

May 13, 1958

P. H. MEYER

2,834,388

SLICING MACHINE SLICER, STACKER AND WEIGHER

Filed Oct. 4, 1954

4 Sheets-Sheet 1

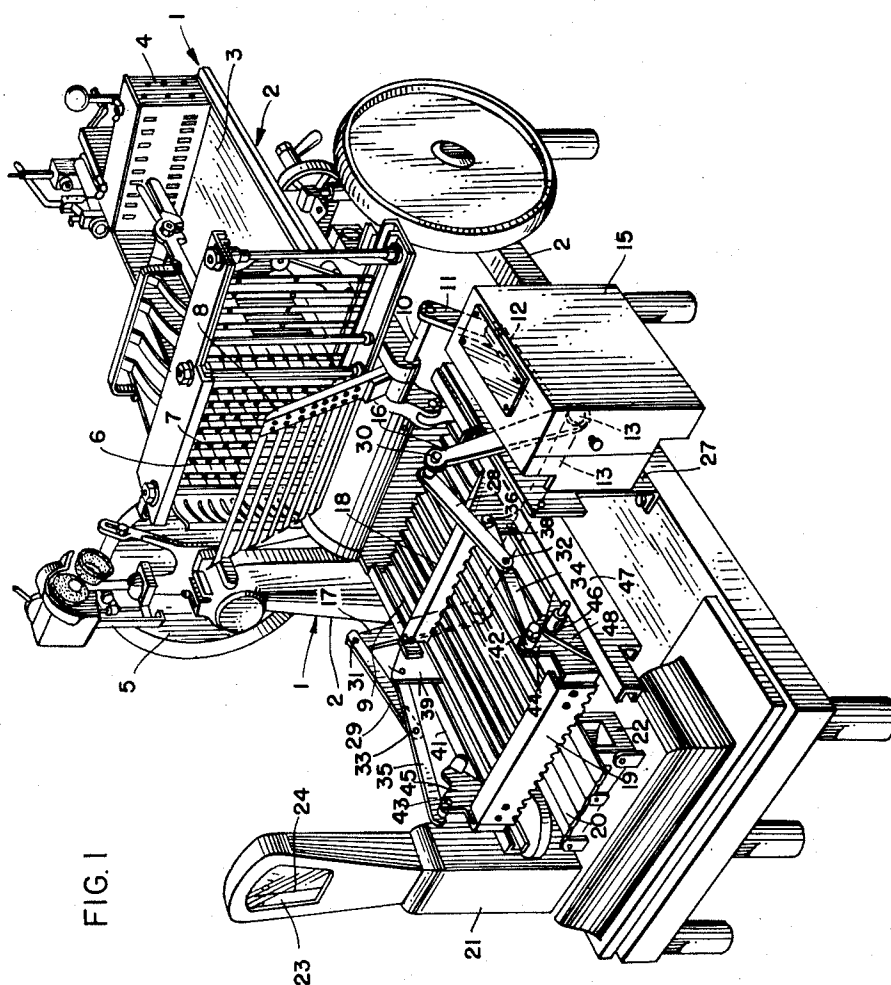


