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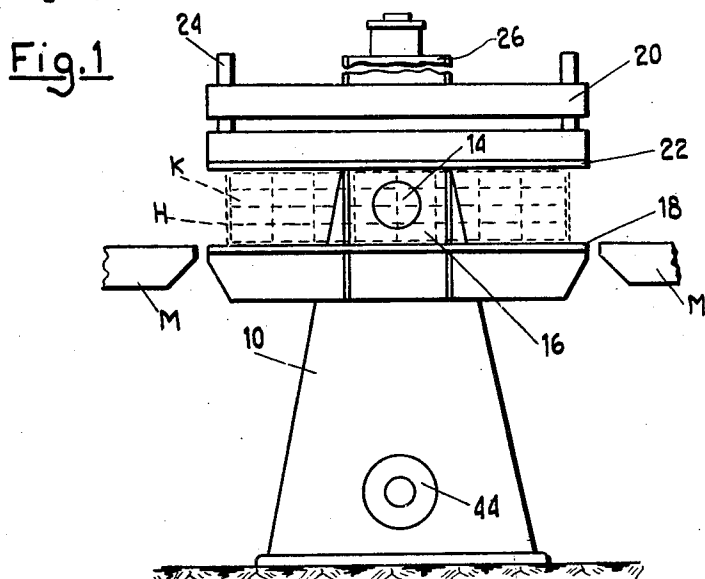
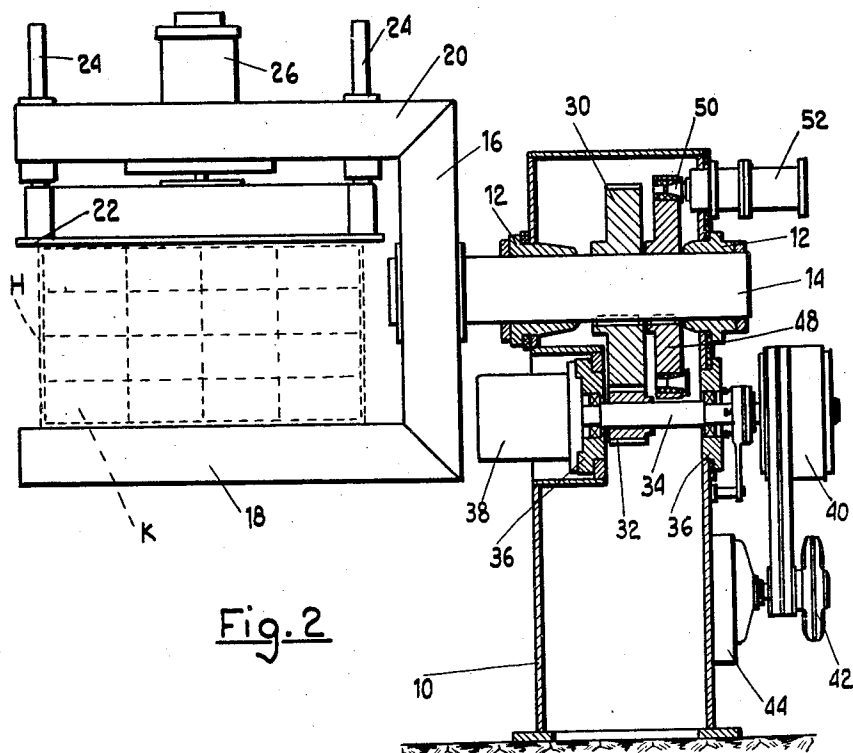
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METHOD AND APPARATUS FOR PACKAGING ARTICLES

