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MACHINE FOR COMPRESSING AND SUBSEQUENTLY PACKING COMPRESSIBLE ARTICLES SUCH AS PULP EGG TRAYS

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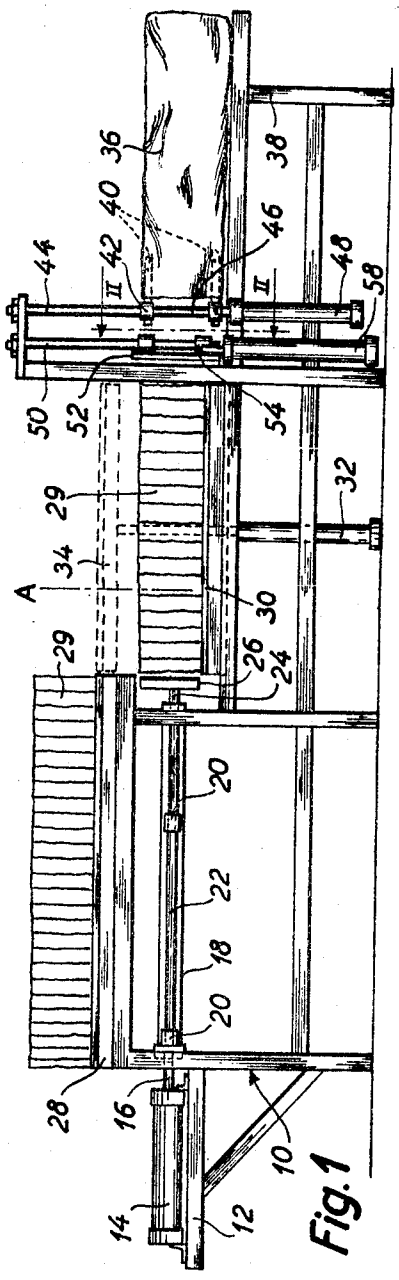


Fig. 1

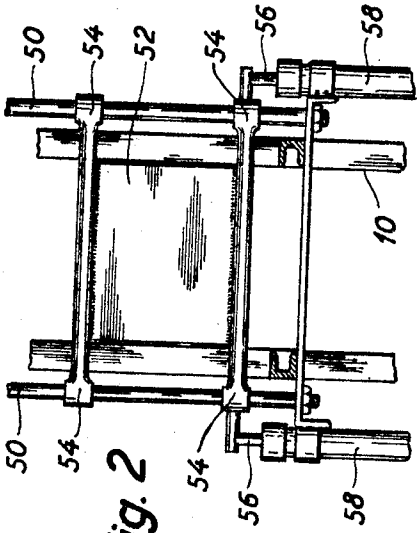


Fig. 2

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MACHINE FOR COMPRESSING AND SUBSEQUENTLY PACKING COMPRESSIBLE ARTICLES SUCH AS PULP EGG TRAYS

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The invention relates to a machine for compressing and subsequently packing compressible material or articles, such as pulp egg trays. The terms "material" and "articles" will be used interchangeably herein.

It is of considerable economic importance that the volume of a quantity of material when packed should be as small as possible, seeing that the costs of storage, transport, and packing of the material will thereby be reduced to the greatest possible extent. It is therefore the usual practice to compress compressible material, before it is packed for storage or transport.

The machine according to the invention comprises a substantially horizontal feed track for the articles as well as pushing members movable in a substantially horizontal direction and parallel to the feed track and being adapted to push the articles into an open package on a package holder, a transfer plate being provided at the end of the feed track, said plate being displaceable between a position wherein it is aligned with the feed track and a position where in it is aligned with the lowermost edge of the opening of a package on the package holder.

