

Jan. 31, 1961

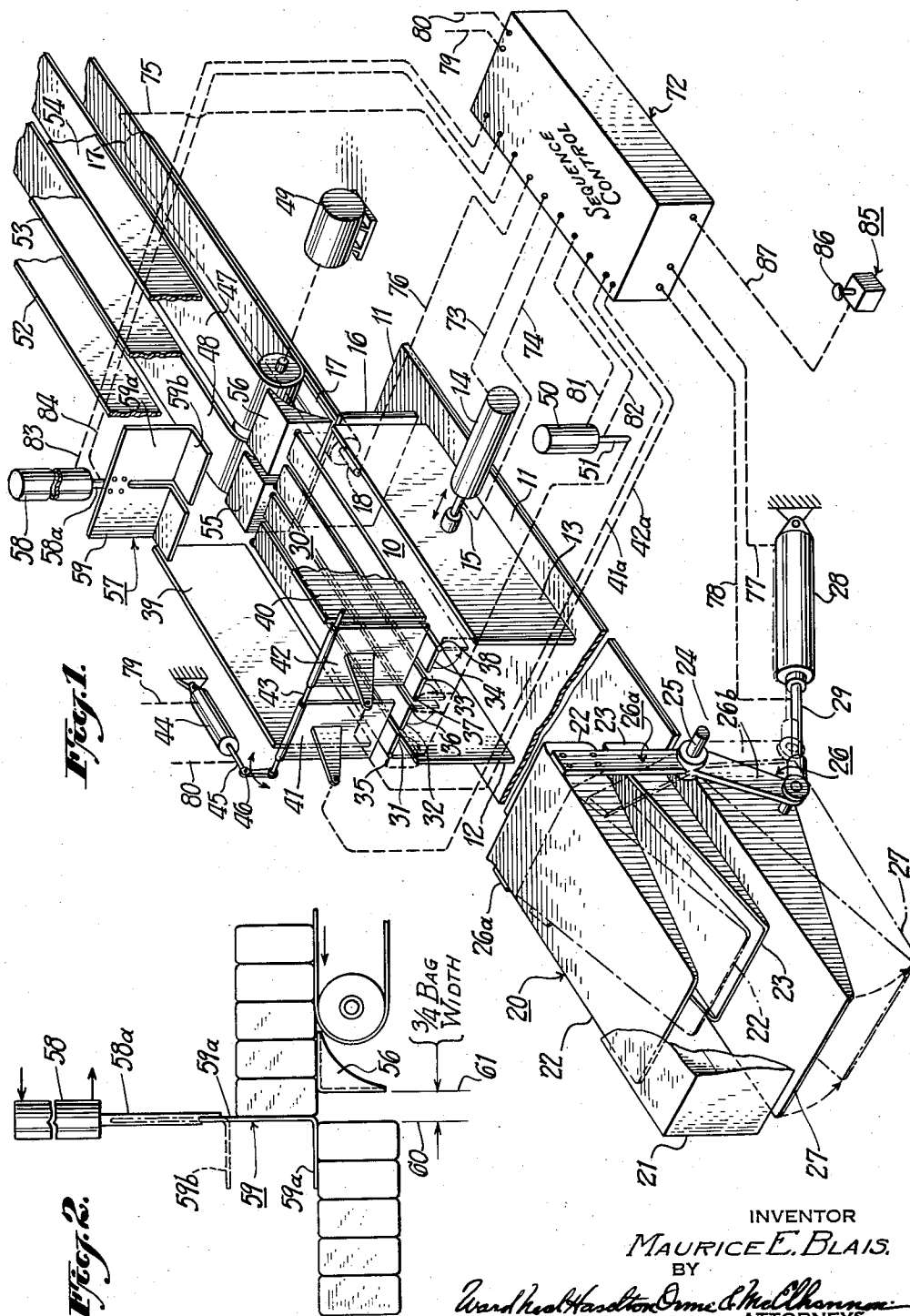
M. E. BLAIS

2,969,629

PACKING APPARATUS

Filed March 12, 1958

2 Sheets-Sheet 1



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Fig. 5.

