Dec. 31, 1935. A. E. VOSLER ET AL 2,026,200

MATERIAL HANDLING SYSTEM

Filed Jan. 5, 1931 3 Sheets-Sheet 1

Fig. 1.

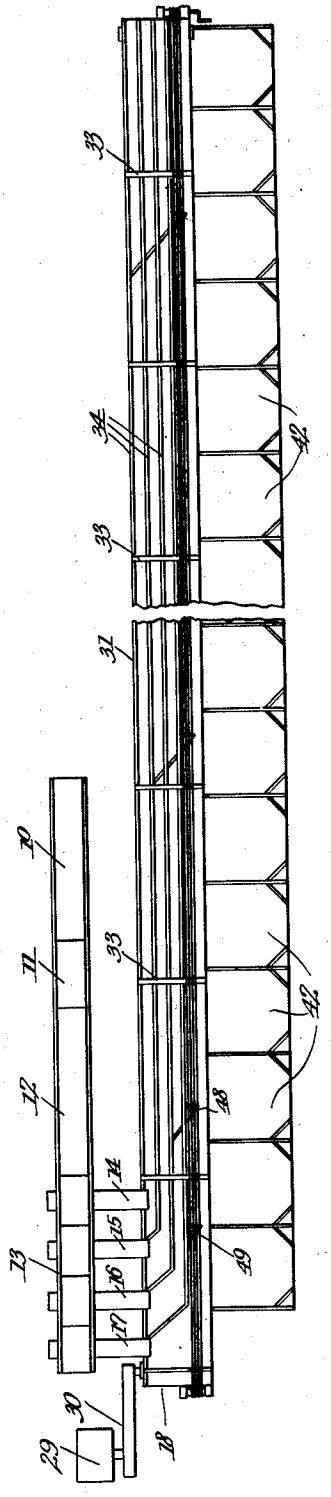
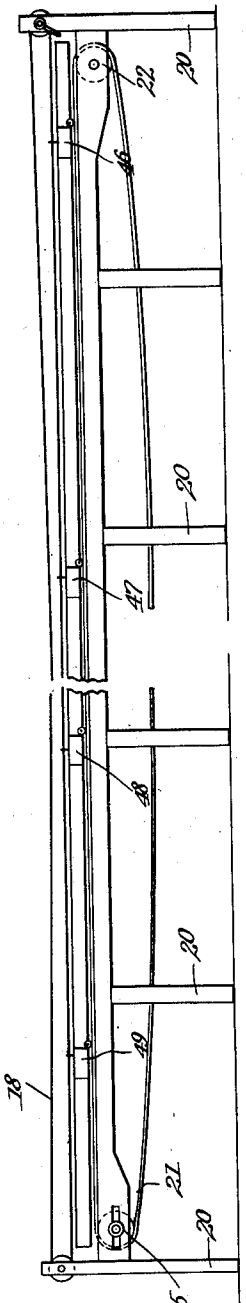


Fig. 2.



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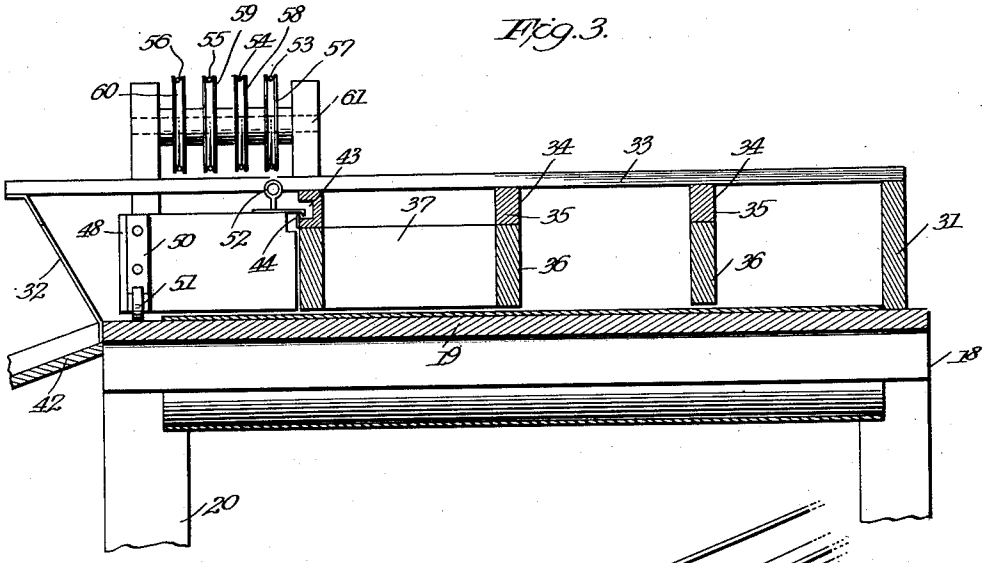
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MATERIAL HANDLING SYSTEM

