Oct. 2, 1928. 1,686,375

J. W. GREER

CONFECTIONERY PACKING MACHINE

Filed July 11, 1927 3 Sheets-Sheet 1

Fig. 1

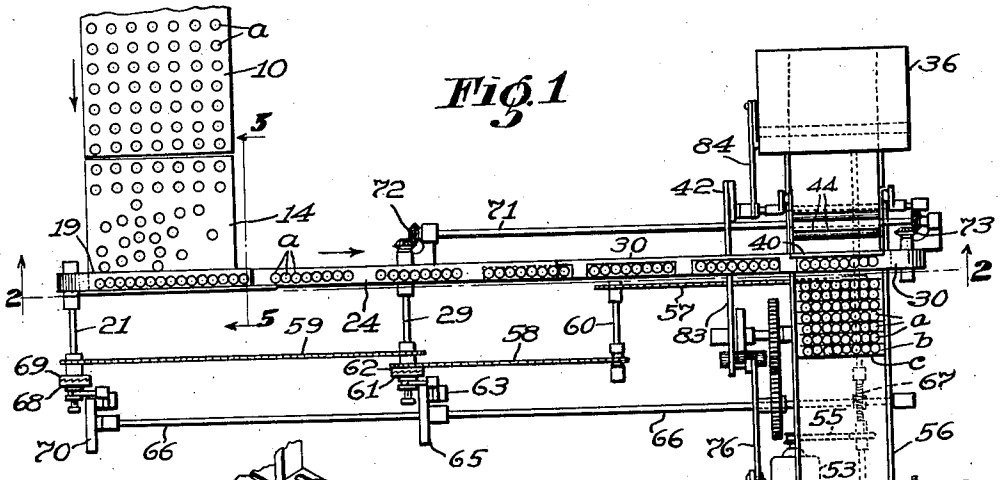


Fig. 3

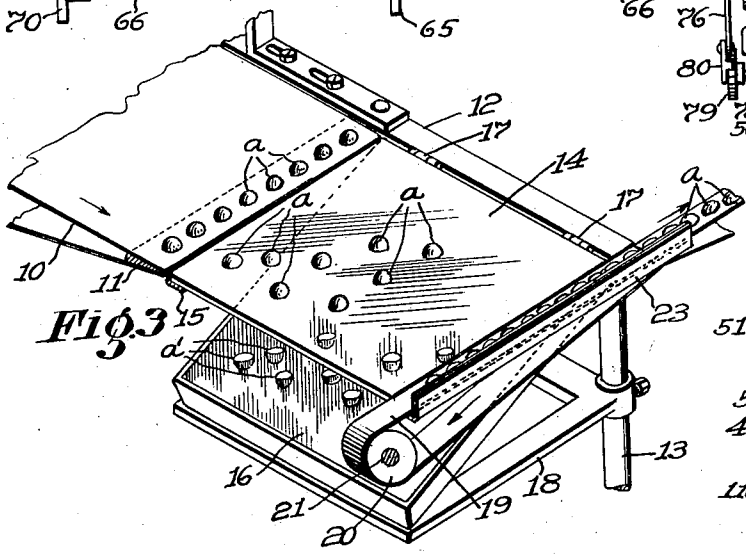
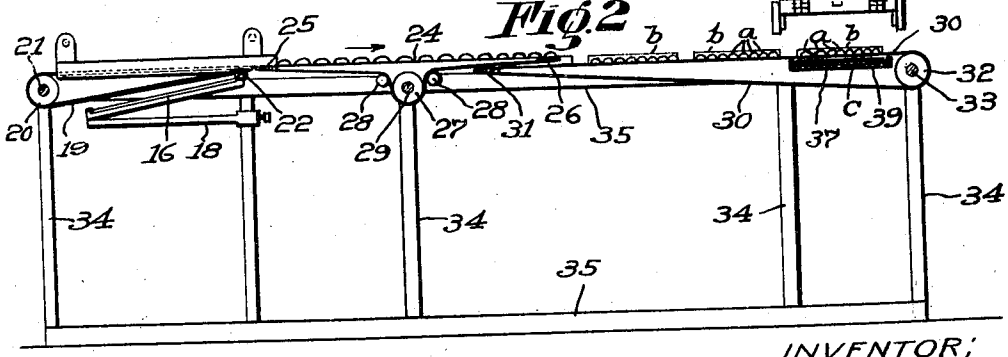