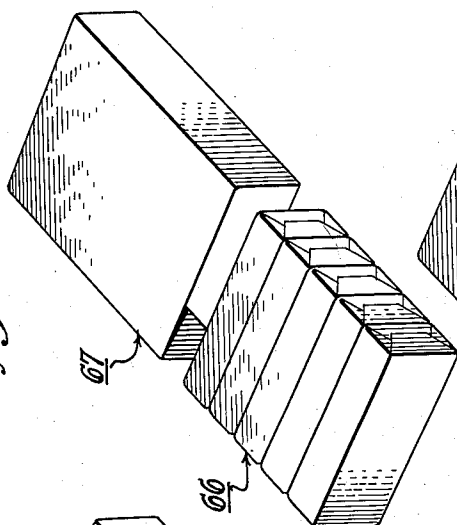


Fig. 7.

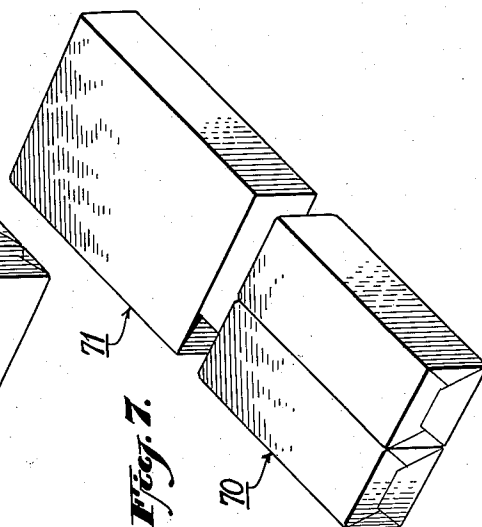


Fig. 4.

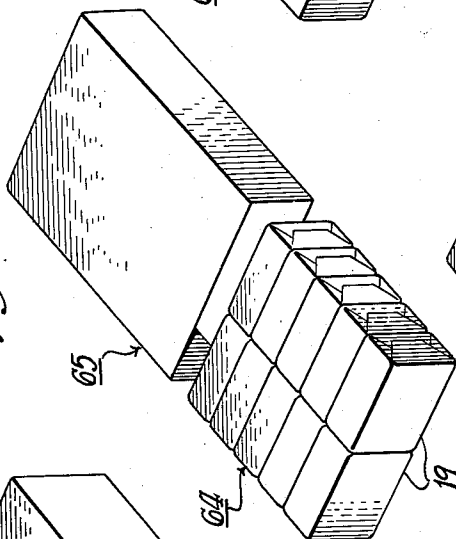


Fig. 6.

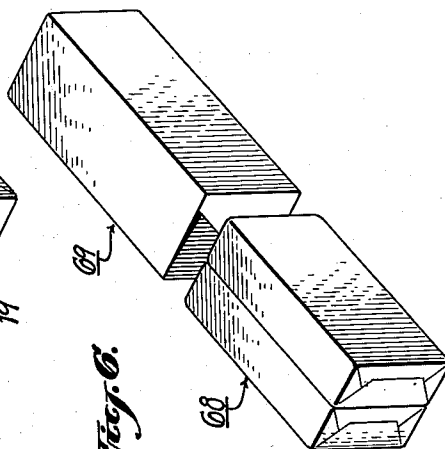
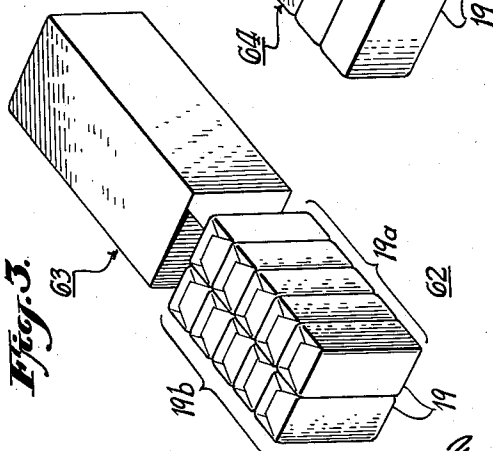


Fig. 3.



INVENTOR
MAURISE E. BLAIS.
BY

Ward Heath Haseltine Orme & McChannone
ATTORNEYS.

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PACKING APPARATUS

Maurice E. Blais, Pawtucket, R.I., assignor to St. Regis Paper Company, New York, N.Y., a corporation of New York

Filed Mar. 12, 1958, Ser. No. 720,904

8 Claims. (Cl. 53—124)

This invention relates to baling apparatus, that is, apparatus for filling a relatively large container, such as a bale or box, with a plurality of smaller containers, such as bags or packages of pulverulent material, and more particularly the invention relates to means for accumulating one charge of such small containers concurrently with the filling of the large container, and immediately after such filling rapidly delivering the previously accumulated charge into a bale loading station.