The known machines of the said type, however, are not provided with members for the compression of the compressible articles prior to the packing operation, but packing machines are also known, which compress the articles before they are packed; in such machines, however, the transfer plate is not displaceably but swingably mounted. When, in the case of such known machines, the articles are advanced on the feed track, a suitable quantity of articles is fed at intervals on to the swingable transfer plate. In order to make possible a compression of the articles, the plate with the articles resting thereon is swung into a vertical position, the articles being placed under compression members, which may e.g. be in the form of a pressure-medium cylinder with a movable piston, and which compress the articles. After compression the articles are returned to a horizontal position, being placed in front of the pushing members, which may then push them into an open package on the package holder. These known machines for compressing and subsequently packing compressible articles are subject to the disadvantage that automatic operation is difficult to achieve, as the articles can hardly be conveyed from the feed track to the vertical position under the compression members and back to a horizontal position in front of the pushing members without manual intervention.

An object of the invention is to provide a machine for compressing and subsequently packing compressible articles, which machine can easily be made to work automatically.

The machine according to the invention is characterized in that it is provided with an independently movable stop, which in a position on a level with the end of the transfer plate is able to follow the movement of same from its former to its latter position, and in that there are provided compression members, so disposed and arranged as to compress articles on the transfer plate against the movable stop.

By these means it is provided that the articles can be influenced by the compression members as well as the pushing members, while they are supported on the transfer plate in one of its ultimate positions. Thus transfer

of the articles to a vertical position during the compressing operation is avoided, and the movements of the machine thereby become so simple that by means of a suitable control system the machine can easily be made to work fully automatically or semi-automatically, whereby the manual operations necessary in the known machines are avoided. The independently movable stop may serve to support the articles during the displacing movement of the transfer plate, while the control system must be so adapted that the stop is moved away from its position opposite the opening of the packing prior to the actuation of the pushing members.

The compression members as well as the pushing members may consist of a pressure-fluid cylinder incorporating a movable piston member, and according to the invention the cylinders of the compression members and the pushing members may be in alignment, one cylinder being attached to the piston member of the other cylinder. It is thereby provided that during the compression as well as the pushing operations the articles on the transfer plate can be actuated by the same centrally disposed actuating member, since this member can be mounted on the piston rod for the cylinder nearest the transfer plate. The articles will thus be subjected to a central pressure during both of the said operations.

One embodiment of the invention will be described hereinafter in more detail, reference being made to the drawing.

FIG. 1 shows schematically a side view of a machine for compressing and subsequently packing pulp egg trays, and

FIG. 2 is a cross section view on the line II—II in FIG. 1.

The machine has a frame **10** in the form of a framework substantially constructed of sectional iron. At the left-hand side of the frame a bracket **12** is provided, a horizontal pneumatic or hydraulic cylinder **14** being mounted on said bracket. This cylinder has a movable piston rod **16**, to one end of which another horizontal pneumatic or hydraulic cylinder **18** has been attached. The cylinder **18** is so mounted as to be displaceable in horizontal direction, being attached at either side to guide sleeves **20**, which are slidable on guide rods **22**, horizontally mounted in the frame **10** and disposed on either side of the cylinder **18**. The cylinder **18** has a movable piston rod **24**, to the free end of which a vertical push plate **26** has been attached.

A feed track **28** is provided on the top of the machine, permitting a row of upright pulp egg trays **29** to be advanced thereon. The feed track may e.g. be in connection with the discharge end of a production machine.

Furthermore, a horizontal transfer plate **30** is provided in the machine, said plate being movable by means of a pneumatic or hydraulic cylinder **32**, attached to the machine frame, between the position shown with solid lines and a position **34**, indicated in FIG. 1 with dotted lines.

In its lowermost position the transfer plate **30** is aligned with the lowermost edge of the opening in a paper bag **36**, which is placed horizontally on a table **38**, and which is kept distended by means of two distending plates **40**, the lowermost one being mounted in fixed relation to the frame **10**, and the uppermost plate being displaceable in vertical direction, as at both sides it is attached to guide sleeves **42**, which are slidable on vertical guide rods **44**, placed on either side of the distending plates. The uppermost one of the distending plates **40** is connected with a vertically movable piston rod **46** for a pneumatic or hydraulic cylinder **48**, attached to the frame **10**.