Filed Jan. 5, 1931 3 Sheets-Sheet 2

Fig. 3.



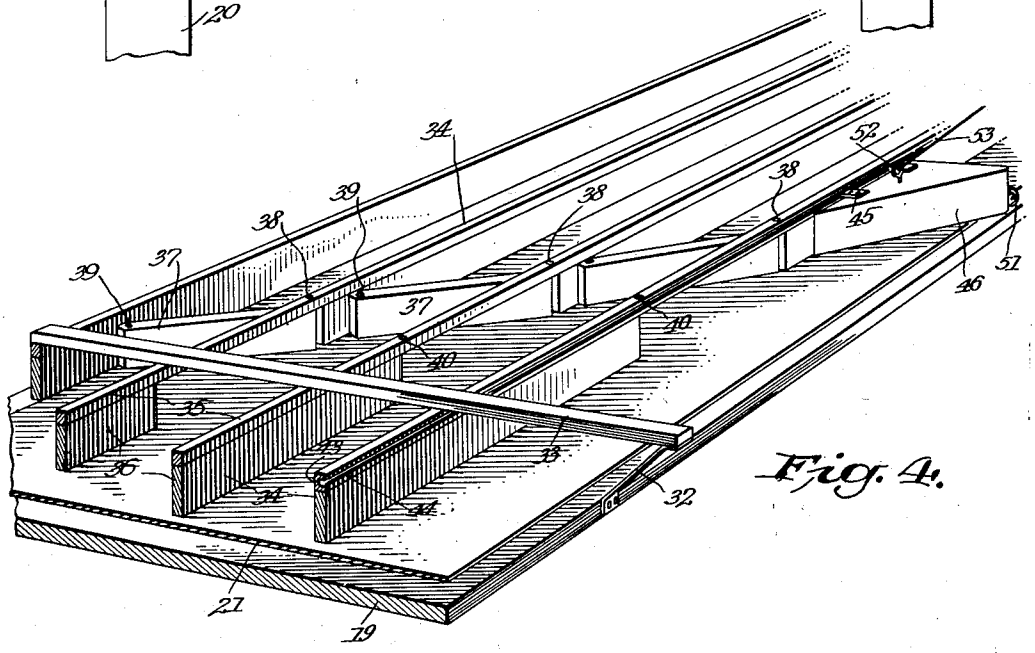


Fig. 4.

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Filed Jan. 5, 1931 3 Sheets-Sheet 3

Fig. 5.

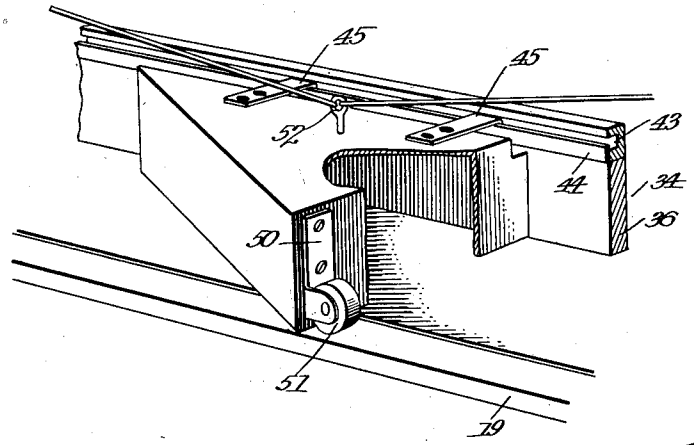


Fig. 6.

