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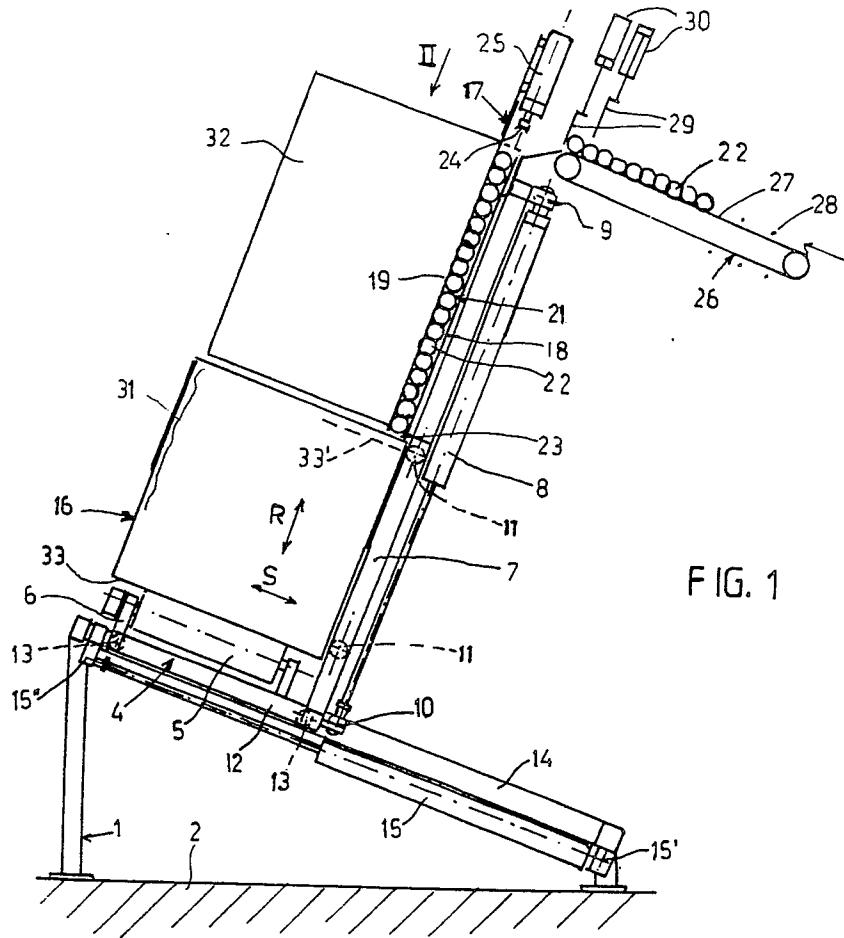
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EP 0 361 550 A1 54 **Device for bringing objects into a packaging box.**

57 A device for bringing objects (22) into a packing box (16) comprising a support means (4) for a box (16) such that the box will be in an inclined position and a filling shaft (17) to transfer objects from a supply conveyor (26) into said box, said support means (4) and filling shaft (17) being executed such that the filling shaft can be brought into said box (16) in such a way that the objects (22) can be brought from the lower end of the filling shaft (17) into the box (16) nearly at the place where they have to be

positioned. Means (23-25; 35,39) being present to initiate that an object (22) is leaving the filling shaft (17).



Device for bringing objects into a packaging box.

The invention relates to a device for bringing objects into a packing box, said objects in particular being formed by units of articles, such as cups or the like, stacked into each other, in such a way that the axes of the objects are mainly horizontally positioned, said device comprising a support means for a box such that the box will be in an inclined position and transfer means to transfer objects from a supply conveyor into a box supported by said support means, said support means and transfer means being executed such that they can be moved in respect of each other in such a way that the objects can be brought into the box one by one and in rows beside and onto each other.

Such a device is known by DE-U-8,620,872. In case of this known device the support means for a box to be filled are bringing the box in a stationary tilted position. The transfer means is in the shape of a column running transverse to the support surface of the support means for the box, said column at its lower end being provided with a gripper. The column is supported by a slide in which it is longitudinally movable and said slide being movable supported by two guides, such that said column, provided with the gripper, is movable in a direction parallel to said support surface.

