June 1, 1937. L. BENOIT 2,082,565

MACHINE FOR ASSEMBLING CARTONS

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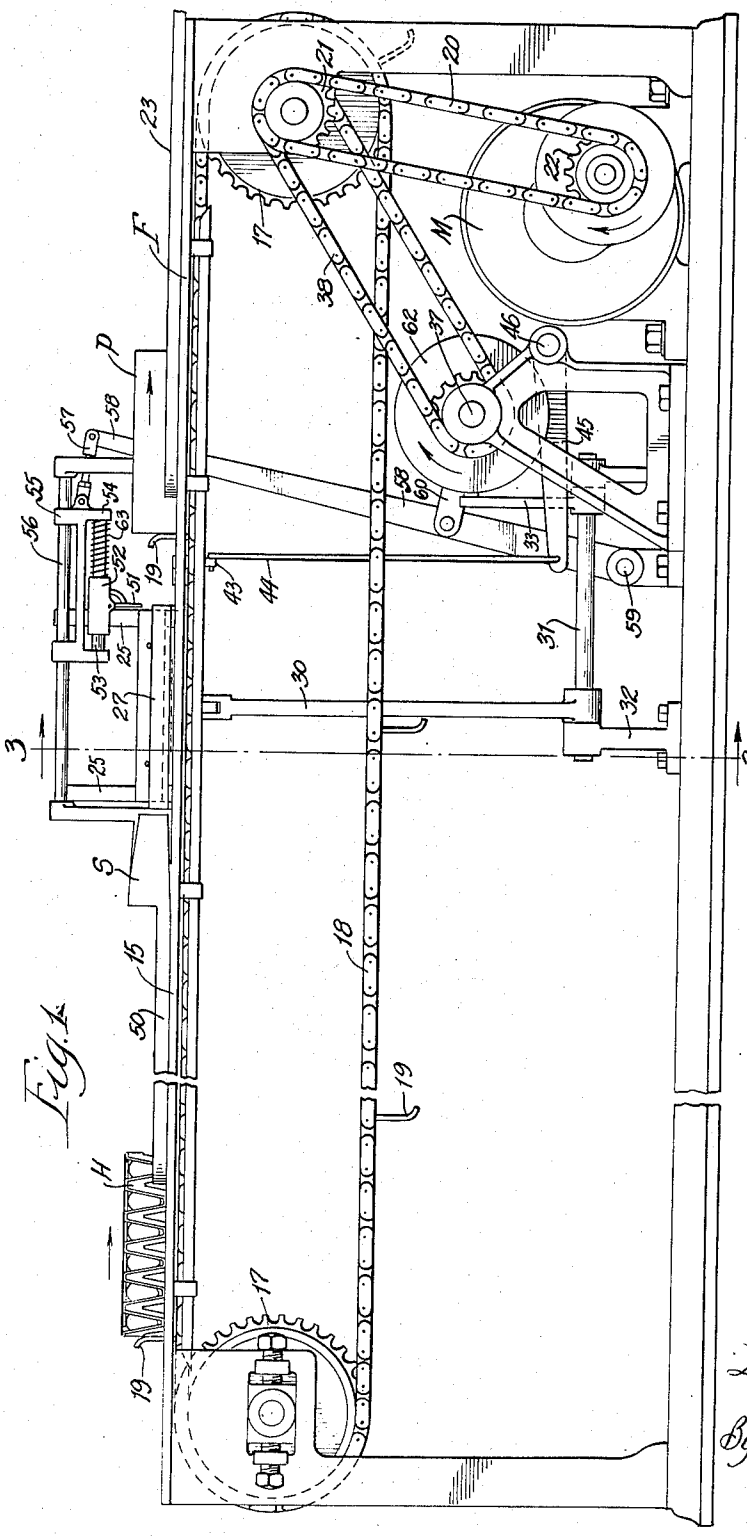