FIG. 1

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FIG. 2

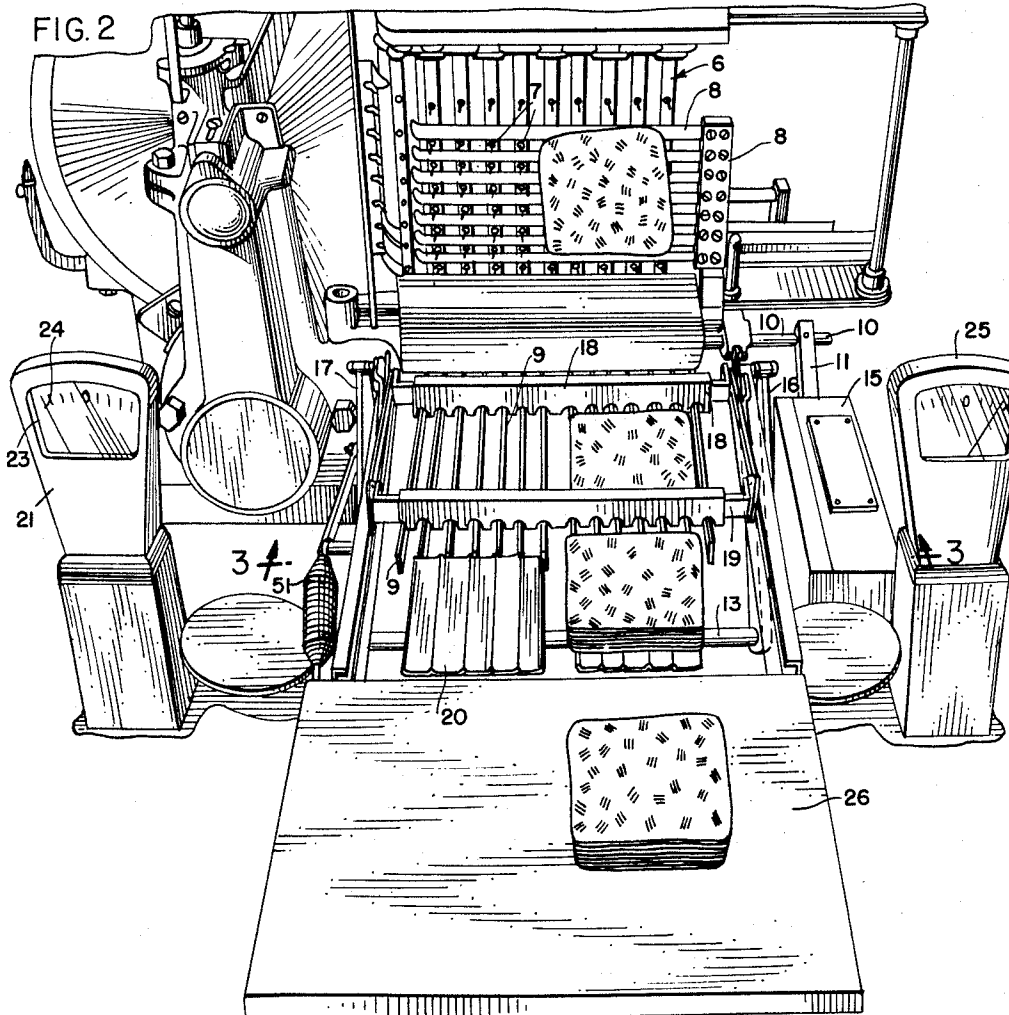
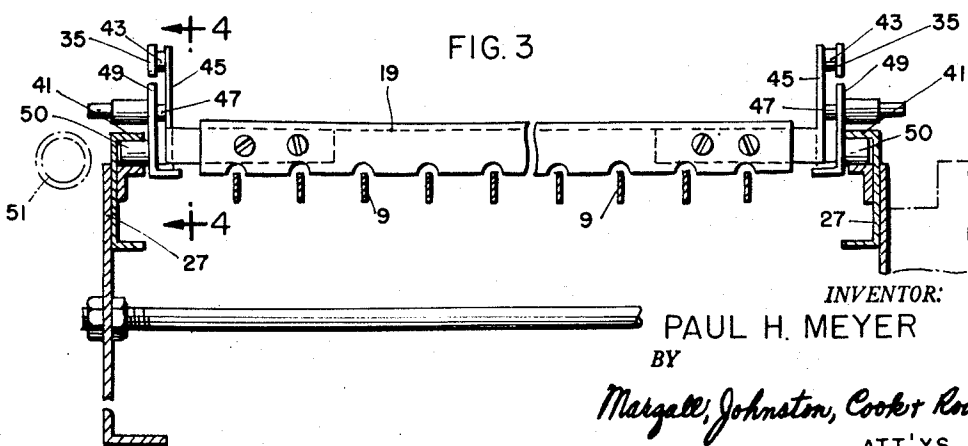