One of the objects of the present invention is to provide novel bag baling apparatus which can operate at a speed not heretofore attained.

Another object is to provide a rapid bag baling apparatus which relieves the operator of the apparatus from manual labor except for the placing of a bale upon a bale mouth opening device.

Another object is to provide novel apparatus of this character which is capable of handling a plurality of sizes of relatively small packages and a plurality of patterns of bale charges made up of such small packages, the groups of such small packages which make up a charge for a bale having a heretofore unattained range of variation in group size.

The invention in one aspect thereof comprises two charge receiving channels, one above the other, the lower one having a reciprocable ram plate movable therein for urging a charge of small packages out of such channel and into a bale or box, the upper channel having trap door means and being adapted for receiving a fresh charge of packages while the aforementioned ram means are so filling a bale. The upper channel is provided with trap door control means for dropping the freshly accumulated charge into the charge receiving station therebelow in proper timed relationship with the movement of such reciprocating ram plate.

The above and further objects and novel features will more fully appear below from the written description when read in connection with the accompanying drawings which illustrate one form of the invention, it being understood that such drawings do not define the limits of the invention, reference for this latter purpose being had to the appended claims.

In the drawings:

Fig. 1 is a perspective view of one form of apparatus embodying the present invention;

Fig. 2 is a fragmentary side elevation of a portion of the apparatus shown in Fig. 1; and

Figs. 3-7 are perspective views of several package patterns which can be employed in the present invention as package charges to be loaded into bales.

Referring to the drawings in greater detail, the embodiment of the invention shown comprises a primary charge receiving station 10 which in turn is constituted by a channel-shaped structure composed of a table 11 and parallel side plates 12 and 13, the lower edges of which are adjacent the top surface of the table 11, the latter being substantially horizontal. The side plates 12 and 13 are relatively movable and, in the form shown, the side

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plate 12 is stationary and the plate 13 is reciprocably movable parallel to the other plate thereby to compress therebetween a charge of packages. Both of said plates are substantially vertical thereby to define the aforementioned channel in combination with the horizontal table top. Such channel, in the form shown, is adjusted in size to receive such charge of relatively small packages or bags, such as that shown in Fig. 3, such charge being dropped through trap doors from a charge gathering station thereabove in a manner to appear more fully hereinafter. It is understood that the aforementioned charge receiving station 10 can be of any desired width to receive various patterns of small packages, such as those shown in Figs. 4-7, the same being true with respect to the charge gathering station which is of analogous conformation.

The side plate 13 is reciprocably movable parallel to the other side plate 12 by means of power means 14 which may comprise a fluid-actuated power cylinder device of well known construction, such power cylinder having a piston rod 15 which at one extremity is secured to the plate 13.

A reciprocable ram plate 16 having a vertical face is positioned for moving along the aforementioned channel under the influence of reciprocative power means, such as a power cylinder 17 having a piston rod 18 which is secured to the rear face of the ram plate 16.

The ram plate 16 and its associated power means 17 thus are adapted for urging out of the primary charge receiving station 10 a charge of packages, such as packages 19 grouped in the pattern shown in the aforementioned Fig. 3 and thence into a bale, for example, of kraft paper, the mouth of which is stretched over duck-bill device 20 in a well known manner. Such a bale is indicated at 21, the mouth thereof being in condition for receiving a charge of small packages from station 10.

The duck-bill device 20 includes upper duck bill 22 and lower duck bill 23, the latter preferably being fixed and the former being hingedly mounted for angular movement about an axis 24 comprising the axis of a pivot rod 25 upon which is mounted a pair of bell crank levers 26, the latter in turn supporting, in the manner shown, the upper duck bill 22 by means of its uppermost arms 26a. Upon the lowermost arms 26b thereof there is mounted a tiltable table 27 which moves angularly with the upper duck bill 22 by virtue of its common mounting, namely, the bell crank levers 26. The purpose for so mounting the duck bill 22 for angular movement is to permit movement from the position shown in solid lines downwardly to that shown in broken lines whereupon the mouth of a fresh bag may be stretched thereover and also over the lowermost duck bill 23.

