

[54] APPARATUS FOR PACKING BAGS IN
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[56]

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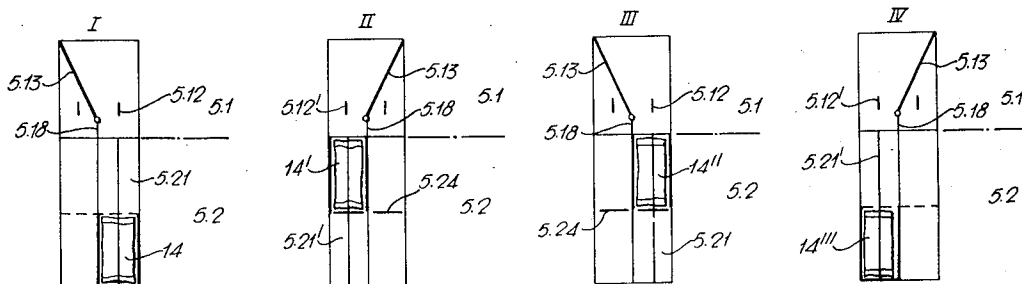
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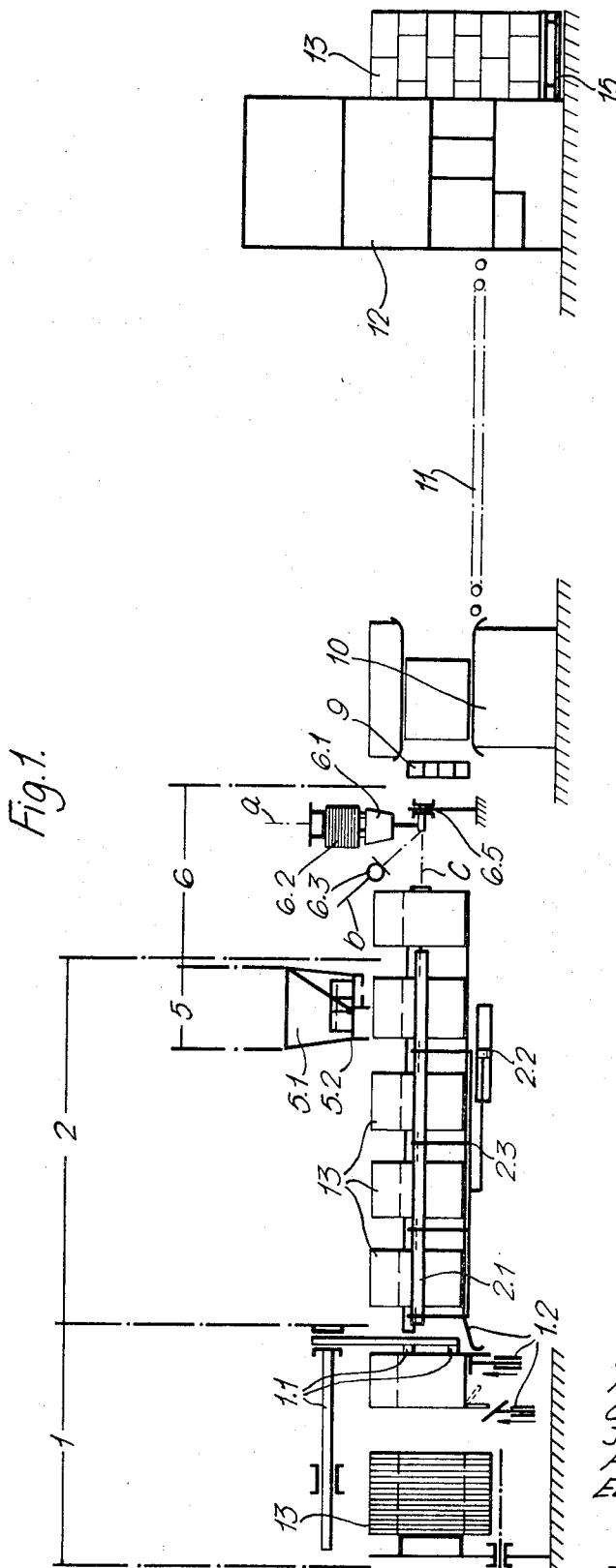
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ABSTRACT

A method and apparatus for packing in cartons bags contain-
ing loose, generally solid, small articles, closing, sorting and
palletting the cartons, wherein the cartons are erected from flat
blanks, moved to a packing station, held to receive the filled
bags which are delivered successively to a plurality of
predetermined stack positions, the filled cartons being ad-
vanced to a labeling station, carton closing station, inspection
and sorting station and held on one or more storage tracks or a
"reject" track, the stored non-rejected cartons being then
stacked as required on pallets and all the foregoing steps being
carried out by apparatus designed to operate continuously and
cooperatively, with the virtual elimination of manual work.