This brings with it that the column with the gripper first has to be moved to the supply conveyor on which an object is present and then to a given position into the box at which position the object has to be laid down. So the transfer of each object requires the movement of relatively big masses and so much energy and is time consuming. Further it has to be guaranteed that when the gripper is picking up an object from the supply conveyor, said object is exactly at the right place and is not moved in longitudinal direction during said picking up, because otherwise the object will come into contact with the upper rim of a side wall of the box to be filled.

The object of the invention is to remove the above mentioned disadvantages and to provide a device which is simple of construction and in operation so that disturbances will hardly occur.

According to the invention said transfer means comprises a filling shaft being elongated as seen in mainly horizontal direction and is having in this direction a length corresponding to the length of an object such that a number of objects can be stacked into said shaft, said shaft at its lower end being provided with a means to prevent that the lowest object is undesirably leaving said shaft, said shaft further being provided with a means to remove the lowest object out of said shaft, the upper

end of said shaft being fixedly connected to the frame of said device and the support means for a box to be filled being executed such that the box at the beginning of its filling can be brought upwardly to position the lower end of said shaft near the lowest corner of the box and at a distance above the bottom of the box which is somewhat larger than the dimension of the object in said direction, from which position the support means will move the box in a direction parallel to its bottom plane while at the same time objects are brought onto the bottom till the other end wall of the box reaches said shaft after which the support means are moved in opposite direction and downwardly to bring the box in the initial position in respect of said shaft but such that the distance between the lower end of said shaft and the bottom of the box is about twice the dimension of the object in said direction.

In this way it is obtained that the filling shaft is stationary so that the objects can be brought in it from the supply conveyor in an easy way. At the beginning of the filling of a box this is brought upwardly so that the filling shaft will be positioned at the lower corner of it. Each time that an object is brought from out the filling shaft into the box the box is moved over the distance of an object till the last object is positioned onto the bottom of the box. Then the box is moved downwardly over a given distance and moved towards its original position so that the second layer of objects can be positioned onto the first layer. Only during moving the box downwardly and backwards the removal of objects out of the filling shaft has to be interrupted.

By the somewhat inclined position of the box the objects which are moving out of the lower end of the filling shaft will stay at the place where they arrive when leaving the filling shaft. By this the danger is avoided that the discharge of an object out of the filling shaft is hampered by one or more other objects.

According to an embodiment of the invention it will be provided that the discharge of an object out of the filling shaft is prevented by a resilient means, a pushing member being present near the upper end of the filling shaft by which via the objects present in said filling shaft a pressure can be exerted upon the lowest object to press this out of the filling shaft.

Said resilient means can be obtained by providing at least one longitudinal rim of the discharge end of the filling shaft with a somewhat inwardly bent portion. This inwardly bent portion of the longitudinal rim can be resiliently per se but also the flexibility of the objects can be sufficient to

press a stack of objects out of the filling shaft along the bent rim.

Dependent on the characteristics of the objects use can be made of a discharge member being pivotably supported in the lower end of said filling shaft such that it is movable between two positions by pivoting it around a mainly horizontal axis, said member being shaped and mounted such that in one position it is supporting the lowest object in the filling shaft and by pivoting to the other position will set free said lowest object while simultaneously locking the object present above it, which object will move to the position of the first one when the discharge member is pivoted back to its first mentioned position, the pivoting of said member taking place by means of a rod or such like extending upwardly out of said filling shaft.

In respect of the first mentioned embodiment the advantage is obtained that no pressure has to be exerted onto the upper object in the filling shaft for moving the lowest object out of this. By said pressure damage may occur of delicate objects.

Although it is preferred that the filling shaft is stationary and the box is moved along it obviously it is possible to move the filling shaft in respect of the box. In this case, however, the supply of objects to the filling shaft will be much more difficult.

According to an embodiment of the invention the support means for the box will comprise a roller track, the support frame of which is movable along at least one column extending obliquely upwardly, said column comprising a base being movable along at least one guide beam being obliquely positioned and extending at right angles to the longitudinal direction of the column.

This gives a support construction which is relatively simple and in which the movement of the support frame of the roller track and the movement of the base of the column may take place by means of pressurized medium motors such as air cylinders.

To supply objects to the filling shaft use can be made of a conveyor comprising catches being present at some distance above the support surface of the conveyor, two slides being present near the discharge end of the conveyor and being movable at right angles to the conveyor surface, said slides being positioned at some distance from each other so that between them an object can be present, one of the slides being in the highest position when the other is in the lowest position.