FIG. 3



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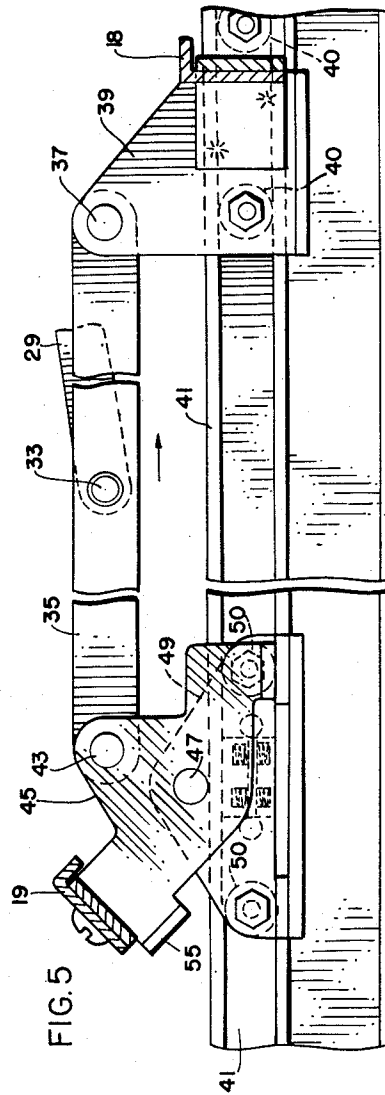
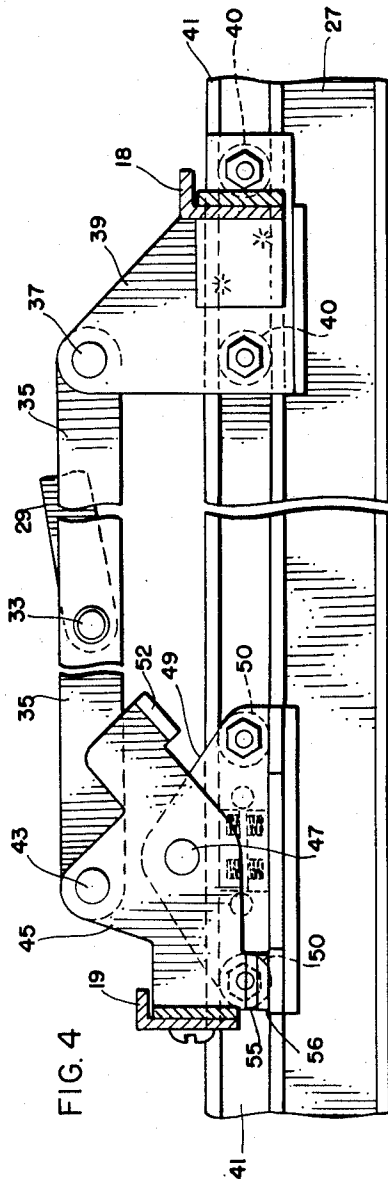
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FIG. 6

