Jan. 3, 1933. C. W. HARTMANN 1,893,169

CARTON FILLING APPARATUS

Filed July 26, 1930 3 Sheets-Sheet 1

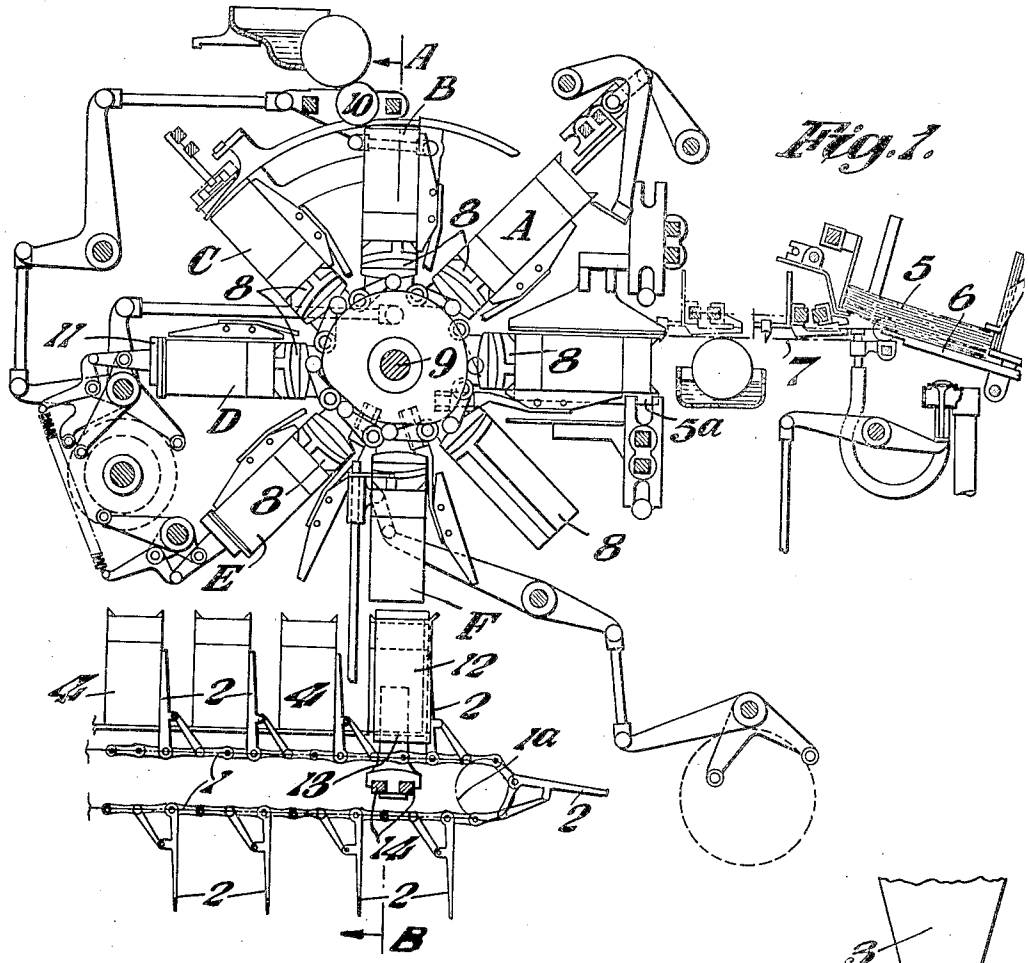


Fig. 1.