Two vertical guide rods **50** are attached to the frame **10** between the transfer plate **30** and the distending plates **40**, see FIG. 2, and a vertical stop plate **52** is displace-

ably mounted on said rods, to which plate there are attached guide sleeves 54, which are so mounted as to be slidable on the guide rods 50. The lowermost two guide sleeves are connected with respective piston rods 56, which can be moved in vertical direction, and which are placed in their respective pneumatic or hydraulic cylinders 58.

All the pressure-medium cylinders in the machine are double-acting and coupled to a pneumatic or hydraulic control system, not shown.

When the transfer plate 30 is in its uppermost position, the stop plate 52 is placed at the end thereof in the same level, and a suitable number of the egg trays 29 on the feed track 28 can be pushed on to the transfer plate automatically or manually. Following this, the control system of the machine causes the transfer plate 30 and the stop plate 52 to be lowered simultaneously to their lowermost positions by means of the cylinders 32 and 58, respectively, the stop plate acting as a support for the upright egg trays. In the said lowermost position shown in FIG. 1 the top plate 52 covers the opening in the paper bag 36, which is kept distended by the plates 40. The control system will now activate the cylinder 14, so that the piston rod 16 and consequently the cylinder 18 and the push plate 26 are moved in the direction of the egg trays 29 on the transfer plate through such a distance that the push plate e.g. arrives at the position A, FIG. 1. During the advance of the push plate the egg trays will then be compressed between the push plate 26 and the stop plate 52. The push plate is now returned being actuated by the the cylinder 14, and the cylinders 58 thereupon actuate the stop plate 52, so that it is moved upwardly relative to the transfer plate 30 and to its uppermost position, in which the opening in the bag 36 is uncovered. The control system of the machine now causes the push plate to advance again, this time being actuated by the cylinder 18. The stroke of the piston rod 24 has such a length that the compressed egg trays 29 on the transfer plate 30 are pushed into the distended paper bag 36 by the push plate 26.

The filled package can now be taken away, the movable distending plate 40 being actuated by the cylinder 48 and moved downwardly, and a new empty paper bag can be placed on the distending plates. Now the cylinder 32 moves the transfer plate 30 to its uppermost position, and the machine is then ready to repeat the operation described in the foregoing.

What I claim is:

1. A machine for compressing and subsequently packing compressible articles such as pulp egg trays, said machine comprising substantially horizontal feeding means for the articles, package holding means for holding a package in its open state, a transferring member being provided at the end of the feeding means, and being displaceable between a position, wherein it is aligned with the feeding means, and a position, wherein it is aligned with the lowermost edge of the opening of said package on the package holding means, a stop member being movable to and away from a position at the end of the transferring member in the latter position of said member, compression and pushing means being adapted to compress articles on the transferring member against the movable stop member when the transferring member is in its said latter position, and said compression and pushing means being movable so as to push the compressed articles from the transferring member in its latter position into said open package on said package holding means, when the stop member has been brought away from its position at the end of the transferring member.

2. A machine for compressing and subsequently packing compressible articles such a pulp egg trays, said machine comprising substantially horizontal feeding means for the articles, package holding means for holding a package in its open state, said holding means being longitudinally spaced from and placed in a level different from that of the feeding means, a transferring member being provided at the end of the feeding means, and being displaceable in a vertical direction between a position, wherein it is aligned with the feeding means, and a position, wherein it is aligned with the lowermost edge of the opening of said package on the package holding means, a stop member being movable to and away from a position at the end of the transferring member in the latter position of said member, compression and pushing means being adapted to compress articles on the transferring member against the movable stop member when the transferring member is in its said latter position, and said compression and pushing means being movable so as to push the compressed articles from the transferring member in its latter position into said open package on said package holding means, when the stop member has been brought away from its position at the end of the transferring member.

3. A machine as defined in claim 2, in which the transferring member is a plate member mounted in the spacing between the feeding means and the package holding means and said plate member is displaceable vertically by means of a vertically mounted pressure-fluid cylinder.

