Aug. 27, 1957 A. R. LUBERSKY 2,804,000

SCOREBREAKER FOR CARTON FORMING MACHINE

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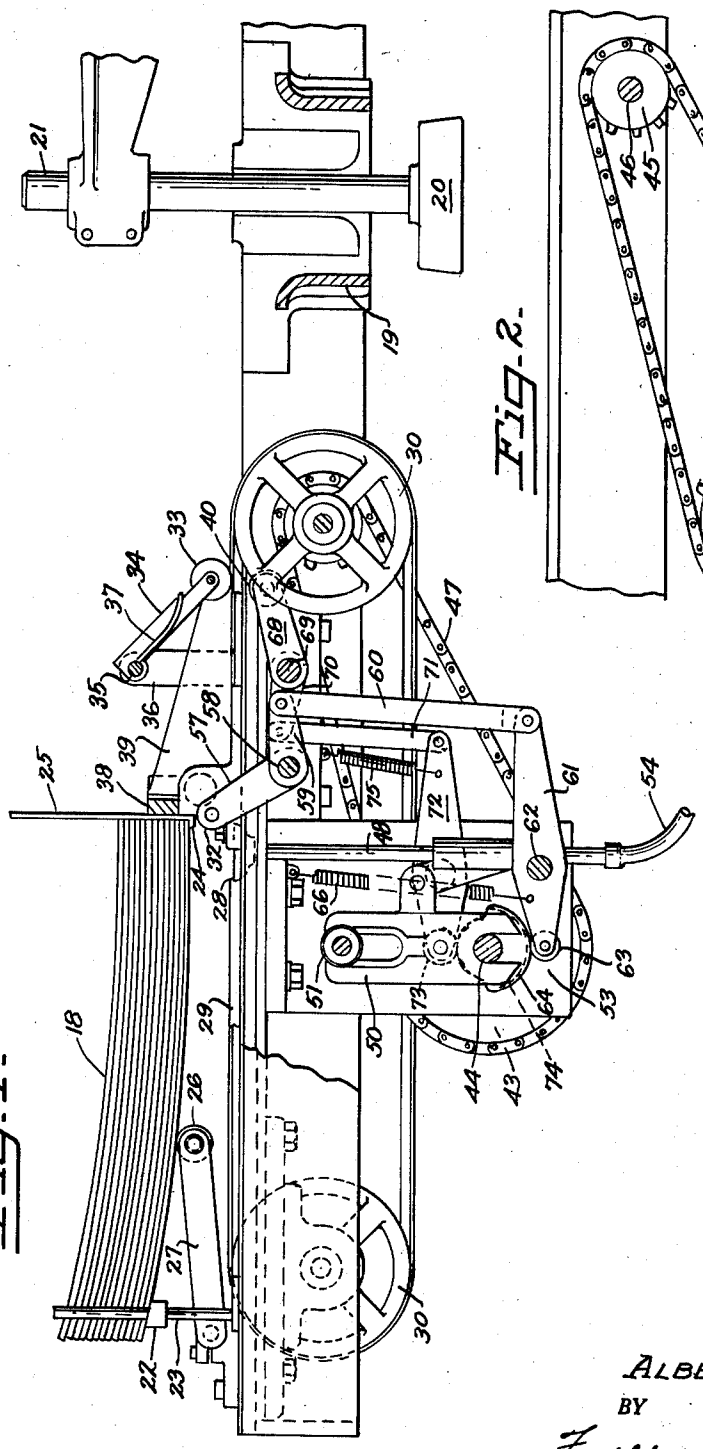


Fig. 1.

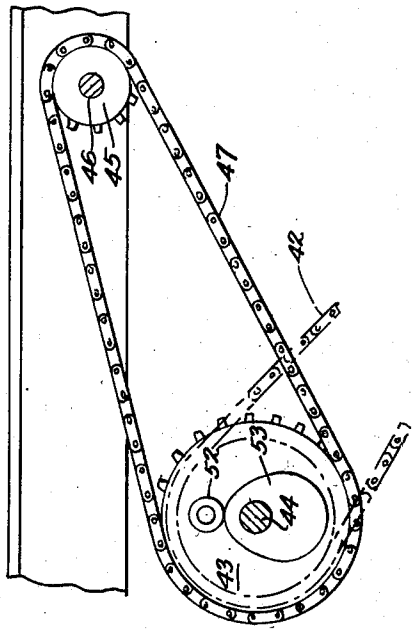


Fig. 2.