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2 Sheets-Sheet 1



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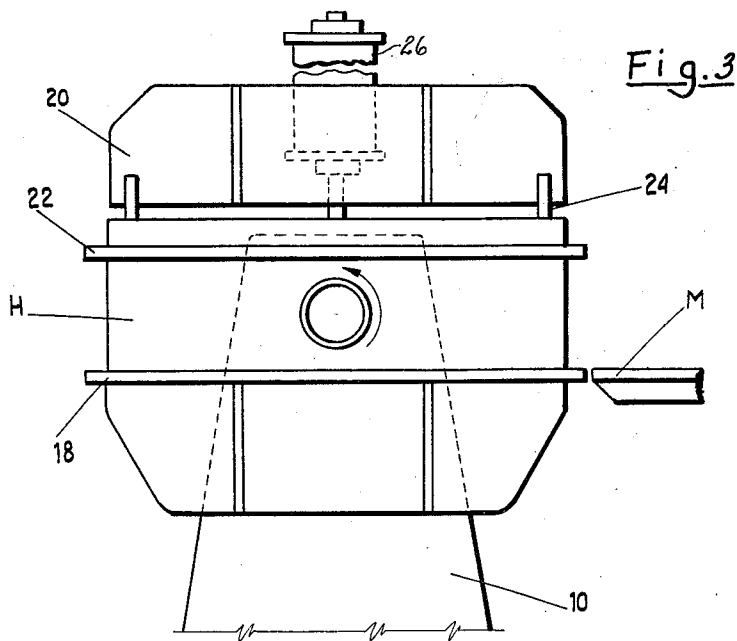
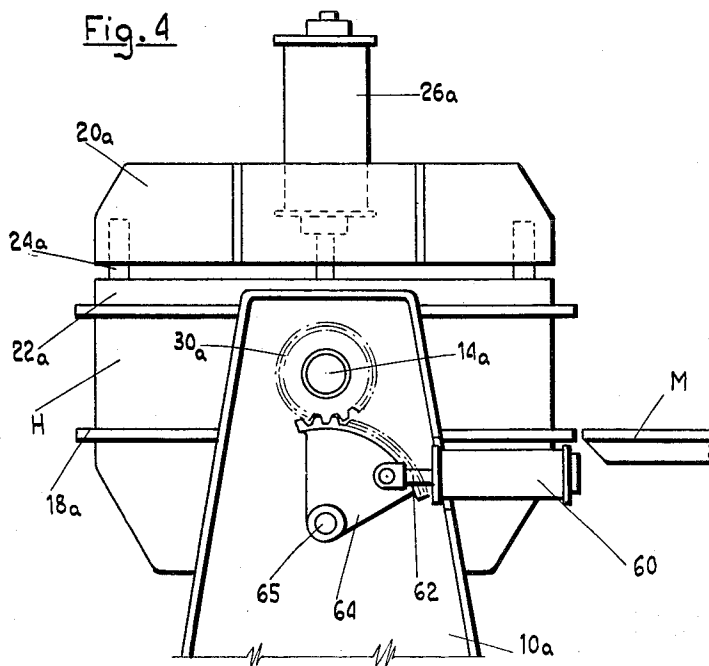
P. BARZANO'

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METHOD AND APPARATUS FOR PACKAGING ARTICLES

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METHOD AND APPARATUS FOR PACKAGING ARTICLES

Piero Barzanó, 18 Via Garibaldi, Bergamo, Italy

Filed Aug. 4, 1960, Ser. No. 47,510

Claims priority, application Italy Aug. 21, 1959

3 Claims. (Cl. 53—392)

This invention relates to apparatus and methods for packing in boxes stacked and classified articles, preferably sheets of paper.

Referring particularly to the packing of piled sheets, for instance of paper, difficulty is encountered when piled sheets are to be introduced into cases or boxes through openings providing only a small clearance for the piled sheets. These deficiencies are magnified when the height of the stack is increased or the size of the sheets are increased.

Numerous drawbacks are encountered when the packing of sheet piles is carried out as the final stage of an automatic production cycle, due to the necessity of having the sheet pile transferred from a supporting platform, into a packing container, the upper edge of which lies in a plane higher than that which the sheet pile is supported on.

It is an object of the invention to provide an easy and quick procedure of putting into boxes or cases, as well as packaging stacks of paper or pasteboard sheets to the extent that the packing container is lowered, upside down, onto the already formed stack of sheets, then overturning the whole, so as to cause the pile of sheets to be suitably fitted into the packing container, which may then be closed in the usual way.

The apparatus satisfying the above object may be advantageously inserted in a production line or other automatized production cycle, to perform the packing of stacks of sheets, or of other articles.

