April 13, 1965 O. HÄNSEL JUN., ETAL 3,177,630

APPARATUS TO FORM PILES OF FLAT, FRAGILE OBJECTS FOR SUBSEQUENT PACKING

Filed June 29, 1961 5 Sheets-Sheet 1

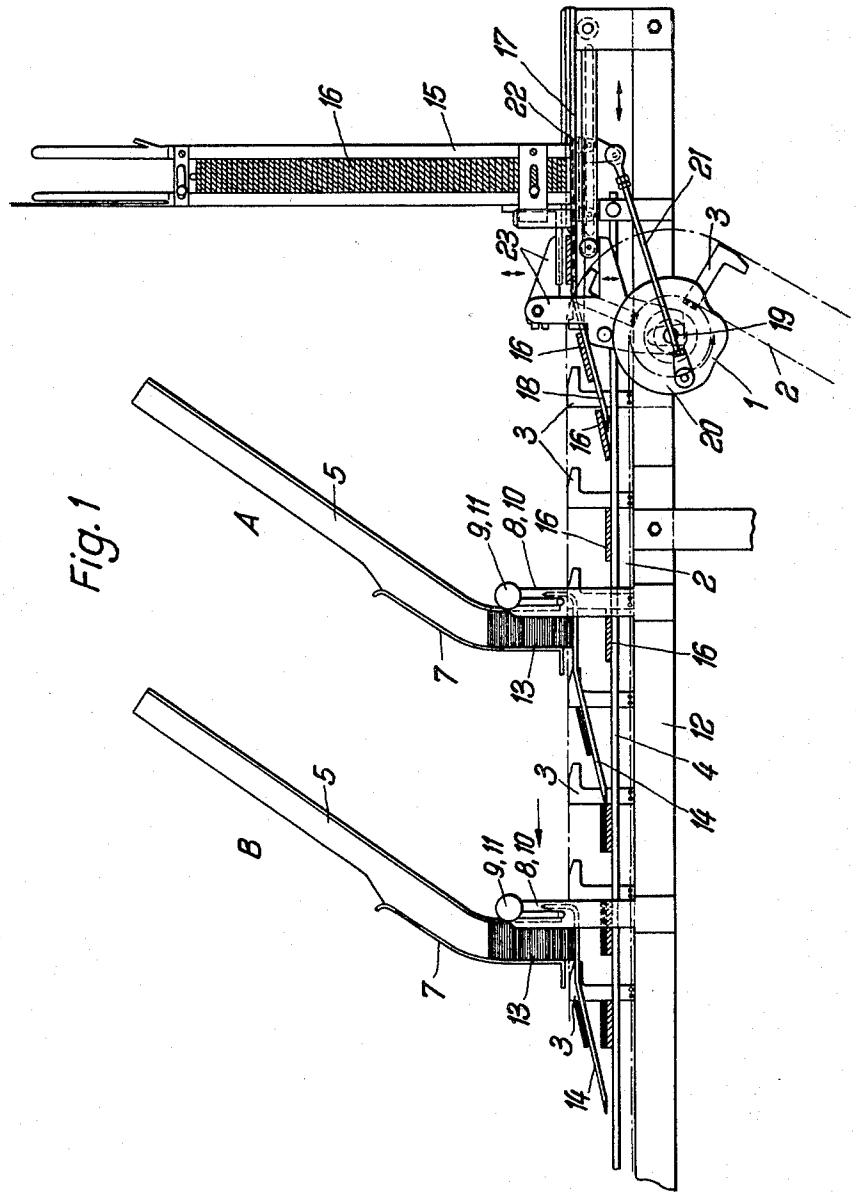


Fig. 1

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APPARATUS TO FORM PILES OF FLAT, FRAGILE OBJECTS FOR SUBSEQUENT PACKING

