Jan. 24, 1956 J. B. LEGROW ET AL 2,732,164

SORTING AND BAGGING APPARATUS

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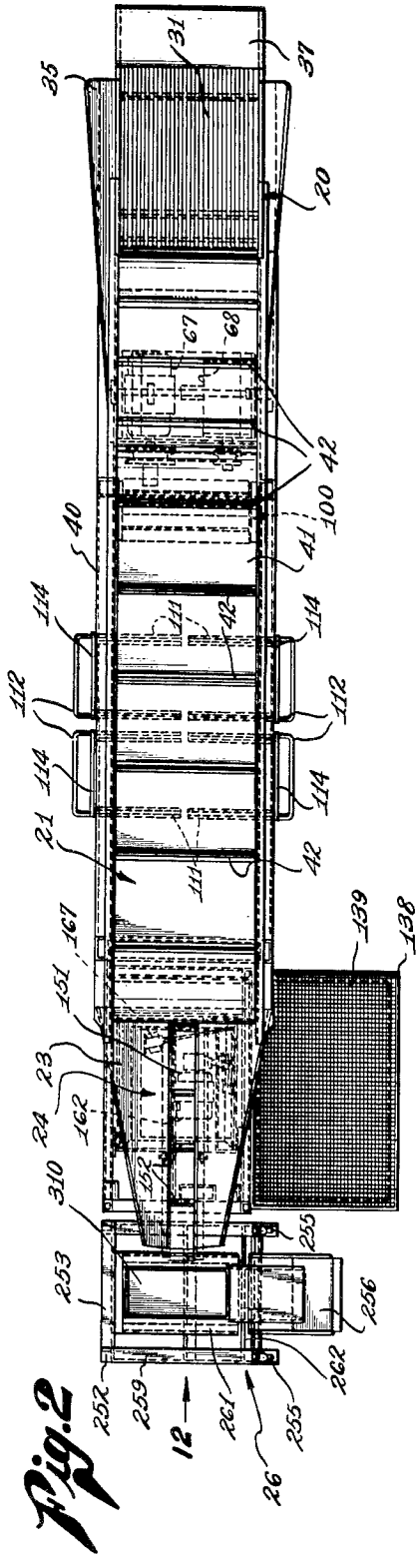


Fig. 2

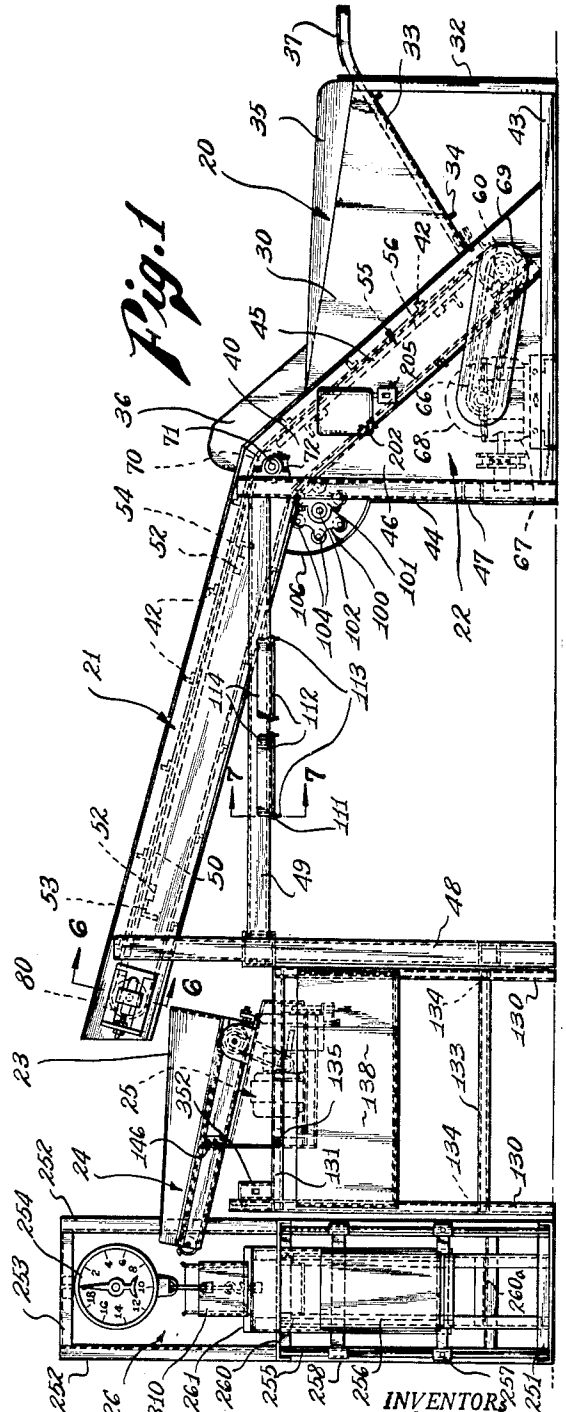


Fig. 1

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Fig. 3

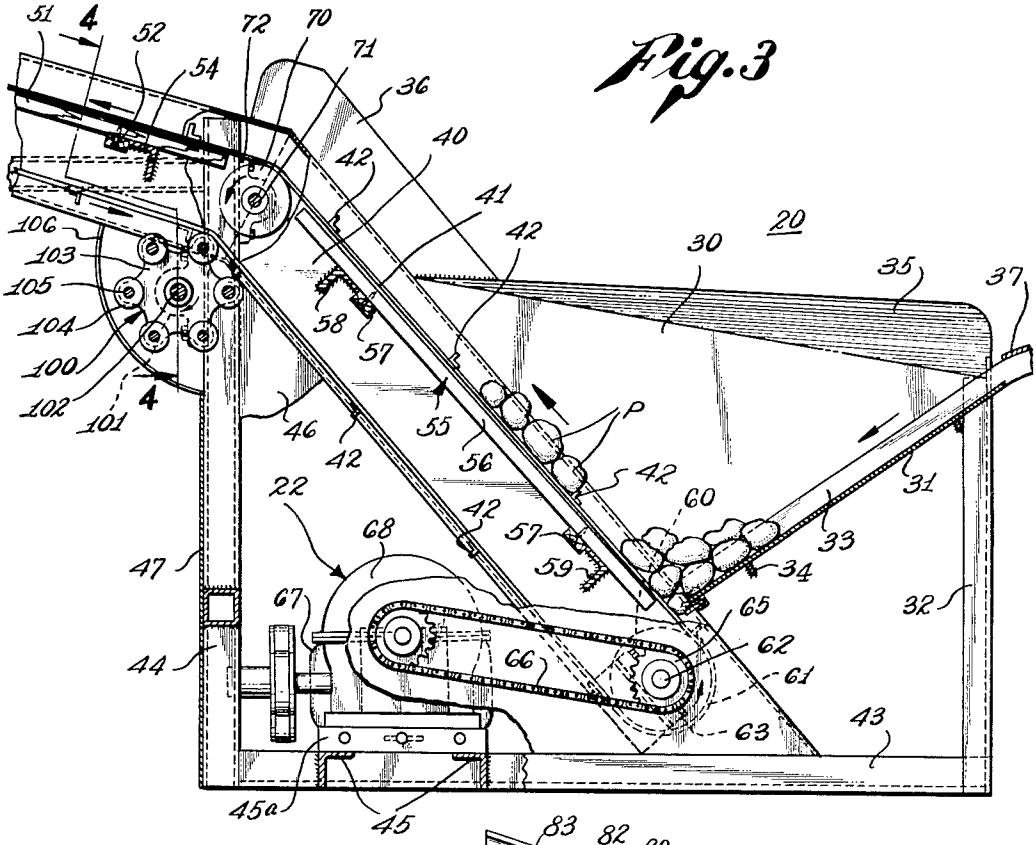


Fig. 4

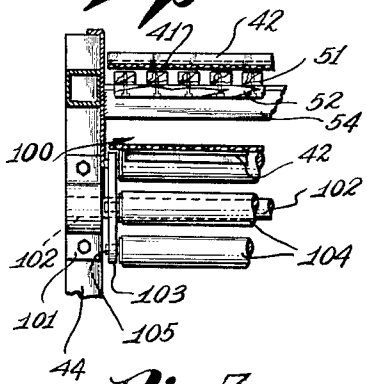


Fig. 5

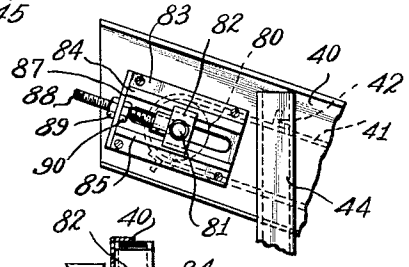


Fig. 6

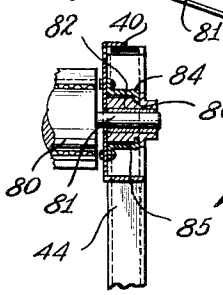
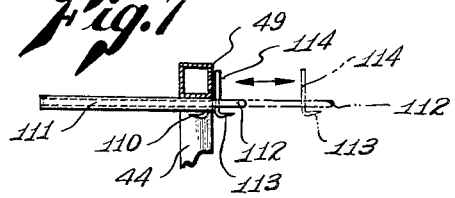


