

3

the bodies, exclusive of their end closure means, project somewhat beyond the ends of the blocks.

I affix a pair of sprockets to the shaft 5, and over these sprockets I pass a pair of chains 12 and 13. The sprockets are the same diameter as the sprockets 6, so that the linear speed of travel of the chains 12 and 13 will be the same as that of the conveyor 7. The chains 12 and 13 return over sprockets mounted on a shaft 14 mounted in bearings in the rails A. One of these sprockets is shown in Figure 1 at 15. The chains 12 and 13 are supported in their upper flights by supporting bars 16 and 17 on which the chains ride. The chains are so spaced and located as to lie off the ends of the blocks 9, 10, 11, as shown in Figure 3. Plates 18 and 19 are affixed in counter-sunk position in the table top the upper surfaces flush with the table top and the lower surfaces acting to prevent the chains 12 and 13 from rising off the bars 16 and 17.

At intervals to the chains 12 and 13, I pivot erecting members 20 and 21. Each of these has a body, a base edge 22, an edge 23 normal to the base edge, and an upstanding dog or tooth 24. The spacing between the members 20 or 21 on their respective chains is the same as the spacing of the pivot or attachment points of the blocks 9, 10, 11. Since the erecting members are pivoted on their respective chains, they are free on the under flight of the conveyor, as shown in Figure 1, to assume a gravitational position. As the chains 12 or 13 come around the sprockets on shaft 14, gravity tends to position the erecting members, as shown at 20a in Figure 1. Should any of the erecting members stick on its pivot, a bar 25, affixed to the rails A, knocks them backwardly and forces them to assume the position 20a. Each of the erecting members carries a small pin 26 which, coming to rest against the chain to which the erecting member is pivoted, supports the free end of the member in such a position that the dog 24 rises slightly above the top of the table C and lies in such a position that it will engage the trailing edge of the lowermost carton in the stack 3. Since there are two chains, 12 and 13, each carton will thus be engaged close to the ends of its body portion by the dogs of two erecting members, one on each chain, and will be carried forwardly along the table C by the erecting members at the same speed of travel as the blocks 9, 10 and 11.

Cam plates 27 and 28 are so supported as to engage the base edges 22 of the respective erecting members after the erecting members have moved a tubed carton free of the stack 3. In Figure 1, I have shown at 20b an erecting member partially actuated by the cam 27, and it will be noted that it has caused a tubed but still unerected carton 3a to abut the trailing edge of the block 11 and to rise into a plane aslant to the level of the table C. In Figure 2 the cam 27 has fully raised the erecting member, as at 20c, and this action, accomplished while the erecting member is traveling bodily at the same speed as the block 11, has erected the carton, as at 3b. While this action is going on, one or more small rollers 29 on a shaft 30 affixed to an arm 31 have been bearing on the top of the carton, first to hold the leading edge down against the table as it contacts block 11, and then to hold the erected carton down on the table top until its trailing side wall will be engaged by the next succeeding block. The arm 31 may be pivoted to the hopper 1 as at 32. It may be spring pressed; but it is convenient to

4

provide a second arm 33 integral with the first on which a weight 34 is adjustably mounted.

The succeeding block 10 will turn into position behind the erected carton when the carton enters the straight flight of conveyor 7, as will be readily understood. At this point, the cams 27 and 28 terminate and (since the carton is now held by two blocks or abutments), gravity will cause the released erecting member to assume the position shown at 20d in Figure 1. Should any erecting member stick or fail to assume the 20d position, pins or a rod 35 on the machine frame will knock the erecting member backwardly, causing it to release the carton as it travels about the return sprocket on shaft 5.

My apparatus also contemplates a safety means whereby the entire stack of cartons 3 may be raised above that level at which the lowermost carton could be engaged by the dogs 24. To the hopper 1, I affix a bracket 36, through which a stud 37 descends to a plate. The rearward end of the plate, as at 38, lies above the table C, but its forward end is depressed and is let into the table top as at 38a. A cam handle 39 is pivotally attached to the stud 37 and may be employed (when raised to vertical position), to raise the stud 37 and hold it in upraised position. The rear end 38 of the plate may be loosely affixed to the table C as by a screw 40 or other suitable means. Raising the stud 37 will thus raise the forward end 38a of the plate, and by means of it will raise the stack 3 of cartons above the line of travel of the dogs 24. A compression spring 41 may surround the stud 37 bearing against the bracket 36 and the plate to enforce the lowering of the plate when the cam handle 39 is moved to the horizontal position. With these means, I can at any time stop the feeding of blanks without stopping the operation of the machine. The cartons, of course, descend by gravity in the hopper 1 so as to lie against the table top and the portion 38a of the plate.