By applying catches the objects will be positively moved while the catches may pass below the objects when at a given moment no discharge of objects from the conveyor will take place. This discharge is controlled by the two slides in such a way that always only one object can be removed from the conveyor and may come into the filling

shaft.

When in the box a bag of synthetic material is present it is preferred that a means is provided to press the bag against two opposite walls of the box during the filling of the box. In this way it is prevented that the objects should not come in the right position into the box by a fold in the bag.

Preferably the means to press the bag against the walls of the box is formed by two centring plates which may come to lie near two opposite side walls of the box to be filled such that they will run parallel to a plane running through the two directions of movement of the box either of the filling shaft.

So it might be said that the filling shaft is moving between the two plates and the plates will be present near the two opposite ends of the objects which have to be brought into the box.

Preferably the centring plates will be connected to the column along which the support frame of the roller track is movable. In this way it is obtained that at the beginning of the filling of a box the centring plate will extend nearly till the bottom of the box while during filling they are automatically and gradually moving out of the box. During this the lower rim of each centring plate remains substantially at the same level as the lower end of the filling shaft.

It can be remarked that by GB-A-1,197,208 a device is known for filling boxes with objects in which the objects are supplied by means of a supply conveyor from which the objects are picked up by means of a rotating element positioned above the box to be filled. The box is positioned at an oblique angle so that a first row of objects is built up against the front wall, after which the box is shifted downwardly and a following row of objects is positioned onto the first row. A disadvantage of this device is, that the first object has to fall over the total height of the box and the next objects are falling downwardly on the foregoing one. To obtain that the objects are coming to lie in a row against the front wall of the box, the box will have to be brought in a rather inclined position and nevertheless the danger will exist that the objects will be moved out of their desired position.

Now the invention is described by means of embodiments shown in the drawing, in which:

Fig. 1 schematically shows a side view of a device according to the invention;

Fig. 2 schematically shows a plan view in the direction of the arrow II in Fig. 1;

Fig. 3A, B and C schematically show the lower end of a filling shaft with some objects and a part of a box with another embodiment of the discharge member in various positions; and

Fig. 4 schematically shows a part of a view in the direction of the arrow IV of Fig. 3B (enlarged

scale).

The device which is particularly shown in the Figs. 1 and 2 comprises a frame 1, which is fixed to a floor 2. The frame 1 supports a first roller track 3 over which empty boxes, which have to be filled, may be moved in the direction of the arrow P so that they will arrive onto a second roller track 4, the rollers 5 of which are provided to a support frame 6 being movable along two columns 7 in an upwardly inclined direction. The movement takes place by means of an air cylinder 8, one end of which is connected to the guiding column 7 at 9 and the other end 10 to the support frame 6. The support frame 6 e.g. may comprise some guiding rollers 11 positioned at some distance from each other and being movable inside the guiding columns 7.

The guiding columns 7 as such are connected by a base 12 provided with rollers 13 to that the base 12 can be moved along two guiding beams 14, said movement taking place by means of an air cylinder 15, the one end of which is connected to the frame 1 of the device near 15' and the other end 15'' to the base 12.

A box 16 present on the rollers 5 can be moved in an obliquely upward and downward direction by means of the air cylinder 8, in the direction of the arrow R and in a backwards and forwards direction as indicated by the arrow S by means of the air cylinder 15.

A filling shaft 17 is connected to the frame 1 of the device in a not indicated way, said filling shaft consisting of a back wall 18, the front wall 19 and the two side walls 20. A stack 21 of objects 22 is present in the filling shaft 17 such that the objects 22 are lying in horizontal direction.

To prevent that the objects 22 are falling out of the filling shaft 17 according to the embodiment of Fig. 1 at least one of the walls 18 or 19 is provided with a rim 23 being bent somewhat inwardly. A pushing member 24 is present near the upper end of the filling shaft 17 and can be moved upwardly and downwardly by means of the air cylinder 25. When the filling shaft is completely filled with objects 22 the lowest one can be pressed out of the filling shaft along the bent edge or edges 23 by means of the pushing member 24. To this end the rim or rims 23 can be resiliently as such either the objects can be flexible so that they will be deformed somewhat when they are pressed out of the filling shaft 17 along the rim 23.

