Feb. 3, 1959 O. HANSEL ET AL 2,872,020

STACKING APPARATUS

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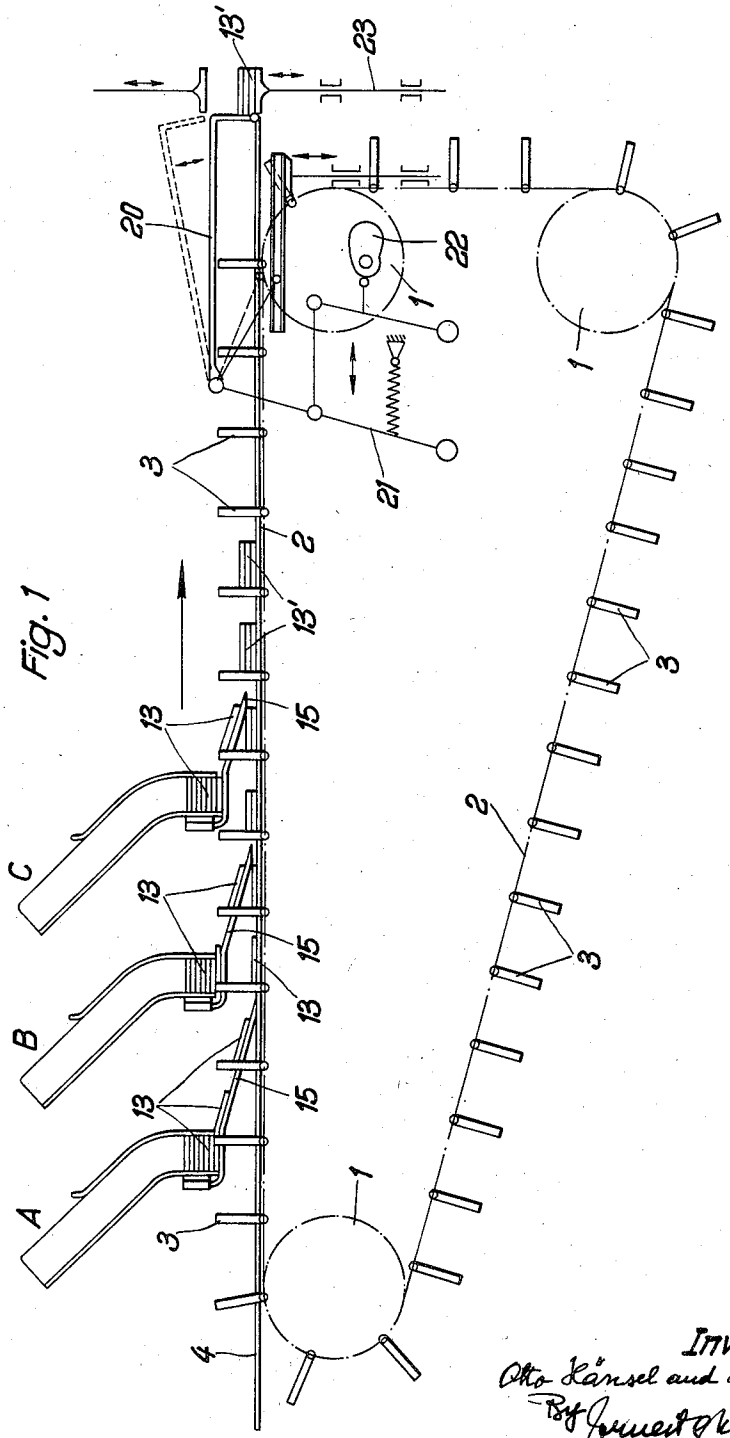