Fig. 7



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Fig. 8

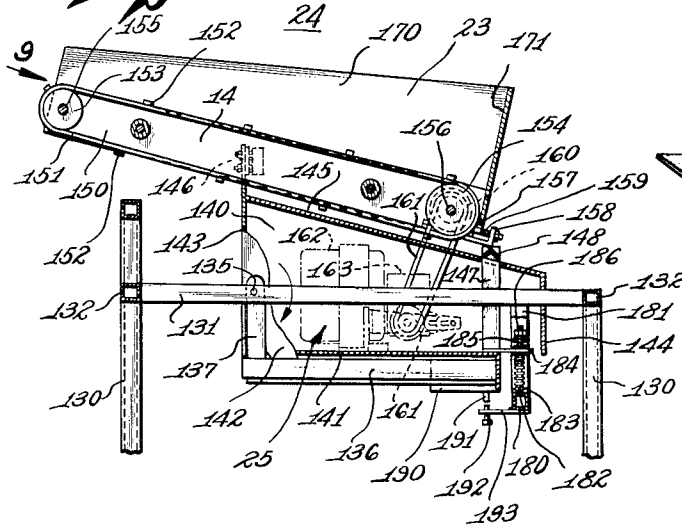


Fig. 9

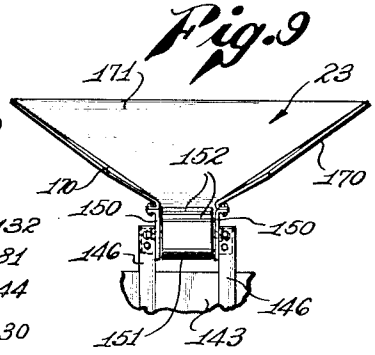


Fig. 10

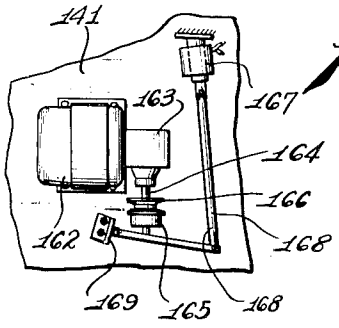


Fig. 11

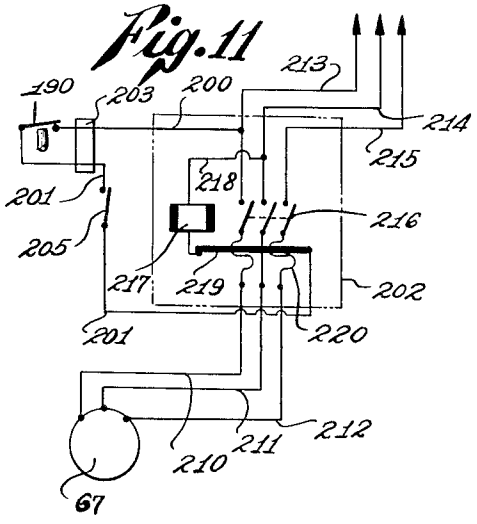
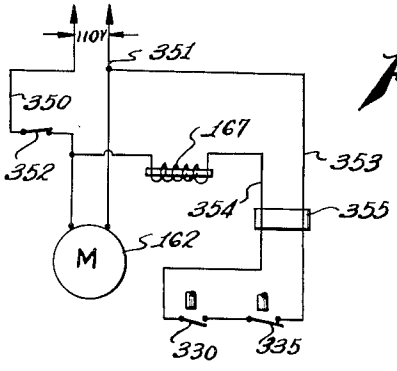


Fig. 16



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Fig. 12

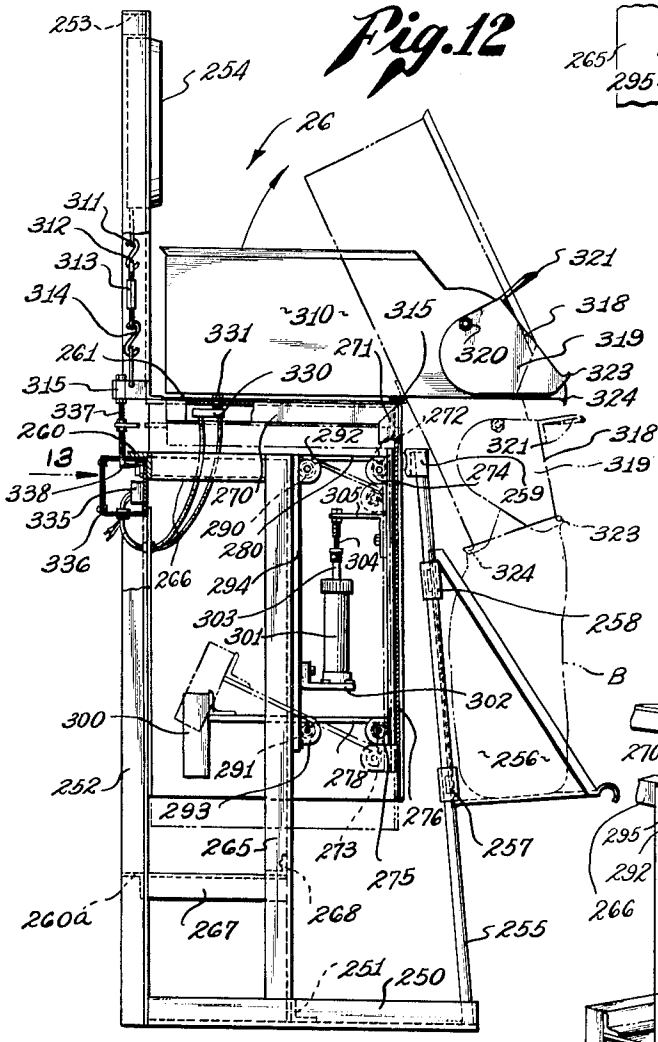


Fig. 14

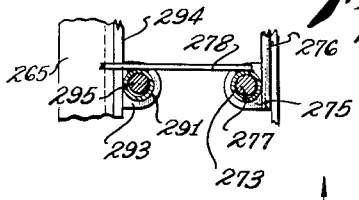


Fig. 13

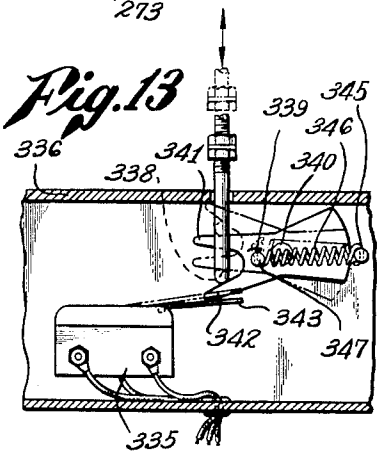


Fig. 17

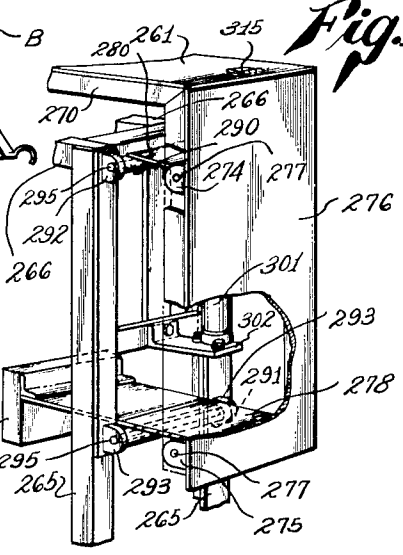
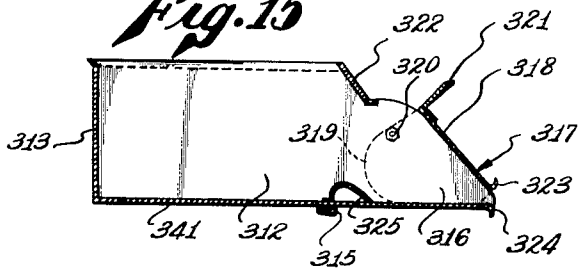


Fig. 15



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SORTING AND BAGGING APPARATUS

Jack Bayard Legrow, South Gate, and Paul C. Joratz, Bell, Calif.

