

Jan. 6, 1970

F. BRINKMEIER

3,488,693

BAG-MAKING MACHINE

Filed Feb. 26, 1968

5 Sheets-Sheet 1

FIG. 1

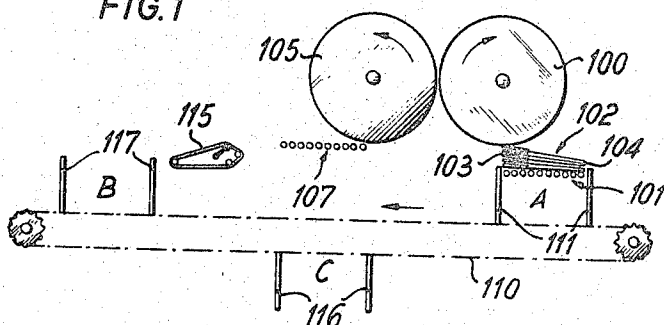


FIG. 2

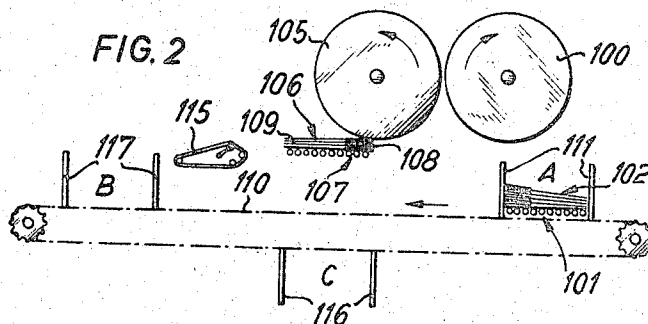
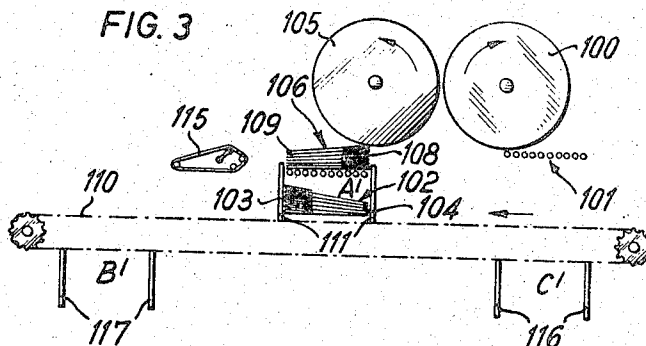


FIG. 3



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FIG. 4

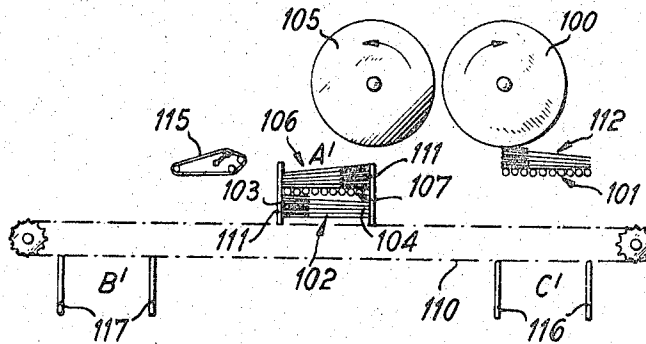
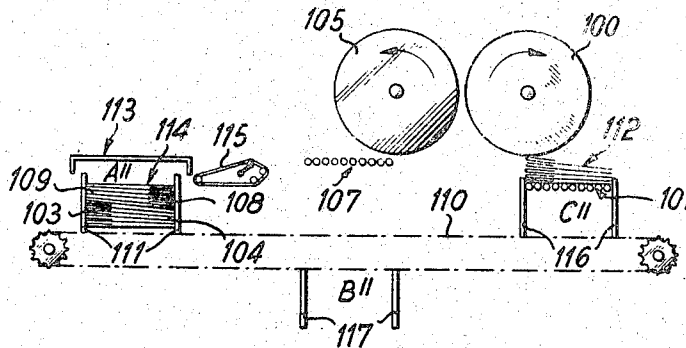