Fig. 2



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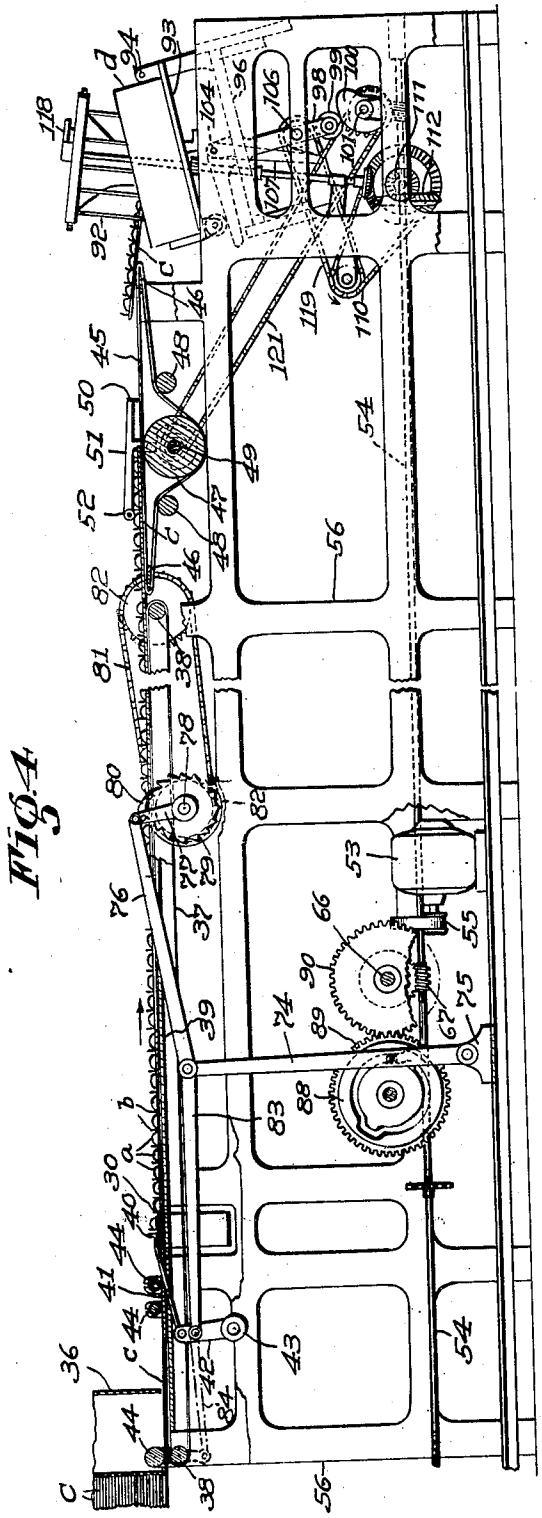


Fig. 4

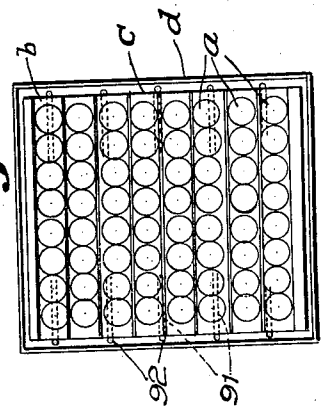


Fig. 6

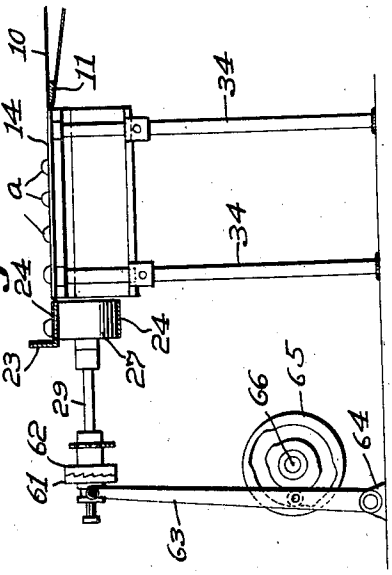


Fig. 5

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CONFECTIONERY PACKING MACHINE