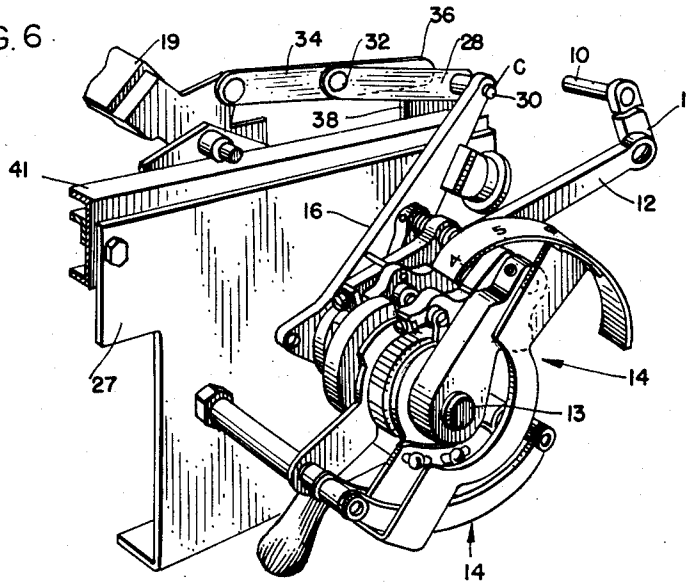


FIG. 7

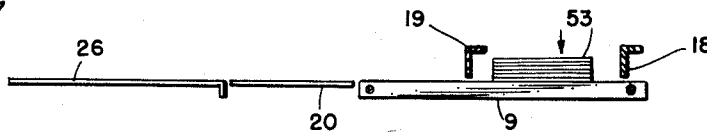


FIG. 8

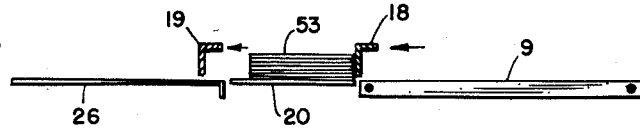


FIG. 9

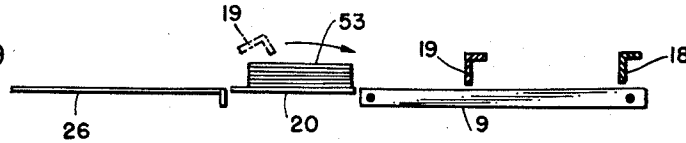


FIG. 10

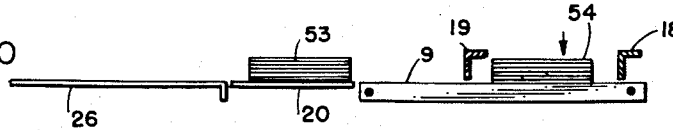
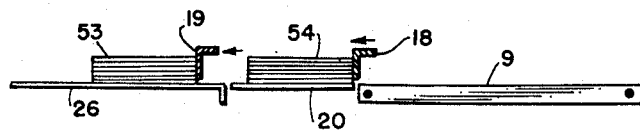


FIG. 11



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SLICING MACHINE SLICER, STACKER, AND WEIGHER

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Application October 4, 1954, Serial No. 459,899

3 Claims. (Cl. 146—94)

This invention relates to slicing machines in general, and particularly to slicing machines embodying a slice stacker for receiving slices as they are cut from a piece of substance and arranging the slices in stacked formation. More specifically, the invention relates to a slicing machine having a stacker for arranging the cut slices in stacked formation, and then delivering the stacks successively to a predetermined position for further conveying.

It is the practice of meat packers, processors and others who are slicing luncheon meats, cheese and other products for subsequent wrapping into packages of uniform, predetermined weight, to check-weigh the stacks or groups of slices by use of an over-and-under scale. Certain conventional slicer-stacker-grouping machines will count out and stack a predetermined number of slices onto a moving conveyer belt, but it is necessary to pick those groups up from the conveyer and place them on the scale manually to check the weight. When products of uniform section and density are being sliced, it is possible by control of the slice thickness to achieve groups of a desired, predetermined weight. If the group comes within weight tolerance, the labor expended in placing it on the scale and taking it off has been wasted, but nevertheless it is something which must be done. In some operations it is necessary to have two girls at the end of the conveyer to pick up the groups, weigh them and correct the weight, if necessary. One type of such machine is disclosed in applicant's copending application, Serial No. 155,248, filed April 11, 1950, which matured into Patent No. 2,687,207.

It is conservatively estimated that at least fifty percent of the groups or stacks can be brought within weight tolerance by control of the slicer, and that those stacks which require correction can be corrected during the interval of time a stack is resting on the scale and while the succeeding group of slices is being accumulated into a stack. Therefore, with the use of the device of the present invention, one operator is able to keep up with the production of the slicer, doing the work of check-weighing and correcting, where otherwise two operators are required.

The present invention consists in impaling slices as they are cut from a substance, and then removing the impaled slices from impaled position onto a receiving platform in stacked formation. Improved means are provided for arranging the slices in stacks according to a predetermined weight, such as, for instance, a predetermined number of slices cut to a predetermined thickness will determine or approximate the weight desired. For instance, five slices of luncheon meat cut to a predetermined thickness will weigh or approximate one-half pound. However, there may be certain conditions, such as the density or porosity of the substance to be cut, so that it is not always possible that the predetermined number of slices will constitute the exact weight required. Therefore, each stack or group of slices must be weighed. The invention, therefore, consists in cutting the slices of

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a predetermined size and density to a predetermined thickness, stacking the slices to constitute a definite or approximate weight, and then moving the stacks of slices onto a weighing scale to determine definitely whether the weight of the stack or group is under or above that exactly required. In cases where the amount is under weight, there must, of course, be an additional amount of substance added, and in cases where the stack is over weight, part of a slice is removed to make it economical for the packer.

A primary object of the invention, therefore, resides in the provision of new and improved means for collecting a plurality of slices on a supporting table, the stack being shifted to a second predetermined position to permit additional slices to be deposited at the first slice receiving position, the prior stack or group being automatically moved onto a scale platform, whereby the weight of each succeeding stack may be checked, all in continuous but intermittent operations.

A further object of the invention consists in arranging slices as they are cut into stacked formation, the successive stacks, each constituting a predetermined number of slices, being transferred to a weighing scale for check-weighing, all in continuous intermittent operations.

A further object of the invention consists in the provision of new and novel mechanism for shifting stacked slices from one position to a weighing scale, where they are successively conveyed to a discharge position.