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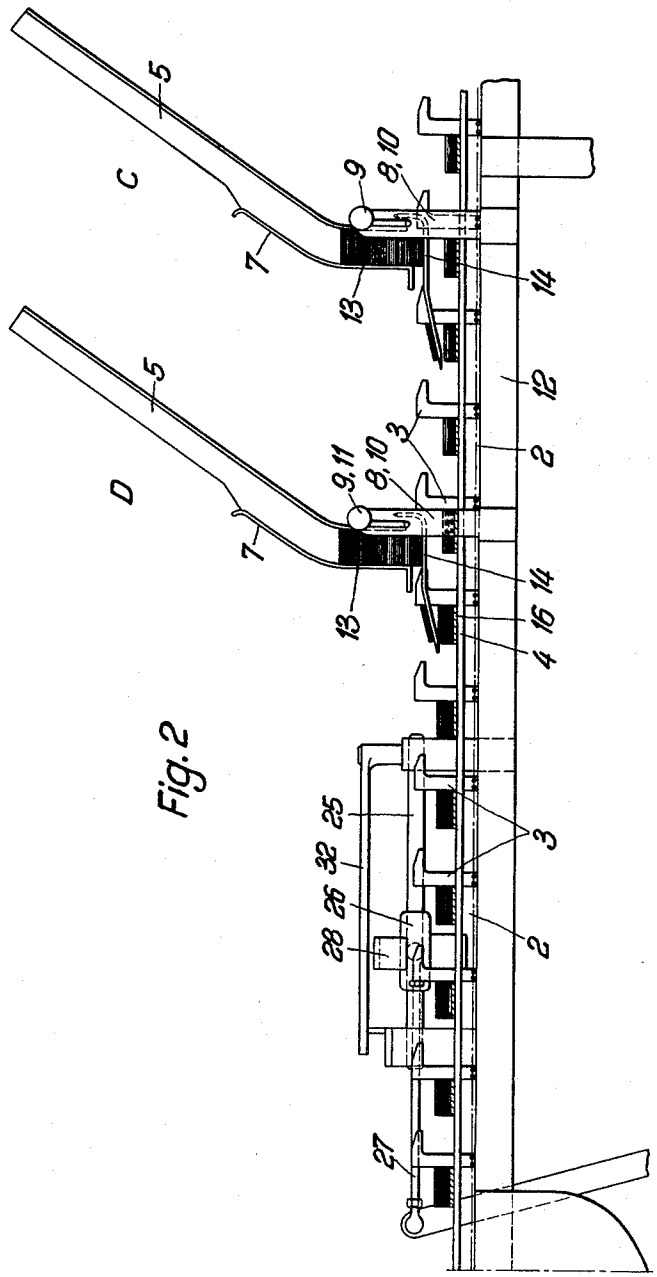


Fig. 2

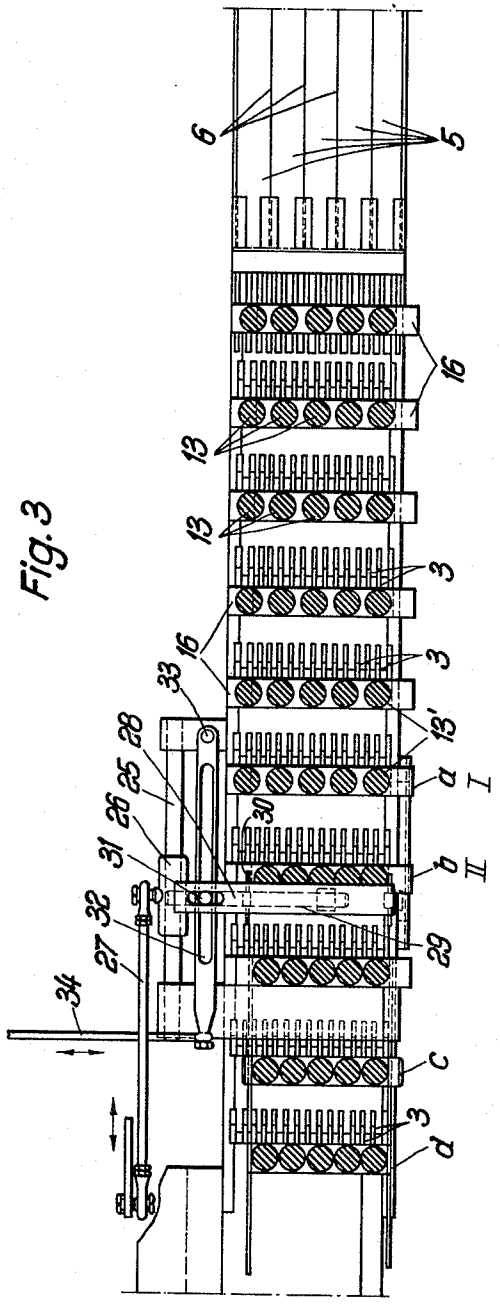
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APPARATUS TO FORM PILES OF FLAT, FRAGILE OBJECTS FOR SUBSEQUENT PACKING