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Fig. 7

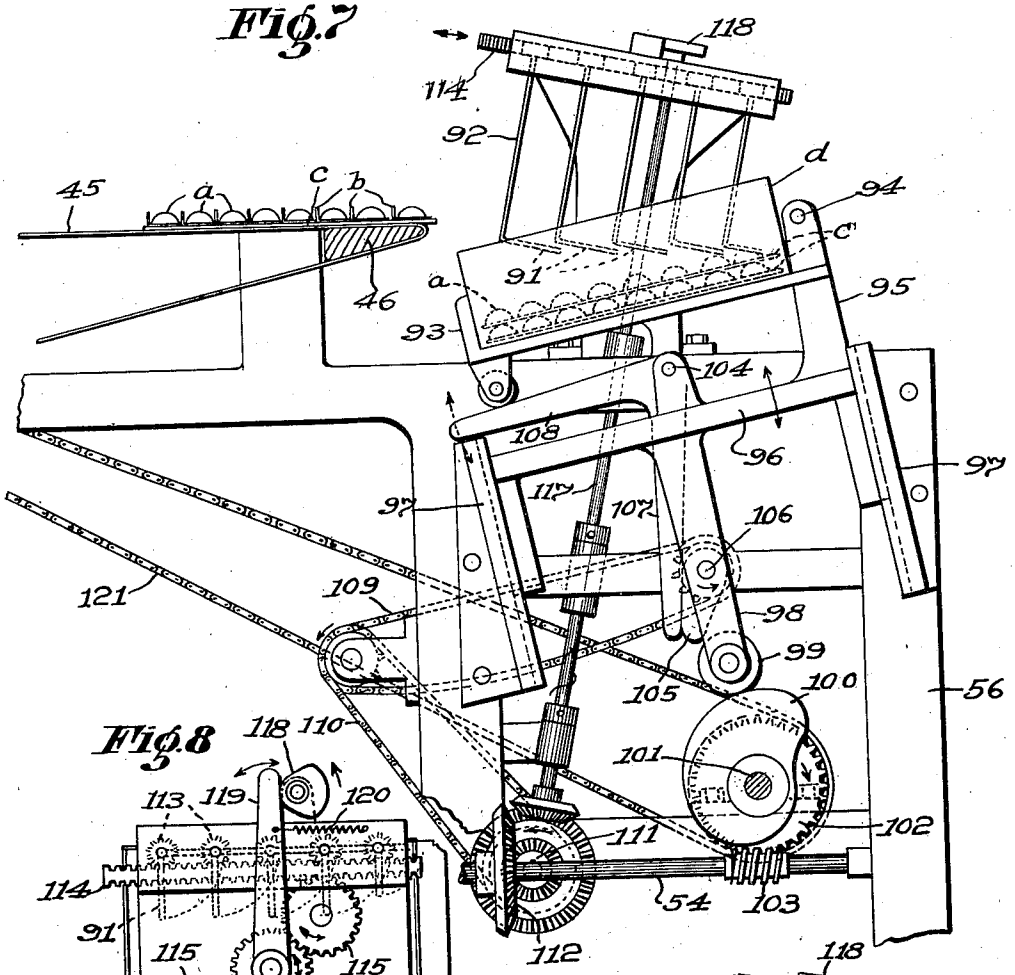


Fig. 8

Fig. 9

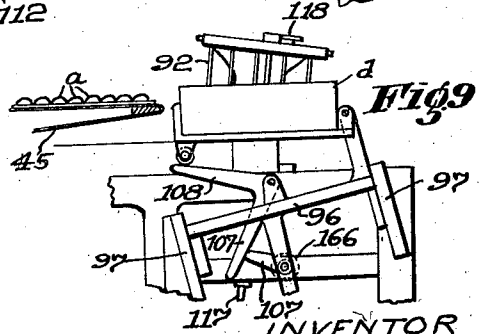
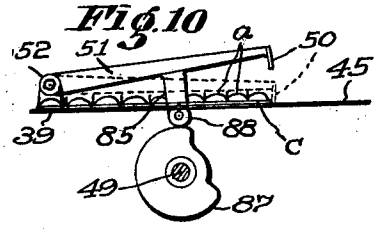


Fig. 10



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UNITED STATES PATENT OFFICE.

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CONFECTIONERY-PACKING MACHINE.

Application filed July 11, 1927. Serial No. 204,822.

This invention relates to machines for placing confections in rows upon cardboard sheets and for packing these loaded sheets one above the other in a box.

Heretofore the work of packing confections in boxes has been performed largely by hand. This not only involves a large amount of work, but necessitates the contact of the hands of the workers with the confections, which is undesirable for sanitary reasons.

The present invention therefore relates to packing machines which are so constructed that the successive steps of placing candy or other confections upon long narrow spacers, depositing several of these loaded spacers on a flat sheet of cardboard, and then depositing these loaded cardboard sheets one above the other in a box is performed automatically so that it is unnecessary for the machine attendants or other workers to touch the confections.