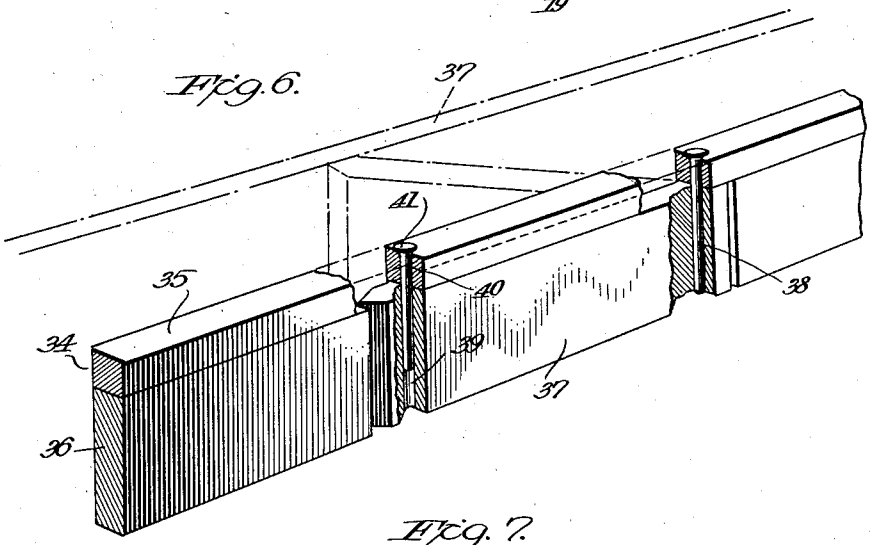
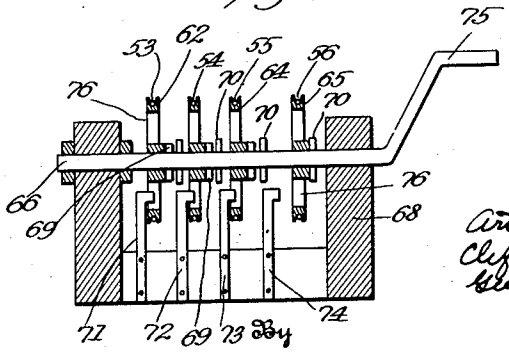


Fig. 7.



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MATERIAL HANDLING SYSTEM

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Application January 5, 1931, Serial No. 506,762

4 Claims. (Cl. 198—42)

This invention relates to produce grading and packing, and more particularly to a distributing or diverting system for conveying sized fruits to desired packing tables.

For some years it has been recognized that it is desirable to grade and size apples, as well as peaches and like fruits, before they are marketed. When the fruit is separated into a plurality of uniform sizes and is graded for quality, it has been found that a better market exists. Furthermore such grading of fruit makes it possible to obtain a higher price for a given quantity of fruit, than is possible if the same is not so graded. Originally the fruit was graded and sized by hand, and although such grading and sizing was desirable, the inability to thus accurately size and grade, together with the resultant relatively low output, caused the discontinuance of this method of selection except in certain of the smaller packing houses.

Mechanical sizers were developed and have come into rather wide use and it has been found that some of such sizers are quite efficient and in fact they are capable of effecting the sizing of fruit in such quantity that the existing apparatus does not permit the utilization of a sufficient number of packers to handle the output, and that therefore the intermittent operation of the mechanical sizers is usually resorted to. This is particularly true since hand packing is normally employed to remove the fruit or other produce from the packing tables and to pack the same in barrels or other receptacles. Attempts have been made to utilize distributing systems by which fruit delivered from the sizers could be distributed to a large number of packing tables and to thereby permit the employment of many more packers with the result that the sizers could operate substantially continuously. So far as we are aware, the heretofore employed distributing systems have not proved satisfactory.

