Jan. 2, 1962 H. THÜRLINGS 3,015,378

ORIENTATION APPARATUS FOR ARTICLES TO BE WRAPPED

Filed Jan. 21, 1960 3 Sheets-Sheet 1

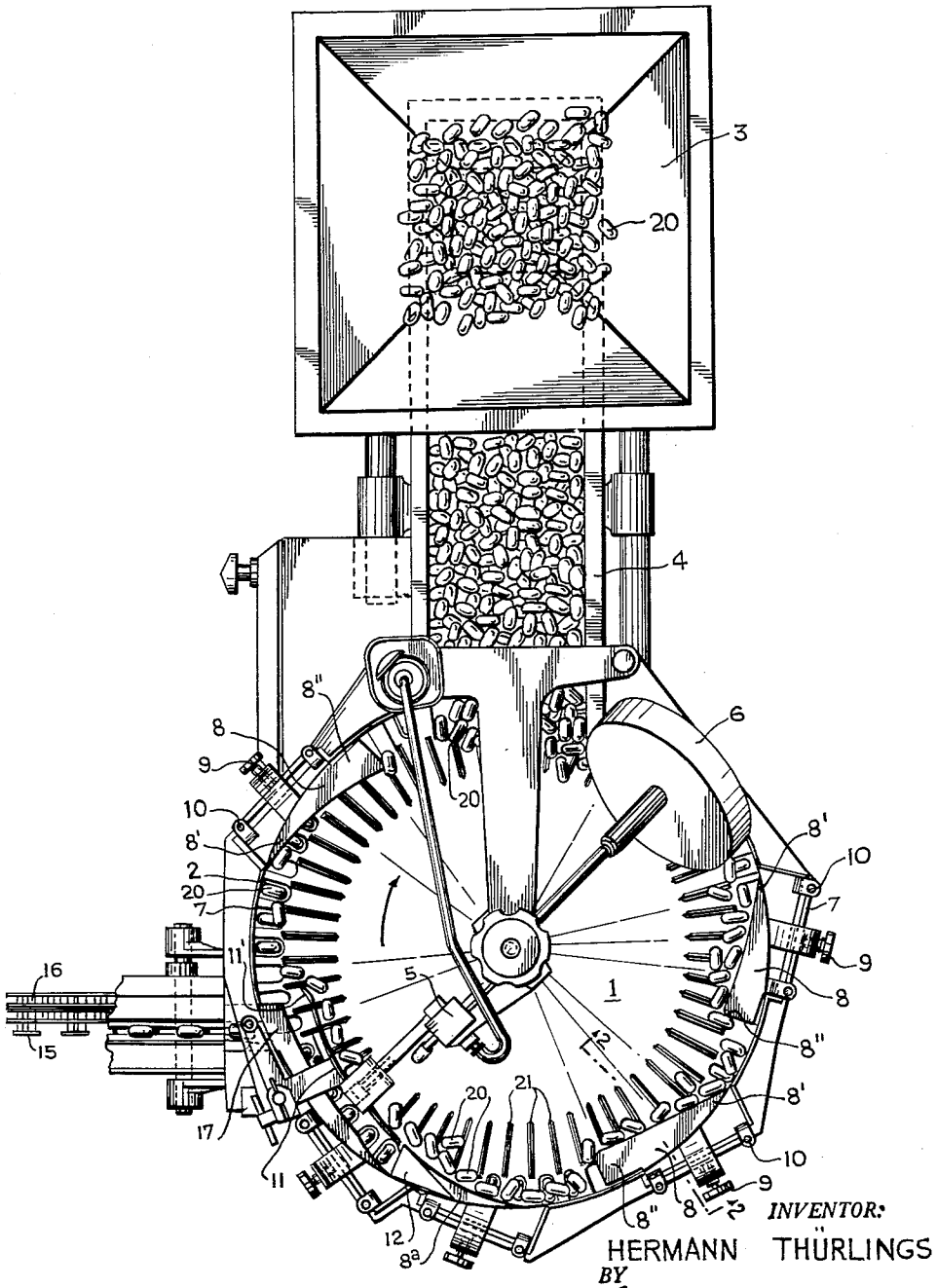


Fig. 1.