One important feature of the present invention resides in mechanism for placing successive rows of the confections on a flat cardboard sheet so that each loaded sheet forms a layer of confections to be placed in a box.

Another feature of the invention resides in mechanism for handling these loaded sheets and for gently placing them in a box one above the other.

Other features of the invention and novel combination of parts in addition to the above will be hereinafter described in connection with the accompanying drawings which illustrate one good practical form thereof.

In the drawings:—

Fig. 1 is a top plan view of a confectionery packing machine constructed in accordance with the present invention;

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a perspective view of a transparent supporting plate and mirror employed in the construction of Fig. 1 in inspecting the bottoms of confections;

Fig. 4 is a side view with parts in section of mechanism for advancing the loaded cardboard sheets to the box filling position;

Fig. 5 is a vertical sectional view taken on the line 5—5 of Fig. 1;

Fig. 6 is a top plan view of a box for the confections and shows a cardboard sheet supported in the box by means to be described;

Fig. 7 is a side elevation of means for supporting a box and for depositing the loaded sheets therein;

Fig. 8 is a top plan view of the mechanism shown in Fig. 7 for depositing the sheets within a box;

Fig. 9 is a view similar to Fig 7, but shows the box supported in its horizontal position rather than in the inclined position of Fig. 7; and

Fig. 10 is a side elevation of sheet holding means to be described.

The box filling mechanism forming the subject matter of the present invention may be employed to pack cakes, candies or other confections in boxes, and while the confections to be packed may be delivered to the present machine from various sources, it is assumed that the confections are delivered to the construction shown in the drawings from a cooling tunnel (not shown) by the conveyor belt 10, the delivery end of which belt passes around the knife blade bar 11 the ends of which bar are secured to the supporting frame 12 provided with the upright supports 13.

It is important that the chocolate-coated candy or other confections be inspected to see that they are free from defects before they are packed in containers ready for the market. The inspection of the bottoms of the confections has been effected heretofore by picking the confections up in the hands in order to examine the bottoms of the same. One of the features of the present machine resides in the construction whereby the bottoms of the confections may be inspected without picking them up in the hands as heretofore, and to this end, in the construction shown, the confections *a* are delivered by the belt 10 onto a transparent plate 14 which may consist of a sheet of glass which rests upon the transversely extending bars 15. Below the transparent plate 14 is placed a mirror 16 one edge of which is pivotally secured to the frame 12 by the hinges 17, and the opposite edge of the mirror 16 is supported by the bracket 18 that is adjustably secured to the uprights 13, the arrangement being such that the mirror may be tilted about the hinges 17 to the desired inclination so that the images *a'* showing the bottoms of the confections *a* may be readily observed by a person seated or standing at the

left-hand side of the transparent plate 14 of Fig. 1. As a result of this arrangement any defects in the bottoms of the confections may be readily observed by simply glancing at the image of the same as reflected in the mirror 16.

The confections *a* which are found to be free from defects are moved across the transparent plate 14 by the person engaged in inspecting the same and are arranged in a row, as shown in Figs. 1 and 2, upon a narrow belt 19 which passes around and is driven by a pulley 20 that is secured to the driving shaft 21. This belt travels in the direction indicated by the arrow and the delivery end thereof passes about the knife blade bar 22. The confections *a* may be moved across the transparent sheet 14 and arranged in a row upon the belt 19 by engaging them with a hand brush which is sufficiently soft to avoid injuring the confections, and makes it unnecessary to touch the same with the hands. An upstanding wall 23 is preferably provided along the upper run of the belt 19 and against which the confections may be pushed in arranging them in a row upon the conveyor belt.

After the confections *a* have been arranged in a row against the wall 23 it is desirable to separate them into spaced groups to facilitate the placing of these groups upon a cardboard sheet having approximately the size of the box into which the confections are to be packed, as will more fully appear. The confections *a* are therefore transferred from the conveyor belt 19 onto a second conveyor belt 24 the upper run of which is supported by the knife blade bars 25 and 26, and this belt may be driven by a pulley 27 that is positioned between the idle rollers 28, as will be apparent from Fig. 2. The pulley 27 is driven by the shaft 29. The conveyor belts 19 and 24 are preferably driven at the same speed and the arrangement of the confections *a* in the desired spaced groups is effected by periodically arresting the movement of the belt 19 while the belt 24 continues to advance until a sufficient gap has been formed between adjacent groups of confections.