Application March 3, 1950, Serial No. 147,524

8 Claims. (Cl. 249—17)

Our invention relates generally to material-handling equipment, and more particularly, to an improved sorting and bagging apparatus for use with fruits, vegetables, or similar produce.

It has been found advantageous to bag fresh produce in small retail quantities of predetermined weight at a central warehouse or market, and thereafter deliver the bags to retail stores where they are sold without further transfer. Bulk handling of such produce involves many difficulties, such as duplication of labor, spoilage, and non-uniform sorting of the product, that may be eliminated by the modern practice. However, prior types of handling equipment have proven unsatisfactory for a material of this nature, and it has heretofore been necessary to use slow and laborious hand packing methods.

It is therefore a major object of our invention to provide a sorting and bagging apparatus that will rapidly and efficiently handle a wide variety of different fresh produce.

Another object of our invention is to provide a sorting and bagging apparatus which fills each bag to a variable predetermined weight.

It is also an object of our invention to provide a sorting and bagging apparatus which requires only inexperienced operators, is absolutely safe in operation, and will not jam or overload.

A further object of our invention is to provide a sorting and bagging apparatus having three structurally distinct components that may be used separately but are interrelated by control circuits to operate as a unit.

Yet another object of our invention is to provide a cleated conveyor assembly which positively moves the material along an inclined path, and has a simple and trouble-free supporting structure.

Still another object of our invention is to provide a sorting and bagging apparatus having a combined dump spout and bag-holding mechanism, permitting rapid and positive filling of the bags.

The preferred apparatus constructed in accordance with our invention comprises generally three component assemblies, an infeed and sorting conveyor, a hopper and loader, and a weighing and bag-filling device, interrelated by control circuits to operate as a single unit. The material is transported in conventional bulk carriers to the apparatus and dumped into a chute or bin where it feeds into the conveyor. A cleated conveyor belt then transports the material over a sorting table to allow defective, undersized, or other undesirable items to be removed. At the end of the conveyor, the material falls into the intermediate hopper which is counterbalanced to control the infeed rate, and shuts down the conveyor as is necessary. A loader or feeder carries the material from the hopper to a weighing receptacle positioned in the weighing and bagging assembly. The receptacle has a combined dump spout and bag-holding mechanism thereon, and after it has filled to a predetermined weight, the operator pivots the receptacle forwardly and dumps the contents into a bag engaged by the bag-holding mechanism, removes the filled bag, and repeats the operation with production line speed.

During the dumping operation the loader shuts off as the receptacle is pivoted forwardly to discharge its contents, and will not resume movement until the receptacle is again in a receiving position. If the operator fails to dump the receptacle when it is filled to the predetermined weight, the loader will automatically shut off, and the hopper will thereafter fill and cause the conveyor to stop. The apparatus then remains in the standby condition until the operator resumes work, at which time the loader and conveyor automatically start up to supply the material. In essence, the apparatus paces itself to the individual capabilities of the operator, and will work automatically in cooperation with him. This is an important feature of the device for, as can be understood, it is impossible to overload, or overrun the machine, and the most efficient and rapid packing is made possible.

The operation of our apparatus will hereinafter be described in connection with the handling of a particular class of material, using as an example potatoes. The potato is one of the most difficult of all materials to handle because of its varying characteristics, and is used as an example for this reason. A potato is not uniform in size, shape or weight. It has an easily punctured skin, will not stack, and will not roll or slide evenly. Moreover, a group of potatoes will bridge and jam in moving machinery, and are sufficiently cheap and bulky to require a tremendous volume output to justify packaging costs. It is thus apparent that the use of our apparatus for bagging potatoes is not by way of limitation, but is illustrative of its flexibility and efficiency.

These various features and accomplishments of our invention, as well as other objects and advantages, will become apparent from the following detailed description of a preferred form thereof, and from an inspection of the accompanying drawings, in which:

Figure 1 is a side elevation of the complete apparatus;

Figure 2 is a top plan view of the complete apparatus;

Figure 3 is a side elevation, partially in section, of the infeed bin and conveyor assembly;

Figure 4 is a cross-section taken along the line 4—4 of Figure 3 and showing the supporting guide means;

Figure 5 is a side detail of the belt adjusting mechanism of the conveyor assembly;

Figure 6 is a cross-section taken along the line 6—6 of Figure 1;

Figure 7 is a cross-section, taken along the line 7—7 of Figure 1;

Figure 8 is a side elevation, partially in section, of the hopper assembly;

Figure 9 is an end view taken in the direction of the arrow 9 in Figure 8;

Figure 10 is a plan detail of the driving unit used in the loader assembly;

Figure 11 is a diagrammatic sketch of the conveyor power and control circuit;

Figure 12 is an end elevation partially in section of the weighing and bagging assembly;

Figure 13 is a detail taken in the direction of the arrow 13 in Figure 12;

Figure 14 is an enlarged detail of the counterbalance support shown in Figure 12;

Figure 15 is a vertical cross-section of the weighing receptacle showing the dump spout and bag-holding means thereon;

Figure 16 is a diagrammatic sketch of the loader control and power circuits; and

Figure 17 is a partial perspective detail of the supporting structure for the loading platform.

Referring now to the drawings and particularly to Figure 1 thereof, the numeral 20 indicates an infeed chute

or bin that is preferably formed as a structural assembly with an inclined conveyor 21 driven by a power unit 22. An intermediate assembly comprising a hopper 23, a belt loader or feeder 24, and a second power unit 25 is positioned to receive material discharged from the output end of the conveyor 21. The loader 24 discharges into a weighing and bagging assembly 26 that is positioned on the end of the apparatus, and is also formed as a separate structure. It is preferable to thus form the apparatus as three separate assemblies so that they may be used apart from each other if desired. Various control means to be hereinafter described interrelate the assemblies to operate as a single unit or apparatus.

The infeed chute or bin 20 is preferably formed as an open-topped triangular box having suitable sheet metal sides 30 and an inclined bottom wall or trough 31 towards the outer or right-hand end portion as seen in Figure 2. The bottom trough 31 is formed as an open grating supported at the top by vertical leg members 32, and along its side edges by angle members 33 inclined downwardly from the legs. The lower ends of the angle members 33 are connected rigidly to a pair of heavy frames or channels 40, which form the front and rear sides of the conveyor 21, and extend upwardly at a steep angle along the inner end of the bin 20. Lateral cross braces 34 are secured to the angle members 33 and pass beneath the grating 31 to hold the latter against bending under the impact of a heavy load of material. The main frames 40 rotatably support a longitudinal movable belt 41 which closes the inner end of the bin 20 and moves upwardly by operation of the drive unit 22. The belt 41 carries spaced lateral cleats 42 which engage a material, illustrated as potatoes P, and carry it upwardly and away from the bin 20, as is best seen in Figure 3.

In the preferred form of the device, the grating or trough 31 is inclined at a substantial angle to provide a positive gravity feed of the potatoes P against the conveyor belt 41, but as can be understood, the device is not limited to the use of a gravity feed. The upper ends of the angle members 33 are curved outwardly to support a generally horizontal transverse shelf 37 which serves as a convenient rest to facilitate dumping large sacks of material into the bin 20. Flanged portions 35 may be turned outwardly along the upper edges of the sides 30 to aid in confining the material within the bin 20, and there may also be side extensions 36 extending along the edges of the channels 40 to prevent spilling therefrom.

Beneath the bin 20 are horizontal bed members 43 joined rigidly to the vertical legs 32 and to the inclined conveyor sides 40. The bed members 43 extend inwardly along the front and rear side to a point beyond the channel 40, to provide a base for the drive or power unit 22, and join the vertical upstanding posts 44 which connect to the upper portion of the channels and complete triangular side frameworks. Spaced across the bed members 43 are suitable lateral frames 45 which provide a base for the power unit 22. A housing to enclose and protect the power unit 22 may be formed of triangular sheet metal sides 46 removably fastened along the lower edges of the members 40 and a transverse end wall 47 extending between the posts 44.

The main frame 40 of the conveyor 21 turn or bend near the top of the bin 20, and continue outwardly or forwardly towards the hopper 23 at a lesser angle or inclination with the horizontal. The upper ends of the frames 40 are elevated a substantial distance from the flooring to overhang the intermediate hopper assembly 23, and are supported by suitable vertical legs 48. Horizontal side beams 49 connect between the legs 48 and the posts 44 to form a rigid framework which supports the heavy structure of the conveyor 21.