FIG. 5



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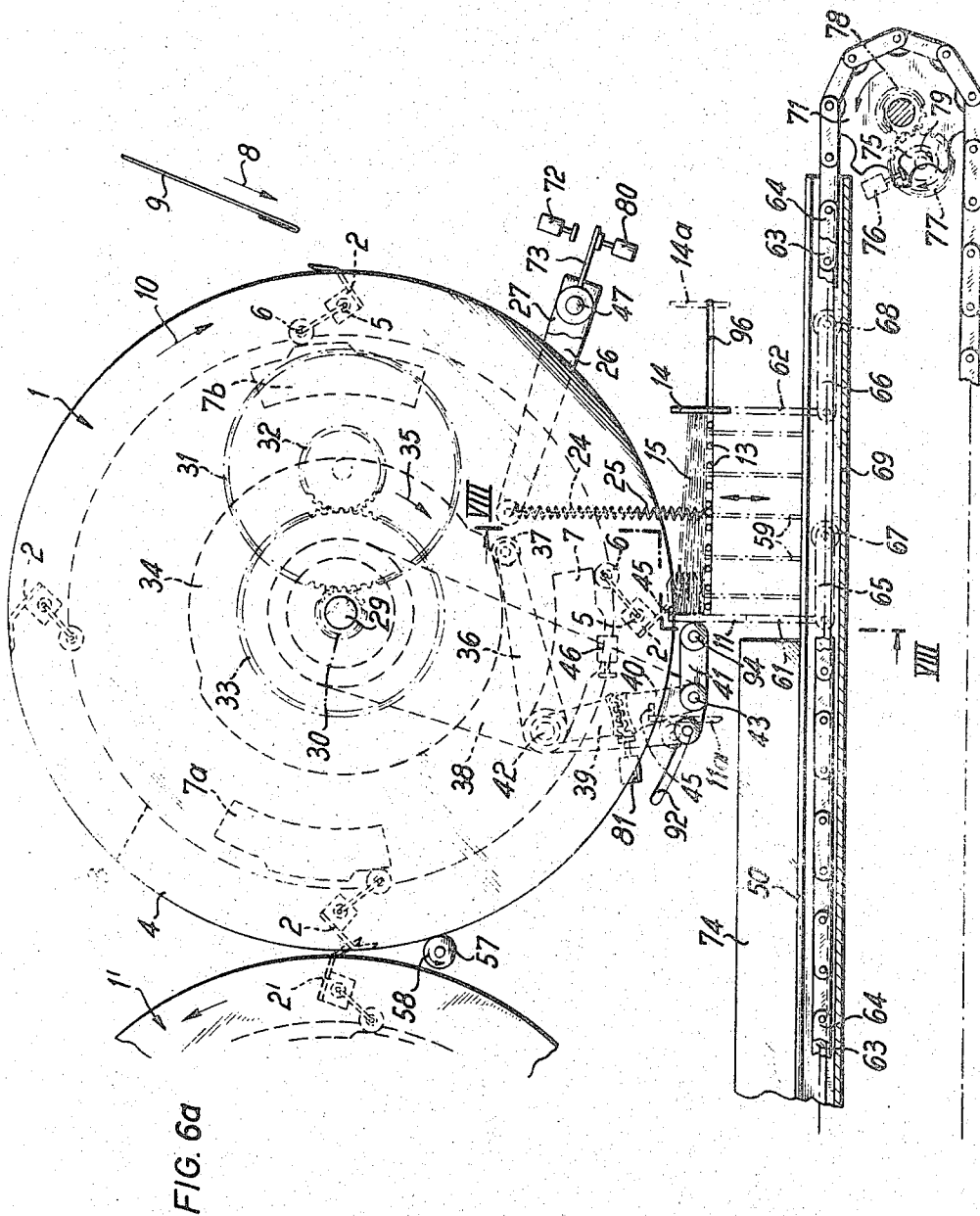
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BAG-MAKING MACHINE

Filed Feb. 26, 1968

5 Sheets-Sheet 3



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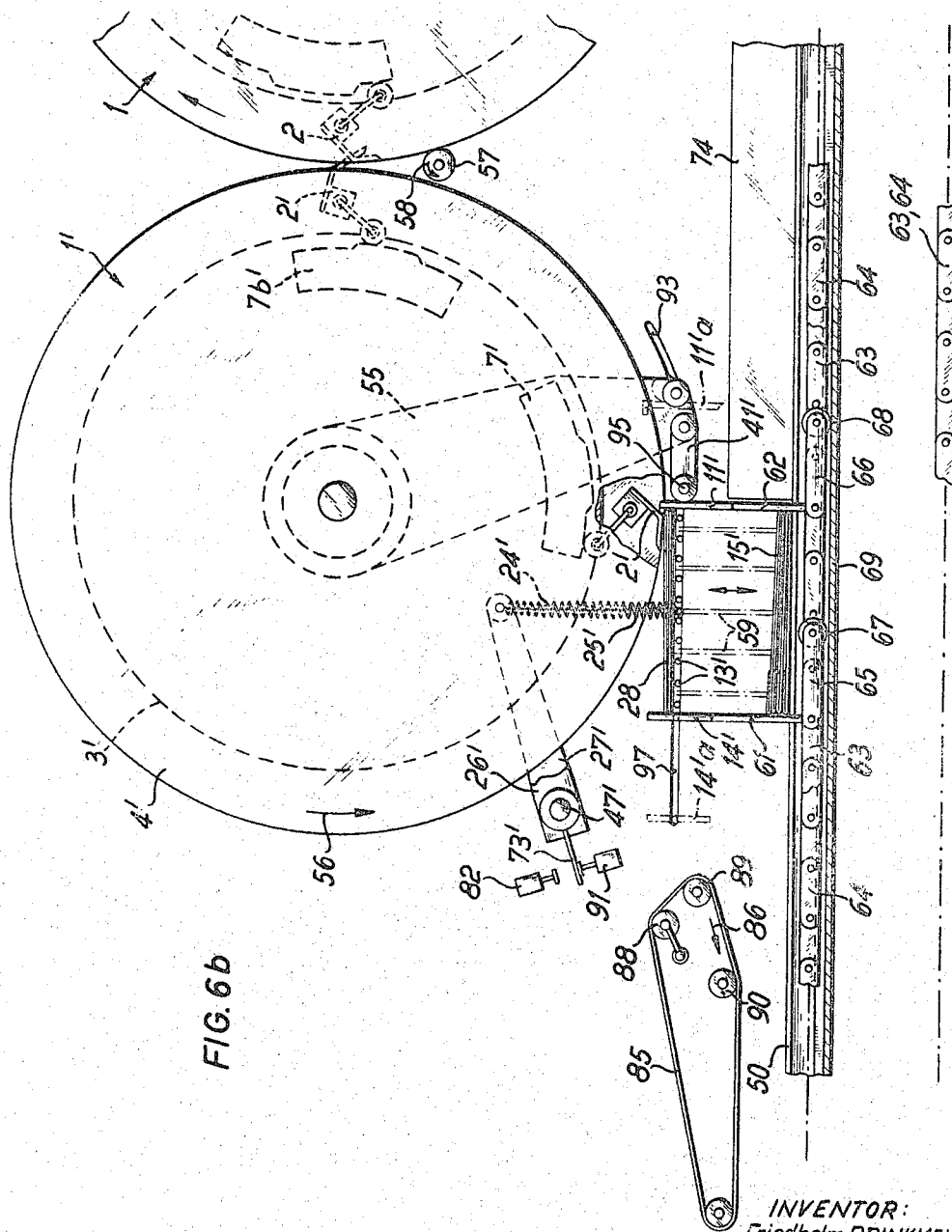
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BAG-MAKING MACHINE