It is an object of the present invention to provide a distributing or diverting system whereby fruit separately delivered in the various sizes from the sizing apparatus, may be separately maintaining in such size in bulk and distributed upon any one of the numerous packing tables. It is contemplated by such an arrangement that predetermined tables can be utilized for the packing of the various sizes in accordance with the proportions of any particular size to the entire lot being packed. The invention further contemplates a distributing system which will permit the employment of sufficient packing tables to make possible the packing of all sizes of the fruit coming from the sizers without interrupting the operation of the sizing mechanism.

It is an object of this invention to provide a distributing system wherein standard parts are employed, and wherein the fruit can be shifted from one lane to another to permit the depositing of predetermined sized fruit upon selected packing tables without the passage of the produce over stationary surfaces.

The invention also contemplates the provision of a diverting system wherein a single conveying belt is employed. Additionally it contemplates the provision of a system wherein segregated produce being distributed is delivered into a lane adjacent a row of packing tables at a predetermined point along said lane, and wherein the produce may be transferred from the lane to a desired table at will, so that as many tables as may be desired may be utilized for the packing of any one of the desired sized produce.

Another object of the present invention is the provision of a diverting system particularly suited as an adjunct to mechanical fruit sizers which employs parallel lanes in which fruit of different sizes is conveyed in the same direction and a lane adjacent a row of packing tables, and in which the system permits the simultaneous travel of all sizes of produce in different portions of the lane adjacent the packing tables while employing means for deflecting the fruit from the lane into desired packing tables without permitting intermingling of the different sized fruit while in said lane.

It is a further object of the present invention to provide diverting blocks or scooter blocks arranged in the same lane, with means for maintaining the blocks against displacement, which means may be rendered ineffective at will to permit the adjustment of the blocks collectively or independently by a common operating means. It is still another object of the present invention to provide scooter blocks which are supported free of the conveying belt although extending thereover.

Other objects and advantages will be apparent from the following detailed description when considered in connection with the accompanying drawings wherein:

Fig. 1 is a diagrammatic top plan view of a distributing system arranged in accordance with the present invention, conveyors and a mechanical sizing apparatus being also diagrammatically shown,

Fig. 2 is a front elevation of a distributing system constructed in accordance with the present

invention with the packing tables being removed,

Fig. 3 is a cross sectional view through the apparatus illustrating the scooter block and operating mechanism, and the partition members and their supporting bridges,

Fig. 4 is a perspective view of a portion of the distributing apparatus illustrating the cross-over mechanism for effecting the passage of fruit from one lane to another together with an adjacent scooter block,

Fig. 5 is a detailed perspective view of a scooter block, the block being partly broken away to illustrate the specific construction thereof,

Fig. 6 is a detailed perspective view of one of the partition members with parts broken away to illustrate the manner of mounting the pivoted sections, and

Fig. 7 is a sectional view through the operating mechanism for the scooter blocks, showing three of the pulleys in locked position and the outermost thereof in engagement with a pin for effecting the rotation of the same.

The numeral 10 illustrates a feed conveyor shown diagrammatically in Fig. 1. A cull elevator 11 is positioned to receive fruit which is discharged from the conveyor 10, and the elevator in turn deposits the same upon a roll conveyor 12. This mechanism may be in the form of any of the well known constructions, the cull conveyor being preferably in a form which permits the passage of the small undesirable fruit therethrough and on to a conveyor, (not illustrated), by which it is eliminated. A sizing unit 13 also of any well known construction and preferably one which will separate the produce into four general sizes, receives the fruit as it is discharged from the roll conveyor 12. The sizing unit 13 is constructed to effect the sizing of the fruit and the depositing of the same while maintained in the separated condition upon transferring belts 14, 15, 16 and 17 respectively delivering their respective charges to a distributing mechanism designated generally at 18.

The distributing mechanism 18 is in the form of an elongated table or platform 19 supported upon legs or other members 20. A conveyor belt 21 extending across the major portion of the table passes over an idling roll 22 at the end of the table adjacent the crossover belts, and the idling roll is in turn mounted in the bearings 23 and 24. Arranged at the opposite ends of the platform 19 is a driving roll 25 over which the conveyor belt 21 passes. The driving roll 25 is supported by a bearing 26 at one side and has a shaft 27 extending through a bearing 28 at the other side. A source of power indicated generally at 29 is utilized for driving the roll 25, it being operatively connected to the shaft through mechanism preferably including a pulley mounted on the shaft. When the pulley is employed on the shaft 27 a belt 30 is utilized to effect the transfer of power to the same.