INVENTOR:
HERMANN THÜRLINGS
BY
Frederick Breitenfeld
ATTORNEY

Jan. 2, 1962 H. THÜRLINGS 3,015,378

ORIENTATION APPARATUS FOR ARTICLES TO BE WRAPPED

Filed Jan. 21, 1960 3 Sheets-Sheet 2

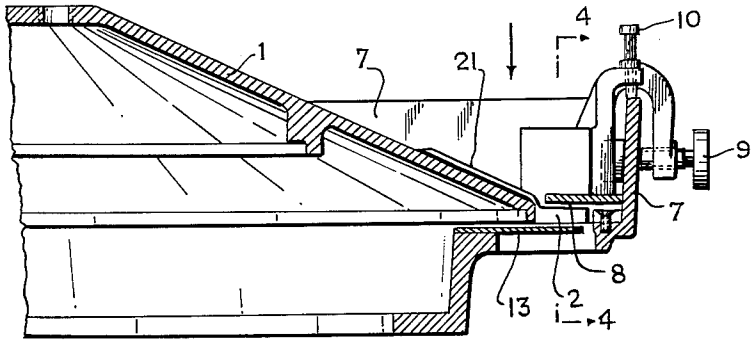


Fig. 2.

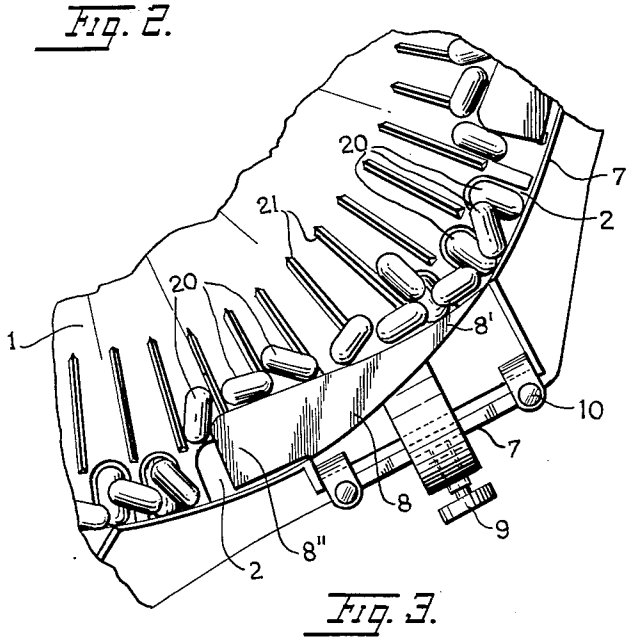


Fig. 3.

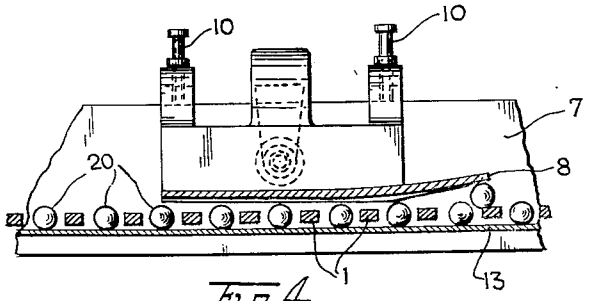


Fig. 4.

INVENTOR:
HERMANN THÜRLINGS
BY
Frederick Breitenfeld
ATTORNEY

Jan. 2, 1962 H. THÜRLINGS 3,015,378

ORIENTATION APPARATUS FOR ARTICLES TO BE WRAPPED

Filed Jan. 21, 1960 3 Sheets-Sheet 3

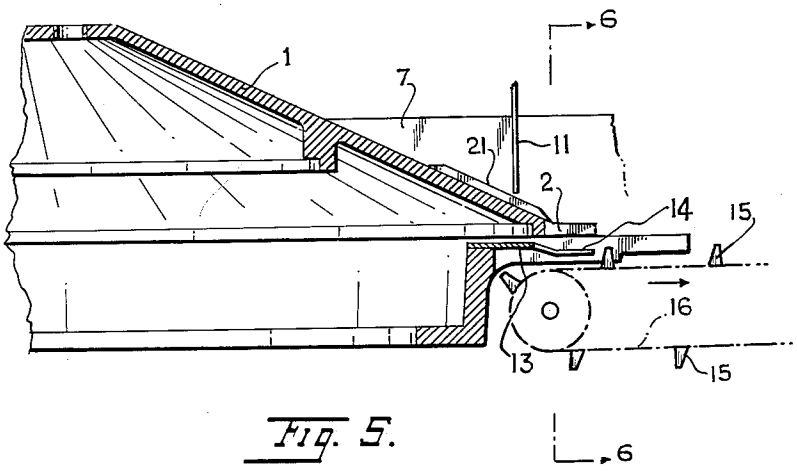


Fig. 5.