Filed Feb. 26, 1968

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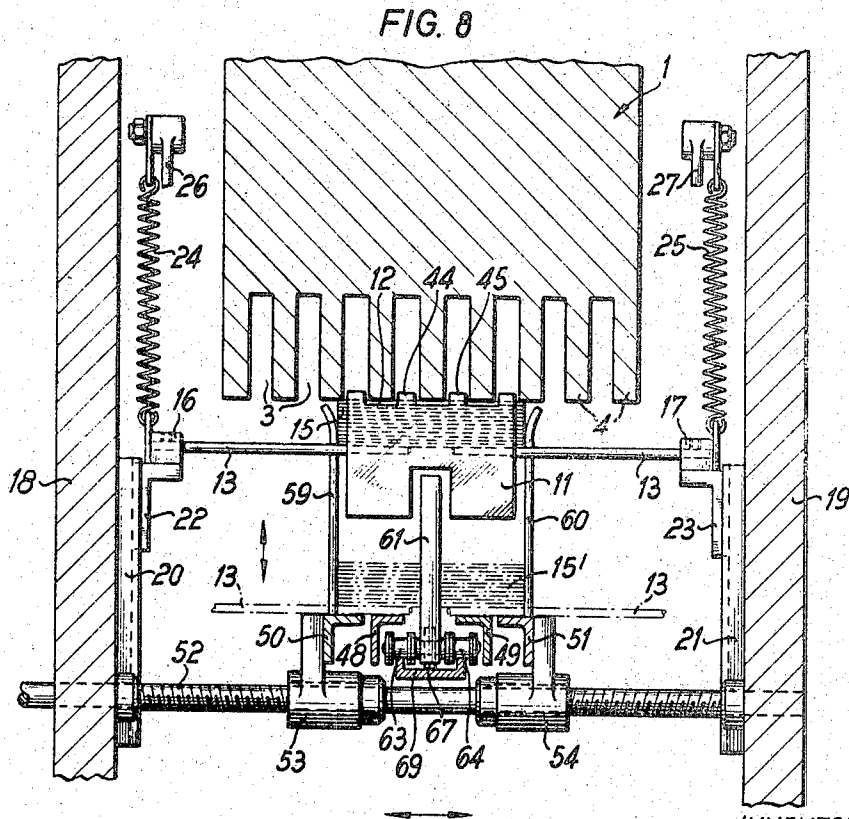
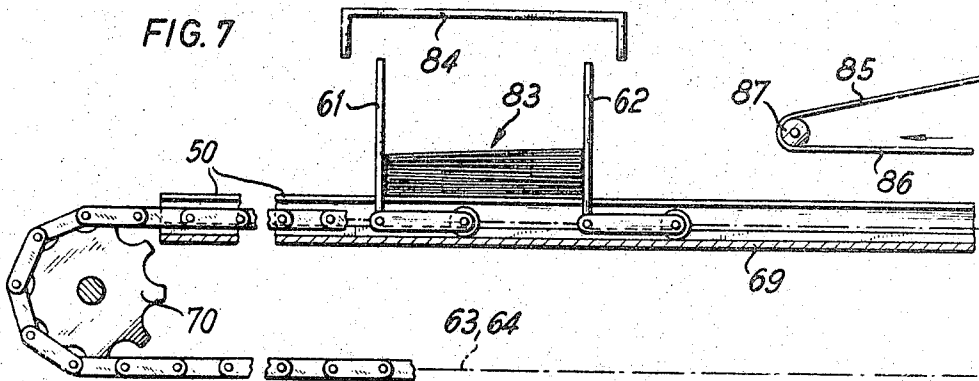
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3,488,693

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5 Sheets-Sheet 5



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3,488,693

BAG-MAKING MACHINE

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Claims priority, application Germany, Mar. 22, 1967,

W 43,622

Int. Cl. B65g 97/16; B65h 29/06

U.S. Cl. 214—6.5

9 Claims

ABSTRACT OF THE DISCLOSURE

A delivery station for use with bag-making machines for making bags which are open at one end or have a flattened bottom comprises two receiving stations having parallel receiving surfaces, means for delivering bags selectively to the two receiving stations and for turning the bags to be delivered to one of the two receiving stations through 180° about their transverse center line relative to the bags delivered to the other receiving station, means for changing the delivery from one of the receiving stations to the other when a predetermined number of bags have been delivered, means for superimposing the stacks formed at the two receiving stations, and a conveyor for conveying the resulting composite stack.

This invention relates to a bag-making machine for making bags which are open at one end or have a flattened end portion. The invention relates more particularly to the delivery station of such machine. In a known paper bag-making machine comprising a delivery device for delivering a predetermined number of open-topped bags so as to form a stack, a delivery drum is equipped with grippers, which for the delivery of the bags open in such a manner that the bags are placed vertically on a receiving table (German patent specification 617,588). When a predetermined number of bags have been delivered, fingers cooperating with the delivery drum are extended to displace one or more bags out of the series of stacked bags so that the same is divided into individual stacks by the displaced bags, which indicate a predetermined number of bags. In the known bag-making machine the individual stacks are removed by hand. When it is desired to form a stack in the form of a parallelepiped from the bags having a flattened bottom end, it is not sufficient simply to superimpose the individual stacks. As the bottom ends of all bags in the series of stacked bags rest on the receiving table, the individual stacks or a plurality of superimposed horizontal individual stacks would assume the form of wedges so that a satisfactory stack could not be formed. In the operation of the known device, a combined stack is formed in that the individual stacks are superimposed in such a manner that adjacent individual stacks in the combined stack are relatively offset 180° with respect to their horizontal transverse center line so that the stack assumes exactly the form of a parallelepiped.

The output of bag-making machines has been so strongly increased recently that it is very difficult for the operators to remove and stack the bags in the manner which has been described hereinbefore. In a constricted space, it is often impossible to use additional operators; this may also be uneconomical owing to the high cost of labor.

It is an object of the invention to facilitate the work of the operators at delivery devices of bag-making machines and to save labor. More specifically, it is an object of the invention to provide a bag-making machine in which the delivery of the bags is automatic in a high

degree and performed in such a manner that parallelepipedic stacks can readily be removed from the delivery device.