The apparatus according to the invention is characterized by at least one table, which is pivotally supported to allow tilting thereof, said table being formed at least at one of its faces with a counter-table which is actuated by means adapted to urge said counter-table towards said table, so as to positively hold therebetween the sheet stack and a packing container, while the tilting is being carried out.

According to the invention, the table is associated with positioning means, adapted to keep the table in the required position. Moreover, according to the different purposes to which the equipment may be put, the table may be provided with a tilting controlling means, such as by the motors for carrying out a given production cycle.

The invention will be disclosed in the following description, taken with the accompanying drawing, wherein a preferred embodiment according to the invention is shown and wherein:

FIG. 1 is a front elevation view of an embodiment of the invention.

FIG. 2 is a side elevation view of the embodiment of FIG. 1 partly in section.

FIGS. 3 and 4 are front elevation views of two modified embodiments of apparatus according to the invention.

The apparatus as shown in FIGS. 1 and 2, comprises a box-shaped pedestal 10. On the pedestal are supported the following: a shaft 14, mounted on bearings 12 fitted on the top of said pedestal, and connected at one of its ends with a cross-member 16. Member 16 forms the middle section of a stirrup shaped element, the legs of which are formed by opposite tables 18 and 20.

The table 20 is fitted with a counter-table 22, held by guide means 24 and a control device, comprising a

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hydraulically actuated cylinder-piston unit adapted to urge said counter-table 22 towards the table 18.

A gear 30, keyed on the shaft 14, engages a corresponding pinion 32, keyed on a counter-shaft 34, placed parallel to shaft 14, and supported by bearings 36 secured to pedestal 10.

A brake 38, of the electromagnetic type which may be adjusted to allow a given amount of slippage, is fitted on one end of the counter-shaft 34. A reducing gear 40, of the differential type, is keyed on the opposite end of said shaft, and is driven by an electric motor 44 through a fluid-dynamic coupling 42.

A disc 48, formed with holes or seats for positioning the tiltable tables 18—20, is also keyed on the shaft 14. In the case as shown, disc 48 is formed with a tapered hole, adapted to accommodate a pin 50, with a truncated end. The pin 50 is secured to the movable element of a driving motor 52, made up of an electromagnet, cylinder-piston unit, or other suitable means.

The operation of the above described apparatus is as follows. A stack K of paper sheets or other articles is supported on the table 18. For instance, such a stack may be deposited on the table 18 by means of conveyors, fitted alongside the table or the stack K may be introduced into the space between tables 18 and 22 by means of hydraulically, or mechanically driven pushers.

The stack K, after having been formed, is first covered by a casing or container H, the opening of which is downwardly directed. The whole unit as thus prepared and disposed between the tables 18 and 22, is clamped therebetween by a downward motion of the counter-table 22.

Then, the motor 52 is started, to disengage the pin 50 from the retaining disc 48, whereupon the motor 44 is started, thereby driving, through the reduction gear 40, the gearing 32—30, and the tables 18—20. The tables, together with stack K, covered by casing H and clamped therebetween, is now rotated through an angle of 180°, so as to bring counter-table 22 in alignment with conveyors M.

Prior to reaching the above position, motor 52 is re-started, to re-engage the pin 50 into the corresponding hole of disc 48, to stop the counter-table 22 in its horizontal position. Of course, a little while before such condition is reached, the motor 44 is switched-off, and the electromagnetic brake 38 energized. The pin 50 is then firmly driven into the hole of disc 48, thereby ensuring a horizontal position for counter-table 22, as well as positive blocking of tables 18—20.

The motor 26 is again started to disengage the casing H, containing the stack K, which is now inverted with its opening directed upward, whereby it can be transferred onto the conveyors M.

The apparatus is then again operated, to bring it once again to its starting position, wherein a further sheet stack K can be conveyed onto the table 18, thereafter, covered with the required casing and inverted as described above.

To simplify the operation, the tables 18—20—22 of the packing apparatus may be alternatively tilted by 180° in both directions. As shown in FIG. 3, it is possible to place one of the loading platforms M very close to table 18, without the danger of driving unit 26 interfering therewith.

