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FEEDING OF COLLAPSED CARTONS AND THE LIKE

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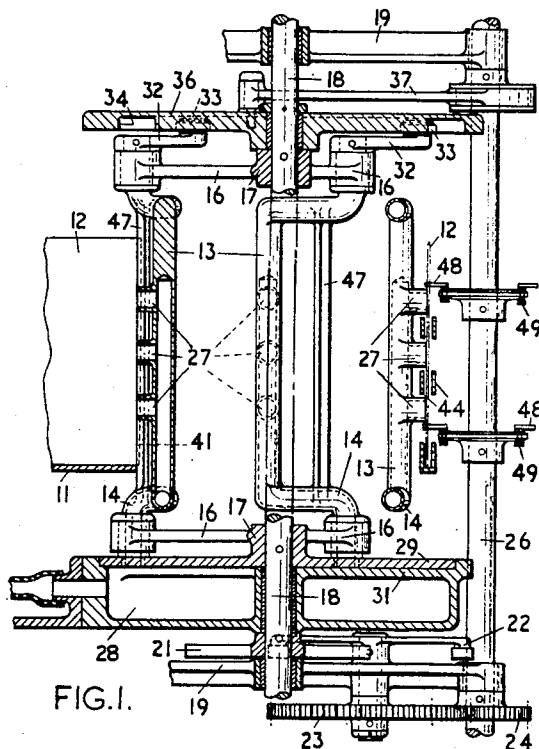


FIG. 1.

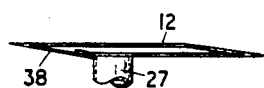


FIG. 3.

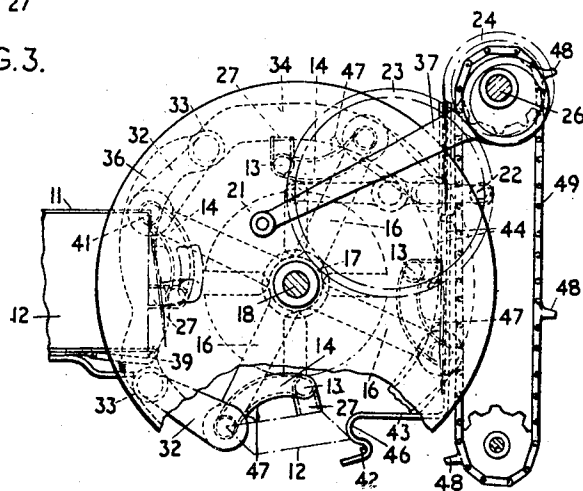


FIG. 2.

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## UNITED STATES PATENT OFFICE

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FEEDING OF COLLAPSED CARTONS  
AND THE LIKE

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5 Claims. (Cl. 93—53)

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This invention relates to the feeding of collapsed cartons and the like from a stack or pack to a forwarding device which forwards the cartons to an apparatus for operating on the cartons, e. g., a carton forming, filling and closing apparatus.

In feeding collapsed cartons to such an apparatus, it is found convenient at some stage of the feeding to break the longitudinal scores of the carton by first opening the carton and then collapsing it in the opposite direction, i. e., by causing three sides of the carton to pivot about the longitudinal score lines through 180 degrees.

According to the invention, collapsed cartons are fed in succession by withdrawing the leading carton from a stack or pack by suction applied at a position on one side of the longitudinal score line on that side of the carton so as to leave the portion of the carton on the other side of the score freely extending, and, while the carton is held by the suction, pivoting the extending portion about said score line through 180 deg. so as to cause the carton firstly to open and then collapse in the opposite direction.

Apparatus for feeding cartons in this manner may comprise a movable suction head adapted to seize the leading carton and move it so that the extending portion engages an opening member between which and the carton there is brought about a relative movement such that the extending portion is caused to pivot about the score line adjacent the suction head through 180 deg. further movement of the suction head carrying the carton to a forwarding device.

As applied to a carton forming, filling and closing apparatus, the suction head may be mounted on a rotatable member arranged for intermittent movement about a vertical axis to carry the suction head firstly to a seizing position adjacent a stationary pack of collapsed cartons standing on their ends, then to a score-breaking position and then to a delivery position.

Conveniently, a series of suction heads are mounted on a common rotatable suction device so that different operations can be performed at the same time on a number of cartons.

By way of example, the invention will now be described in greater detail with reference to the accompanying drawings, as applied to a carton-forming, filling and closing machine.

In the drawings:

Figure 1 is a sectional elevation of a carton-feeding apparatus.

Figure 2 is a plan of the apparatus shown in Figure 1, and

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Figure 3 is a diagram illustrating part of the action of the feeding apparatus.