The object is accomplished according to the invention in that the delivery station comprises two receiving stations having parallel receiving surfaces, means for delivering bags selectively to the two receiving stations and for turning the bags to be delivered to one of the two receiving stations through 180° about their transverse center line relative to the bags delivered to the other receiving station, means for changing the delivery from one of the receiving stations to the other when a predetermined number of bags have been delivered, means for superimposing the stacks formed at the two receiving stations, and a conveyor for conveying the resulting composite stacks. The use of the delivery station according to the invention results in exactly parallelepipedic composite stacks because the lower end of one stack formed by the open ends of the bags is laid on that end of the other stack which is higher because it is formed by the closed bottoms of the bags when the two stacks are combined. The bag-making machine according to the invention eliminates the need for a turning of the individual stacks relative to each other by the operators to form parallelepipedic composite stacks of open-topped bags. The delivery operation is highly automatic so that the capacity of a modern bag-making machine can be fully utilized.

In a development of the invention, the delivery and turning means may consist of two delivery cylinders, which rotate in opposite directions about parallel axes and are associated with respective receiving stations, said delivery cylinders alternating in delivering a predetermined number of bags to the respective receiving stations. The first delivery cylinder may be arranged to receive all bags, and its grippers can be controlled in such a manner in this case to selectively deliver bags to the receiving station associated with this cylinder or to transfer the bags to the second delivery cylinder.

Each receiving station comprises desirably a vertical stop plate for exactly aligning the bags and a carrier having a horizontal surface, on which the bags are delivered which have been moved as far as to the stop plate. In a development of the invention, each carrier may have a central slot extending in the direction in which the bag stacks are removed and vertically extending, movable shifting flights may be movable in the slots to convey the stacks. It is also desirable according to the invention if every carrier is adapted to be lowered when it was received a stack consisting of the predetermined number of bags, the shifting flights extend through the slot of the carrier when the latter is in its lower position, and the stop plate extends from the periphery of the cylinder to the carrier in the upper position of the latter. This will ensure that the individual stacks will be satisfactorily formed when the carrier is in its upper position and that the stop plate will not obstruct the conveyance of the stack by the shifting flights when the carrier is in the lower position. The measures which have been described also enable a lowering of the individual stack formed at the first receiving station and a movement of said stack under the individual stack being formed on the second carrier when no bags are being delivered to the first receiving station.

Each stop plate may have teeth, which in the vertical position of the plate extend with a clearance into grooves of the associated delivery cylinder to prevent an inadvertent transfer of bags to the second delivery cylinder. When the bags are to be transferred to the second cylinder, the stop plate is moved out of the grooves of the first cylinder. It is also desirable if the stop plates of both receiving stations are formed on the underside with re-

cesses, which form passages for the upper ends of the shifting flights.

According to the invention, pressure belts may be provided over the stack conveyor between the second receiving station and the station for removing the complete parallelepipedic stacks and these pressure belts may compress the two component stacks from above. It is also desirable according to the invention if the lower ends of the shifting flights are pivoted on chain pins of revolving conveyor chains and are provided with right-angled levers extending opposite to the direction of movement and supported throughout the path of the shifting flights by rollers carried by stationary guide rails so that the shifting flights are held in their vertical position. In this design, the guide rails may be dimensioned so that the shifting flights are swung rearwardly at any desired point while the levers carrying the rollers are pivoted downwardly. As a result, the stacks can be deposited at the desired point even if the movement of the shifting flights is continued when they are in an inoperative position.

The invention will be explained more fully hereinafter with reference to the drawing, in which:

FIGS. 1 to 5 are diagrammatic views showing the various phases of the operation of the apparatus according to the invention,

FIGS. 6a and 6b are diagrammatic side elevations showing partly in section and by way of example an embodiment of the apparatus according to the invention. Parts which are not important for an understanding of the invention are omitted,

FIG. 7 shows the removing station of the apparatus of FIG. 6, and

FIG. 8 an enlarged sectional view taken on line VII—VIII in FIG. 6a.

Bags which are open at one end are fed from a bag-making machine to a first delivery cylinder 100 and collected on a receiving station 101 to form a stack 102 consisting of a predetermined number of bags. The bottoms of all bags are disposed at the end 103 of the stack 102 so that this end is higher than the opposite end 104 and the stack 102 assumes the shape of a wedge.

When the stack 102 contains the predetermined number of bags, additional bags supplied from the bag-making machine are fed to the second delivery cylinder 105 and delivered by the latter to a receiving station 107 to form a second stack 106 having the same number of bags as the stack 102. During this operation the bags fed to the delivery cylinder 105 are turned 180° about the transverse center line of each bag relative to the attitude of the bags in the stack 102 so that the higher end 103 of the stack 106 formed by the superimposed bottoms of the bags of the stack 106 is opposite to the higher end 103 of the stack 102. The same remarks apply to the lower ends 109 and 104 of the stacks 106 and 102, respectively.

When the formation of the stack 106 on the receiving station 107 is initiated, the completed stack 102 is lowered to a lower plane by the receiving station 101 (FIG. 2) and is then moved by a shifting device 111 under the receiving station 107 and the stack 106 (FIG. 3). The shifting device 111 is secured to a conveyor which revolves in the direction of the arrow and consists, e.g., of chains 110. The higher end 103 of the stack 102 is now under the lower end 109 of the stack 106, and the lower end 104 of the stack 102 is under the higher end 108 of the stack 106.

The revolving movement of the chains 110 is terminated as soon as the shifting device 111 has reached the position shown in FIG. 3. At the same time, the receiving station 101 returns from its lower position (FIG. 2) to a position in which it is ready to receive a new stack of bags (FIG. 3).

When the desired number of bags have been combined in stack 106, the same is lowered by means of the receiving station 107 on to the stack 102. The receiving

station 107 slightly compresses the higher end 103 of the stack 102 so that a compact stack is obtained (FIG. 4). Additional bags are not supplied to the delivery cylinder 105 when the stack 106 has been completed. The subsequently arriving bags are delivered by the delivery cylinder 100 to the receiving station 101 to form a further stack 112, which corresponds to the stack 102 (FIG. 4).

