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MATERIAL ALIGNING AND WEIGHING MACHINE  
HAVING A HOPPER WITH MEANS FOR  
VIBRATING A SIDE WALL THEREOF

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2 Sheets-Sheet 1

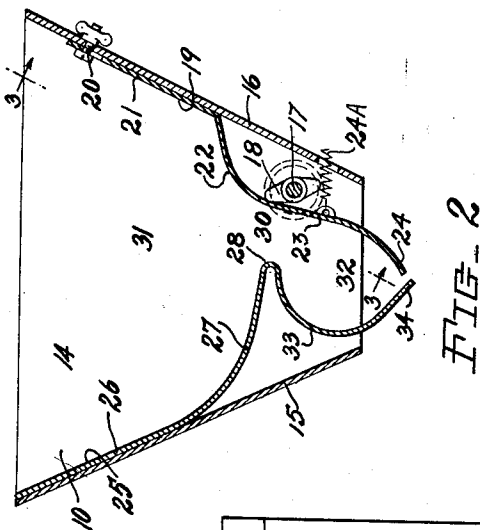


FIG. 1

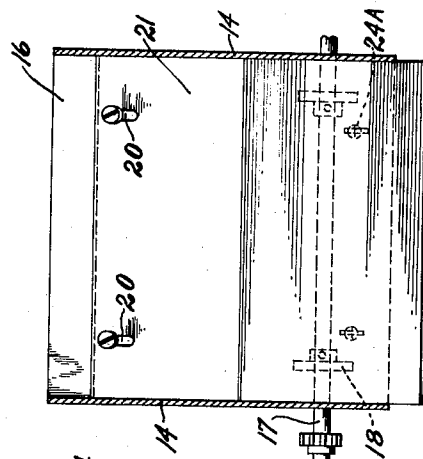


FIG. 2

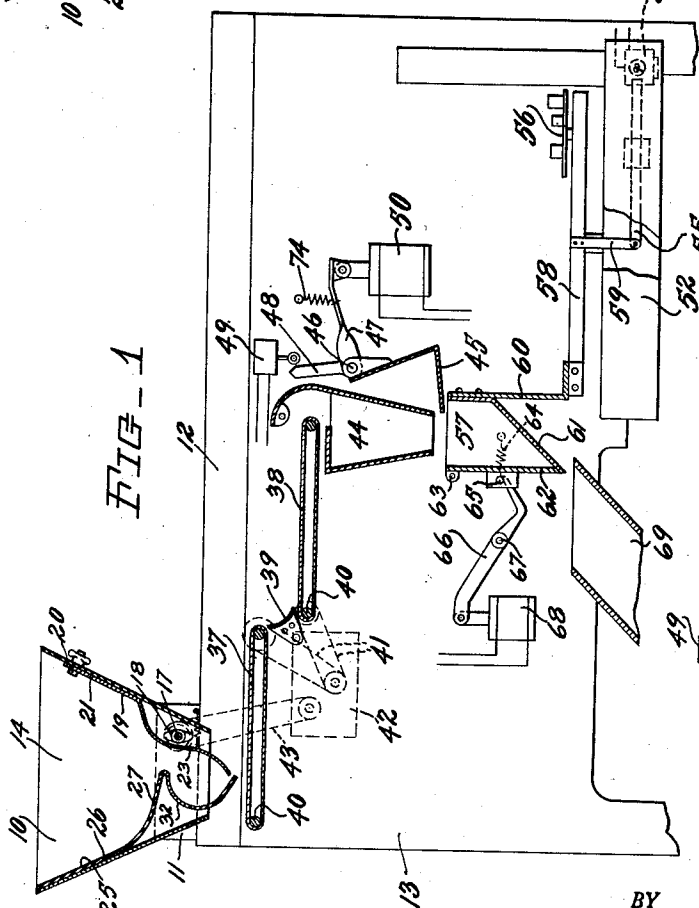
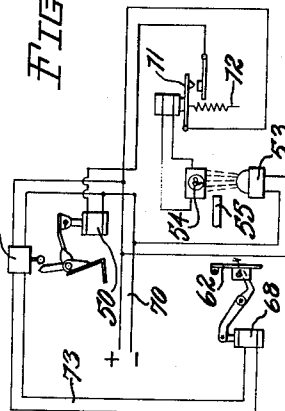


FIG. 3

FIG. 4



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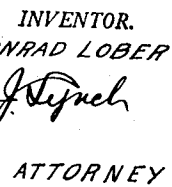
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**2,676,733**

2 Sheets-Sheet 2



## UNITED STATES PATENT OFFICE

2,676,733

MATERIAL ALIGNING AND WEIGHING MACHINE HAVING A HOPPER WITH MEANS FOR VIBRATING A SIDE WALL THEREOF

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8 Claims. (Cl. 222-202)

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This invention relates to material feeding and weighing, and in particular to a machine for handling stick material of fragile nature, such as spaghetti.

