J. L. FERGUSON.

CARTON HANDLING APPARATUS.

APPLICATION FILED JAN. 14, 1921. RENEWED JUNE 13, 1922.

1,423,097. Patented July 18, 1922.

3 SHEETS—SHEET 1.

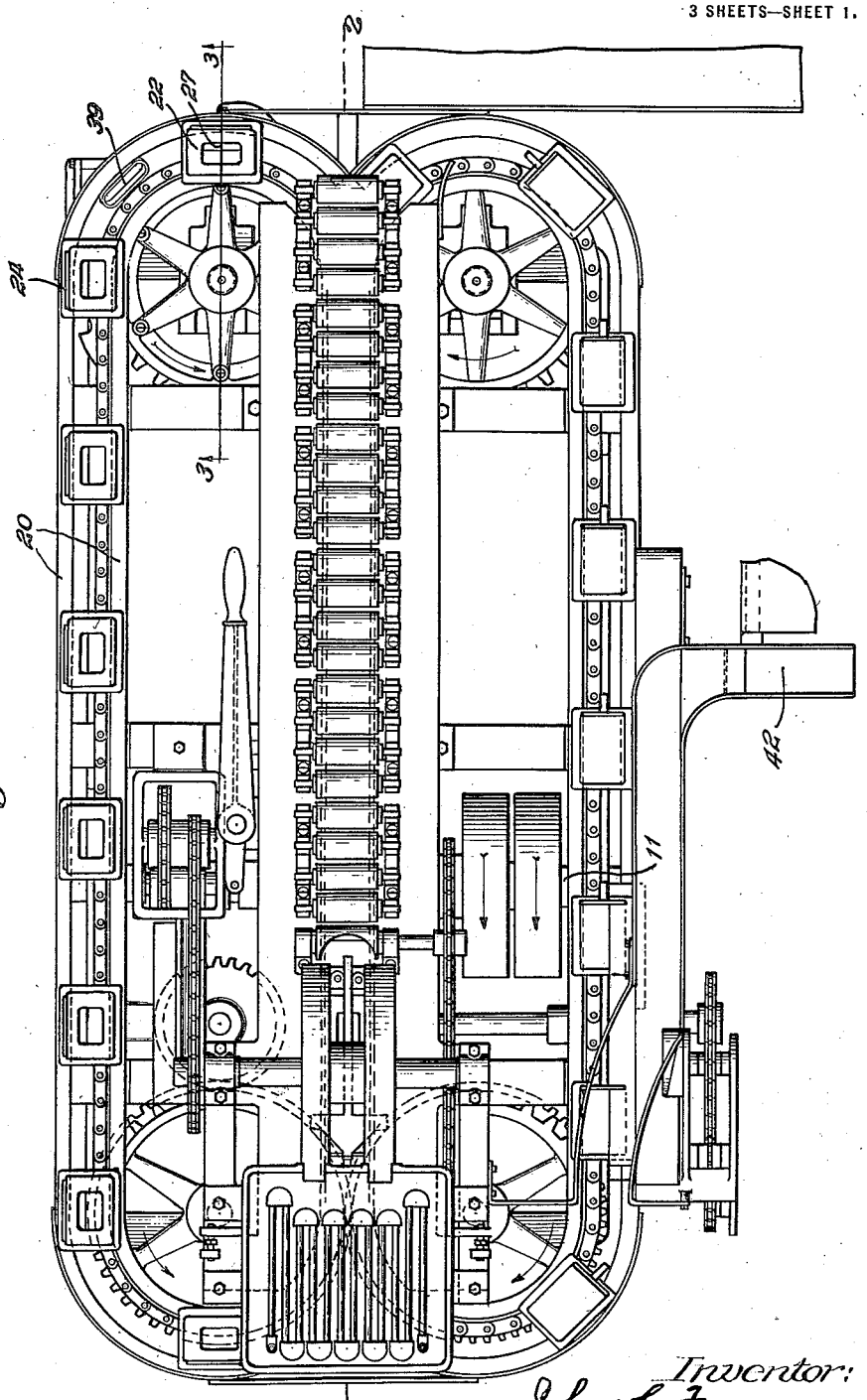


Fig. 1

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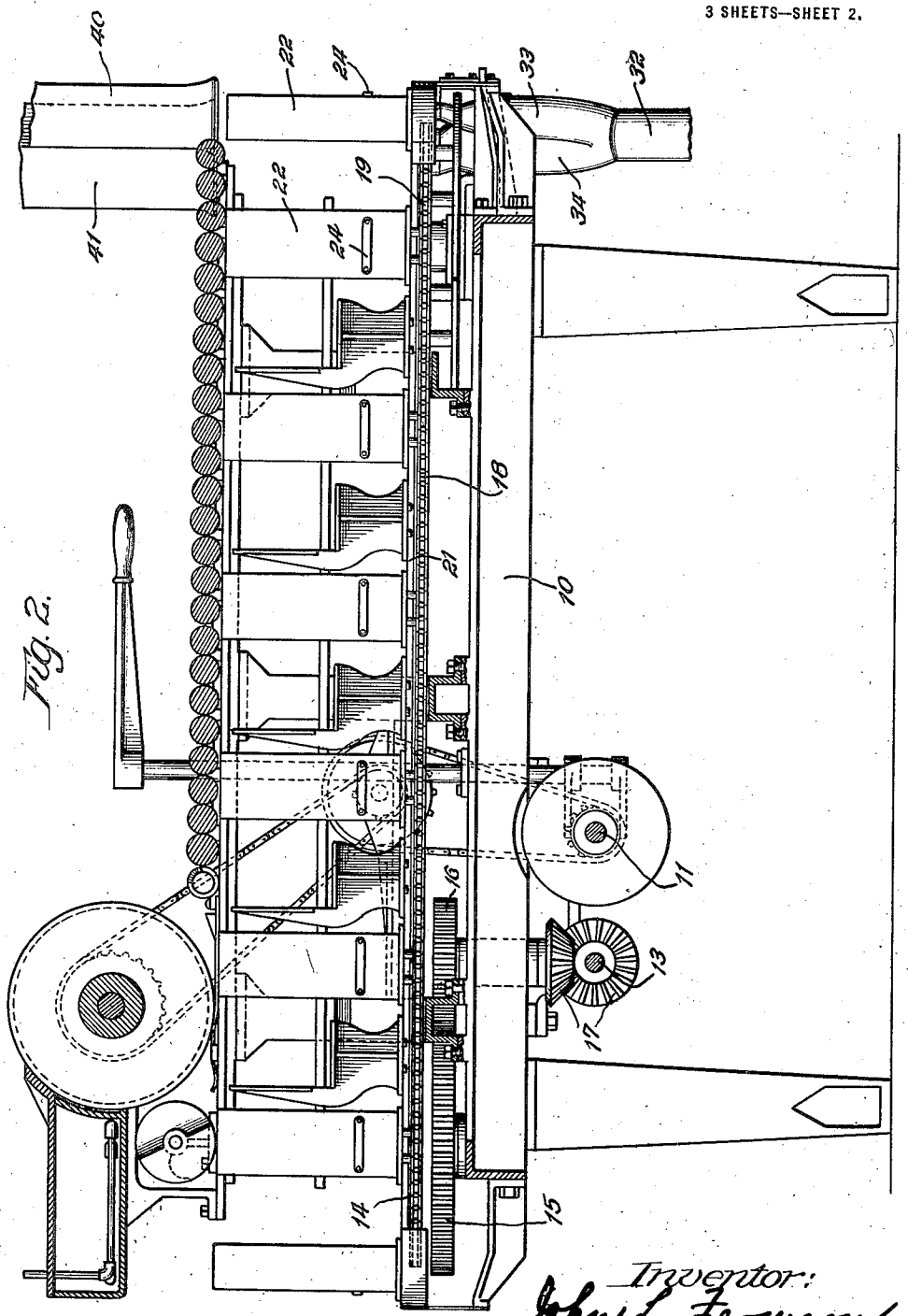


Fig. 2.