When the stack 112 is being formed under the delivery cylinder 100 and the stack 106 has reached the position shown in FIG. 4, the revolving movement of the chains 110 is resumed so that the shifting device 111 moves the stack 106 out of the receiving station 107 and jointly moves the stacks 102 and 106 to a removing station 113. The chains 110 are then stopped. During this operation, the stacks 102 and 106 are combined in a composite stack 114 (FIG. 5) as soon as the stack 106 has left the receiving station 107. The higher end 108 of the stack 106 lies on the lower end 104 of the stack 102 and the lower end 109 of the stack 106 lies on the higher end 103 of the stack 102. The snug contact of the higher end 108 of the stack 106 on the lower end 104 of the stack 102 is promoted in that the composite stack 114 moving to the removing station 113 passes under pressure belts 115, by which vertical pressure is applied to the top of the stack 114 so that the two component stacks 102 and 106 are combined in a compact composite stack 114. As has been mentioned hereinbefore, the stacks 102 and 106 contain the same number of bags so that a parallelepipedic stack is obtained which can well be handled and packaged.

When the shifting device 111 has reached the position shown in FIG. 5, another shifting device 116 has been moved under the delivery cylinder 100 so that the stack 112 can be lowered and can be conveyed by the shifting device 116 in the next step. This operation has already been described with reference to the stack 102.

From the steps which have been described with reference to FIGS. 1 to 5, it is apparent that it is sufficient to move by every other step of movement of the chains 110 a shifting device under the delivery cylinder 100 or 105 and into the removing station 113. As a result, each shifting device will jointly convey one complete stack while moving from the delivery cylinder 100 to the delivery cylinder 105 and will jointly convey two complete stacks while moving from the delivery cylinder 105 to the removing station 113. In the arrangement shown in FIGS. 1 to 5, an additional shifting device 117 is provided to meet this requirement and the center spacing of the three shifting devices 111, 116 and 117 on the chains 110 is twice the distance moved by the chains 110 during each step. In accordance therewith, the length of the chains 110 is three times the center distance between adjacent shifting devices 111, 116 and 117.

The circulation of the shifting devices 111, 116 and 117 is apparent from FIGS. 1 to 5. In the assumed initial position shown in FIGS. 1 and 2 the shifting devices 111, 117 and 116 are in positions A, B and C, respectively. The next step of the chains 110 moves the shifting devices to positions A', B' and C', respectively, shown in FIGS. 3 and 4. After the next following step, the shifting devices assume positions A'', B'' and C'', respectively, shown in FIG. 5. The shifting device 116 is now in a position which corresponds to position A of the shifting device 111 shown in FIGS. 1 and 2 and is ready to perform a cycle of operations in the manner which has been described for the shifting device 111.

In the embodiment shown in FIGS. 6-8, the apparatus according to the invention comprises two basically known delivery cylinders or drums 1 and 1', which are arranged one behind the other. A plurality of evenly spaced apart rows of grippers 2 and 2' are provided as required on the periphery of the delivery drums 1 and 1'. The grippers 2 and 2' are pivoted by respective pins 5 in annular discs 4 and 4', which are defined by milled annular grooves 3 and 3' on the periphery of the delivery drums. The open-

ing and closing movements of each gripper are controlled by the cooperation between a cam follower roller 6 connected to the pin 5 and associated cams 7, 7a and 7b or 7' and 7b'. The number of grippers 2 or 2' of a row depends on the width of the bag to be conveyed. The cams 7a, 7b and 7b' are secured in suitable manner to parts, not shown, of the machine frame. The cam 7' is screw-connected to a bearing plate 55. The cam 7 is rigidly connected to a lever 36. The purpose of this arrangement will be fully described hereinafter.

Bags 9 having at their leading end a folded bottom, which is reversely folded onto the top ply of the bag, are moved by feeding means, not shown, in the direction of the arrow 8 to the delivery drum 1, which rotates in the direction of the arrow 10, and are received in known manner by the grippers 2. A bag 9 received by the grippers 2 is moved by the latter against a stop plate 11. The stop plate 11 is provided at its upper end with teeth 44, which are defined by recesses 12 and which are engaged by the bags 9 when the grippers 2 have been opened shortly before the stop plate 11 is reached. To open the grippers 2, the cam follower 6 runs up on the lobe of the cam 7. The grippers 2 subsequently move through the recesses 12 and continue their revolution with the delivery drum 1 in carrying out a new cycle of operations. The grippers 2 are closed when the cam follower 6 rolls off the lobe of the cam 7. The bag 9 which has been moved against the stop plate 11 comes to rest on receiving rods 13, which extend transversely to the longitudinal axis of the bag. A rebounding of the bag from the stop plate 11 is prevented by a backplate 14, which is secured to parts, not shown, of the machine frame. The bag 9 which has been fed first and all similarly delivered bags 9 are thus deposited in the space which is defined by the plates 11 and 14; the receiving rods 13 and the outside peripheral surface of the annular discs 4 so that an exact stack 15 is formed. A reverse folding of the bags of this stack will be prevented in that the bottom end of the bag which has been deposited last is always in contact with the peripheral surface of the delivery drum 1, more particularly, of the annular discs 4.

The receiving rods 13 are firmly mounted on both sides of the stack 15 in respective bars 16 and 17 (FIG. 8) and in registry with each other and extend under the stack 15 only to the extent which is required for a reliable support of the stack. Guide rails 20 and 21 are provided on respective side frame walls 18 and 19 of the apparatus. The guide bars 16 and 17 are secured to respective carriages 22 and 23, which are slidable up and down in the guide rails 20 and 21. For the sake of clearness, the bars 16 and 17, the guide rails 20 and 21 and the carriages 22 and 23 are not shown in FIG. 6. The bars 16 and 17 are resiliently connected by respective springs 24 and 25 to respective levers 26 and 27, which are normally fixed, so that the carriages 22 and 23, the bars 16 and 17 and the receiving rods 13 together with the stack 15 of bags are resiliently suspended from the levers 26 and 27. The distance from the receiving rods 13 to the delivery drum 1 is thus continually adjusted to the increasing stack 15 of bags while the springs 24 are being extended. As a result, the stack 15 of bags always bears with the desired pressure on the outside peripheral surface of the delivery drum 1.