Fig. 1

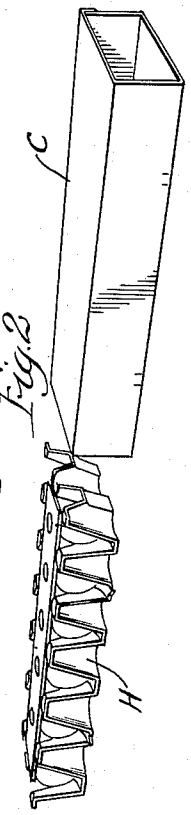


Fig. 2

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Fig. 3

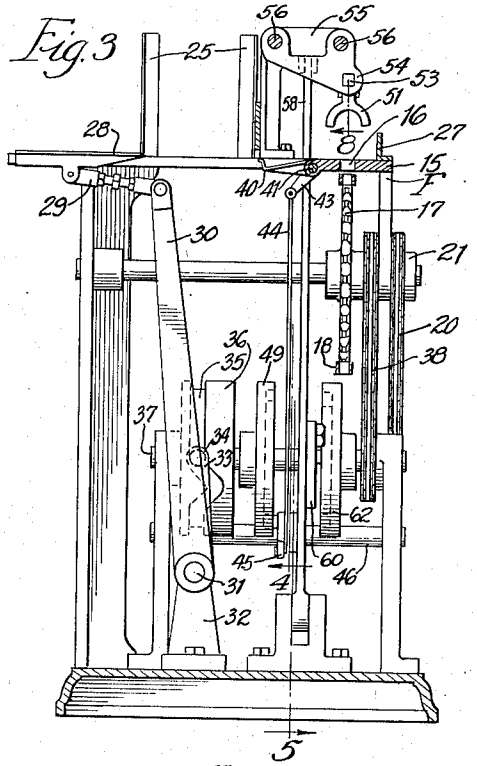


Fig. 4

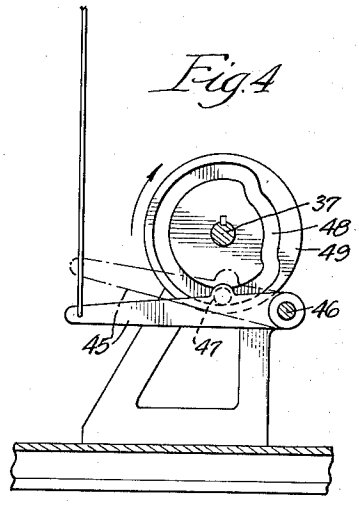
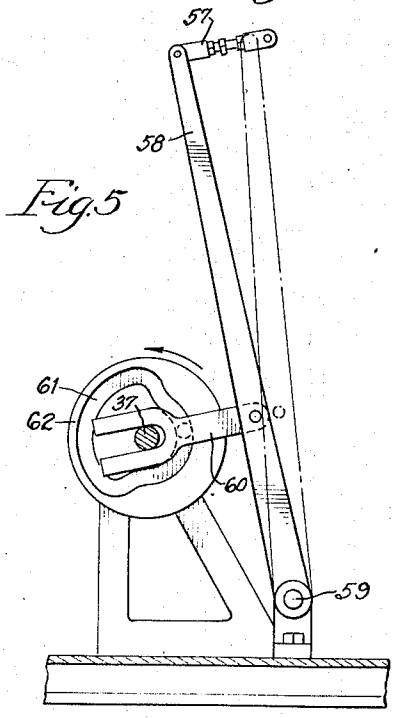


