

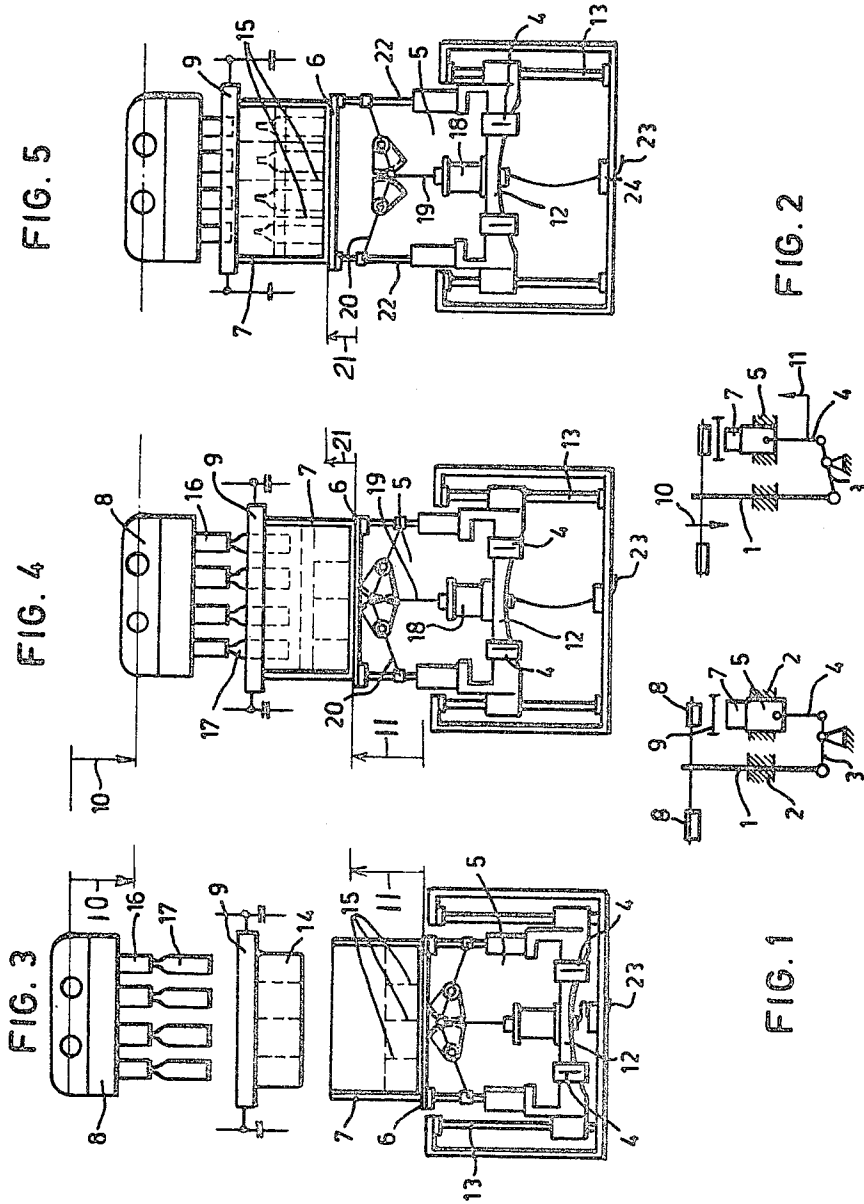
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MACHINE FOR PACKING AND UNPACKING BOTTLES

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MACHINE FOR PACKING AND UNPACKING BOTTLES

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The invention relates to a machine for packing bottles in and unpacking bottles from bottle cases, which can be lifted mechanically during the packing or unpacking process with the aid of a case lifting member.

It is known in such machines to move holding frames for the bottles and the bottle cases in opposite vertical directions, to lower the holding frames for the bottles and to lift the bottle cases. This approach of the holding frames for the bottles and of the bottle cases is necessary to be able to remove the bottles from or to place the bottles in the cases, and it is very useful to communicate this movement both to the holding frames for the bottles and to the bottle cases. It is known to couple the central column of such a packing and unpacking machine, to which the holding frames for the bottles are secured via carrying arms, with the device for lifting the bottle cases in the way of a balance, by which with the movement of the bottle frames and of the bottle cases a balance of the weight is effected.

It is also known to apply between the holding frames for the bottles and the bottle cases a correction frame for the introduction of the bottles into the cases, which frame on the one side is also lifted by the cases and by which frame on the other side when lowering the bottle frames the bottles are passed downwards from above. Since, for the introduction of the bottles into the correction frame the bottom of the bottles must be above the correction frame and on the other hand the upper side of the bottle cases must stand under the correction frame, the height of the correction frame must also be considered with the extent of the relative movement of the holding frames for the bottles and of the bottle cases with respect to each other. The fact must be taken into account that in the same machine bottles of differing size and moreover bottle cases of different height must be processed. For various reasons and in order to obtain a high capacity, the relative movement of the bottle cases and of the holding frames for the bottles with respect to each other should also not be too great.

It is known in such machines to use electric safety switching devices, which as soon as, for example, the movement of the bottle cases with respect to the holding frame for the bottles is blocked switch off the driving mechanism of the machine, in order to avoid damage of bottles and parts of the machine. It, however, often occurs that in packing bottles in cases having compartment divisions, some bottles will bump against the compartment division and thereby switch off the machine. Moreover, foreign bodies, such as fragments and so forth, can stop the machine during the last phase of the movement of bottle cases and bottle frames. For restarting the machine, first of all the disturbance must be removed. Further, when packing bottles in cases with compartment divisions it is also very annoying that the bottles after passing the only relatively narrow correction frame often bump on the compartment division.