In many cases it is desirable to deposit each group of confections upon a spacer which may consist of a long, narrow strip of cardboard having one edge thereof bent upwardly to form a side wall against which the confections may be arranged; that is, the long, narrow strip of paper may be L-shaped in cross-section. Each group of confections *a* is readily deposited upon a spacer *b* in accordance with the present invention by providing a third narrow conveyor belt 30 the upper run of which extends a substantial distance under the delivery end portion of the belt 24, as will be apparent from Fig. 2, wherein it will be seen that the left-hand end of the upper run of the belt 30 is supported by a knife blade 31 slightly below the lower run of the belt 24, the arrangement being such that a cardboard spacer *b* may be placed by an operative upon the upper run of the belt 30 near the left-hand end thereof and below the belt 24 so that as this spacer *b* is advanced by the belt 30 it will pass out from under the delivery end of the belt 24 to receive the confections, as will be apparent from Fig. 2. In effecting this the operative should be careful to so place the spacer *b* upon the belt 30 that the first confection of a group will be deposited upon the spacer *b* close to the leading end thereof. The opposite end of the belt 30 is supported by the pulley 32 which is driven by a shaft 33 and the operating parts so far described may be supported by the frame having the uprights 34 to which the longitudinally extending beams 35 are secured.

It is desirable to place a number of the loaded spacers *b* side by side upon a cardboard sheet *c* which sheet is to be placed in a box *d*; the cardboard sheets *c* it will be understood serve to separate the layers of the confections which are placed one above the other in the box *d*, as will be apparent from Fig. 7. The cardboard sheets *c* may be supplied by a box feeding device 36 of any suitable or well known construction which will serve to deliver these sheets one at a time to a wide conveyor belt 37 the upper run of which belt is disposed slightly below the upper run of the narrow belt 30, the arrangement being such that the belt 37 travels at right angles to the path along which the confections are advanced by the belts 19, 24 and 30. The belt 37 is provided at its opposite ends with the supporting rollers 38 and the upper run of this belt is supported intermediate its ends by a board or table 39. The belt 37 is advanced by a step-by-step movement, the arrangement being such that the loaded spacers *b* are successively pushed sidewise off their supporting belt 30 onto a sheet *c* which is supported below the belt 30 by the wide belt 37. The movement imparted to the belt 37 each time it is advanced is just sufficient to accommodate the width of a loaded strip *b*, and as a result the loaded spacers are deposited upon the belt 37 side-by-side, as will be apparent from Fig. 4 along the upper run of this belt. The means shown for transferring the loaded spacers *b* from one belt to the other consists of the reciprocating bar 40 the side links 41 of which are connected to the upper ends of the rocking arms 42 which arms are supported by the pivot shaft 43, as will be apparent from Fig. 4. The cardboard sheets *c* are delivered by the feeding mechanism 36 so that they follow one after the other along the upper run of the belt 37 in close proximity or in abutting relation with each other and they may be held in place upon the conveyor belt 37 by the floating rollers 44 until the confections are placed upon the sheets *c*, after

which the weight of the confections will serve to hold them in place upon the conveyor belt. Before the loaded cardboard sheets *c* are delivered to the boxes into which they are to be packed, it is desirable to space these sheets apart so that one loaded sheet may be deposited in its box before the next sheet arrives at the box. The spacing of these loaded sheets is accomplished in accordance with the present invention by providing a second wide belt 45 in alignment with the upper run of the belt 37 and the belt 45 is supported at its opposite ends by the knife blade bars 46. This belt may be driven by a pulley 47 positioned between the idle rollers 48, and the pulley 47 is mounted upon and is driven by the shaft 49. As a result of the step-by-step movement imparted to the conveyor belt 37 the loaded cardboard sheets *c* are advanced at a relatively slow speed by said belt; the spacing of the sheets *c* may therefore be effected by transferring them from the belt 37 to the belt 45 which is driven at a faster speed. In order to insure that the loaded cardboard sheets *c* will be properly spaced from each other and will arrive at the box filling mechanism, to be described, at the proper time, means is provided for holding each cardboard momentarily so that it will not be advanced by its supporting belt 45. This will properly space the sheets *c* and will insure their arrival properly at the box filling mechanism. The holding means shown consists of the bar 50 secured to the rocking arms 51 that are pivotally secured to the pivot pins 52. The arrangement is such that when the stop 50 is lowered, as shown in Fig. 4 and in dotted lines in Fig. 10, the loaded sheets *c* will be held by this stop from traveling with the belt 45, but when the stop 50 is raised to the position in which it is shown in full lines in Fig. 10 the cardboard sheet will be released, to be advanced by the belt 45 to the box-loading device.