6 Claims, 7 Drawing Figures



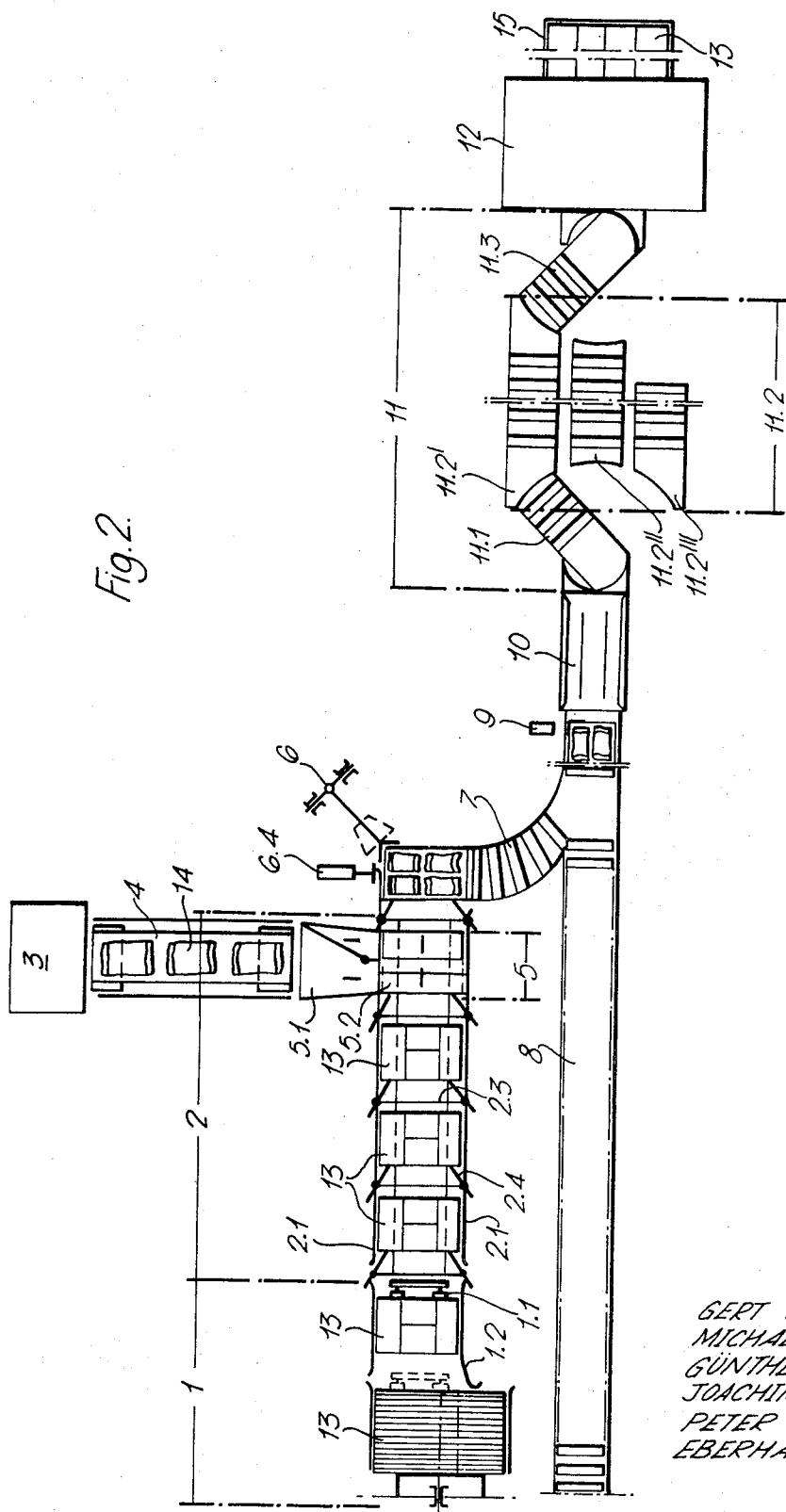


