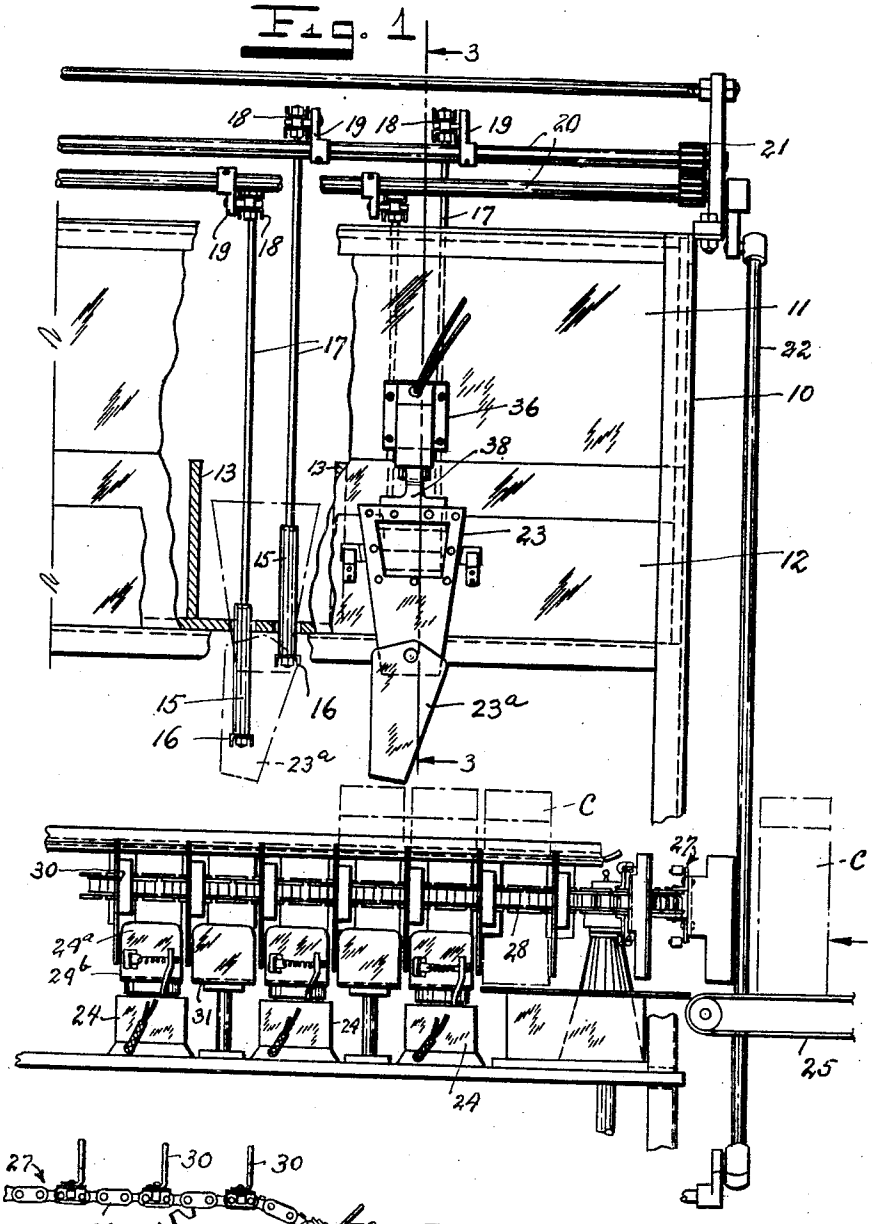
Oct. 19, 1948. S. CHRISTENSEN 2,451,534

MACHINE FOR WEIGHING AND PACKING MIXED NUTS OR THE LIKE

Filed Oct. 31, 1945

3 Sheets-Sheet 1

Fig. 1



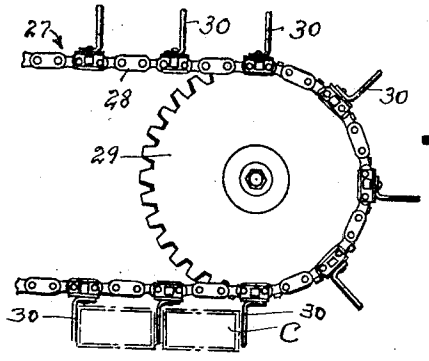


Fig. 2

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Fig. 3

