METHOD FOR PACKAGING LOOSE FIBROUS MATERIAL FROM A CONTINUOUS FLOW
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INVENTOR
Claude Brochet

By Sparrow and Sparrow
ATTORNEYS
METHOD FOR PACKAGING LOOSE FIBROUS MATERIAL FROM A CONTINUOUS FLOW
Claude Brochot, Antony, France, assignor to Service d'Exploitation Industrielle des Tabacs et des Allumettes, Paris, France
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1 Claim

ABSTRACT OF THE DISCLOSURE
Process for packaging of loose fibrous material, such as tobacco, from a continuous flow, in portions subjected to successive compressions in a press device. The press device has a pressing cylinder which is open on both ends, with removable side walls. Provision is made for placing a bottom plate and a top plate on the packaged material.

BACKGROUND OF THE INVENTION
The invention is a continuation-in-part of my co-pending patent application Ser. No. 476,070 filed July 30, 1965 now abandoned, and refers to a method for pressing loose fibrous material which is supplied in a continuous flow, into packages of a predetermined constant weight, and more particularly for pressing loose tobacco in several portions which are subjected to a constant pressure by successive compressions until the predetermined package has eventually been attained, and to an apparatus for performing this method.

Various methods and apparatus have been known for packaging or baling loose, lightweight, fibrous material by reciprocatingly moving a plunger or presser in a press device while the material is continuously fed into the press. Other methods are known for compressing loose material into a package by one pressing stroke; but none of these known methods had been able to avoid uneven pressing and furthermore to attain packages of a predetermined, constant weight. This problem is solved by this invention.

SUMMARY
The invention consists in such novel features, construction arrangements, combinations of parts and improvements as may be shown and described in connection with the method and the apparatus herein disclosed by way of example only and as illustrative of a preferred embodiment. The basic idea of the invention is to solve the problem of compressing certain fibrous materials such as tobacco which tend to swell to a considerable extent, by a successive number of compressions of individually fed portions until the required quantity and weight of the package is attained. Objects and advantages of the invention will be set forth in part hereafter and in part will be obvious herefrom or may be learned by practicing the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

One of the objects of the invention is to provide a method by which the quantity for packaging of the tobacco is subdivided into as many sub-portions as the capacity of the press apparatus requires.

A further object of the invention is to provide a method by which the pressing apparatus is fed with such decreasing or increasing quantities instead of successive equal quantities, that the volume of material which is subjected to each compression action, is constant, at least up to and including the next to last compression, while the final compression is performed on a volume which is equal to that of each of the preceding compressions.

Furthermore, it is an object of the invention to provide packaging contrivances including a level detector in the press apparatus, such as a photo-electric cell, arranged to stop the feeding of the tobacco to the press device and to actuate the compressing apparatus when the accumulated material has reached a certain level in the press apparatus.

Various further and more specific purposes, features and advantages will clearly appear from the detailed description given below taken in connection with the accompanying drawing, which forms part of this specification and illustrates merely by way of example only an embodiment of the apparatus of the invention.

BRIEF DESCRIPTION OF THE DRAWING
In the following description and in the claim, parts will be identified by specific names for convenience, but such names are intended to be as generic in their application to similar parts as the art will permit. Like reference characters denote like parts in the several figures of the drawing, in which:

FIG. 1 is a schematic plan view of the feeding system of the packaging press;
FIG. 2 is a schematic side elevation of the packaging press;
FIG. 3 is a schematic view of the upper plate feeding device of the press;
FIG. 4 is a partial view of the final enclosure of the package.

DESCRIPTION OF THE PREFERRED EMBODIMENT
Referring now in more detail to the drawing illustrating a preferred embodiment by which the invention may be realized, there is in FIG. 1 a conveyor 4, preferably one of the well-known, conventional belt conveyors, which feeds continuously, loose material to a distributing conveyor 2 having a hopper 3, 3' at each end thereof. Conveyors of this type are equally well-known and conventional in the use for stockpiling material into silos. Conveyor 1 is driven by an electric motor not shown in the schematic drawing, this motor being conventional and is not a part of the invention and is not claimed. Conveyor 2 is driven by a conventional two-speed gear motor, also not shown in the drawing for the same reason as stated with regard to conveyor 1.

The drive of conveyor 2 can be reversed by reversing the direction of rotation of the gear motor. Thus, conveyor 2 feeds alternately hoppers 3, 3'. Scales 31, 31', schematically indicated, in FIG. 1, are arranged for supporting hoppers 3, 3'. Scales 31, 31' have electric contacts, one intermediate and one final on maximum contact, both of which can be adjusted. Scales of this kind are well-known, commercially obtainable, and per se do not form a part of this invention.