Concurrently with such angular movement of the duck bill 22 the table 27 is tiltable downwardly to the position shown in broken lines from that shown in solid lines thereby to facilitate the discharge of a filled bale 21 which has just received a charge of packages. If desired, a suitable conveyor belt (not shown) may be positioned to receive such a filled bale discharged from the down tilted table 27.

Suitable power means are provided for angularly shifting the table 27 and the duck bill 22 together in the manner aforementioned, such power means, in the form shown, comprising a fluid-actuated power cylinder device 28 having a piston rod 29 operatively connected to the bell crank levers 26 in a desired manner, for example, as shown in Fig. 1.

As aforementioned, there is located directly above the primary charge receiving station a charge gathering station or feeder station 30 which also is channel-like in configuration. The charge gathering station 30 includes, in the form shown, suitable trap door means, for ex-

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ample, comprising two pairs of trap doors, namely, pairs 31, 32 and 33, 34 which are respectively hingedly mounted along their longitudinal edges at 35, 36 and 37, 38.

The trap door means 31-34 are conformed to receive a charge of ten bags, for example, as shown in Fig. 3, two groups of five bags each, namely, a group 19a located beside a group 19b. The group 19a, in the form shown, rests upon the trap doors 31, 32 and the group 19b upon trap doors 33, 34.

The charge gathering station 30 is provided with suitable means for retaining the bags therein after they have been moved onto the trap doors, such means comprising parallel adjustably mounted side plates 39 and 40 which are respectively positioned analogous to the side plates 12 and 13, the latter pair of plates also performing the function of compression plates for the charge of packages under the influence of power means 14 as will appear below.

At the near or left end of the charge gathering station, as viewed in Fig. 1, suitable end plates 41 and 42 are provided which are mounted upon a common pivot rod 43 and thus adapted for angular movement with respect to such rod under the influence of power means 44 also comprising a pneumatic power cylinder device having a piston rod 45 operatively connected to the pivot rod 43 via a crank lever 46. The purpose of such power cylinder device 44 is to shift angularly the end plates 41 and 42 so that they can be moved to a position to facilitate the dropping of a charge of packages from the charge gathering station 30 onto the primary charge receiving station 10 therebelow. Normally the end plates 41 and 42 are held in a substantially vertical position as shown and are able to shift a small angular degree despite the fixed condition of the piston rod 45, such slight angular shift being for the purpose of signalling the receipt of its respective group of packages 19a and 19b, such two groups of packages being urged to the left, as viewed in Fig. 1, against such end plates under the influence of endless belt conveyors 47, 48 and which are respectively in alignment with the trap door pairs 31, 32 and 33, 34. The conveyor belts 47 and 48 are of the endless belt variety and are driven as by a motor 49.

Such trap doors 31, 32 and 33, 34 can be opened and closed by means of another power cylinder device 50 having a piston rod 51 which is operatively connected in a desired manner to such trap doors to operate same in a well known manner.

The conveyor belts 47 and 48 respectively direct a series of small packages, such as 19 aforementioned (Fig. 3), in an upright position as shown toward the charge gathering station 30, the series on each belt being kept separate by side plates 52, 53 and 54.

The series of upright bags moved by the belts 47 and 48 are respectively urged into the charge gathering station 30 over stationary thresholds 55 and 56, respectively, the latter being shown in side elevation in Fig. 2.

Located at the entrance to the charge gathering station 30 are gate means 57 comprising a vertically reciprocable stop plate 59 which moves up and down under the influence of power means 58 also in the form shown comprising a fluid-actuated power cylinder device having a piston rod 58a.

The position of the stop plate 59 in its uppermost position and in an intermediate lower position is illustrated in Fig. 2. The stop plate 59 is provided with a substantially vertical portion 59a and a substantially horizontal portion or foot 59b located at the lowermost extremity thereof.