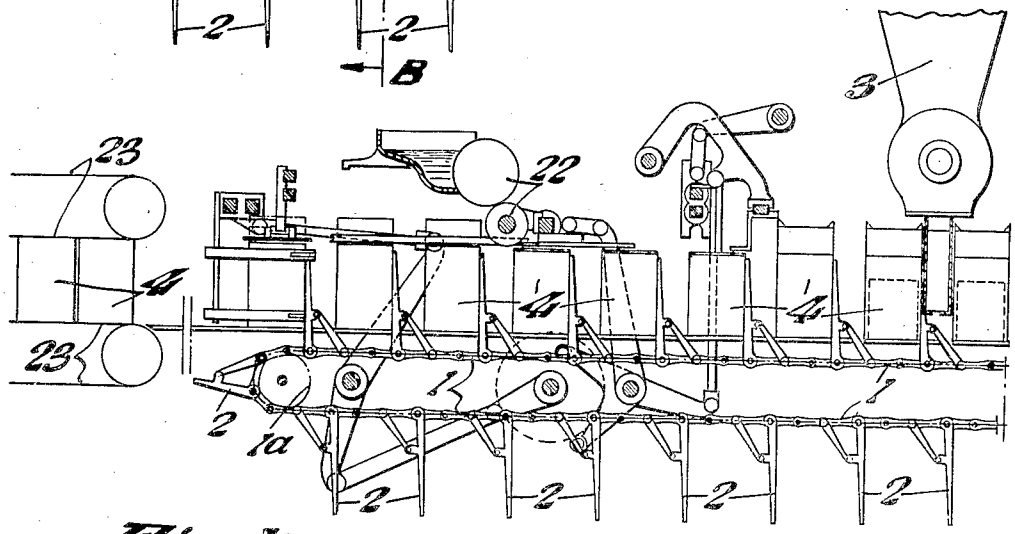


Fig. 1a

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Fig. 3

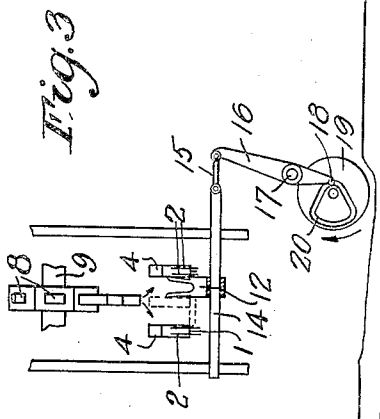
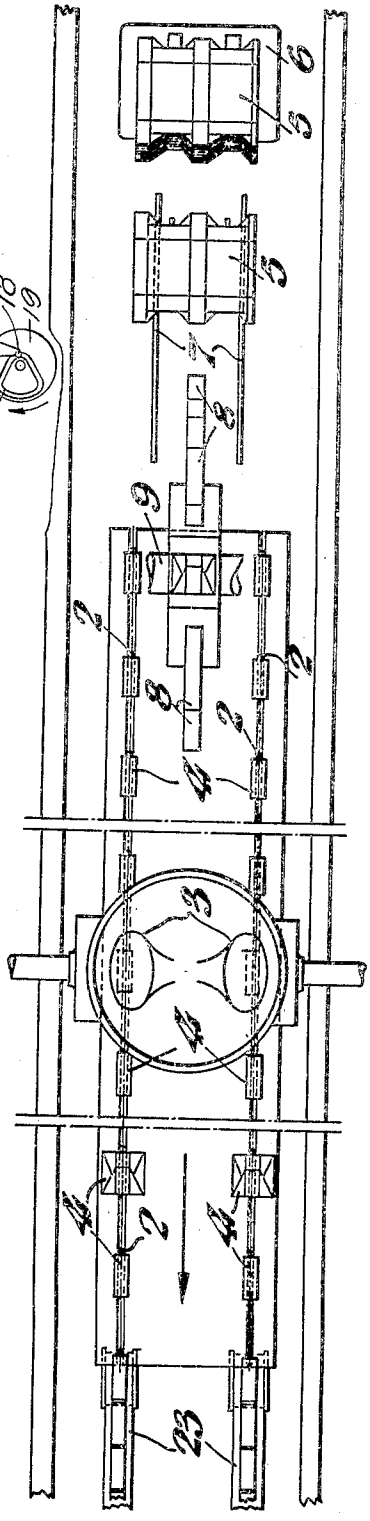