After an object 22 is removed out of the filling shaft and after the pushing member 24 is moved upwardly a new object can be supplied to the filling shaft from the conveyor 26 which at some distance above the support surface 27 of it is provided with catches 28. The catches may pass below the objects 22 when no object can be discharged from the conveyor. Two slides 29 serve to remove the

objects 22 one by one, said slides being controlled by means of air cylinders 30 in such a way that when the one slide is in its highest position, so that an object may pass below it, the other slide will be in the lowest position as this is indicated in Fig. 1. When now the pushing member 24 is moved upwardly after the removal of an object out of the filling shaft 17, the left slide 30 can also move upwardly and the right slide 30 downwardly so that the most left object will be removed from the conveyor 26 and will come to lie in the filling shaft 17.

When a bag 31 of plastic foil is present in the box 16 a centring plate 32 will be connected to the upper end of each column 17 and said plates will slide along the opposite side walls of the box and of the bag present in it during bringing upwardly the box 16. The centring plates 32 are present directly near the side walls 20 of the filling shaft 17 so that the filling shaft will move along these plates during the filling of the box 16 with objects 22.

In Fig. 1 the position is shown directly after bringing an empty box 16 below the filling shaft. Then the box is brought upwardly by means of the air cylinder 8 till the bottom 33 of the box 16 is positioned at the place indicated by broken lines and by 33'. Then an object 22 can be removed out of the filling shaft 17. Subsequently the box is moved to the right in the direction of the arrow S by means of the air cylinder 15 such that the next object 22 can be laid down directly besides the object being already present on the bottom of the box. This is repeated till the whole bottom of the box is covered by objects and the left side wall of the box is present near the filling shaft 17. Then the box 16 is moved downwardly over the height of an object 22 and is brought again to the most left position after which the process as described above can be repeated.

After the box is completely filled this can be discharged over the discharge track 34 and an empty box can be brought onto the roller track 4 by means of the roller track 3.

The Figs. 3 and 4 show another embodiment of a discharge member 35. In this case the discharge member 35 is mainly formed by a partially curved plate 36 extending along the lower end of the filling shaft 17. Near the side walls 20 of the filling shaft 17 the plate 36 is connected to end plates 37, each being provided with a pivot 38 supported by said side walls 20. At least one end plate 37 is pivotally connected to a rod 39 running upwardly to the air cylinder 25 as this was described above by means of Fig. 1.

Fig. 3A shows the position at the moment that the rod 39 is brought downwardly in the direction of the arrow T by means of the air cylinder 25. By doing this the discharge member 35 is rotated in

the direction of the arrow V towards the position shown in Fig. 3A. Then the lowermost object 22 can fall downwardly into the box 16 while the next object 22' is held back by the discharge member 35. Then the position is obtained as this is indicated in Fig. 3B. Now the rod 39 is moved upwardly in the direction of the arrow X by means of the air cylinder 25 so that the position will be reached as this is indicated in Fig. 3C. By doing this the object 22' can fall downwardly over a given distance but cannot fall out of the filling shaft 17.

When the rod 39 is moved downwardly the next time the situation will occur as this is indicated in Fig. 3A.

It will be obvious that only some possible embodiments of the device according to the invention are shown in the drawing and are described above and that many modifications can be applied without leaving the inventive concept.

Claims

1. A device for bringing objects (22) into a packing box (16), said objects in particular being formed by units of articles, such as cups or the like, stacked into each other, in such a way that the axes of the objects (22) are mainly horizontally positioned, said device comprising a support means (14) for a box (16) such that the box will be in an inclined position and transfer means (17) to transfer objects from a supply conveyor (26) into a box supported by said support means, said support means (4) and transfer means (17) being executed such that they can be moved in respect of each other in such a way that the objects (22) can be brought into the box (16) one by one and in rows beside and onto each other,

characterized in

that said transfer means comprises a filling shaft (17) being elongated as seen in mainly horizontal direction and is having in this direction a length corresponding to the length of an object (22) such that a number of objects can be stacked into said shaft (17), said shaft at its lower end being provided with a means (23; 35) to prevent that the lowest object is undesirably leaving said shaft, said shaft (17) further being provided with a means (24,25;39) to remove the lowest object (22) out of said shaft (17), the upper end of said shaft being fixedly connected to the frame (1) of said device and the support means (4) for a box (16) to be filled being executed such that the box (16) at the beginning of its filling can be brought upwardly to position the lower end of said shaft (17) near the lowest corner of the box (16) and at a distance above the bottom (33) of the box (16) which is somewhat larger than the dimension of the object

(22) in said direction, from which position the support means (4) will move the box (16) in a direction parallel to its bottom plane (33) while at the same time objects (22) are brought onto the bottom (33) till the other end wall of the box (16) reaches said shaft (17) after which the support means (4) are moved in opposite direction and downwardly to bring the box (16) in the initial position in respect of said shaft (17) but such that the distance between the lower end of said shaft (17) and the bottom (33) of the box (16) is about twice the dimension of the object (22) in said direction.

