May 19, 1936. J. A. LIDBERG ET AL 2,041,358

ORIENTATING AND CARTON FEEDING DEVICE

Filed Dec. 18, 1931 5 Sheets-Sheet 1

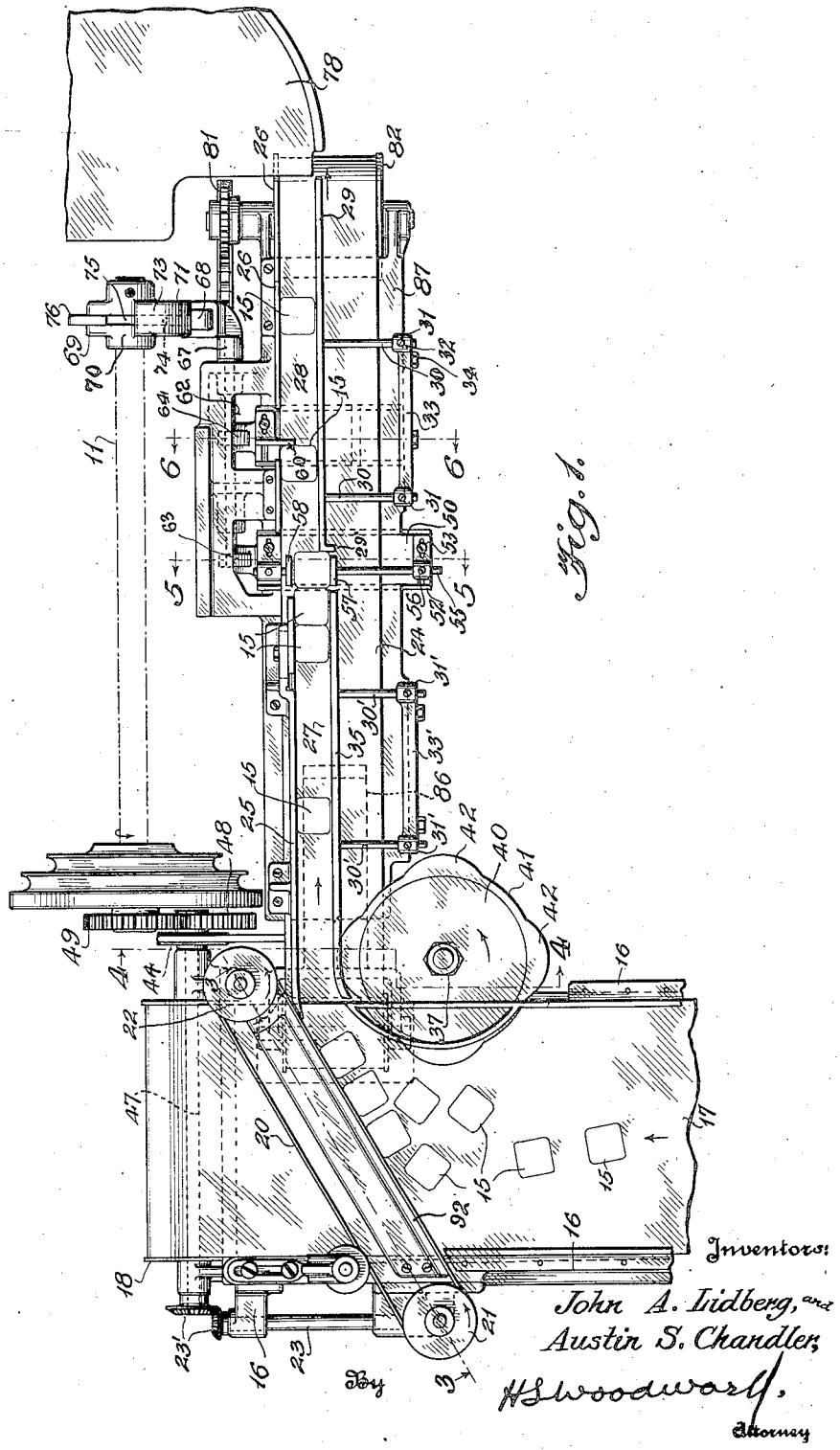


Fig. 1.