It is essential that the various operating belts be driven in timed relation with respect to each other, and while various means to this end may be provided, one good practical form of drive shown in the drawings will now be described. The entire machine shown in the drawings may be driven from the motor 53 which serves to drive a power shaft 54 through a belt 55 at a reduced speed. The shaft 54 extends lengthwise of the supporting frame 56 which supports the wide conveyor belts 37 and 45. The narrow belts 19, 24 and 30 are driven from the shaft 54 by the sprocket chains 57, 58 and 59. The chain 57 drives a shaft 60 and rotative movement is imparted from the shaft 60 to the shaft 29 through the chain 58. It is desirable, however, to drive the belts 24 and 30 by a step-by-step movement rather than continuously, to arrest the travel of each loaded spacer *b* while the same is being transferred from the belt 30 to the wide belt 37. This is accomplished in the construction shown by providing the shaft 29 with a clutch having a sliding element 61 which is keyed to the shaft 29 and a cooperating element 62 which is free to rotate relative to the shaft 29. The element 61 of the clutch is moved into and out of driving engagement with the element 62 by an upstanding lever 63 the lower end of which is pivotally secured to a fixed bracket 64, and this lever is shifted to and from the position in which it effects driving movement of the shaft 29 by a cam wheel 65 which is secured to and is driven by the relatively long shaft 66. This shaft is driven from the power shaft 54 but at slow speed through a worm and worm gear 67. The belt 19 is driven intermittently at the same speed as the belt 24 by the chain 59 through the co-operating clutch elements 68 and 69 which may be controlled by a cam wheel 70 that is driven by the shaft 66.

As above stated, it is desirable to drive the belt 24 after the movement of the belt 19 has been arrested, to thereby effect the desired spacing of the groups of confections on the belt 24. This is accomplished by simply varying the construction of the clutch controlling cams 65 and 70 so that the shaft 21 will rotate for a shorter period of time than the shaft 29. The belts 24 and 30 should be similarly driven and this is accomplished by providing a driving connection between the shaft 29 and the shaft 33 which shafts drive the belts 24 and 30. The driving connection as shown in Fig. 1 consists of the relatively long shaft 71 the left-hand end of which is driven by the bevel gears 72 one of which is secured to the shaft 29 and the other to the shaft 71; and at the opposite end of the shaft 71 are provided the co-operating bevel gears 73 which serve to impart the rotative movement of the shaft 71 to the shaft 33.

Having described the mechanism for driving the three narrow conveyor belts, the construction shown for driving the wide belts 37 and 45 will now be described. The belt 37 is advanced step-by-step by the upstanding rocking lever 74 the lower end of which is pivotally secured to a fixed bracket 75. A link 76 is secured to the upper end of the rocking lever 74 and as this link moves back and forth it operates the rocking arm 77 which is pivotally mounted upon the shaft 78. The shaft 78 is provided with a ratchet wheel 79 which is advanced step-by-step by a dog 80 mounted upon the rocking arm 77. The movement imparted to the ratchet 79 is imparted to the belt driving roller 38 by the sprocket chain 81 and sprockets 82. The rocking movement of the upstanding shaft 74 serves also to move the link 83 back and forth in the direction of its length to rock the arm 42 for operating the pusher 40, above described as constituting the means for transferring the loaded spacers from the narrow

belt 30 to the wide belt 37. The sheet feeding mechanism within the box 36 containing the cardboard sheets *c* may be operated by a link 84 which is moved back and forth by the rocking movement imparted to the arm 42. The card holding device or stop 50 may be raised and lowered by providing one of the arms 51 which is secured to this stop with a downwardly extending projection 85 having a roller 86 that rests upon a cam wheel 87 which cam wheel may be mounted upon and secured to the shaft 49, as shown in Fig. 10. It will be apparent that if the proper configuration is given to the cam 87 the stop 50 will be raised and lowered to space the loaded sheets *c* the desired distance apart. The desired rocking movement is imparted to the upstanding lever 74 by a cam wheel 88 which is driven from the shaft 66 by the cooperating gears 89 and 90. The box in which the confections *a* are to be packed is normally supported in an inclined position by the mechanism best shown in Fig. 7, the arrangement being such that as a loaded cardboard sheet *c* reaches the delivery end of the belt 45 it is fed onto the supporting fingers 91 which extend laterally from the lower ends of the downwardly extending rods 92 arranged in a row at each side of the sheet *c*. The arrangement is such that when the fingers 91 extend towards each other, as shown in Fig. 8, they will support a loaded sheet *c* in an elevated position within the box *d*, but when the shafts 92 are rotated to the position in which they are shown in Fig. 7 they will release the sheet so that it may move downwardly within the box. The box *d* is normally supported in the inclined position shown in Fig. 7 so that an advancing sheet *c* will not strike the lower side wall of the box as it is being fed onto the supporting fingers 91, but, since it is necessary to place the confections gently within the box, means is provided for momentarily swinging the same upwardly to the horizontal position in which it is shown in Fig. 9. It is desirable to lower the box step-by-step, as each new layer of confections is placed therein. In order to accomplish these objects the box *d* is mounted on a supporting frame 93 which is pivotally secured by pivot pins 94 to the upstanding post 95. These posts project upwardly from the sliding frame 96 that is supported by the slideways 97 for a rising and falling movement at an inclination to the vertical.