Between the upper portions of the frames 40 is a longitudinally extending, horizontal table 50 lying parallel to the upper edges of the frames and dropped slightly

below them. The belt 41 travels forwardly over the table 50 to allow sorting of the potatoes P as they are carried upwardly from the bin 20, and is vertically supported by the table so as to prevent stretching or sagging under a heavy load of material. To reduce surface friction with the belt 41, the table 50 is preferably formed of longitudinally extending spaced battens 51 held in alignment by ribs 52 which are removable locked between suitable cross braces 53 and 54 attached to the frames 40. A shorter wall 55 is secured parallel to and between the inclined lower portions of the frames 40, and forms a backing to support the portion of the belt 41 which closes the forward end of the bin 20. The wall 55 is similarly formed of longitudinally extending spaced battens 56 and transverse ribs 57 which are removably supported on cross braces 58 and 59, as is best seen in Figure 3.

The belt 41 is of flexible construction, such as a rubberized fabric, and has cleats 42 spaced laterally thereon at short intervals. Each cleat 42 may be formed very simply as a right angle secured to the belt 41 by suitable fasteners. The cleats 42 project upwardly from the surface of the belt 41, and provide ledges in which the potatoes P seat so as to be lifted from the bin 20. This is an important feature in a conveyor of this type for, as can be understood, the potatoes P, or a similar material, have a tendency to roll on the inclined surface of the belt 41, and without the cleats 42 the flow of material through the conveyor would be at best sporadic. The belt 41 travels forwardly over the upper surface of the inclined wall 55 and the table 50, remaining a slight distance below the top edges of the side frames 40, and returns in a generally parallel path. A transverse roller 60 is supported between the frames 40 and is located at the bottom edge of the wall 55 to support the lower portion of the belt 41. Similar rollers 70 and 80 are positioned near the bends of the frames 40 and at their upper ends to support the central and upper portions of the belt 41, respectively.

The lower roller 60 is the driving means which moves the belt 41, and is operated by the drive unit 22. A hollow tubular shell 61 forms the surface of the roller 60 and has mounted therein a rigid axial shaft 62 which extends outwardly to pass through the frames 40 and a pair of pillow block bearings 63 mounted thereon. Outwardly of the front bearing 63, the shaft 62 carries a suitable sprocket wheel 65 driven by a link chain 66 from a drive unit 22. The drive unit 22 is conventional, comprising a suitable electric motor 67 and a gear reduction box 68 having an output sprocket that engages the chain 66, and permits the roller 60 to travel at a comparatively slow speed. The motor 67 and gear box 68 are mounted on cross braces 45 by a slotted adjustable base 45a which may be moved to keep the proper tension on the chain 66. A cover 69 may be fastened on the outside of the housing 46 to enclose the drive chain 66 and protect the operating personnel from danger.

The intermediate roller 70 supports the belt 41 at the bend of the frame 40, having an axle 71 which is rotatably mounted between suitable pillow block bearings 72 secured outwardly of the frames 40 on the upstanding posts 44. As is best seen in Figure 3, the roller 70 allows the belt 41 to make a smooth turn from its upward travel along the wall 55 to its travel along the table 50. The roller 70 also cooperates with the rollers 60 and 80 to keep the belt 41 spaced slightly above the wall 55 and the table 50 so as to reduce the sliding friction caused by the movement of the belt.

The roller 80 is positioned between the upper ends of the frames 40 to support and turn the belt 41 approximately 180° for travel rearwardly under the table 50. As is best seen in the details of Figures 5 and 6, the roller 80 carries an axial shaft 81, which is rotatably mounted in bearing 82 on the outside of the frames 40. A slotted plate 83 is secured on each of the frames 40 and carries outwardly extending guide rails 84 and 85 which engage

opposed top and bottom grooves 86 in the bearings 82, and permits the latter to travel longitudinally along the frames 40. On the forward and of the plate 83 is an out-turned flange 87 which engages a threaded adjusting stud 88 projecting longitudinally from the forward base of the bearing 82. The adjusting stud 88 controls the position of the bearing 80 along the rails 84 and 85, and provides for longitudinal movement of the roller 80 to keep the belt 41 in proper tension. An adjusting nut 89 engages the stud 88 outwardly of the flange 87, and an inner locking nut 90 is adapted to be tightened against the flange to provide positive locking of the stud.

The lower roller 60 drives the belt 41 by frictional engagement, and it is apparent that the belt must always be kept under proper tension. If the belt 41 were to be unsupported on its lower half, it would hang between the roller 80 and the roller 60 in a loose span or catenary, because of the triangular disposition of the rollers made necessary by the angular bend of the frames 40. Such a design is not satisfactory for a long span because the belt 41 tends to stretch under its own weight, and would not remain in frictional engagement with the roller 60 under load conditions. Also, if the belt 41 can be made to return in a lower path generally parallel to the upper path, much less space is enclosed by the belt, and the assembly may be made more compact. For these reasons, it is necessary to support the belt 41 on the lower reach of the under side, having the lateral cleats 42 thereon. Such supporting is difficult because the cleats 42 will not pass over a conventional guide roller, and we have therefore developed a novel supporting guide as will now be described.

Adjacent the bend of the frames 40 and below the roller 70, a generally cylindrical guide means 100 is rotatably mounted to support the lower reach of the belt 41. A pair of bearings 101 are rigidly attached to the forward sides of the posts 44 to support a shaft 102 which extends transversely beneath the belt 41. At each end of the shaft 102 is a generally star-shaped plate 103 which is concentric about the shaft 102, and carries a plurality of circumferentially spaced, and laterally extending rollers 104. Each of the rollers 104 is rotatably journalled in the plate 103 by means of a center axle 105 and is a proper radial distance from the shaft 102 to place the surface of the roller 104 in contact with the outer surface of the belt 41 as is best seen in Figures 3 and 4. In the preferred form, six rollers 104 are spaced peripherally about the plate 103, but the exact number of rollers can of course be varied depending upon the proportion of the device. A semi-cylindrical cover 106 may be positioned outside of the guide means 100 and secured beneath the frames 40 to shield the operating personnel from this mechanism, as is done by the use of covers throughout the apparatus.

Were it not for the cleats 42, an uppermost roller 104 would tend to remain in contact with the belt 41 rolling about its own axle 105. However, a cleat 42 cannot ride over the roller 104, and therefore pushes it to rotate about the shaft 102 in the direction indicated by the arrow of Figure 3. As the roller 104 continues to rotate about the shaft 102, it leaves the surface of the belt, and allows the cleat 42 to pass it and continue downwardly with the belt. At the same time, rotation of the shaft 102 has caused the adjacent roller 104 to travel to the top of its arc and engage the belt 41. This roller 104 then remains in place relative to the shaft 102, and rotates on its own axle 105 until the next cleat 42 forces it to move. The proportions of the star plate 103 are such that there is always one roller 104 in contact with the belt 41, and yet as has been explained, they in no way interfere with the cleats 42. The use of the guide means 100 in a conveyor of this type is very advantageous, but it will be understood that there are other types of conveyors in which the guide means may also be used.

The control of the conveyor 21 will hereinafter be described in detail, in connection with the intermediate hopper 23 to which it is connected. However, it can be understood that when the motor 67 is energized, it drives the roller 60 through the gear box 68 and chain 66. The roller 60 is kept in proper frictional engagement with the belt 41 by adjustment of the upper roller 80, and the cooperation of the guide means 100. As the belt 41 travels upwardly, it carries the potatoes P out of the bin 20 by means of the engaging cleats 42, and thence over the table 50.

The table 50 provides a sorting zone for the purpose of sorting any particular undesirable items from the potatoes P to provide uniform size and quality in the final product. Beneath the sides of the table 50, bag-holding means are secured to the horizontal frames 49, as seen in the detail of Figure 7, to support large bags for disposing of the undesired items. Spaced in-turned hooks 110 are positioned beneath the frames 49 and are adapted to engage one side of a large burlap bag or the like (not shown). The hooks 110 are arranged in horizontal pairs, and are fastened to the bottom of a pair of guides or tracks 111 which extend across to the opposite frame 49 and are rigidly held in place. In the preferred form, the guides 111 are tubular sleeves which slidably support the ends of an outer U-shaped rod 112 that may be moved outwardly from the frames 49 as indicated by the arrows of Figure 7. The center portion of the rod 112 carries a lower pair of out-turned hooks 113 which are adapted to engage the opposite side of the bag. As the rod 112 is pulled outwardly, the hooks 110 and the hook 113 separate and open the mouth of the bag, so that it is easy to drop the undesired items therein when they are removed from the belt 41. Each rod 112 may also have a stop plate 114 extending across its central portion to abut the frame 49 and prevent the rod from being wedged too far into the tubular sleeves 111.

In the preferred form as herein illustrated, there are two sets of sleeves and rods 111, 112 on each frame 49, so as to allow four bags to be held in position and permit two operators to sort, one on either side. More or less sets 111, 112 can, of course, be used for particular conditions. After passing the table 50, the belt 41 continues upwardly until it reaches the roller 80. The remaining bulk of the potatoes P on the belt 41, is then dumped over the roller 80, and into the intermediate hopper 23 positioned thereunder.

