March 12, 1963 T. L. COOK 3,080,797

CARTON EXTRACTOR AND OPENER

Filed May 2, 1961 2 Sheets-Sheet 1

Fig. 1.

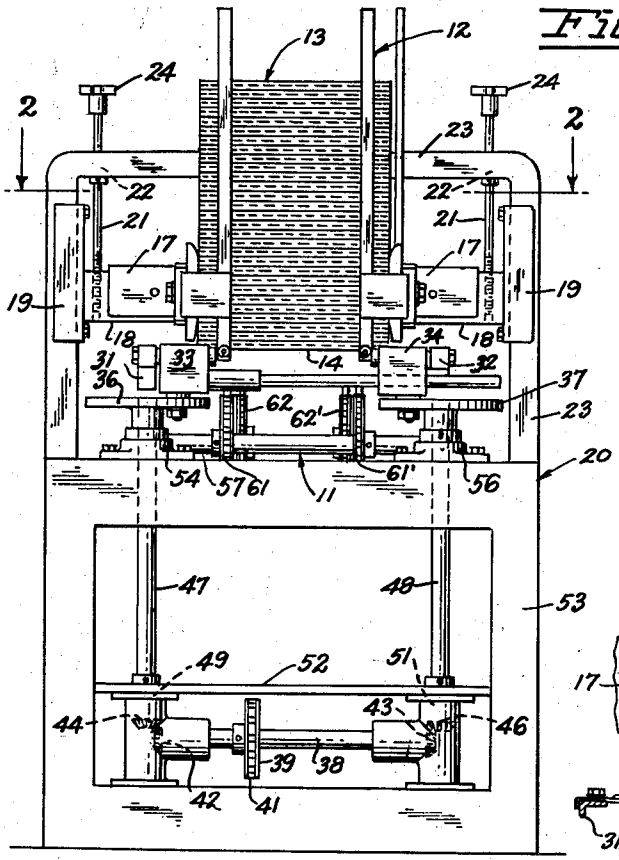


Fig. 3.

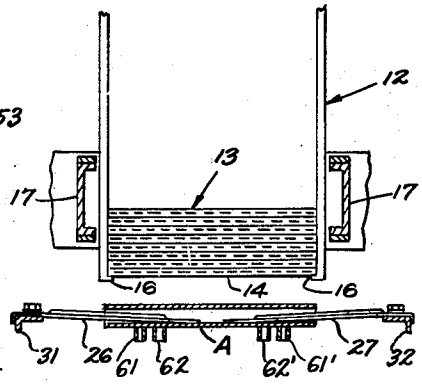
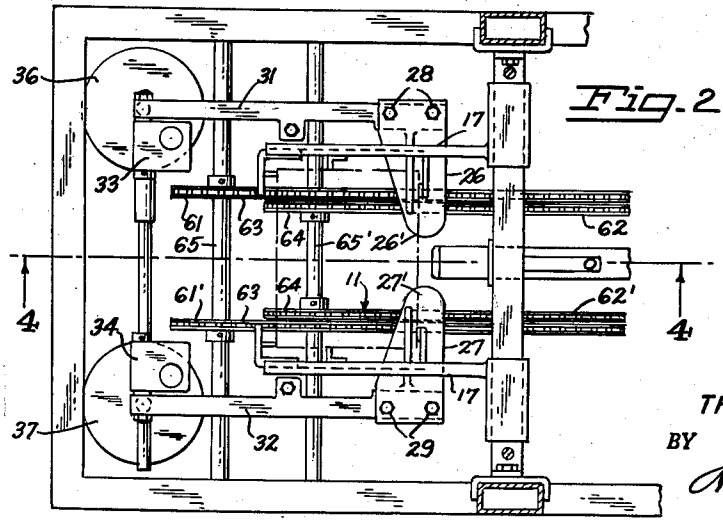


Fig. 2.



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Filed May 2, 1961 2 Sheets-Sheet 2

Fig. 4.