Fig. 2



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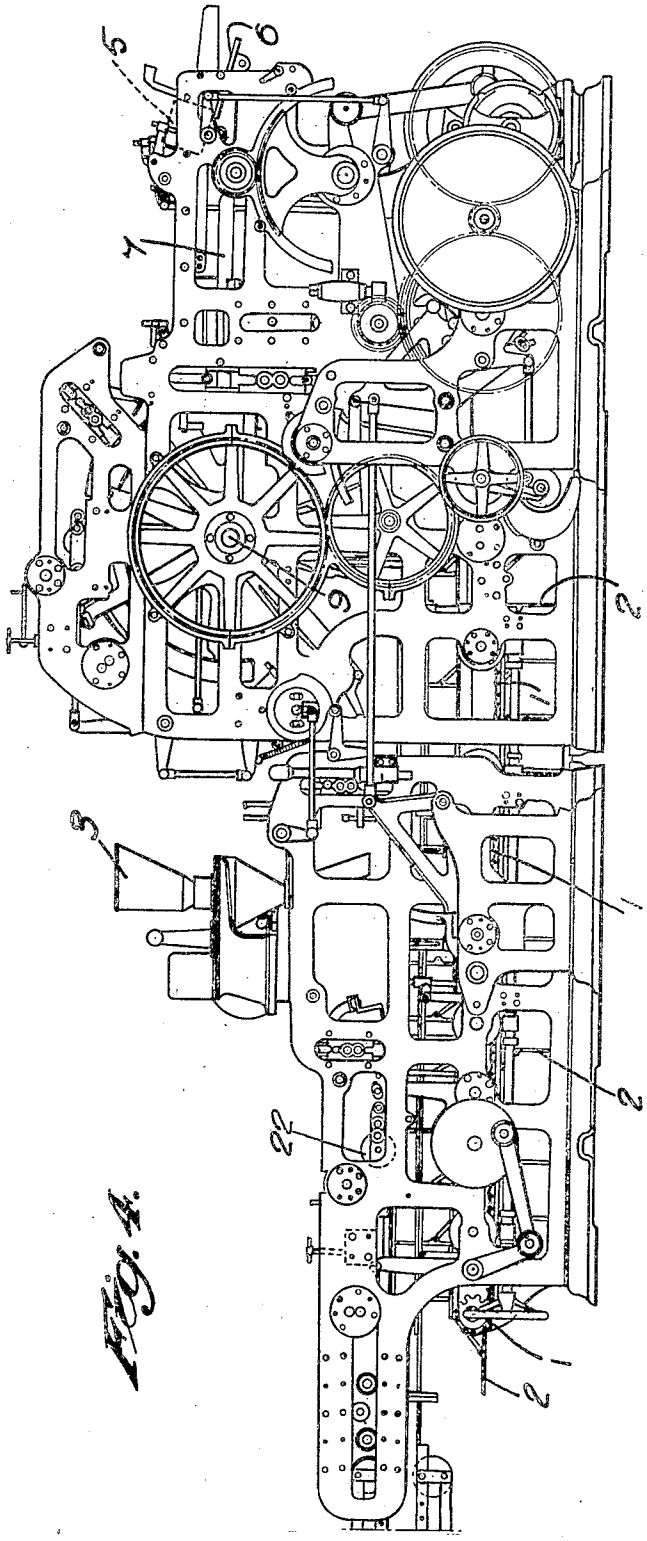


Fig. 4.

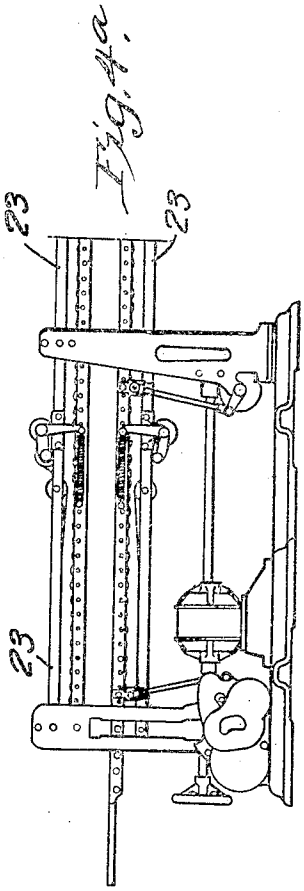


Fig. 4a.

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UNITED STATES PATENT OFFICE

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CARTON FILLING APPARATUS

Application filed July 26, 1930, Serial No. 470,836, and in Great Britain August 3, 1929.

This invention relates to a method for automatically filling powdered, granular or other materials into a series of cartons or packages and to automatic apparatus for effecting the filling operation and which may in addition effect the closure of the carton or package.

The object of my invention is to increase the time available for filling the cartons or packages without reducing the rate at which the empty cartons or packages are supplied.