In the packaging of spaghetti for the consumer, it is weighed out in lots and boxed, and it has been necessary heretofore, due to the fragile nature of the commodity, to feed the product by hand to the package during the weighing operation because the sticks are so thin and difficult of separation that practiced hand feeding and separation has been the accepted method. This is slow and costly, and adds to the market price of the commodity. While spaghetti is mentioned, the same objections prevail in the handling of any thin stick or tubular material, and the use of spaghetti is by way of example only.

It is an object of the invention, therefore, to construct a feeding means that will automatically straighten out the stick material without breaking it, will feed it at a suitable speed by a fanning out process so that it can be weighed out in precise quantities and perform these operations by automatic machinery so that the resultant saving in packaging costs can be of benefit to the consumer.

A further object of the invention is to provide a definite hopper structure which will automatically align the sticks of the product so that they can be fed to a weighing machine or packaging device without need of the commodity being manually handled.

With these and other objects in view, the invention comprises certain constructions herein-after described and then particularly pointed out in the claims, and a preferred embodiment of my invention is illustrated in the accompanying drawing, in which:

Figure 1 is a view in sectional elevation of a machine for aligning and weighing a stick type product;

Figure 2 is an enlarged view in sectional elevation of a hopper forming part of my invention;

Figure 3 is a section on the line 3-3 of Figure 2;

Figure 4 is a wiring diagram employed in the machine;

Figure 5 is a view similar to Figure 1, showing a modified form of machine;

Figure 6 is a view similar to Figure 2, showing a modified form of hopper;

Figure 7 is a section on the line 7-7 of Fig. 6; and

Fig. 8 is an enlarged fragment of one corner of the hopper, showing the vibrating mechanisms employed.

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Referring to the drawings in detail, 10 indicates a hopper supported by side plates 11 mounted on the outwardly channeled sides 12 of a machine frame 13. The hopper 10, specifically shown in Fig. 2, consists of vertical end walls 14 and sloping side walls 15 and 16, the end walls serving as bearings for a cam shaft 17 to which is fixed one or more cams 18 for vibrating the lower flexible end of a jogger plate 19 adjustably mounted on the wall 16 through the medium of bolt and slot connections 20. The jogger plate 19 is shaped to provide an upper flat portion 21 abutting the wall 16, and is bent inwardly to provide an arcuately sloping feed section 22 leading to a more steeply declivitous sub-hopper wall section 23 terminating in a lifting lip portion 24 at the lower free edge thereof. This lip portion lies substantially in the median plane of the hopper and the plate 19 is sufficiently flexible so that the part thereof that is directed inwardly and away from the hopper wall 16 may vibrate under the influence of the cam means 18 which engages the underside of the section 23 of the jogger plate. This section is connected by a retractile spring 24A with a side plate 11 so that movement of the plate 19 is against the resistance afforded by the spring.

The opposite wall 15 of the hopper has suitably secured thereto a fixed plate 25, an upper portion 26 of which abuts the wall 15. The mid-area of the plate has an inwardly and downwardly gently sweeping curved section 27 terminating in a bent over ledge 28 disposed substantially in the median plane of the hopper and adapted to coact with the feed section 22 of the jogger plate to align the sticks of spaghetti or other like foodstuff that is sold commercially in the well known long, thin, rigid strip form, and is of fragile nature. The sections 22 and 27 further coact to provide a constricted passage 30 between an upper hopper area 31 and a lower hopper area 32 which passage varies in width as the jogger plate vibrates to straighten the stick material and allow it to feed through the throat 30. The fixed or guide plate 25 below the ledge 28 is arcuately shaped outwardly from the center of the hopper or toward the side wall 15 as at 33, and terminates as at 34 in a straight lower end or gate section which cooperates with, and is slightly below the level of the bottom edge of the right lip 24. The size of the discharge opening afforded by the spacing of 24 and 34 may be varied by adjustment of the jogger plate 19 obliquely along the wall 16 of the hopper through the connections 20.

The spaghetti is discharge on to a primary conveyor belt 37 whose end is adjacent and above

a secondary conveyor belt 33. The space between the ends of the belts is spanned by a bridge piece 39 mounted on the frame 13 in which the belt rollers 40 are journaled. Two of the rollers 40 carry sprockets for chain drive connection 41 with a multi-speed transmission 42 from which is also operated, by a chain drive 43, the cam shaft 17. The conveyor belt 33 has a faster rate of travel than the belt 37 so that the spaghetti sticks are thinned out in quantity with respect to those on the belt 37 so that the amount that drops off the belt 33 can be closely controlled in the weighing operation, which is automatic.