When the first layer of confections is placed in the box *d* the same should be supported in its position of greatest elevation and should be gradually lowered as the successive layers are placed therein. This is accomplished by providing the slide 96 with a downwardly extending arm 98 having a roller 99 at its lower end which rests upon the cam 100. This cam is secured to a transversely extending shaft 101 which is driven by a worm gear 102 that meshes with a worm 103 secured to the shaft 54. Means is provided for swinging the box *d* upwardly to its horizontal position each time a layer of confections is placed therein. This is accomplished by providing the sliding frame 96 with the bell crank lever which is pivotally secured to the slide by a pin 104. Rocking movement is imparted to this lever by a projection 105 that is secured to a shaft 106, the arrangement being such that as the shaft 106 rotates the projection 105 will act against a downwardly extending arm 107 of the bell crank lever. This will serve to rock the arm 108 of the bell crank lever upwardly to thereby elevate the box supporting means 93 to the position in which it is shown in Fig. 9. The shaft 106 is driven by a chain 109 which in turn is driven by a chain 110 from the transversely extending shaft 111 that is driven from the shaft 54 through the bevel gears 112.

The means for imparting a rocking movement to the fingers 91 to cause them to release a loaded sheet *c* is best shown in Fig. 8 wherein it will be seen that each finger supporting rod 92 is provided at its upper end with a pinion 113, which pinions are rotated by the sliding racks 114, and these racks are moved to operate the pinions by the gears 115 which engage the central gear 116. When it is desired to swing the fingers 91 from the position in which they are shown in Fig. 8 to a position in which they lie close to the side walls of the box *d*, rotative movement is imparted to the upwardly extending shaft 117 through the operating gears provided at the lower end of this shaft. This will serve to rotate the cam 118 at the upper end of the shaft 117 and as the cam rotates it will push the lever 119 in a contraclockwise direction viewing Fig. 8 in opposition to the pull of the spring 120. This movement of the lever 119 will rotate the gear 116 to actuate the racks 114 and the pinions 113, to rotate the rods 92. The driving shaft 49 for the belt 45 may be driven from the shaft 101 by the chain 121.

From the foregoing description when read in connection with the drawings, it will be seen that the confections delivered by the belt 10 undergo an inspection while resting upon the glass plate 14, and the confections found to be free from defects are arranged in a row by the operative upon the narrow conveyor belt 19. As the aligned confections are advanced by the narrow belts 19, 24 and 30, they are separated into spaced groups in the manner above described and are placed upon the spacers *b* which spacers upon being conveyed to a position directly above the wide belt 37, are deposited upon cardboard sheets being advanced step-by-step upon the belt 37. The loaded sheets *c* are advanced to the box loading position, where one loaded sheet after another is gently deposited in a box *d* in the

manner above described. The cam 100 serves to gradually lower a box as the same is being filled and after the last layer of confections is placed within a box the same will be lowered sufficiently to cause its side walls to clear the lower ends of the downwardly extending rods 92 so that a full box may be removed from the box supporting frame 93 and an empty box may be substituted therefor in a position to be filled. In this manner one box after another may be filled with confections without the latter being touched with the hands.

What is claimed is:

1. In a device of the class described, in combination, a belt for conveying paper spacers along a predetermined path, a second belt for advancing spaced groups of confections toward the first mentioned belt and having the delivery end portion of its upper run positioned over the first mentioned belt and adapted to deposit a group of confections in a row upon each spacer as the successive spacers are advanced under the discharge end portion of the second belt.

2. In a device of the class described, in combination, means for advancing cardboard sheets along a predetermined path, a conveyor for advancing long, narrow spacers loaded with confections to a position above one of said sheets, and means for shoving successive spacers off of the conveyor onto said sheet to arrange them side by side thereon.