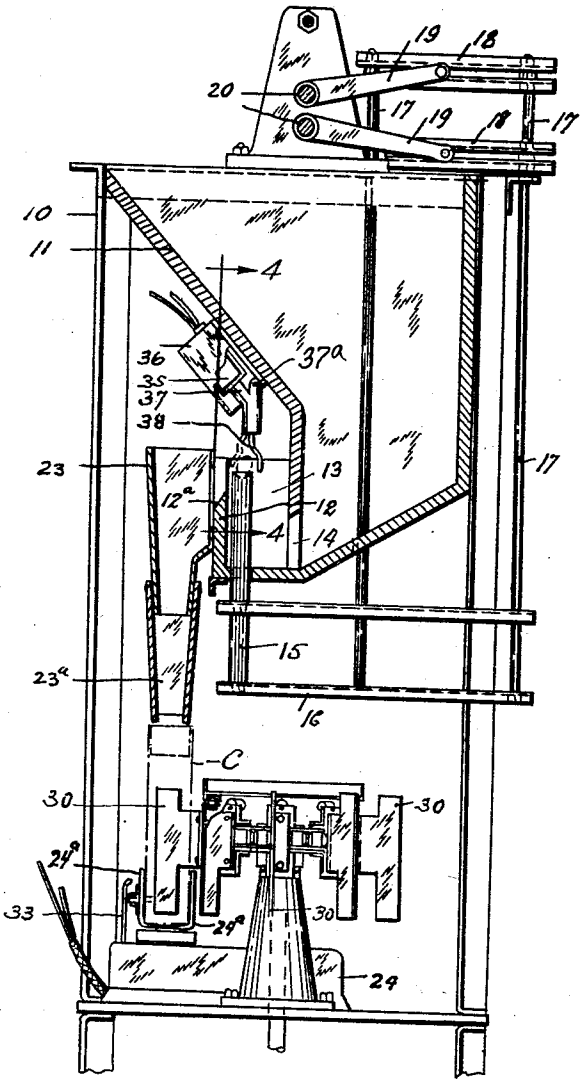


Fig. 5

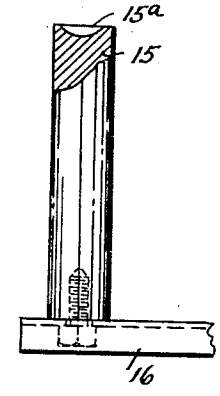
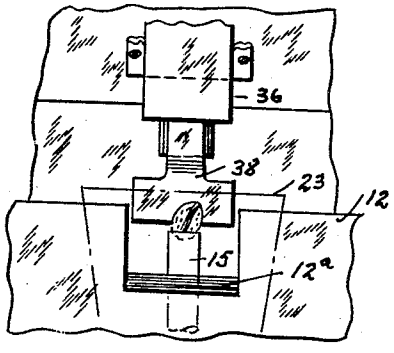


Fig. 4



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Fig. 6

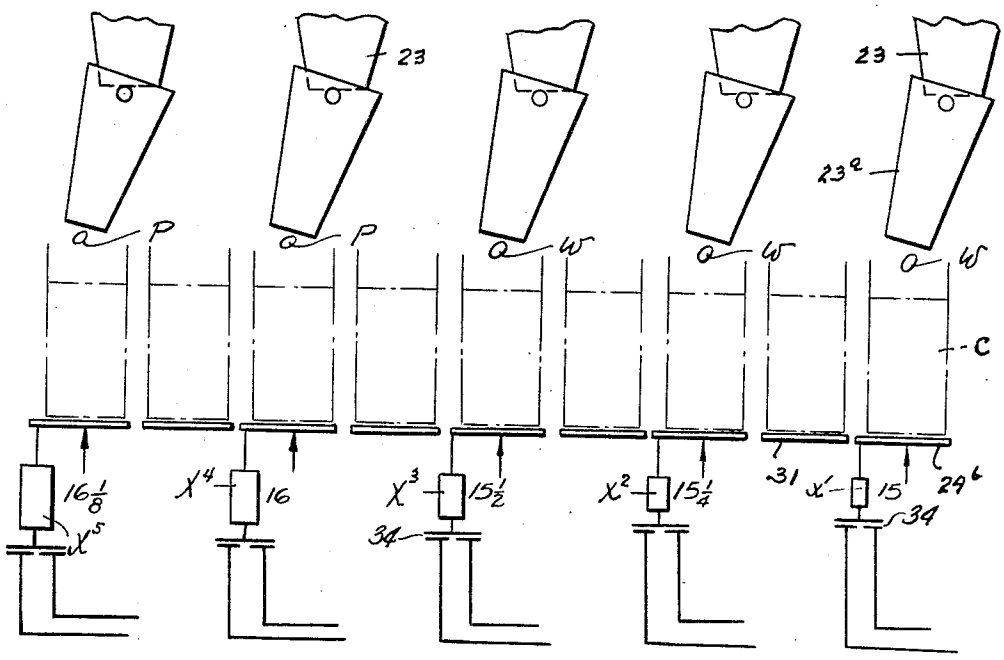
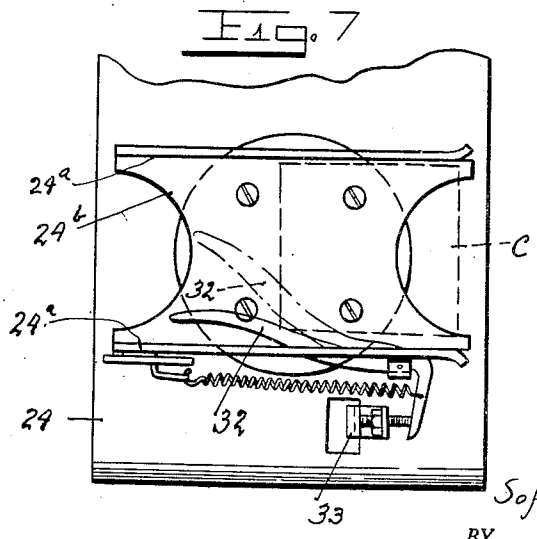