Arranged along one side of the platform 19 is an upstanding flange or wall 31, while spaced at intervals along the opposite side of the platform 19 are brackets 32. Bridge bars 33 are employed with one end of each supported by one of the brackets 32. The opposite ends of the bridge bars 33 are mounted upon and secured to the upper edge of the wall 31.

The bridge bars 33 are arranged across the platform 19 and are vertically spaced from the conveyor a distance equal to the height of the wall 31. Secured to each of the bridge bars 33 are a series of dividing members 34. Each of the dividing members extends down from the bridge bars to a position closely adjacent but out of contact with the conveyor belt 21. Such a construction permits the conveyor belt 21 to be effectively divided into a plurality of lanes, while it actually extends substantially entirely across the top surface of the platform 19. The number of the lanes into which the conveyor is divided is determined by the number of dividing members 34, and while four such lanes are illustrated, they may be varied in number according to the particular type of sizing mechanism employed. In practice the partitions 34 are supported by wood screws which pass through the bridge bars 33. Each of the partitions 34 may be formed in two parts, that is the upper part 35 and the vertical extending web 36. The webs 36 of the partitions 34 are supported by the upper parts 35 and are formed into longitudinally arranged sections at intervals throughout the length of the distributing mechanism. We have found that if the sections are arranged in 5 ft. lengths with interposed pivoted sections between the ends thereof, which pivoted sections are of sufficient length to be swung to contact the next adjacent partition in the direction of the wall 31 with the sections in such contact being inclined at approximately 30° from the longitudinal center of the mechanism, a particularly efficient transfer mechanism will be had. The pivoted sections 37 have their pivot points at the ends remote from the transferring belts 14, 15, 16 and 17, and the pivoted sections may be constructed of wood with each pivot being formed by means of a nail 38 or other fastening element which passes downwardly through a member 35 and into the respective section adjacent the end of the same. In order to maintain the pivoted sections 37 in position to form unbroken walls with the remainder of the partition members, openings 39 and 40 are provided in the free end of each section 37 and in a registering portion of the member 35 so that the section can be maintained in the inoperative position by the passing of a nail 41 or other fastening element through the openings to bind the free end of the member 37. By locking the pivoted sections 37 in position under their respective member 35 it will be seen that the fruit will be carried along in the lanes without being diverted to a different lane.

In the form illustrated the partition members 34 adjacent the sizing mechanism are angularly disposed so that the cross-belts 14, 15, 16 and 17 may deliver the fruit on to the conveyor 21 at the same general transverse position. Such a construction permits the cross-over belts to be of a uniform length and therefore capable of being operated by a common roll or by driving rolls substantially in axial alignment, and with the opposite ends thereof passing over an idle roll or idle rolls in axial alignment. The angularly disposed portions of the partitions 34 are arranged at an angle of substantially 30° and the fruit delivered upon the conveyor belt 21 will, upon movement of the conveyor, pass into contact with the angular portions and be caused at the outset to pass into the appropriate lanes utilized for the sized fruit.

Packing tables 42 are arranged along the side of the platform 19 opposite to the wall 31 with the tables preferably corresponding in number to the number of sets of pivoted sections 37. The first set of pivoted sections are formed in only two of the partition members, as illustrated, while one of the tables is arranged even in advance of the

first set of pivoted members. The series or sets of pivoted diverting members of the system, as well as the number of tables employed, may be increased or diminished to any number desired in any particular installation, but the arrangement shown in Fig. 1 has been found to be quite practical for large operations.

The lane of travel for the fruit which is arranged adjacent the tables 42 may be constructed in a slightly inclined manner to avoid the fruit rolling off the outer edge thereof, or a sectional bead may be arranged along the outer edge to prevent the fruit from rolling off except at the points predetermined by the adjustment of the scooter blocks, hereinafter to be more fully referred to.

