

Oct. 19, 1937.

H. E. BRUNKOW

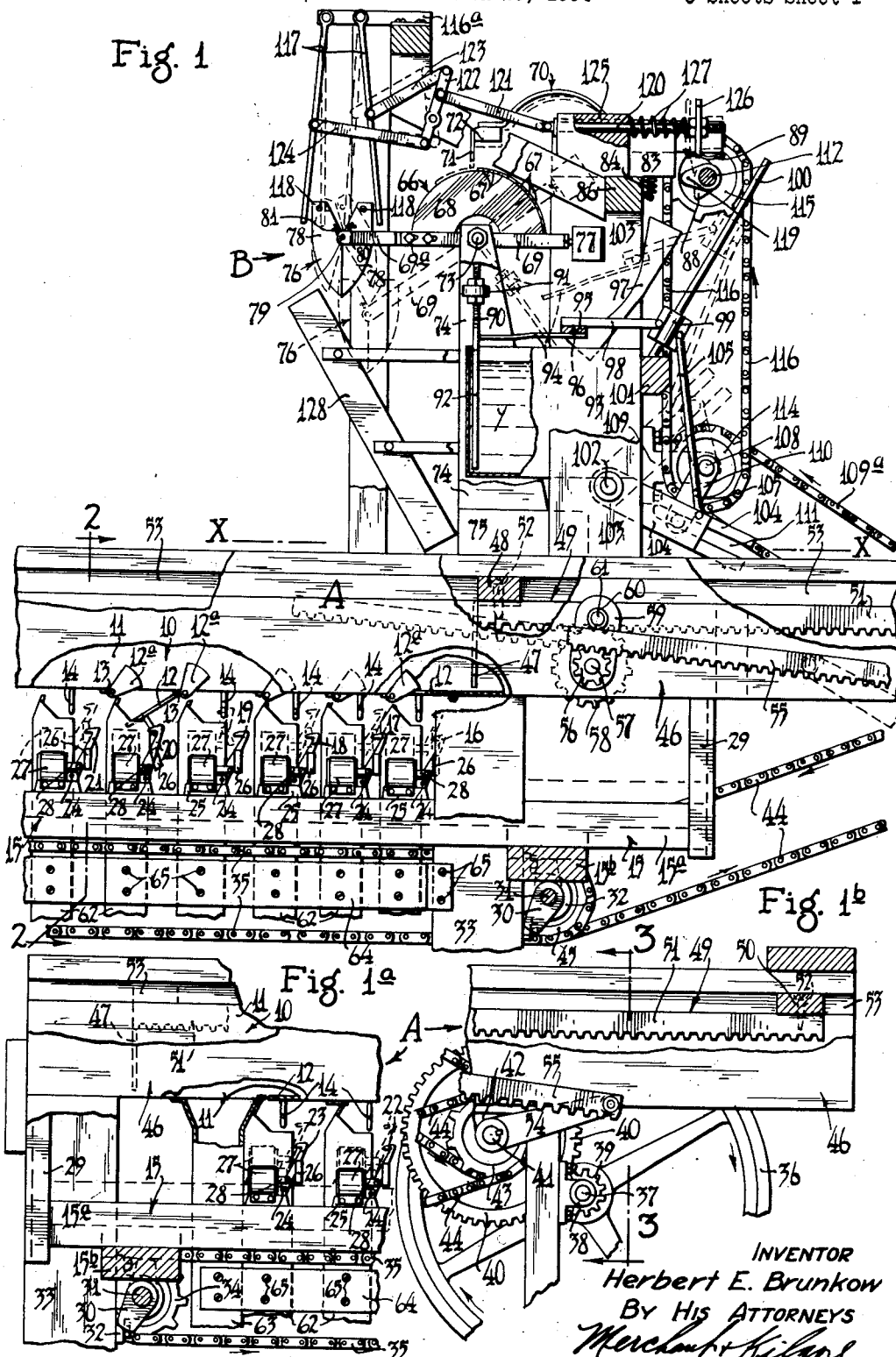
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SORTING MACHINE