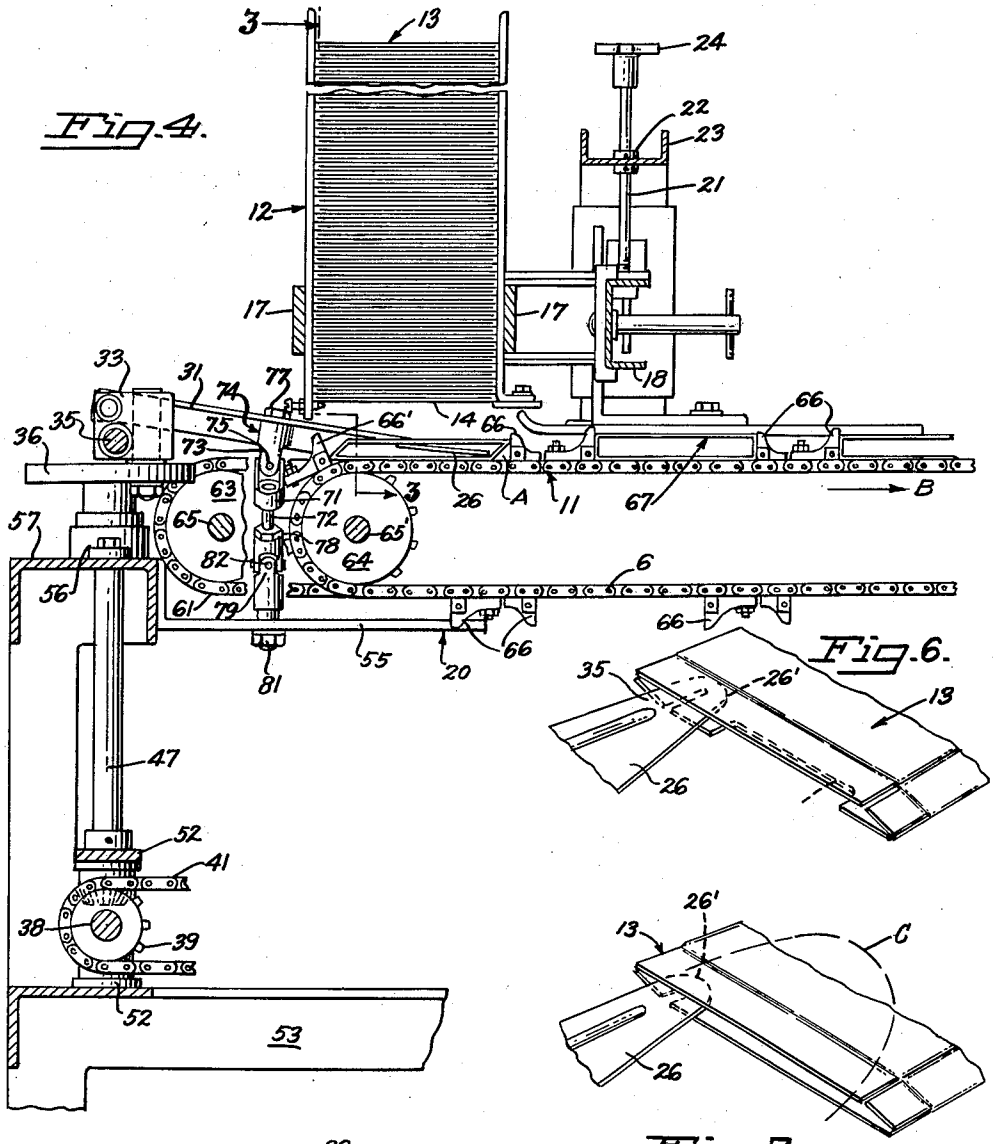
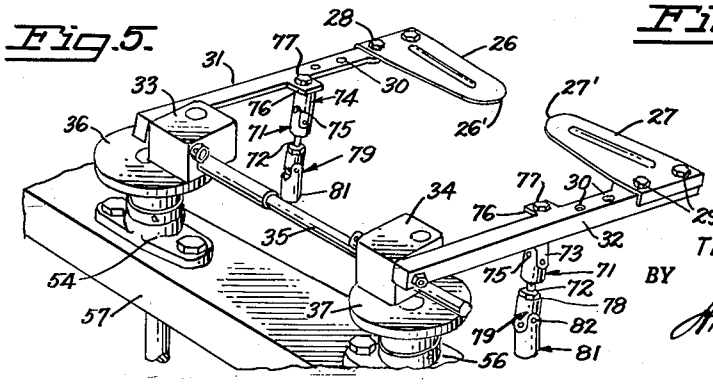


Fig. 6.

Fig. 7.

Fig. 5.



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CARTON EXTRACTOR AND OPENER

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18 Claims. (Cl. 93—53)

The invention, in general, relates to packaging equipment and more particularly relates to an improved machine for rapidly and effectively converting flat carton blanks to carton form for the reception of any one of a variety of predetermined substances, such as pies, cakes or other foods or other articles.

It is perhaps well known that there have been recent developments in the art of devices for opening blanks to provide carboard cases, cartons or the like, and that there are presently available on the market various types of these devices. In the main, however, most of these prior carton blank openers are disadvantageous in use in that these prior machines are relatively complex in construction and in operation, and are relatively costly to maintain. The present invention is directed to the provision of an improved carton extractor and opener which is extremely rapid in its operation of converting flat carton blanks to open-end cartons and which effectively positions the carton for the ready reception of any desired item.

A primary object of the invention is to provide a carton extractor and opener which is adaptable for opening various sizes and shapes of carton blanks.

Another important object of my present invention is to provide an improved carton extractor and opener of the indicated nature which is additionally characterized by its capability of facile and rapid adjustment to accommodate variances in carton blank shapes and forms.

A still further object of the present invention is to provide an improved carton extractor and opener of the aforementioned character which is adaptable for ready operation with a number of different sizes and shapes of extractor and opener elements which can be quickly substituted one for another.

Other objects of the invention, together with some of the advantageous features thereof, will appear from the following description of a preferred embodiment of my invention which is illustrated in the accompanying drawings. It is to be understood, however, that I am not to be limited to the precise embodiment shown, nor to the precise arrangement of the various components thereof, as my invention, as defined in the appended claims, can be embodied in a plurality and variety of forms.

Referring to the drawings:

FIG. 1 is an end elevational view of the preferred embodiment of my invention.

FIG. 2 is a top plan view thereof, partly in section, taken on the line 2—2 of FIG. 1.

FIG. 3 is a cross-sectional view of the preferred embodiment of my invention, this view being taken on the line 3—3 of FIG. 4.

FIG. 4 is a fragmentary, sectional elevational view, taken on the line 4—4 of FIG. 2.