Fig. 5



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Fig. 6

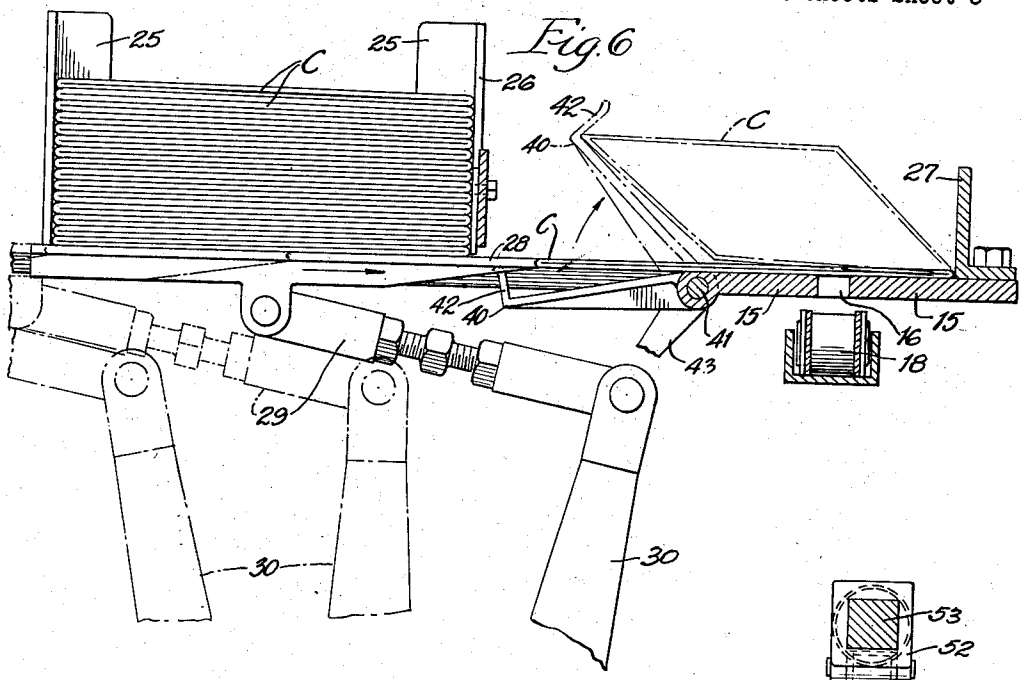


Fig. 7

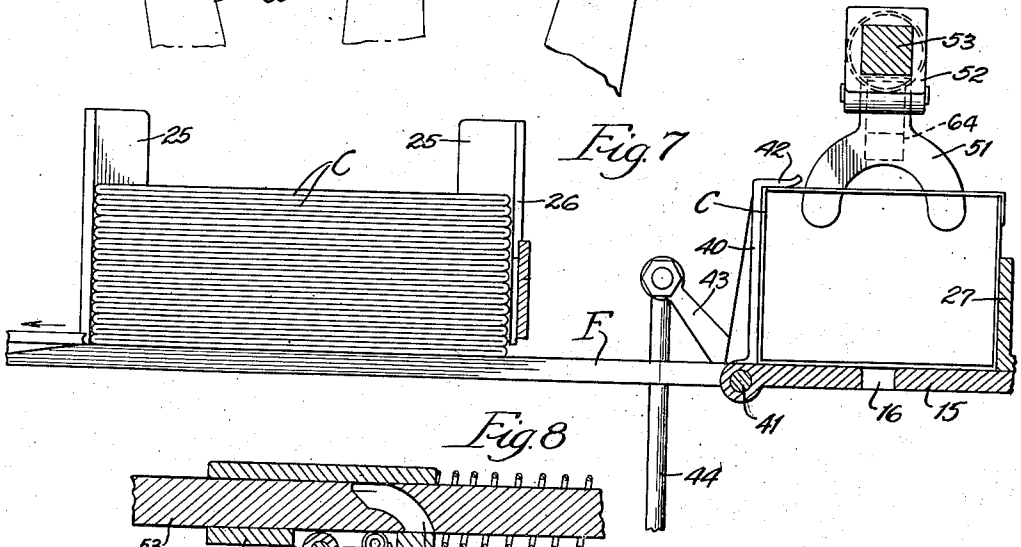


Fig. 8

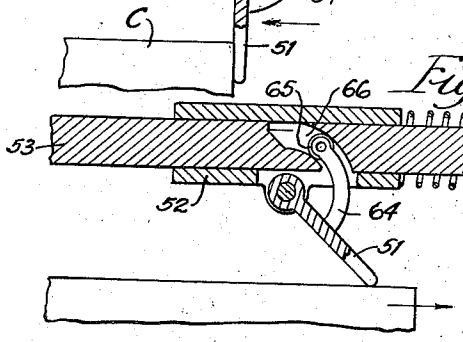


Fig. 9

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MACHINE FOR ASSEMBLING CARTONS