Filed March 23, 1934

3 Sheets-Sheet 1

Fig. 1



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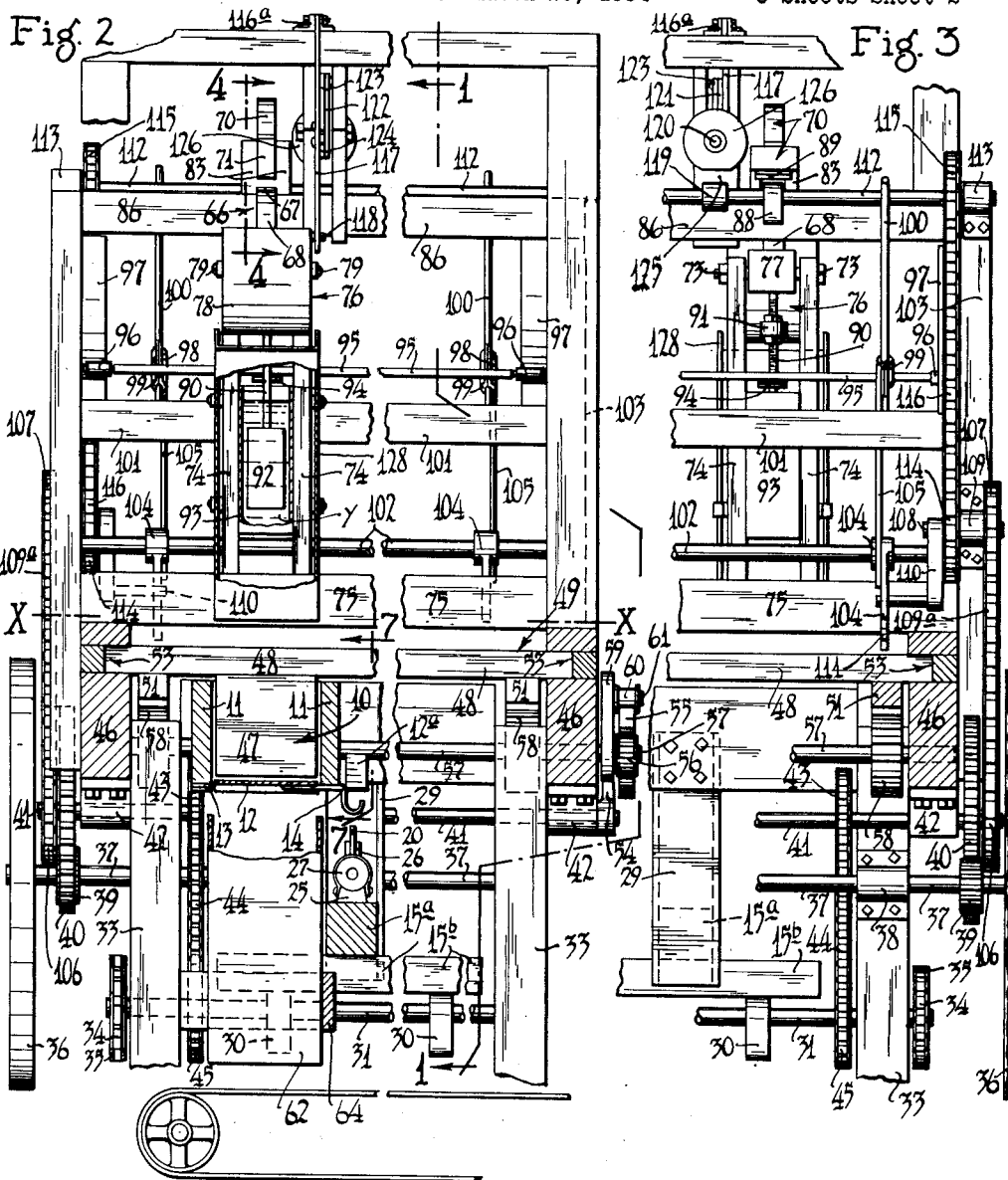
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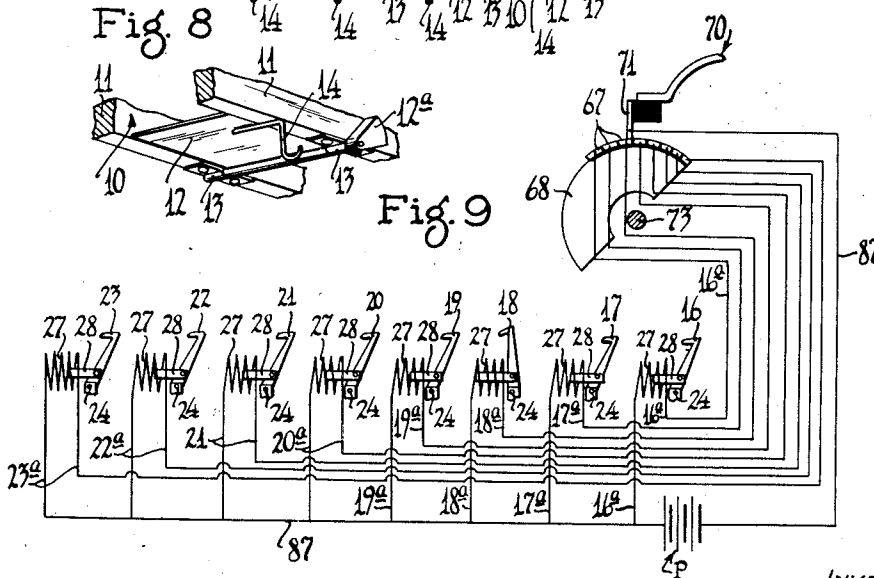
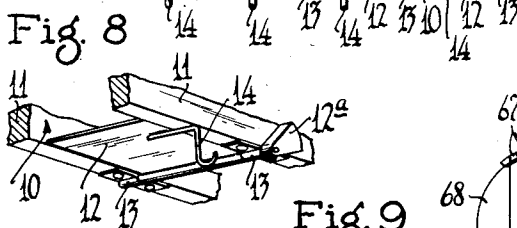
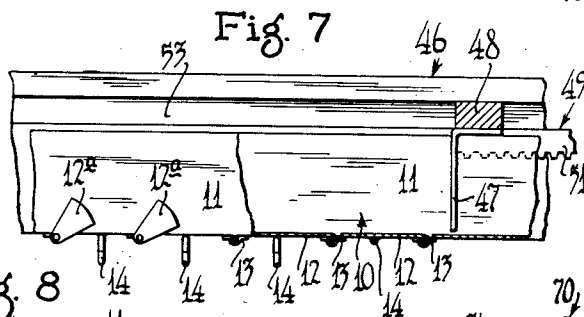
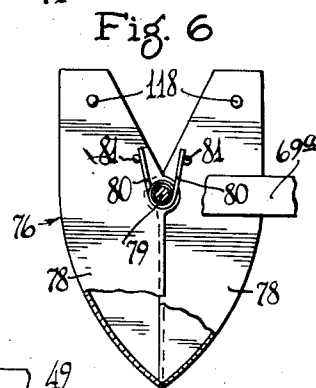
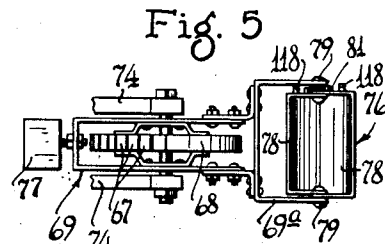
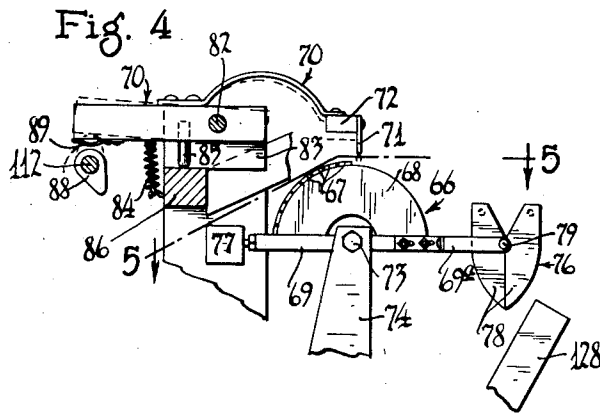
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SORTING MACHINE