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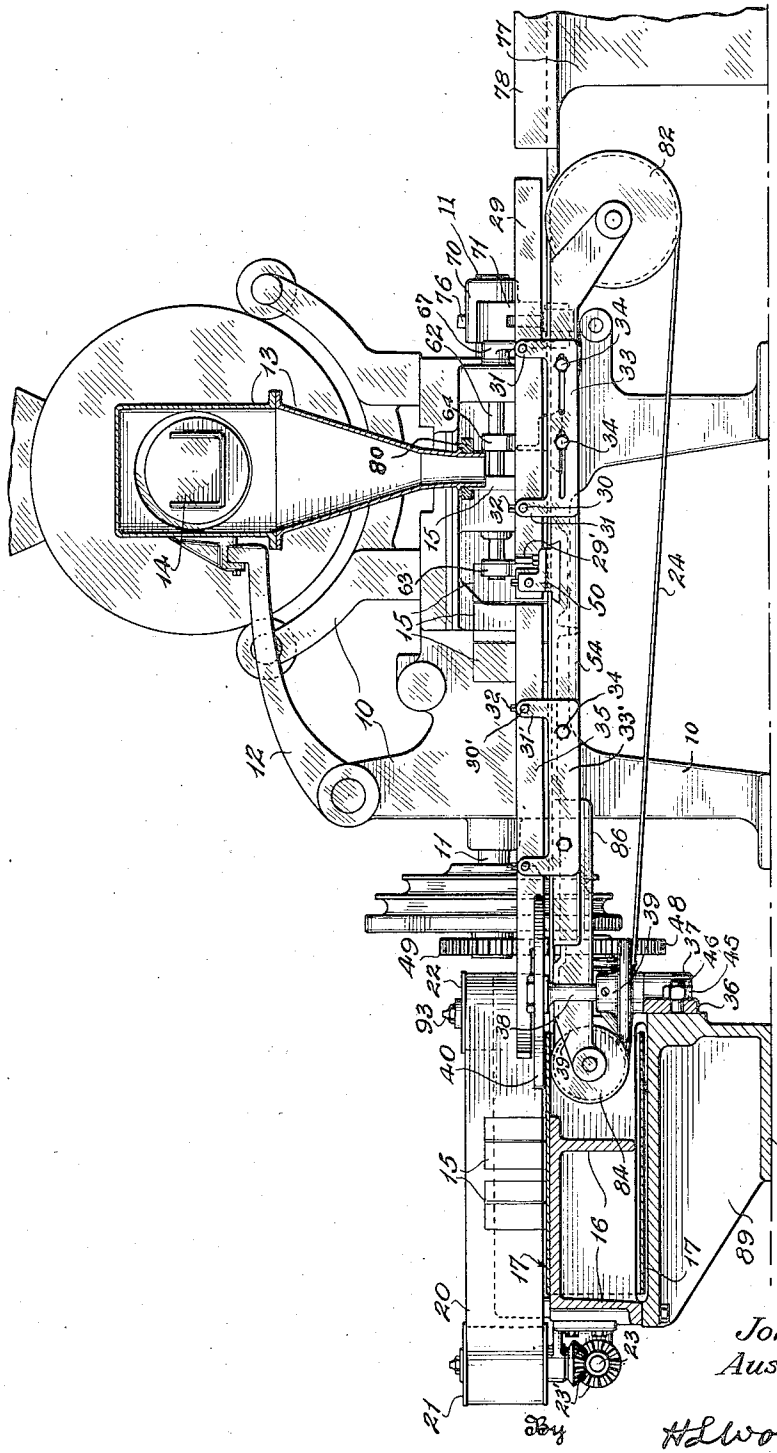


Fig. 2.

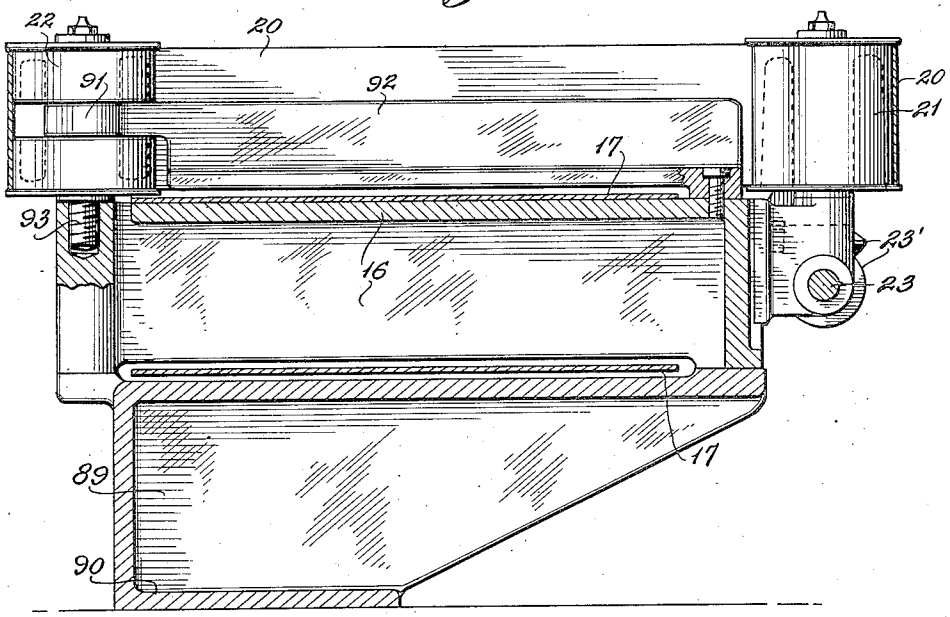
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ORIENTATING AND CARTON FEEDING DEVICE

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Fig. 3.