The member 35 of the partition 34, which is arranged closest to the tables, is grooved at 43 and has the lower outer face thereof provided with an upwardly extending plate 44. This plate extends above the lower wall of the groove 43 and effects the formation of a retaining slot for connecting member 45 provided on each of a series of scooter blocks. Preferably four scooter blocks 46, 47, 48 and 49 are employed in the size of system illustrated, and each thereof is generally triangular shaped with the face which contacts with the advancing fruit arranged at an angle of substantially 30° from its base which base lies parallel to the partition 34.

The scooter blocks may be of any desired construction but they are preferably in the form of inverted cup-shaped structures so as to render them light and yet sufficiently rigid and of such size as to properly divert the fruit into adjacent tables as the fruit contacts with the forward walls thereof. Two connecting members 45 are preferably employed on each scooter block and the outermost end of each scooter block extends beyond the conveyor belt 21. A bracket 50 is provided adjacent the cuter extremity of each scooter block and a supporting roller 51 is mounted in the lower end of each of the brackets for engaging the platform 19 beyond the edge of the conveyor belt. This construction of the scooter blocks, as thus described, permits longitudinal movement of said blocks while maintaining the lower edges of the same spaced above the conveyor belt and yet in close contact therewith.

Each scooter block is provided with a screw eyelet 52 to which a rope or cable is adapted to be securely attached. A separate cable is employed for each scooter block, these cables being 53, 54, 55 and 56 for the respective scooter blocks 46, 47, 48 and 49. The cables are in the form of continuous belts and pass over free pulleys 57, 58, 59 and 60 respectively mounted on a fixed shaft 61 at the feeding end of the system. At the opposite end of the system the respective cables pass over pulleys 62, 63, 64 and 65. Each of the pulleys 62, 63, 64 and 65 are freely mounted upon a shaft 66 which is in turn mounted in bearing blocks 67 and 68. These free pulleys are each provided with clutch faces 9 which are adapted to receive corresponding pins 70 therein upon movement of the respective pulleys longitudinally of the shaft 66.

Extending upwardly from the base below the pulleys 62, 63, 64 and 65, are corresponding hook stops 71, 72, 73 and 74. The outer end of the shaft 66 is bent into a crank 75 to form a handle to permit the rotation of the shaft 66 together with the pins 70 secured thereon. Each of the pulleys 62, 63, 64 and 65 is provided with openings 76 in the webs thereof so that the pulleys may be maintained in locked position with the upper ends of the hook stops extending through one of the openings of selected ones of the pulleys when such pulleys are moved longitudinally of the shaft against their respective hook stops.

Upon engaging any one of the free pulleys with its respective hook stop, the respective cable or belt is prevented from moving and therefore the pressure of the advancing fruit upon the corresponding scooter block will in no way move the scooter block and it will act as a deflecting or diverting means for causing the fruit to be deposited into an adjacent packing table. When it is desired to advance or recede any one of the scooter blocks, the corresponding free pulley is moved along the shaft until the clutch face thereof engages a corresponding pin, whereupon the movement of the crank 75 will result in the movement of the belt and in turn its scooter block, the respective hook stop having been rendered ineffective by the sliding movement of the pulley.

In the operation of the system which has been employed to illustrate the invention, the bulk of fruit which may be in the form of apples is deposited on the feed conveyor 10. The fruit is then carried to the elevator 11 upon which elevator the small undesirable apples are eliminated by dropping therefrom. The apples which are eliminated drop upon a conveyor or other means whereby they are carried away from the system. The apples which are of a size to be retained then pass along a roll conveyor 12 which serves as a sorting table to permit the undesirable apples to be manually removed, experts usually being employed for that purpose. After the undesirable apples have been removed from the conveyor 12 the remained of the bulk is passed over the first of the sizing mechanisms contained in the sizing unit 13. This fruit sizing unit preferably has rolls of such size that apples up to 2¼ inches in diameter will fall between the same and be deposited upon the transfer belt 14. The transfer belt 14 delivers this particular sized apples to the lane on the distributing conveyor 21, illustrated in Fig. 1 as being farthest removed from the tables. The apples which are not deposited upon transfer belt 14 then pass to another sizing mechanism of the unit wherein the sizing rolls are of such size that apples up to 2½ inches in diameter will pass therebetween and be deposited upon transfer belt 15. The apples of this size transferred by the belt 15 are deposited upon the conveyor 21 into the lane next adjacent that farthest from the tables.