FIG. 5 is a fragmentary top perspective view of one type of extractor and opener element, together with the mounting therefor, employed in a preferred embodiment of the invention, this view showing the extractor and opener elements in their extreme inward and downward positions.

FIG. 6 is an enlarged fragmentary perspective view showing the relationship of the extractor and opener element in different positions with respect to one typical carton blank form, shown in fragmentary view.

FIG. 7 is a view similar to FIG. 6 but showing a different type of carton blank, this view showing in dotted lines the approximate path taken by the carton opening element in its movement in a predetermined path.

In its preferred form, the carton extractor and opener of my present invention preferably comprises, in combination with a moving conveyor as well as a stationary magazine containing a replenishable supply of superposed individual carton blanks each comprising a top and a bottom panel, a pair of movable extractor and opener elements arranged on opposite sides of said magazine, together with means for recurrently moving said extractor and opener elements sequentially between the top and bottom panels of each carton blank of a plurality thereof arranged in superposed relationship in said magazine, sequentially removing the lowermost carton blank from said magazine, sequentially partially opening said lowermost carton blank and finally positioning the partially open carton blank on said moving conveyor, and means for squaring the cartons on said conveyor in open-end form.

As particularly illustrated in FIGS. 1, 2 and 4 of the accompanying drawings, I provide a moving conveyor which is designated generally by the reference numeral 11 in the annexed drawings for moving a succession of opened carton blanks in the form of open-end cartons from a predetermined point along a predetermined path. In association with the moving conveyor 11, I provide a magazine 12 in which a plurality of carton blanks, designated generally by the reference numeral 13, are temporarily retained in superposed relationship with the lowermost carton blank, designated generally by the reference numeral 14, resting upon a four-point suspension consisting of inwardly directed projections 16 which are adjustably mounted upon the bottom of the magazine 12. With relationship to the underlying moving conveyor 11, the set of projections 16 at the right of the view of FIG. 4 may aptly be and hereafter are termed forward projections. As shown particularly in FIG. 4, the magazine 12 is supported in overlying relationship with respect to the conveyor 11 and is so supported that its relative position to the conveyor 11 can readily be adjusted. To this end, the magazine is conveniently supported on a projecting frame 17 which is carried on an auxiliary frame 18 that is, in turn, supported by means of angles 19 on a main frame 20; the auxiliary frame 18 being in the form of a single channel beam which extends in back of the magazine from side to side and which is fashioned with spaced threaded openings in one of its webs for the passage of threaded adjusting rods 21. The rods 21 are suitably mounted in bearings 22 secured to an inverted U-shaped frame 23 supported on main frame 20, and the rods 21 are rotatable by means of manually operable wheels 24 fixedly secured to the tops of the rods 21, as shown. The lower ends of the threaded rods 21 can be made to bear upon the opposed web of the channel beam 18 for raising the magazine 12 or lowering the same relative to the moving conveyor 11, whenever desired.

In accordance with the present invention, I provide specially constructed means including carton blank extractor and opener elements for recurrently reaching up into the magazine 11 and successively removing the lowermost carton blank therefrom, and sequentially thereafter partially opening such carton blank into an open-end carton and depositing the same upon the moving conveyor 11. The means for effecting these purposes just stated preferably comprise opposed hands 26 and 27, see FIG. 5, which are removably fastened by means of screw bolts 28 and 29, respectively, to elongated arms 31 and 32, respectively, which are pivotally secured by means of suitable pivot pins to eccentrically mounted blocks 33 and 34, respectively, that are carried by rotatable discs 36 and 37, respectively. As indicated in FIG.

2 of the annexed drawings, the mounting of the discs 36 and 37 is such that the arms 31 and 32 as well as the hands 26 and 27 thereon, normally rotate in a horizontal plane. The discs 36 and 37 are so arranged in spaced relationship to one another as to permit relative movement therebetween, by means of a hole in block 33 which slidably receives a shaft 35 connecting the blocks 33 and 34, and they are arranged for being rapidly driven, in unison, by a motor or other prime mover, not shown, with either a belt and pulley drive or a sprocket and chain drive from the motor to a common shaft 38; the present embodiment being exemplified in a sprocket and chain drive from the motor, not shown, including the sprocket 39 which is keyed or otherwise secured to the shaft 38, and the chain 41 trained over the sprocket 39, as well as trained over a sprocket, not shown, secured to the motor shaft, also not shown. In order to drive the discs 36 and 37 in unison and at a relatively rapid speed, as well as in opposite directions of rotation so as to move the arms 31 and 32 outwardly and inwardly on each cycle of rotation, I provide on the opposite ends of the common shaft 38 suitable bevel gears 42 and 43 which are arranged to mesh with associated bevel gears 44 and 46, respectively, carried on vertically disposed shafts 47 and 48 which are journaled in bearings 49 and 51, respectively, secured to a cross-beam 52 of a framework 53. The shafts 47 and 48 are also journaled in bearings 54 and 56, respectively, secured by suitable bolts to a second cross-beam 57, and the two discs 36 and 37 are keyed or otherwise secured to the upper ends of the shafts 47 and 48 as clearly shown in FIG. 1.