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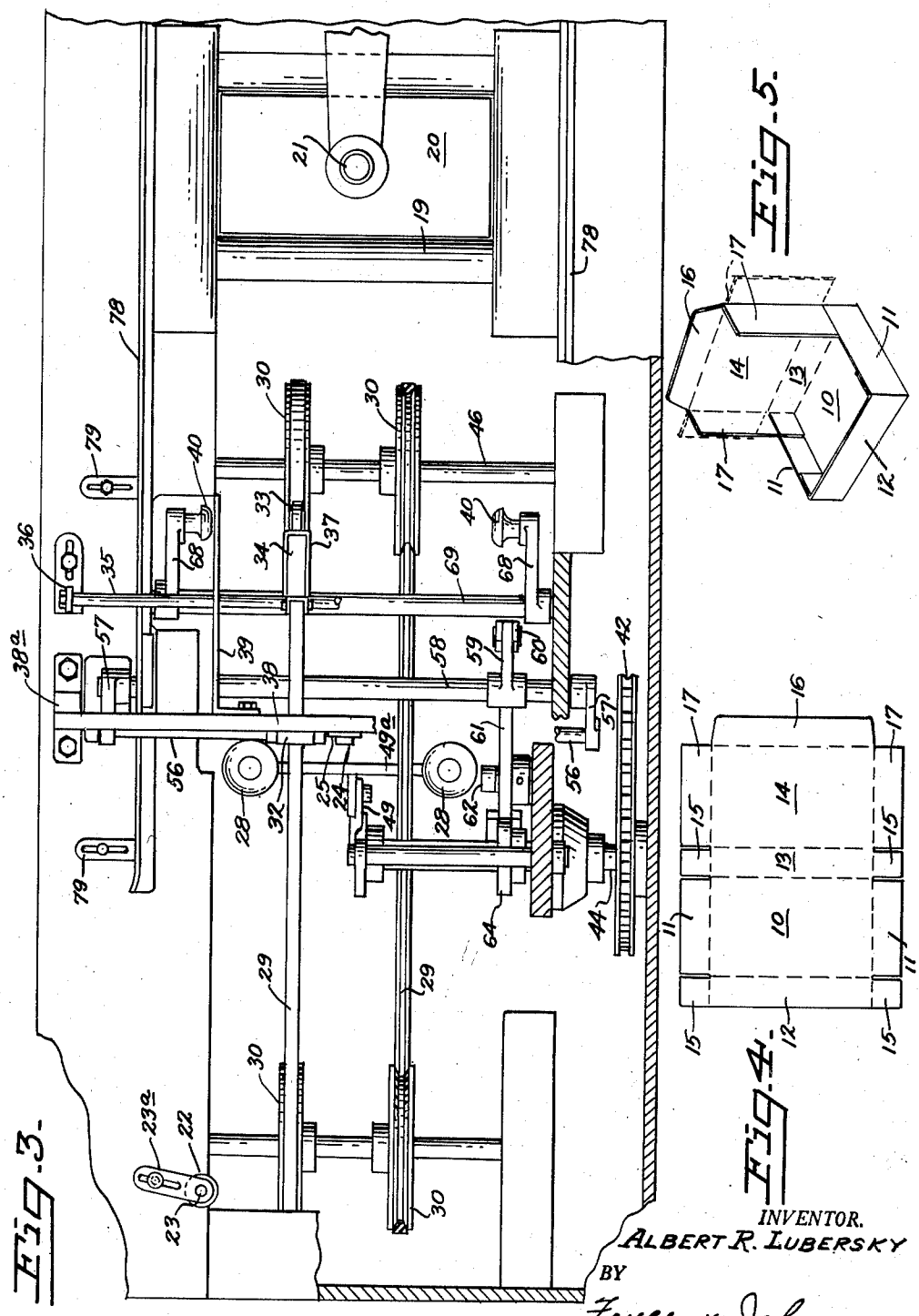


Fig. 3.

Fig. 5.

Fig. 4.