The sizing unit continues to function and the next size of apples which are transferred to the conveyor are those up to 2¾ inches in diameter which are deposited upon transferring belt 16 and are delivered thereby upon the conveyor into the second lane from the tables. The remaining apples which did not pass between any of the sizing rolls are deposited upon transfer belt 17 whereafter they are delivered into the lane on the conveyor 21 immediately adjacent the tables. It will be seen that the apples in the separate sizes are now contained in the several lanes upon the conveyor belt 21 and are maintained in the separated condition by the dividing members or partitions 34. The conveyor, of course, is in operation and is conveying the apples continuously in the direction away from the transferring belts. Any of the pivoted sections or gates may now be swung to assume an angular position with respect to the remainder of the partitions merely by withdrawing their respective locking nails 41 and swinging such sections about their respective

pivots 38. After the desired pivoted sections have been angularly disposed to effect the diverting action upon the apples to cause them to pass from one lane to another and finally to the lane next adjacent the tables, the scooter blocks 46, 47, 48 and 49 may be moved by the mechanism above described to the tables desired.

A specific example of the operation, while of course subject to variation depending upon the components of the bulk of fruit being packed, may be given by stating that the apples are intermittently deposited at random upon the feed conveyor 10. The apples are deposited according to the speed of operation of the system, which is preferably carried on continuously. We will assume that the bulk of apples is made up of the various sizes as follows:

15% sufficiently small to pass through 2¼ inch sizing mechanism.

50% of a size which will pass them over a 2¼ inch sizing mechanism but through a 2½ inch sizing mechanism.

25% of a size to pass them over a 2½ inch sizing mechanism but through a 2¾ inch sizing mechanism.

10% of such size that they will pass over a 2¾ inch sizing mechanism.

As 15% of the apples are not larger than 2¼ inches in diameter, 15% of the packers should preferably be employed in the packing of this size fruit, or in other words 15% of the total fruit being packed should be delivered to substantially 15% of the packing tables. In order to accomplish such a delivery of the apples, assuming that a system employing twenty-seven tables is involved, three pivoted members 37 of a set are operated at a point to discharge or divert the small apples from the lane farthest from the tables to cause these smaller size apples to be conducted to the lane immediately adjacent the tables. The apples pass into this last mentioned lane at a point to permit them to be discharged upon any one of the last four tables, the scooter block 46 being adjusted as desired in order to keep each of these tables replenished with apples as they are removed by the packers. The apples thus delivered upon the last four tables are 2¼ inches or under in diameter and as the last four tables constitute substantially 15% of the tables available they permit the proportionate facilities for the packing of this proportionate quantity of the entire bulk of fruit being packed.

The apples in the next adjacent lane, being those from 2¼ inches to 2½ inches in diameter, should be diverted to that lane immediately adjacent the tables so as to pass in said lane in front of approximately thirteen of the tables. This is approximately 50% of the tables and the scooter block 47 should be adjusted to a position in front of any one of these thirteen tables which require replenishing. Of course, the apples between 2¼ inches and 2½ inches in diameter in the said lane on the conveyor are caused to be diverted to the lane containing the scooter blocks by the positioning of the two outermost pivoted members 27 of that set which is immediately adjacent the most forward of the said thirteen tables. The apples which are deposited upon the conveyor 21 by the transfer belt 16 are between 2½ and 2¾ inches in diameter and are carried in the second lane from the tables. These apples are diverted to the scooter lane so as to pass in front of approximately seven tables, these being approximately 25% of the total number of tables. Of course, the apples are diverted from the lane second from the tables by means of a single pivoted member 37 of that set which is immediately adjacent the most forward of these seven tables. The scooter block 48 is utilized to keep each of these seven tables replenished, the scooter block being adjusted in the manner as described.