2. A device according to claim 1, characterized in

that the discharge of an object (22) out of the filling shaft (17) is prevented by a resilient means (23), a pushing member (24) being present near the upper end of the filling shaft (17) by which via the objects (22) present in said filling shaft a pressure can be exerted upon the lowest object (22) to press this out of the filling shaft (17).

3. A device according to claim 2, characterized in

that said resilient means are obtained by providing at least one longitudinal rim of the discharge end of the filling shaft (17) with a somewhat inwardly bent portion (23).

4. A device according to claim 1, characterized in

that use is made of a discharge member (35) being pivotably supported in the lower end of said filling shaft (17) such that it is movable between two positions by pivoting it around a mainly horizontal axis (38), said member (35) being shaped and mounted such that in one position it is supporting the lowest object (22) in the filling shaft (17) and by pivoting to the other position will set free said lowest object (22) while simultaneously locking the object (22) present above it, which object (22) will move to the position of the first one (22) when the discharge member (35) is pivoted back to its first mentioned position, the pivoting of said member taking place by means of a rod (39) or such like extending upwardly out of said filling shaft (17).

5. A device according to one of the preceding claims, characterized in

that the support means for the box will comprise a roller track (4), the support frame (6) of which is movable along at least one column (7) extending obliquely upwardly, said column (7) comprising a base (12) being movable along at least one guide beam (14) being obliquely positioned and extending at right angles to the longitudinal direction of the column (7).

6. A device according to one of the preceding claims, characterized in that to supply objects (22) to the filling shaft (17) use is made of a conveyor (26) comprising catches

(28) being present at some distance above the support surface (27) of the conveyor (26), two slides (29) being present near the discharge end of the conveyor (26) and being movable at right angles to the conveyor surface (27), said slides (29) being positioned at some distance from each other so that between them an object (22) can be present, one of the slides (29) being in the highest position when the other (29) is in the lowest position.

7. A device according to one of the preceding claims, characterized in that when in the box (16) a bag (31) of synthetic material is present a means is provided to press the bag (31) against two opposite walls of the box (16) during the filling of the box (16).

8. A device according to claim 7, characterized in that the means to press the bag (31) against the walls of the box (16) is formed by two centring plates (32) which may come to lie near two opposite side walls of the box (16) to be filled such that they will run parallel to a plane running through the two directions of movement (R,S) of the box (16) either of the filling shaft (17).

9. A device according to claim 8, characterized in that said centring plates (32) are connected to the column (7) along which the support frame (6) of the roller track (4) is movable.