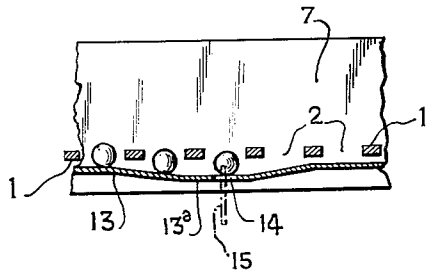


Fig. 6.

INVENTOR:
HERMANN THÜRLINGS
BY
Frederick Breitenfeld
ATTORNEY

United States Patent Office 3,015,378 Patented Jan. 2, 1962

3,015,378

ORIENTATION APPARATUS FOR ARTICLES TO BE WRAPPED

Hermann Thürlings, Viersen, Bezirk Dusseldorf, Germany, assignor to Hansella-Werke Albert Henkel A.G., Viersen, Rhineland, Germany, a corporation of Germany

Filed Jan. 21, 1960, Ser. No. 3,912
Claims priority, application Germany Aug. 19, 1959
6 Claims. (Cl. 198—33)

This invention relates generally to packaging machines and more particularly to apparatus for arranging the articles to be wrapped in a predetermined orientation with respect to the wrapping apparatus.

The invention is primarily intended for use in the individual packing of relatively small articles such as candies, but numerous features are of wider applicability.

In a known type of article orientation apparatus, the articles to be wrapped are deposited upon a plate or table having a series of pockets each of which is adapted to accommodate a single article. From these pockets the articles are fed in succession to the wrapping apparatus. For instance, there are candy packing machines in which the plate which receives the candies is shaken intermittently in such a way that the candies fed onto the plate move from the center of the plate toward its periphery as a result of centrifugal force, and drop into pockets provided at the periphery. There are also known devices in which the candies to be packed are urged by means of a rotating rake toward and into the pockets of the feed plate. Still other known apparatus is provided at the edge of the feed plate with rotating brushes which similarly serve to fill the pockets of the rotating plate.

In all these machines, difficulty is encountered in seeing to it that each of the pockets in the plate has received one of the articles before the pocket arrives at the delivery point at which separate means transfers the properly oriented candies or other articles, one at a time, to the wrapping apparatus. In modern high speed machines, all of the pockets are not always filled, and as a result the output is materially reduced. Furthermore, particularly in the case of candies, the filling of the pockets must be done in a very gentle manner to avoid crushing the candies.

The object of the present invention is to overcome the difficulty referred to. For this purpose the invention provides an article orienting device of novel structural and operational character which handles and arranges the articles in an unusually careful and effective manner. The device is provided with a continuously rotating plate which receives the articles (delivered, for instance, by a vibrating conveyor); it is provided along its periphery with a series of pockets; and it is so shaped that it rises conically upward from its edge to its center of rotation. Spaced at circumferential intervals along the edge of the plate are stationary deflectors which are encountered by articles that have not yet found their way into pockets. The deflectors direct such articles radially inward and upward toward the axis of rotation of the plate, and as the plate continues to rotate the articles move around the rear edge of each deflector and slide down toward the plate edge. In this way, due to the combination of the shape of the plate and the centrifugal force produced by its rotation, the articles are urged toward and into the empty pockets which move past the rear edge of each deflector.

The pockets are preferably devoid of floors moving with the plate, and a stationary guide ring is provided below the periphery of the plate for supporting the articles accommodated within the pockets. The guide ring is appropriately shaped at the point of delivery so that members of a conveyor chain, emerging from a slot in the guide ring, may enter successive pockets and move the entrapped articles out of the pockets and toward the wrapping apparatus.

One way of attaining the objects of the invention is illustrated in the accompanying drawings, in which—

FIG. 1 is a plan view of an apparatus for orienting articles to be wrapped;

FIG. 2 is a section along the line 2—2 of FIG. 1;

FIG. 3 is a detail of FIG. 1 on a larger scale.

FIG. 4 is a section along the line 4—4 of FIG. 2;

FIG. 5 is a view similar to FIG. 2 showing the delivery point of the apparatus; and

FIG. 6 is a section along the line 6—6 of FIG. 5.

Referring now to the drawings, the device for arranging the candies or other articles in a predetermined orientation before delivery to the wrapping apparatus (not shown) consists of a circular plate 1 rotatable about its vertical axis in a clockwise direction as seen in FIG. 1. The plate is provided around its periphery with a series of pockets or apertures 2, each of which is capable of receiving a single one of the candies 20, and a series of radial ridges 21 to aid in frictionally carrying the candies around with the plate as the latter rotates. The candies are fed from a hopper 3 (FIG. 1) by means of a vibratory conveyor chute 4. The means (not shown) for actuating the conveyor chute 4 is energized and deenergized under the control of a switch 5, arranged to open when the level of the candies on the plate 1 elevates the feeler roll 6 to a predetermined height. When the level of the candies on the plate falls, the switch 5 closes again to cause more candies to be fed to the plate by the vibratory conveyor 4.