The hopper and loader assembly 23, 24 into which the material P is carried by the conveyor 21 is supported on an open rectangular framework comprising vertical posts 130 attached to horizontal side frames 131 and transverse braces 132. Lower side braces 133 and cross braces 134 may also be provided. Near the forward or right-hand end of the horizontal frames 131 are a pair of pivot pins 135 which support inner generally horizontal balance arms 136 by means of short upper right angle cranks 137. The balance arms 136 are attached to the sides of a housing 140 which encloses the power or drive unit 25, and carries above it the loader 24 and hopper 23. As can be understood, the entire structure supported by the arms 136 tends to rotate clockwise about the pivots 135 in the direction indicated by the arrow of Figure 8.

As is seen only in Figures 1 and 2, a large rectangular box 138 may be secured to the forward side of the posts 130 to project outwardly in a generally horizontal position spaced above the supporting surface. The box 138 is of light sheet metal construction, using a screen or grating 139 to form its bottom, and serves to hold the empty bags to be filled in the weighing and bagging assembly 26.

The housing 140 is a closed box having an elevated base or bottom 141, vertical sides 142, a forward end wall 143, and a shorter removable rear end wall 144. The sides 142 have inclined upper edges and are joined

to a top plate 145 which completes a weatherproof cover for the drive unit 25 suitably mounted on the base 141. Spaced vertical legs 146 extend above the top of the forward wall 143 to support the loader 24 as can best be seen in Figure 9. The base 141 terminates short of the rear end wall 144 leaving a bottom opening in which are positioned balancing means later to be described. On the rear edge of the base 141, a pair of spaced brackets 147 extend upwardly through the top member 145 to join a central horizontal frame 148. The loader 24 is supported at its rear end by the frame 148, and is inclined forwardly parallel to the top member 145 to overhand the supporting framework and feed into the weighing and bagging assembly 26.

The loader 24 has spaced parallel side frames or channels 150 which carry an endless movable belt 151 on which are mounted spaced lateral cleats 152. The belt 151 is formed of resilient material and is of relatively narrow width as is best seen in Figure 9. A front roller 153 is rotatably journalled in the side frames 150 and a rear or driving roller 154 is positioned at the rear end of the frames to drive the belt 151, which travels forwardly over the rollers and returns in a lower generally parallel path. The roller 153 is mounted on an axle 155 extending through the side frames 150, and the rear roller 154 is mounted on an axle 156 that extends through the side frames and is rotatably journalled in spaced parallel bearings 157, mounted on an adjustable bracket 158. A locking stud 159 permits adjustment of the bearings 157 in the direction of the longitudinal axis of the side frames 150 so as to keep the proper tension on the belt 151. The shaft 156 carries a pulley 160 outboard of one of the bearings 157, driven by a belt 161 from the drive unit 25. When the drive unit 25 is energized, the roller 154 drives the belt 151 to carry the material P forwardly by means of the cleats 152.

The drive unit 25 as is best seen in Figure 10, comprises an electric motor 162 mounted on the base 141 and connected to a suitable gear reduction box 163. A shaft 164 of the gear box 163 has a clutch 165 at its outer end which engages a pulley 166 for rotation therewith. The clutch 165 is operated by a solenoid 167 connected through a suitable linkage 168 pivoted about a bracket 169 secured to the base 141. When the solenoid 167 is energized, it draws the linkage 168 inwardly to engage the clutch 165 with the pulley 166. The pulley 166 engages the upper belt 161 and causes the belt 151 of the loader assembly 24 to travel forwardly. When the solenoid 167 is de-energized, as will be explained in connection with the weighing and bagging apparatus 26, the clutch 165 instantly disengages from the pulley 166 and stops the travel of the belt 151. The use of the clutch 165 prevents any overtravel of the belt 151 due to inertia of the motor 162 as might otherwise happen, and permits very fine control of the feed into the weighing assembly 26.

The hopper 23 is a trough-like structure comprising inclined side walls 170 secured along the upper edges of the frames 150 to extend upwardly and outwardly. A triangular rear wall 171 extends across between the sides 170, and the top and forward ends of the hopper 13 are open to allow intake and discharge of the material P. The rear end of the hopper 23 is depressed to conform to the side frames 150 and creates an inverted apex into which the material tends to fall. Because of the inclined walls and the depressed rear portion, there is a positive feed of material into the belt 151 until the hopper 23 is completely exhausted. However, the belt 151 is of relatively narrow width as compared to the conveyor 21, and feeds the material into the bagging and weighing assembly 26 in almost a piece by piece flow, allowing accurate control of the weighing mechanism, which operates to start or stop the travel of the belt 151. As with the conveyor 21, the use of the cleats 152 on the belt 151 is very advantageous in an apparatus for handling material such as potatoes, that would otherwise tend to slide and slip on the inclined surface of the belt.

It will be remembered that the entire structure supported by the balance arms 136 on the pivot pins 135 tends to rotate downwardly. The weight of material P in the hopper 23 varies the tendency of the structure to rotate on the balance arms 136, and is used to regulate the operation of the conveyor 21 by means of balancing springs and plunger operated control switch, as will now be described.

A transverse underslung frame 180 is rigidly supported by braces 131 secured to the side frames 131, and extends across the bottom open portion of the housing 140. A pair of helical balance springs 182 are mounted on vertical stems 183 near the outer ends of the frame 180 and support apertured ears 184 which slidably engage the stems and seat on the top of the balance springs. The ears 184 extend forwardly and are firmly mounted on the rear end of the base 141 to hold the balance arms 136 from rotating downwardly about the pivot 135, except by compression of the springs 182. As the weight of material P in the hopper 23 is increased, the springs 182 compress and allow the arms 136 to rotate a limited amount. Above the ears 184, damping or counterbalancing springs 185 may be mounted on the stems 183 and secured in place by locking nuts 186 to control the oscillation of the arms 136 as the springs 182 resist the downward movement of the ears.

Beneath the base 141 is a plunger operated control switch 190 having a downwardly extending plunger 191 adapted to engage an adjustable stop 192 mounted on a flange 193 extending rigidly forwardly from the frame 180. The switch 190 has normally closed electrical contacts, and when the arms 136 rotate downwardly, the plunger 191 engages the stop 192 to open the contacts which are connected in a control circuit. As can be understood, the stop 192 may be spaced from the plunger 191 to require more or less compression of the springs 182 depending upon the weight of material P which is to fill the hopper 23. In the preferred embodiment using a material such as potatoes, the hopper 23 will be filled with approximately 50 pounds of material, and the stop 192 is set to engage the plunger 191 under this condition.

Operation of the switch 190 controls the drive unit 22 in the previously described conveyor 21. Removable conductors 200, 201 connect the switch 190 into a control box 202 mounted on the side of the conveyor 21 by means of a jack 203 as illustrated in the schematic diagram of Figure 11. A starting switch 205 is in series with the line 201 and is mounted adjacent the control box 202 as is seen in Figure 1. The motor 67 of the drive unit 22 is preferably of three phase type to carry the heavy load of the conveyor 21, and has lines 210, 211 and 212 connected into the output terminals of the control box 202. Input lines 213, 214 and 215 lead from a suitable source of electrical energy and are connected into the input terminals of the box 202.

Conventional contacts 216 are closed to connect the input and output terminals of the box 202 upon energization of an operating coil 217 that is connected in series with the line 201 leading from the starting switch 205 and the plunger operated switch 190. A line 218 is connected from the operating coil 217 to the input line 214, and with the line 200 connected to the input line 213, completes the control circuit across a single phase of the power source. When both switches 205 and 190 are closed, the operating coil 217 is energized to close the contacts 216 and energize the motor 67. If desired a thermal overload strip 219 may be connected between the coil 217 and the line 201, and operated by heating coils 220 in the lines 210 and 212 to open the control circuit if the system is badly overheated.

Normally the switch 205 is closed when the apparatus is placed in operation, and the switch 190 is likewise closed until the hopper 23 is filled. If the hopper 23

is being emptied by the loader 24, the conveyor 21 remains in operation and carries material P into the hopper 23. As soon as the hopper 23 begins to overload with an excess weight of material P, the switch 190 opens, and the operating coil 217 is de-energized, opening the contacts 216. The motor 67 is de-energized and stops the travel of the conveyor belt 41 carrying material into the hopper 23 so as to automatically prevent overrunning of the hopper. When the springs 182 are able to overcome the weight of the hopper 23, the switch 190 closes and motor 67 is energized to again drive the conveyor belt 41.

The weighing and bagging assembly 26 is positioned at the output end of the loader 24 and may be considered as disposed sideways with respect to the direction of travel of the loader and conveyor 21, so that Figure 1 is a front view thereof, and Figure 12 is a side elevation of the same. In describing the details of the assembly 26, it will hereinafter be considered as disposed in this manner, and the direction will be referenced accordingly.