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3 Sheets-Sheet 3



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2,096,572

SORTING MACHINE

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15 Claims. (Cl. 209—121)

This invention relates to machines for sorting or distributing all kinds of objects having varying characteristics into groups that have like or nearly like desired characteristics and, generally stated, the invention consists of novel devices, combinations of devices, and arrangement of parts hereinafter described and defined in the claims.

Among the important objects of the invention is the provision of a machine by means of which objects of a common classification, but of various different physical dimensions, may be divided into a plurality of groups, each group being made up of objects of like physical dimensions or at least alike within approximately chosen limits.

Another important object of the invention is the provision of a machine by means of which objects of various different weights may be divided into groups, each group being made up of those objects which are of like or similar weight.

A still further and more specific object of the invention is the provision of a machine for efficiently sorting like kinds of objects having peculiar and irregular shape into groups of substantially like size.

The particular machine here illustrated and which contains the preferred embodiments of the invention, was constructed primarily for use in sorting or grading of pickle cucumbers or other objects of varying size but of substantially the same weight per bulk, into groups of substantially like sizes and in this machine such grouping according to size is the result of individually weighing the objects of varying size, but of like weight per bulk, and distributing them into groups, according to weight.

From the foregoing and from the following specification and claims, it will be evident that the invention is capable of a wide range of uses among which is the sorting of pickle cucumbers, various fruits, and eggs. The provision of a machine for sorting or grading of cucumbers whether cured or uncured has, however, been an exceedingly difficult problem to solve due to the peculiar and irregular shape of these objects and attempts to provide such machinery for this purpose have been so unsuccessful that up to the present time pickles or pickled cucumbers are most usually sorted by hand in pickle factories which are otherwise fully equipped. It will, of course, be appreciated that the grading of pickles, eggs, or in fact most anything else, is slow and tedious if done by hand and often results in inaccuracy. Therefore, since this machine very suc-

cessfully solves the problem, it will fill a long-felt need in various industries.

The above noted and other important objects and advantages of the invention will be made apparent from the following specification and claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a view, partly in section and partly in side elevation, taken on the irregular line 1—1 of Fig. 2, of the intermediate portion of the machine, the opposite ends thereof being broken away and shown elsewhere and certain intermediate parts not on the section line being broken away and shown in section;

Figs. 1^a and 1^b are fragmentary views illustrating the left and right hand end portions, respectively, of the machine, and which portions are broken away in Fig. 1 and may be assumed to be taken on the same line as Fig. 1 and have some parts, beyond the section line, broken away and shown in section;

Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1 and having certain intermediate parts broken away;

Fig. 3 is a fragmentary transverse sectional view taken on the line 3—3 of Fig. 1^b;

Fig. 4 is a fragmentary detail view taken approximately on the line 4—4 of Fig. 2;

Fig. 5 is a fragmentary plan view taken approximately on the irregular line 5—5 of Fig. 4;

Fig. 6 is an enlarged detail view with some parts broken away;

Fig. 7 is a fragmentary view taken approximately on the line 7—7 of Fig. 2 and has some parts broken away, some parts shown in section, and other parts omitted;

Fig. 8 is a fragmentary perspective view; and

Fig. 9 is a wiring diagram illustrating the hookup of the electrical elements of the machine.

Before entering into a detailed description of the machine it should be understood that the drawings are illustrative of a complete and operative machine and that those parts which are omitted by breaking away and narrowing up the drawings, as in Fig. 2, represent duplicate parts which, if included, would merely provide a plurality of parallel but inter-connected mechanisms.

The machine illustrated may be divided into two co-operating mechanisms, to wit: A distributing mechanism, indicated as an entirety by A, and a selector mechanism, indicated as an en-

tirety by B. With the exception of certain inter-connecting driving connections, all parts located below the plane of broken horizontal line X—X of Fig. 1, constitute parts of the distributing mechanism A and all parts located above the plane of said line constitute parts of the selecting mechanism B.

Distributor mechanism

10 The distributor mechanism A includes a guide-way in the nature of a long trough 10 having rigid side walls 11 and a bottom wall made up of a series of displaceable sections 12. Each displaceable section 12 constitutes a discharge device pivoted to the opposite sides 11 of the trough 10 in a suitable bearing 13 and is normally yieldingly maintained in a closed or trough bottom completing position by its own counter-weight 12^a. The free end portion of each pivoted section 12 is provided with an offset latch element 14, the horizontal portion of which normally engages the bottom edge of one of the trough sides 11 and acts in the capacity of a stop to limit closing movements of its attached pivoted section 12 to a position wherein it is aligned or parallel to the plane of the bottom edge of the trough sides.