The apples which are transferred to the conveyor by belt 17 come directly into the scooter block lane and as these apples constitute 10% of the bulk, it is desirable to pass them in front of but three of the tables. The scooter block 49 is adjusted to the desired position to cause this sized fruit to be deposited upon either of the three tables and to thereby keep them replenished. Should the relative portions of fruit vary during any operation, the variation may be compensated for by closing the open pivoted members referred to and opening different pivoted members in order to cause the number of tables employed for any sized fruit to be altered in accordance with the proportionate variation of such fruit to the entire bulk.

If desired to permit the use of a single table for two sizes of fruit, the table may have a partition plate arranged thereon to permit it to be utilized as two independent tables. Furthermore, since two packers are usually employed at each table, the partition plates may be arranged in all of the tables to thereby permit each of the same to be formed into two tables of lesser capacity. Any of the usual types of packing tables may be employed and, if desired, gates may be arranged at the outer end of each table to permit the insertion of receptacles thereunder so that the opening of the gates will permit the gravity filling of the receptacles without the necessity of individually handling the fruit.

Various modifications may be made within the scope of the claims, and the distributing mechanism may be associated in any manner with the sizing apparatus, the particular illustration being suited for conserving space in some packing houses, but the invention contemplates the rearrangement by which the sizer may be positioned to deposit the fruit upon the distributing conveyor belt from any angle. Furthermore, packing tables may be arranged along both sides of the conveyor belt with the pivoted members being adapted to pivot in either direction to divert the fruit from any lane to either one of two scooter lanes arranged respectively adjacent the rows of tables on both sides of the conveyor belt.

What we claim is:

1. A distributing system for fruit and the like comprising a conveyor, means for operating the conveyor, means subdividing the conveyor into lanes for differently sized fruit with a common lane for the passage of all sizes of fruit while maintained separate, tables arranged along the conveyor and adapted to receive fruit discharged therefrom, a plurality of scooter blocks adjustably positioned in the common lane, a belt for each scooter block, a pulley adjacent each end of the conveyor for each belt, means normally preventing the movement of either belt but adapted to be rendered ineffective to permit the movement of selected belts, and common means adapted to effect the movement of each belt upon the rendering of the movement preventing means ineffective, whereby the scooter blocks may be independently adjusted to various positions along the common lane for causing a discharge of the fruit upon adjacent tables.

2. A distributing system for fruit and the like

comprising a table, an endless conveyor having a flight thereof moving on the table with a portion of the table extending beyond the edge of the flight, partition means subdividing the conveyor into a plurality of lanes, said subdividing means including bridge supports and vertical partition walls extending downwardly therefrom but terminating short of the conveyor surface with the partition walls being formed with sections which are adapted to be pivoted to assume a position across an adjacent lane so that fruit traveling on the conveyor in a lane having one of the sections extending thereacross is intercepted and caused to be passed through the opening in the partition wall caused by the pivoting of said section, means for operating the conveyor, said partitioning means being so arranged that an end lane is open at one side thereof, and means arranged in said end lane for the diverting of the fruit from the conveyor, said diverting means being longitudinally adjustable and being supported by said extending portion of the table and the partition wall extending along said lane.

3. A distributing system for fruit and the like comprising a table, an endless conveyor having a flight thereof moving on the table, means subdividing the conveyor into a plurality of lanes with one lane being open along its outer side, the table extending beyond the edge of the flight along the open side of said open lane, the subdividing means including a partition wall along the inner side of the open lane provided with a longitudinal groove, and means for diverting the fruit from the open lane, said diverting means being longitudinally adjustable and having a wheel engaging the extending position of the table and a member engaging in the slot in said partition wall for supporting the same out of contact with the conveyor flight but closely adjacent thereto.

4. A distributing system comprising a conveyor, means for operating the conveyor, means for subdividing the conveyor into a plurality of walled lanes and a lane open at one side thereof, means positionable at will for intercepting the passage of fruit in any of the walled lanes at one or more points longitudinally thereof and the transferring thereof across the intervening lanes toward the open lane and a plurality of shiftable members in the open lane and between which, respectively, the fruit from said other lanes is delivered, said members being movable along the length of said open lane for effecting the discharge of the fruit from the conveyor at any desired points along said open lane.

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