3. In a device of the class described, in combination, means for advancing cardboard sheets along a predetermined path, means for depositing successive groups of confections upon successive spacers, a conveyor for advancing the loaded spacers to a position above one of said sheets, and means for shoving successive spacers off of the conveyor onto one of said sheets to arrange the loaded spacers side by side thereon.

4. In a box filling machine, in combination, means for advancing cardboard sheets along a predetermined path, means for depositing successive groups of confections upon successive spacers, a conveyor for advancing the loaded spacers to a position above one of said sheets, means for transferring the loaded spacers to said sheet and for placing them side by side thereon, and means for depositing the loaded sheets one above the other in a box.

5. In a box filling machine, in combination, means for depositing confections upon cardboard sheets, means for supporting a box in a tilted position to receive the loaded sheets, means for depositing the loaded sheets in the box one above the other, and means for gradually lowering the box as the loaded sheets accumulate therein.

6. In a box filling machine, in combination, means for supporting a box in a tilted position to receive loaded sheets, means for feeding the loaded sheets one at a time into said box, and means for momentarily moving the box to a horizontal position as each sheet is deposited therein.

7. In a box filling machine, in combination, means for supporting a box in a tilted position so that loaded sheets that are fed in a horizontal direction into the box will clear the lowered side of the box, and means for feeding loaded sheets horizontally into the box and for releasing the sheets therein.

8. In a box filling machine, in combination, box supporting means, conveying means for feeding loaded sheets one after the other to a position above the supported box, and means for momentarily raising the box to receive a sheet and then lowering the box.

9. In a box filling machine, in combination, box supporting means, mechanism for feeding a loaded sheet to the box, means for supporting the sheet in an elevated position within the box, and means for lifting the box to facilitate the gentle placement of the sheet therein.

10. In a box filling machine, in combination, box supporting means, mechanism for feeding a loaded sheet to the box, means for supporting the sheet in an elevated position within the box, and means for lifting the box to gently receive the sheet and for operating the sheet supporting means to release the sheet.

11. In a box filling machine, in combination, a group of fingers for supporting a loaded sheet, means for supporting a box and for lifting it to receive said loaded sheet, and means for actuating said fingers to release the sheet while the box is raised to thereby gently place the sheet within the box.

12. In a box filling machine, in combination, a group of fingers for supporting a loaded sheet, means for supporting a box and operable to lift it to receive the loaded sheet, means for actuating said fingers to release the sheet while the box is raised to thereby gently place the sheet within the box, and means for feeding one loaded sheet after another onto said fingers.

13. In a box filling machine, in combination, a group of downwardly extending rods having laterally extending fingers for supporting a loaded sheet within a box, means for supporting a box and for effecting a relative movement between the box and rods to place the loaded sheet within the box, and means for shifting the fingers to release the sheet and gently place it within the box.

14. In a box filling machine, in combination, a group of downwardly extending rods having laterally extending fingers for supporting a loaded sheet within a box in close proximity to the bottom thereof, and means for shifting the fingers to release the sheet within the box.

15. In a box filling machine, in combination, a box support, means constructed to project under the side edges of a loaded sheet and adapted to extend downwardly within a box on said support to support the sheet in close proximity to the bottom of the box, and means for actuating the sheet supporting means to cause it to release the sheet within the box.

16. In a box filling machine, in combination, means constructed to project under the side edges of a loaded sheet and to support the same so that the supporting means will enter a box as the box is raised to receive the loaded sheet, mechanism for supporting a box and operable to raise the same to receive the loaded sheet, and means for operating the sheet supporting means to cause it to release the sheet within the box.

17. In a box filling machine, in combination, a box support, a group of fingers for supporting a loaded sheet within a box positioned upon said support and adapted to extend downwardly within the box, and means for shifting said fingers to cause them to release the loaded sheet and deposit it in said box.

18. In a box filling machine, in combination, a box support, mechanism for feeding a loaded sheet horizontally into a box placed upon said support, and means mounted in spaced relation to said feeding mechanism for supporting the forward end of said sheet as the sheet is fed into said box and constructed to extend downwardly within the box to deposit the sheet therein.

19. In a box filling machine, in combination, a box support, mechanism for feeding a loaded sheet into position to be deposited into a box placed upon said support, means mounted in spaced relation to said feeding mechanism and adapted to engage the marginal portion of said sheet to support the sheet as it is fed into the box, and said means being also constructed to enter said box to deposit the sheet therein.

In testimony whereof, I have signed my name to this specification.

JESSE W. GREER.