The moving conveyor 11 preferably comprises two pairs of endless chains 61, 61′ and 62, 62′ which are arranged in transverse spaced relationship to one another, with the chains 61, 61′ arranged as outer chains and the chains 62, 62′ as inner chains. This arrangement is such that the chains are all trained over suitable pairs of sprockets secured to shafts rotatably supported in longitudinally spaced relationship to one another in the conventional manner. For brevity and simplicity of illustration in the annexed drawings, but one sprocket of each pair of sprockets for each of the endless chains 61, 61′ and 62, 62′ are shown in the illustrations and but one shaft of each of the pairs of shafts on which the chains 61, 61′ and 62, 62′ are driven are shown; it being well known that these shafts and sprockets are to be so arranged that the endless chains 61, 61′ and 62, 62′ will operate parallel to one another and at the same levels. As shown particularly in FIGS. 2 and 4 of the annexed drawings, the endless chains 61, 61′ and 62, 62′ are supported and trained about sprockets 63 and 64, respectively, which are keyed or otherwise secured to shafts 65 and 65′, respectively; such shafts being placed in driving connection in conventional manner with the shafts of motors or other prime movers, not shown. The arrangement preferably is such that the distance between the two pairs of chains 61, 61′ and 62, 62′ can be varied either by bringing the endless chains 61 and 61′ closer to chains 62 and 62′ or by moving the chains farther apart in order to accommodate different size cartons which are so disposed thereon that they span the two parallel pairs of chains after the two hands 26 and 27 have extracted the carton blanks from the magazine 12, partially opened the same, and deposited them upon the conveyor 11.

In order to facilitate the variable adjustment of the distances between the two pairs of endless chains 61, 61′ and 62, 62′, I preferably arrange the pairs of shafts 65 on which the sprockets 63 are mounted in off-set relationship longitudinally with respect to the pairs of shafts 65′ on which the sprockets 64 are secured, all as shown in FIGS. 2 and 4 of the annexed drawings. The variable adjustment of the distances between the parallel chains can be accomplished in any conventional manner and is well known to those skilled in the art and constitutes, per se, no part of the present invention, otherwise than to permit the accommodation of different sizes of cartons and carton blanks for deposition on the endless conveyor 11 after extraction from the magazine 12 which, as noted above, also is variably adjusted to accommodate different sizes of carton blanks.

It is to be especially observed that the preferred embodiment of the present invention embraces means for effectively and properly positioning partially opened carton blanks upon the conveyor 11 and sequentially squaring the carton blanks after deposition on the conveyor 11 into the form of open-end cartons whereby the same can be filled from either end with such food items as pies or cakes or with any other item or article. To this end, I provide on each of the chains of the conveyor 11, a series of pivotally mounted dogs or lugs 66 and arrange these lugs 66 in longitudinally spaced arrangement along the chains for limiting and confining the movement of the cartons, after deposition of the same upon the conveyor. It is to be especially observed that the location or point of deposition of the partially opened carton blanks onto the series of endless chains comprising the endless conveyor 11 is at what may be aptly termed an "open" location of these pairs of endless chains. By "open" position of the endless chains, I mean a position where a leading set of aligned lugs 66 is in a vertically disposed position on a horizontal section of the upper runs of the conveyor 11 while the following set of aligned lugs 66 is disposed at an inclination to the vertical and has not yet reached a horizontal section of the upper runs of the conveyor 11. That is to say, the following sets of lugs 66 are on that portion of the conveyor 11 just short of attaining a horizontal position or still on an angular position just prior to leaving the sprockets 63 and 64. This is clearly illustrated in FIG. 4 of the annexed drawings wherein the magazine 12 is shown in an overlying relationship to this "open" position of the conveyor 11 with a leading set of aligned lugs 66 on a horizontal section of the conveyor 11 and a following set of lugs 66′ on a curved section of the conveyor 11 but approaching the horizontal section while the chains are still on the sprockets 63 and 64. In view of this deposition of the extracted and partially opened carton blanks onto the conveyor 11 at this "open" position of the conveyor 11, the carton blanks will be squared between the leading set of lugs 66 and the following sets of lugs 66′ as the conveyor moves in the direction of the arrow B and as the opened carton arrives at the station designated by the reference numeral 67. The sequential operations of extracting the lowermost carton blank 14 from the magazine 12, partially opening the same and depositing the same in the "open" position of the conveyor 11 is synchronized with the movement of the conveyor chains 61, 61′ and 62, 62′ so that this action of receiving the partially opened carton blanks followed by the squaring of the blanks to put them in the form of open-end cartons, as indicated by the reference numeral 67 in FIG. 4 of the drawings, is one of the principal features of the present invention.

As hereinabove described, the arms 31 and 32 carrying the hands 26 and 27, respectively, are pivotally mounted on the blocks 33 and 34 eccentrically fastened to the discs 36 and 37, respectively, in order that the arms 31 and 32 and the hands 26 and 27 may be rotated in a horizontal plane to move the hands 26 and 27 outwardly and inwardly on each cycle of rotation of the discs 36 and 37. In order to cause the movement of the hands 26 and 27 into the magazine 12 and to be inserted in between the top and bottom panels of the lowermost carton blank 14 in the magazine 12, I provide additional means for effecting movement of the arms 31 and 32 and which, in conjunction with the motion supplied to the arms 31 and 32 by the rotation of the discs 36 and 37, respectively, affords a compound action on the arms 31 and 32 to cause them to move in a plane at an inclination to the horizontal thereby causing the hands 26 and 27 to be moved into