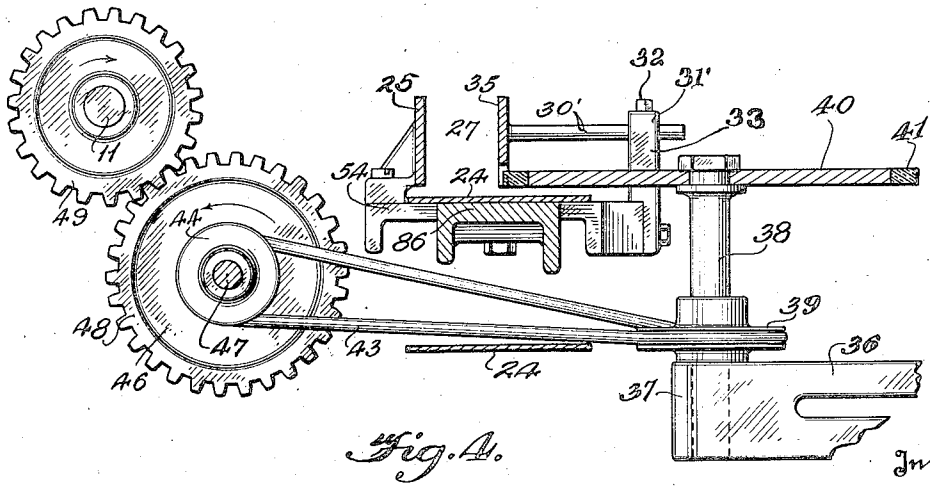


Fig. 4.

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ORIENTATING AND CARTON FEEDING DEVICE

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Fig. 5.

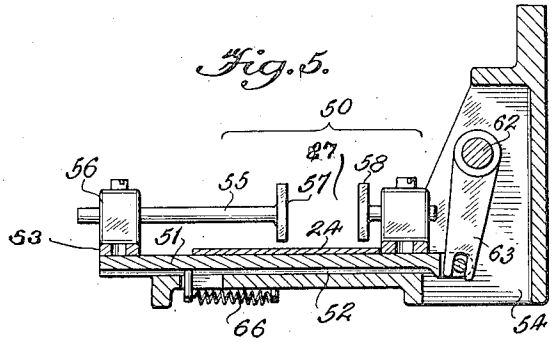


Fig. 6.

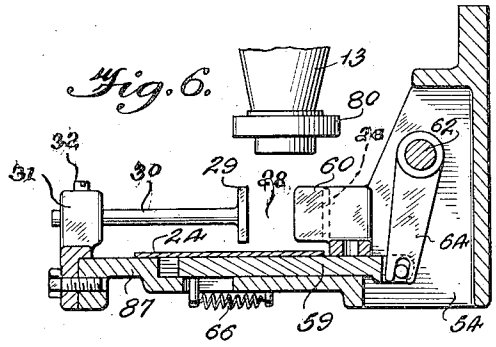
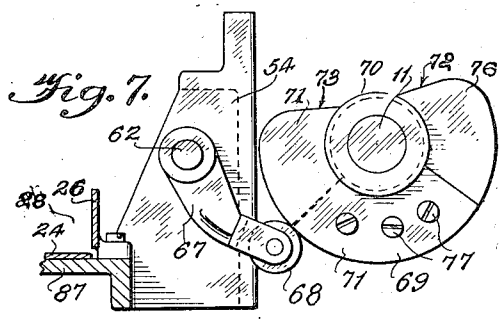


Fig. 7.



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Fig. 8.

