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TABLET PACKAGING MACHINE

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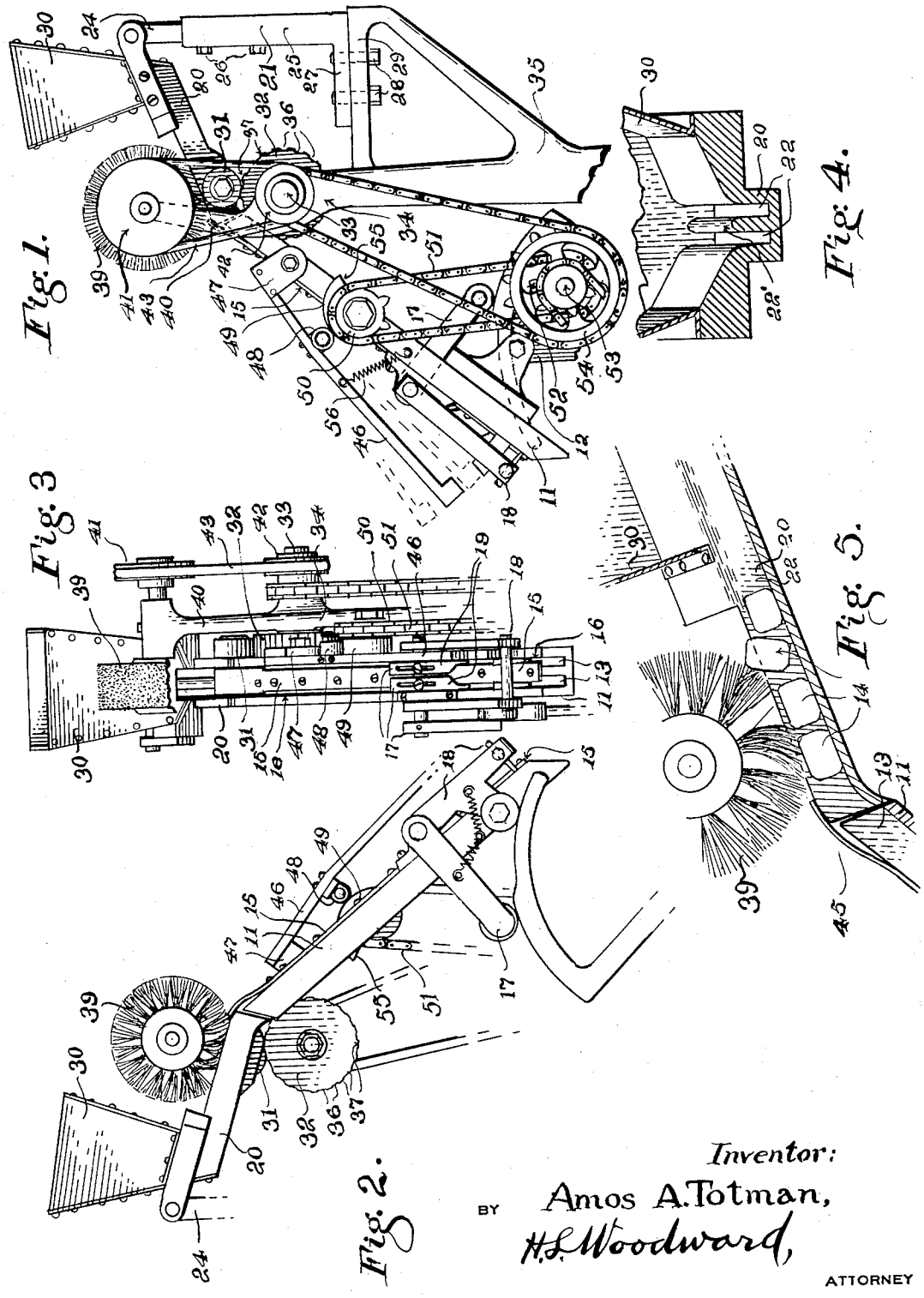


Fig. 1.

Fig. 2.

Fig. 3

Fig. 4.

Fig. 5.

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TABLET PACKAGING MACHINE

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4 Claims. (Cl. 226—2)

The invention relates to packaging machines, and particularly to a machine adapted to package candy tablets or other tablets of the larger size. It is an object of the invention to present a novel means for ordering such tablets in a chute as a part of a counting or charge forming mechanism by which the goods are introduced into suitable bags or other containers. It is specially a purpose to enable this ordering of the stock without damage to the easily frangible coating applied to such tablets in many cases, and to effect the feeding of the stock from a hopper with a minimum jostling movement of the stock to cause adjustment of the individual articles as required.

Another aim is to effect the ordering and counting of the articles within a limited space and with apparatus of extreme simplicity.

A further object is to present an ordering device adjustable readily to function with articles of various materials to assure their proper movement from the hopper and in the order desired. Another object is to provide means to insure effective clearance of each charge and to adjust the goods compactly in the container.