Fig. 1

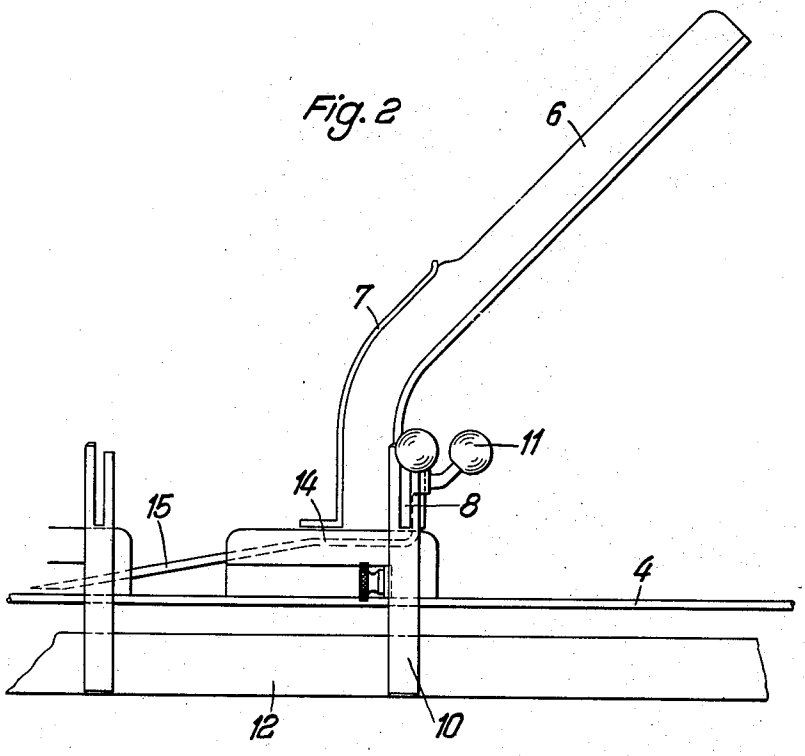
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Fig. 2



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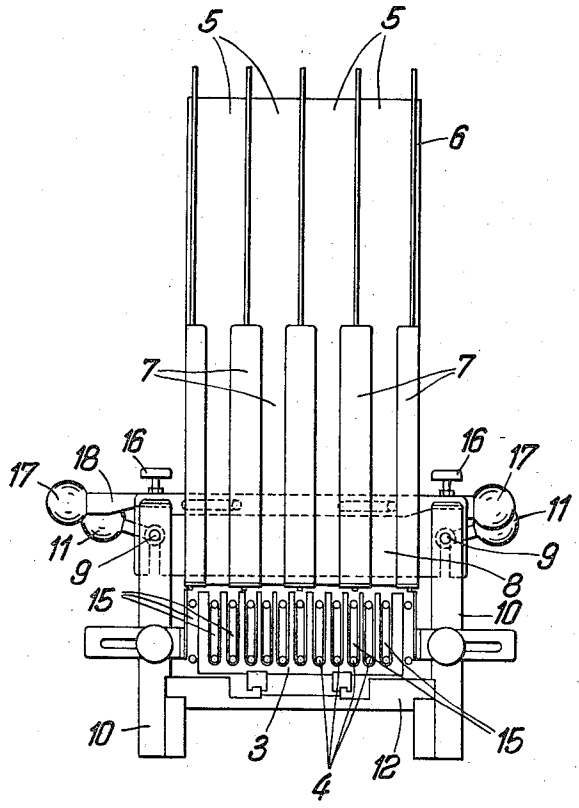