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SCOREBREAKER FOR CARTON FORMING MACHINE

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Application August 9, 1954, Serial No. 448,572

2 Claims. (Cl. 93—49)

This invention relates to the setting up of cartons on a machine of the same general kind shown in my assignee's pending application of William H. Wilcox entitled "Carton Setting Up Machine," filed August 31, 1953; Serial Number 377,324, now U. S. Patent No. 2,743,651, and pertains particularly to the pre-bending or "breaking" of certain parts of the scored carton blank to facilitate and improve the setting up function of the machine.

The machine of said pending application is used for setting up cartons which have a bottom, side walls, end walls, a cover extending from one of the side walls, and flaps on the cover. In the operation of setting up, the bottom portion of a flat carton blank is positioned above a rectangular shaping form, and a plunger presses the blank through the form to bring the side and end walls into position leaving the top with its flaps in an open position to be closed after the carton is packed.

Since the cover has flaps which extend from its side edges, these flaps in their flat or blank position exceed the walls of the carton passing through the shaping form and are likely to become bent, broken or torn during the setting up operation.

It is therefore the object of the present invention to provide an improved carton forming machine and specifically to provide means in a carton former of the kind described to bend or "break" certain portions of a scored carton blank just prior to a setting up operation. Further and more specific objects and advantages of the invention are made apparent in the following specification wherein reference is made to the accompanying drawings for a detailed description of the invention.

In the drawings:

Fig. 1 is a view in side elevation with parts in section of a machine embodying the present invention.

Fig. 2 is a fragmentary view showing portions of the drive mechanism of the same machine.

Fig. 3 is plan view of the same machine with parts broken away and parts in section.

Fig. 4 is a plan view of a carton blank of the kind set up by the machine illustrated, and

Fig. 5 is a perspective view of a set up carton.

Reference is first made to Figs. 4 and 5 of the drawings to illustrate the desirability of the scorebreaker of this invention. Fig. 4 shows a carton blank with dotted lines indicating score lines which divide it into its several carton parts. The parts are a bottom 10, end walls 11, front and back walls 12 and 13 respectively and a top 14. The front and back walls have tabs 15 to cooperate with the end walls in forming a box like structure. In practice these tabs and the end walls have cooperating cut away portions and slits (not shown) which interlock as the blank is set up but these may be of various forms and do not relate to the present invention. The top 14 of the carton has a front flap 16 and side flaps 17 which upon final closing of the packed carton cooperate with the front and end walls respectively to make a secure closure.

Fig. 5 shows the carton after it is set up and shows the flaps 17 of the top in dotted lines in the position they would assume were it not for the scorebreaker of the present invention. The flaps 17 of the top shown in full lines illustrate the position to which they are moved by the scorebreaker. The scorebreaker acts upon the blank while it is still flat as in Fig. 4 so that as the blank is pressed downwardly through a shaping former to set it up the flaps 17 will not project outwardly beyond the walls of the former where they are subject to being broken or torn.

The mechanism for accomplishing the breaking of the score line between the cover and the flaps 17 as the blank approaches the shaping former is shown in Figs. 1, 2, and 3.

In Figs. 1 to 3 of the drawings, a typical carton setting up machine is illustrated as supporting a stack 18 of carton blanks which are withdrawn one at a time from the bottom of the stack and delivered to a shaping former illustrated at 19. The shaping former 19 is in effect a rectangular box-like structure open at the top and bottom and a plunger 20 carried for vertical movement on a shaft of 21 descends upon a carton blank when the bottom portion of the blank is positioned directly above the shaping former. The plunger is illustrated at the lower portion of its stroke and the mechanism for reciprocating the plunger is not illustrated. This mechanism, as well as the specific configuration of the shaping former is well known and is disclosed in the pending application hereinabove referred to.

The carton blanks in the stack 18 are supported adjacent their rear ends by collars 22 on vertical posts 23 carried by adjustable brackets 23*a*. Their forward ends are supported by a small lip 24 extending rearwardly from a vertical plate 25. A roller 26 on an adjustable arm 27 limits the tendency of the carton blanks to sag between their points of support.

