United States Patent [19]

Couten

[11] **3,878,665**

[45] **Apr. 22, 1975**

[54] **BOTTLE PACKING INSTALLATION**

[75] Inventor: **Jean Couten**, Paris, France

[73] Assignee: **Chandon Handelsgesellschaft**

[22] Filed: **Mar. 6, 1974**

[21] Appl. No.: **448,569**

[30] **Foreign Application Priority Data**

Mar. 12, 1973 Germany 2312167

Oct. 9, 1973 France 73.35956

[52] **U.S. Cl.** **53/143**; 53/161; 53/164; 53/240; 53/247; 53/251

[51] **Int. Cl.** **B65b 21/06**; B65b 35/56

[58] **Field of Search** 53/142, 143, 159, 161, 53/164, 165, 240, 247, 251

[56] **References Cited**

UNITED STATES PATENTS

2,069,926 2/1937 Read ..... 53/161 X

3,802,154 4/1974 Dillon ..... 53/159 X

FOREIGN PATENTS OR APPLICATIONS

1,231,613 12/1966 Germany 53/164

Primary Examiner—Robert L. Spruill

[57] **ABSTRACT**

Bottles are located in cradles on a bottle conveyor in a manner such that the bodies of alternate bottles are nested between the necks of adjoining bottles. A case conveyor parallel to the bottle conveyor moves open-topped cases in spaced relationship to a filling position at which two sets of gripper means movable above the conveyors are operable each to remove a predetermined number of nested bottles from the bottle conveyor and to deposit them as layers in cases. One set of gripper means deposits a first layer in a case and the other set deposits a second layer on top of the first layer following movement of a case from a first to a second layer receiving position.