For individually opening the several pivoted runway sections or discharge devices 12, there is provided a vertical reciprocating bed 15 that underlies the several latch elements 14 and is connectable individually to the several latch elements 14 of the several pivoted trough sections 12 by means of a plurality of independently operable latch elements 16 to 23, inclusive, respectively, looking from left toward the right, in respect to Figs. 1, 1^a, 1^b, 7 and 9, there being one for individual co-operation with each runway section latch element 14. Each of these latch elements 16 to 23, inclusive, is pivotally anchored at 24 to the reciprocating bed member 15 through the medium of a different anchoring base 25, the several of which bases are mounted fast on a longitudinally horizontally disposed member 15^a of the bed 15. The several pivoted latch elements 16 to 23, inclusive, are each provided with a counter-weight 26 which, through the action of gravity, maintain the same under yielding tension to move to their fully extended inoperative positions wherein, under reciprocating movements, the offset free ends thereof freely pass and are inoperative on their respective co-operating latch elements 14.

Each latch element 16 to 23, inclusive, is provided with its own motivating device and in accordance with the illustration, these are in the nature of solenoid coils 27, each suitably mounted on a base 25 and being provided with a plunger-actuating core 28 that is pivotally anchored to the intermediate portion of a co-operating one of the latch elements 16 to 23, inclusive.

Obviously, when the solenoid coil 27 of one of the latch elements 16 to 23, inclusive, is energized the said latch element will be moved against the yielding action of gravity to an extreme left hand position, in respect to Figs. 1, 1^a, 7 and 9, wherein its offset free end will travel in a line with its co-operating latch element 14 and, of course, if this is done when the bed 15 and its latch members 16 and 23, inclusive, are in their extreme upper positions, then the pivotally moved of the latch members 16 to 23, inclusive, will interlock with its co-operating latch member 14. Then under downward movements of the operatively moved of the latch members 16 to 23, inclusive,

with the bed 15, the engaged latch member 14 will move with the same, thereby moving the associated runway forming section 12 pivotally to an open position against the yielding action of the counter-weight 12^a. At this point, attention is called to the fact that the free ends of the latch elements 16 to 23, inclusive, are sufficiently hook-shaped that once they are interlocked with the co-operating latch element 14 and moved downwardly sufficiently to place the engaged latch element 14 under tension, the co-operating elements will remain engaged without the aid of the co-operating solenoid coil 27 so that the solenoid may be rendered inoperative as soon as the co-operating elements are placed under tension. The co-operating latch elements will, of course, remain engaged through the downward movement of the bed 15 and return upward movement thereof and near the completion of said upward movement, the co-operating elements will be released of tension and will be automatically disengaged by gravity.

The bed 15 is in the nature of a rectangular frame comprising parallel longitudinal members 15^a and cross members 15^b. The opposite ends of the longitudinal bed members 15^a work slidably in vertical channel-shaped guide-ways 29, which guide the bed for true vertical movements. The cross members 15^b of the bed 15 each ride on a pair of laterally spaced cams 30 which, when rotated, produce the desired reciprocating movements of the bed 15. The cams 30 of each pair are mounted on a shaft 31 which is journaled near its opposite ends in bearings 32 provided on opposite machine-supporting legs 33. The shafts 31, carrying opposite pairs of cams 30, are connected for common rotary movements by means of suitable sprockets 34 and a chain 35. The connected pair of cam shafts 31 are driven from a suitable source of power, such for example as an electric motor, not shown, through a large pulley 36, a transverse shaft 37 extending completely across the machine and journaled in suitable bearings 38 on transversely opposite legs 33. This drive shaft 37 is provided with a spur pinion 39 that intermeshes with a relatively large speed-reducing gear 40, which gear 40 is mounted fast on a shaft 41 that is journaled in suitable bearings 42 and is provided with a sprocket 43. These driving connections are completed by a chain 44 which runs over sprocket 43 and a similar sprocket 45 on one of the cam shafts 31.

At this point, attention is directed to the fact that the complete machine is supported and built around a rectangular frame 46 which is supported from the floor by the legs 33 which are rigidly secured thereto. The bearings 42 are secured directly to the bottom sides of the longitudinal members of the frame 46.

Mounted for horizontal forward and rearward reciprocating movements in the runway trough 10 and over all of the pivoted bottom-forming sections 12 thereof is a conveyor head 47. This conveyor head 47 is mounted fast on and depends from the front cross member 48 of a rectangular sliding frame, indicated as an entirety by 49, and comprising said front cross member 48, a similar rear cross member 50, and a pair of laterally spaced parallel racks 51 that serve as frame side members and are secured to the front and rear cross members 48 and 50 by suitable screws or the like 52. The opposite ends of the cross members 48 and 50 project beyond the racks 51 and work slidably in opposed channels 53 formed in opposite sides 46 of the machine.

The conveyor frame 49 is driven from the shaft 41 through the following driving elements, to wit: A crank 54, mounted fast on the projected end of the shaft 41, a relatively long rack 55 pivotally anchored at one end to the free end of the crank 54 and running over a pinion 56 on the projected end of a transverse shaft 57 that is journaled at its opposite ends in opposite frame members 46 and is provided immediately with pinions 58 that mesh, one with each of the conveyor frame racks 51. The rack 55 is maintained in constant mesh with the pinion 56 by means of a guide plate 59 and a guide roller 60. The guide plate 59 is loosely journaled on the shaft 57 and the roller 60 is journaled on a stud shaft 61 that projects outwardly from the plate 59 over the upper surface of the rack 55.