FIG. 4 shows, by way of example, a control unit comprising a motor 60 for exerting movement in a linear direction (for instance a hydraulic jack), positively secured to pedestal 10a. The rod 62 of said motor 60 is linked to a tooth sector 64, fitted on pedestal 10a by means of pin 65, and engaging a gear 30a, rotatable with shaft 14a.

Modifications and changes may be made in the afore-

mentioned and illustrated equipment to suit the particular features and requirements of the intended final use, since said equipment, though described in relation to the packing of paper sheets, is however suitable also for the packing of other articles as for example cans, soaps, boxes and the like.

The packing apparatus may be fitted with relays, servomotors and other means, as required, for an automatic control thereof in accordance with the operation of other machines combined therewith in a production line.

To eliminate the necessity of having the tables 18—20 tilted at the end of each cycle, the table 18, too, may be fitted with a counter-table 22, provided with a relative driving motor. Said counter-tables may be alternatively actuated, according to the position taken each time.

Moreover, to facilitate the removal of articles K, packed within the container H, the movable table 22—or counter-table may be stopped in a position not exactly horizontal, but slightly inclined with regard to the plane of the conveyor, to promote the transfer of said container H, together with the articles contained therein, onto the conveyor M.

The invention has been described with reference to apparatus for packing stacked articles into a container and wherein the apparatus comprises a pair of parallel tables in spaced relation and means rigidly connecting the tables together. The apparatus further comprises a counter-table between the parallel tables and parallel thereto and means connecting said counter-table to one of the first said tables and permitting displacement of the counter-table parallel to said first table. The articles to be packed are placed in stacked relation on the other of the tables. A container is provided having a downwardly facing open mouth enclosing the stack. The container is supported with the open mouth facing the stack so that as the counter-table is displaced towards the stack, the counter-table externally contacts the container. Further displacement of the counter-table causes the same to be urged against the container such that the sheets of the stack are immovably contained in the container by the counter-table and said other table. Additionally provided is means coupled to the first said means for inverting the tables and counter-table in unison whereby the stack can be freely supported in the container and can be removed from the apparatus as a unit with the container.

It will be obvious to those skilled in the art to modify and vary the disclosed embodiment without departing from the spirit of the following claims.

What I claim is:

1. Apparatus for packing stacked articles into a container, said apparatus comprising a pair of parallel tables in spaced relation, means rigidly connecting said tables together, a counter-table between said parallel tables and parallel thereto, means connecting said counter-table to

one of the first said tables and permitting displacement of said counter-table parallel to said first tables, said articles being adapted for placement in stacked relation on the other of said tables, a container being provided and having a downwardly facing open mouth for tightly enclosing said stack, the container being supported with said open mouth facing said stack so that as said counter-table is displaced towards said stack the counter-table externally contacts said container, further displacement of said counter-table causing the same to be urged against said container such that the sheets of said stack are immovably contained in said container by the counter-table and said other table, and means coupled to the first said means for inverting the tables and counter-table in unison whereby the stack is freely supported in the container and said stack can be removed from said apparatus as a unit in said container, said means for inverting said counter-table and tables in unison comprising means connecting said tables and counter-table together and means for rotating the means connecting the tables and counter-tables about an axis of rotation, said apparatus further comprising a stationary frame supporting said means connecting the tables and counter-tables, a shaft rotatably supported in said stationary frame and connected to said means connecting the tables and counter-tables, a rotary member on said shaft, said rotary member being provided with recesses for angularly positioning said means connecting the tables and counter-tables with respect to the stationary frame, and stop means engageable with said recesses for selectively locking said means connecting the tables and counter-tables when the counter-table and tables are in normal and inverted positions.

2. Apparatus as claimed in claim 1, wherein said means connecting the tables and counter-tables comprises a cross-member, said shaft being rigidly coupled to said cross-member, said one table being connected to said cross-member and supporting the means permitting displacement between the counter-table and the other of said tables.

3. Apparatus as claimed in claim 1 comprising a gear on said shaft, a further gear in driving relation with the first said gear, a motor supported on said frame and in driving relation with said further gear, and braking means connected to said motor for applying braking action thereto.

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