11 Claims, 6 Drawing Figures

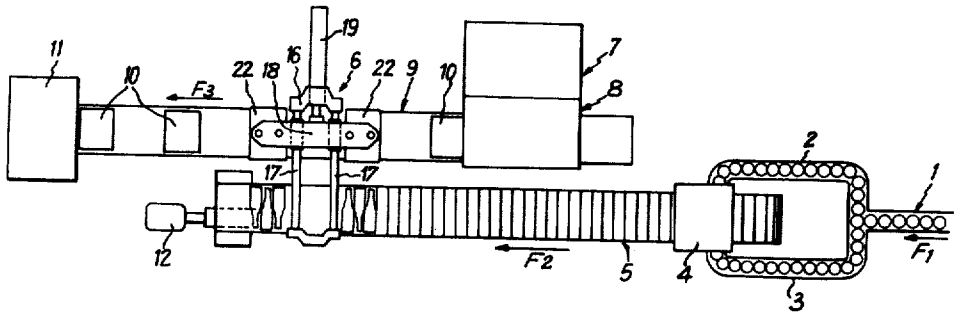


Fig:1

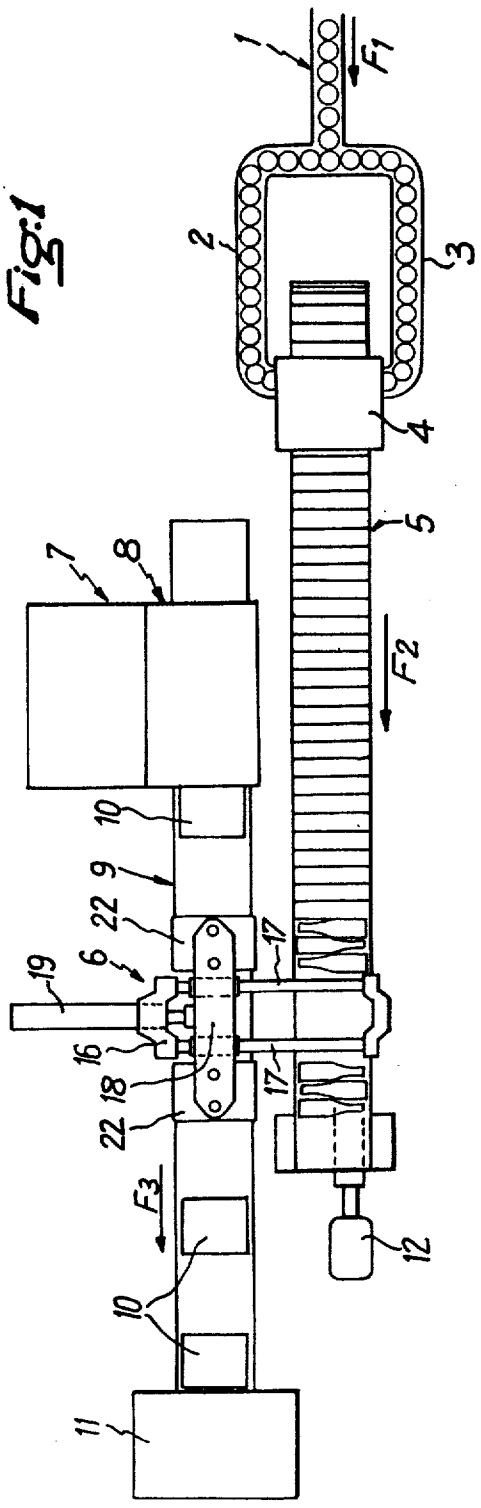

1
F1
2
3
4
5
F2
7
8
10
9
22
6
19
17
16
18
F3
12
11