Fig. 3

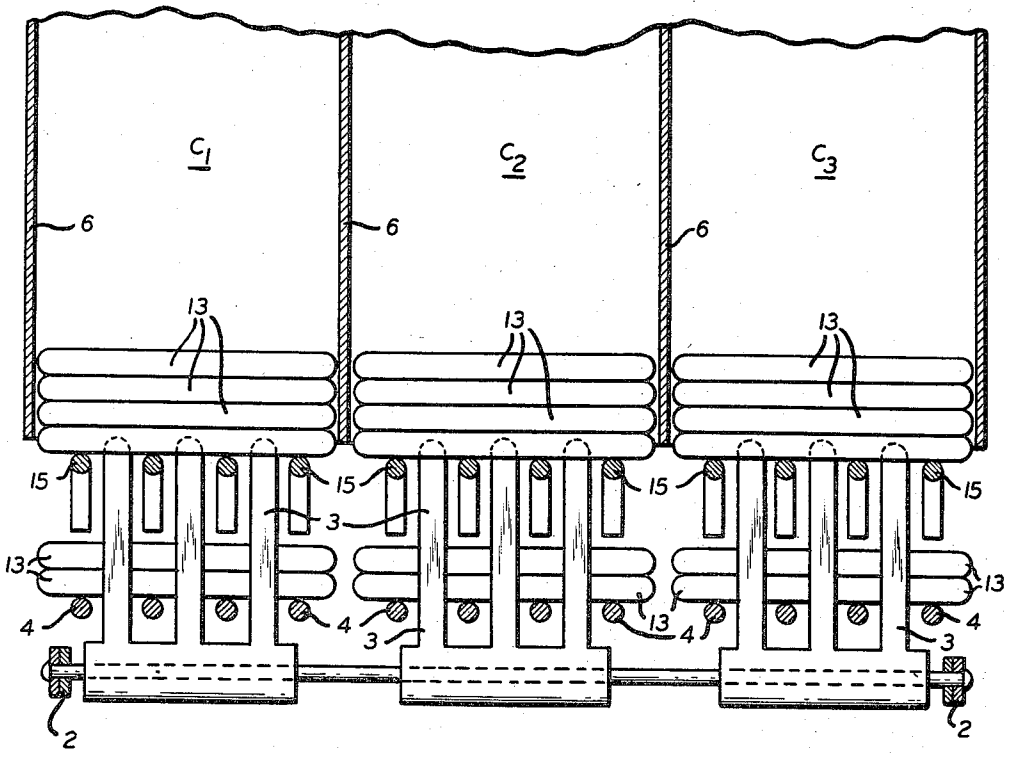
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FIG. 4.



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STACKING APPARATUS

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7 Claims. (Cl. 198—35)

The present invention relates to an apparatus for packing piled-up tablets, as for instance crackers, biscuits, chocolate bars, etc., and particularly to a device for feeding of such objects to the packing station where they are wrapped up in form of piles.

It is known that packing of crackers, biscuits, or similar objects causes difficulties, because these objects break easily and because they cannot be subjected to severe strains. On the other hand, packing of such objects is accomplished in such a manner that several biscuits or crackers are placed one on the other to form a pile and several of such piles are packed in a side by side arrangement. For this reason it was necessary to do the packing by hand.

It is, therefore, one object of the present invention to provide an apparatus which mechanically accomplishes all kinds of biscuit packings or the like in the fastest and simplest manner. This object is achieved by providing a plurality of feeding piles or pile containers for crackers, biscuits, or the like in series arrangement, below which piles moves an endless conveyor means having tappets to take a biscuit out of each of the successively arranged piles and to place it on top of the biscuit taken from the preceding pile to eventually form a pile to be packed. Transfer elements as for instance rakes, hooks, or the like are arranged at the end of the conveyor stroke which transfer elements transfer the pile emerging from the conveyor means to the packing station.

It is another object of the present invention to provide an apparatus wherein to allow for several piles to be packed side by side, the feed devices are provided with several chutes arranged at right angles to the direction of feed, and each of the feeding devices and their chutes form a self-contained unit which can be fitted to the table of the conveyor means in any desired number.

It is yet another object of the present invention to provide an apparatus which includes means for adapting each feeding device to the dimensions of the different objects to be packed. In order to bring about these results, the bottom of each feeding device is formed of guide rods arranged in the direction of feed. The tappets provided on the conveyor means extend through the guide rods so that the lowermost object is taken out of each pile and placed on top of the objects taken from the preceding piles.