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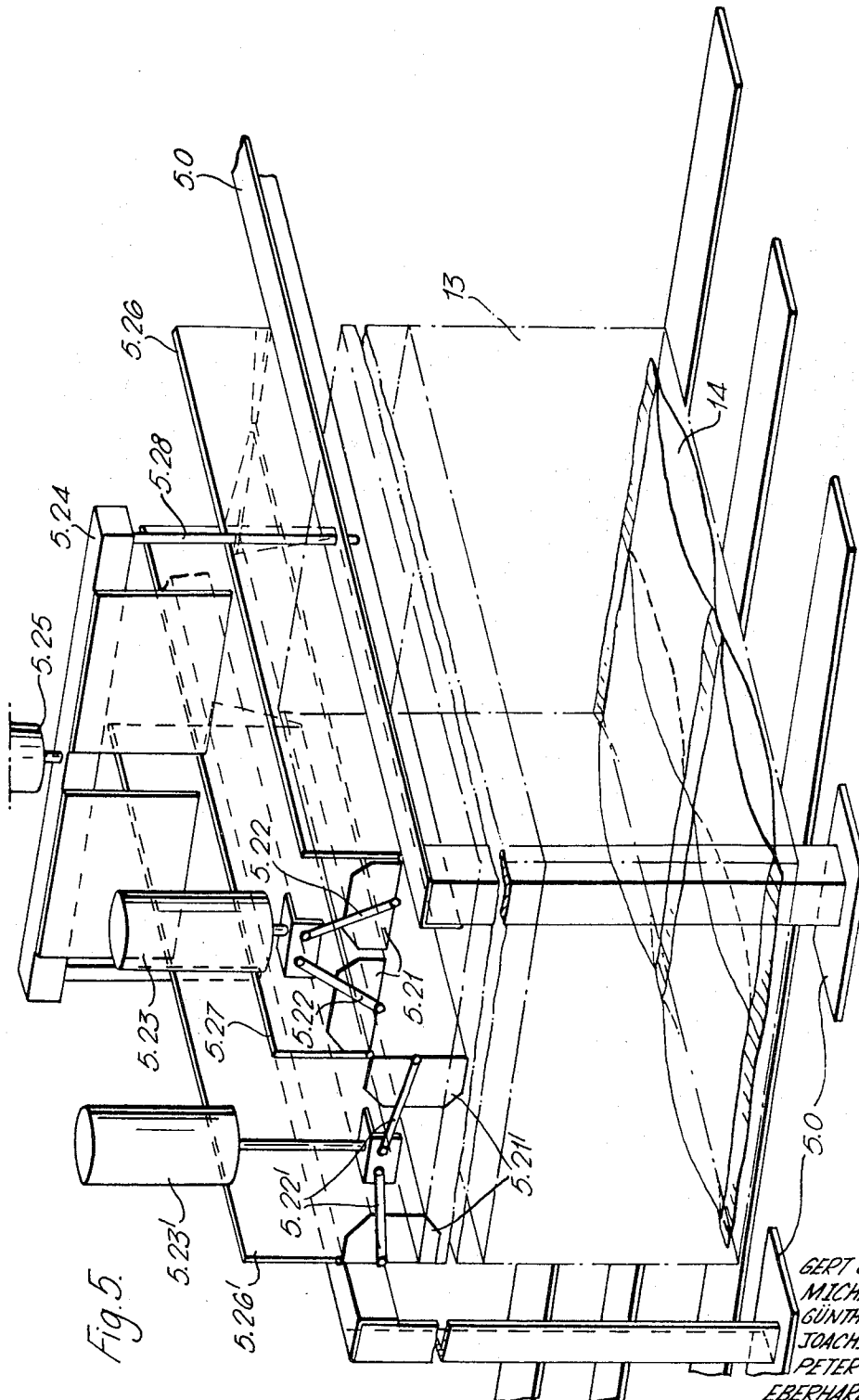
Fig. 2.