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Fig. 10

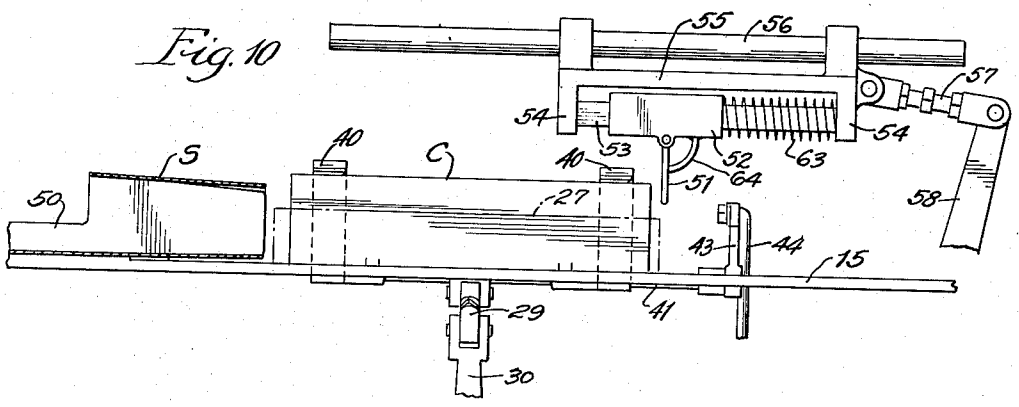


Fig. 11

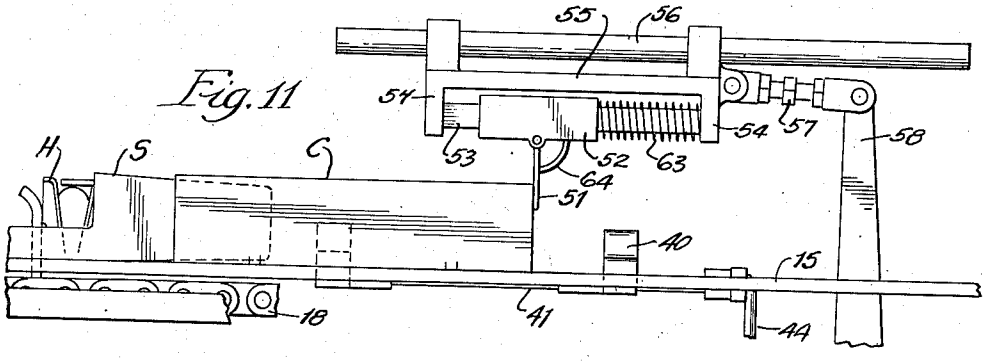
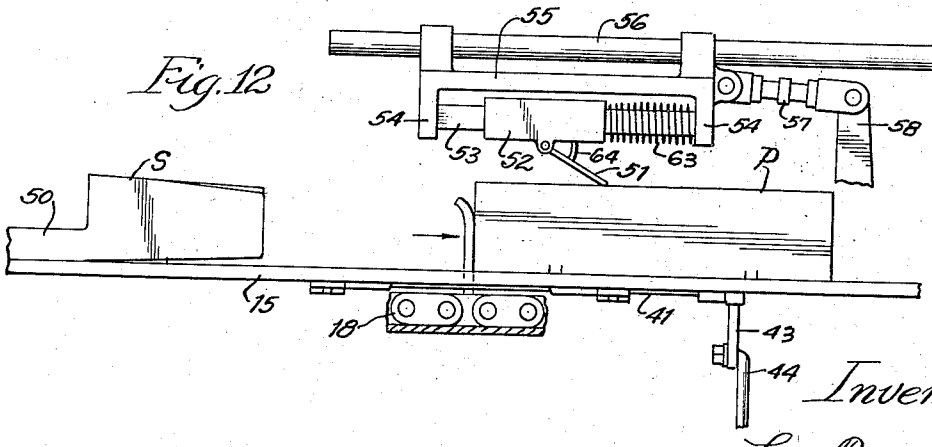


Fig. 12



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2,082,565

UNITED STATES PATENT OFFICE

2,082,565

MACHINE FOR ASSEMBLING CARTONS

Leon Benoit, New York, N. Y.