According to my invention I propose to employ a number of conveyors arranged side by side, for instance two or three parallel conveyors, and means is provided for receiving empty cartons successively from a delivery device common to all of the conveyors and for delivering them in regular sequence successively onto the conveyors, each of said conveyors passing the apparatus for filling the cartons on the conveyors.

In carrying the invention into practice the cartons or packages are fed automatically in a number of single lines each of which travels towards a hopper or filling device which weighs or divides the material into predetermined quantities and delivers it to the cartons when they arrive in position beneath it. The line of cartons or packages before they reach the filling apparatus are separated or divided into two or more lines but preferably not more than three lines are used. By this means the time available for weighing or dividing the material into predetermined quantities and delivering it to each individual carton or package is double in the case of two lines being used and treble in the case of three lines being used than would be the case if the cartons were fed past the feeding apparatus in a single line. The weighing or dividing and filling apparatus is arranged transversely across the lines of cartons or packages and the mechanism for feeding them along the machine. This enables two or three weighing or dividing devices to be arranged side by side so that two or three cartons or packages may be filled simultaneously. Ample space will be available for these two or three weighing or dividing devices side by side and to enable the delivery outlets from the devices to the cartons or packages to be kept either vertical or substantially vertical thus ensuring a quick and effective delivery of the whole of the weighed or divided material to the cartons. This is especially of advantage when handling materials which are likely to clog or which are sluggish in their movements. As the lines of cartons or packages pass away from the filling apparatus after being filled they may if desired be again brought into a single line so that a single closing and sealing apparatus may operate on the whole. If desired however, separate closing and sealing devices may be employed for each line of the two or three lines of cartons or packages. The closing and sealing device may be of any suitable known character.

In carrying my invention into practice I prefer to employ a machine or apparatus which may be built in a series of units adapted to be erected side by side so that any suitable number of units may be coupled up together so that the whole will form a machine capable of giving any desired output in a given time. Each unit of the machine comprises a suitable bed or frame at one end of which the cartons or packages to be filled are supplied to the machine. If desired the cartons may be arranged in piles in blank form at one end of the machine and a suitable rotary or other folding apparatus is provided which folds up the cartons and closes the lower end thereof. This apparatus may comprise a rotatable hub having a series of formers corresponding to the shape of the carton projecting radially therefrom. The blank carton is fed to each former and is folded around it and secured by suitable adhesives. The outer ends of the carton are then closed by pressing inwardly the end flaps of the carton and spreading the side flaps outwardly. Adhesive is then applied to the spread-out surface of the side flaps which are subsequently turned down and pressed together until the adhesive sets. The folded carton is then delivered open end upwards to a device which acts to separate the cartons into two or three lines along which they are fed to the weighing or dividing and filling device. The device for separating the

cartons into two or three lines comprises a reciprocating member which pushes each carton laterally to one side or the other of its position of delivery onto a conveyor having suitable fingers or holding devices for carrying them along the conveyor. One movement of the conveyor in one direction will displace the carton to the right placing it on the right hand conveyor, whilst the return movement of the device will displace the next carton to the left placing it in position on the left-hand conveyor, thus dividing the cartons into two lines arranged on two conveyors which will in turn convey them to and beneath two weighing or dividing devices which are located side by side transversely across the machine and which may if desired be housed in a single hopper or feeding device for containing the material to be packed in the cartons. The weighing or dividing devices deliver the materials direct to chutes arranged vertically over the cartons into two conveyor lines beneath them. Suitable plungers or other devices may be provided to push up the cartons so that their open upper ends will engage directly over the delivery outlet from the weighing or dividing devices so that the material will be delivered directly into the carton in a substantially straight line thus ensuring effective filling of each carton with accurate quantities of material. After each carton is filled it is again lowered on to the conveyor and the two lines of cartons then move onwardly along the length of the unit of the machine to the apparatus for closing and sealing the upper ends of the carton. The packed and sealed cartons are then delivered from the end of the machine in either two lines or a single line as desired.

In order that my invention may be clearly understood and readily carried into effect I have appended hereto sheets of drawings illustrating somewhat diagrammatically an embodiment thereof, and wherein:—

Figs. 1 and 1*a* show in two parts a side elevation view showing the relative positions of the parts necessary for a complete sequence of operations.