Additional objects, advantages and features of invention reside in the construction, arrangement and combination of parts involved in the embodiment of the invention, as will be understood from the following description and accompanying drawing, wherein

Figure 1 is a side elevation of a mechanism embodying my invention.

Figure 2 is a fragmentary elevation from the opposite side.

Figure 3 is a front view of the machine.

Figure 4 is a cross section through the hopper.

Figure 5 is a fragmentary sectional view longitudinally of the chute 20, showing the action of the brush 39.

There is illustrated a machine corresponding in its main driving mechanism and lower operative mechanism to the structure shown in the patents to Cummings, 539,171, and Barter 1,164,975, and otherwise. It includes a counting or charge forming means similar to that presented in the patent to Brown, 1,531,644.

This style of machine includes a main shaft upon which there are provided cams and sprockets to operate the various mechanisms, and certain of the cams and sprockets are common to various adaptations of the machine, being used to operate widely various members in the different machines. In the present instance the cam may be used somewhat as shown in the Brown patent to operate the upper and lower detent devices by which tablets are segregated in predetermined number, within the chute. The machine shown is adapted to use with chewing gum tablets or the like, each of which consists of a flattened body substantially rectangular around its major perimeter, and of a thickness less than half its width.

The machine includes a chute 11, carried on the regular frame 12, the chute being inclined at an angle of about 35 degrees to the vertical, which is much steeper than the usual inclination of nail chutes for nail packaging machines. The chute is formed with one or more channels 13 extending throughout its length, and adapted to receive slidably tablets 14 and to hold them with their medial major planes in a vertical position. The tablets shown may be either square or oblong. The channels are partly covered by a top plate 15 projecting partly across the channels, but leaving a slot 16 at one side over each channel. Upper and lower detents 17 and 18 are mounted on the chute, which may be operated as in the patent to Brown named, these including fingers 19 which are quite flexible and resilient at their extremities, being tapered to enter the slots 16.

A starting chute 20 is pivoted on a vertical telescopically adjustable support 21 forming part of a rear extension of the frame of the machine. The chute section 20 at its forward end is alined with the chute 10 and has channels 22 therein adapted to register with the channel 16 of the chute 11 at times, the upper end of the chute 11 being shaped concentric with the pivot of the chute section 20 so that the forward end of the latter may oscillate vertically in close relation thereto. The pivot of the section 20 is on the upper member 24 of the support 21 the lower member 25 of which is slotted to receive screws 26 engaged in the upper member and clamping the two together. The lower member 25 is L-shaped, its lower arm 27 being longitudinally slotted and having screws 28 engaged therethrough in suitable apertures of a horizontal rearwardly extending bracket bar 29 to clamp the latter and the lower arm 27 together adjustably. A hopper 30 is mounted on the rear part of the chute section 20 for movement with the section 20. The sides of the channels 22 within the hopper are flared so as to facilitate entrance of stock to the channels, as will be described. The chute section is also widened and thickened at its upper part, the outer walls of the channels being continued divergently upward and outward

from the channels with proper inclination to serve as a bottom for the hopper.

The forward end of the starting chute 20 is provided with a roller 31 mounted on the under side and supporting the chute 20 by resting upon a cam wheel 32 fixed on a counter shaft 33 journalled in the bracket 34 on the frame extension 35. This cam has uniformly spaced depressions and elevations 36 and 37 of slight altitude, so that when the cam is rotated, it jostles the forward end of the chute 20, vibrating or agitating the contents of the hopper 30 so that they will become adjusted in the chute channels 22. The depth of the channels 22 in the chute 20 is the same as the minor transverse dimension of the tablets in their major plane, and the hopper 30 is formed by mounting the side walls thereof directly upon the chute 20 without any other bottom.

The front side of the hopper rests across the channels 22 of the chute 20, and may be notched over the channels to permit ready passage of tablets when projecting slightly above the top face of the chute 20. A rotary brush 39 is mounted in a bracket fixed upon the chute 20 so as to move translatively therewith. The shaft of the brush carries a pulley wheel 41 at the outer end and on the counter shaft 33 there is a pulley 42 belted to the pulley 41 by an elastic slack belt 43. The brush serves to hold the tablets in the chute at its extremity, and to press into alinement any tablets which may not be in proper ordered relation in the chute 20. The brush for this purpose rotates so as to sweep upwardly on the chute 20. Its bristles are preferably hog bristles and the brush is positioned so that the bristles are substantially flexed when engaged with the tablets, so that the latter may readily slip under the bristles by the agitation of the chute. The degree of oscillation of the chute 20 at its forward extremity is less than one sixteenth of an inch between its opposite limits, and with the chute 20 at its lowermost position the bottoms of the channels 22 of the chute 20 are nearly in alinement with the respective channels 16 of the chute 11, but slightly higher, so that tablets are unobstructed in moving from the chute 20 to the chute 11. At the upper position of the chute 20, the tablets have been abruptly lifted, so that they move easily into the chute 11. The use of the brush 39 is necessary because in the movement of the tablets from the chute 20 against tablets in the chute 11, the latter tablets would be pressed toward the top of the channel which is in effect deepened at the beginning, by having a cover plate 45 extended over the chute 11 divergent therefrom toward the chute 20. The friction and shocks thus involved would tend to damage the coatings of the tablets. Retarding action of the brush lessens this friction and shock.