Application September 6, 1935, Serial No. 39,388

7 Claims. (Cl. 93—6)

This invention relates to a mechanism operable upon a collapsed carton, and also upon an erected holder, the several operating agencies being so timed and correlated as to feed the collapsed carton to a position where it is first erected, and then to advance into such carton the erected holder whereby the carton and holder are assembled one with the other.

More specifically, the present improvements relate to (1) means for setting up and supporting collapsed cartons one at a time, (2) means for producing relative movement between such erected carton and a guide to which it is fitted, and (3) means for advancing a holder through the guide into the carton for assembly therewith, the latter means serving additionally to remove the assembled carton and holder to a remote point. The several mechanisms for accomplishing these ends are of simple construction, and will operate with speed and certainty to obtain assured results.

These various objects of my invention, as well as others which will hereinafter appear, may be realized by a construction which is illustrated in the accompanying drawings in the manner following:

Figure 1 is a side elevation of the assembling machine in its entirety;

Fig. 2 is a view in perspective of a holder and carton in the positions they occupy just prior to assembly;

Fig. 3 is a transverse section through the machine on line 3—3 of Fig. 1;

Fig. 4 is a detail in section taken on line 4 of Fig. 3;

Fig. 5 is a similar view on line 5 of Fig. 3;

Fig. 6 which is a detail in section, about on line 3—3, shows on an enlarged scale certain of the operating parts by which a collapsed carton is fed from the magazine for erection at a definite point;

Fig. 7 is a similar view showing the carton at the completion of the erecting operation;

Figs. 8 and 9 are details in longitudinal section through the means, shown in two different positions, by which the erected carton is shifted endwise; and

Figs. 10, 11, and 12 are views in elevation of the same mechanism, showing three different positions thereof.

As shown best in Figs. 1 and 3, I may utilize a framework F in which is comprised an elongated top mounting a pair of rails 15 spaced apart to provide therebetween a slot 16. The various bearings, driving mechanism, etc., are all supported upon this framework near each end of which is a sprocket wheel 17 over which trains an endless conveyor chain 18 carrying at spaced intervals fingers 19 which, on the upper run, extend upwardly to ride through the slot 16. The chain is continuously moved as by a driving connection 20 extending from a wheel 21 associated with one of the sprockets to a wheel 22 that is geared to a motor M.

The two rails furnish a support on which the material to be operated upon is rested and slidingly advanced. Such material comprises a cellular holder H and a tubular carton C (see Fig. 2) having one or both ends open. The holder may be moulded from a pulp composition so as to be load-sustaining, all as described in my pending application filed August 10, 1935, under Serial No. 35,660. A holder filled with eggs or other commodities, when placed on the rails at the left end of the machine, as viewed in Figure 1, is adapted to receive engagement from one of the conveyor fingers and thereby be advanced toward the opposite end of the machine. During its travel the holder is assembled with the carton, and the resulting filler package P then moves on between upstanding guides 23 to a discharge or take-off point.

The cartons which are desirably of rectangular form in cross section are initially collapsed into flat condition (see Figs. 6 and 7) for vertical stacking in a magazine which may comprise four angle posts 25. The facing flanges 26 on the two posts adjacent the rails are cut away at the bottom and carry gauges which may be vertically adjusted to provide the requisite space for movement thereunder of the lowermost collapsed carton in the stack toward and upon the rails where I have provided an upstanding flange 27 which serves as a combined stop and guide. The successive feeding movement of collapsed cartons is effected by a plate 28 which is reciprocally mounted under the stack and connected for operation with an adjustable link 29 pivoted to a lever 30 which is carried fast upon a shaft 31 rockably mounted in bearings 32. A second lever 33 attached to the same shaft carries a roller 34 (see Fig. 3) adapted to track in a cam groove 35 that is formed peripherally in a wheel 36 mounted on a shaft 37 that is driven as by a chain 38 from the proximate sprocket wheel 17. By some such mechanism as this the plate is reciprocated to displace from the stack the lowermost collapsed carton which is thereupon advanced to a position upon the rails against the stop 27.