Fig. 2 is a plan view of Fig. 1 showing two lines of conveyors supplied from a common source and each passing under its own carton filling apparatus.

Fig. 3 is a detail sectional end view on line A—B of Fig. 1 showing a suitable mechanism for alternately feeding the empty cartons on to the conveyors.

Figs. 4 and 4*a* show a side view in two parts of a complete apparatus.

Referring to the drawings it is preferred to employ apparatus which can be readily arranged alongside another apparatus of a similar nature in a convenient space, and for this purpose the conveyors for receiving the empty cartons can be adapted to be coupled together for movement in unison. Each unit comprises any suitable frame supporting an endless conveyor 1 carried over sprocket wheels 1*a* (Fig. 4) formed with a series of equidistantly spaced upstanding fingers 2 adapted to engage the empty cartons and to carry them under a measuring and filling apparatus 3 provided with each conveyor 1. The measuring and filling apparatus 3 are arranged transversely across the travelling lines of cartons 4 on the conveyors 1 which enables a number of cartons to be filled simultaneously.

It is preferred to arrange the cartons in a pile 5 on a suitable support 6 from which they are fed by hand or by any suitable sheet feeding apparatus on to a guide 7 opposite which are brought successively a number of formers 8 radiating from a rotatable hub 9, the formers 8 having the carton blanks folded and closed at one end thereon in a succession of operations. The formers 8 correspond to the shape of the finished open carton and as each blank is fed from the guide 7 on to the upper horizontal edge of the former 8 immediately opposite it, the carton is folded along two longitudinal lines to produce two parallel sides and one longitudinal end, and subsequently the remaining end, indicated by 5*a*, is also folded and sealed in correct position, for instance by the time the said former has moved to the position A in Fig. 1. In a successive position B of the said former the open flaps of the carton at the outer end of the former are pasted by paste applying device 10, and in a still further position C these pasted flaps are sealed and subsequently in a position D of the former brought under a pressure applying member 11. The carton can be subjected to a further pressure operation at the point E of the former, but at the point F the carton drops or is pulled off the former on to a device for delivering it on to one of the conveyors 1.

The said delivering device comprises an upstanding plate 12, as shown in Fig. 3 and it is reciprocated alternately with regular intermittent movements of the conveyors, so that when the conveyors 1 are stationary the plate 12 engages one vertical side of a carton dropped from the lowermost of the ring of formers 8 and pushes it laterally along a support 13 on to a fixed narrow plate, not shown, which will enable the said carton upon movement of the appropriate conveyor to be engaged by a pair of upstanding fingers 2 of the conveyor and carried with the conveyor to the appropriate filling apparatus 3. The plate 12 for pushing the cartons on to the conveyors is carried by a horizontal axially slidable rod 14 connected at one end by a link 15 to one end of a rocking arm 16 fulcrumed at 17 and carrying at its other end a lateral roller 18 engaged in a cam slot or groove 20 in a continuously rotating wheel

19. The cam slot or groove 20 in the wheel 19 contains two idle concentric parts which hold the arm 16 stationary as the conveyors 1 are moving, the two cam parts which move the arm when the conveyors are stationary. The conveyors are stationary at the moments empty cartons are aligned beneath the filling apparatus and during these stationary periods vertically reciprocating pushers 21 engage and raise the cartons against the filling hoppers of the filling apparatus and by such movements release into the cartons the weighed material. After each carton is filled it is lowered back on to the conveyor and the conveyor now continues its movement to bring the next in succession of the empty cartons under the filling apparatus when the filling operation is repeated.

The conveyors 1 carry the cartons under pasting rollers 22 after they are filled, and these rollers paste the open flaps at the upper ends of the cartons. The pasted flaps are folded on to each other and delivered into a combined conveying and pressure apparatus 23.