The assembly is similar to the device described in the copending application of Jack B. Legrow, Serial No. 54,883, filed October 16, 1948, for Bagging and Weighing Device, issued October 3, 1950 as United States Patent No. 2,524,391, but has many important changes to adapt it for use as an interrelated unit of the instant apparatus, and has an improved and simplified bag-holding and filling means as will be described.

The assembly 26 has preferably a flat bed or base comprising horizontal side frames 250 joined by a central transverse angle member 251 to rest firmly on the supporting surface. At the rear of the side frames 250 vertical spaced uprights 252 extend upwardly and are joined by an upper transverse beam 253 which overhangs the assembly and supports a dial type scale or weight indicator 254 as is best seen in Figure 1. Front inclined legs 255, formed simply from tubing, extend upwardly from the side frames 250 to support a shelf or bag support 256 on the front wall of the device by means of spaced transverse straps 257 and 258 joined thereon. The shelf 256 has upwardly turned triangular side portions and a rear flat wall to brace firmly against the straps 257 and 258 in the preferred form. The upper ends of the legs 255 are connected by horizontal side braces 259 to the rear uprights 252 and form open rectangular side frames meeting the uprights at approximately the middle thereof. At this junction a transverse brace 260 extends across the uprights 252 as does a similar lower brace 260*a*. As seen in the plan view of Figure 2, the legs 255 are joined by an upper transverse brace 262 which forms with the side braces 259 and the rear transverse brace 260, an open generally square-topped framework having the uprights 252 overhanging at the rear to support the scale 254. The scale 254 in turn is connected to a vertical slidable platform 261, as will be described, and indicates the weight of material (not shown) supported thereon.

Within the outer framework is an inner fixed framework which includes spaced parallel uprights 265 joined to the transverse bed member 251 to extend upwardly inside of the frames 250. The tops of the uprights 265 are connected by horizontal side braces 266 to the rear transverse brace 260, and similar braces 267 connect their lower portions to the lower transverse brace 260*a*. Suitable cross braces 268 joint the uprights 265 to form a rigid frame carrying a forward parallelogram linkage which supports the vertically movable platform 261.

The platform 261 has spaced horizontal side supports 270 on which are joined forward downwardly extending leg members 271 disposed a substantial distance in front of the uprights 265 and rearwardly of the legs 255. Upper and lower transverse rollers 272 and 273 are mounted on the legs 271 by means of spaced pairs of end bearings 274 and 275, respectively. A vertical extending strip 276 is fastened to the rear edge of each leg 271 and has the bearings 274 and 275 projecting rearwardly therefrom. As is best seen in the detail of Figure 14, the roller 273 is simply formed as a hollow tubular member having an inner rotatable shaft or axle 277 journalled in the end bearings 275, and a central horizontal rearwardly extending arm 278 rigidly fastened on its top outer surface. The upper roller 272 also has an axle 277 journalled in the bearings 274, and has a central rearwardly extending arm 280 fastened on its top surface.

Upper and lower transverse rollers 290 and 291, respectively, are likewise mounted on the forward side of the uprights 265 by means of spaced pairs of end bearings 292 and 293 projecting forwardly from vertical strips 294 secured on the forward side of each upright. The rollers 290 and 291 are similar in construction to the rollers 272 and 273, and have center axles 295 which are journalled in the bearings 292 and 293. The upper roller 290 is rigidly fastened to the arm 280 which extends rearwardly from the roller 272, and the lower roller 291 is fastened to arm 278 which extends from the roller 273. The arm 280 terminates at the uprights 265, but the lower arm 278 continues rearwardly to hold a large counterweight 300 which balances the weight of the movable platform 261 and its associated supporting members.

As is seen in Figure 12, the rollers 290 and 291 define a fixed side of a parallelogram linkage while the rollers 272 and 273 define the opposite movable side which is held in parallelism by the arms 278 and 280. The vetrical legs 271 are thus free to move in a generally vertical path, as the movable platform 261 is pushed downwardly under a load of material. A receptacle 310 is held on the top of the platform 261 to receive the material, and when filled, is dumped into a bag as will later be described. Downward movement of the container 310 and platform 261 raises the rear end of the arm 278 carrying the counterweight 300 as is seen in the phantom outline of Figure 12. The weight 300 is just sufficient to balance the tare or empty weight of the receptacle 310 and its associated supporting structure, and causes the readings of the scale 254 connected to the platform 261 to indicate the net weight of the material held thereon.

The scale 254 is of conventional dial indicating type, and has its weighing element 311 extending from the bottom to engage an S-shaped hook 312 supporting a turnbuckle 313 and a lower hook 314. A bracket 315 extends rearwardly from the platform 261 to engage the hook 314, so that as the platform is pushed downwardly, it is resisted by the scale 254, and the amount of resistance or force indicated on its dial face. To prevent oscillation or vibrations of the indicating means of the scale 254, it is preferable that the movement of the platform 261 be dampened by a dash-pot 301 disposed between the movable legs 271 and the fixed upright 255.

The dash-pot 301 has a cylindrical body portion mounted on an L-shaped bracket 302 extending forwardly to connect between the uprights 255. A piston rod 303 is fitted within the dash-pot 301, and has an upper adjustable stem 304 which engages a bracket 305 secured between the movable legs 271. The rod 303 is slidable vertically within the dash-pot 301 and moves a piston therein to dampen the movement of the legs 271, and consequently the oscillations of the indicating means of the scale 254. The adjustable stem 304 regulates the damping effect of the dash-pot 301 to compensate for different operating conditions, and permits accurate control of the weight of material placed into the receptacle 310.

The loader 24 carries the material, such as potatoes, forwardly and drops it into the receptacle 310 which is substantially rectangular, and has an open top disposed slightly below the forward end of the loader. A flat sheet 341 forms the bottom of the receptacle 310 and has vertical sides 312 and a vertical rear wall 313 joined on the edges to extend upwardly. The top portions of the sides 312 and the rear wall 313 may be flanged outwardly to form a smooth edge for prevention of injury to the material as it falls into the receptacle. The bottom 311 is substantially longer than the platform 261 and

overhangs the forward edge, about which it is adapted to pivot downwardly

A transverse hinge 315 is fastened across the receptacle bottom 311 slightly forward of its center of gravity and is mounted on the forward edge of the platform 261 to allow upward movement of the rear portion of the receptacle 310 as indicated by the arrow of Figure 12. Because of pivot axis of the hinge 315 being ahead of the center of gravity of the receptacle 310, the latter will normally remain balanced on the platform 261 and will not fall forwardly unless it is intentionally lifted.

A bag B (shown in phantom outline) is positioned on the shelf 256 and is adapted to receive the material from the receptacle 310 when the latter is pivoted about the hinge 315. As can be understood, the bag B is usually of mesh or cloth and must be held in an upright position by supporting means near its top or mouth. The forward end of the receptacle 310 is shaped to enter the mouth of the bag B and engages it firmly to hold the sides spread apart and prevent collapsing under the impact of the falling material.

At a point approximately above the hinge 315, the side walls 312 drop sharply down and incline towards the forward edge of the bottom 311 forming triangular nose pieces 316 which cooperate with a hinged jaw or gate member 317 pivotally mounted thereon. The jaw member 317 is of inverted U-shape having a flat center section 318 which bridges the nose pieces 316 and carries downwardly turned ears or flanges 319 which overlap the nose pieces and are pivotally connected thereon by fastening means 320. The central section 318 serves as a gate to hold the material within the receptacle 310 and is lifted by rotation of the ears 319 about the axis of the fasteners 320.

In the preferred form, the fasteners 320 are located near the upper rear edges of the ears 319 and the weight of the member 317 tends to keep it normally closed against the nose pieces 316. An L-shaped lifting handle 321 is fastened to the top of the section 318 and cooperates with a transverse plate 322 fastened across the top of the side walls 312 to facilitate lifting and opening the receptacle 310 in a simple one-handed movement. The operator places his thumb in front of the handle 321 and his fingers over the plate 322 By closing his hand and lifting slightly at the same time, the jaw member 317 is opened and the receptacle 310 is tilted forwardly about the hinge 315 as shown in the phantom outline of Figure 12. This simple movement is all that is required of the operator to fill the bag B, and may be done very rapidly.

With the receptacle 310 in its normal horizontal position and the jaw 317 closed, it is very easy to slip the mouth of a bag B over the nose. When the handle 321 is then lifted, the forward edges of the bottom 311 and the jaw member 317 separate and serve as spreaders to hold the mounth of the bag B in an open position. On the upper edge of the member 317 are laterally spaced prongs 323, and on the lower edge of the bottom 311 are similar downwardly projecting prongs 324. As the edges of the member 311 and 317 separate, the prongs 323 and 324 engage lightly in the sides of the bag B and prevent it from being collapsed or pushed downwardly under the impact of the falling material.