As the bottoms of all bags 9 are at one end of the stack 15, the same is oblique. On the other hand, it is desired to obtain a final stack having boundary surfaces which are at right angles to each other. When a counted number of bags have been combined in the stack 15, the latter is moved according to the invention under the delivery drum 1' so that the stack 15 having the bag bottoms at one end has superimposed on it an additional stack 28, which contains an equal number of bags having their bottom at the opposite end.

The bags 9 placed on the receiving rods 13 are counted by a gear train, which comprises a gear 30 rotating with

the shaft 29 of the delivery drum 1, a freely rotatably mounted gear 31, which is in mesh with the gear 30 and firmly connected to a rotatably mounted gear 32, a further freely rotatably mounted gear 33, to which the rotation of the gear 32 is transmitted, and a camwheel 34, which is firmly connected to the gear 33 and rotates with the same in the direction of the arrow 35. The speed of the camwheel 34 depends on the transmission ratio of the gear train 30, 31, 32, 33.

When the desired number of bags have been delivered, a cam follower roller 37 rotatably mounted at the free end of the lever 36 rolls off the lobe of the camwheel 34. The lever 36 is pivoted at its other end at 42 in a mounting plate 38. A gear segment 39 is rigidly connected to the lever 36 and in mesh with another gear segment 40, which is pivoted at 43 in the mounting plate 38. The stop plate 11 is firmly connected to the gear segment 40 by a pair of levers 41. When the cam follower 37 reaches that part of the camwheel 34 which is smaller in diameter, the lever 36 and the gear segment 39 are pivoted in a counterclockwise direction about the pivot 42. Because the two gear segments 39 and 40 are in mesh, the pivotal movement is transmitted to the gear segment 40 so that the pivot 43 connecting the gear segment 40 to the lever 41 performs a clockwise rotation and the teeth 44 of the stop plate 11 are pivotally moved out of the milled grooves 3 of the delivery drum 1. At this time, the bags 9 combined in the stack 15 are slightly depressed by extensions 45, which are formed on the teeth 44 and bear on the bag bottoms so that even the higher end of the stack 15, which higher end is formed by the bag bottoms, will be reliably disengaged from the annular discs 4 of the delivery drum 1. While the stop plate 11 is being swung out of the delivery drum 1, the cam 7 rigidly connected to the lever 36 is pivotally moved also in the counterclockwise direction about the pivot 42 of the lever 36 to such an extent that the cam follower 6 no longer rolls on the cam 7 and the following series of grippers, which have been closed by the cam 7b after receiving a bag, cannot open but transfer the following bags 9 to the delivery drum 1', where each bag is received by the grippers 2' of the drum 1' and is deposited in the space defined by the receiving rods 13', the peripheral surface of the annular discs 4', a stop plate 11' and a backplate 14' to form a stack 28 in the manner which has been described in connection with the delivery drum 1.

Just as the receiving rods 13 associated with the delivery drum 1, the receiving rods 13' are mounted to be slidable up and down on the machine frame and are resiliently suspended by springs 24' and 25' from levers 26' and 27'. The stop plate 11' is rigidly mounted on the mounting plate 55 and the backplate 14' is secured to parts, not shown, of the machine frame.

The delivery drum 1' rotates in the direction of arrow 56 so that the bags 9 received by the grippers 2' and moving to the receiving rods 13' are turned through 180° about their transverse center lines relative to the bags 9 deposited on the receiving rods 13 so that the bottoms of the bags in the stack 28 lie on the underside of the bags and at that end of the stack 28 which is opposite to the corresponding end of the stack 15.

To prevent an interference between the grippers 2 and 2' during the transfer of the bag 9 from delivery drum 1 to delivery drum 1', the grippers 2' are laterally staggered relative to the grippers 2. To this end, each of the annular discs 4' of the delivery drum 1' in which the grippers 2' are mounted is in registry with a milled groove 3 in the delivery drum 1. As a result of a suitable arrangement of the cams 7a and 7b' controlling the positions where the grippers 2 and 2' open and close, the grippers 2 delivering the bag open shortly before the grippers 2' which receive the bag are closed. To prevent a falling of the bag 9 being transferred in the gap between the delivery drums 1 and 1' in the interval of time between the opening of the grippers 2 and the closing of the

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grippers 2', a pressure roller 57 is provided, which is freely rotatably mounted on a pair of levers, which are mounted in the machine frame. The pressure roller 57 contacts the outside periphery of the delivery drum 1 and is rotated by the latter in the direction of arrow 58. The roller 57 does not contact the delivery drum 1'. During the short time in which the bag 9 is not in contact with the grippers 2 nor with the grippers 2', the bag 9 is urged by the roller 57 against the periphery of the delivery drum 1 and is moved at the same time toward the bag transfer position between the two transfer drums so that a satisfactory transfer is effected. The roller 57 does not contact the closed grippers 2 because their gripping parts are received in known manner in suitable recesses formed in the annular discs 4 when the grippers are closed. The distance from the roller 57 to the bag transfer position is smaller than the shortest length of the bags to be transferred so that these bags can also be reliably handled.