There is provided below each pivoted runway section 12 an independent delivery chute 62 for receiving and delivering objects from their respective pivoted section and delivering them to desired different destinations. Beyond the most forwardly located pivoted section 12, there is provided a similar chute 63 which receives and suitably directs any and all objects that are not discharged through one of the chutes 62 and the several chutes 62 and 63 are all tied together and supported from certain of the legs 33 by means of a long bracket 64 and screws or the like 65. The complete distributor mechanism has now been described but before proceeding with the detailed description of the selecting mechanism therefore and a detailed discussion of the operation of the mechanism as a whole, attention is directed to the fact that the conveyor head 47 and the bed 15, carrying latches 16 to 23, inclusive, are driven from a common source, not shown, through the driving connections described in such timed relation that the bed 15 is always fully lowered by its cams 30 when the conveyor head 47 is at its extreme of its rearward movement, as shown by full lines in Figs. 1, 1^a and 1^b, and said conveyor and bed are cycled alike. The extreme forward position of the conveyor head 47 and the extreme upper position of the bed 15 and its latch devices 16 to 23, inclusive, is shown by dotted lines in Figs. 1 and 1^a.

Selector mechanism

The preferred selector mechanism herein illustrated in conjunction with and for controlling operation of the distributor mechanism includes as a primary element a weight-controlled switch, indicated as an entirety by 66. This selector switch 66 includes a plurality of switch contacts 67 mounted in circumferentially spaced relation about an insulating segment 68 that is mounted on and concentric to the axis of an oscillatory weighing lever 69, and further includes a co-operating switch arm 70 having a contact tip 71 insulated electrically from the main body thereof by suitable insulation 72.

The weighing lever 69 is pivotally suspended at 73 between a pair of supporting brackets 74 that project from a cross member 75 on the machine frame and is provided, at its forward end portion, with a yoke 69^a adapted to receive a normally closed sectional weighing bucket 76 and at its rear said weighing lever is provided with a counter-weight 77 which balances the empty bucket and maintains the lever 69 normally in a horizontally disposed position. The bucket 76 is formed of like halves 78 that are pivotally connected together and to the yoke 69^a at 79. These like halves 78 are normally yieldingly closed to-

gether by means of a spring 80 wound about one of the pivots 79 and having its free ends pressing against suitable pins or lugs 81 on opposite bucket halves 78.

The switch arm 70 is pivoted at 82 between a pair of frame members 83 and is subject to tension of a spring 84 which normally maintains the contact tip 71 thereof slightly above the arc described by the several contacts 67 and a stop pin 85 thereon against a fixed frame member 86. By reference to full lines in Figs. 1 and 4, it will be noted that when the bucket 76 is empty and the weighing arm is balanced in a horizontal position, the entire series of contacts 67 are rotatively positioned beyond the co-operating contact tip 71 in a clockwise direction, in respect to Fig. 1, and in a counter-clockwise direction, in respect to Fig. 4.

By reference particularly to the wiring diagram of Fig. 9, it will be noted that there is provided an individual one of the selector switch contacts 67 for each solenoid coil 27 of the distributor mechanism and that the circuit of each solenoid 27 includes the switch arm contact tip 71 and a different one of the contacts 67. With reference to Figs. 1 and 9, it will be seen that the contacts 67, looking from left to right, control the solenoid coils 27 progressively from right to left. A common source of potential P is provided for energizing the several solenoids 27 and this may be in the nature of a storage battery.

Considering the extreme left hand contact 67, in respect to Figs. 1 and 9, to be the first of the series and the extreme right hand solenoid coil 27 to be the first in that series, it will be noted that the first solenoid 27 is connected between P and the first contact 67 by leads 16^a, that the second solenoid in the series is connected between the second contact 67 and P by leads 17^a and so on, each succeeding solenoid 27 being connected between P and a correspondingly positioned contact 67 by a lead numbered like the latch device operated by that solenoid and the exponent *a*. The circuit of each solenoid is completable independently through the switch arm tip 71 and a common lead 87.

The pivoted switch arm 70 is moved pivotally to bring its tip 71 into yielding engagement with the segment 68 or a contact 67 thereof, once during each cycle of the distributor mechanism A, by means of a cam 88 that engages a leaf spring 89 on the rear end of said switch arm 70, once during each cycle. By reference to Figs. 1, 1^a and 4, it will be seen that cam 88 is cycled to move the switch arm 70 pivotally to a position where in the tip 71 thereof engages the segment 68 or a contact 67 thereof, depending upon the pivoted position of the weighing arm and contact segment, at the time the conveyor head 47 is making its return movement and the bed 15 and its latch devices 16 to 23, inclusive, are in fully elevated positions.

Depending from the axis of the weighing arm 69 for pivotal movement therewith is a pendulum-like arm 90 that is provided at its intermediate portion with an adjustable pendulum weight 91 and at its free lower end with a paddle 92 that works in a receptacle 93 containing oil or other suitable fluid *y*. The combined action of the pendulum weight 91 and paddle 92 working in fluid *y* serves to retard and stabilize the action of the weighing arm and provide an important contribution toward the successful operation of the selecting mechanism. As a further means of stabilizing the action of the weigh-

ing arm under load and for returning said arm and loaded bucket to a normal position after selection according to the weight of an object placed in the bucket 76, so as to position the bucket the same for the opening operation regardless of varying weights of objects placed therein, I provide the following described mechanism, to wit:

Co-operating directly with the pendulum arm 90 is a guide arm 94 that is rigidly anchored at its rear end to a transverse guide bar 95 that is provided at its opposite ends with rollers 96, which rollers each ride on a suitable but rigidly mounted concave track 97. Rigidly secured to and extending rearwardly from opposite end portions of the transverse guide bar 95 is a laterally spaced pair of links 98, each of which is pivotally anchored at its extended rear end to an opposite one of a pair of cross heads 99. Each cross head 99 is slidably mounted on an opposite one of a laterally spaced pair of rearwardly inclined guide rods 100 that project from and are rigidly anchored in a frame member 101. The cross heads 99 are reciprocated on the guide rods 100 from a transverse rock-shaft 102 that is journaled in opposite frame members 103 through rock levers 104 and rigid links 105. The rock levers 104 are anchored fast on the rock-shaft 102 and said links are pivotally anchored to the levers 104 and cross heads 99. The rock-shaft 102 is oscillated from the shaft 41 by driving connections comprising a sprocket 106, fast on shaft 41, a sprocket 107, fast on one end of a short shaft 108 that is journaled in a bearing 109, a chain 109^a running over sprockets 106 and 107, and a crank 110 fast on the shaft 108 and having its free end slidable in a long slot 111 in one of the rock levers 104. The curvature and angle of inclination of the tracks 97 and the angle of inclination of guide rods 100 is such that the free end of guide member 94 will travel in an arc of a circle struck from the axis of the weighing arm 69.

The switch arm operating cam 88 is mounted on a transverse cam shaft 112 that is journaled at opposite ends in bearings 113 and is driven from shaft 108 through a sprocket 114 on shaft 108, and sprocket 115 on cam shaft 112, and a chain 116 running over sprockets 114 and 115.

For opening the bucket 76 it is desirable to provide a mechanism which is normally free from and independent of the bucket 76 and weighing arm 69 so that it will not interfere with pivotal movements of the weighing arm and for this purpose I provide the following described mechanism, to wit:

Depending from and pivotally anchored to a fixed frame member 116^a is a pair of arms 117 that are each engageable with a pin 118 on an opposite section 78 of the bucket 76 but are normally spaced apart sufficiently to be completely free from said pins and all other portions of the bucket. In Fig. 1 the normal inoperative position of the arms 117 and the closed position of the bucket sections 78 is indicated by full lines and the operative positions of the arms 117 and the open positions of the bucket sections, indicated by dotted lines. These arms 117 are moved into bucket-opening position once during each cycle of the machine by a cam 119 on cam shaft 112 through connections comprising a spring-retracted plunger 120, a push rod 121, a lever 122 and links 123 and 124. The plunger 120 works slidably through a frame member 125 and is provided with a head 126 for engagement with cam

119. The spring for retracting the plunger, and which is compressed between frame member 125 and head 126, is indicated by 127.

Operation

The summary of the operation will start with the parts positioned, as shown by full lines in all figures except Fig. 9.

Attention is directed to the fact that the pivoted runway section 12 operated by latch device 20 is, at this time, in an open position and that an object *x* to be distributed, and which may be a pickle, has been delivered to the runway at a point just forward of the conveyor head 47 which at this time, is in a substantially extreme rearward position just starting on its forward movement during which forward movement it will deliver the pickle *x* to the open pivoted section 12 causing it to be discharged through the chute 62 underlying that pivoted section.

With the parts positioned, as shown by full lines in all figures, except Fig. 9, a pickle or other object to be sorted is placed in the weighing bucket 76. The weighing arm 69 will be held against pivotal movements momentarily by the guide arm 94, which at this point in the cycle of operation, is in engagement with the pendulum 90 of said weighing arm. This guide arm 94, however, begins withdrawing to its rearward dotted line position shortly after the object has been placed in the bucket and permits the weighing arm to move pivotally to a position of balance which will vary according to the weight of the object placed in the bucket and, for the sake of illustration, it may be assumed that this particular object is of such weight as to cause the weighing arm to balance at a point wherein the contact tip 71 of the switch arm 70 is directly over the third contact 67 of the selector switch.

By the time the conveyor has made approximately two-thirds of a cycle of operation from the starting point and at which time the bed 15 is in its fully elevated position and the guide arm 94 is in its fully retracted position, the selector switch-operating cam 88 will have fully engaged the spring 89 of the switch arm 70 and will have caused the contact tip 71 of said switch arm to be moved into firm electrical contact with the then aligned third selector switch contact 67, looking from left to right in respect to Figs. 1 and 9 and as shown by full lines in Fig. 9. This engagement of the contact tip 71 with the third switch contact 67 will complete the circuit through and energize the solenoid 27 operating latch device 18 and said latch device 18 will be moved into interlocking engagement with its then aligned co-operating latch device 14 on the third pivoted runway section 12, looking from the right to the left in respect to Fig. 1.

During the next one-third cycle of operation of the machine, the bed 15 will be lowered back to its full line position and the said third pivoted runway section 12 will be opened, the extreme opening having been effected upon completion of the cycle. Also during the last one-third of operation, the guide arm 94 engages the pendulum 90 and returns the same and the weighing arm 69 to their normal positions. As previously indicated, the cam 88 will maintain the selector switch closed for only a very short duration of time but sufficient nevertheless for the co-operating engaged latch elements 18 and 14 to be placed under tension, which tension maintains the engagement during a complete cycle. Therefore, engaged latch devices will always be

released by gravity upon being relieved of tension at the end of a cycle, unless the same pivoted section 12 and co-operating latch elements and solenoid 27 are successively selected.

5 Upon return of the weighing arm to a normal horizontal position the cam 119 will engage the head 126 of the plunger 120 and will move the same and its operating connections, including the bucket opening arms 117, to the position shown
10 by dotted lines, wherein said arms have engaged the pins 118 on the opposite bucket sections 78 and moved said bucket sections pivotally to an open position. The opening of the bucket is only momentary but is sufficient to discharge the then
15 weighed pickle or other object *x* into a trough 128, which trough will direct the pickle or other object *x* to the runway at a point just ahead of the then fully retracted conveyor head 47. Under forward movements of the conveyor head 47,
20 the last delivered object *x* will be conveyed to the still open last selected pivoted section 12, which is the third from right to left in respect to Fig. 1, and the object will be discharged through the underlying delivery chute 62 to a chosen destination, not shown.