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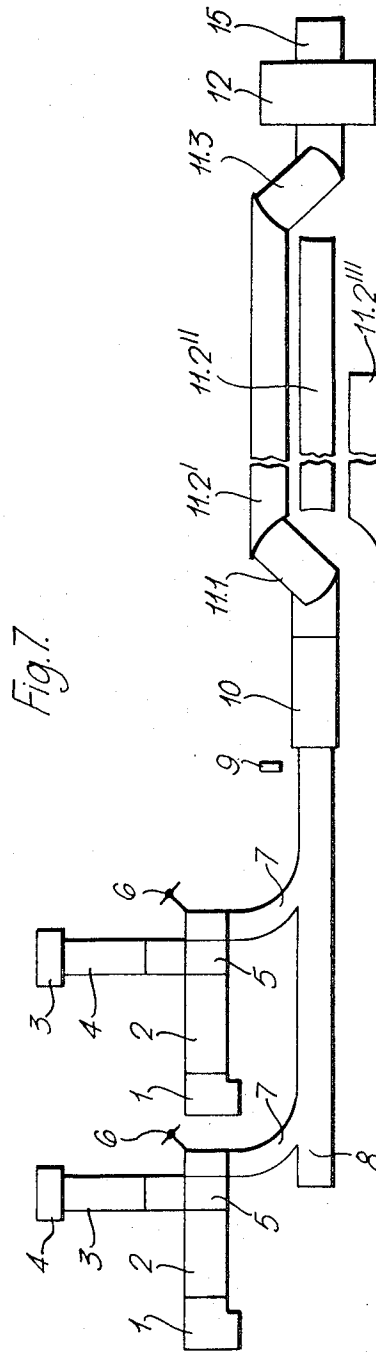
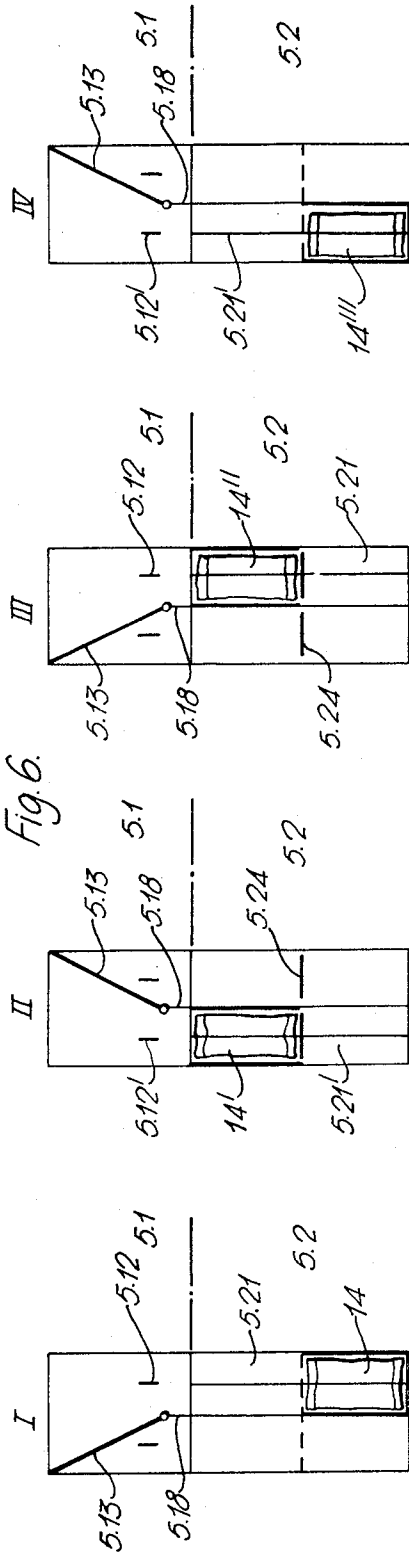
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APPARATUS FOR PACKING BAGS IN BOXES OR CARTONS

BACKGROUND OF THE INVENTION

This invention relates to a method and apparatus for packing in delivery boxes or cartons bags containing loose goods and subsequently palleting said boxes or cartons particularly, but not exclusively, for the packing and palleting of sweets, keep-fresh bakery products, short farinaceous products or small metal parts when packed in bags.