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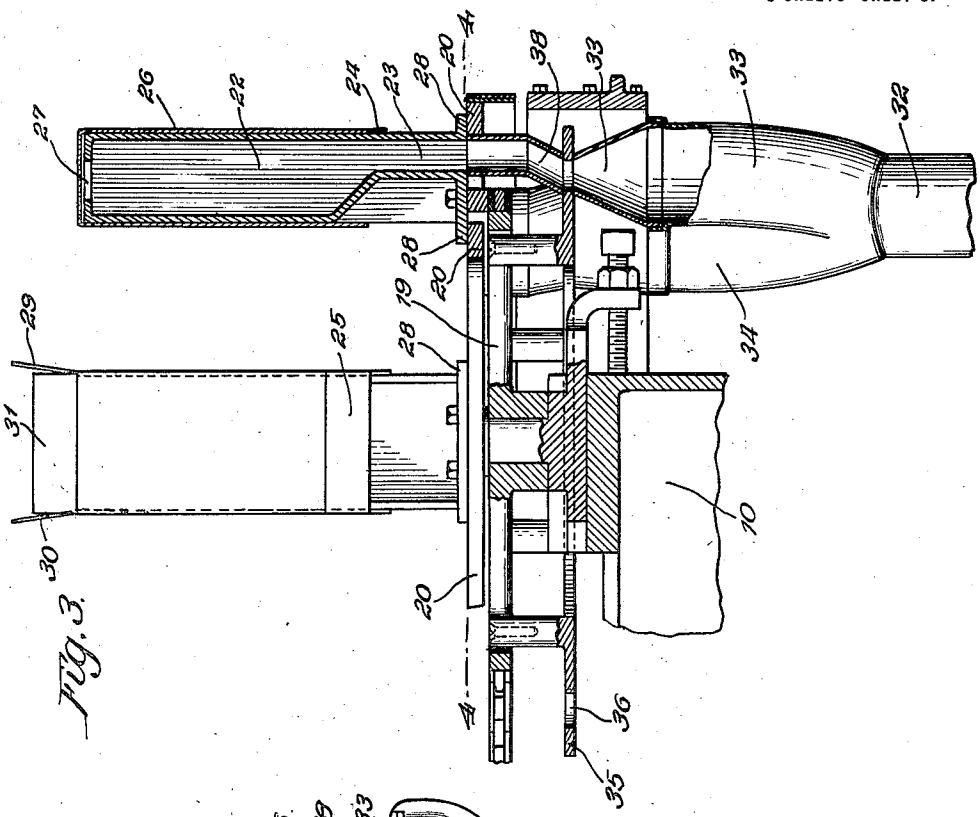


Fig. 3.