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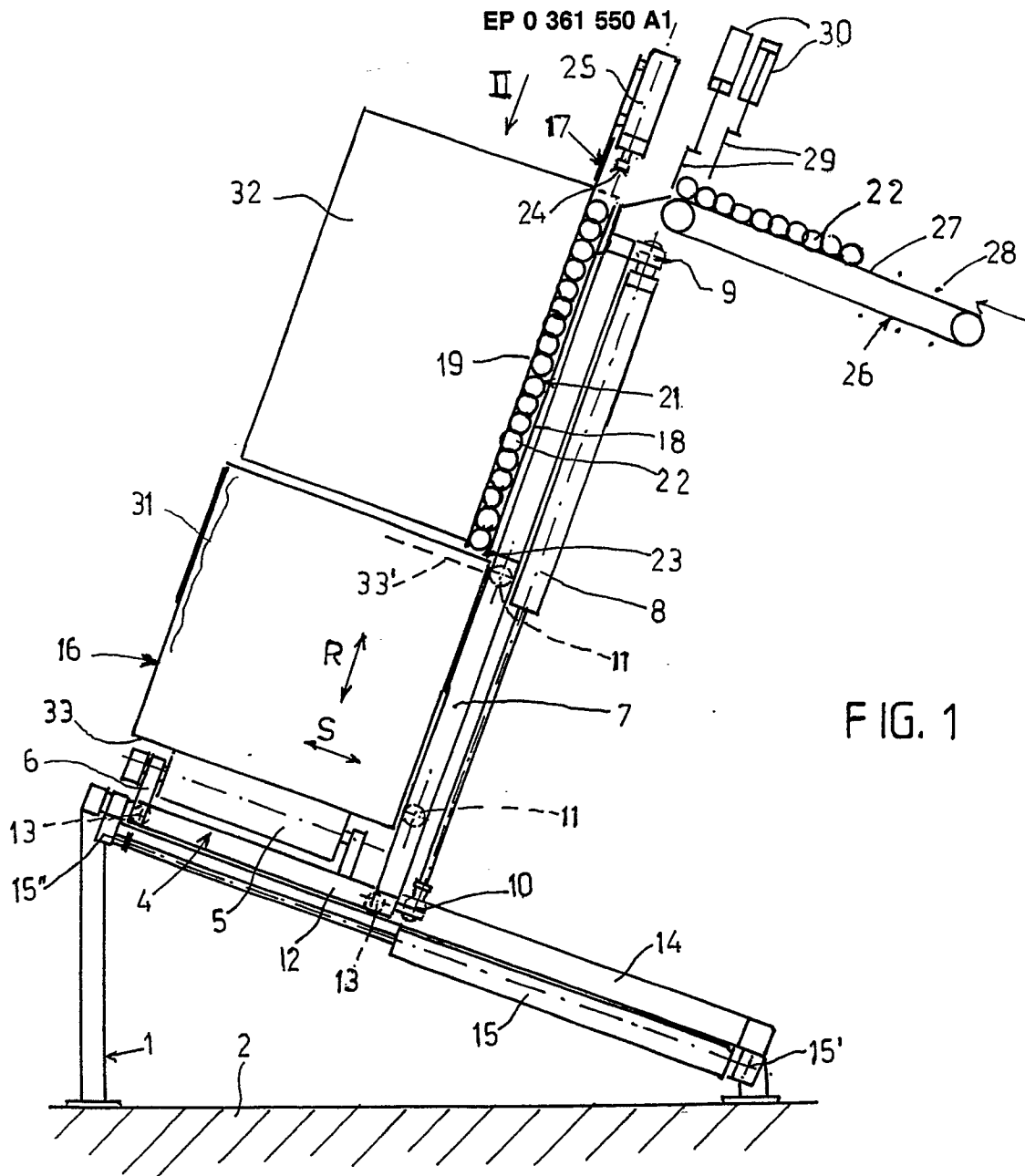