the magazine 12 from opposite sides thereof and in between the top and bottom panels of the lowermost carton blank 14 of the magazine 12. These additional means not only support the arms 31 and 32 but alter the paths of movement thereof from a horizontal plane to an inclined plane. To this end, I mount a pair of universal joints on the framework of the machine, comprising the transverse beams 53 and 55, and attach these universal joints approximately midway between the mounting blocks 33 and 34 of the arms, at one side, and the respective hands 26 and 27, on the other side. Thus, on each side of the magazine 12 or on each side of the device, a universal joint is connected between the framework and the arms on which the hands 26 and 27 are mounted. While any suitable type of universal joint may be employed, as desired, I preferably utilize the so-called open-cup type wherein the base 71 of each universal joint is keyed or otherwise secured to a vertically disposed shaft 72, and a tongue 73 of the swivel element 74 of each joint is pivotally connected to the wall of the base 71 by means of a pivot pin 75. As particularly shown in FIGS. 2 and 5 of the annexed drawings, the swivel element 74 of these universal joints is conveniently secured to a flange 76 which inwardly projects from each of the arms 31 and 32 and which is provided with an aperture therethrough for the passage of a bolt 77 which can be tightened down to secure the joints in operative positions. The vertically disposed shaft 72 is connected to a second universal joint, by means of a nut 78 which fastens the shaft 72 to a swivel element 79 of second universal joints, each having as its other element a fixed base 81 which is secured at the cross-beam 55. It is to be understood that the two universal joints just described are arranged one above the other, in pairs on opposite sides of the device or in association with the arms 31 and 32, respectively, as clearly shown in FIGS. 4 and 5, and that they operate to control the movement of the two arms 31 and 32 on which the hands 26 and 27 are mounted in conjunction with the control or regulation of the movement of these arms by the discs 36 and 37. The fixed element 81 of the second universal joint of each pair of universal joints is secured, by any suitable means, to the cross-beam described and the swivel element 79 thereof is pivotally secured to the tongue of the fixed element by means of a pivot pin 82, all as shown in FIG. 4.

In operation, with the discs 36 and 37 rotating at a rapid rate and in unison, and by virtue of the action of the universal joints, just described, the arms 31 and 32 move in an inclined plane so as to carry the hands 26 and 27 upwardly to and on opposite sides of the magazine 12 to positions where the inner ends of the hands, designated by the reference numerals 26' and 27', respectively, are inserted between the top and bottom panels of the lowermost carton blank 14 of the plurality of superposed carton blanks 13 temporarily retained in the magazine 12. During this movement of the arms 31 and 32, the arms 31 and 32 are moved in a circular path as well as in an inclined path so that the movement of the hands in relation to any particular carton blank is indicated by the dotted line C in FIG. 7 of the annexed drawings. Sequentially, with the continued movement of the discs 36 and 37 and their associated elements including the mounting blocks 33 and 34 for the arms 31 and 32, the lowermost carton blank is extracted with the forward end thereof fulcrumed on the two forward projections 16 on magazine 12 and brought downwardly from the magazine and partially opened by the hands 26 and 27 as the extracted carton blank is deposited in the "open" position of the conveyor 11 as shown at the station indicated by the reference character A in FIG. 4 of the annexed drawings. During the bringing of each successive carton blank downwardly from the magazine 12 to adjacent its final position on the conveyor 11, the rear end of each opening carton blank 14 fulcrums on the set 66' of following lugs of the conveyor 11 to assist the deposition of the open-end carton blank 14 to its position on conveyor 11 between the leading set of lugs 66 and the following set of lugs 66' as both sets 66 and 66' reach a horizontal position of the conveyor 11. This sequential action of the hands 26 and 27, resulting in the deposition of the partially opened carton blank between adjacent lugs or dogs 66 and 66' on the conveyor 11 at its "open" position is sequentially followed, by reason of the continued movement of the conveyor 11 in the direction of the arrows indicated by the reference character B, by a squaring of the carton and a further opening of the same so that it is disposed and confined in an upright position normal to the conveyor 11 as shown by the reference character B and the reference numeral 67 in FIG. 4 of the annexed drawings. As the conveyor chains 61, 61' and 62, 62' moving in the direction of the arrow indicated by reference character B, see FIG. 4 or away from the discs 36 and 37 and consequently away from the hands 26 and 27, there will be, in effect, a withdrawal of the hands 26 and 27 from the partially opened carton blanks followed by a repetition of this cycle, just described, with the hands 26 and 27 again being carried upwardly and inwardly for insertion between the top and bottom panels of the next lowermost carton blank 14 in the magazine 12 to be sequentially followed by the extraction of the carton blank from the magazine and the downward movement thereof with a partial opening of the same by the withdrawing outwardly and downwardly moving hands 26 and 27 as well as the fulcruming of the front ends of the carton blanks on the leading projections 16 of the magazine and the rear ends of the blanks on the following lugs 66' of the conveyor with the final deposition of the extracted carton blank onto the moving conveyor 11 in the "open" position, as indicated by the reference character A in FIG. 4 of the annexed drawings. This cycle is repeated successively until the desired number of carton blanks have been extracted from the magazine 12, deposited upon the conveyor 11 and squared in the form of open-end cartons and filled with pies, cakes or the like as they are carried along in the open-end condition on the conveyor 11; it being understood that the magazine 12 is filled and refilled with carton blanks 13 until the desired amount of cartons have been filled. While not shown in the drawings, after the cartons assume the positions shown in the reference character 67 in FIG. 4 of the drawings, termed in their "squared" positions, and remain open at opposite ends thereof, certain actuated elements, not shown, close one end of the successive cartons so that the cartons are only open at an opposite end for the reception of the desired articles or substances, and thereafter the remaining open-end of the carton is closed and the carton is ready for shipment with the enclosed item therein.