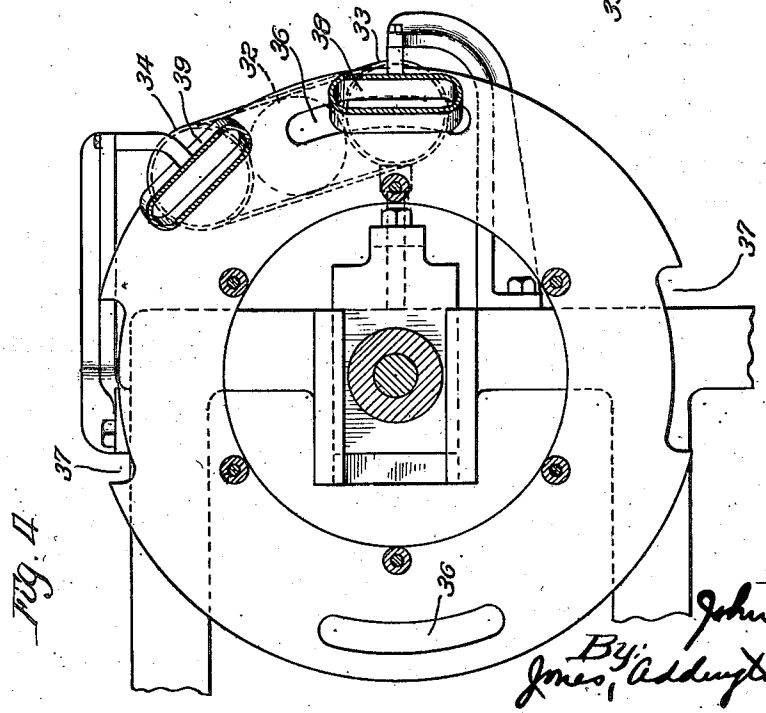


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN L. FERGUSON, OF JOLIET, ILLINOIS, ASSIGNOR TO THE QUAKER OATS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

CARTON-HANDLING APPARATUS.

1,423,097. Specification of Letters Patent. Patented July 18, 1922.

Original application filed August 29, 1913, Serial No. 787,371. Renewed July 16, 1919, Serial No. 311,381. Divided and this application filed January 14, 1921, Serial No. 437,319. Renewed June 13, 1922. Serial No. 567,974.

To all whom it may concern:

Be it known that I, JOHN L. FERGUSON, a citizen of the United States, residing at Joliet, in the county of Will and State of Illinois, have invented new and useful Improvements in Carton-Handling Apparatus, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to carton handling apparatus and it has particular relation to a pneumatically operated system wherein cartons may be transferred from one desired point to another, and deposited at the latter point in a predetermined position.

I will hereinafter describe my invention in connection with a carton handling and sealing machine which is more fully described and claimed in my co-pending application, originally filed August 29, 1913, Serial No. 787,371, renewed as Serial No. 311,381, on July 16, 1919, the present application being a division of said identified earlier application.

My invention embodies means whereby articles in this particular instance cartons are transferred pneumatically from one point to another and, in the particular machine hereinafter described and which was first disclosed in my above identified co-pending application, the cartons, which have had one end thereof closed, are positioned at one point in their travel over a nozzle from which issues air under pressure. The cartons are blown into a tube and after passing through said tube are deposited in proper position to be filled or otherwise treated, whence they are delivered to another conveyor and are again brought into operative relation with the carton handling and sealing machine.

In the particular embodiment of my invention hereinafter described, two tubes are provided and the mechanism controlling the carton blow-off is so adjusted that alternate cartons are deposited in the same tube whereby two filling or weighing machines may be continuously supplied with empty cartons, it being assumed that the cartons are supplied from the handling and sealing machine too rapidly for only one weighing and filling apparatus to accommodate the same. After the weighing and filling operation is completed the cartons are deposited on a conveyor which returns them to the sealing machine in a filled condition and ready for the sealing mechanism to act thereupon to close their open ends.

For a better understanding of my invention reference may be had to the accompanying drawings; in which,

Fig. 1 is a plan view of a carton sealing and handling machine with which my pneumatic carton-transferring mechanism is employed;

Fig. 2 is an elevational view on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional and elevational view of one end of the machine and illustrates more clearly the mechanism embodied in my invention, taken on line 3—3 of Fig. 1; and

Fig. 4 is a plan view taken on the line 4—4 of Fig. 3.

I will only briefly describe the machine as a whole, reserving the more detailed illustration for that portion thereof embodying the invention which is hereinafter claimed in this application, it being understood that the machine as a whole is more fully described in my co-pending application, above identified.

The machine includes a bed 10 supported on suitable legs, and carries bearings for a main drive shaft 11 which is driven from another suitable source of power. The shaft 11 drives, through gearing (not shown), a countershaft 13 from which the majority of the parts of the machine receive their motion.