Fig:2

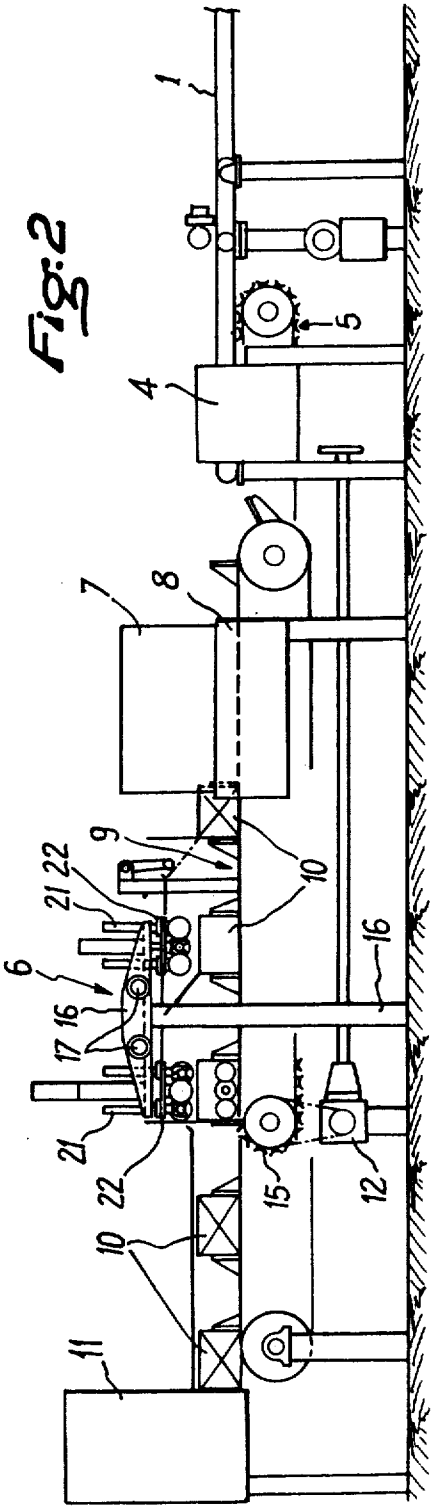

1
5
4
7
8
9
10
21
22
6
16
17
15
12
11

Fig:3

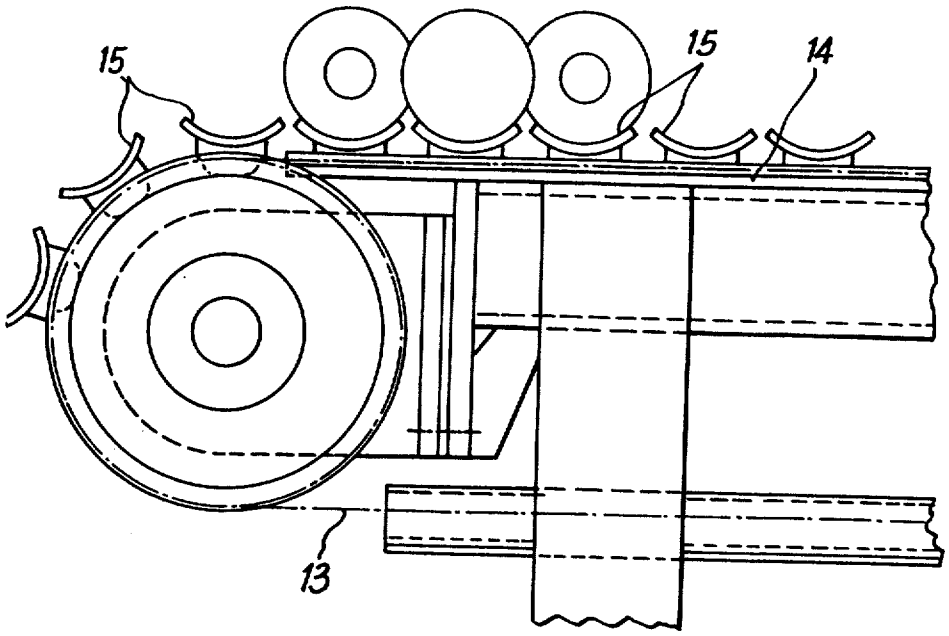
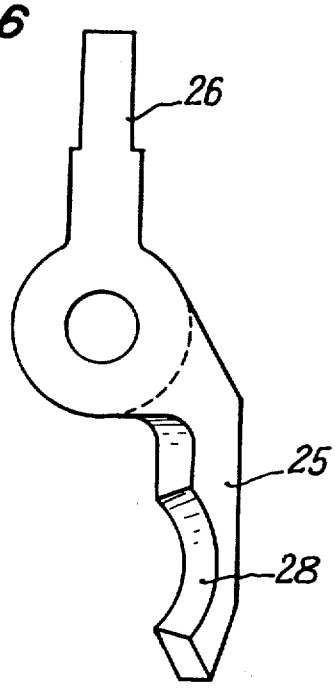