The universal joints exemplified by the uppermost universal joints consisting of the parts 71–74 and pivot pins 75, as well as the lowermost universal joint of each of the pairs of universal joints, and consisting of the parts 79–82, prevent the dislodgment of the arms 31 and 32 from their precise paths of movement and lend some rigidity to the action of these arms 31 and 32, as well as the hands 26 and 27 thereon, so that successive carton blanks retained in the magazine 12 are effectively removed, partially opened, and deposited upon the conveyor 11 exceedingly rapidly and effectively.

In FIG. 6 of the accompanying drawings, I have diagrammatically illustrated the positions of a typical carton blank and the carton extracting and partial opening element of my improved combination, thereby indicating the action at the lowermost carton blank supported in the magazine 12. The illustration in FIG. 6 shows two sequential positions of one of the carton extracting and opening elements, such as the hand 26. In FIG. 7, the extracting and partial opening action of the hand 26 is shown in connection with a different type of carton blank; the blank illustrated in FIG. 6 being designated by the reference numeral 13 and that illustrated in FIG. 7 being designated by the reference numeral 13' to distinguish

between the two types of carton blanks. It is to be understood, of course, that the showings of carton blanks in these two views is not to be taken as the only type and shape of carton blanks that can be partially opened by the action of the hands **26** and **27** of the machine but they are merely illustrative of some of the carton blanks that are acted upon and extracted from a magazine such as the magazine **12**. It should be further understood, with respect to the views of FIG. 6 and FIG. 7 that similar, but opposed, action takes place simultaneously on the opposite side of the magazine **12** during the movement of hand **27** in unison with the movement of a hand **26**.

The carton blank **13** shown in FIG. 6 is conventional and includes a top panel having a hingedly connected narrow end flap thereon with a straight outer edge, and also includes a bottom panel which contains a hingedly connected end flap composed of a major section and a minor section interrupted by a slit therebetween. A major section of the hingedly connected end flap on the bottom panel of the carton blank **13**, as shown in FIG. 6, is recessed, as at **15'**, inwardly from its straight outer edge. In extracting a carton blank of the type shown in FIG. 6 from the magazine **12**, the hands **26** and **27** can be carried so as to be inserted either at a position where the hand in this view is designated as **35**, adjacent to a corner of the blank **13** or, as designated by the numeral **26** in a position with its inner end **26'** entering between the two hingedly connected end flaps of the top and bottom panels adjacent to the recessed portion **15'** of the hingedly connected flap of the bottom panel. The showing in FIG. 7 indicates the travel of the hands **26** and **27** on opposite sides of the magazine **12**, by the dotted line designated by the reference character C.

The position of entry of the inner ends **26'** and **27'** of the hands **26** and **27** carried on the arms **31** and **32** of the present embodiment is not critical and can be readily adjusted to meet and accommodate any given size or shape of carton blank. To afford adjustment of the entry positions of the hands, as well as to provide for the substitution of different types of hands **26** and **27** than those shown in the present drawings, I provide additional openings **30** in the arms **31** and **32** adjacent to the outer ends thereof for passing the screw-bolts **28** and **29**. In other words, if it is deemed advisable by the operator to move the hands **26** and **27** inwardly on the arms **31** and **32**, it is only necessary to remove the bolts **28** and **29** from their positions as shown in FIG. 2 of the annexed drawings and move the hands backwardly and then reinsert the screw-bolts **28** and **29** to secure the same in the new positions of the hands. By these adjustments, the hands **26** and **27** can be made to move in a narrower circular inclined path for extracting shorter widths or shorter lengths of carton blanks carried in the magazine **12** so that there will be no interference of any kind in the movement of the hands.

While not specifically delineated in an enlarged view in the accompanying drawings, it is to be undersood that the lugs **66** on the chains **61**, **61'** and **62**, **62'** can readily be adjusted in relation to one another so that different sizes of cartons can readily be "squared" in position on the conveyor **11**. The adjustable feature of these lugs, arranged in pairs and aligned with one another in pairs, is not a part, per se, of the present invention as it is well known in the art how these lugs can be adjustably positioned on link chains of the character depicted in the accompanying drawings.

Whenever relatively small carton blanks are temporarily held in the magazine **12**, such as blanks which will make up into cartons for holding 5" diameter pies or the like, only one hand, say the hand **26**, of the two hands **26** and **27** is required for opening and extracting such smaller carton blanks from the magazine **12**.

It is to be understood that the appended claims are to be accorded a range of equivalents commensurate with the scope thereof.

I claim:

1. A carton extractor and opener comprising, in combination with a moving conveyor and a magazine for holding a replenishable supply of carton blanks arranged in superposed relationship to one another; said magazine being supported normal to and in overlying relationship to said conveyor and presenting an opening to said conveyor, a pair of pivotally and rotatably mounted hands arranged on opposite sides of said magazine, and means for causing the recurrent movement of said hands into said magazine on opposite sides thereof to enter within and remove successive carton blanks from the opening of the magazine as well as for causing recurrent and sequential movement of said hands while within a removed carton blank to move and deposit the removed carton blank directly onto said conveyor.