The relative dispositions of a vertical plane 60 in which the stop plate 59 moves and a vertical plane 61 comprising the leftmost face of the threshold 56 (Fig. 2) is an important factor in the construction of this apparatus because it provides for a heretofore unattained range of variations in package group sizes. Fig. 2 illustrates the advantage that a larger range of package group sizes can

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be accommodate by the apparatus of this invention. As shown in Fig. 2, the feed stop plate 59 (under the action of power cylinder 58 as controlled by a master control device to appear later) descends before the trap door is opened and pauses at the top of the packages. Then such feed stop plate follows the packages downward when the trap doors are open and in the manner shown in Fig. 2. This permits the feed stop plate to be adjusted in position (relative to plates 41 and 42) to the minimum longitudinal dimension of a charge or accumulation of packages, such as the package group 19a. The maximum "drop opening" of the trap door means can be and are adjusted so that the difference between the minimum and maximum longitudinal dimension of a package group (to be dropped) is approximately three-quarters of the width of one bag as illustrated in Fig. 2, e.g., a bag of the group in Fig. 3. For example, where a five pound sugar bag is employed, the bag being of conventional dimensions, such difference between the maximum and minimum package group dimension is about 2½ inches. Since there is no crossing of the packages in any of the patterns as shown in the drawings, and particularly in Fig. 3, it is possible to drop two rows or two groups, namely, the aforementioned 19a and 19b at one time even though group 19a is longer or shorter than group 19b. That is, the length of the package group 19a may be substantially different from the length of the package group 19b and despite this the apparatus functions properly.

The charge of packages or bags 19 of Fig. 3 is collectively designated at 62 and, by means of the apparatus of Fig. 1, is loaded into a bale 63. The packages 19, for example, may be able to hold each five pounds of pulverulent material, such as flour or sugar, thereby making the weight of the total charge fifty pounds.

Referring to Fig. 4, a different pattern of the same bags 19 is shown, consecutive pairs of bags being arranged in longitudinal alignment with their end surfaces pressed against one another. The pattern of the charge of packages shown in Fig. 4 is designated 64 and is adapted to be inserted in a suitably conformed bale 65.

In Fig. 5 is shown a pattern or charge 66 of five bags or packages which may, for example, be of the capacity of ten pounds each and arranged in the pattern shown adapted to be inserted into a bale 67, the latter being identical in shape to the bale 65.

In Figs. 6 and 7 are shown two different charge patterns for two relatively large bags or packages, each capable of containing, for example, twenty-five pounds of pulverulent material. The charge of Fig. 6, designated at 68, is insertable into a bale 69 which is identical in dimension to the aforementioned bale 63. Also, the charge of Fig. 7 designated at 70 is insertable into a bale 71 which is similar in dimension to the bales 65 and 67.

Referring again to Fig. 1, there will now be described the means for controlling the sequence of operations of the several elements of the apparatus. Any suitable sequence control means may be employed for governing the operations of the several power cylinder devices (14, 17, 28, 44, 50 and 58). In lieu of the power cylinder devices which are fluid-actuated, any other suitable devices for exerting the desired force may be employed, for example, solenoid devices or solenoid-like devices with suitable speed control means for the plungers thereof. In the form shown, there is employed a master sequence control means 72 which is associated with the various power elements as will now be described. For purposes of simplification and clarity, only a single line is shown between the master control means 72 and each of the several power cylinder devices for the purpose of governing the flow of fluid thereto to cause the respective piston rod to extend or to be withdrawn into the power cylinder. Also, there is shown a single line from each piston rod of each power cylinder device as another operative interconnection with the master control means 72, such single line indicating a feedback inter-

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connection for a control impulse thereto for the purpose of controlling the operation of the respective power cylinder and coordinating same in suitable timed relationship with the other power cylinder devices.

Thus the power cylinder device 14 is controlled as to the extension and retraction of its piston 15 via an operative interconnection 73 and the feedback impulse to the master control is via an operative interconnection 74.

Power cylinder 17 for the ram plate 16 is operatively interconnected to the main control means 72 via operative interconnection 75 and the feedback impulse to such main control is via interconnection 76. Analogous interconnections for the several other power cylinder devices are as follows: power cylinder device 28—interconnections 77 and 78; power cylinder device 44—interconnections 79 and 80; power cylinder device 50—interconnections 81 and 82; power cylinder device 58—interconnections 83 and 84.

The function of such operative interconnections, together with the coaction of the master or main control means 72, is indicated by the following description of the operation of the apparatus under the influence of such master control means 72.