Fig. 7



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Patented Oct. 19, 1948

2,451,534

UNITED STATES PATENT OFFICE

2,451,534

MACHINE FOR WEIGHING AND PACKING MIXED NUTS OR THE LIKE

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Application October 31, 1945, Serial No. 625,813

6 Claims. (Cl. 249—15)

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This invention relates to machines for packing mixed solid articles of varying sizes and weights and particularly mixed unshelled nuts such as walnuts and pecans.

With automatic packing of mixed unshelled nuts of various sizes, great difficulties have been experienced in avoiding both underweight and overweight of the package which is very important. For if a package be found to be underweight the packer or vendor not only is liable under the law but his reputation as an honest dealer is jeopardized. On the other hand, allowing an overweight even by a small fraction of an ounce of thousands of packages would result in considerable losses of profits which already by reason of great competition in this field must be kept as low as possible.

To overcome these difficulties the packages have been first partly filled with the mixture to a certain gross weight and subsequently layers of nuts of either one or the other kind have been added on top of the mixture. This attempt to solve the problem failed for various reasons. First, of course, a precise adjustment of the deficiency of weight not to exceed a small fraction of an ounce could not be easily and readily attained. Secondly, if layers of only one kind of nuts are deposited on top of a mixture the packages which are generally in form of cartons of non-transparent material and without windows have been found to deceive purchasers on opening the cartons as to the contents thereof giving rise to unnecessary and time-wasting disputes and possibly rejection of the purchased packages.

One of the objects of my invention is, therefore, to provide a machine for weighing and packing of solid articles of various sizes or weights whereby the prescribed correct weight can be quickly attained with great precision.

According to my invention the packages or cartons, as hitherto, are first filled partly with the mixture of nuts to a certain gross weight, then conveyed over a series of scales adjusted to progressively increasing weights below a corresponding series of hoppers, then causing the successive discharge each into a package, from a corresponding hopper, that happens to weigh less than the predetermined weight setting of the particular scale, of a single article at a time of different kinds, alternately or otherwise, until the desired minute adjustment of the prescribed correct weight is attained.

My invention also consists in the novel construction, arrangement and combination of parts of the apparatus employed for carrying out my

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method, as will be hereinafter more fully described and defined in the appended claims.

In the accompanying drawing, which constitutes part of this specification and in which similar reference characters denote corresponding parts,

Fig. 1 is a front elevation of the automatic nut packing machine,

Fig. 2 is an enlarged top plan view of a detail of the package conveying means,

Fig. 3 is a vertical section on line 3—3 of Fig. 1 seen in the direction of the arrows,

Fig. 4 is an enlarged vertical section on line 4—4 of Fig. 3 seen in the direction of the arrows,

Fig. 5 is an enlarged elevation, partly in section, of a detail of the nut discharging device,

Fig. 6 is a diagrammatic illustration of the operation of the machine, and

Fig. 7 is an enlarged top plan view of the automatic scale releasing device.