Fig:6



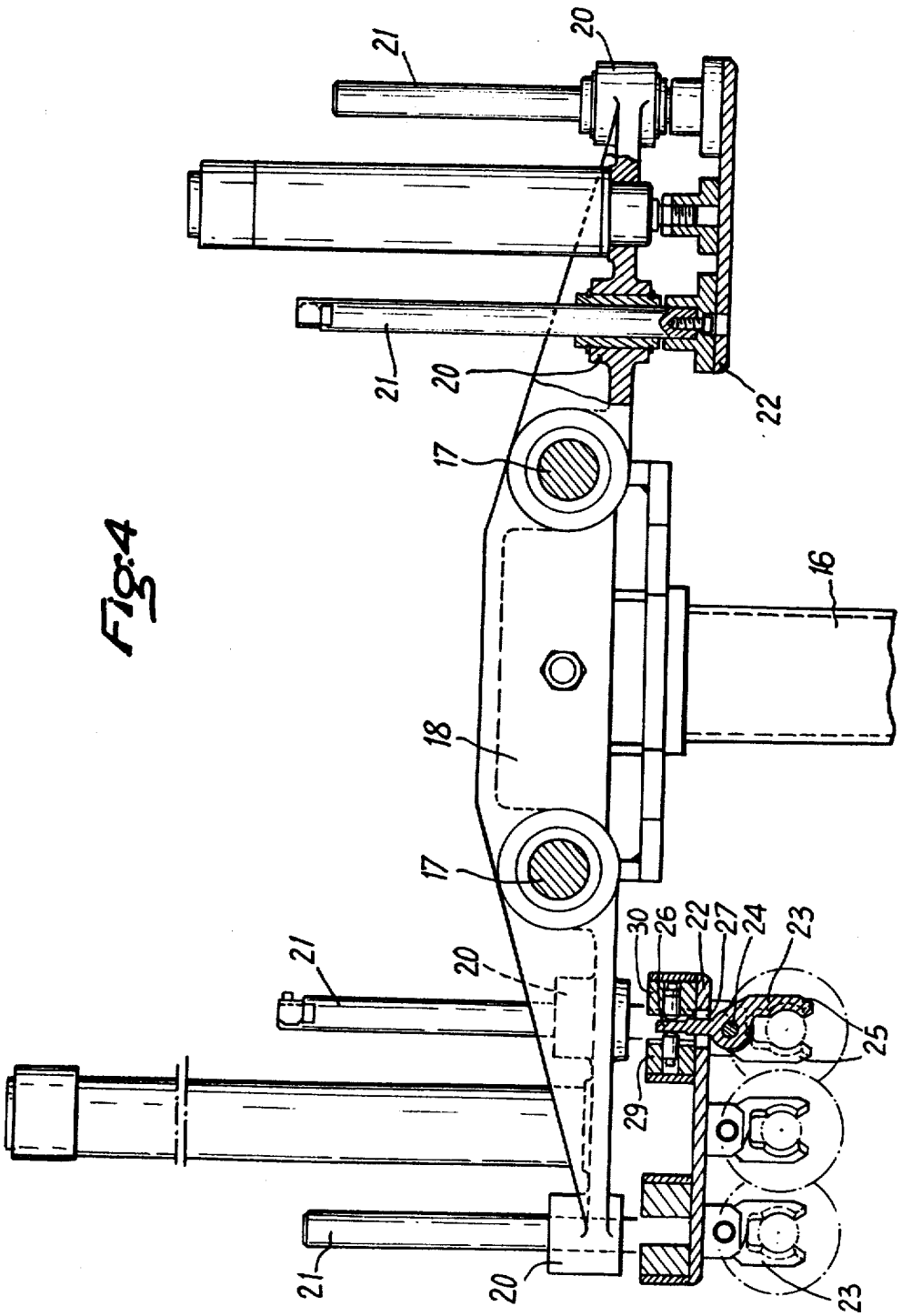
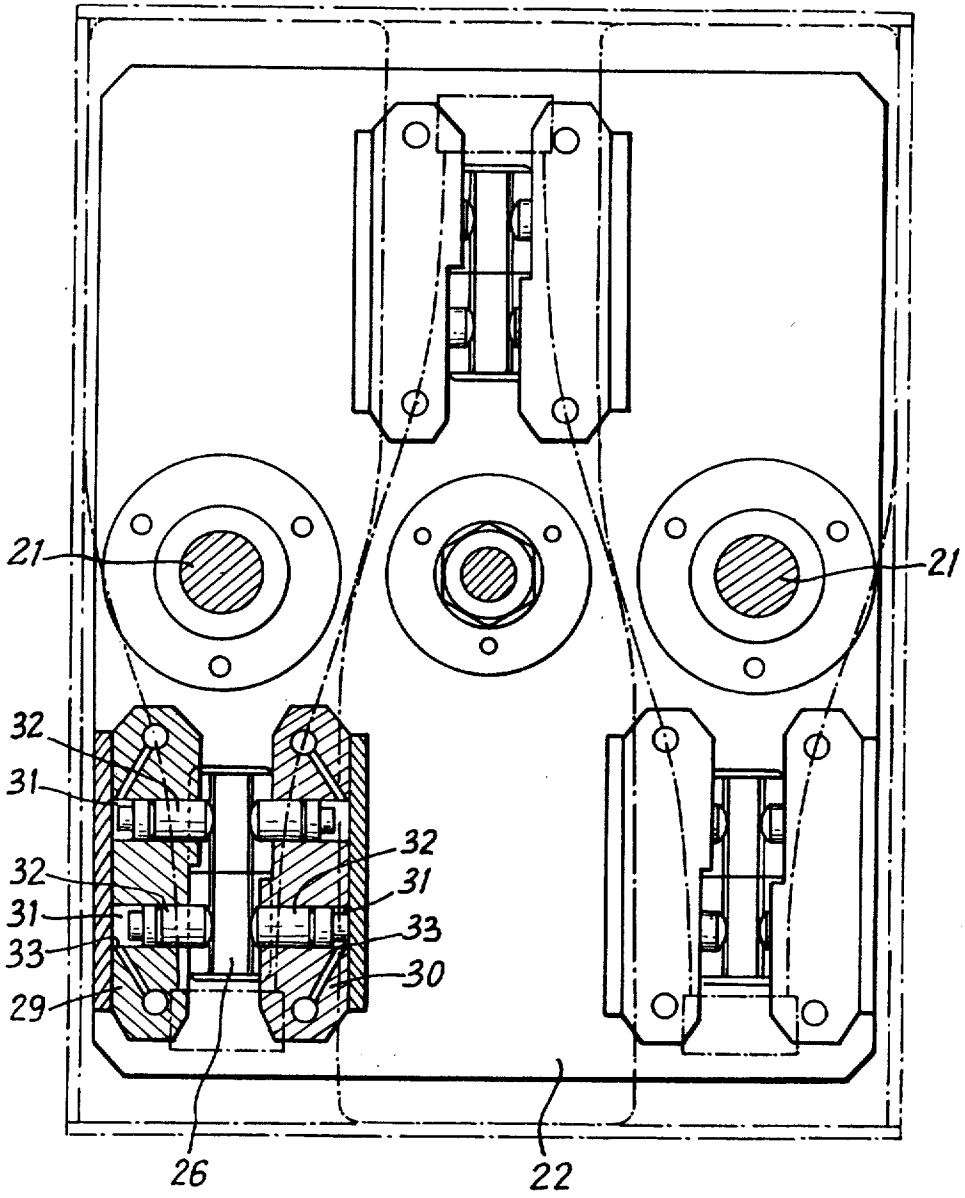