In operation, assume that the duck bills 22 and 23 are in the position for having a bale 21 applied thereto for filling, that is, the uppermost duck bill 22 is in the position shown in broken lines in Fig. 1. Further assume that there are no packages or small bags either in the primary charge receiving station 10 or in the feeder station 30. However, assume that the conveyor motor 49 is in operation, that the stop plate 59 is in a raised condition sufficient to permit the passage therebeneath of a series of bags as by the conveyor belts 47 and 48. In this condition the operator places the aforementioned bale 21 upon the duck bills 22, 23 and actuates a manual control device 85 having a handle 86, the device 85 being operatively connected to the master control device 72 by means of interconnection 87. The effect of the actuation of the handle 86 is as follows: The power cylinder device 28 is actuated via the operative interconnection 77 thereby to raise the duck bill 22 to the position shown in solid lines in Fig. 1 thus holding the mouth of the bale in a desired stretched open position to receive a charge of packages or small bags. Concurrently with the raising of the duck bill 22 the table 27 is also raised from the position shown in broken to that shown in solid lines. Immediately thereafter the two parallel lines of bags on the conveyors 47 and 48 are directed beneath the stop plate 59 over the thresholds 55, 56 and onto the trap doors 31, 32 and 33, 34. The two parallel lines of bags engage the end plates 41 and 42 and when an adequate pressure has been exerted upon such end plates by virtue of the force of the conveyor belts 47 and 48, suitable switch means are actuated via the operative interconnections 41a, 42a to the master sequence control means 72 to open the aforementioned trap doors (31—34) thereby to permit the charge thereon to drop onto the primary charge receiving station 10. Concurrently therewith the stop plate 59 moves downwardly in the manner shown in Fig. 2 and, as explained above, the foot portion 59b stopping temporarily at the top of the charge of bags and moving downwardly with the dropping charge, and thus stopping the oncoming bags (Fig. 2). Immediately the trap door means are closed again via the operation of the power cylinder device 50 and through the intermediary of the master control switch 72, also the stop plate 59 is raised to permit the entrance of a fresh charge of bags.

The ram plate 16 and its power cylinder device 17 are, of course, at this point in a retracted condition, as shown in Fig. 1, but upon the dropping of the charge as afore-mentioned, and signalled by suitable means to the sequence control device 72, the power cylinder device 17 is actuated to urge the charge of bags in the charge

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receiving station 10 (and e.g. in the pattern shown in Fig. 3) off the table 11 and into the bale 21. The operative interconnection 76 causes retraction of the piston rod 18 immediately following the urging of the charge into the bale 21.

As aforementioned, immediately after the dropping of the charge from the feeder station 30, the trap door means are closed and the stop plate 57 is raised to permit a new charge to move onto the now horizontal trap door means while the charge below is being fed into the bale 21 by ram 16.

In response to the retraction of the ram plate 16 to the position shown in Fig. 1, the power cylinder device 28 is actuated via its operative interconnections 77 to release the bale 21 by retracting the piston rod 29 so that the table 27 and the duck bill 22 are lowered to the position shown in broken lines.

For the purpose of facilitating the dropping of the charge of bags from the feeder station 30, the end plates 41, 42 may be angularly shifted from a norm position, as shown in Fig. 1, to a charge releasing position which is angularly removed from that shown in a clockwise direction by a selected number of degrees. This can be brought about by means of the above-described power cylinder device 44 operatively connected to the main sequence control means 72.

After a charge has been dropped from the feeder station 30 to the charge receiving station 10, the above-described power cylinder 14 is actuated in suitable timed relationship to the other means for moving the compression plate 13 toward the compression plate 12 thereby to compress the charge and to aid in forming it (decreasing its girth) for insertion into the bale 21.

The main sequence control means 72, of course, is constructed and arranged in such a way to prevent the actuation or tripping of the trap door means unless the charge receiving station therebeneath is ready to receive the charge, namely, the ram plate 16 is in a retracted position as shown in the figure, the compression plate 13 is suitably withdrawn to open up the channel in which the charge is to be dropped, and the duck-bill device is in the position shown in solid lines. Also, by virtue of means 72, the trap door means cannot be actuated until the end plates 41 and 42 are suitably angularly shifted by the pressure of the oncoming two streams of bags.

For the purpose of achieving a heretofore unattained baling rate for each work shift, for example, of eight hours, a novel combination of elements is employed comprising the apparatus above described acting in combination with automatic means for positioning the open mouths of bales over the duck bills, such automatic means being operatively interconnected to the apparatus heretofore described for acting in selected timed relation therewith.