Referring in detail to the drawing, 10 denotes a frame to the front wall of which is suitably fixed a trough-like receptacle 11 which extends throughout the length of the frame and which may be suitably divided horizontally into a number of compartments each to receive nuts of different sizes and weights. At its lower end, this trough has a forwardly projecting extension 12 which too is horizontally partitioned by walls 13 into a corresponding number of separate compartments in which nuts are allowed to pass from the main hopper or trough 11 through openings 14, (one opening only being shown in Fig. 3). Movably borne in the bottom of said extended hopper portion 12 of each compartment is one or a pair of vertical reciprocating plunger-like members 15 the upper end of each of which may be hollowed or formed with a concaved cavity 15a, whereby during each upward stroke of a plunger it will be caused to pick up a single nut at a time and lift it somewhat above the upper forwardly sloping edge 12a of the front wall of said trough extension 12. The plungers may be continuously reciprocated from a motor in any suitable manner. In the present embodiment the lower ends of said plungers 15 are fixed to horizontal bars 16 which are fixed to vertical rods 17 each being fixed to a pair of horizontal superposed bars 18 arranged at an upper part of the frame 10 and each pair of bars 18 slideably engaging a crank arm 19. These arms are fixed to shafts 20 which are vertically located above one another and impelled from a motor (not shown) through gears 21 and a connecting rod 22 or other suitable transmission means, so that

the shafts 20 will revolve and the crank arms 19 accordingly will cause the pair of plungers 15 in each compartment to alternately reciprocate in opposite directions. Suitably fixed to the front wall of the trough extension 12 opposite the sloping edge 12a and in register with each compartment of said trough extension 12 are a plurality of vertical downwardly projecting hoppers 23 of which each may have a laterally adjustable depending chute like section 23a.

Mounted in front of the frame and below the said chutes 23a is a corresponding number of horizontally supported sensitive weighing scales 24, of any suitable or well known construction, spaced apart in conformity with the spacing of said hoppers 23 and having vertical front and rear walls 24a projecting from their platforms 24b. These scales are adjusted to progressively increasing weights to be presently more fully described. The packages or cartons C, which as hitherto are first filled in a well known manner with a mixture of unshelled nuts to a gross weight short of the prescribed correct net weight, are continuously conveyed by a suitable infeed conveyor 25 in the horizontal plane of the scale platforms 24b and are then suitably transferred from said belt conveyor to a second conveyor 27, which is adapted to continuously feed the cartons over the series of scales. This second conveyor may comprise an endless chain 28 mounted around a horizontally disposed driven chain gear 29 and provided with blades or other suitable push members 30 adapted to engage and continuously shift the packages or cartons from scale to scale. Bridging the free spaces between adjacent scales may be stationary guide platforms 31.

According to my method, as already stated, a single nut at a time, of a preselected kind, is dispensed from the hopper into a package or carton as it travels over the scales, if its weight is deficient relative to the adjusted weight of a particular scale. Each scale is provided with any well known suitable means adapted to hold the scale in inoperative position until and unless a package enters its platform. Such means may comprise, as shown, a spring loaded tripping lever 32 which normally projects into the space above the scale platform 24b and in the path of the moving package and is adapted to operate a finger 33 forming part of a locking means (not shown) associated with the scale. The tripping lever 32 is adapted to be operated automatically by the carton C as the latter passes over the scale platform 24b (Fig. 7). Associated with each scale is also a suitable electric switch 34, (diagrammatically shown in Fig. 6) adapted to close an electric circuit, indicated by wires, when the gross weight of the package passing over a scale is less than the adjusted weight thereof. If the package balances the scale or is of an overweight the switch 34 remains open.

The electric circuit which is controlled by suitable timing cams (not shown) driven from the main shaft of the machine is adapted to cause the operation of a nut dispensing mechanism provided for each compartment of the trough extension 12. Such mechanism, as shown in the present embodiment, may comprise a solenoid 35 which may be suitably mounted in a casing 36 fixed to the front wall of the main trough 11, one above each compartment of the trough extension 12. The solenoids 35 are adapted to be energized by said electric circuit upon the closure of the switch 34. The armatures 37 of said solenoids are pivotally mounted as at 37a on the

wall of main hopper 11 and connected to or formed integrally with hammer or shovel-like members 38 which normally extend downwardly terminating near but slightly displaced rearwardly relative the hollowed upper ends of the plungers 15 when the latter reach the end of their upward stroke, so that when the solenoids 35 are energized said members 38 will be caused to swing forwardly striking against the lifted nuts resting in the cavities of said lifters or plungers 15 and thereby kicking them over into the corresponding hoppers 23.