4. A machine for compressing and subsequently packing compressible articles such as pulp egg trays, said machine comprising substantially horizontal feeding means for the articles, package holding means for holding a package in its open state, a transferring member at the end of the feeding means, said transferring means being displaceable between a position wherein it is aligned with the feeding means and a position wherein it is aligned with the lowermost edge of the opening of said package on the package holding means, a stop member being movable to and away from a position at the end of the transferring member in the latter position of said member, a compression and pushing member being actuated by a pressure-fluid cylinder and adapted to compress articles on the transferring member against the movable stop member when the transferring member is in its said latter position, and said compression and pushing member being movable by means of a second pressure-fluid cylinder so as to push the compressed articles from the transferring member in its latter position into said open package on said package holding means when the stop member has been brought away from its position at the end of the transferring member.

5. A machine as defined in claim 4, in which the cylinders of the compression and pushing member are in alignment, one cylinder being attached to the piston member of the other cylinder.

6. A machine for compressing and subsequently packing compressible articles such as pulp egg trays, said machine comprising substantially horizontal feeding means for the articles, package holding means for holding a package in its open state, said holding means being longitudinally spaced from and placed in a level different from that of the feeding means, a transferring member being provided at the end of the feeding means, and being displaceable in a vertical direction between a first position, wherein it is aligned with the feeding means, and a second position, wherein it is aligned with the lowermost edge of the opening of said package on the package holding means, a stop member at the end of the transferring member being movable together with the said transferring member from its first to its second position, and independently of the transferring member from the second to the first position, and compression and pushing means being adapted to compress articles on the transferring member against the movable stop member when the transferring member is in its second position, said compression and pushing means being movable so as to push the compressed articles from the transferring member in its second position into said open package on said package hold-

ing means when the stop member has been independently moved to the said first position.

7. A machine as defined in claim 6, in which the stop member comprises a vertical plate and said verticle plate is movable along vertical guiding rods and is actuated by pressure-fluid cylinders.

8. A machine for compressing and subsequently packing compressible articles such as pulp egg trays, said machine comprising substantially horizontal feeding means for the articles, package holding means for holding the package in its open state, said holding means being longitudinally spaced from and placed in a level below that of the feeding means, a transferring member, between the feeding means, and the package holding means, said transferring member being displaceable in a vertical direction between a first position wherein it is aligned with the feeding means and a second position wherein it is aligned with the lowermost edge of the opening of said package on the package holding means, means comprising a pressure-fluid cylinder to actuate said transferring member, a stop member at the end of the transferring member being movable together with the transferring member from its first to its second position and independently of the transferring member from the second to the first position, means comprising a pressure-fluid cylinder to actuate said stop member, a compression and pushing member adapted to compress articles on the transferring member against the movable stop member when the transferring member is in its second position, means comprising a pressure-fluid cylinder to actuate said compression and pushing member during its compression stroke, said compression and pushing member being also movable so as to push the compressed articles from the transferring member in its second position into said open package on said packing holding means when the stop member has been independentlty moved away from said second position, and means comprising a pressure-fluid cylinder to further actuate said compression and pushing member in said pushing movement, said cylinders actuating the compression and pushing member being in alignment wih one another, one of said cylinders being attached to the piston member of the other cylinder.

9. A machine as defined in claim 8, in which the pressure-fluid cylinders for the transferring member, the stop member, the compression and pushing member are connected to a control system for controlling the mutual movements of said members.

10. A machine for compressing and subsequently packing compressible material, said machine comprising in combination feeding means for feeding said material and having a delivery end, package holding means for holding a package in its open state, said package holding means being placed in spaced relationship to said delivery end of said feeding means and out of alignment therewith, transferring means for transferring said material from said feeding means to said package, said transferring means being movable between a first position in which said transferring means is approximately aligned with said feeding means and a second position in which said transferring means is out of alignment with said feeding means and is adjacent to the open end of said package, means for moving said material from said feeding means to said transferring means in said first position thereof, stop means movable between a package opening blocking position and a non-blocking position when said transferring means is in its second position, means movable towards said stop means in its blocking position and in a path substantially coincident with said material on said transferring means in the second position thereof as to compress said material against said stop means in its blocking position and to subsequently pack said compressed material by pushing it from said transferring means into said package when said transferring means is in its second position.

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