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Fig. 3



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Fig. 7

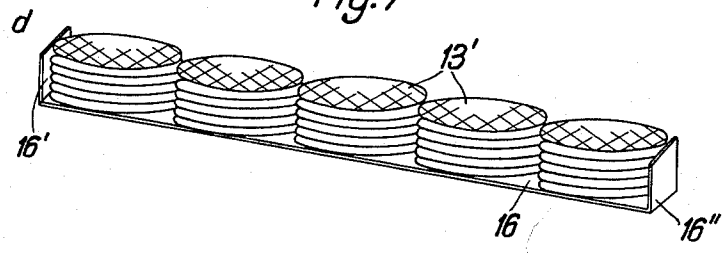


Fig. 6

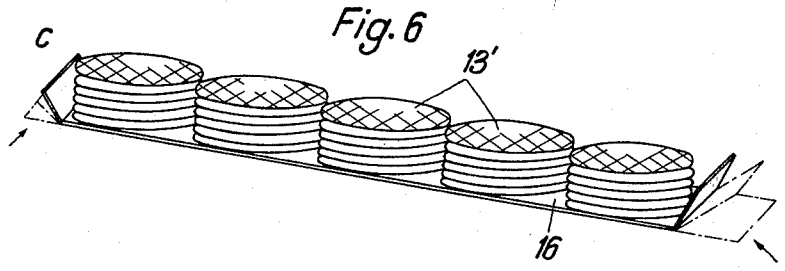


Fig. 5

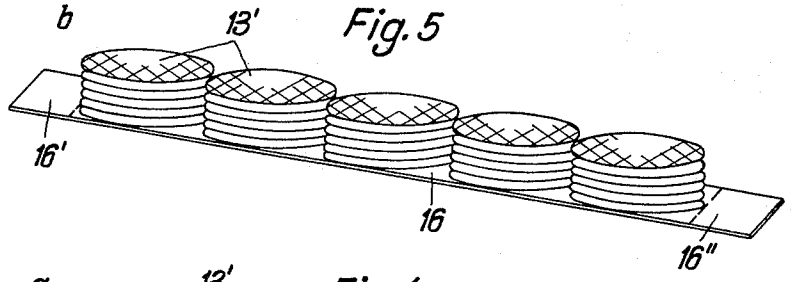
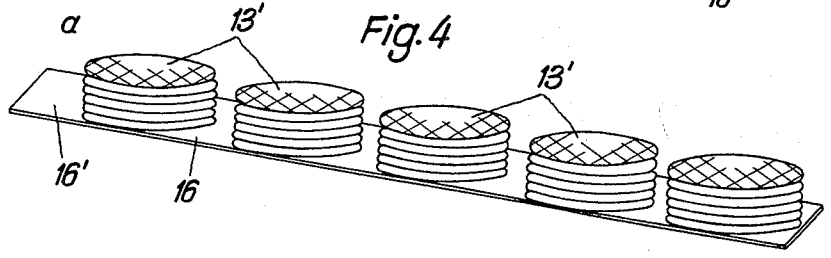
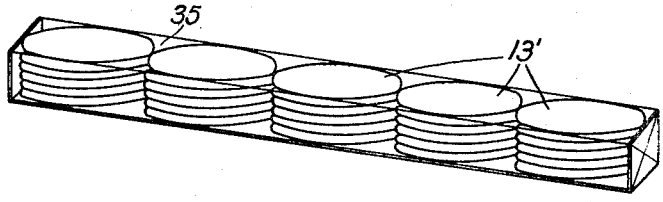


Fig. 4



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Fig. 8



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APPARATUS TO FORM PILES OF FLAT, FRAGILE OBJECTS FOR SUBSEQUENT PACKING

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Claims priority, application Germany, Nov. 10, 1960, H 40,905
3 Claims. (Cl. 53—240)

The present invention relates to an apparatus for forming piles of flat, fragile objects, as for instance biscuits, chocolate bars, or the like for subsequent packing, and particularly to a further development of the apparatus disclosed in applicant's prior Patent No. 2,872,020, dated February 3, 1959, in which an endless conveyor means is provided with fingers and associated feeding chutes arranged one after the other in the direction of movement of the conveyor means and in a number corresponding to the number of objects forming a pile.