According to the present invention, in one aspect there is provided a method of packing in delivery boxes or cartons bags containing loose goods and subsequently palleting said boxes or cartons, comprising the steps of withdrawing flat or substantially flat blanks of boxes or cartons from a stack or stacks of blanks, folding each withdrawn blank into box shape, conveying each folded box or carton to a filling apparatus, filling each box or carton with a preselected number of filled bags supplied from a bag filling and sealing apparatus, conveying each filled box or carton to a labelling and box or carton closing apparatus, conveying each closed box or carton to a sorting apparatus, storing the boxes or cartons in intermediate storage tracks and, when a preselected number of boxes or cartons has been stored, conveying them along a discharge track to a palleting apparatus and stacking them by means of this apparatus on pallets, any boxes or cartons without labels being separated out in the sorting apparatus.

According to the present invention, in another aspect there is provided apparatus comprising apparatus for withdrawing blanks from a stack and folding them into boxes or cartons, conveyor means leading from said apparatus to a filling apparatus, means for filling bags with goods and for sealing said bags, means for conveying filled and sealed bags to a box or carton filling apparatus, conveyor means for conveying filled boxes or cartons to a labelling and box or carton closing apparatus, a sorting apparatus, storage tracks for storing boxes or cartons, means for conveying stored boxes or cartons to a discharge track and palleting apparatus for stacking boxes or cartons onto pallets.

The filling apparatus preferably comprises a frame, a chute supported in said frame, a pivotable guide plate in said chute, sensing devices disposed in the bottom wall of said chute, one disposed in each path formed by the guide plate, the lower end of said chute communicating with chambers formed by side plates and a central plate, each chamber being completed by flaps pivoted to the side and central plates, means for pivoting said flaps to allow bags contained in the chambers to drop into said box or carton. Said chamber may be divided by a vertically movable slide member.

The flaps and said slide member are desirably actuated by actuating members, e.g., pneumatic piston and cylinder devices.

The apparatus for sorting, separating and intermediate storage of the delivery boxes with labels stuck on them at various levels, or for separating-off delivery boxes without labels, comprises a plurality of photo-electric sensing devices arranged one above the other and connected by way of a control means to a delivery track which selectively forms the conveyor connection with one of a number of intermediate storage tracks or a separating-off track, and a discharge track which is arranged subsequent to said intermediate storage tracks and which, when a preselected number of delivery boxes is reached on a storage track, forms the conveyor connection between the selected intermediate storage track and the palleting apparatus.

The number of intermediate storage tracks desirably corresponds to the maximum number of various fillings for the flat bags which, in accordance with the above stated method, are simultaneously to be packed according to sorts of goods and palletled. The length of the intermediate storage tracks must advantageously be at least such that all the delivery boxes required for filling a pallet with a particular sort of goods can be carried in a row one behind the other, therefore

it must at least correspond to the total of the lengths of the sides of the delivery boxes in the direction of conveyance.

Using the method according to the invention permits the collective packing in delivery boxes of flat bags filled with various sorts of loose goods and the subsequent palleting thereof, according to sort of goods, with the optimum use being made of the capacity of the apparatus. Using the delivery box filling apparatus according to the invention ensures that a predetermined number of flat bags filled with loose goods are automatically introduced in an orderly fashion into delivery boxes, without any manual work. Owing to its flexible design, the sorting apparatus according to the invention permits automatic palleting, according to sorts of goods, of delivery boxes and separating-off of delivery boxes without labels, and therefore enables the several elements of the apparatus used to be employed to the optimum of their capacity, in accordance with the method of the invention.

An embodiment of the invention will now be described with reference to the accompanying drawings, in which:

FIG. 1 shows the side view of the apparatus required for carrying out the method;

FIG. 2 shows a plan view of FIG. 1;

FIG. 3 shows a basic diagram illustrating the flow of flat bags from the bag filling and sealing apparatus to the delivery box filling apparatus;

FIG. 4 shows a plan view of the chute of the delivery box filling apparatus;

FIG. 5 shows a perspective view of the filling member of the delivery box filling apparatus;

FIG. 6 shows positions I to IV of the filled flat bags in the delivery box and the position of the control member of the chute shown in FIG. 4; and

FIG. 7 shows a diagrammatic plan view of the apparatus elements of FIG. 2.

For convenience in correlating the text and drawings, the principal elements of the apparatus (including boxes 11 and bags 14) are designated by simple numbers, while the detail parts of said elements are identified decimally, as will be apparent.