It has already been proposed to arrange a correction frame projecting into the bottle cases to avoid this last mentioned disadvantage. This would, however, involve an excessive increase of the stroke of the machine.

To avoid said disadvantages, it is proposed according to the invention that the case lifting member which is mechanically movable upwards and downwards in the machine frame be provided with a platform for receiving the bottle cases, said platform being adapted to be lifted and lowered additionally in the case lifting member independently of the mechanical driving thereof.

Further it is proposed that for independent driving of the platform a pneumatic working cylinder (air cylinder) supported in the case lifting member and intermediate levers in communication therewith and engaging the platform guide be provided. By such a device a proportionally deeper correction frame may be used. Also, a part of the lifting movement of the bottle cases is effected not mechanically, but pneumatically or electromagnetically. Further, it is avoided that a bumping against the compartment divisions or other such obstacles might cause serious problems during the last part of the lifting movement. By the final pneumatic lifting movement of the cases, a buffer action is generated, the hardness of which is dependent on the working pressure of the air cylinder taking care of the second lifting movement of the platform.

Further it is proposed that in the air inlet conduit for the working cylinder an adjustable pressure reducing valve is arranged. Thereby an adaptation to the various case weights is possible.

Moreover it is proposed that the control valves for the working cylinder of the platform be secured in the machine frame and be adapted to be switched dependently on or independently of the position of the case lifting member, while the pneumatic lifting of the platform may take place simultaneously with or after the mechanical lifting of the case lifting member.

Further it is proposed that between the case lifting member and the holding frame for the bottles, a correction frame be provided, which may extend deeply into the cases.

A preferred embodiment of the invention will now be described by way of example with reference to the accompanying drawings, in which:

FIGURES 1 and 2 show schematically the construction of a packing or unpacking machine; and

FIGURES 3, 4 and 5 show the upwardly and downwardly movable dual stage lifting member in various positions during a packing process.

The machine comprises a central upwardly and downwardly movable shaft 1, which is supported in the machine frame 2 shown only schematically. The shaft 1 is supported at the lower end on a balance beam 3, which via an intermediate lever 4 carries the case lifting member 5. On the upper platform 6 of the case lifting member 5 the bottle case 7 is placed. Between the bottle case 7 and the holding frames 8 for the bottles a correction frame 9 is provided. In FIG. 1 the holding frame 8 for the bottles and the case lifting member 5 are spaced so far from each other that the holding frames 8 with the bottles hanging therein may be moved freely above the case 7. When these frames 8, such as in FIG. 2, take up the correct position above the case 7, the shaft 1 is lowered in the direction of the arrow 10 and the case lifting member 5 is lifted automatically due to the balance beam 3 in the direction of the arrow 11. Instead of a balance beam 3 other transmission devices may be applied. In each case mechanical levers 4, as also shown in FIGS. 3-5 in another view, coact with a yoke 12 of the case lifting member 5. The rods 13 serve as a guide for the yoke 12. The bottle correction frame 9 is provided with correction compartments 14 penetrating deeply into the case 7, said correction compartments ending only little above the compartment division 15 of the case when, as in FIG. 4, the case lifting member together with the case 7 is moved upwards over the distance indicated by the arrow 11. The correction

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frame 9 sits on the case 7 and has already been slightly moved in upwards direction. Simultaneously the holding frame 8 for the bottles is lowered by a distance indicated by the arrow 10, while the bottles 17 hanging from the bottle grippers 16 enter through the correction frame into the bottle cases 7. In addition to the movement according to the arrows 10 and 11 a supplemental lifting movement is provided for the lifting member 5. This supplemental movement is effected by means of an air cylinder 18 which acts via rod 19 on levers 20 having meshing tooth segments, the lever 20 serving to raise the platform 6 of the case lifting member 5 by a distance indicated by the arrow 21, the aid of the air cylinder 18 arranged in the case lifting the rods 22 guiding the platform 6. By this very quick supplemental pneumatic movement in accordance with the arrow 21 the bottles 17 enter completely into the compartments 15 of the case 7. The correction frame 9 is further taken along in upwards direction by the case 7. Even if one of the bottles 17 were to bump against a wall of a compartment division, this would cause no serious disturbance of the machine, since then only the supplementary lifting movement according to the arrow 21 is wholly or partly omitted; however, the further process is not hindered. The air cylinder 18 provides for the necessary damping. Consequently the total stroke has been increased by the distance according to the arrow 21 while the strokes according to the arrows 10 and 11 remain equal. Thereby a correction frame 9 with correspondingly deep compartment divisions 14 can be used. In the air inlet conduit 23 to the air cylinder 18, a pressure reducing valve 24 may be arranged, with the aid of which the force action and damping action of the air cylinder may be adapted to

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the weight of the cases 7 to be lifted and of the correction frame 9. The control valves for the air inlet conduit may be switchable, in dependence on the position of the case lifting member 5 or 4.

What is claimed is:

1. Bottle handling apparatus comprising a bottle-case lifting member, a bottle holding frame above said case lifting member and adapted for suspending bottles above a case supported on the lifting member, a lever means engaging said lifting member and frame and adapted for moving the same in opposite vertical directions towards and away from each other, and supplemental lifting means on the lever means between the latter and said lifting member to supplement the movement of the lifting member imparted by said lever means.

2. Apparatus as claimed in claim 1 comprising a correction frame between the lifting member and holding frame and wherein said lever means comprises a balance lever pivotally coupled to said lifting member and holding frame.

3. Apparatus as claimed in claim 2 wherein the supplemental lifting means is a pneumatic piston-and-cylinder means.

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