The discharge end of belt 33 overlies the upper end of a magazine 44 whose sides may be tapered and whose lower end is periodically closed by a gate 45 secured on a cross shaft 46 in the frame. The shaft has fixed thereto a solenoid arm 47 and a switch arm 48, the latter of which, in its swinging movement, is adapted to operate a switch 49 for controlling a circuit to be described while the solenoid arm is actuated by the solenoid 50 in the usual manner.

In the lower part of the frame 13 of the machine, a scale 52 is mounted in which is housed a light beam source 53, a photocell device 54, and a movable strip 55 for cutting off the light beam. The scale includes a weight pan 56 and a load hopper or receptacle 57 mounted on the usual beam or balance frame 58 from which depends an arm 59 pivoted at its lower end to the light strip 55. The strip cuts off the light beam when the quantity of spaghetti or other matter in the load receptacle 57 equals the weight of the adjustable weights supported on the pan 56.

The receptacle 57, mounted on the balance frame 58, through a bracket 60, is provided with a sloping bottom 61 and a side wall 62 pivoted at 63 to the ends of the receptacle for swinging opening movement against the resistance of a spring 64. The receptacle door 62 carries a bracket borne pin 65 for engagement by a trip lever 66, mounted on a suitable pivot pin 67, and actuated by a solenoid 68. When a pound of spaghetti is in the receptacle, the gate 45 closes and the door 62 discharges the contents of the receptacle into a chute 69 which leads to the packaging machine.

In Figure 4, the wiring diagram is shown and includes a power circuit 70 which is maintained open by a relay switch 71 controlled by the photocell circuit. When the light beam is cut off by the strip 55, a spring 72 closes the switch 71 and the solenoid 50 is energized and closes the gate 45 and through arm 48 operates the switch 49 to complete a circuit 73 through solenoid 68 to open the door 62. When the receptacle contents are discharged and the light beam and photocell again energizes the relay, the switch associated therewith breaks the main circuit with the result that a spring 74 pulls the gate 45 open, causing the switch 49 to break the circuit so that the spring 64 closes the door 62. This operation of the parts is coordinated and instantaneous so that very accurate weight is attained by quickly cutting off feed of the material from the magazine 44 to the scale receptacle 57.

Substantially the same circuit is used in the form of the invention shown in Figures 5-8 in which the feed belts are omitted and their function carried out by the structure of the hopper or bin 75 which is identical in some respects with the hopper 19 in that it includes the sloping side walls 76, end walls 77, a fixed plate 78, and an adjustable jogger plate 79. The plates 78 and 79 have the same curvature in cross sectional

shape as their counterparts 25 and 19, and plate 79 is adjustable vertically through the bolt and slot connections 80. A restricted passage 81 is provided that leads from the upper section 82 to the lower section 83, the latter formed by the lower reaches of the plates 78 and 79, which terminate in spaced relation to form an adjustable throat opening 84. The jogger plate 79 is vibrated by a cam 85 fixed to a shaft 86 carrying a chain sprocket 87 and a gear 88. The latter meshes with a smaller gear 89 fixed on a shaft 90 suitably journaled in the side walls 12 of the machine frame 13. The shaft 90 carries spaced multi-sided cams 91 for engagement with vibrator arms 92 secured to and projecting from an auxiliary jogging strip 93. The strip is fixed adjacent to and extends beyond the lower end of the side wall 76 of the hopper and is sufficiently flexible so that an inwardly directed semi-circularly channelled portion 94 presenting a convex face longitudinally thereof acts as a feed retarder by coacting with the troughed portion 95 of an auxiliary fixed plate 96 secured to the outer lower portion of the hopper. The lower edge of the plate 96 underlies the lower edge of plate 78 so that material coming through orifice 84 at a certain speed of feed will pile up on plate 96 and will pass through the feed opening 97 as permitted by the vibratory motion of strip 92. The vibrations of jogging plate 79 are slower than the vibrations of jogging strip 93 so that these members are equivalent in action to the plural belt arrangement of Fig. 1, thus saving space and the added mechanisms necessary to operate the belts at varying speeds. In this manner, close control of the amount of material fed is possible so that when the predetermined weight of material is indicated, the flow of material to the scale can be cut off without waste, or interruption in the operation of the machine.