A still further object of the invention resides in the provision of new and improved mechanism, including a pusher for pushing slices from one position to another in an intermittent slidable movement, there being a rearward pusher reciprocal forwardly and rearwardly to push slices onto a weighing platform as a next succeeding group of slices is being cut and stacked, a forward pusher pushing the weighed stacks to discharge position, the forward pusher being raised on the return stroke to clear the next succeeding group or stack of slices.

Another object of the invention resides in mechanism synchronized and correlated with a discharge fly, which is operable upon the operation of a predetermined movement of the fly, to cause stacked slices to be shifted from a platform onto a weighing platform and then off the weighing platform onto a discharge element.

Still another object consists in the provision of new and novel mechanism operable upon the deposit of a predetermined number of slices onto a slice platform, where successive stacks are shifted intermittently along a predetermined path to a weighing platform and then onto a discharge table or conveyer.

A still further object of the invention consists in the novel arrangement and construction of the parts to effect the proper operation of certain elements in timed relation with the operation of a slicing machine, to, first cause slices to be stacked, second, to cause successive stacks to be deposited upon a weighing scale, and third, to push the successive stacks off the scale platform onto a table or conveyer, all automatically.

A still further object of the invention consists in the method of causing slices from a slicer to be deposited onto a slice receiving platform where the slices are arranged in stacked formation, the stacks then being slid along the platform onto a weighing scale platform for checking the weight of each stack, and then automatically removing each stack, each stack being pushed off the scale platform onto a conveyer or table.

Numerous other objects and advantages will be apparent throughout the progress of the specification which is to follow.

The accompanying drawings illustrate a selected embodiment of the invention, and the views therein are as follows:

Fig. 1 is a detail perspective view of a meat slicing machine and embodying the stacking, conveying, and weighing mechanism of the present invention;

Fig. 2 is a detail front elevational view showing the manner in which two pieces of substance may be cut simultaneously, and shifted to predetermined positions for weighing and discharge purposes;

Fig. 3 is an enlarged detail transverse sectional view on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged detail longitudinal sectional view on the line 4—4 of Fig. 3 and showing the pusher assembly;

Fig. 5 is a view similar to Fig. 4 but showing the pushers on the return movement;

Fig. 6 is a detail perspective view showing some of the drive mechanism, including pawls and ratchets, for causing the operation of the pusher assembly; and

Figs. 7 to 11, inclusive, are detail longitudinal schematic views showing the progressive operation of shifting stacks of slices from the time slices are first cut until they are discharged from the weighing scale.

The particular construction herein shown for the purpose of illustrating the invention comprises a well known slicing machine 1, as manufactured by U. S. Slicing Machine Company, Inc. of La Porte, Indiana, and includes a frame 2, Fig. 1, upon which there is mounted a substance support 3. Substance to be cut is deposited on the substance support table or food table 3, where it is progressively moved forward by means of a food pusher 4, to feed the substance to a slicing machine knife 5 which cuts slices of predetermined thickness. As the slices from the substance are cut by the knife 5, they are impaled upon a movable impaling device 6, which includes a plurality of outwardly extending prongs 7, Figs. 1 and 2. The slices are removed from their impaling position by means of a vertically oscillating slice fly 8, which strips the slices from the prongs 7 and deposits them in stacked formation on a food table 9.

The slice fly 8, Figs. 1 and 2, is fixed to an oscillating shaft 10, which is operated by certain operating mechanism of the slicing machine as each slice is cut. The shaft 10 may be oscillated by any convenient means, just so the operation of the fly occurs immediately after each slice is cut and is in the impaling position on the member 6, as shown in Fig. 2. In the present embodiment the shaft 10 operates in timed relation with an operable part of the slicing machine 1.

The shaft 10, Figs. 1 and 2, has an arm 11 connected thereto which drives a crank arm 12, Figs. 1 and 6, which in turn causes rotation in one direction of a shaft 13 through the pawl and ratchet mechanism 14 which is arranged within a housing 15, Figs. 1 and 2.