Referring to the drawings, a carton magazine 11 containing a pack of collapsed cartons 12 is arranged adjacent a suction device, generally indicated by reference numeral 13, arranged for rotation about a vertical axis. The suction device consists of a series of suction arms 14 pivotally mounted on arms 16 of a pair of spiders 17 secured to a shaft 18 rotatably mounted in upper and lower members of a main framework 19. The shaft 18 is arranged for intermittent rotation by a Geneva wheel 21 secured to the shaft 18 and a crank 22 rotatably mounted in the framework 19 and driven by gearing 23, 24, by a driving shaft 26 rotatably mounted in the framework 19.

The suction arms 14 are each formed with a series of suction nozzles 27 which are metal faced and about one inch in diameter. Suction is applied to the nozzles 27 through the hollow interior of the arms 14 from a suction chamber 28 secured to the framework 19, the lower journals of the suction arms 14 passing through their bearings into a disc 29 secured to the lower spider 17 and rotatably mounted in the suction chamber 28. An inner wall 31 of the chamber 28 provides for the cutting off of the suction over the required period.

The suction arms 14 are provided at their uppermost extremities with extensions 32 each carrying a cam roller 33 arranged to run in a cam groove 34 formed in a cam member 36 freely mounted on the shaft 18 and arranged to be oscillated by a link 37 eccentrically mounted on the shaft 26, the arrangement being that the cam 36 makes one oscillation for each partial rotation of the Geneva wheel 21.

Upon rotation of the suction device 13 each suction arm is moved in succession to a seizing position adjacent the leading end of the pack of cartons 12, and the arms 14 are so arranged that, in seizing position, the nozzles 27 lie on one side of the longitudinal score line on that side of the carton so as to leave the portion 38 of the carton on the other side of the score line freely extending. The cartons 12 are arranged in the magazine 11 in such a manner that the edge of the over-lapping seam of the carton (which is co-incidental with the score line mentioned above) faces the nozzles 27 and acts as an abutment against which the nozzles tend to press during subsequent movement of the cartons by the suction arms 14 (see Figure 3).

As the leading arm 14 approaches the seizing

position, the cam 36 causes it to rock outwardly to clear the leading carton 12 and then inwardly to engage the carton. At this stage, the suction device 13 is momentarily stationary while the cam 36 is moving under the influence of the eccentric link 37 to cause the suction arm 14 to move inwardly away from the pack to withdraw the leading portion of the carton against the action of a yieldable stop 39. A further movement of the suction device 13 then takes place so that the nozzles 27 move in a direction transverse to the general direction of movement of the cartons 12 in the magazine 11. This action causes the suction arm 14 to slide the carton out of the pack against the action of a fixed stop 41, the overlapping seam of the carton acting as an abutment for the nozzles 27, as explained above. During continuance of this further movement of the suction device 13, the cam 36 causes the arm 14 to rock outwardly to cause the leading edge of the carton to pass into a recess 42 formed as a projection 43 from one of a pair of stationary guide rails 44, the edge of the carton reaching the recess as the suction device 13 once more stops under the action of the Geneva wheel 21. The cam 36 then causes the arm 14 again to rock inwardly to cause the portion 38 of the carton to strike an abutment 46 formed on the projection 43, such action causing the portion 38 to pivot about the scope line adjacent the nozzles 27, thus causing the carton to open as shown in Figure 2. The suction device is then caused to make a further movement, during which the pivoting action of the portion 38 continues so that the carton is first opened and then collapsed in the opposite direction. Stops 47 are formed on the arms 14 to support the face of the carton held by the nozzles 27 during the opening and closing action of the carton.

As the suction device 13 once more comes to rest, the leading edge of the carton is led between the guides 44, mentioned above, and the suction is cut off. The suction device 13 is then caused to make the final movement of the cycle during which the arm 14 is idle.

As the carton is led between the guides 44 by the arm 14 a projection 48 on a chain conveyor 49 moves into position behind the carton and feeds it forward towards a carton-filling and closing machine in well known manner.

We claim:

1. A carton feed comprising a holder for containing a pack of collapsed cartons, a rotatable suction member, a series of suction heads pivotally mounted on said suction member, driving means for rotating said suction member intermittently to carry the suction heads in turn firstly to a seizing station, then to an opening station and then to a delivery station, means for pivoting each suction head as it reaches the seizing station to cause it to seize and withdraw a carton from the pack, an abutment at the opening station, means for pivoting the suction head at the opening station to cause a relative movement between it and the abutment for the purpose of engaging a leading portion of a carton carried by the suction head and causing it to pivot through 180° thereby opening the carton and recollapsing it, and means at the delivery station for receiving the collapsed carton from the suction head.

2. A carton feed as in claim 1, wherein the means for pivoting the suction heads on the suction member comprises a cam member adapted to engage each of the suction heads and means for oscillating the cam to cause the pivotal movement of the heads at the seizing and opening stations.

3. A carton feed as in claim 2, and which includes a rotatable eccentric for oscillating the cam.

4. A carton feed as in claim 1, and which includes a conveyor for receiving the cartons at the delivery station.

5. A carton feed as in claim 1, and wherein the suction heads each comprise at least one metal faced nozzle of substantial diameter.

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