The next operation upon the carton is to set it up. This is accomplished by an arm (or arms) 40 supported upon a shaft 41 which parallels the rails in proximity to the edge thereof which is nearest the magazine. This arm is of a length which about corresponds with the vertical dimension of the erected carton and at its swinging or free end is turned toward the carton to provide a finger 42 which will closely overlie the proximate edge thereof. A rocking movement of slightly more than 90° is imparted to this arm. This is effected by a crank 43 which extends from the shaft 41 for pivotal connection with a link 44 whose lower end (see Fig. 4) is joined to a lever 45 pivoted at 46 and provided with a roller 47 which tracks in a cam 48 formed in one end face of a wheel 49. By such a mechanism the arm 40, immediately after retreat of the feeding plate 28, is caused to rise up and engage the collapsed carton which is thereupon caused to "break" along preformed score lines defining its edges. In so doing, it is erected to the position shown in Fig. 7. In this operation the parts move through positions one of which is indicated by the dotted lines in Fig. 6. The angled free end of the arm effectively restrains any but a correct movement of the carton, and this is important because of the resistance offered by the collapsed carton to bending at its four parallel edges two of which are initially related at 180° and the other two at 0° apart. When the carton is fully set up, the arm 40 remains in vertical position as long as need be to cooperate with the flange 27 in holding and guiding the carton during the succeeding operations. After that the arm swings down again below the level of the feeding plate so as not to interfere with its next reciprocatory advance.

The holder H, when first advanced by the conveyor chain, moves between a pair of walls 50 (see Fig. 1) into a guide which may be in the form of a shoe S having four walls about corresponding in transverse dimensions to those of the carton walls. These shoe walls, however, are inclined inwardly very slightly and are resilient so as to be readily accommodated within an open end of the carton which, in the next operation, is shifted endwise so as to be fitted over the shoe-guide which has a fixed mounting upon the rails. The shoe-guide is, of course, slotted lengthwise of its bottom so as to allow the conveyor fingers to ride therethrough.

Each erected carton is, in turn, engaged at its end opposite the shoe-guide by a hand 51 which depends from a sleeve 52 by which it is pivotally supported. This sleeve is slidingly carried upon a rod 53 whose ends are secured in brackets 54 depending from a carriage 55 that is slidingly mounted on a pair of guide rods 56. To one end of the carriage is joined a link 57 in connection with one end of a lever 58 whose other end is fulcrumed at 59 (see Fig. 5), a yoke arm 60 extending from the lever to establish operative connection with a cam groove 61 that is formed in an end face of a wheel 62 mounted on the shaft 37. The shape of this cam is such that the carriage will be reciprocated only after the carton is erected whereby the latter may then be shifted endwise for fitting upon the shoe. This movement of the carriage stops when the carton and shoe are interfitted.

During advance of the carriage the sleeve is yieldingly supported by a light spring 63 which will compress only after the carton is fitted upon the shoe-guide. The hand which acts to advance the carton is sustained in a vertical depending position as by an arcuate finger 64 projecting therefrom to carry on its end a roller 65 which engages with the under wall of the sleeve wherein is an arcuate slot 66 whose opening is normally offset with relation to the finger. As long as there is no countershifting force exerted upon the carton, this finger will continue to abut the sleeve and be braced thereby; but when a reverse movement of the carton commences, the sleeve will recede until the finger is positioned opposite the slot 66. At this point the finger will enter the slot and withdraw its bracing of the hand which will thereupon swing upwardly and out of the way, as shown in Fig. 9.

With the carton fitted upon the shoe-guide, a holder H which is advanced by one of the conveyor fingers will pass through the guide and enter the carton. The inclined resilient walls of the shoe act to guide the holder accurately in reaching this position. During this operation the hand 51 remains engaged with the end of the carton to act as a stop so that the carton will remain stationary. When the holder has been completely received within the carton, the conveyor finger then engages the latter with the result that the sleeve is retracted to the point where its hand is freed to swing back and out of the way. The carton with a holder assembled therewithin may thereafter continue to advance without restraint. This movement proceeds as indicated in Fig. 1 toward the delivery or take-off end of the machine where the filler package, complete with eggs, is ready to be packed for storage, shipping or other purposes.