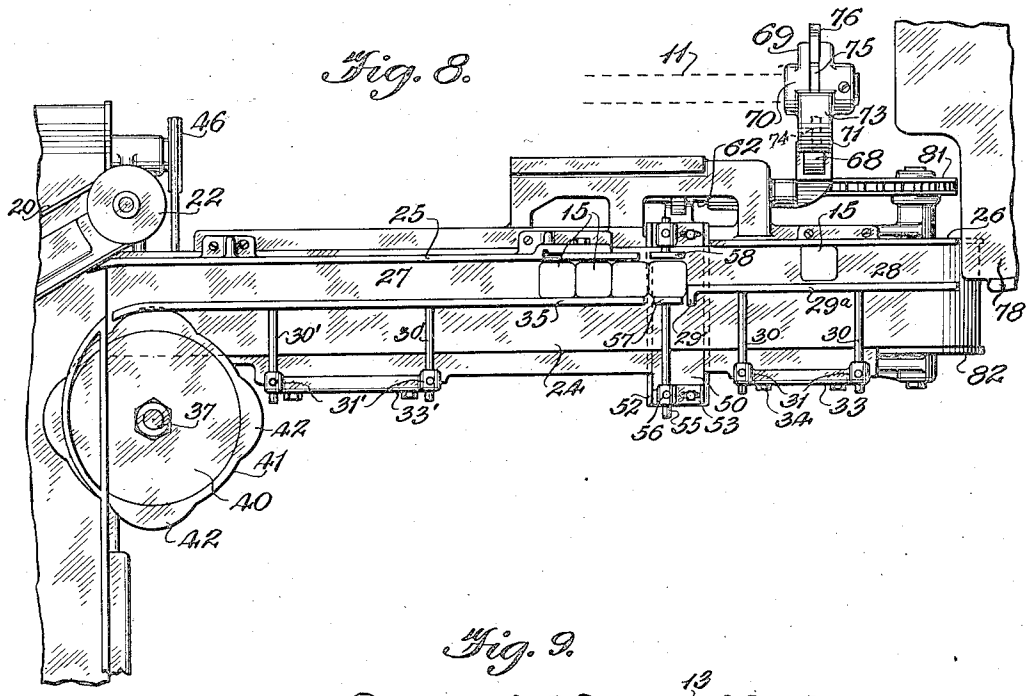
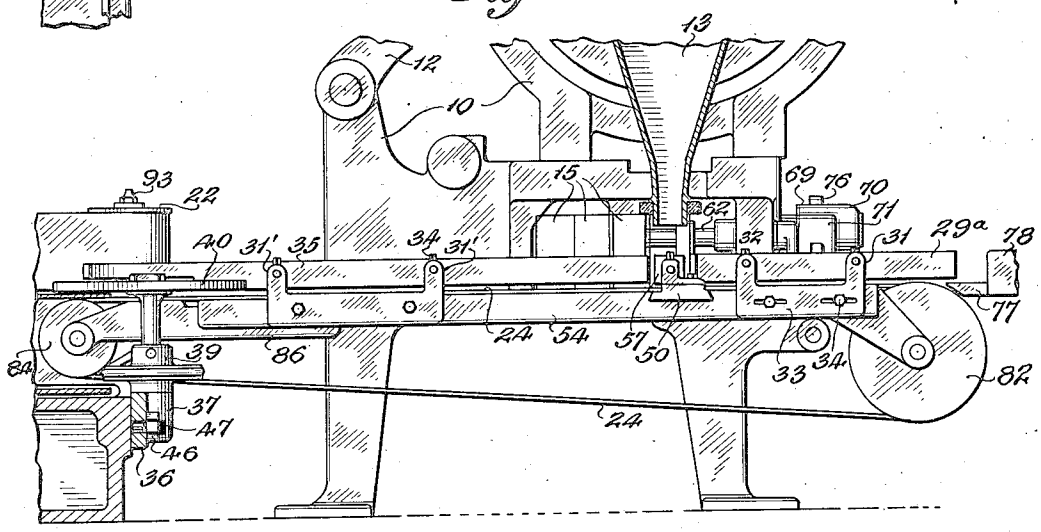


Fig. 9.



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Patented May 19, 1936

2,041,358

UNITED STATES PATENT OFFICE

2,041,358

ORIENTATING AND CARTON FEEDING DEVICE

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Application December 18, 1931, Serial No. 581,981

6 Claims. (Cl. 226—95)

The invention relates to article ordering or orientating and has for an object to present a new and extremely simple mechanism for effecting the ends in view and which will function in a new way for the presentation of articles in a fixed position at a given point when introduced in irregular order.

It is also an aim to present a novel and efficient means to move articles to a given station for filling or other operation and after a predetermined interval to move them filled from the station.

An important aim of the invention is to present a novel guide apparatus adjustable in a simple way to accommodate articles of different sizes.

A specific object of the invention is to present an attachment for bag filling machines whereby such machines may be inexpensively adapted to fill cartons.

It is an object to present a novel orientating device which is adaptable to use in positioning boxes, or small articles such as candy tablets, cakes, or other objects and articles to be presented in position for filling, wrapping or packing.