2. A carton extractor and opener comprising, in combination with a moving conveyor and a magazine for holding a replenishable stack of carton blanks arranged in superposed relationship; said magazine being supported normal to and in overlying relationship to said conveyor and presenting an opening to said conveyor, a pair of pivotally and rotatably mounted hands on opposite sides of said magazine, and means for causing the movement of said hands in a predetermined path including movement of said hands upwardly into said magazine to enter within and remove the lowermost carton blank of the stack of carton blanks in said magazine through said opening as well as for causing movement of said hands downwardly while within a removed carton to partially open the same and to move and deposit the removed carton blank directly onto said conveyor.

3. A carton extractor and opener as defined in claim 2, and including means for limiting and confining the movement of said pair of hands in said predetermined path.

4. A carton extractor and opener comprising, in combination with a moving conveyor and a magazine for holding a replenishable stack of carton blanks arranged therein in superposed relationship; said magazine being supported normal to and in overlying relationship to said conveyor, a pair of hands arranged on opposite sides of said magazine, and means for sequentially moving said hands upwardly and inwardly into said magazine for entering within the lowermost carton blank in the stack in said magazine, sequentially removing said carton blank from said stack, sequentially thereafter moving said hands downwardly to move the blank directly onto said conveyor, and sequentially thereafter withdrawing the hands from the blank.

5. A carton extractor and opener comprising, in combination with a moving conveyor and a magazine for holding a replenishable stack of superposed carton blanks; said magazine being supported normal to and in overlying relationship to said conveyor, means driven in a predetermined path for recurrently removing the lowermost carton blank of said stack of carton blanks in said magazine and for recurrently partially opening the removed carton blank while simultaneously moving the carton blank downwardly directly onto said conveyor, and means for adjusting the relative positions between said magazine and said conveyor.

6. A carton opener as defined in claim 5, and including means for enlarging and diminishing the width of said magazine to accommodate different sizes of carton blanks.

7. A carton extractor and opener comprising, in combination with a moving conveyor and a magazine for holding a replenishable stack of superposed carton blanks; said magazine being supported normal to and in overlying relationship to said conveyor, a plurality of lugs arranged in spaced relationship in pairs on opposite sides of said conveyor, a pair of hands movably supported on opposite sides of said magazine and in close proximity thereto, means for causing said hands to be moved recurrently in a predetermined path including inwardly and upwardly into said magazine and within the lowermost

carton blank of said stack of carton blanks in said magazine and outwardly and downwardly for partially opening said lowermost carton blank while within the same and further downwardly depositing the carton blank directly onto said conveyor between adjacently disposed but spaced apart lugs on said conveyor.

8. In a carton extractor and opener, an endless conveyor, means for moving said conveyor, aligned lugs on opposite sides of said conveyor and extending the length thereof in spaced relationship to one another in pairs, a magazine for holding a replenishable stack of superposed carton blanks supported normal to and in overlying relationship to said conveyor, and recurrently driven means for removing the lowermost carton blank of said stack of carton blanks in said magazine and sequentially to partially open said lowermost carton blank and thereafter sequentially deposit the same directly upon said conveyor between adjacent pairs of lugs on said conveyor.

9. In a carton extractor and opener, a pair of endless chains arranged in spaced relationship to one another, aligned pairs of sprockets arranged in spaced relationship to one another for supporting said pairs of chains at the same level to define upper runs thereof lying in a horizontal plane, transversely aligned pairs of lugs secured to said pair of chains in spaced relationship to one another throughout the extent of said endless chains; said lugs defining an open position on said chains adjacent to one extremity thereof when one pair of aligned lugs overlies the sprockets at said end of said parallel chains and the next leading pair of aligned lugs on said pair of chains are in a horizontal plane, a magazine for holding a replenishable stack of superposed carton blanks supported normal to and in overlying relationship to said open position of said pair of endless chains, a pair of hands movably supported on opposite sides of said magazine and in close proximity thereto, and means for sequentially moving said hands into said magazine and into the lowermost carton blank of the stack of carton blanks in said magazine, sequentially removing or extracting said carton blank from said stack with said hands, and sequentially thereafter partially opening said lowermost carton blanks with said hands while within the same and disposing said partially opened lowermost carton blank with said hands directly onto said chains in the open position thereof.

10. A carton extractor and opener as defined in claim 9, and including means on said conveyor chains for squaring the partially opened carton blank into the form of an open-end carton for the reception of items of food or the like while on the moving endless chains.

11. A carton extractor and opener comprising a moving conveyor consisting of pairs of endless chains arranged in spaced relationship to one another, pairs of aligned sprockets supporting said chains at opposite ends thereof, means for rotating said sprockets to cause constant movement of said conveyor, pairs of aligned lugs fastened to said chains in spaced relationship longitudinally thereof; said lugs defining an open position on said conveyor adjacent to said sprockets at one end thereof, a magazine for holding a replenishable stack of superposed carton blanks supported in overlying relationship to the open position of said conveyor, a pair of pivotally and rotatably mounted hands on opposite sides of said magazine, and means for causing the recurrent movement of said hands into said magazine to enter within and remove with said hands successive carton blanks from the bottom of the stack thereof in said magazine as well as for causing recurrent and sequential partial opening of said carton blanks with said hands and deposition of the same with said hands directly onto the conveyor in the open position thereof.