Two belt conveyors 9, 9' are arranged at right angles to conveyor 2. Conveyors 9, 9' are automatically loaded by delivery heads connected with scales 31, 31'. Each one of conveyors 9, 9' feeds the weighed material into a press apparatus, generally designated by numeral 10. Pressing apparatus 10 has a body or stand 11 and a platen 12. Below body 11 is a plate 26 arranged for receiving the base 29 of the packing case, that is the bottom of the compressed package. Encasing plate 26 are four movable side panels 25, one on each side (two are shown in FIG. 2). Near the top of body 11 is a photo-electric cell 20. Near the top of body 11 is a pusher 21, actuated by a
3,614,850 3. fluid power motor 14, acting horizontally across body 11 for evenly planing the heap of material which has been delivered by conveyor 9. A further mechanism is provided for automatically placing lid 28 on top of the compressed package. This mechanism consists of a fluid power motor 15 for pushing one lid 28 at a time over a support plate 24 to cover the compressed package in body 11. Lids 28 are stacked up and are supported by two sets of forks, 22, 23 which are arranged to be retracted alternately upon given cycle signals.

The operation of the packaging of the loose fibrous material is performed as follows:

Loose material is fed by conveyor 1 over conveyor 2 into hoppers 3, 3'. When a certain amount of material has been delivered to hopper 3 (or 3') at full speed of conveyor 2, the first contact on scale 31 (or 31') causes the gear motor of the conveyor to step down to a much reduced speed for accurately completing the pre-set weight of the material on the scale. When the pre-set final weight has been attained, the second or final contact on the scale causes the reversal of the gear motor and the shifting back of the gear to the higher speed. Conveyor 2 then is feeding into the other hopper on the other scale. At the same instant the weighed portion of the material is delivered from the scale to conveyor 9 (or 9') which then carries the material to the press 10. Conveyors 9, 9' may be arranged for shuttling the material rather than continuously delivering it in a single flow. When press body 11 has been filled, photo-electric cell 20 acting as a level detector, causes the emptying of hopper 3 onto conveyor 9 to be stopped and also stopping of the conveyor. At this time pusher 21 levels the heap in body 11. Subsequently platen 12 is set in motion for a first compressing of the first filling. After platen 12 has been retracted, a photo-electric cell 20 becomes again free, the feed is automatically restarted. This cycle is repeated until the scale 31 of hopper 3 has returned to zero. At this point a delay relay is activated for the next following operation. Pusher 21 makes one more levelling movement. Then first set of forks 22 is retracted for dropping one lid 28 which is immediately pushed over plate 24 onto the top of the material in body 11. While forks 22 return to their starting points, forks 23 are withdrawn letting the pile of lids drop and thereupon return for intercepting the pile above the now lowest lid. With lid 28 in place on top of the material, and the timed delay of the relay being expired, a last compression of the material with the lid 28 on top of it takes place whereupon platen 12 remains in the lowest position while side panels 25 are returned to their initial position. There is then sufficient space to place a wrapper 27 consisting preferably of four articulated panels around the package. Lid 28 and base 29 are kept together by battens 30 extending over the entire length of lid 28 and base 29, (FIG. 4). Eventually the finished package may be carried off to a stacking area. This last operation does not pertain to the invention.

While the invention has been described and illustrated with respect to a certain preferred example which gives satisfactory results, it will be understood by those skilled in the art after understanding the principle of the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended therefore in the appended claim to cover all such changes and modifications.

I claim:

1. A method for compressing and packaging predetermined quantities of loose fibrous material, particularly tobacco, and maintaining said material in a compression condition within a container comprising the steps of:

(a) feeding quantities of tobacco of predetermined weight and volume to a compactor,

(b) placing said quantities within a first rigid enclosure,

(c) subjecting said tobacco to a first compaction step within said enclosure by applying a first compaction pressure to selected portions of said enclosure,

(d) releasing said first compaction pressure,

(e) feeding at least one successive quantity of tobacco to said container,

(f) repeating said compaction step after the introduction of each successive quantity until said predetermined quantity is achieved,

(g) removing selected portions of said first rigid enclosure including at least two side members and retaining selected other portions thereof while maintaining said tobacco under compaction pressure,

(h) introducing a substitute rigid enclosure means for each selected enclosure portion previously removed,

(i) connecting each said replaced enclosure portion with adjacent ones of those portions previously retained sufficient to retain said material in a compacted state,

(j) releasing said compacting pressure and removing said assembled package from said compactor.

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WAYNE A. MORSE, Jr., Primary Examiner

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