The aforementioned automatic means mentioned in the last paragraph is defined as follows: a bale stack supporting device for holding a plurality of flat, empty bales, each bale having a marginal portion of the bale side along the bale bottom folded back upon the adjacent bale side thereby to form a flat bale bottom having a portion thereof which in cross-section, together with such back-folded portion, forms a bag bottom spur, said bale stack supporting means having a discharge opening through which the bottom of the lowermost bale protrudes, said bales being so disposed in said bale stack supporting means whereby the bale bottom faces downwardly thereby permitting a bag bottom spur to partially open, means for engaging such spur portion of the lowermost of each such bale consecutively to withdraw bales from said bale stack supporting means, a substantially vertical single bale holder, said bale holder being positioned for receiving an empty bale near the lower extremity thereof through an entrance formed therein, means for urging an empty bale through such entrance and upwardly into the bale holder; the bale being then

in an inverted position with the mouth thereof directed downwardly and the bottom thereof facing away from said bag stack supporting means, means for holding open the mouth of such a bale and comprising a pair of duck bill-like elements mounted for pivotal movement relative to one another, the mouth of a bale being applicable to such mouth opening means when the extremity of such duck bill-like elements are relatively close to one another, means for moving said duck bill-like elements to relatively open and closed positions, said single bale holder being positioned above said duck bill-like elements, and means for grasping an empty bale in said single bale holder, moving same downwardly mouth first, and applying the mouth thereof over said duck bill-like elements, the latter being in relatively closed condition.

What is claimed is:

1. Apparatus of the class described including in combination: a substantially vertical ram plate mounted for reciprocable motion with respect to a substantially horizontal table and between a pair of substantially vertical compression plates, said ram and compression plates defining three sides of a charge receiving station, the fourth side comprising a discharge opening, charge gathering means located above said charge receiving station and including trap door means located directly thereabove and substantially coextensive in area and normally parallel to said table, means for directing onto said charge gathering station a plurality of containers through an entrance thereto, retaining means located along the sides of said charge gathering station except for the entrance thereto and positioned for retaining containers thereupon, gate means for said charge gathering station, and control means for actuating said compression plates, said ram plate, trap door means and gate means in preselected timed relationship, said gate means being held open by said control means during the actuation of said ram plate.

2. In apparatus of the class described, trap door means comprising normally horizontal floor means, means for enclosing said trap door means except for an entrance through which may be directed a plurality of containers, means for directing a series of such containers through such entrance, a vertical feed stop plate positioned for vertical reciprocable motion with respect to such entrance, such plate having a horizontal foot portion, power means for moving such plate in such vertical reciprocable motion, a threshold element fixedly mounted at such entrance and over which such containers pass in entering upon said trap door means, said feed stop plate being mounted for vertical reciprocable motion in a substantially vertical plane spaced from said threshold element a selected distance measured horizontally and comprising a predetermined part of the width of one such container, and control means for lowering said stop plate to rest such foot portion temporarily upon the tops of containers therebeneath and for urging said plate down in response to the opening of said trap door means.

3. In apparatus of the class described, a primary charge receiving station having on one side thereof a fixed compression plate and opposite thereto a reciprocably mounted compression plate for pressing a charge of bags therebetween, power means for actuating said reciprocably mounted compression plate, a charge loading ram plate and reciprocable power means for moving said ram plate reciprocably between said compression plates for urging a charge of bags out of said station, a feeder station located above said primary station, said feeder station being constituted by trap door means comprising the floor thereof and means for enclosing three sides of said feeder station, one side being normally open for the entrance of bags therein, means for directing a group of bags into said feeder station, a stop plate mounted to act as gate means to open and close the aforementioned entrance side of said feeder station, power means for opening and closing said trap door means, power means for reciprocably vertically moving the aforementioned stop

plate, control means for controlling the sequence of operations of the aforementioned power means to actuate the trap door means thereby to drop a charge of bags onto such primary charge receiving station and concurrently to actuate the power means for said stop plate to lower same and for reversing such power means to reclose the trap door means and lift said stop plate whereafter said power means for said reciprocably mounted compression plates is actuated and thereafter said power means for the ram plate is actuated to urge the compressed charge out of the charge receiving station.

4. Apparatus in accordance with claim 3 including: duck-bill means including a pair of duck bills mounted for relative angular movement for receiving the mouth of a bale and stretching same open in response to the spreading of such duck bills, the mouth of said duck-bill means being positioned in alignment with the stroke of said ram plate to receive a charge moved out of such charge receiving station by such ram plate.