Fig.4

Fig: 5



BOTTLE PACKING INSTALLATION

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to an installation capable of automatically packing bottles in cases so that they lie side-by-side and top to bottom in the cases, each bottle being wrapped in tissue paper and being delivered to the installation in an upright position.

It is an object of the invention to provide such an installation which is arranged to deposit the bottles in at least two superimposed rows or layers in the cases, and another object is to provide an installation by which the bottles are deposited in the cases in such a manner that the bottles occupy the minimum possible volume in each of the cases.

SUMMARY

The installation comprises a case conveyor operable to move open-topped cases in succession in predetermined spaced relation, transporter means operable to move bottles lying on their sides in side-by-side top-to-bottom relationship with the bodies of alternate bottles nested between the necks of adjoining bottles, a machine operable to overturn upright bottles and dispose them in said side-by-side relationship on the transporter means, an upright bottle conveyor operable to deliver upright bottles in two paths to opposite sides of the bottle overturning machine, and a case filling head operable to remove from the transporting device a predetermined number of successive recumbent bottles and to deposit the bottles as a layer in a case on the case conveyor.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a diagrammatic general plan view of an installation according to the invention,

FIG. **2** is a general diagrammatic view in elevation of the same installation,

FIG. **3** is a partial view in elevation of a recumbent bottle conveyor forming a part of the installation,

FIG. **4** is an elevation, partly in section, of a filling head provided in the installation,

FIG. **5** is an underneath plan, partly in section, of an element of the filling head shown in FIG. **4**, and

FIG. **6** is a view of one of two articulated parts which together comprise a gripper forming part of the installation.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, an installation according to the invention includes means and elements which are known per se and which will not be described; the description will be confined to the arrangements which are characteristic of the invention.

The bottles arrive in the upright state in the direction of the arrow F_1, FIG. **1**, on a conveyor **1** of any suitable kind. The conveyor **1** is divided into two parallel branches **2** and **3**, which lead respectively to a bottle overturning machine **4** which is known per se. Transporter means including a conveyor **5** for recumbent bottles extends from the machine **4** and moves in direction of arrow F_2 to a case filling head **6**.

Near the bottle overturning machine **4** there is situated a storage machine **7** which contains cardboard case blanks in a flat state. The machine **4** supplies the

blanks one by one to a setting-up mechanism. The latter comprises a punch moving vertically between two fixed arms. Each blank is shaped in the form of a case **10** by the punch, between the fixed arms, and is deposited in a frame of a conveyor **9** for open cases.

The conveyor **9** is provided with equidistant frames which receive the cardboard cases and transport them with constant spacing. These frames are composed of vertical angles disposed facing one another. The conveyor **9** is disposed parallel to and at a short distance from the recumbent bottle conveyor **5**, within the zone of action of the filling head **6**. The two conveyors **5** and **9** perform intermittent, parallel movements respectively in the direction of the arrows F_2 and F_3.

The conveyor **9** delivers filled cases to a final discharge unit **11** of any suitable kind.

In order to make it possible for the difficulty which has to be overcome to be fully appreciated it will be pointed out that, as shown in FIGS. **1** and **5**, the recumbent bottles are not simply laid side by side or flank against flank. It is advantageous to place the bottles in positions in which they occupy the minimum total space. This is achieved by placing the convex connection zones situated between the bodies and the necks of the bottles in tangential contact, as illustrated in FIG. **1**, so that the bodies of alternate bottles are nested between the necks of adjoining bottles.

The conveyor **5** comprises spaced wheels adapted to be rotated by a motor **12** situated at one of the ends of the conveyor. Endless chains **13**, FIG. **3**, extend between the wheels; the top runs of the chains are supported by sections **14**. Cradles **15** are attached to the chains; these cradles are concave. The cradles **15** are disposed transversely across the conveyor **5**, but their succession extends parallel to the case conveyor **9**. The cradles are spaced apart by the desired distance so that when the machine **4** has overturned the bottles arriving in succession from the branch **2** and from the branch **3** of the conveyor **1**, the bottles are situated top to bottom and in tangential contact.