It will be understood that objects of various different weights will cause various different degrees of pivotal movement of the weighing arm 69 and therefore will cause different selector
30 switch contacts 67 to be engaged by the contact tip 71, and hence, different pivoted sections 12 to be opened, and it will be further understood that should an object be run through the machine which was either too light to move the first
35 contact 67 into alignment with the contact tip 71 or was so heavy as to move the last contact 67 beyond a position of alignment with the contact tip 71, that no selection of outlets 12 would be made, and hence, the object would be conveyed
40 completely through the runway to and discharged through the chute 63 at the forward end of the runway.

What I claim is:

1. In a sorting machine, the combination with
45 a distributor comprising a guideway having a bottom made up of a plurality of normally closed but independently displaceable sections, a conveyor for moving objects over all the closed of said displaceable sections, a bed mounted in parallel relation to the runway for reciprocating
50 movements toward and away therefrom, means for operating said bed and conveyor in timed relation, and a plurality of normally inoperative latch devices on said bed, each being operatively engageable with a different one of said displaceable sections to cause opening thereof under reciprocating movement of the bed, of means for selectively controlling operation of the several latch devices.

60 2. In a sorting machine, the combination with a distributor comprising a guideway having a bottom made up of a plurality of normally closed but independently displaceable sections, a conveyor for moving objects over all the closed of
65 said displaceable sections, a bed mounted in parallel relation to the runway for reciprocating movements toward and away therefrom, means for operating said bed and conveyor in timed relation, and a plurality of normally inoperative
70 latch devices on said bed, each being operatively engageable with a different one of said displaceable sections to cause opening thereof under reciprocating movement of the bed, of means for selectively controlling operation of the several latch devices, said means being in the nature of

a variable position selector operative in different positions to cause operation of different of said latch devices and being constructed and arranged to receive objects to be sorted prior to delivery to the distributor, and means for delivering objects from the selector to the distributor.

3. In a sorting machine, the combination with a distributor comprising a guideway having a bottom made up of a plurality of normally closed but independently displaceable sections, a conveyor for moving objects over all the closed of said displaceable sections, a bed mounted in parallel relation to the runway for reciprocating movements toward and away therefrom, means for operating said bed and conveyor in timed relation, and a plurality of normally inoperative latch devices on said bed, each being operatively engageable with a different one of said displaceable sections to cause opening thereof under reciprocating movement of the bed, an electromagnetic device for independently operating each of the several latch devices and a circuit for each of said magnetic latch operators, of means for selectively controlling operation of the several electromagnetic latch operators comprising a variable
25 position multi-contact selector switch connected to control the circuits of the several electromagnetic latch operators and cause operation of different latches in different positions, said variable position switch being provided with means for
30 receiving objects and being constructed and arranged to be moved to various different positions according to the varying weights of the objects, means for closing weight-selected contacts of the selector switch in timed relation to the bed, and
35 means for delivering objects from the selector to the distributor.

4. In a sorting machine, the combination with a distributor comprising a guideway having a bottom made up of a plurality of normally closed but independently displaceable sections, a conveyor for moving objects over all the closed of said displaceable sections, a bed mounted in parallel relation to the runway for reciprocating movements toward and away therefrom, means
45 for operating said bed and conveyor in timed relation, and a plurality of normally inoperative latch devices on said bed, each being operatively engageable with a different one of said displaceable sections to cause opening thereof under reciprocating movement of the bed, a plurality of electromagnetic devices for independently operating each of the several latch devices, a circuit for each of said electromagnetic operators, of a variable position switch mechanism for selectively
50 controlling operation of the several electromagnetic latch operators comprising a pivoted weighing lever provided near a free end with a normally closed bottom dump bucket for reception of objects to be sorted, yielding means normally
55 balancing said weighing arm in inoperative position, a series of switch contacts carried by the weighing lever in circumferentially spaced relation about an arc struck from the axis of the weighing lever, a switch arm for co-operation
60 with the several contacts in the series carried by the weighing arm, the contact portion of said switch arm being normally spaced from the arc traversed by the several weighing lever contacts, the entire series of weighing arm contacts being
65 normally positioned beyond the contact portion of said switch arm, the circuit of each of said electromagnetic latch operators including said switch arm and a different one of said series of weighing arm contacts.

5. The structure defined in claim 4 in further combination with means for dumping the weighing bucket, said last named means being normally free and independent of the bucket and being operatively engageable therewith when and only when the bucket and parts movable therewith are substantially in their normal inoperative positions.

6. The structure defined in claim 4 in further combination with means operative to return the loaded bucket and parts pivotally movable therewith to their inoperative positions after selection is complete, and means for dumping the weighing bucket after selection is complete, said last named means being normally free and independent of the weighing bucket and being operatively engageable therewith when and only when the weighing bucket and parts movable therewith are in their substantially inoperative positions.

7. In a sorting machine, a distributor comprising a guideway having a wall made up of a plurality of normally closed but independently displaceable sections, a bed mounted for reciprocating movement in respect to the guideway, means for reciprocating said bed, a plurality of normally inoperative latch devices on said bed, each of said latch devices being operatively engageable with a different one of said displaceable sections to cause opening thereof under reciprocating movements of said bed, and means for selectively controlling operation of said latch devices.