Modifications may be made in my invention without departing from the spirit of it. Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In mechanism of the class described, spaced moving abutment means, spaced carton feeder and erecting means traveling at the same speed, a hopper for tubed carton blanks disposed above the path of said carton feeder and erecting means, said feeder and erecting means having engagement elements for contacting the rear edge of the lowermost tubed carton in said hopper, withdrawing it therefrom and moving it forwardly in the direction of movement of the abutment means, and means for moving said feeder and erecting means arcuately whereby to position said carton body aslant to the direction of movement of said abutment means, bring its leading edge into engagement with an abutment means, and square up said carton by exerting pressure on its trailing edge.

2. In combination in a machine, a table top, a conveyor mounted below the surface of said table top, said conveyor having abutment means rising above said surface, a hopper for tubed cartons, means traveling at the same speed as said abutment means and passing under said hopper for feeding and moving a tubed carton forwardly along said table top, and means for imparting to said last mentioned means a rotary motion whereby it is caused to bring said tubed carton against an abutment and thereafter erect the carton against said abutment,

5

3. In combination in a machine, a table top, a conveyor mounted below the surface of said table top, said conveyor having abutment means rising above said surface, a hopper for tubed cartons, means traveling at the same speed as said abutment means and passing under said hopper for feeding and moving a tubed carton forwardly along said table top, and means for imparting to said last mentioned means a rotary motion whereby it is caused to bring said tubed carton against an abutment means and thereafter erect the carton against said abutment means, and thereafter move with said carton to maintain an erected condition thereof.

4. In combination in a machine, a table top, a conveyor mounted below the surface of said table top, said conveyor having abutment means rising above said surface, a hopper for tubed cartons, means traveling at the same speed as said abutment means and passing under said hopper for feeding and moving a tubed carton forwardly along said table top, and means for imparting to said last mentioned means a rotary motion whereby it is caused to bring said tubed carton against an abutment means and thereafter erect the carton against said abutment means, and thereafter move with said carton to maintain an erected condition thereof until the trailing wall of said carton is engaged by a second following abutment, said second following abutment coming into position behind said carton in an arcuate path.

5. In a device of the character described in combination with a hopper, a main conveyor comprising a chain with abutment means attached thereto at intervals, a shaft, a sprocket on said shaft over which said chain returns, a second sprocket on said shaft, a second chain passing over said second sprocket and extending in a direction opposite that of the first chain, and pivoted spaced feeder and erecting means on said second chain, said second chain passing under a hopper, means for positioning said feeder and erecting means to feed carton blanks from said hopper, and means intermediate the path of travel of said second chain for swinging said erecting means about their pivots whereby to erect a carton blank by pressing it against an abutment.

6. In a device of the character described in combination with a hopper, a main conveyor comprising a chain with abutment means attached thereto at intervals, a shaft, a sprocket on said shaft over which said chain returns, a second sprocket on said shaft, a second chain passing over said second sprocket and extending in a direction opposite that of the first chain, and pivoted spaced feeder and erecting means on said second chain, said second chain passing under a hopper, means for positioning said feeder and erecting means to feed carton blanks from said hopper, and means intermediate the path

6

of travel of said second chain for swinging said erecting means about their pivots whereby to erect a carton blank by pressing it against an abutment, and resilient means for exerting downward pressure on a carton blank during intervals of feeding and erection.

7. The structure claimed in claim 6 wherein there are two of the second mentioned chains in spaced relationship whereby to provide erecting means at each end of the body of a carton blank, the abutment means on said first mentioned chain being of lesser length than said body.

8. The structure claimed in claim 6 wherein there are two of the second mentioned chains in spaced relationship whereby to provide erecting means at each end of the body of a carton blank, the abutment means on said first mentioned chain being of lesser length than said body, and means for raising a stack of cartons in said hopper above the line of engagement with said feeder and erecting means.

9. In a device of the character described, a main conveyor carrying spaced abutments, sprocket means over which said conveyor moves and which form a forward terminus for said conveyor, a second conveyor extending forwardly from the terminus of said main conveyor and travelling in the same direction, carton erecting means pivoted to said second conveyor, each of said means having a dog for engaging the trailing edge of a tubed carton, and means intermediate the path of travel of said erecting means, and forward of the terminus of said main conveyor, for swinging said erecting means forwardly on its pivot, whereby a tubed carton body is engaged by said erecting means on said second conveyor, brought against an abutment on said main conveyor, is tilted, and is erected by pressure exerted on it by said erecting means against said abutment, so that a second abutment on said main conveyor, moving into position around said sprocket means, can engage said erected carton body permitting withdrawal of said erecting means.

RUDOLPH WM. VON SYDOW.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,337,845	McGeouch et al.	Apr. 20, 1920
1,868,873	Bergstein	July 26, 1932
1,873,059	Smith et al.	Aug. 23, 1932
1,935,613	Bronander	Nov. 21, 1933

FOREIGN PATENTS

Number	Country	Date
428,296	Great Britain	May 10, 1935