Mounted so as to rotate in vertical bearings carried by the bed 10 is a vertical sprocket wheel 14. The shaft of said wheel 14 also carries a gear wheel 15 which meshes with a pinion 16 carried by a stub shaft, which latter shaft is driven, through beveled gearing 17, by the counter shaft 13. A sprocket chain 18 passes around the sprocket wheel 14 and around a second sprocket wheel 19, the latter being supported at the opposite end of the machine to the wheel 14. The sprocket chain 18 carries the supporting members for the empty cartons.

The bed 10 carries a pair of rails 20 which encloses between them that part of the sprocket chain 18 which is located at the outside of the machine and the end thereof. The body also carries a pair of rails 21 which enclose that part of the chain which is located at the center of the machine. As more fully described, in my above identified co-pending application, the rails 21 act in cooperation with the sprocket chain for the filled-carton chairs as well as with the sprocket chain 18 which carries the supports for the empty cartons.

The supports for the empty cartons are placed at equal distances along the sprocket chain 18. Each of these supports comprises a hollow stand 22 of such size that a carton will fit thereover and, as shown, said stand is provided with an inlet port 23 at its lower end. The stand 22 is also provided with a ledge or shoulder portion 24 which acts as a stop and upon which rests the edge of one of the side flaps 25 of a carton 26. The stand 22 has an aperture or port 27 formed at the top thereof whereby the carton is blown off said stand and upwardly when air under pressure is admitted through the port 23 into the interior of said hollow stand 22.

The stand 22 is provided at its bottom with side flanges 28 which rest upon, and are slidably supported by, the guides 20 or the guides 21, according to the position of the stand in the machine. It will be seen from the above, that, as the sprocket chain 18 travels in the direction indicated by the arrow, the stands 22 are carried first down the outside of the machine, and then through the center of the machine. As these stands pass down the outside of the machine, the empty cartons are placed thereon by hand, both ends of said cartons being open.

As the cartons are conveyed through the center of the machine, end flaps 29 and 30 at the top end of the cartons are folded down and side flaps 31 at the top of said cartons are folded down, the latter first having glue applied thereto as more specifically described in my above identified co-pending application.

In Fig. 3 I have shown a carton with the top side and end flaps in the position occupied thereby when the carton form is placed upon the stand 22. From this point the cartons are carried down the outside course of the conveyor (toward the left) and then through the center of the machine where the top gluing operation is perfomed. After the top end has been folded and glued, as just indicated, and prior to the stands passing around to the outside of the machine again, the cartons are blown off by the air under pressure which is admitted to the interior of the stand 22. The cartons then enter suitable chutes which serve to deliver them with their unsealed or open ends uppermost whereby material may be supplied thereto.

The manner in which the air pressure is supplied to the interior of the stands 22 will now be described. Mounted beneath the sprocket wheel 19 is a blower pipe 32 which is connected with a suitable source of air under pressure and which terminates adjacent said sprocket wheel, in a pair of nozzles 33 and 34. Said nozzles 33 and 34 are spaced apart a distance which is equal to half the distance between each of the stands 22 and, as shown most clearly in Figure 4, the nozzle 34 is positioned closer to the periphery of the sprocket wheel 19 than is the nozzle 33.

Secured to the sprocket wheel 19 and extending in a plane parallel to the face of said sprocket wheel is a disc valve 35 having formed therein a pair of valve apertures 36 which are adapted to register with the nozzle 33, and having a second pair of valve apertures 37, which latter are adapted to register with the nozzle 34, said latter apertures 37 being spaced equi-distantly between the apertures 36 but as shown in Fig. 4 being formed a greater radial distance from the center of the valve disc 35 than are the apertures 36.

Mounted above the disc valve 35 and with its lower end co-extensive and in registry with the nozzle 33, is a pipe 38, the upper end of which is so located that it registers with the ports 23 in the stands 22 as the latter pass above it. A pipe 39 is likewise provided, the lower end of which registers with the nozzle 34 and the upper end of which registers with the ports 23 of the stands 22 as the latter pass above it. Located above the pipes 38 and 39 are a pair of open ended chutes or tubes 40 and 41 respectively. It will be understood that said chutes reach to a suitable weighing or filling machine (not shown) and that the cartons, with one of their ends sealed, are projected into these chutes and, as indicated, will be delivered, with their open ends upward, to such a filling machine. After the packages are filled it is assumed, for purposes of convenience and illustration, that the filled cartons are placed upon another conveyor 42 by means of which they are delivered again to the sealing portion of the machine and their open ends sealed closed.