5. In apparatus of the class described including in combination: a substantially horizontal table, a pair of substantially vertical compression plates, a substantially vertical ram plate mounted for reciprocable motion in respect to said table and between said compression plates, said ram and compression plates defining three sides of a charge receiving station, the fourth side comprising a discharge opening, charge gathering means located above said charge receiving station and including trap door means located directly thereabove and substantially coextensive in area and normally substantially parallel to said table, means for directing onto said charge gathering station a plurality of containers through an entrance thereto, retaining means located along the sides of said charge gathering station except for the entrance thereto and positioned for retaining containers thereupon, gate means for said charge gathering station, and control means for actuating said compression plates, said ram plate, trap door means and gate means in preselected timed relationship, said gate means being held open by said control means during the actuation of said ram plate, said control means being constructed and arranged to close said trap door means immediately after opening same, said ram plate and said container directing means being operable concurrently under the influence of such control means to enable the accumulation of a charge in such charge gathering station simultaneously with the removal of a charge from such charge receiving station.

6. In apparatus of the class described including in combination: a substantially horizontal table, a substantially vertical ram plate mounted for reciprocable motion in respect to said table, said ram being positioned along one side of a charge receiving station upon such table, an opposite side of such station comprising a charge discharge side, charge gathering means located above said charge receiving station and including trap door means located directly thereabove and substantially coextensive in area and normally substantially parallel to said table, means for directing onto said charge gathering station a plurality of containers through an entrance thereto, retaining means located along the sides of said charge gathering station except for the entrance thereto and positioned for retaining the containers thereupon, gate means for said charge gathering station, and control means for actuating said ram plate, trap door means and gate means in preselected timed relationship, said gate means being held open by said control means during the actuation of said ram plate, said control means being constructed and arranged to close said trap door means immediately after opening same, and to operate said ram plate and said container directing means concurrently to enable the accumulation of a charge in such charge gathering station simultaneously with the removal of a charge from such charge receiving station.

7. In apparatus of the class described, trap door means comprising normally horizontal floor means, means

for enclosing peripherally said trap door means except for an entrance through which may be directed a plurality of containers, means for directing a series of such containers through such entrance, a vertical feed stop plate positioned for vertical reciprocable motion with respect to such entrance, such plate having a horizontal foot portion, power means for moving such plate in such vertical reciprocable motion, a threshold element fixedly mounted at such entrance and over which such containers pass in entering upon said trap door means, said feed stop plate being mounted for such vertical reciprocable motion in a substantially vertical plane spaced from said threshold means a selected distance measured horizontally, said distance comprising a predetermined part of the width of one such container, and control means for lowering such stop plate to rest such foot portion temporarily upon the tops of containers therebeneath and for urging said plate down in response to the opening of said trap door means, a substantially horizontal table positioned beneath said trap door means and comprising a charge receiving station, said trap door means comprising a ram plate mounted for reciprocable motion with respect to said table for removing therefrom a charge which has been dropped thereon from above, said control means also being operatively connected to said ram plate, said control means being constructed and arranged for actuating said stop plate as aforementioned, opening said trap door means and thereafter promptly closing same and raising said stop plate whereby a new charge of containers is accumulated in such charge gathering station simultaneously with the actuation of said ram plate and the removal of a charge from the charge receiving station.

8. In apparatus of the class described, trap door means comprising normally horizontal floor means, means for enclosing peripherally said trap door means except for an entrance through which may be directed a plurality of containers, means for directing a series of such con-

tainers through such entrance, a feed stop plate positioned for motion with respect to such entrance, power means for moving such plate, a threshold element fixedly mounted at such entrance and over which such containers pass in entering upon said trap door means, said feed stop plate being mounted for motion in a path spaced from said threshold means a selected distance, said distance comprising a predetermined part of the width of one such container, and control means for moving said plate to stop the movement of containers onto the trap door means at the time of the opening of said trap door means, a substantially horizontal table positioned beneath said trap door means and comprising a charge receiving station, said trap door means comprising a charge gathering station, a ram plate mounted for reciprocable motion with respect to said table for removing therefrom a charge which has been dropped thereon from above, said control means also being operatively connected to said ram plate, said control means being constructed and arranged for actuating said stop plate as aforementioned, opening said trap door means and thereafter promptly closing same and raising said stop plate whereby a new charge of containers is accumulated in such charge gathering station simultaneously with the actuation of said ram plate and the removal of a charge from the charge receiving station.

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