The crank 12 operates a system of pawl and ratchet mechanism 14, Fig. 6, which becomes locked to the oscillating shaft 10 in timed relation with a predetermined number of slices cut from a piece of substance. The structure is such that, when a predetermined number of slices, indicative of a predetermined weight, such as five slices to a quarter of a pound, has been cut and stacked on the slice receiving tray 9, the oscillating shaft 13 will become locked to the shaft 10 through the medium of the crank arm 12 and rotate the shaft 13 in one direction. When a certain number of slices, stacked vertically, are deposited on the receiving tray or platform 9, the pawl and ratchet mechanism 14 causes the crank 12 of the pawl and ratchet mechanism 14 to become locked to the cross-oscillating shaft 13 to turn the cross shaft 13 first in a counterclockwise direction, later to be returned to starting position by a clockwise rotation of the shaft 13. The shaft 13 is adapted to be returned to initial normal position by means of certain springs connected to a bell crank on one side of the machine, to the left, Figs. 1 and 2.

The shaft 13, Figs. 1 and 2, which extends entirely across the width of the machine frame, has driving arms

16 and 17, rigidly connected thereto. These arms operate a pusher assembly which includes a rear pusher 18 and a forward pusher 19. The rear pusher 18 operates to slide a predetermined number of slices from the spaced bars which comprise the receiving tray 9 onto a weighing scale platform 20, which is independently mounted on a weighing scale 21. The scale platform 20 of the scale 21 has a weigh beam 22, Fig. 1, which is set for a predetermined weight, such as one-quarter of a pound. The weigh beam 22 of the scale 21 is operatively connected to weight indicating means 23, and if one-quarter of a pound of substance is being weighed, the indicator will register zero. Should the number of slices in a stack weigh more than the amount set, the indicator finger 24 will move to one side of zero to indicate "overweight" in fractions of ounces. Therefore, the operator will adjust the machine to decrease the thickness of slices to be cut from the substance. In the event the number of slices weighs less than the amount set, the indicating finger 24 will move to the other side of zero to indicate "underweight" in fractions of an ounce. The operator then will add sufficient material to bring the weight to the zero point, or even "over," just so long as there will be no underweight whatever. In instances where the underweight is too great, the operator will adjust the slicing machine for thicker slices. In actual practice, however, it has been found that a certain number of slices cut from a substance, such as pressed meatloaf, will weigh the precise proper weight. In any event, no package must be underweight, and of course it is desirable for the packers that the amount of overweight not be too great. All groups of slices, therefore, must be weighed. In most cases the slices will not be underweight, and not too much overweight. The groups may thus pass through the production line without change, but those underweight must have some material added while the stack is on the scale platform 20.

In Fig. 1, one scale 21 having a scale platform 20 is disclosed. However, it has been found desirable in many instances that two pieces of substance be cut simultaneously. In such cases a second scale 25 is provided, the scale 25 being identical in all respects to the scale 21 except it is on the opposite side of the machine. The scale 25 has its separate scale platform and weigh beam identical in construction with the scale platform 20 and weigh beam 22 of the scale 21. Therefore, the invention contemplates the use of multiple scales having multiple weigh beams and multiple scale platforms to weigh separate stacks of slices which are being cut practically simultaneously from separate pieces of substance. The fly 8 operates identically whether a single smaller piece of substance, or a single larger piece of substance, or two pieces of substance are being cut. In any event, the fly operates in proper correlation and synchronism, and in proper timed relation with the severance and impaling of the substance on the impaling member 6, Fig. 2.

The first or rear pusher bar 18 pushes the collected slices on the spaced apart rods, which constitute the slice receiving tray 9, onto the scale tray or platform 20, where the "under" and "over" reading is made, the operator adding substance to the underweight, and taking off some substance should the stack be too much overweight. The properly weighed group, or groups, is shifted from the scale platform by the forward or second pusher 19, to a position on a conveyor or platform 26, Fig. 2, for the final wrapping and packaging.

The pusher bars 18 and 19, Figs. 1 and 2, are operated by the crank arms 16 and 17 when the oscillating shaft 13 is caused to be operated by the pawl and ratchet mechanism 14. The arms 16 and 17 are rigidly connected to the transverse shaft 13, which is mounted in suitable bearings in spaced plates located on each side of the supporting frame.