It is an important advantage of my construction that by having the pivot of the chute and hopper immediately adjacent the hopper the movement of the stock into the chute channels is effected with a very slight degree of oscillatory movement of the stock, whereas, if the pivot were immediately adjacent the junction of the chute 20 and chute 11, it would require a very considerable swing of the chute to cause the stock to move properly past the pivot. It has been known to pivot the lower end of a starting chute immediately adjacent the upper end of a chute receiving therefrom, it having been heretofore thought necessary to avoid—as far as practicable —movement of the two chutes relatively. In such prior devices the oscillatory movement required has been many times as great as is necessary in my device. I have discovered that it is practicable to utilize the starting chute pivoted at the opposite end from its discharge end, and to accomplish proper feed of stock under relative movement of the discharge end of the starting chute with respect to the receiving end of the lower chute, with markedly improved results. It permits the extremely slight movement in agitation indicated by my construction, attaining thereby great economy in wear of parts, and reduction of damage to stock.

In the operation of my machine, the stock being introduced in bulk into the hopper, and the machine operated, the cam 32 produces a steadily sustained but very slight vertical jostling of the contents of the hopper, and the lower articles quickly enter the channels 22 of the chute 20 and pass outward therethrough to the vertically oscillating extremity of the starting chute. This oscillation merely causes a slight loose movement of the stock in the chute, so that it slides easily into the chute 11. The oscillations are at a very rapid rate and might more properly be termed a vibration, occurring as they do at the rate of from 40 to 50 per second, but being of such slight degree from one limit to the other, that the tablets are not lifted from the chute 20, nor do they tend to become thrown above the chute 11. However, there is a certain resilience in the tablets, and the brush 39 is provided in order to obviate liability that the period of oscillation of the starting chute may be so coordinated with the reaction of some of the tablets that they may tend to be thrown upward unduly with liability of breaking the coating.

The counting mechanism in the chute 11 operates in the way familiar with such apparatus, discharging the tablets in charges of predetermined number.

Certain tablets have a tendency to stick or be frictionally held in the lower chute, and in order to counteract this tendency there is provided a tapping hammer or lever 46 having an offset ear 47 at the lower side pivoted on the side of the chute 11 by means of a stud bolt near the upper extremity of the chute. A wiper roller 48 is mounted on the side of the lever a distance from its pivot, and a cam 49 is mounted on the side of the chute supporting the roller and rotated by a sprocket 50 fixed thereon and driven by chain 51 from a suitable driving sprocket 52 on a shaft 53. The countershaft 33 is likewise driven from the shaft 53 but by a larger sprocket 54 and the connection shown is such that the cam 32 will rotate twice for each revolution of the cam 49. The cam 49 is formed with a lobe having an eccentric or rising face terminating at its maximum radius in a drop 55 to the part of minimum radius. The extremity of the lever 46 is located and shaped so as to strike the top of the chute or an anvil thereon when the roller 48 falls over the drop of the cam coincident with the lifting of the detent 18, and thereby the chute 11 is jarred sufficiently to insure smooth movement of the tablets past the counting device and from the chute. The lever 46 is held with the wiper 48 firmly against the cam by a suitable spring 56. The starting chute 20 has not had a spring attached thereto to hold it down, gravity being apparently sufficient, and the practice in this respect may be adapted to the requirement of the action of the device.

I claim:

1. In a machine of the character described, a stationary lower chute, a starting chute having a discharge end vertically oscillatable in alinement with the first chute and a spring plate mounted to extend over mutually adjacent portions of both chutes and bearing resiliently on the higher one.

2. In a machine of the character described, a chute section pivoted distant from its discharge end, a hopper open at its bottom on the chute near the pivot, said chute exposed adjacent its discharge end for a distance and a flexible brush having bristle elements to engage upon stock passing in the chute to bear downwardly thereon and away from the discharge end of the chute.

3. A tablet ordering and counting device comprising a stationary inclined main chute, a starting chute having a pivotal mounting a distance rearwardly of and above the receiving end of the main chute, the two having proximal ends closely fitting each other for relative vertical oscillation of the starting chute, a hopper on the upper end of the starting chute open upon this chute, and means to oscillate the lower end of the starting chute vertically, said mounting including a vertical lower member, an upper member telescopically adjustable thereon and pivotally connected to the starting chute, and means to secure the telescoped parts in adjusted positions.

4. The structure of claim 3 in which a base frame is provided, said vertical lower member being slidably mounted thereon for adjustment horizontally, and means to secure the lower member in adjusted positions on said base frame.

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