As the material drops out of the hopper through the orifice 97, it passes through a magazine 98 which is periodically closed at its bottom by a gate 99 hinged as at 100 to the machine for swinging movement through operation of a spring held lever 101, a link 102 pivoted to the gate and the core of a solenoid 103 to which the lever 101 is pivoted. The scale is the same as previously explained and includes the balance frame 104, light arm 105, light beam source and photocell unit 106, weight pan 107 and load hopper or receptacle 108. The latter has an operable side wall 109 constituting a door which is actuated on its pivot 110 by linkage 111 operated by a solenoid 112. As in the wiring diagram of Figure 4, closing of the main circuit energizes the solenoids 103 and 112 to operate the gate 99 and door 109 through the switch 113. The gear 87 is operated from a suitable motor or speed regulator unit 114.

My invention is not to be restricted to the precise details of construction shown since various changes and modifications may be made therein without departing from the scope of the invention or sacrificing the advantages to be derived from its use.

What I claim is:

1. A hopper comprising opposed converging side walls, one of said side walls in its lower mid-section being shaped to provide an inwardly directed shelf portion bent outwardly to provide a ledge and a depending semi-circular section terminating in a straight lower obliquely disposed gate end, and the opposite wall being bent inwardly to provide an arcuately sloping feed section and a subjacent more steeply declivitous

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section terminating in a lifting lip at the lower edge thereof spaced from the lower edge of said gate end, said walls defining upper and lower hopper sections and providing between said shelf portion and said declivitous section a restricted upper throat between said sections, the lower ends of said walls defining a lower discharge orifice and means for flexing one of the side walls laterally to align stick form material passing through the throat to control the rate of discharge thereof from said orifice.

2. A hopper comprising outer opposed converging walls, inner opposite side walls mounted on said outer walls and shaped to present intermediate the upper and lower edges thereof inwardly directed curved portions defining upper and lower hopper sections and providing between said curved portions a restricted upper throat connecting said sections, the lower ends of said walls defining a lower discharge orifice and means for agitating one of the side walls to align stick form material passing through the throat, a plate fixed to one wall and extending therebelow, a jogging strip on the opposite wall coacting with said plate, the lower edges of the plate and the strip being disposed below said discharge orifice and constituting a lower chamber to which the material is fed, and means for vibrating said jogging strip at a faster rate than said one wall of the hopper is vibrated.

3. A hopper of the character set forth in claim 1 including opposed outer downwardly converging walls upon which said side walls are mounted, means for adjustably mounting one of said side walls on one of said outer walls whereby a raising or lowering movement of said adjustable side wall will adjust the size of the opening in the discharge orifice.

4. A hopper of the character set forth in claim 2 including means for adjustably mounting one of said inner walls on an outer wall whereby a raising or lowering movement thereof will adjust the size of the opening in the discharge orifice.

5. A hopper for feeding fragile stick material comprising opposing converging outer walls, an inner wall mounted on each outer wall one of the inner walls being shaped to provide an inwardly and downwardly directed arcuately sloping jogger feed section and a subjacent more steeply declivitous section terminating in a lifting

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lip at the lower edge thereof the other inner guide wall being shaped to provide an inwardly and downwardly gently sweeping curved section terminating in a bent over ledge and a depending semi-circular section terminating in a straight lower obliquely disposed gate end adapted to coact with said jogger feed section to provide a constricted passage defining upper and lower hopper areas, the lower edge of said guide wall extending to a point adjacent and below the lower edge of said feed section to provide a discharge opening of lesser width than said constricted passage and means for jogging said feed section laterally to vary the width of the said constricted passage and align stick form material passing there-through and for varying the feed of material through the space between said lifting lip and the edge of said gate end.

6. A hopper of the character set forth in claim 5 including means for adjusting said jogger feed section vertically along the inner wall of the hopper to vary the size of said discharge opening.

7. A hopper of the character set forth in claim 5 including an auxiliary plate adjacent to said guide wall and presenting a troughed portion extending therebeyond, an auxiliary jogging strip opposite said plate shaped to present an inwardly directed semicircular channeled portion presenting a longitudinal convex face coacting with said troughed portion to act as a feed retarder, and means for jogging said auxiliary jogging plate.

8. A hopper of the character set forth in claim 7 including a common driving means for operating said jogger feed section and said auxiliary jogging plate in unison.

#### References Cited in the file of this patent

#### UNITED STATES PATENTS

| Number       | Name            | Date          |
|--------------|-----------------|---------------|
| 40 602,754   | Himes -----     | Apr. 19, 1898 |
| 1,300,441    | Marsa -----     | Apr. 15, 1919 |
| 1,485,099    | Wahl -----      | Feb. 26, 1924 |
| 2,071,443    | Weckerly -----  | Feb. 23, 1937 |
| 2,261,654    | Livengood ----- | Nov. 4, 1941  |
| 46 2,466,386 | Curioni -----   | Apr. 5, 1949  |

#### FOREIGN PATENTS

| Number  | Country       | Date          |
|---------|---------------|---------------|
| 489,264 | Germany ----- | Dec. 10, 1927 |