The pushers 18 and 19, Figs. 1, 2, 4 and 5, are operated by the arms 16 and 17 by means of spaced links

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28 and 29 pivotally connected at 30 and 31, respectively. The forward ends of the links 28 and 29 are pivotally connected at 32 and 33, intermediate the links 34 and 35 which have their rear ends pivotally connected at 36 and 37 to plates 38 and 39 located on opposite sides of the substance supporting platform 9. The plates 38 and 39 are each provided with pairs of spaced rollers 40, which operate in spaced channel-shaped guides 41, Figs. 4 and 5, connected to the opposed side plates 27. The rear or primary pusher 18 is connected to the spaced plates 38 and 39. Thus, as the arms or cranks 16 and 17 move forward by the clockwise rotation of the shaft 13 (away from the fly 8), the rear pusher bar 18 is caused to move forwardly and sweep a stack or group of slices from the stationary receiving tray 9 onto the scale platform 20, where the weighing is performed. As the rear pusher 18 moves forwardly, the front or secondary pusher 19 will also move forwardly to sweep the weighed stacks of slices off the scale platform 20 and deposit them onto the conveyer or table 26 for final wrapping purposes.

The forward ends of the links 34 and 35, Figs. 1, 4 and 5, are pivotally connected at 42 and 43 to front end plates 44 and 45. The forward ends of the plates 44 and 45 are rigidly secured to the front pusher or pusher bar 19.

The plates 44 and 45, Fig. 4, are pivotally connected at 46 and 47 to front triangularly shaped end plates 48 and 49, respectively. Each end plate 48 and 49 is provided with pairs of spaced rollers 50, 50, Figs. 4 and 5, which operate in the spaced side channel guides 41. Thus, as the rear primary pusher 18 moves forwardly to push stacks from the receiving tray 9, the forward or secondary pusher 19 will push a previously weighed stack of slices off the scale platform 20 and onto the conveyer or table 26.

Inasmuch as the pawl and ratchet mechanism 14 only drives the shaft 13 in one direction, spring means 51, Fig. 2, connected to the arm 17 and to a rigid part of the frame, return the pusher assembly, the pushers 18 and 19, by causing rotation of the shaft 13 in a reverse direction. The shaft 13 is driven in one direction by the pawl and ratchet mechanism 14 and is returned in an opposite direction by the spring means 51. The shaft 13 is propelled in a counterclockwise direction by the pawl and ratchet mechanism and moved in a clockwise direction by the spring means 51.

The forward or secondary pusher 19, Figs. 4 and 5, is raised on its return movement so as to clear the stacks on the scale platform 20 during the return movement of the pusher 19 to its original normal position. The links 34 and 35, which are pivoted at 42 and 43 to the plates 44 and 45, pull the plates 44 and 45 rearwardly during the return movement of the pushers, and inasmuch as the plates 44 and 45 are pivoted at the apices of the plates 48 and 49, the pusher 19 will be caused to first swing on its pivots 46 and 47 to raise the plates 44 and 45 in an upward arc to clear the stack of slices, and then pull the plate 19 rearwardly back to its normal position, there being a stop 52, Fig. 4, on the plates 44 and 45 to limit the upward arcuate movement of the front pusher 19 upon the return stroke of the pusher assembly.

The bottom edges of both pushers 18 and 19 are close to the upper surface of the platform 9 and to the scale tray 20 on the forward movement of the pusher assembly, but the forward pusher 19 is raised during its return movement.

The construction is such that the first primary pusher 18, in its forward position, moves far enough forward to push the successive stacks of slices from the receiving tray 9 fully onto the scale platform 20. The forward pusher 19 is positioned rearwardly a distance sufficient to engage the successive stacks from the rear, then moving forwardly a sufficient distance to push each successive stack off the scale platform 20. Both of the pushers 18 and 19 are close to the slice platform 9 and scale platform 20 during the forward stroke, but the front pusher 19 raises during the return stroke to clear the next stack on the

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platform 20 of the scale. It is not necessary that the rear pusher 18 be raised on its return stroke, because at that time there are no slices on the receiving tray 9 to clear, as the pusher assembly operates between slicing operations. The operation of the pusher assembly is such that a forward shifting movement of the pushers 18 and 19 is relatively rapid, moving forwardly and then returning rearwardly between slice severances.

In Figs. 7 to 11, there is shown progressively the movement of the pusher assembly, which comprises the rear pusher 18 and the forward pusher 19. Slices are first deposited on the stationary platform 9 in front of the front edge of the pusher 18, being arranged in stacked formation by the fly 8, Fig. 7. After a sufficient number of slices forming a first stack 53 is deposited on the slice receiving platform 9, the pawl and ratchet mechanism 14 will cause operation of the shaft 13 and thereby operate the spaced arms 16 and 17 to move the pusher assembly forward, whereupon the pushers 18 and 19 will be moved from the position shown in Fig. 7 to the position shown in Fig. 8.