Having described one embodiment of my invention the operation thereof is substantially as follows:

The empty cartons, with their top ends sealed, are positioned on the stands 22 which are moved, as illustrated, from left to right. As one of said stands, carrying a carton with its top end sealed and positioned directly over the aperture 27, reaches a position in which the port 23 is in registry with the

pipe 38 the mechanism of the machine is so synchronized that one of the valve apertures 36 will be in registry with the nozzle 33, the other nozzle being closed by said disc valve. Inasmuch as a clear passage then extends from the nozzle 33 into the interior of the stand 22, the compressed air passes upwardly through the port 23 and into the interior of said stand, whereupon the carton is forcibly blown upwardly into the chute 40 and, since this chute is, of course, of such dimensions that the carton does not turn over therein, said carton is delivered to the weighing and filling machine with its open end upward.

However, it has been assumed that each filling and weighing machine can only take care of one-half of the cartons which are sealed by the mechanism hereinbefore indicated. Therefore, the next carton, which has been carried through the center of the machine and which has had its top end sealed, is projected into the other chute 41 and, as assumed, is delivered in proper position to another weighing machine. By this arrangement it will be seen that the mechanism of the package handling system is so arranged that no interruption is suffered by reason of the package sealing machine having a greater capacity than one package filling and weighing machine.

The projection of the last indicated package into the chute 41 is accomplished as follows: When the stand, next following that from which the carton has just been removed and projected into, the chute 40, reaches the pipe 38, the nozzle 33 will have been closed; but by the time this latter stand reaches the pipe 39 the nozzle 34 will have been opened, by reason of one of the ports 23 having come into registry therewith. The next carton, therefore, will be blown up into the chute 41.

It will be seen therefore, that the empty cartons, with their top ends sealed, are alternately blown off the stands into the chutes 40 and 41, and are thus delivered in proper position to the weighing and filling mechanism. From the latter they are returned to the machine via another conveyor 42, which is indicated in Fig. 1.

From the foregoing it will be evident to those skilled in the art that I have so arranged a pneumatically operated carton-transferring mechanism, that the cartons with the top ends thereof are sealed, are automatically removed from the stands upon which they are positioned and pneumatically carried to another point where they are deposited in the proper position for some other operation to be performed thereupon.

While I have illustrated and described but one embodiment of my invention it is apparent that many modifications therein may occur to those skilled in the art and I desire, therefore, that my invention be broadly interpreted and limited only by the showing of the prior art and by the scope of the appended claims.

Having thus described my invention what I now claim as new and desire to secure by Letters Patent is:

1. In a machine of the character described, carton supporting means, a driving member for moving said carton supports, a source of compressed air positioned to supply said air to remove said cartons from said supports, and means depending from said driving member comprising a member to open and close said compressed air source.

2. In a machine of the character described, a series of hollow carton supporting members provided with an aperture whereby each of said cartons may have air under pressure projected against its interior, driving means comprising a conveyor upon which said cartons are mounted and a sprocket wheel for moving said conveyor, an air supply line adapted to furnish air to the interior of said hollow supports, and a valve member mounted on, but spaced apart from, said wheel for opening and closing the entrance from said line into the interior of said supports.

3. In a machine of the character described, a series of hollow carton supports, driving means for said supports comprising a conveyor and a sprocket wheel driving the latter, said supports being mounted perpendicular to the face of said wheel, as air supply pipe, and means comprising a member carried by said sprocket wheel and adapted to be moved transversely across the end of said supply pipe whereby the air, supplied to the interior of said hollow supports, is regulated.