12. In a carton extractor and opener, the combination of an endless conveyor consisting of a pair of endless chains supported in spaced transverse relationship in the same elevated horizontal plane, a plurality of pairs of lugs in longitudinally spaced relationship on said conveyor; said pairs of lugs being arranged in transverse alignment adjacent to opposite sides of said conveyor, aligned pairs of sprockets adjacent to opposite longitudinal extremities of said chains over which said chains are trained, a magazine for temporarily retaining a stack of a plurality of superposed carton blanks adjustably supported normal to and in overlying relationship to said conveyor adjacent to one aligned pair of said pairs of sprockets, means for recurrently entering said magazine from opposite sides thereof to extract successive lowermost carton blanks from said magazine and to partially open the same and deposit the extracted carton blanks in partially opened position directly on said conveyor, and means for driving said conveyor and said first-named means in synchronism so that each successive partially opened carton blank is deposited on said conveyor in an open location on said conveyor underlying said magazine as defined by a leading pair of transversely aligned lugs on said conveyor which are presented on a horizontal section of the conveyor adjacent to said one pair of aligned sprockets while a following pair of transversely aligned lugs are presented on a curved section of said conveyor on said one pair of aligned sprockets; said leading pair of transversely aligned lugs and said following pair of transversely aligned lugs serving to square each successive partially opened carton blank to open-end carton form while both of said pairs of lugs are on a horizontal plane section of said conveyor and as each successive carton blank is carried by said conveyor beyond said defined open location of said conveyor.

13. In a carton extractor and opener, the combination as defined in claim 12, and means for adjustably setting said pairs of lugs at variable predetermined distances apart to accommodate different sizes of carton blanks and to confine the blanks on the conveyor in squared open-end form for the reception of items of food or the like.

14. A carton extractor and opener comprising, in combination with a moving conveyor and with a magazine for holding a replenishable supply of superposed carton blanks; said magazine having an opening in the bottom thereof, directed toward said conveyor, extracting and controlling means for extracting successive carton blanks from said magazine through said opening and for controlling the movement of removed carton blanks to successive positions on said moving conveyor; said extracting and controlling means comprising a pair of movably mounted hands arranged on opposite sides of said magazine, and means for moving said hands in a predetermined path including inwardly toward said magazine and upwardly to within the lowermost carton blank in said magazine as well as outwardly and downwardly from said magazine to a point adjacent said moving conveyor; movement of said hands in said predetermined path effecting the extraction of the carton blank from the magazine, partially opening the same and moving the carton blank with said hands within the same toward and depositing the carton blank directly onto said moving conveyor.

15. A carton extractor and opener comprising, in combination with a moving conveyor and with a magazine for retaining a replenishable stack of openable carton blanks in superposed relationship; said magazine having an opening in the bottom thereof and being arranged normal to and in overlying relationship to said moving conveyor, inwardly directed rear projections and forward projections arranged in aligned pairs on the bottom of said magazine for seating said stack of openable carton blanks, a pair of movably mounted hands on opposite sides of said magazine, and means for recurrently moving each of said hands in a predetermined path including inwardly and upwardly into the lowermost carton blank on said magazine to extract the same from said projections and for partially opening the same

and outwardly and downwardly while within said carton blank to deposit the same directly onto said moving conveyor; said forward projections on said magazine serving as fulcrums during the extraction of each successive lowermost carton blank from said magazine through the opening in the bottom thereof.

16. A carton extractor and opener as defined in claim 15, and a plurality of pairs of upstanding aligned lugs arranged in longitudinally spaced relationship to one another on said moving conveyor; said pairs of upstanding lugs defining spaces for the deposition of said partially opened carton blanks of which one pair of aligned lugs constitutes a following pair which serve as fulcrums for each carton blank in its downwardly movement for deposition in said defined spaces on said moving conveyor.

17. A carton extractor and opener comprising, in combination with a moving conveyor and with a magazine holding a replenishable stack of openable carton blanks arranged in superposed relationship to one another therein; said magazine being supported normal to and in overlying relationship to said moving conveyor and having an opening in the bottom thereof presented to conveyor, a pair of hands movably mounted below and on opposite sides of said magazine, and means for recurrently moving each hand of said pair of hands in a predetermined path at an inclination to the horizontal to cause each hand to move upwardly and inwardly to within each one of a succession of lowermost cartons in said stack of cartons in said magazine and outwardly and downwardly while within the said lowermost carton

to extract the same through said opening and to partially open the same and finally dispose each of said lowermost cartons so partially opened in successive positions on said moving conveyor.

18. A carton extractor and opener comprising, in combination with a moving conveyor and with a magazine holding a replenishable stack of openable carton blanks arranged in superposed relationship to one another within said magazine; said magazine being supported normal to and in overlying relationship with said moving conveyor and having an opening in the bottom thereof presented to said conveyor, positively acting means for extracting each one of a succession of lowermost carton blanks from said stack thereof in said magazine and for controlling the extraction as well as the partial opening of said lowermost blank until it is finally disposed upon said moving conveyor; said positive acting means comprising a pair of moveably mounted hands arranged on opposite sides of said magazine, and means for moving said hands in unison in a predetermined path at an inclination to the horizontal whereby said hands move upwardly and inwardly into the lowermost carton of said stack thereof in said magazine and partially open the same and deposit it upon said moving conveyor.

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