The stack 15 formed under the delivery drum 1 is lowered when the stack 28 under the delivery drum 1' is being formed. To initiate this operation, the gear segment 40 pivotally moving in the clockwise direction actuates a limit switch 46, which by known means, not shown, initiates the energization of an electric motor, not shown. The latter rotates a shaft 47, to which the levers 26 and 27 are fixed, which are now pivotally moved in the counterclockwise direction. The pivotal movement of the levers 26 and 27 in the stated direction first relieves the springs 24 and 25, which have been extended by the constant growth of the stack 15 during the delivery operation. As a result, a balance is established between the force exerted by the levers 26 and 27 on the springs 24 and 25 and the load of the components suspended from said springs, inclusive of the stack 15. The continued pivotal movement of the levers 26 and 27 causes a descent of the stack 15 to position 15' (FIG. 8) by means of the receiving rods 13, guided by the guide rails 20 and 21. In position 15', the receiving rods 13 rest on slide rails 48, 49, 50 and 51. When this position is reached, the motor acting on the shaft 47 is deenergized by a limit switch 72 to terminate the descent of the levers 26 and 27. The limit switch 72 is actuated by a contacting rod 73 which is secured to the lever 26. By means not shown, the slide rails 48 and 49 are firmly connected to the machine frame. The slide rails 50 and 51 are firmly connected to respective nuts 53 and 54, which are threaded on an adjusting screw 52. During its descent to position 15', the stack 15 is laterally guided by guide rods 59 and 60 secured to the slide rails 50 and 51, respectively. These guide rods 59 and 60 are shown in FIG. 8 but are indicated only by dash-dot lines in FIG. 6 for the sake of clearness. This arrangement serves to prevent a slipping of the bags in the stack.

The stack 15 is moved from position 15' to position 15'' under the delivery drum 1', where the stack 28 is formed at the same time. For said movement of the stack 15, shifting rods 61 and 62 are provided, which are firmly mounted by means of chain pins on respective chains 63 and 64 (FIG. 8). The shifting rods 61 and 62 and parts associated with them are indicated by dash-dot lines under the delivery drum 1 in FIG. 6 because there are actually no shifting rods 61, 62 under the delivery drum 1 when there are a pair of shifting rods under the delivery drum 1' (see FIG. 3). For the same reason, the stack 15 and the stop plate 11 are indicated in operative position in FIG. 6 in dash-dot lines because there is in fact no deposition of bags under the delivery drum 1 when a stack is being formed under the delivery drum 1'. This is also apparent from FIG. 3. Rollers 67 and 68 are freely rotatably mounted in the free end portion of respective levers 65 and 66, which are secured to the lower end of the shifting rods 61 and 62. The rollers 67 and 68 serve to support the associated shifting rods. The rollers 67 and 68 run on the web of a channel-shaped

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guide rail 69, which is disposed adjacent to the upper course of the chains 63 and 64. The latter extend around sprockets 70 and 71. The sprockets 71 are adapted to be driven by a common motor, which is not shown.

When the limit switch 72 is actuated upon the termination of the descent of the levers 26 and 27 and the motor acting on the shaft 47 is deenergized, the switch 72 initiates at the same time the energization of the motor for driving the sprockets 71 so that the chains 63 and 64 are caused to revolve and the shifting rods 61 and 62 move through the space between opposite receiving rods 13 to shift the stack 15 from its position 15' on the receiving rods 13 to its position 15'' under the receiving rods 13' associated with the delivery drum 1'. When moving from position 15' to position 15'', the stack 15 is guided by plates 74 disposed on both sides of its path so that a slipping of the bags in the stack is prevented.

The revolving movement of the chains 63 and 64 is terminated with the aid of a camwheel 75, which co-operates with a limit switch 76. The camwheel 75 is firmly connected to a gear 77, which meshes with a gear 78. The latter is fixed to the driving shaft for the sprockets 71. When the motor is energized, the camwheel 75 rotates in the direction of the arrow 79 and by means of its lobe actuates the limit switch 76 to deenergize the motor for driving the sprockets 71 as soon as the stack 15 has reached the position 15''.

When the motor for driving the sprockets 71 is deenergized, the limit switch 76 causes at the same time the energization of the motor acting on the shaft 47 so that the latter rotates in the clockwise sense and the levers 26 and 27 as well as the receiving rods 13 are pivotally moved back substantially to the initial position shown in FIG. 6. This operation is terminated by a limit switch 80, which is actuated by the contacting rod 73 and de-energizes the motor acting on the shaft 47. The receiving rods 13 are now ready to receive a new stack of bags.

When the camwheel 34 has rotated to a position in which the cam follower 37 runs again on the lobe of the camwheel, the desired number of stacks have been deposited under the delivery drum 1' to form the stack 28. The running-up of the cam follower 37 on the lobe of the camwheel 34 causes a pivotal movement of the stop plate 11 and the cam 7 back to their operative position shown in FIG. 6. A further stack of bags is now formed in the previously described manner on the receiving rods 13 under the delivery drum 1. No more bags are transferred to the delivery drum 1'. During the above-mentioned reverse pivotal movement of the stop plate 11 and the cam 7 with the aid of the gear segment 40, the latter actuates a limit switch 81, which initiates the energization of a motor, not shown, which serves to lower the levers 26' and 27' and to rotate a shaft 47'. In the manner which has been described with respect to the stack 15, the stack 28 resting on the receiving rods 13' is now lowered onto the stack 15''. In this position, the weight of the stack 28, of the receiving rods 13' and of the components by which said rods are mounted and upwardly and downwardly slidably guided in the machine frame exerts a slight pressure onto the stack 15'' to promote the formation of a compact stack.

The descent of the levers 26' and 27' is terminated as soon as the stack 28 carried by the receiving rods 13' rests on the stack 15''. To this end, the contacting rod 73' secured to the lever 26' actuates a limit switch 82, which deenergizes the motor acting on the shaft 47'. Upon its actuation by the contacting rod 73', the limit switch 82 also initiates the energization of the motor for driving the sprockets 71 so that the chains 63 and 64 are started again. During the revolving movement of the chains 63 and 64, the shifting rods 61 and 62 shift the stack from the receiving rods 13' in the manner which has been described with respect to the stack 15. The stack 15'' is advanced at the same time so that the stack 28 comes to rest on the stack 15''. A stack 83 is thus formed,

in which one half of the bags have their bottoms at one end and the other half of the bags have their bottoms at the opposite end of the stack 83, which thus has boundary surfaces extending at right angles to each other. During the conveyance of the stack 83 to a removing station 84 (FIG. 7), pressure is applied to the top of the stack by two pressure belts 85 so that the component stacks 15 and 28 are well combined in the composite stack 83 and the bags do not slip in the stack during this conveyance. The two pressure belts 85 are disposed on opposite sides of the path of the shifting rods 61 and 62 and move in the direction of the arrow 86 around rollers 87-90. One of these rollers, e.g., the roller 87, is driven. The bags which have been combined in a stack as has been described can readily be packaged in the removing station 84 to form parallelepipedic packages, which can well be stacked too.