Additional objects, advantages and features of invention reside in the construction, arrangement and combination of parts involved in the embodiment of the invention, as will be understood from the following description and accompanying drawings, in which

Figure 1 is a top view of the orientating device.

Figure 2 is a front elevation thereof.

Figure 3 is a vertical section on the line 3—3 of Figure 1.

Figure 4 is a cross section on the line 4—4 of Figure 1.

Figure 5 is a section on the line 5—5 of Figure 1.

Figure 6 is a section on the line 6—6 of Figure 1.

Figure 7 is a detail of the cam, wiper and receptacle shifter control.

Figures 8 and 9 are fragmentary top and front views of a modification of the machine.

There is illustrated a portion of the main frame 10 of a standard form of bag filling machine in the trade well known as Brown bag filling machine, principal details of which are shown in the patent to Cummings, No. 539,171 and others. This machine includes a main shaft 11, which is utilized as the driving means for parts of the present invention. The prior machine includes also a stock-measuring and receptacle-filling apparatus the principal feature of which that is involved here being the funnel arm 12, which is moved downwardly at regular intervals so that it may receive the charges from the measuring device 14 and guide them into the receptacles. In the standard machine a bag feeding box, gummer and bag sealing mechanism are provided, but for the use of the present invention the said box, gummer, and bag sealing mechanisms are removed, and the tunnel 12 differs from the regular funnel or tunnel of the standard machine in being adapted to the particular size and shape of the receptacles 15 to be filled.

An auxiliary frame 16 is provided having legs 89 adapted to set on the same bed as those of the standard machine. On this auxiliary frame there is mounted a container-receiving conveyor in the form of a very broad endless belt 17 located to the left of the tunnel device a distance and extending from the front of the machine at right angles to the main shaft. This belt is carried upon rollers 18 and 19, one of which is adjustable. The upper reach of the belt moves inward toward the filling machine, and next the machine there is mounted closely over this broad belt a diagonal endless belt 20 mounted on vertical right hand and left hand rollers 21 and 22 located at opposite sides of the broad belt. The lower edge of the belt 20 rests on or is located closely over the top side of the belt 17. The right hand vertical roller 22 is nearest the charge forming machine, while the left-hand roller 21 is sufficiently distant to position the front reach of the belt 20 in a plane at an angle of 60 degrees to the line of travel of the broad belt. The roller 18 of the belt 17 is driven at its right hand end by spur gears 48—49 from the main shaft 11.

The shaft 47 of the roller 18 at its left end is utilized to drive by bevelled gears a countershaft 23, and this in turn drives by bevel gears 23' the left hand vertical roller 21 of the diagonal belt 20. The front reach of the belt 20 is backed by an angle plate 92 secured on the frame 16, one flange resting against the belt. By means of a bracket frame 54, an alley belt 24 is mounted on the frame 10 at right angles to the belt 17 and at the right of the latter, its upper reach moving toward the right. At the rear edge of this belt there are fixed two rear walls, 25—26 of receiving and discharge alleys 27—28. At the front side of the discharge alley 28 there is a wall 29 having fixed rods 30 at right angles thereto slidably adjustable in mounting sleeves 31 which are provided with set screws 32 and are formed on a lower plate 33 secured to the frame 54 by bolts 34 engaged in longitudinal slots of the plate 33, so that the front wall 29 of the discharge alley may be adjusted both longitudinally and transversely. Spaced to the left from the wall 26

there is a front wall 35 of the receiving alley 27, this wall being adjustable in its spaced relation to the rear wall 25, being mounted by rods 30' in sleeves 31' of a plate 33' secured on the bracket frame 54 to be described. This wall need not be adjustable longitudinally but the mounting of the wall 29 may be duplicated here if desired. The rear wall 25 of the receiving alley projects slightly over the belt 17 and is bevelled and slightly curved at the left end so as to lie close to and as nearly in line with the belt 20 as practicable. The front wall of the receiving alley extends over the belt 17 also and is curved away from the belt 20 slightly. On a suitable horizontally slotted plate 36 on the right hand side of the frame 16, there is a bearing 37 supporting the lower end of a spindle 38. On the lower end of the spindle over the bearing there is a pulley 39 located immediately above the level of the lower reach of the belt 24, while at the upper extremity of the spindle there is fixed thereon a friction wheel 40 slightly above the belt 17 and projecting a distance thereover, is periphery spaced from the diagonal belt 20 a distance equal to the width of the alley 27, or slightly more. The wheel 40 is projected a short distance horizontally through the lower part of the front wall 35 of the receiving alley 27 at the curved part of the wall. The wheel 40 is provided with a friction facing 41 having prominences 42 at suitable intervals, these being in the form of arcuate radial enlargements. The wheel 40 is driven by a crossed belt 43 from a pulley 44 on the shaft 47 of the roller 18, engaged on the pulley 39 so as to rotate the wheel 40 in a counter clockwise direction. The friction facing of the wheel is an elastic belt fitted tightly on the periphery of the body of the wheel. The wheel may be a simple circular disc and the belt may mave the prominences 42 formed integrally thereon, as shown. The plate 36 is secured by a clamp nut 45 engaged on a stud 46 extending through the slot of the plate and fixed in a plane face or the right side of the frame 16, the plate being thus movable to permit adjustment toward and away from the belt 20 and back wall of the alley 27. The shaft 47 has a large gear 48 at its inner end and a smaller gear 49 meshed therewith is fixed on the left hand end of the main drive shaft 11.