As can be seen in FIG. 2, the plate 1 rises conically upward from its edge to its axis of rotation. The plate is surrounded by a stationary dish-shaped member 7 which serves to keep the candies on the plate. Spaced around the member 7 are a number of deflectors 8 located above the periphery of the plate 1. The deflectors are wedge shaped and widen from their forward tips 8′ to their rear ends 8″. The rear corner of each deflector 8 is rounded to permit the candies to slide around it smoothly, and the rear edge of each deflector is cut back at a small angle to a radius of the plate so as not to interfere with the candies sliding around the rear corner toward the pockets 2. The deflectors 8 are preferably fabricated of a flexible material, such as rubber, and are mounted on the member 7 by means of the clamp screws 9 and 10. Such mounting permits the height and angle of the deflectors, with respect to the plate, to be adjusted depending on the shape and the thickness of the candies to be oriented.

The last deflector 8*a* which the candies pass before they reach the delivery point or station 17 (FIG. 1) is extended in the direction of its inner edge by a strip 11 of sheet metal or other material, standing on edge. The strip 11 terminates directly beyond the delivery station 17 in a rounded rear edge 11′. The height of the strip 11 is about equal to the height of the dish-shaped member 7. Upon the rear portion of the deflector 8*a* there is arranged a wedge of foam rubber 12 of approximately the same height as the member 7.

Below the periphery of the plate 1, and concentric therewith, is an annular guide ring 13 for supporting the candies 20 disposed in the pockets 2 of the plate. The guide ring 13 is deformed downwardly as at 13*a* in the region of the delivery station 17 (FIG. 6), and the deformed portion 13*a* of the ring is provided with a radial slot 14 through which delivery fingers 15 on a conveyor chain 16 pass. The delivery fingers serve to transfer the properly oriented candies 20 individually from the pockets 2 to the wrapping apparatus.

The orienting apparatus described above operates in the following manner: After the packaging machine has been activated, the vibratory chute 4 delivers a quantity of candies 20 to the rotating plate 1. After a few revolutions, those candies which have not yet fallen into the pockets 2 are carried by the ridges 21 against the strip 11 which, as mentioned, terminates beyond the delivery station 17. As a result of the conical shape of the plate 1, these candies slide down around the rounded rear edge 11' of the strip 11 toward the pockets 2. Those candies which do not at this time enter any of the pockets 2, either because the pockets are already filled or because the candies are not properly oriented with respect to the pockets, remain at the periphery of the plate in a disarranged heap covering both the empty and filled pockets. These candies are carried along the member 7 by the ridges 21 in the plate 1 until they reach the first deflector 8 (as viewed in the direction of rotation of the plate). They are forced inward thereby, toward the axis of the plate, as a result of the wedge-shaped contour of the deflector. Due to the conical shape of the plate 1, the candies which have been forced inward are also forced upward. When the candies reach the rounded rear end 8'' of the deflector, they slide downwardly by gravity toward the edge of the plate so as to fill some of the pockets which were not filled by the candies when they dropped around the rear edge 11' of the strip 11.

The candies which even now do not find their way into any of the pockets 2 continue to be carried along the edge of the plate 1 and are acted upon as described above by each of the successive deflectors 8. Each of the deflectors 8 serves to clear the edge of the plate of the disoriented candies which overlie the pockets 2 and prevent properly oriented candies from dropping into the pockets. Furthermore, the rounded shape of the rear ends 8'' of the deflectors 8, and the rear edge 11' of the strip 11, tends to properly orient the candies moving around them so that the candies readily fall into empty pockets 2. The last deflector 8*a* before the delivery station 17 guides those candies which are still not located in pockets, along its inner edge to the strip 11 along which these candies are moved past the delivery station. Due to the number of deflectors located around the plate 1, each pocket has several opportunities to be filled between the time it passes the delivery station 17 and the time it returns to that station.

The foam rubber wedge 12 on the deflector 8*a* serves as a barrier to the candies sliding along the inner edge of the deflector 8*a* in order to preclude the possibility that any of these candies might enter the peripheral plate region which has already passed the deflector 8*a*. In this way, only properly oriented candies in the pockets 2 are permitted to arrive at the delivery station 17. The strip 11 serves as a barrier for the same purpose as the rubber wedge 12.