Mixed unshelled nuts, specifically walnuts and pecans, are packed and generally sold in one pound packages. It has been found that the average weight of three unshelled walnuts with two unshelled pecans, is 1.75 ounces. In practice, therefore, it is advantageous to have the packages or cartons first filled each to a gross weight of 14⅜ ounces, and employ five scales adjusted to progressively increasing weights X^1 X^2. . . X^5 in the direction of travel of the cartons, as follows: 15 ounces, 15¼ ounces, 15½ ounces, 16 ounces and 16⅛ ounces (the ⅛ ounce being the weight of an empty carton). It also has been practical to successively discharge one walnut at a time from the first three hoppers and subsequently a single pecan nut at a time from the last two hoppers. Consequently the first three compartments of the trough extension 12 will contain say walnuts W and the last two compartments pecans P.

When thus a partly filled carton passes over the first scale and weighs less than the adjusted weight of say 14⅜ ounces of said scale the latter will operate switch 34 which will close the electric circuit and thereby energize the solenoid 35 of the corresponding compartment of the trough, as a result of which the armature 37 thereof will cause the member 38 to swing forwardly and kick a single walnut, lifted by the plunger 15, into the hopper from which it will drop into the carton before the latter reaches the next scale. If the carton balances the scale or weighs more than the adjusted weight thereof, the switch will not be operated and there will be no discharge of a nut into the carton. Similarly, when the carton passes over the next scale, which as was assumed, may have been adjusted to 15¼ ounces and the weight of said carton is below that of said scale, the latter will operate its switch and in the aforementioned manner will cause the discharge of a single nut into the carton and, likewise, if it balances said scale or overbalances it there will be no discharge of a nut from the corresponding hopper, and so on.

By thus causing the apparatus to successively add a single nut at a time, alternately or by any other suitable arrangement, varying in size and weight, the desired correct weight can be attained with great accuracy.

What I claim is:

1. A machine of the character described, comprising a receptacle for solid articles divided into a number of compartments, a number of hoppers depending from and communicating with said receptacle, one opposite each compartment, a corresponding number of weighing scales of progressively increasing capacity arranged below and in range with said hoppers, means for continuously conveying a package over said scales, means in said receptacle for successively bringing a single article at a time into the range of the corresponding hopper and means automatically controlled from each scale and adapted to dis-

charge said article from said hopper into the package, when the weight of the latter is less than the predetermined weight setting of the scale.

2. An apparatus for packing mixed solid articles of various weights into a package of a correct prescribed weight, comprising a receptacle divided into a number of compartments for holding articles of different weights, dependent hoppers leading from and opposite each compartment, a corresponding number of weighing scales of progessively increasing capacity arranged below and in range with said hoppers, means for continuously conveying a package over said scales, vertically reciprocating means in each compartment capable of lifting at each stroke a single article at a time to the mouth of its hopper, means for discharging said lifted article from said reciprocating means into the corresponding hopper and means automatically controlled from each weighing scale for operating said discharge means when the weight of a package is less than the predetermined weight setting of the scale.

3. In a machine according to claim 1 in which the means for discharging a single article at a time from a hopper comprise a reciprocating member, an electric circuit controlled from each scale, a solenoid arranged in the vicinity of each hopper and energized by said circuit and an article discharge element associated with and operated from the armature of said solenoid.

4. A machine of the character described, comprising a receptacle having a plurality of compartments, each adapted to hold solids of different weights, hoppers communicating with the different compartments, weighing scales of progressively increasing capacity below and in range

with said hoppers, means for continuously conveying a package over said scales, driven means for periodically lifting a single article at a time from a compartment into the range of the mouth of the corresponding hopper, electric means associated with each hopper and controlled from the corresponding scale for discharging said lifted article into said hopper, when the weight of a package passing over said scale is less than the predetermined weight setting of the latter, and a chute depending from each hopper whereby said article is caused to drop into said package.

5. In a machine according to claim 4 in which each compartment has an extension open at its bottom, and in which said lifting means each comprise a pair of alternately reciprocating members operating through the bottom of said extension.

6. In a machine according to claim 1 in which said automatically controlled means comprise an electric circuit including a solenoid, and a striking member associated with the armature of said solenoid.

SOFUS CHRISTENSEN.

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