When it is desired to divide the cartons into three lines and to place them upon three conveyors then the reciprocating member 12 first moves one carton to the right and one to the left. The reciprocating member misses every third carton which is caused to travel along the centre of the machine being delivered to a central conveyor. The other two cartons of each three are displaced laterally one to the right and one to the left as in the formation of two lines already described, so that the three cartons are arranged for engagement with the fingers 2. When three lines of cartons are employed arranged upon three conveyors, then three weighing or dividing devices 3 are necessary. These as previously are arranged side by side transversely across the length of the machine and if necessary the width of the machine may be slightly increased to afford the necessary accommodation. Suitable intermittent movement is imparted to the various portions of the apparatus which are interconnected so as to operate automatically and in unison to feed the cartons onto the conveyors to the weighing or dividing and filling devices where they are filled, to close their ends after filling and to deliver the filled, closed and sealed cartons at the opposite end of the machine automatically and at a high rate of speed.

This machine may be constructed in a series of units each comprising two or three lines of cartons with two or three weighing or dividing and filling devices. The arrangement of the weighing or dividing and filling devices transversely across each unit enables all the devices for a number of units to be coupled together for operations directly from a single shaft or driving means. The same applies to the carton folding apparatus having the formers 8 a number of which may be mounted upon a single transverse shaft extending across a number of units each carton folding device being located over or in line with each unit of the machine. As the units of the machine are simply duplicates of each other a composite machine may be built up by coupling together a number of units and this composite machine may have any desired rate of output according to the numbers of units coupled together. Such a composite machine consisting of a number of identical connected units can be built at a less cost than a single unit designed to have the same rate of output. The arrangement also enables the operation of weighing or dividing and filling each carton to remain constant irrespective of the rate of output of the composite machine and ensures a sufficient length of time for the accurate and correct weighing or dividing of the material and its delivery to each carton in turn.

I claim:—

1. In apparatus for filling material into cartons, a number of conveyors, a corresponding number of filling devices arranged over said conveyors, a common carton shaping and supplying device for said conveyors and means for automatically delivering the cartons from the common supplying device successively to the different conveyors whereby there is obtained an increased period for the filling operation for any given rate of delivery of the packages.

2. Apparatus for filling material into cartons comprising two conveyors running side by side, two filling apparatus located one above each conveyor, a carton shaping apparatus common to both conveyors and a common source of supply for carton blanks, means being provided between said shaping apparatus and said conveyor for successively receiving the shaped cartons and delivering them alternately on to the said two conveyors.

3. Apparatus for filling material into cartons comprising two conveyors running side by side, two filling apparatus located one above each conveyor, a carton shaping apparatus common to both conveyors and a common source of supply for carton blanks, and a support beneath said carton shaping apparatus on to which the shaped empty cartons are delivered, a reciprocating upstanding plate with said support adapted to engage each empty carton, said abutment carrying the cartons successively opposite alternate conveyors.

4. Apparatus for filling materials into cartons comprising a pair of intermittently driven substantially parallel conveyors and a common source of carton supply for the conveyors, the said conveyors being driven from a point at which empty folded cartons are delivered on to them from said common source of supply to a point where material is de-

livered into the empty cartons, means common to all of the conveyors at such delivery end for shaping the cartons, and means for successively delivering the shaped cartons on to individual conveyors during the stationary periods of the conveyors.

5. Apparatus for filling materials into cartons comprising a pair of intermittently driven substantially parallel conveyors and a common source of carton supply for the conveyors, the said conveyors being driven from a point at which empty folded cartons are delivered on to them from said common source of supply to a point where material is delivered into the empty cartons, means common to all of the conveyors at such delivery end for shaping the cartons, and means for successively delivering the shaped cartons on to individual conveyors during the stationary periods of the conveyors, said delivering means comprising an upstanding abutment slidable transversely across the space between the supply ends of the conveyors, a stationary support upon which the empty cartons are delivered successively, and means for reciprocating said abutment relative to said support so that it engages opposite sides of successive empty cartons and pushes them on to the conveyors alternately.

6. Apparatus for filling material into cartons comprising two conveyors running side by side, two filling apparatus located one above each conveyor, a carton shaping apparatus common to both conveyors and a common source of supply for carton blanks, and a support beneath said carton shaping apparatus on to which the shaped empty cartons are delivered, a reciprocating upstanding plate with said support adapted to engage each empty carton, said abutment carrying the cartons successively opposite alternate conveyors, said abutment being slidable transversely across the space between the supply ends of the conveyors, a stationary support upon which the empty cartons are delivered successively, and means for reciprocating said abutment relative to said support so that it engages opposite sides of successive empty cartons and pushes them on to the conveyors alternately.

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