The height of the guide ring 13, on which the candies 20 in the pockets 2 are supported, is such that each of the candies 20 completely fills its respective pocket. In order that the apparatus may be adapted to handle candies of varying dimensions the guide ring is made adjustable in height with respect to the plate 1. The downward deformation of the guide ring 13 in the region of the delivery station 17 permits the delivery fingers 15 on the conveyor chain 16 to engage the candies in the pockets 2 and transfer them to the wrapping apparatus of the packaging machine.

As mentioned above, the deflectors 8 are adjustable in both height and angularity with respect to the plate 1, and in operation are so adjusted depending upon the dimensions of the particular candies employed that they guide the disoriented candies lying at the edge of the plate inward and upward, for the purpose described. However, if by chance one of the candies not disposed in a pocket 2 should accidentally find its way between a deflector 8 and the plate 1, the candy will not be damaged since (as shown in FIG. 4) the flexible deflectors are yieldable upward.

The invention has been shown and described in preferred form only and by way of example and many variations and modifications may be made therein and in its mode of operation which will still be comprised within its spirit. It is understood therefore, that the disclosure is to be taken in an illustrative rather than a limiting sense, except insofar as such limitations are found in the appended claims.

What is claimed is:

1. In or for a packaging machine including wrapping apparatus, means for orienting articles to be wrapped before their delivery to the wrapping apparatus, comprising a continuously rotating plate serving to receive the articles to be wrapped, said plate being provided around its edge with pockets for accommodating the articles and said plate sloping conically upwardly from its edge to its axis of rotation, a stationary edge member surrounding said plate, and at least one wedge-shaped stationary deflector arranged above said plate and adjacent to said edge member, said deflector being positioned so that it widens in a horizontal plane in the direction of rotation of said plate and is encountered by articles carried by said plate and not yet located in said pockets thus moving said articles upwardly and inwardly along the surface of said plate away from said pockets.

2. Orienting means as defined in claim 1, wherein a plurality of said deflectors are mounted on said edge member and spaced around said edge member.

3. In or for a packaging machine including wrapping apparatus, means for orienting articles to be wrapped before their delivery to the wrapping apparatus, comprising a continuously rotating plate serving to receive the articles to be wrapped, said plate being provided around its edge with a series of pockets for accommodating the articles and said plate sloping upwardly from its edge to its axis of rotation, a stationary edge member surrounding said plate, and a number of stationary deflectors spaced above the pockets a distance less than the smallest dimension of the articles, said deflectors serving to move said articles not yet located in said pockets inwardly and upwardly along the surface of said plate and being flexible in a direction away from said plate in order that they may yield upwardly in the event that an article not accommodated by one of said pockets moves between any one of said deflectors and said plate.

4. In or for a packaging machine including wrapping apparatus, means for orienting articles to be wrapped before their delivery to the wrapping apparatus, comprising a continuously rotating plate serving to receive the articles to be wrapped, said plate being provided around its edge with a series of apertures for accommodating the articles and said plate sloping conically upwardly from its edge to its axis of rotation, a delivery station having means for transfering the articles from said apertures to the wrapping apparatus, a stationary edge member surrounding said plate, at least one stationary deflector spaced above said apertures in said plate, and a guide ring beneath said plate for supporting the articles in said apertures, said guide ring being deformed downwardly in the region of said delivery station to facilitate the engagement of the articles by said transferring means.

5. In or for a packaging machine including wrapping apparatus, means for orienting elongated articles to be wrapped before their delivery to the wrapping apparatus, comprising a continuously rotating plate serving to receive the articles to be wrapped, said plate being provided around its edge with elongated pockets whose longitudinal axes are arranged radially for accommodating the articles and said plate sloping conically upwardly from its edge to its axis of rotation, a stationary edge member surrounding said plate, and at least one wedge-shaped stationary deflector mounted on said edge member and

spaced above the pockets in said plate a distance less than the smallest dimension of the articles, said deflector having a forward edge for guiding articles not yet located in said pockets inwardly and upwardly toward the center of said plate, said forward edge of said deflector terminating at its rearward end in a rounded edge about which said articles are rotated by the continued movement of said plate whereby said articles are urged into positions in which their longitudinal axes are arranged radially with respect to said plate for ready accommodation by said pockets.

6. Orienting means as defined in claim 5 wherein said deflector is flexible in a direction away from said plate

in order that it may yield upwardly in the event that an article not accommodated by one of said pockets moves between any one of said deflectors and said plate.

References Cited in the file of this patent

UNITED STATES PATENTS

990,593	Ringland	Apr. 25, 1911
1,823,995	Streby	Sept. 22, 1931
2,792,099	Hefft	May 14, 1957
2,853,176	Kay	Sept. 23, 1958

FOREIGN PATENTS

277,347	Germany	Aug. 11, 1914