The alley belt 24 is operated at a more rapid speed than the belt 17, and the diagonal belt 20 also operates at a greater lineal speed than the belt 17.

It will be noted that the back wall 25 of the receiving alley 27 is set forwardly from the plane of the back wall 26 of the discharge alley 28 about three eighths of an inch for all sizes of receptacles, although the particular distance is not arbitrary. These walls need not be adjustable. The two front walls are longitudinally spaced a distance slightly more than the corresponding measurement of receptacles which are to pass through the alleys, and when the machine is to be used with a different sized receptacle the front wall 29 of the discharge alley is preferably adjusted further toward the right. The left end of the wall 29 is formed with an outturned flange 29' serving as a stop for containers passing from the alley 27.

Between the walls of the receiving and discharging alleys 27—28 there is transversely reciprocable a shifter 50 (Figs. 1, 2 and 5) consisting of a plate 51 having bevelled edges fitted in a dovetail channel 52 in the bracket frame 54 mounted on the front side of the frame 10. On the front part of the shifter plate 51 there is longitudinally adjustable a front set-over bar 55 engaged in a sleeve 56 which is tranversely adjustable on the front end of the plate 51, this bar having a head 57 to engage receptacles. A back piece 58 is similarly adjustable transversely on the rear end of the plate 51. The head 57 is adjusted with respect to the back piece 58 to the same spacing as that between the front and back walls of the alleys 27 and 28. The shifter is normally positioned in line with the receiving alley and is moved momentarily toward the rear at the same time intervals as the tunnel, but before the downward movement of the tunnel. The point under the mouth of the tunnel when lowered will be termed the loading station.

At a point slightly beyond this station toward the end of the alley 28, a receptacle stop 60 (Fig. 6) slidably mounted is projected through a longitudinal slot in the rear wall 26 of the discharge alley over the belt and extending a short distance into the alley normally. This stop is fixed on a plate 59 mounted like the plate 51 on the bracket frame, and is similiarly adjustable. Its movement may be of the same extent and direction, and at the same time as the movement of the shifter 50. Movement of the shifter and receptacle stop are effected by a rock shaft 62 mounted to the rear of and above the alley 28 on the bracket frame 54 and having respective arms 63—64 extended downwardly and connected to the plates 51—59. A spring or springs 66 may be used to hold the shaft 46 at initial position. At the extreme right end of this shaft 62 a third arm 67 (Fig. 7) is projected downward therefrom having a wiper 68 engaged by a cam 69 on the main shaft 11, by which the shaft 62 is rocked at the same intervals that the tunnel arm 12 is oscillated but sufficiently in advance of the movement of the arm 12 for the shifting of receptacles under the tunnel while the latter is elevated.

The proper timing and relative positions of the tunnel and shifter and stop are comparatively simple since the shaft 11 also operates the arm 16 and the measuring device in the standard machine.

The principal period in the cycle of operation of the shifter and stop is the time required for filling the receptacle. Another period of importance is the time required for a receptacle to clear the head of the set-over bar after it has been moved into line with the second alley 28. This period will vary with the size of the receptacle and special means is provided to adapt the device thereto. This consists in forming the cam with an adjustable lobe. The cam comprises a low face portion 70 from which rise parallel planiform lobes 71, joined at the drop side if desired, both being the same shape and transversely alined. Their peripheries are concentric, and they have rising and drop faces 72—73 at the front and rear sides. There is thus formed between the lobes a space 74, and the bottom of this space is formed concentric with the shaft, a groove 75 being continued therefrom on the face 70. In the space 74 and the groove there is slidably fitted a circumferentially extensible lobe piece 76. One of the lobes 71 is thicker than the other, and set screws 77 are engaged therethrough by which the extension 76 is secured in adjusted positions. The wiper 68 is of a width to lie across both lobes 71 and is held against the cam by means of the springs 66 as before indicated which may be as discretion dictates, but in the present instance a contractile spring is engaged with the

shifter plate 51 at the under side and anchored to the frame 54, while another such spring is similarly connected with the stop mounting plate 59, and with the frame 54.