After the first stack 53 has been moved from the slice receiving platform 9 onto the scale platform 20, as shown in Fig. 8, the front pusher 19 has moved to a position over the conveyer or table 26, whereupon the pusher assembly is adapted to return to original position, as shown in Fig. 9. In this latter position the assembly has moved rearwardly so that the forward pusher 19 has been moved behind the stack 53, thus being in position to engage the stack 53 for pushing it onto the table or conveyer 26 during the next stroke. As soon as the pusher assembly has returned to original position, the first stack 53 will be moved behind the stack on the scale table 20, whereupon a next succeeding stack 54 will be in position in front of the rear or first pusher 18. The stacks are arranged consecutively in that order, whereupon the pushers 18 and 19 will move simultaneously, the pusher 18 moving the stack 54 off the table 9 onto the scale platform 20 as the pusher 19 moves the stack 53 off the scale platform onto the table or conveyer 26, as shown in Fig. 11. As soon as there are two stacks in position, the first stack will be wiped off the scale platform and the subsequent stack will be pushed onto the scale platform, whereupon the pusher assembly returns and another subsequent stack will be in position for action by the pusher assembly.

The plates 44 and 45 each are provided with feet 55, Figs. 4 and 5, which are engageable with rubber stops 56 on a flange on the triangular plates 48 and 49 to limit the pivotal movement of the pusher 19 as the pusher 19 is moved close to the scale platform, whereupon the pusher will be located close to the scale platform as the links 34 and 35 push forwardly.

An arm, not shown, on the shaft 13 has a foot provided thereon which engages a stationary pad on the end of the left hand plate 27, so as to limit the return oscillatory movement of the oscillating pusher assembly drive shaft 13.

Changes may be made in the form, construction and arrangement of the parts without departing from the spirit of the invention or sacrificing any of its advantages, and the right is hereby reserved to make all such changes as fall fairly within the scope of the following claims.

The invention is claimed as follows:

1. A combined slicing machine, stacker and conveyer comprising, a slice receiving platform, an oscillating fly to deposit slices in stacked formation on said platform, an oscillating shaft to oscillate said fly, a transverse shaft adjacent said oscillating shaft, pawl and ratchet mechanism on the transverse shaft, means connecting the oscillating shaft to said pawl and ratchet mechanism to drive said transverse shaft from the oscillating shaft during oscillating movement of the oscillating shaft in one direction, a weighing scale platform adjacent the end of the slice receiving platform, pusher means to push a stack

of slices off the slice receiving platform onto said scale platform and to push the stack of slices off the scale platform to a discharge position, and means to operate said pusher means from said transverse shaft, said pusher means comprising a forward and a rearward pusher bar, spaced front plates connected to the forward pusher bar, spaced slidable rear plates connected to the rearward pusher bar, front slide means pivotally connected to the front plates, and links pivotally connected to said front plates and to the rear plates.

2. A combined slicing machine, stacker and conveyer comprising, a slice receiving platform, an oscillating fly to deposit slices in stacked formation on said platform, an oscillating shaft to oscillate said fly, a transverse shaft adjacent said oscillating shaft, pawl and ratchet mechanism on the transverse shaft, means connecting the oscillating shaft to said pawl and ratchet mechanism to drive said transverse shaft from the oscillating shaft during oscillating movement of the oscillating shaft in one direction, a weighing scale platform adjacent the end of the slice receiving platform, a reciprocating pusher assembly movable along said slice receiving platform and said scale platform simultaneously to push stacks of slices onto and off of both platforms simultaneously, and means to operate said pusher assembly from said transverse shaft, said reciprocating pusher assembly comprising a front pusher bar and a rearwardly spaced rear pusher bar, spaced front plates connected to the front pusher bar, spaced slidable rear plates connected to the

rear pusher bar, front slide means pivotally connected to the front plates, and links pivotally connected to said front plates and to said rear plates.

3. In a slicing machine having a cutting knife, a platform upon which cut slices are accumulated in successive stacks, and means for conveying stacks of slices along a predetermined path to a plurality of stack receiving positions, said means comprising a rear pusher normally arranged behind a stack, operating means to operate said pusher in a forwardly direction to move a said stack to a predetermined position, a second pusher forwardly of the first pusher to push said stack to a second predetermined position, said pushers being pivotally connected together by spaced links, spaced pivotally mounted plates connected to the second pusher, driven links connected to and driven by the first named links, said second pusher being pivotally connected to a slidable guided member.

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