The apparatus described in said prior patent shows a plurality of feeding chutes in series arrangement above and along a conveyor means which have a bottom grate for the objects to be packed, the bars forming the grate having their forward ends inclined towards the conveyor means in such manner that a pile of objects formed by the previous feeding chutes may pass under the ends of the bars, the lowermost objects being removed from the feeding chutes and advanced by means of fingers. Each feeding chute comprises several channels arranged side by side and at right angles to the direction of feed which form self-contained units and which may be mounted along the conveyor means in any desired number.

Although such apparatus enables a continuous production of piles, difficulties arise when the piles, formed side by side on the conveyor means, are transferred into a packing. It is, therefore, one object of the present invention to provide an apparatus for forming piles of flat, fragile subjects for subsequent packing, which eliminates these deficiencies.

It is another object of the present invention to provide an apparatus for forming piles of flat, fragile subjects for subsequent packing, which includes a supply unit for cardboard or similar shims which is mounted in front of the feeding chutes. The objects ejected from the following feeding chutes are placed on these shims. Furthermore, a cross feeding device is arranged behind the feeding chutes to push the piles on the shim together.

Various types of stiffening shims may be used, which, for instance, may have the exact size of the bottom area of the packing to be produced, or which may be longer than the packing, so that the ends can be bent upwards, enclosing the piles of objects between them and forming a lateral reinforcement of the packing. To bend the ends of the shims, conventional grooving, cutting, and/or bending tools may be provided.

It is yet another object of the present invention to provide an apparatus for forming piles of flat, fragile subjects for subsequent packing, which includes a cross feeding device provided with a member which moves together with the piles to be packed and which reciprocates at the same time. During the continuous movement of the conveyor means, this member is also oscillated, whereby the piles are pushed together. The member is of narrow width so that during its movement it can pass between the fingers of the conveyor means advancing the piles.

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 side elevational view of the rear part of the packing machine;

FIG. 2 is a side elevational view of the front part of the packing machine;

FIG. 3 is a top plan view of the front part of the machine shown in FIG. 2; and

FIGS. 4 to 8 are different illustrations showing different stages in the operation of the packing machine.

Referring now to the drawings, as already described in said prior Patent No. 2,872,020, an endless conveyor chain **2** with rakes **3** spaced at certain distances one behind the other, passes over transport rollers **1**. Closely above the horizontally moving part of the conveyor chain **2**, smooth bars **4** of plastic material are arranged parallel to and spaced at certain distances from each other, said bars forming together a grate. The tines of the rakes **3** mounted on the conveyor chain **2** extend through the gaps between the bars **4**. Direction of movement is indicated by an arrow in FIG. 1. Each feeding device A to D comprises, for instance, four chutes or channels **5** in side by side arrangement, separated from each other by walls **6**. In the lower part, the channels **5** are 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 at both sides, so that the carrier **8** may be pushed over holding pins **9** on the lateral supports **10**, which arrangement enables the complete feeding device to be easily exchanged. With the aid of a set screw **11** it is possible to secure the chute in its position. The supports **10** are fixedly mounted on the guide table **12** along which moves the horizontal part of the conveyor chain **2** with its rakes **3**.

The biscuits **13** to be packed are piled up in superposed position in the feeding chutes **5**. The bottom of the chutes is formed of grate-like bars **14** which have an end portion inclined towards the conveyor chain **2**. By means of set screws (not shown) the height of the grate bars **14** is adjustable relative to the feeding chute, corresponding with the thickness of the objects **13** to be packed. The bars **14** forming the bottom are adjusted so that the pile of objects just formed may pass through the gap remaining below the front end of the bars **14**.

According to the present invention, a supply chute **15** is arranged in front of the feeding chute A, and contains shims **16** or stiff cardboard or similar material. Here, too, the bottom of the chute **15** consists of bars forming a grate **17**, the front ends **18** of which being inclined towards the conveyor chain **2** to pass the shims **16** to the conveyor chain **2**.