The filling head **6** is provided with bottle gripping means which must maintain the arrangement of the bottles so that they occupy the smallest possible volume in the cases. It will also be observed that in this position the bottles offer little grip to the gripping means.

The number of bottles to be placed in each case is not dictated by the invention. Nevertheless, as champagne is frequently shipped in cases of six bottles, an installation capable of taking two layers of three bottles in each case has been selected as an example.

The filling head **6** provided for this purpose is carried by a general support **16**, which may be a gantry, which supports spaced horizontal slide guides **17** which extend transversely above the conveyors **5** and **9**. A cross-member **18** is guided by the slide guides **17**. A horizontal jack **19**, FIG. **1**, attached to the support **16** of the slide guides **17** moves the cross-member **18** between two positions in which it is situated respectively above the cradles **15** of conveyor **5** and above the open cases of the conveyor **9**.

At its free ends the cross-member **18** is provided with guide bearings **20**, FIG. **4**, and vertical columns **21** are mounted in the bearings **20** to be displaceable in the vertical direction. Two plates **22** are fixed respectively at the bottom ends of the columns **21**, below the cross-member **18**.

A jack mounted vertically between the columns **21** has a piston rod which passes through an opening provided in the cross-member **18** and is attached to the top face of the corresponding plate **22.**

The right-hand part of FIG. **4** shows the method of fastening the plates **22** to the columns **21** and also to the piston rod of the jack. For this reason, the plate **22** of the right-hand end of the cross-member is shown partly in section and without bottle gripping means, but it is understood that it is provided with the same means as the plate **22** on the left-hand end of the cross-member.

Before the gripping means are described, it will be recalled that the bottles ready for shipment are wrapped in a thin paper and there must naturally be no danger that this paper will be removed or torn during the packing of the cases; in this respect there is also a certain difficulty which the invention has succeeded in overcoming.

In the illustrated example the gripping means with which each plate **22** is provided are composed of three grippers **23** opening in the downward direction, with controlled opening and closing. At the bottom face of each plate, where they are mounted, the three grippers are disposed at the apices of an isosceles triangle (see FIG. **5**) to correspond with the necks of three bottles lying side-by-side and top to bottom in cradles **15,** as was explained above.

Each gripper **23** comprises a horizontal pivot **24,** FIG. **4,** supported by suitable lugs on the bottom face of the plate; the two movable parts of the gripper are mounted on the pivot **24** and each has a jaw **25** with a concave portion **28** and, at the opposite end, an operating branch **26** which passes through a suitable aperture **27** in the plate **22.**

FIG. **6** shows that each jaw **25** is shaped in its concave portion **28** as a depression matching one-half of a portion of the neck of a bottle. The two jaws of a gripper can thus be closed around the neck of a bottle and thus hold the latter firmly.

The two branches **26** of the same gripper (FIG. **5**) are disposed one following the other between opposite jacks **29, 30** fixed on the top face of the plate **22.**

The jacks **29, 30** associated with the branches **26** each comprise, facing each branch, a cylinder **31** and a piston **32** having an end projecting out of the cylinder and applied against the corresponding branch **26.** At its opposite end to the projecting part of the piston, the cylinder **31** has an aperture **33** for connection to a suitable fluid system. The opposite jacks are successively fed with fluid under pressure and connected to a discharge circuit, in a suitable manner for opening and closing the gripper.

The length of the cross-member **18** is selected so that the spacing of the plates **22** correspond to the spacing between successive frames carrying cases **10** which are to be filled. At the same time this spacing is such that the three grippers of each plate **22** correspond to a group of three bottles constituting a layer filling the cases. Furthermore, this same spacing is a multiple of the length occupied on the conveyor **5** by the groups of three bottles.

The operation of the installation is as follows:-

The case conveyor **9** is halted when cases **10** are situated under the plates **22** of the filling head **6.** The latter is pushed by the jack **19** above the conveyor **5,** which is likewise halted. With the grippers open, the plates **22** are lowered and the grippers simultaneously grip two groups of three bottles lying side-by-side and top to bottom. The plates **22** are raised by their jacks and the cross-member **18** is drawn by the jack **19** to a position above the conveyor **9.** The plates **22** are lowered again and the grippers open, thus simultaneously laying a layer of three bottles in two spaced cases. Each case receives a first layer in a halted position under the cross-member **18,** and a second layer after it has been moved to a second halted position under the other end of the cross-member. In this second position of the case the downward stroke of the plate **22** is shorter, in order to take into account the presence of the first layer of bottles. A suitable movement detector, not shown, mounted on the cross-member **18** controls the stopping of the plate **22** at the desired level and also the opening of the grippers.