FIG. 1

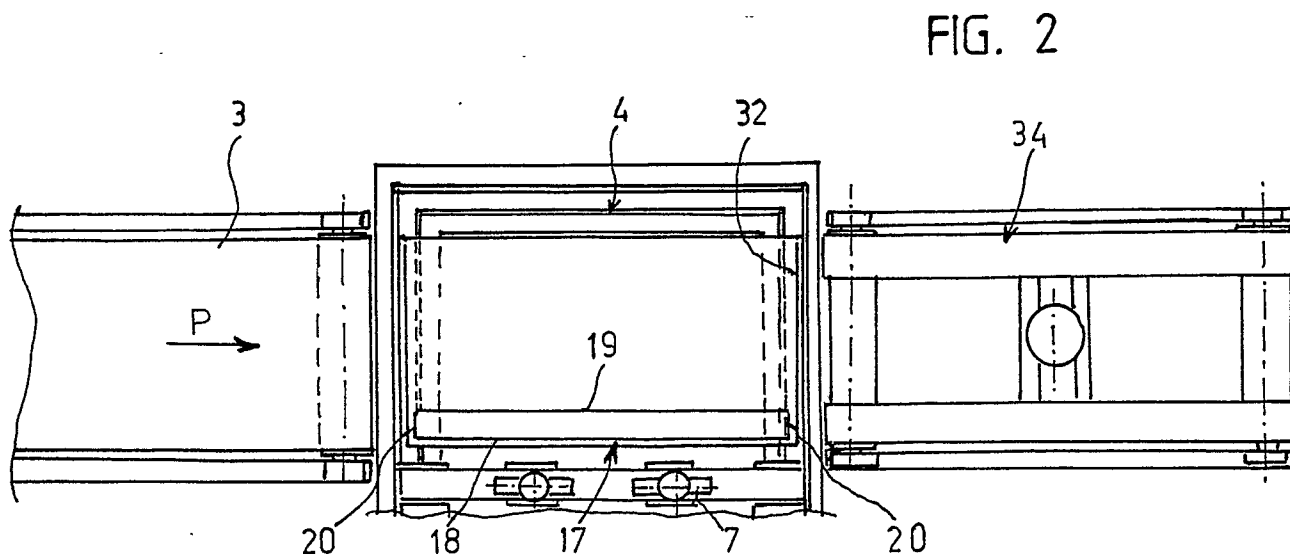


FIG. 2

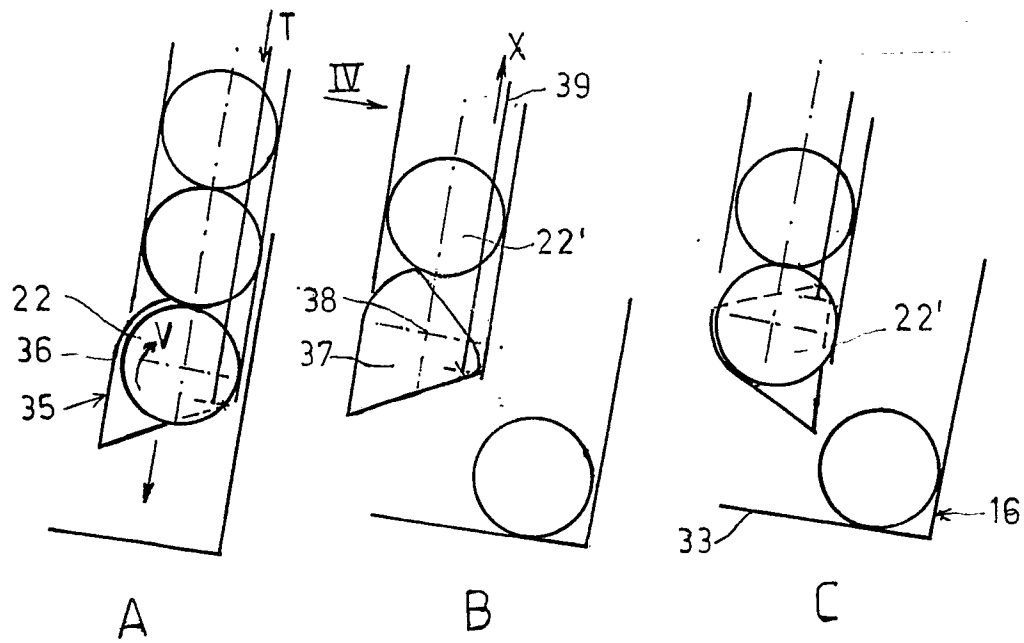


FIG. 3

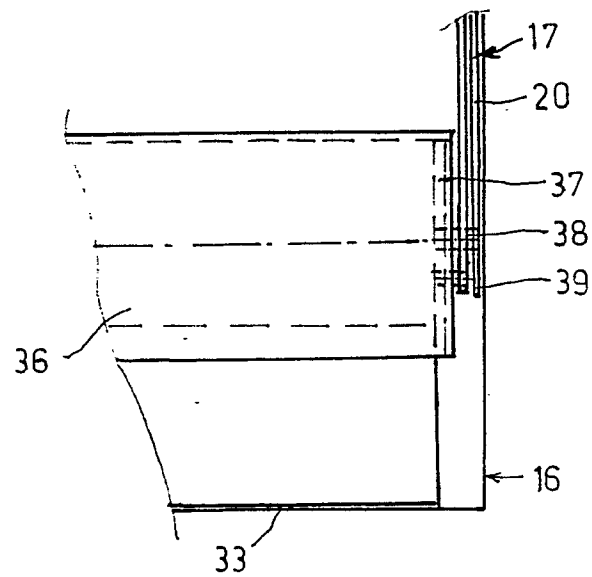


FIG. 4

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	GB-A-1 180 650 (SELPACK) * Page 1, line 67 - page 2, line 113; figures 1-4 * ---	1,2	B 65 B 5/10
D,A	DE-U-8 620 872 (ILLIG) * Whole document * ---	1	
A	SU-A- 174 540 (SOKOLOV) * Figure 1 * ---	1	
A	GB-A-1 197 208 (MACKINTOSH) * Whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 65 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20-11-1989	Examiner CLAEYS H.C.M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			