It is still another objects of the present invention to provide an apparatus, wherein in order to make sure that broken pieces are sorted out, the objects are moved over a grate formed of bars arranged in the direction of feed, so that broken pieces can fall through the grate bars. The bars may be made of tasteless and odorless plastic material. At the end of the transport line a pusher, a rake, or the like is arranged which transfers the pile to be packed to the packing device or station.

With these and other objects in view which will become apparent in the following detailed description, the

present invention will be clearly understood in connection with the accompanying drawings, in which

Figure 1 is a diagrammatical elevational view of the conveyor means,

Fig. 2 is a side elevational view of a feeding device on an enlarged scale;

Fig. 3 is a front elevational view of the feeding device disclosed in Fig. 2; and

Fig. 4 is a cross-section of the machine.

Referring now to the drawings, the conveyor rollers **1** carry an endless conveyor belt or chain **2** provided with tappets **3**, spaced apart from each other. Closely above that portion of the conveyor chain **2** which runs along a horizontal path are smooth plastic bars **4** which are disposed parallel to each other and spaced apart from each other at a predetermined distance, all said bars **4** forming together a grate. The tines of the tappets **3** mounted on the conveyor chain **2** extend between the grate and guiding bars **4**, as shown in Figs. 1 and 3. The direction of feed is indicated by an arrow in Fig. 1.

The feeding device is clearly disclosed in Figs. 2 and 3. It comprises, for instance, four channels or chutes **5** in side by side arrangement and separated from each other by the walls **6**. The lower part of the chutes **5** is partially covered by plates **7**. The chutes **5** and the walls **6** and **7** enclosing them are fixedly mounted to a carrier **8**. The latter has a slot on each side so that the carrier **8** may be pushed over holding pins **9** of the lateral supports **10**, which arrangement permits of easy replacement of the complete feeding device. It is possible to secure the feeding device in its operative position by means of a screw **11**. The supports **10** are fixedly mounted on the guiding table **12** along which the conveyor chain **2** together with its rakes **3** moves in its horizontally disposed portion of its path.

The biscuits **13**, crackers, or the like, to be packed, are piled up in superposed position in the feeding device and its chutes **5**, respectively. The bottom of the feeding device consists of horizontally disposed grate-like bars **14** which have an inclined end portion **15** running towards the conveyor chain **2** in the direction of feed. The height of the grate-like bars **14** is adjustable relative to the feeding device and corresponding with the thickness of the objects **13** to be packed by means of a set screw **16**. The grate-like bars **14** forming the bottom are adjusted in such a manner that a gap remains between the latter and the horizontal portion of the front plate **7** of the corresponding chute **5**, which gap is wide enough to permit of passing of a single object **13**, while the remaining objects **13** are retained in the chute **5**.

The rods **15** are disposed parallel to each other in such a manner that the tines of the rakes **3** can pass through between them.

Furthermore, the carrier **8** of each of the feeding devices is equipped with a control slide **18** having handles **17**, the control slide **18** having control curves and resting on the supports **10** of the machine frame. By displacing the control slide **18** the entire feeding device together with all associated parts may be lifted and lowered and put into operative and inoperative position, respectively. This is brought about in such a manner that the entire feeding device is raised in its inoperative position so that the lowermost object disposed in the chute **5** is lifted out of the path of the rake **3**. In the operative position the same object is located in such low position that it is gripped by the rakes **3** passing therebelow.

As may be ascertained from Fig. 1, any number of feeding devices A, B, C, etc., may be arranged above the horizontally disposed portion of the conveyor chain **2**. In the example, disclosed in Fig. 1, three feeding de-

vices A, B, C are provided, though any number may be arranged. In the successive feeding devices A, B, C the inclined end portions **15** of the bars **14** are of different length, i. e. the end of the bars **14** of the pile A is immediately above the grate **4**, the bottom layer of the objects **13**, disposed side by side, is taken out of the feeding device A by the tappets **3** and slides over the inclined end portions **15** of the bars **14** onto the grate **4**.