The motor for driving the sprockets 71 is deenergized by the limit switch 76 as has been described hereinbefore as soon as the stack 83 has reached the removing station 84; at the same time, the limit switch 76 initiates the energization of the motor acting on the shaft 47' so that the latter is rotated in the counterclockwise sense and the levers 26' and 27' return to their initial position shown in FIG. 6. When this position is reached, the contacting rod 73' actuates a limit switch 91, which deenergizes the motor acting on the shaft 47.

As has been explained with reference to the shifting devices 111, 116 and 117 shown in FIGS. 1 and 5, the center spacing of the pairs of shifting rods 61, 62 performing the function of said shifting devices is twice the distance travelled by the chains 63 and 64 during each step. The number of pairs of shifting rods 61, 62 provided on the chains 63 and 64 will depend on the length of the chains, which will be selected in view of the required length of the path of conveyance. In any case, the length of the chains must be an integral multiple of the center distance between adjacent pairs of shifting rods. As a result, the movement of a pair of shifting rods 61, 62 into the removing station 84 will be synchronized with the movement of a new pair of shifting rods 61, 62 under the receiving rods 13 associated with the delivery drum 1 so that a new cycle of operations has been performed, as has been described hereinbefore with reference to FIGS. 1-5.

For a delivery of bags differing in length from those shown in the drawing, the stop plate 11 or 11' and the backplate 14 or 14' are moved each by one-half of the difference in length, e.g., to positions 11a or 11a' and 14a or 14a', respectively. As a result, the length of each step moved by the chains 63 and 64 will always be the same regardless of the length of the bags to be deposited. For displacing the stop plates 11 and 11', each of the mounting plates 38 and 55 is slidably mounted in a slot 92 or 93, which is formed in the machine frame and concentric with the periphery of the respective delivery drum. As a slight inclination is imparted to the stop plates 11 and 11' by the displacement, they are subsequently adjusted to a vertical position about a pin 94 or 95, by which they are normally firmly connected to the pair of levers 41 or 41'. The backplates 14 and 14' are also slidably mounted in respective slots 96 or 97 in the machine frame to permit of an adjustment.

In accordance with the positions of the stop plates 11 and 11' and of the backplates 14 and 14', the shifting rods 61 and 62 are also adjusted each by one-half of the entire distance of adjustment. As all shifting rods 61 are secured to the chain 63 and all shifting rods 62 are secured to the chain 64, an adjustment is easily accomplished in that the sprockets 71 are disconnected from their common drive connection and the chains 63 and 64 are moved in mutually opposite directions by one-half of the required distance of adjustment. It is not necessary to remove all shifting rods from the chains 63 and 64 and to secure the shifting rods to the chains at positions which

are determined by the different bag length. Depending on the length of the bags to be delivered, receiving rods 13 and 13' are removed from the bars 16 and 17 or additional receiving rods are inserted into said bars. To this end, the bars 16 and 17 have the same length as the longest bags to be delivered.

For a delivery of bags differing in width from those shown in the drawing (FIG. 8), the guide rods 59 and 60 are shifted by the guide rails 50 and 51 equal distances to the left and right, respectively, in FIG. 8 for an adjustment to the desired width of the bag in known manner by a rotation of the adjusting screw 52 to operate the nuts 53 and 54. For instance, the nut 53 has a right-hand screw thread and the nut 54 has a left-hand screw thread.

What is claimed is:

1. A delivery station for bag-making machines for making bags which are open at one end or have a flattened bottom, comprising two receiving stations having parallel receiving surfaces, means for delivery bags selectively to the two receiving stations and for turning the bags to be delivered to one of the two receiving stations through 180° about their transverse centerline relative to the bags delivered to the other receiving station, said means including two delivery cylinders which rotate in opposition directions about parallel axes and are each associated with one of said receiving stations, one of said delivery cylinders positioned immediately succeeding the bag-making machine, and the grippers of said one delivery cylinder being controlled selectively to deliver bags to the receiving station associated with said one delivery cylinder and to transfer bags to the other delivery cylinder, means for changing the delivery from one of the receiving stations to the other when a predetermined number of bags have been delivered, means for superimposing stacks formed at the two receiving stations, and a conveyor for conveying the resulting composite stack.

2. A delivery station according to claim 1, wherein each receiving station comprises a vertical stop plate and a carrier having a horizontal surface.

3. A delivery station according to claim 2, wherein each carrier has a central slot extending in the direction in which the stacks or bags are conveyed, and that movable vertical shifting flights for conveying the stacks are movable in the slots to convey the stacks.

4. A delivery station according to claim 3, wherein each carrier is adapted to be lowered when it has received a stack consisting of the predetermined number of bags and that the shifting flights extend through the slot when the carrier is in its lower position, whereas the stop plate extends from the periphery of the cylinder to the carrier when the same is in its upper position.

5. A delivery station according to claim 2, wherein each stop plate has teeth which in the vertical position of the stop plate extend with a clearance into grooves of the associated delivery cylinder.

6. A delivery station according to claim 5, wherein the stop plate associated with said one delivery cylinder is disposed out of the grooves of said one cylinder during the transfer of the bags to the other delivery cylinder.

7. A delivery station according to claim 3, wherein the stop plates at both receiving stations are provided at their lower edges with recesses forming passages for the top ends of the shifting flights.

8. A delivery station according to claim 1, wherein pressure belts are provided over the conveyor between the second receiving station and the discharge end of the conveyor, said pressure belts acting to compress the two superimposed stacks.

9. A delivery station according to claim 3, wherein the lower ends of the shifting flights are pivoted on chain pins of revolving conveyor chains and are provided with right-angled levers extending opposite to the direction of movement and supported throughout the path of the shifting flights by rollers carried by stationary guide rails

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so that the shifting flights are held in their vertical position.

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