The two conveyors **5** and **9** then advance the desired distance and the filling head repeats its movements. Because of the simultaneous packing of two layers of bottles in different cases, the installation attains a high output rate while effecting perfect arrangement of the bottles in the smallest possible space and without damaging the fine paper in which the bottles are wrapped. With layers of three bottles the installation succeeds in packing in cases at least 7,500 bottles per hour. Nevertheless, the number three was selected only by way of example. With larger cases it is possible for a higher number of bottles to be gripped simultaneously by a selected number of grippers, so that the output per hour is higher.

I claim:

1. An installation for packing bottles lying side-by-side and top to bottom in cases, comprising a case conveyor operable to move open-topped cases in succession in predetermined spaced relation, transporter means operable to move bottles lying on their sides in side-by-side top to bottom relationship with the bodies of alternate bottles nested between the necks of adjoining bottles, a machine operable to overturn upright bottles and dispose them in said side-by-side relationship on the transporter means, an upright bottle conveyor operable to deliver upright bottles in two paths to opposite sides of the bottle overturning machine, and a case filling head operable to remove from the transporting device a predetermined number of successive recumbent bottles and to deposit the bottles as a layer in a case on the case conveyor.

2. An installation according to claim **1,** including a discharge unit to which filled cases are delivered by the case conveyor.

3. An installation according to claim **1,** wherein the transporter device comprises an endless conveyor which supports a succession of concave cradles and which extends parallel to the case conveyor, wherein horizontal slide guides extend transversely above the succession of cradles and the case conveyor, and wherein the filling head is movable along said slide guides between two positions one of which is above the cradles, and the other is above the case conveyor.

4. An installation according to claim **3,** wherein the filling head comprises a cross-member guided by the horizontal slide guides, guide bearings carried at the free ends of the cross-member, vertical columns mounted in the guide bearings to be displaceable in a vertical direction, two plates fixed below the cross-member respectively one to the bottom ends of each of

the vertical columns, bottle gripping means depending from each plate and disposed in a staggered arrangement on each plate to correspond with the relative positions of nested bottles carried by said cradles, the spacing between the plates and the gripping means from one end to the other of the cross-member being such that the gripping means correspond to two groups of nested bottles carried by the cradles and to two separate cases carried by the case conveyor.

5. An installation according to claim **4**, wherein the case conveyor is provided with equidistant frames arranged to support cases, the spacing of the frames being equal to the spacing of said plates, wherein the spacing of the cradles is such that nested bottles carried thereby occupy a minimum volume, and wherein the distance between the plates is a multiple of the space occupied by a number of recumbent bottles corresponding to a layer to be deposited in a case.

6. An installation according to claim **4**, wherein the gripping means for each plate comprise grippers arranged to open in a downward direction with controlled opening and closing.

7. An installation according to claim **5**, wherein the gripping means for each plate comprise grippers arranged to open in a downward direction with controlled opening and closing.

8. An installation according to claim **7**, wherein each gripper comprises two parts mounted for pivotal movement about a horizontal pivot supported by and extending from the bottom face of a plate, said two parts of the gripper each including a concave jaw and in extension of the jaw an operating branch which extends through an aperture provided in the plate and is disposed between two opposed jacks secured to the upper face of the plate.

9. An installation according to claim **8**, wherein the concave part of each jaw of the grippers reproduces in the form of a depression one half of a length of a neck of a bottle.

10. An installation according to claim **9**, wherein said jacks each comprise a cylinder, a piston having one end projecting out of the cylinder and applied against an operating branch of a gripper part, and means connecting each cylinder to a system of fluid under pressure provided at the opposite end of the cylinder to the projecting part of the piston and operable in a manner such that the two jacks associated with the branches of each gripper are fed in succession with fluid under pressure in order to open and close the gripper.

11. An installation according to claim **10**, wherein each plate is provided on its bottom face with three grippers disposed respectively one each at the apices of an isosceles triangle to correspond with the necks of three nested bottles supported by said cradles.

* * * * *