8. In a sorting machine, a distributor comprising a guideway having a wall made up of a plurality of normally closed but independently displaceable sections, a bed mounted in substantially parallel relation to the guideway for reciprocating movements in respect to the guideway, means for reciprocating said bed, a plurality of normally inoperative latch devices on said bed, each of said latch devices being operatively engageable with a different one of said displaceable sections to cause opening thereof under reciprocating movements of said bed, and means for selectively controlling operation of said latch devices.

9. In a sorting machine, a distributor comprising a guideway having a wall provided with a plurality of normally closed but independently displaceable sections, a bed mounted for reciprocating movements in respect to said guideway, a plurality of normally inoperative electro-magnetic latch devices carried by said bed, each of said latch devices being operatively engageable with a different one of said displaceable sections to cause opening thereof under reciprocating movements of the bed, and means for selectively controlling operation of the several electro-magnetic latch devices.

10. In a sorting machine, a distributor comprising a guideway having a wall provided with a plurality of normally closed but independently displaceable sections, a bed mounted for reciprocating movements in respect to said guideway, a plurality of normally inoperative electro-magnetic latch devices carried by said bed, each of said latch devices being operatively engageable with a different one of said displaceable sections to cause opening thereof under reciprocating movements of the bed, and means for selectively controlling operation of the several electro-magnetic latch devices comprising a variable position multi-contact selector switch connected to control the circuits of the several electro-magnetic latch devices and cause operation of different latch devices in different positions; said variable position switch being provided with means for receiving objects

and being constructed and arranged to be moved to various different positions according to varying weights of the objects, means for closing the weight-selected contacts of the selector switch in timed relation to the bed, and means for delivering objects from the selector to the distributor.

11. In a sorting machine, the combination with a weight-controlled variable position selector mechanism including a normally balanced pivoted weighing arm provided near a free end with an object receiving bucket, said bucket being made up of pivotally connected sections, and yielding means normally maintaining said bucket sections closed together, of means for opening the bucket sections, said bucket opening means comprising a pair of opposed arms movable toward and from one another and into engagement with opposite bucket sections and means for moving the opposed arms into operative engagement with opposite bucket sections to impart opening movement thereto, said arms normally being so spaced and disposed as to be entirely free from and independent of the weighing arm and bucket throughout full operative movements of the weighing arm and bucket and permitting full range pivotal movements thereof without any interference by the opening means.

12. In a sorting machine, the combination with a distributor having a plurality of normally closed outlets, means for bringing objects being sorted into registration with any open outlet and normally inoperative means for independently opening the several outlets, of a weight-controlled variable position selector mechanism controlling operation of the said means for opening the several distributor outlets and operative to cause opening different outlets in different weight-moved positions, said weight-controlled variable position selector mechanism including a pivoted weighing lever provided near a free end with an object-receiving bucket made up of two pivotally connected sections, and yielding means for pivotally moving the bucket sections to open position, said bucket-opening means being normally entirely free and independent of the weighing arm and bucket and being in the nature of a pair of opposed arms movable toward one another and engageable with opposite bucket sections when and only when said bucket is in a substantially normal position and normally being spaced apart sufficiently to permit free movements of the weighing lever, in further combination with means for holding the weighing lever against pivotal movements during the portion of each cycle of operation when objects are being dropped into the weighing bucket but thereafter releasing the loaded weighing lever for pivotal selecting movements, and then when selection is completed, returning the loaded weighing lever to a normal position wherein the bucket is positioned for engagement with said bucket-opening arms.

13. In a sorting machine, the combination with a distributor having a plurality of discharge devices, of a weight-controlled variable position selector mechanism controlling operation of the said discharge devices and operative to cause operation of different outlets in different weight-moved positions, said weight-controlled variable position selector mechanism including a pivoted weighing lever provided near a free end with an object-receiving bucket made up of pivotally connected sections, and yielding means normally maintaining the sections pivotally closed together and means for pivotally moving the bucket sections to open position, said bucket-opening means being

normally entirely free and independent of the weighing arm and bucket throughout the full operative range of movement of the arm and bucket and being in the nature of a pair of opposed arms movable toward one another and engageable with opposite bucket sections when and only when said bucket is in a substantially normal position and normally being spaced apart sufficiently to permit free full range movements of the weighing lever.

10 14. In a sorting machine, a distributor having a plurality of discharge devices, means for independently operating the discharge devices including a plurality of normally inoperative electro-magnetic devices each being operatively associated with a different one of said discharge devices, means for moving the several electro-magnetic devices alternately toward and from their respective co-operating discharge devices, means for selectively controlling operation of the several electro-magnetic devices comprising a variable position multi-contact selector switch connected to control the circuits of the several electro-magnetic latch devices and cause operation of different latch devices in different positions, said variable position switch being provided with means for receiving objects and being constructed and arranged to be moved to various different positions according to varying weights of the objects, means for closing the weight selected con-

tacts of the selector switch in timed relation to movements of the said electro-magnetic devices, and means for delivering objects from the selector to the distributor.

15 In a sorting machine, a distributor comprising a guideway having a wall provided with a plurality of normally closed but independently displaceable sections, a plurality of normally inoperative electro-magnetic latch devices each being operatively engageable with a different one of said displaceable sections, means for imparting like reciprocating movements to said latch devices with respect to said guideway, and means for selectively controlling operation of the several electro-magnetic latch devices comprising a variable position multi-contact selector switch connected to control circuits of the several electro-magnetic latch devices and cause operation of different latch devices, in different positions, said variable position switch being provided with means for receiving objects and being constructed and arranged to be moved to various different positions according to varying weights of the objects, means for closing the weight-selected contacts of the selector switch in timed relation to the electro-magnetic latch devices, and means for delivering objects from the selector to the distributor.

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