Within the receptacle 310 is a low baffle 325 shown in the preferred form as extending transversely across the bottom 311. The jaw member 317 separates a substantial distance from the bottom 311 as the handle 321 is lifted, but the amount of separation is necessarily limited by the size of the bag B, and the opening permits only a restricted flow of the material falling from the receptacle 310. To prevent jamming it is necessary to retard the flow of the lower layer of material within the receptacle 310 until the top layer have been discharged. The baffle 325 serves this purpose, and retards the lower layer sufficiently long for the top material to be discharged. After this the lower material overrides the baffle 325 and is likewise discharged. As shown, the baffle 325 is a streamlined member which retards the material momentarily, but has a rounded contour to prevent jamming. However, it will be understood that other suitable constructions performing this function may be used.

The amount of material packed into the bag B is indicated on the scale 254 and is a predetermined weight, as for example 5, 10 or 15 pounds. As this weight is reached by the discharge of material from the loader 24 into the receptacle 310, it is necessary to shut off the loader. The operator then places a bag B on the jaws 316 and 317, as has been explained, and dumps the receptacle by means of the handle 321. During the time the operator is adjusting the bag B, and dumping the receptacle 310, it is necessary to have the loader 24 shut off to prevent over-running of the material into the receptacle 310 or on the platform 261. Therefore, it is necessary to have switch means which shut off at the desired weight, and which remain off duing the bag engaging and subsequent dumping operation.

Positioned beneath the rear portion of the platform 261 is a plunger switch 330 having an upper operating plunger 331 which extends through the platform and contacts the bottom of the receptacle 310. Normally, the weight of the receptacle 310 holds the plunger 331 downwardly and the switch 330 in a closed position. When the receptacle 310 is lifted, the plunger 331 is spring-urged upwardly to open the electrical contacts of the switch 330. The control circuit of the loader drive unit 25 is connected through the switch 330, as will be explained, and operates to shut off the travel of the loader belt 151 when the switch is opened.

Also connected into the control circuit of the loader drive unit 25 is a weight switch 335 positioned at the rear of the assembly beneath the scale 254. A small rectangular housing 336 is mounted beneath the transverse frame 260 and has the switch 335 mounted therein on the forward wall. The bracket 315 extending rearwardly from the platform 261 carries a downwardly extending lever arm 337 which passes through an opening in the top of the housing 336, as is best seen in Figure 12. The upper portion of the lever arm 337 is threaded for adjustment lengthwise with respect to the bracket 315, and the lower portion is turned forwardly to form a cam follower or trip 338, tapered to a small diameter. The trip 338 loosely engages a lost motion cam 339 which is in turn connected to the switch 335. Downward movement of the cam 339 opens the electrical contacts of the switch 335, while upward movement of the cam 339 closes the electrical contacts, but only after the cam has traveled a substantial distance, for a purpose to be explained.

As seen in Figure 13 the cam 339 is formed as a flat plate pivotally mounted on a central pin 340 which seats in the forward wall of the housing 336 at one side of the lever 337. The inner end of the cam 339 is forked to provide an upper ear 341 and a lower ear 342 having inner edges which join together in a rounded V-shaped cam surface. The cam follower 338 rides between the ears 341 and 342, causing the cam 339 to pivot about the pin 340 as the cam follower moves up or down, as indicated by the arrows of Figure 13, engaging the upper ear 341 or the lower ear 342. When the lower ear 342 is pushed downwardly it engages a spring switch arm 343 extending from the side of the switch 335, and opens the inner electrical contacts. This opens the control circuit to the loader drive unit 25 and prevents the flow of any more material into the receptacle 310. The lever 337 moves with the scale element 311 and is adjusted so that the cam follower 338 engages the ear 342 when the scale element has moved a distance proportional to a weight of material slightly less than the amount being packed. For example, if the bags B are being filled to a weight of 10 pounds, the cam follower will be set to

engage when the scale element **311** has moved a distance proportional to a weight of 9½ or 9¾ pounds. As can be understood, the loader **24** will deliver a small amount of material after it is shut off, and this setting is determined to place exactly the desired amount of material in the receptacle **310**.

Adjacent the opposite end of the cam **339** is a fastener 345 which holds one end of a coil spring **346**. The other end of the spring **346** is engaged with a stud **347** projecting from the cam **339** at a location midway between the ears 341 and 342 and spaced inwardly from the pin **340**. The spring **346** is expanded and urges the stud **347** to rotate about the pin **340**, acting as a crank arm. When the cam follower **338** has urged the ear **342** downwardy against the switch arm **343**, the spring **346** acts to keep the ear in firm engagement with the switch arm.

It is not desirable that the switch **335** be closed immediately upon the initial upward movement of the scale element 311 and arm **337**, hence the cam follower **338** is made to move upwardly a substantial distance before engaging the ear **341**. During the upward movement of the cam follower **338** the spring **346** holds the ear **341** against the switch arm **343** until the follower engages the ear 341. As the ear **341** is lifted the ear **342** rises, and the contact arm **343** returns to its normal closed position, closing the electrical contacts of the switch 335. The stud **347** moves above the pivot **340** and the spring 346 serves to hold the cam **339** in the upward position. The follower **338** will engage the ear **341** at a weight considerably less than the packing weight; for 10 pounds it will normally operate at a weight of 3 or 4 pounds.

The purpose of the lost motion cam **339** may now be fully understood. When the predetermined weight is reached the switch **335** operates to shut off the loader 24. The operator, in engaging the bag B to the jaws **316** and 317, often tends to impart a slight lifting action to the receptacle 310, which is in its horizontal position holding down the plunger **331**. As the receptacle **310** is lifted, the load is taken off of the platform **261** and the cam follower **338** rises. At this time it is highly undesirable to start the loader **24** since the receptacle 310 is filled to the proper amount. By use of the cam 339 we prevent any starting of the loader **24** until the receptacle 310 is emptied, since almost all of the weight must be removed in order to raise the cam 339 enough for the contact arm **343** to return to its normal closed position. By setting the follower **338** to engage the ear 341 at a weight considerably less than the packing weight, it requires an intentional act to again start the loader 24. This prevents any unintentional starting during the operation of engaging the bag B to the jaws 316 and 317.

It will be remembered that both the switch 330 and the switch **335** are in the control circuit of the loader drive unit 25. Because a very fine control of the drive unit 25 is necessary, it is provided with the solenoid clutch 165 which prevents overrunning of the drive pulley 166 under the inertia of the motor **162**. As is seen in the schematic diagram of Figure 16, the motor 162, typically of single phase, is connected across a source of electrical energy by the conductors 350 and 351. A conventional starting switch 352 in the line 350 is conveniently mounted on the loader assembly **24**, and is closed when the packing operation commences so that the motor **162** is energized and running at all times. The switches 330 and 335 mounted on the weighing and bagging assembly 26, are remotely connected across the conductors 350 and 351 by lines 353 and 354 leading through a suitable jack 355. Both switches **330** and **335** are in series with the operating solenoid **167** of the clutch **165**. When either of the switches **330, 335** is open the solenoid **167** is deenergized instantly, and the clutch **165** disengages from the pulley 166. As can be understood, this provides a very fine control of the drive to the loader belt **151**, stopping the latter immediately upon the opening of the switches **330, 335** so that there will be no overrunning of material, and a very good weight regulation may be achieved.

Throughout the description of the component assemblies the operation of the apparatus has been considered, and it is deemed unnecessary to repeat the overall operation of the apparatus. It can be understood that the structural assemblies are interrelated to form one complete apparatus which rapidly and efficiently sorts, weighs, and bags material of the nature herein described. Although we have described in detail a preferred embodiment of our invention, we wish it to be understood that many modifications in design and construction will be apparent to those skilled in the art, and we do not wish to be restricted except as defined in the appended claims.

We claim:

1. In a sorting and bagging apparatus the combination which includes: generally horizontally traveling belt conveyor means for advancing unsorted material through a sorting zone; a hopper positioned to receive material from the discharge end of said conveyor means, said hopper being pivotally balanced and movable from an upper position to a lower position in response to a predetermined weight of material; an electrical circuit including contact means opened when said hopper is moved to its lower position and connected into said conveyor means to stop the travel thereof; traveling belt loader for advancing material from said hopper; a vertically movable platform positioned at the discharge end of said loader; counterweighted lever means to balance the weight of said platform; a receptacle pivotally mounted on said platform and normally positioned to hold a quantity of material received from said loader, and manually movable to a position for dispensing material therefrom; scale means engaging with said platform for continuously weighing the material in said receptacle; means on the forward portion of said receptacle for engaging the mouth of a bag and holding same to receive said quantity of material dispensed from said receptacle; and an electrical circuit including contact means opening and remaining open whenever said receptacle is moved away from the normal position, and contact means opened when said scale means exceed a prdetermined weight, said circuit being connected into said loader means to stop the travel thereof.