The present machine is advantageous because of its extreme simplicity and the certainty and speed of its operation. It is characterized by (1) means for advancing a collapsed carton; (2) means for setting-up the carton; (3) means for shifting the carton into interfitting relation with a guide; and (4) means for advancing (*a*) a holder through the guide into assembled relation with the carton and (*b*) thereafter the filler package complete. In the performance of these operations the erected carton is sustained between appropriate walls and is advanced to interfitting relation with the shoe-guide by means which thereupon serves as a yieldable stop to assist the holder in entering the carton. All such mechanisms which cooperate to perform these operations are driven by mechanism which is simple and timed in accordance with the sequence of the successive operations.

It will be noted that the carton is advanced initially in a state of collapse by a transverse movement, it is then set up in the path of movement of the holder, it next receives a further movement, this time longitudinally of itself, relative to a guide to which it is then fitted, following this it receives the holder which passes through the guide to enter the carton, and finally it again moves endwise of itself, but this time in a direction reverse to that in which it was previously shifted. The path of the holder movement is simple, whereas that of the carton is compound. The means for finally moving the carton with the holder assembled therewith is the same means which advances the holder into the carton. The path of carton movement which is compound coincides in part with the single path through which the holder itself is moved. By this relationship of movements I am enabled to expedite the several operations, including that

of assembly of the holder within the carton, all in a satisfactory and uniform manner.

I claim:

1. In a machine for assembling a holder in interlocking engagement with an open-ended carton, the combination of a shoe, means for fitting the end of a carton over the shoe with holder interlocking means thereof covered by the shoe, and means for advancing a holder through the shoe and completely into the carton for interlocking therewith and thereafter moving the assembled holder and carton to a remote point.

2. In a machine for assembling a holder within a collapsed carton, the combination of means for erecting and laterally supporting a carton, a guide, means for shifting the erected carton relative to its erecting means with an open side into supporting relation with the guide, and means for advancing the holder into the carton while laterally supported by said guide and erecting means.

3. In a machine for assembling a holder in interlocking relation with a collapsed carton, the combination of a single means for erecting a carton and supporting the erected carton in a fixed position, and other means for advancing a holder into an open end of the carton in spaced relation with an inner wall thereof while so supported by the erecting means for final interlocking engagement of the holder and carton.

4. In a machine for assembling a holder within a collapsed carton, the combination of a single means for erecting a carton and thereafter guidingly supporting the erected carton, means for moving the erected carton in one direction while guidingly supported by said first means, and other means for advancing a holder completely within the carton for interlocking engagement therewith and thereafter moving the assembled holder and carton by the holder in a direction opposite to the first movement of the carton.

5. In a machine for assembling a holder with a carton, the combination of means for producing a continuous linear advance of holders in succession, and means for producing an intermittent feed of cartons in succession into the path of movement of the holders, the cartons having means for interlocking engagement with a holder, said cartons when so positioned being disposed with an open side facing the direction from which the holders are advanced, guide means for the holders engageable with an inner wall of the cartons to cover interlocking means thereof, and mechanism corelating the operation of the aforesaid means so that a holder is advanced completely within a carton before interlocking engagement therewith while one of these units is at rest.

6. In a machine for assembling a holder with a carton, the combination of means for producing a linear advance of holders in succession, and means for producing a feed of cartons in succession into the path of movement of the holders, each of said holders and cartons having means for interlocking engagement, the cartons when so positioned being disposed with an open side facing the direction from which the holders are advanced, means to prevent interlocking engagement of a holder and carton until the holder is completely advanced within the carton, and mechanism corelating the operation of the aforesaid means so that a holder is assembled in interlocked relation with a carton while the carton is at rest.

7. For operation upon a collapsed carton, a stop against which one carton edge may be rested, and an arm pivoted to move upwardly and toward the stop to advance the carton thereagainst with a pressure sufficient to force erection of the carton, the free end of the arm being provided with angled means engaging the proximate angled edge of the carton whereby to control its movements during erection, and means for moving the carton longitudinally in one direction between the stop and arm, said means being operable to permit movement of the carton in the opposite direction upon completion of said first movement.

LEON BENOIT.