Each of the following tappets **3** takes another layer of objects **13** out of the pile, as is shown in Fig. 1. When passing, however, below the pile B, the lowest layer of the objects **13** is taken out. The inclined end portions **15** of the bars **14** in this pile are somewhat shorter and terminate immediately above the object **13** which is already on the grate **4** and has been taken from the pile A and another layer of objects **13** is placed on top of the bottom layer. This process is repeated in each pile so that behind the last feeding device, as for instance C, new piles **13'** have formed which have to be packed. In the embodiment illustrated, four of these piles **13'** are produced and placed side by side on the conveyor chain **2**.

During its further travel in horizontal direction, the pile to be packed reaches a pusher rake **20** which is controlled by a link mechanism **21** and a control cam **22**, respectively, and which performs an oscillating movement and in its rear end position it grips a pile **13'** to be packed, which is thus pushed along the grate **4** beyond reach of the conveyor chain **2** and onto a pusher plate **23** which is vertically movable and which transfers the pile **13'** into a packing machine, a folding station (not shown) or the like.

It is to be understood that the machine is readily adjustable in any way. More or less than four piles may be formed side by side, and each pile may contain as many objects as may be desired.

While I have disclosed one embodiment of the present invention, it is to be understood that this embodiment is given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

We claim:

1. An apparatus for packing flat, breakable objects, as biscuits, crackers, chocolate bars or the like, comprising a sliding path made of a plurality of first longitudinally disposed, substantially horizontal and parallel guiding bars and a plurality of channels disposed in series arrangement along and above said path and having a plurality of said objects piled up in superposed position therein, the number of said channels being equal with the number of said objects to be wrapped in a piled-up assembly, an endless conveyor means disposed below said sliding path and having a plurality of tappets spaced apart from each other along said conveyor means and projecting upwardly therefrom to a height to engage the lowermost of said objects in said channels, said tappets moving in slots formed between each pair of said adjacent guiding bars and moving the lowermost of said objects piled-up in each of said channels on top of the pile of said objects removed from the previous of said channels, the distance between the lowermost of said objects in each of said channels from said guiding bars being greater than the height of the pile of objects to be packed and assembled at the end of said sliding path, and the bottom of each of said channels comprising a plurality of second, grate-like bars disposed parallel to each other in the direction of feeding, and said tappets moving in slots formed by each pair of said second bars, the free ends of the latter being downwardly inclined towards said sliding path in the direction of feeding, and said free ends terminating successively at a level higher than that of the previous one of said channels for an amount equal to the thickness of each of said objects, in order to move the lowermost of said objects from each of said channels on top of the object removed from the previous one of said channels and to permit of the sliding through of said plurality objects removed from said previous channels.

2. The apparatus, as set forth in claim 1, wherein each of said channels comprises a plurality of chutes arranged crosswise to the direction of feeding said objects, all said chutes forming a closed unit.

3. The apparatus, as set forth in claim 1, which includes a support carrying all said guiding bars and means for adjusting the level of said guiding bars in order to adapt said apparatus to the thickness of the objects to be packed.

4. The apparatus, as set forth in claim 1, which includes means for adjusting the height of each of said channels relative to said tappets of said conveyor means.

5. The apparatus, as set forth in claim 1, which includes brackets disposed laterally relative to said conveyor means, each of said channels being removably mounted on said brackets and a slide member carried by said brackets and causing each of said channels to assume an operative and inoperative position, respectively.

6. The apparatus, as set forth in claim 1, which includes a reciprocating pusher plate disposed at the end of the horizontally disposed portion of said endless conveyor means.

7. The apparatus, as set forth in claim 1, which includes means feeding the pile of said objects removed from the last one of said channels to a wrapping device.

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