2. In a sorting and bagging apparatus the combination which includes: a hopper; a traveling belt loader for advancing material from said hopper; a vertically movable platform positioned at the discharge end of said loader; a counterweighted lever to balance the weight of said platform; a receptacle pivotally mounted on said platform and normally horizontal to hold a quantity of material received from said loader and manually movable to a forwardly and downwardly sloping position for dispensing material therefrom; means engaging with said platform for weighing the material in said receptacle; means on the forward portion of said receptacle for holding a bag in a position to receive material dispensed from said receptacle; means for stopping the travel of said loader when said receptacle is moved away from the horizontal position; and means for stopping the travel of said loader when it is moved downwardly by a predetermined weight of material on said receptacle.

3. In a sorting and bagging apparatus the combination which includes: traveling belt conveyor means for advancing material through a generally horizontal sorting zone, said means having an inclined intake portion to receive said material; a hopper positioned to receive material from the discharge end of said conveyor means, said hopper being pivotally balanced and movable from an upper position to a lower position in response to a predetermined weight of material; means for stopping the travel of said conveyor means in accordance with the position of said hopper; traveling belt loader for advancing material from said hopper; an open framework at the discharge end of said loader; a platform above said frame-

work vertically movable with respect thereto by movement of vertically spaced parallel lever arms rotatably journaled on said framework and on a forward downwardly extending portion of said platform, one of said lever arms carrying a counterweight to balance the weight of said platform; a receptacle pivotally mounted on said platform and normally horizontal to hold a quantity of material received from said loader and manually movable to a forwardly and downwardly sloping position for dispensing material therefrom; scale means supported by said framework and operatively associated with said platform for continuously weighing the material in said receptacle; means on the forward portion of said receptacle for holding a bag in a position to receive material dispensed from said receptacle; means for stopping the travel of said loader when said receptacle is moved away from the horizontal position; and means for stopping the travel of said loader when it is moved downwardly by a predetermined weight of material on said receptacle.

4. In a sorting and bagging apparatus the combination which includes: a generally horizontally traveling belt conveyor means for advancing unsorted material through a sorting zone; drive means for moving said conveyor belt means; a hopper positioned to receive material from the discharge end of said conveyor means, said hopper being pivotally balanced and movable from an upper position to a lower position in response to a predetermined weight of material; an electrical circuit including contact means opened when said hopper is moved to its lower portion and connected to said conveyor drive means to stop the travel thereof; a traveling belt loader for advancing material from said hopper; drive means for moving said loader; an open framework at the discharge end of said loader; a platform above said framework, vertically movable with respect thereto by movement of vertically spaced parallel lever arms rotatably journaled on said framework and on a forward downwardly extending portion of said platform, one of said lever arms carrying a counterweight to balance the weight of said platform; a receptacle pivotally mounted on the forward edge of said platform in a first position to hold a quantity of material received from said loader and manually rotatable about an axis forward of the center of gravity of said receptacle into a forwardly and downwardly sloping second position for dispensing material therefrom; engaging means on the forward portion of said receptacle for engaging the mouth of a bag and holding same to receive said quantity of material dispensed from said receptacle; and an electrical circuit including contact means opening and remaining open when said receptacle is away from said first position and contact means opening and remaining open when said scale means exceed a predetermined weight, said circuit being connected into said loader drive means to stop the travel thereof.

5. In a bagging assembly having a hopper, traveling belt loader for advancing material from said hopper, and means for driving said loader the combination of: vertically movable support means positioned at the discharge end of said loader; counterweighted means to balance the weight of said support means; a receptacle pivotally mounted on said support means and normally positioned to hold a quantity of material reecived from said loader, but movable to a position for dispensing material therefrom; scale means operatively associated with said receptacle for weighing the material therein; engaging means on the forward portion of said receptacle for engaging the mouth of a bag and holding same to receive material dispensd from said receptacle; and an electrical circuit including contact means opened when said receptacle is moved to the dispensing position, and contact means opened when said scale means exceed a predetermined weight, and having a lost motion mechanism whereby not to again close until said scale indicates a weight substantially less than said predetermined weight, said circuit being connected to the means driving said loader to stop the travel thereof.

6. In a bagging assembly having a hopper, a traveling belt loader for advancing material from said hopper, and means for driving said loader the combination of: an open framework at the discharge end of said loader; a support above said framework vertically movable with respect thereto by movement of vertically spaced parallel lever arms rotatably journaled on said framework, and on a forward downwardly extending portion of said support, one of said lever arms carrying a rear counterweight to balance the weight of said support; a receptacle pivotally mounted on the forward edge of said support to hold a quantity of material received from said loader, and rotatable about an axis forward of the center of gravity of said receptacle into a forwardly and downwardly sloping position for dispensing material therefrom; hinged gate means on the forward portion of said receptacle adapted to open and cooperate with said receptacle to engage and hold the mouth of a bag in a material-receiving position; and an electrical circuit including contact means opened when said receptacle is moved to the dispensing position, and contact means opened when said scale means exceed a predetermined weight, and having a lost motion mechanism whereby not to again close until said scale indicates a weight substantially less than said predetermined weight, said circuit being connected to said means driving said loader to stop the travel thereof.

7. In a bagging assembly having a hopper, traveling belt loader for advancing material from said hopper, and means for driving said loader the combination of: an open framework at the discharge end of said loader having a rear upstanding bracket overhanging a forward generally rectangular portion; a platform above the rectangular portion of said framework vertically movable thereon by movement of vertically spaced parallel lever arms rotatably journaled on said framework, and on a forward downwardly extending portion of said platform, one of said lever arms carrying a rear counterweight to balance the weight of said platform; a shelf support rigidly mounted on the front of said framework and spaced forwardly of said platform downwardly extending portion; a receptacle pivotally mounted on the forward edge of said platform to hold a quantity of material received from said loader and rotatable about an axis forward of the center of gravity of said receptacle into a forwardly and downwardly sloping position for dispensing material therefrom; a nose portion on the forward end of said receptacle formed as a flat-bottomed trough having an open end; hinged gate means mounted on said receptacle nose portion to normally close same, and adapted to open and cooperate with said nose portion to spread and hold the mouth of a bag in a material-receiving position, the lower portion of said bag seating on said shelf; scale means supported from said framework rear bracket and having a weighing lever extending downwardly to engage with the rear edge of said platform, for continuously weighing the material in said receptacle; electrical contact means mounted on said platform and engaging the rear portion of said receptacle, said contact being opened when said receptacle is moved to a dispensing position; another electrical contact means mounted on said framework beneath said scale means and engaged therewith, said contact means opening when said scale means exceed a predetermined weight, and having a lost motion mechanism, whereby not to again close until said scale indicates a weight substantially less than said predetermined weight; and an electrical circuit connecting said contact means to said loader drive means to stop the travel thereof.

8. In a sorting and bagging apparatus the combination which includes: traveling belt means for advancing unsorted material through a sorting zone; a hopper; traveling belt loader for advancing material from said hopper positioned to receive material from the discharge

end of said traveling belt means; vertically movable counterbalanced support means positioned at the discharge end of said loader; a receptacle pivotally mounted on the forward edge of said support means to hold a quantity of material received from said loader, and manually rotatable about an axis forward of the center of gravity of said receptacle into a forwardly and downwardly sloping position for dispensing material therefrom; hinged gate means on the forward portion of said receptacle adapted to open and cooperate with said receptacle to engage and hold the mouth of a bag in a material-receiving position; means operatively associated with said support means for continuously weighing the material in said receptacle; and means for stopping the travel of said loader whenever said receptacle is manually moved away from its receiving position.

References Cited in the file of this patent

UNITED STATES PATENTS

590,530 Richardson ---------- Sept. 21, 1897
698,379 Elizondo ---------- Apr. 22, 1902
756,693 Parr ---------- Apr. 5, 1904
1,066,566 Wortham ---------- July 8, 1913
1,430,766 Stebler ---------- Oct. 3, 1922
2,016,443 Levitre ---------- Oct. 8, 1935
2,071,443 Weckerly ---------- Feb. 23, 1937
2,084,711 Smith ---------- June 22, 1937
2,103,400 Weckerly ---------- Dec. 28, 1937
2,193,709 Bottgereet et al. ---------- Mar. 12, 1940
2,303,140 Sackett ---------- Nov. 24, 1942
2,466,386 Curioni ---------- Apr. 5, 1949
2,524,391 Legrow ---------- Oct. 3, 1950
2,597,949 Rappaport et al. ---------- May 27, 1952
2,626,042 Aldridge ---------- Jan. 20, 1953