On a shaft **19** a cam disc **20** is fitted with a pusher rod **21** which causes a member **22** to perform a reciprocating movement to eject the shims **16**. A transfer and pressure device **23** ensures correct transfer of the shims **16** in such manner that a shim **16** is placed on the bars **4** in front of each rake **3**. The shims **16** form the bottom of the packing which will be completed later and receive the piles of objects to be packed.

FIG. 3 is a top plan view showing a series of shims **16** with piles **13'** of the objects **13** which are advanced by the rakes **3**.

The shape of the feeding chutes **5** and the channels formed therein ensure that the piles **13'** do not collide with each other and that gaps remain between them. To have the piles **13'** packed tightly in the final packing, it is necessary to close these gaps. For this purpose, a cross feeding device as shown in FIG. 3 is arranged at the end of the conveyor chain **2**, to push the piles **13'** together.

On a guide **25**, there is a slide **26** which is reciprocated in the direction of the arrow, by means of a rod **27**. The slide **26** is provided with a crossbar **28** which guides a rod **29** carrying a flat finger **30**. Fixed to the crossbar **28**, there is a guide pin **31**, controlled by a slotted rod **32**. The latter is pivotally arranged on a pin **33** and

oscillated by a rod 34 at right angles to the direction of movement of the piles 13'.

The movements of the control rods 27 and 34 are synchronized so that on the one hand, the finger 30 follows the piles 13' at the speed of the conveyor chain 2 and, on the other hand, is also reciprocated in transverse direction in such manner that the individual piles 13' are pushed together from a position I (FIG. 3) to a position II in which the piles 13' touch each other.

On the other hand, cutting and bending members, which are of conventional nature and the specific structure of which is not the subject matter of the present invention, are provided (not shown) which bend the projecting parts of the shims 16 upwards. This operation is illustrated in FIGS. 4 to 8, the various positions being indicated by letters *a* to *d* in FIGS. 4 to 7, while FIG. 8 shows the completed packing.

As is indicated in FIG. 3, the shims 16 are placed on the conveyor chain 2 so that a cut-in rim 16' (FIG. 4) remains on one side. According to FIG. 4, the piles 13' are spaced apart in the position *a*. When they are transferred into position *b*, according to FIG. 5, the piles 13' are pushed together, thus leaving another rim 16'' on the shim 16. The rims 16' and 16'' are cut-in for the following bending operation. When passing into the positions *c* and *d* (FIG. 3) or as indicated in FIGS. 6 and 7, the lateral projecting rims are bent upwards. After completion of this operation, the stiff shim encloses the piles 13', in this case five of them, so that now the unit can be packed like a rectangular packing by applying a suitable wrapper 35. In the packing shown in FIG. 8, a wrapper 35 of cellophane is used.

While we 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 disposed longitudinally substantially horizontally,

a plurality of chutes disposed in series arrangement spaced apart from each other along and above said sliding path and adapted to have a plurality of objects piled up in superposed position therein,

a plurality of longitudinal bars disposed longitudinally along said sliding path, spaced apart from each other to form a grate,

an endless conveyor means disposed below said sliding path and having a plurality of rakes spaced apart from each other along and moving with said conveyor means and projecting upwardly therefrom to a height to engage the lowermost of said objects emerging from said chutes,

means for releasing said objects from each of said chutes at a level higher than that of the previous chute,

a supply chute for stiffening shims of cardboard-like material disposed in front of the rearmost of said chutes, said stiffening shims being adapted to support a pile of said objects emerging from said chutes,

means for removing successively the lowermost of said shims from said supply chute,

a cross-feeding device disposed in front of the most forward of said chutes and including means for pushing together said objects crosswise to the direction of movement on said shims.

2. The apparatus, as set forth in claim 1, wherein

said means for pushing together said objects comprises a flat finger, and

means causing a reciprocating movement in transverse direction relative to the direction of movement of said objects during movement of the latter.

3. The apparatus, as set forth in claim 1, wherein

said flat finger is of narrow width to permit its movement between said rakes of said endless conveyor means.

References Cited by the Examiner

UNITED STATES PATENTS

1,860,143	5/32	Fuller.	
2,239,945	4/41	Tuthill et al.	53—156 X
2,542,330	2/51	Henderson et al.	53—250 X
2,872,020	2/59	Hansel	198—35
2,991,996	7/61	Kaye	53—250 X

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