Pre-formed delivery boxes or cartons 13 in a flattened condition are laid in stacks in a carton folding apparatus 1. The flat boxes or cartons 13 are drawn off the stack by means of a suction device 1.1, and are folded into shape by folding members 1.2 which are operative in the directions indicated by the arrows and the folded boxes or cartons 13 are inserted between clamp bars 2.1, which are subdivided into segments, of the carton delivery apparatus 2. By means of a conventional actuating member 2.2, for example a pneumatic piston and cylinder device, the set up delivery boxes 13 are moved stepwise towards a box or carton filling apparatus 5 by means of advance members comprising a conveyor rack 2.3 and entrainment means 2.4 secured thereto, the length of each step corresponding to the width of a delivery box 13 plus the necessary spacing distance between two adjacent delivery boxes 13 (see FIG. 2). After, for example, three working strokes of the actuating member 2.2, the first delivery box 13 has been moved below the delivery box filling apparatus 5 into the filling position. In this position bags 14, supplied from a bag filling and sealing apparatus 3, are passed by way of a conveyor belt 4 (FIGS. 2, 3 and 7) to the delivery box filling apparatus 5.

The delivery box filling apparatus 5 (FIGS. 1 to 6) comprises a frame 5.0 which carries a chute 5.1 having a bottom plate 5.11 and two side plates 5.19. A guide plate 5.13 is pivotally mounted on a pin 5.15 and held by means of guidepins 5.17 which move along a slot provided in a fixed guide plate 5.16. Arranged adjacent the pivot of the guide plate 5.13 is a fixed separating wall 5.18. The guide plate 5.16 has mounted thereon an actuating member 5.14 (shown as a piston and cylinder device). Located in the bottom plate 5.11 are two symmetrically arranged sensing devices 5.12 and 5.12'. The frame 5.0 also carries a filling member 5.2 which comprises side plates 5.26 and 5.26', a central plate 5.27 and

bottom flaps 5.21 and 5.21' pivoted thereon. The bottom flaps 5.21 and 5.21' are moved via links 5.22 and 5.22' by actuating members 5.23 and 5.23' (also shown as piston and cylinder devices). A vertically movable slide 5.24 is connected to an actuating member 5.25 and is mounted in the frame 5 by guide means 5.28. The actuating members 5.23, 5.23' and 5.25 are preferably pneumatic piston and cylinder devices.

From the delivery belt 4, the filled bags 14 are passed on to the sloping bottom plate 5.11 of the chute 5.1 (FIG. 3). Under the effect of gravity, they slide down the bottom plate 5.11 and are guided laterally by one of the side walls 5.19 and by the guide plate 5.13 and adjacent separating wall 5.18, and reach the filling member 5.2 as shown in FIG. 6. During its sliding movement down the chute 5.1, each bag 14 actuates one of the two sensing devices 5.12 or 5.12' and thereby initiates all the operations required for positioning the bags 14 in the filling member 5.2 and for introducing them into the delivery boxes 13. Actuating the pulse transmitters 5.12 also causes the bags 14 to be counted.

As shown in FIG. 6, the bags 14 are positioned in the following manner:

In position I the bag 14 slides on the bottom flaps 5.21. The contact made by means of the sensing device 5.12 then causes the guide plate 5.13 to pivot to position II and the bottom flaps 5.21 to open. The following flat bag 14' actuates the pulse transmitter 5.12', whereby the vertically movable slide 5.24 is lowered and the bag 14' passes into position II. The sensing device 5.12' then causes the guide plate 5.13 to pivot into position III and the bottom flaps 5.21' to open (FIG. 5). A further bag 14'' actuates the sensing device 5.12 and passes into position III. The guide plate 5.13 then pivots into position IV and the bottom flaps 5.21 open. By actuating the sensing device 5.12' the next bag 14''' causes the vertically movable slide 5.24 to be immediately lifted, and thereby passes into position IV. The sensing device 5.12' then causes the guide plate 5.13 to pivot into position I and the bottom flaps 5.21' to open. Repetition as desired of the sequence of operations illustrated from positions I to IV in FIG. 6 produces in the delivery box 13 a continuous orderly layer, each layer containing four bags 14 lying beside and behind each other. The number of flat bags 14 to be packed in a delivery box 13 can be preselected by means of a counting mechanism which is not shown. When a preselected number of bags 14 per delivery box 13 is reached, the filled delivery box is conveyed by a further working stroke of the actuating member 2.2 to a labelling apparatus 6 and an empty delivery box 13 is moved into the filling position below the delivery box filling apparatus 5. By means of label carriers 6.1, the labels are drawn in position *a* from the label magazine 6.2, then passed in an arcuate movement across a gluing apparatus 6.3 in position *b* and are then stuck on the side of the delivery box 13 in the position *c*. The label carrier 6.1 is arranged for vertical adjustment on a pivotal mounting 6.5. After the labelling operation has been carried out, the filled delivery box 13 is moved by a suitable actuating member 6.4, for example a pneumatic piston and cylinder device, on to a roller track 7 and thereby to a collector conveyor 8. The collector conveyor 8, which is in the form of a roller track and is slightly inclined in the direction of conveyance, serves to collect the delivery boxes 13 from a plurality of units comprising the several elements 1 to 7 of the apparatus and conveys the boxes 13 to a box closing and gluing apparatus 10 which, in known manner, closes the delivery boxes 13 in the longitudinal direction at the top and bottom by means of adhesive strips. The delivery boxes 13, which have been filled with various sorts of goods by the various units

comprising the apparatus elements 1 to 7, are labelled in these units with labelling apparatus 6 set to label at different heights.

Located in front of the apparatus 10 is a sensing member 9 comprising a plurality of photo-electric sensing devices arranged one above the other. The labels stuck on the boxes at different heights are sensed by means of the sensing devices. This controls a movable delivery track 11.1 which can be swung horizontally to align it with one of three tracks 11.2' or 11.2'' or 11.2''' , as shown in FIG. 2, so that the delivery boxes 13 are stored, depending on the sort of goods, on one of the intermediate storage tracks 11.2' or 11.2''. Any delivery boxes 13 without labels are moved by the delivery track 11.1 to the separating-off track 11.2''' , whereby these unlabeled boxes 13 are segregated, to be hand-labeled, for instance.

When a preselected number of boxes 13 is present on one of the intermediate storage tracks 11.2' or 11.2'', a suitable pulse is fed to a discharge track 11.3 which takes up a position relative to that intermediate storage track such as to form a conveyor connection with a palleting apparatus 12, by means of which the preselected number of delivery boxes 13 is delivered to the palleting apparatus 12. The sorting apparatus 11 is provided with roller tracks.

The described embodiment provides a rational method for the orderly collective packing in delivery boxes of flat bags which cannot be free-stacked, being filled with various sorts of loose goods, and subsequent palleting thereof according to sorts of goods, wherein the capacity of all the elements of the apparatus is used to its optimum and manual work is virtually eliminated.

What is claimed is:

1. In apparatus for packing, means for filling bags with goods and for conveying filled bags to a carton filling apparatus, wherein the carton filling apparatus comprises a frame, a chute supported in said frame, a pivotable guide plate in said chute, bag-sensing devices disposed in a bottom wall of said chute, one disposed in each path formed by the guide plate, the lower end of said chute communicating with chambers formed by side plates and a central plate, each chamber being provided with flaps pivoted to the side and central plates, and means responsive to said bag-sensing device for pivoting said flaps to allow bags contained in the chamber to drop into said box or carton, said chambers being divided by a vertically movable slide member.

2. Apparatus as claimed in claim 1 in which said flaps and slide member are operated by piston and cylinder devices.

3. Apparatus as claimed in claim 2 in which the piston and cylinder devices are pneumatically operated.

4. Apparatus as claimed in claim 1 in which the apparatus for sorting, separating and storing filled boxes or cartons comprises a plurality of photoelectric sensing devices arranged one above another and connected by control means to a first horizontally swingable conveyor track having its free end adapted to be positioned in register with one of a plurality of intermediate storage tracks or a separating-off track, and a horizontally pivotable discharge track adapted to communicate with the end of one of said storage tracks and leading to a palleting apparatus.

5. Apparatus as claimed in claim 4 in which the number of intermediate storage tracks corresponds to the number of types of goods to be packed.

6. Apparatus as claimed in claim 4 in which the length of each storage track corresponds at least to the sum of the lengths of the number of boxes or cartons to be loaded on a pallet.

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