A delivery table 78 is provided at the mouth of the discharge alley and on this there is provided means to divert the discharge containers each side of the table, so that operatives at each side of the table may place covers thereon or otherwise close the containers.

As exemplified, the machine is particularly valuable for filling rectangular boxes or cans but will operate equally well with circular or oval containers. If desired, cartons with closing flaps may be handed thereon by providing any approved opening means, and if desired, carton closing means such as are known may be added to the mechanism. The enlargements 42 of the wheel 40 may be omitted if found desirable for particular forms of containers, and the motion of the wheel modified by suitable means, as required.

In operation, the stock with which receptacles are to be filled being supplied to the machine properly, and the machine being ready to operate, a number of the receptacles are introduced into the receiving alley 27 and one at the filling station, on the belt 24 against the stop 60. The machine may then be started and the receptacles to be filled simply placed bottoms down on the belt 17 in any order. By this belt they are carried rearwardly and against the belt 20. Striking this they become adjusted with one side flat against the belt 20 and are rapidly carried in this position onto the belt 24 in the receiving alley 27 by reason of the forces frictionally applied by the belts 17 and 20. Some of the receptacles, however, become interposed between the belt 20 and parts of or corners of others, preventing them from passing into flat engagement with the belt 20, and a group in such order will occasionally move toward the alley. Engaging the jigger wheel 41, however, its friction facing will turn the receptacles which engage it, causing them to adjust themselves quickly to the belt 20. As soon as a receptacle is engaged by the wheel and moved substantially toward operative relation to the belt 20, the belt 17 carries it away from the wheel 41, so that no further disturbance of the position of the receptacle will be caused by the wheel. In this way all receptacles are quickly alined with and entered in the alley 27, into which they move until the one furthest in advance enters the space in the shifter 50 and has brought up against the end of the wall 29 of the discharge alley 28, where it is held until the shifter works. When the shifter works, the belt 24 carries the receptacle out of the shifter along the alley 28 toward the filling station, and upon reaching this point it is checked by the stop 60. At the same time that the shifter moves inward the stop 60 is withdrawn from the alley and the filled carton allowed to find its way through the discharge alley by the propulsion of the belt 20. The stop returns immediately after the filled carton has moved clear thereof. The speed of this belt is such as to move the carton at least the distance of the width of the carton longitudinally of the alley during the time the shifter is held at the inner limit of its movement. This obviates liability that on return movement the receptacle last shifted will not have cleared the shifter, be drawn back and damaged against the end of the front wall 35. This movement must also be sufficiently rapid to move an empty receptacle from the shifter to the filling station before the tunnel 13 descends.

The tunnel 13 is shaped at its lower end to fit snugly in the opening of the receptacle, and there is also provided on the tunnel a resilient rubber collar or flange 89 which is of sufficient extent to project beyond the sides of the receptacle and located far enough down on the tunnel to engage flatly upon the top edge of the receptacle and thus prevent any of the charge from splashing out as it enters the receptacle.

The belt 24 is driven by a sprocket 81 on the rear end of the shaft of the right hand roller 82 for the belt 24, to which a chain may be run from any suitable driving member, not shown.

For the period during which the shifter must remain in line with the alley 28 to clear an empty receptacle moving to the loading station and during which the stop 60 may be held retracted, the total circumferential or angular measurement between the rising and drop faces 72—73 of the cam 69 may be adjusted to provide the necessary period length. The remainder of the cycle of operations may be readily accomplished while the wiper is travelling upon the high face portions of the cam and extension pieces, if the cam is adjusted so as to provide a minimum drop period for the wiper, consistent with assured clearance of receptacles from the shifter and past the stop 60.

The initial movement of the shifter and stop in relation to the tunnel movement and loading operation is always the same, beginning immediately after lifting of the tunnel.