4. In a machine of the character described, supports for carrying cartons, carton-directing guideways, means for removing said cartons from said supports, projecting them through said guideways, and depositing them at a predetermined point, said means comprising an air line and valve devices for so connecting said air line to said carton supports that said cartons are, upon removal from the latter, directed into the several guideways in a predetermined sequence.

5. In a machine of the character described, supports for carrying cartons, propelling means for said supports, carton-directing guideways, means for removing said cartons from said supports, projecting them through said guideways, and depositing them at a predetermined point, said means comprising an air line and valve devices associated with said propelling means for so directing the air from said pipe to said supports that said cartons are, upon removal from the latter, directed alternately into the several guideways.

6. In a machine of the character described, supports for carrying cartons, a conveyor

carrying said supports and a wheel propelling said conveyor, carton-directing guideways, means for removing said cartons from said supports, projecting them through said guideways, and depositing them at a predetermined point, said means comprising an air line and a valve disc carried by said wheel and provided with apertures for so connecting said air line with said carton supports, that said cartons are, upon removal from the latter, directed into the several guideways in a predetermined sequence.

7. In a machine of the character described, supports for carrying cartons, means for propelling said supports comprising a wheel, carton-directing guideways, means for removing said cartons from said support, projecting them through said guideways, and depositing them at a desired point, said means comprising an air line adapted to be connected to said supports and a disc valve carried by said wheel and having apertures therein whereby said air line may be connected to alternate supports to blow the cartons thereupon into one guideway and may be connected to the other supports to blow the other cartons into another guideway.

8. In a machine of the character described, supports for carrying cartons, means for propelling said supports comprising a wheel, carton-directing guideways, means for removing said cartons from said supports, projecting them through said guideways, and depositing them at a desired point, said means comprising a branched air line adapted to be connected to said supports and a disc valve carried by said wheel and having apertures therein whereby one branch of said air line may be connected to alternate supports to blow the cartons thereupon into one guideway and whereby another branch of said line may be connected to the other supports to blow the other cartons into another guideway.

9. In a machine of the character described, supports for carrying cartons, means for propelling said supports comprising a wheel, carton-directing guideways, means for removing said cartons from said supports, projecting them through said guideways, and depositing them at a desired point, said means comprising an air line adapted to be connected to said supports and a disc valve mounted in a plane parallel to, and carried by, said wheel and having apertures therein whereby said air line may be connected to alternate supports to blow the cartons thereupon into one guideway and may be connected to the other supports to blow the other cartons into another guideway.

10. In a machine of the character described, supports for carrying cartons, means for propelling said supports comprising a wheel, said supports extending perpendicularly to the face of said wheel and the cartons being positioned thereupon with their closed ends upwards, carton-directing guideways, mounted above said carton supports, means for blowing said cartons off said supports upwardly into said guideways, the latter being so directed that the cartons are deposited, at a desired point, with their open ends upwards, said means comprising an air line adapted to be connected to said supports and a disc valve carried by said wheel and having apertures therein whereby said air line may be connected to alternate supports to blow the cartons thereupon into one guideway and may be connected to the other supports to blow the other cartons into another guideway.

11. In a machine of the character described, a series of carton supports, an air line, means embodying a wheel, for moving said supports, and a disc valve mounted on said wheel and adapted to connect said line to said supports.

12. In a machine of the character described, a series of carton supports, a branched air line, means embodying a wheel for moving said supports, and a disc valve mounted on said wheel and embodying means whereby one branch of said air line operates to blow the cartons from some of the supports and another branch thereof blows the cartons from other supports.

13. In a machine of the character described, a series of carton supports, a branched air line, means for moving said supports embodying a wheel, and a disc valve mounted on said wheel having apertures whereby one branch of said line furnishes air to blow the cartons from alternate supports and another branch thereof supplied air to blow the cartons from the supports intermediate said first named supports.

In testimony whereof, I have hereunto subscribed my name.

JOHN L. FERGUSON.