The blanks are withdrawn from the bottom of the stack 18, one at a time by a pair of suction cups 28 mounted for vertical reciprocation, as well presently be described, and engageable with the lower most blank to pull it free of the supporting lip 24. These suction cups draw the blank into contact with a pair of moving conveyor belts 29 trained over sets of suitable pulleys such as indicated at 30. As the carton blank engages the belts, a pair of drop rolls 32, see Fig. 3, swings downwardly to engage the top surface of the blank and press it into contact with the conveyor belts so that it will be positively advanced by the belts. Pressure rollers 33 also contact the blank as it is being advanced. These rollers are carried at the ends of arms 34, pivotally mounted on a shaft 35 supported between posts 36 at opposite sides of the machine. A spring 37 urges each of the arms 34 to swing downwardly. A cross bar 38 is supported on posts 38*a* at opposite sides of the machine and extends over the advancing blank and supports a pair of plates 39 disposed above the advancing blank in a position substantially over the score line which separates the flaps 17 from the cover 14. A pair of score breaker rollers 40 are mounted one on each side of the blank and beneath the blank to swing upwardly just as the flaps 17 are disposed beneath the plates 39 and thus to bend the flaps upwardly at right angles to the blank so that they will assume this position when the blank reaches its position over the former 19.

The drive for the parts just described is taken from a motor (not shown) through a chain 42 which drives a sprocket 43 on a cam shaft 44. A second sprocket on the same shaft drives a sprocket 45 on the shaft 46 which supports the forward pulleys 30 of the conveyor belt assembly through a chain 47, see Fig. 2.

The suction cups 28 are supported on reciprocable tubes 48 connected as by a link 49 and a cross member

49*a* with a vertically sliding member 50 guided as by rollers 51. This sliding member 50 has a cam roller 52 adjacent its lower end, the position of which is illustrated in Fig. 2 engageable by a cam 53 fixed to the cam shaft 44 so that upon each complete rotation of the shaft, the suction cups are raised into contact with the lowermost blank in the stack 18. The lower ends of the tubes 48 which support the suction cups are connected with a source of vacuum not shown as by flexible tubing illustrated at 54.

The drop rolls 32 are supported on a shaft 56 which extends across the machine and is carried at its ends by levers 57 fixed to a shaft 58. Also fixed to the shaft 58 is a lever 59 the end of which is connected as by a link 60 with a lever 61 supported for rocking motion on a shaft 62. The opposite end of the lever 61 has a cam roller 63 which engages a cam 64 on the main shaft 44. The high portion of the cam 64 swings the drop rolls downwardly through the linkage described and a spring 66 engages the lever 61 to hold the roller 63 in contact with the cam for swinging the drop rolls upwardly when the roller rides on the low portion of the cam.

The scorebreaker rollers 40 are carried on arms 68 secured to a shaft 69. Also secured to the shaft 69 is a lever 70. A link 71 connects the lever 70 with a centrally pivoted lever 72, the opposite end of which carries a cam roller 73 for engagement with a cam 74 also mounted on the cam shaft 44 and similar in shape to the cam 64. A spring 75 urges the lever 72 toward the position where the roller 73 rides on the cam 74. Thus, after the lowermost blank on the stack 18 has been deposited on the conveyor belts and is being advanced forwardly the scorebreaker rollers 40 are swung upwardly to engage the flaps 71 and bend them upwardly against the plates 39.

Guide rails 78, see Fig. 3, are disposed on both sides of the machine and guide the blank in its movement toward the former. These rails may be mounted in adjustable brackets 79 to accommodate carton blanks of different sizes.

I claim:

1. In a carton forming machine which forms cartons from blanks including a cover portion and flap portions separated from opposite ends of the cover portion by score lines, and which machine comprises a hollow former and plunger for forming the body of the carton and conveyor mechanism for delivering the blanks in a horizontal plane to the former, the combination of means for breaking the scores of said flap portions to position them at right angles to the blank before it reaches the former comprising a pair of rollers carried on levers beneath the blanks, means to swing the levers upwardly to cause the rollers to contact the flap portions and bend them upwardly, and means above the blank to hold the cover in the plane of the blank as the flap portions are being bent.

2. In a carton forming machine which forms cartons from blanks including a cover portion and flap portions separated from opposite ends of the cover portion by score lines, and which machine comprises a hollow former and plunger for forming the body of the carton and conveyor mechanism for delivering the blanks in a horizontal plane to the former, the combination of means for breaking the scores of said flap portions to position them at right angles to the blank before it reaches the former comprising a pair of rollers carried on levers beneath the blank, means to swing the levers upwardly to cause the rollers to contact the flap portions and bend them upwardly, and spring pressed rollers bearing downwardly on the cover while the flap portions are being bent upwardly.

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