The alley belt 24 is mounted entirely on the bracket frame 54, passing over and downward around a roller 82 at the right, the shaft of this roller being journalled in fixed bearings 83 at front and rear of the frame 54, and projecting at the rear, where the sprocket 81 is fixed thereon. At the left (Fig. 2), this alley belt passes around a roller 84 journalled in a yoke 85 having a tongue 86 slidably and adjustably secured in a suitable channel in the top plate 87 of the bracket frame. This top plate and the tongue 86 support the top reach of the belt. The mounting of the outer end of the belt 17 (not shown) may be similar to the mounting of the left end of the belt 24, or otherwise, as discretion dictates. The legs of the frame 16 may be simple plates 89 having foot flanges or a common flange 90 as in Figure 2. The right hand end of the diagonal belt 20 is carried by a split roller 22 comprising upper and lower sections, and an arm 91 (Fig. 3) is extended from the diagonal angle plate 92 and secured on the spindle 93 of the split roller between the sections of the roller. The other end of this plate 92 is secured on top of the frame 16, beyond the left edge of the belt 17. This angle plate just clears the belt 17 and has a vertical flange 94 at its front side lying against the inner side of the belt as a support or buttress for the belt.

The invention is applicable to use in filling bottles, or the orientating of cakes or other articles of various kinds to be delivered to any succeeding mechanism. For the various adaptations to which it is suited, various parts may be omitted, and proportions varied as discretion may dictate to meet the particular requirements of each case.

In a preferred form of the invention as shown in Figures 8 and 9 the stop 60 is omitted, and the front wall 29a of the second alley is stopped with the same form as first shown but at a point im-

mediately beyond the filling station, while the alley 27 is continued short of that point in the same relation to the alley 28 as before described. Thus the filling station is immediately at the right hand end of the alley 27, instead of in the alley 28. The first described arrangement is desirable where it is considered unsafe to have a series of following articles press against the one being filled or in case it should be wished to use any auxiliary apparatus operative at the filling station, or to leave the receptacle at the filling station clear for other reasons.

In the showing of Figures 8 and 9 the shifter 59 is also located immediately before the left hand end of the wall 29 and may be of the same construction before described, and similarly connected to the rock shaft 62. The cam 69 may be used in the same form as before, but adjusted so that it operates the shifter immediately after raising of the tunnel 13, instead of in advance thereof, and the tunnel is shaped and extended so that it will discharge over the alley 27.

It should be understood that the point at which the shifter device is located is immaterial, and that the particular location of the stops by which the containers are held stationary while being filled may be varied to suit requirements. The alley 28 may be shortened at the right if desired, the wall end 29' and shifter may be located more to the left, or further to the right if a particular filling machine requires it.

We claim:—

1. A receptacle positioning means for filling machines, comprising a horizontal endless friction conveyor, an alley guide formed over the first part of the conveyor, a second similar alley formed over the last part of the conveyor spaced longitudinally from the first alley and offset laterally therefrom, a shifter transversely reciprocable between the mutually adjacent ends of the alleys, a retractable stop in the second alley spaced from the shifter, operative means connected with the shifter and stop to operate them simultaneously to shift an article from the first alley to the second and retract the stop, and to return the shifter and stop to initial positions, and means to operate the conveyor at a speed to bring the shifted article to the vertical transverse plane of the stop subsequent to return of the stop.

2. A conveyor belt, means to operate the belt, two sets of alley walls spaced apart over the belt to form first and second alleys, one offset from the other, the mutually adjacent ends of the walls of the two alleys being spaced longitudinally apart, a set-over device operable in the space between and including the mutually adjacent ends of the alleys and normally positioned to receive articles from the first alley, and means to move the set-over device to shift an article upon the belt from the first alley into line with the second alley, the wall of the second alley proximal to the first alley being slidably mounted and including means for longitudinal adjustment, said set-over device including an article-engaging head adjustable longitudinally of the first alley in said space.

3. The structure of claim 2, comprising operative means for the set-over device including an adjustable time control member, whereby to control operation of the set-over device in coordination with the sizes of receptacles and the rate of movement of the conveyor belt.

4. The structure of claim 2 in which said set-over device includes an article-engaging head adjustable longitudinally of the first alley in said space, said head having a stem slidably mounted on the set-over device for adjustment transversely of the alley.

5. In a machine of the character described, a conveyor for receptacles to be filled comprising an endless belt adapted to support receptacles slidingly thereon, a starting alley alined with the conveyor, a second alley over the conveyor having a receiving end offset from the first alley, a receptacle stop adjacent the receiving end of the second alley in line with the first alley, a receptacle shifter operable transversely of the alleys to move receptacles singly from the starting alley to the second alley, a retractable stop in the second alley, a filling means for filling receptacles in advance of the retractable stop over the second alley and means to operate the shifter and stop comprising a rock shaft, arms projected therefrom, connections between the arms and the shifter and stop respectively, and means to rock the shaft.

6. The structure of claim 5 in which said means to rock the shaft comprises a rotary shaft operatively associated with the filling mechanism, a cam thereon consisting of a lobe having an advance side fixed with respect to the rotary shaft, and a trailing side extensible concentrically and a wiper device engaged with the cam and operatively connected with the shaft.

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