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(54) **Drop-feed apparatus, for example for filling containers and the related method**

Schwerkraft-Zuführvorrichtung, z.B. zum Füllen von Behältern und entsprechendes Verfahren

Dispositif d'alimentation par gravité, p. ex. pour remplir des récipients, ainsi que le procédé correspondant

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(73) Proprietor: **Ferrero S.p.A.**
I-12051 Alba (Cuneo) (IT)

(72) Inventor: **Cognigni, Silvano**
I-62018 Potenza Picena (Macerata) (IT)

(74) Representative:
Bosotti, Luciano et al
c/o JACOBACCI & PERANI S.p.A.
Corso Regio Parco, 27
10152 Torino (IT)

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Description

The present invention relates to drop-feed apparatus and has been developed with particular concern for its possible use for packing containers with small toys, trinkets or the like intended to be inserted as surprises in food products or the like.

Specifically, the present invention relates to apparatus and a method according to the preambles of Claims 1 and 9, which are known, e.g. from FR-A-1 066 367. A substantially similar arrangement is known from GB-A-904 668.

A solution has been known for many years in this field in which the surprise is inserted in a container (usually called a "little barrel") constituted by two cup-like bodies which can be coupled together by engagement of their open ends.

Very often the surprise is of a type requiring assembly and a sheet of assembly instructions and\or a sheet of transfers to be applied to the surprise must be put into the container as well as the component parts; usually this sheet or sheets are rolled into a tube for insertion in one of the cup-like bodies in contact with its inner surface.

In view of the high production rate of the products in which the container must be inserted (especially in the case of confectionery manufactured on an industrial scale) and considering the need to keep the cost of the surprise as low as possible it is definitely desirable to be able to fill and assemble the container automatically, particularly as far as the following operations are concerned:

- picking up the component parts of the surprise in order to put them into the container,

- inserting the components into the container (usually into one of its cup-like constituent parts), together with the sheet or sheets carrying the assembly instructions and/or decorative transfers, and

- assembling the container by coupling its two constituent cup-like bodies.

Until now, it has been practically impossible to carry out the operations described above entirely automatically. In order to ensure that the finished product was reliable (especially to ensure that the container contains all the parts of the surprise, that the sheet or sheets are inserted and that the container is securely closed), manufacturers were therefore obliged to resort to manual packaging which involved considerable problems of organization, costs and, above all, of hygiene of the finished product.

The object of the present invention is to solve the problem of the insertion of the parts or component elements of the surprise in the container, the other problems mentioned above being resolved by solutions which form the subjects of EP-A-0 631 932 and EP-A-0 631 933.

According to the present invention, this problem is solved by virtue of apparatus having the further characteristics claimed specifically in Claim 1. The invention also concerns the related method according to Claim 9.

The invention will now be described purely by way of non-limitative example, with reference to the appended drawings, in which:

- Figure 1 is a general elevational view of apparatus according to the invention, and

- Figures 2 to 4 are further views corresponding substantially to Figure 1 and illustrating the operating sequence of the apparatus of the invention.

As already indicated above, the apparatus according to the present invention is useful (for example) for filling a generally cup-shaped container C inserted with its mouth open upwardly in a cooperating, vertical-axis opening in a tray or palette (V). More particularly, small mechanical items constituting, for example, the parts of a toy, trinket, etc, (surprise) to be assembled, must be inserted in the container C which is in course of being completed by the engagement of a further cup-like body mouth to mouth therewith.

In general, the items in question are dropped from above (according to criteria which will be described further below).

In particular, it will be supposed that the container C intended to receive an item P1 dropped into it by the apparatus of the invention is not originally empty but already contains other items P2, P3, as well as one or more sheets F (for example a sheet with instructions for the assembly of the surprise and/or a sheet with decorative transfers) rolled into a tube and located in contact with the inner surface of the container C.

More particularly, the preferred embodiment of the apparatus according to the invention, generally indicated 1, is intended to ensure that:

- the item P1 is inserted in the container C with its largest dimension oriented generally vertically, and

- the insertion of the item P1 into the container C is achieved while avoiding interference with the items P2, P3 (the number of these items previously inserted in the container C is certainly not limited to two as in the example illustrated but may be of any number) and with the sheets F, which may project upwardly beyond the mouth of the container C.

For this purpose, according to the invention, the feed structure for dropping the items P1 includes a tubular duct 2, usually cylindrical, having a lower end 3 cut like a recorder mouthpiece, the duct 2 being arranged in

a vertical orientation or, preferably, slightly inclined to the vertical so that the outlet defined by the cut end 3 (usually cut at an angle of 30° to the longitudinal axis of the duct 2 which is cylindrical) opens above the container C which is located in an underlying position.

The cyclic supply of the individual items P1 into the duct 2 is achieved from above by means which will be assumed below to be known; the supply may be achieved in a particularly advantageous manner by the apparatus which constitutes the subject of a patent application filed on the same date by the same applicant.

The end 3 of the duct 2, defining the outlet opening through which the items P1 are projected into the underlying container C is closed by a flap 4 (defined as the "closure means" in the claims which follow) driven by an actuator (for example a fluid actuator 5).

It will be appreciated that the flap 4, which is hinged about an upper, generally horizontal axis X4, may "serve" the outlets 3 of several identical discharge ducts 2 simultaneously. This enables several ducts 2 of identical structure to that described previously to be combined in a multiple station so as to enable identical items P1 to be loaded simultaneously into a corresponding number of containers C (for example four containers C) aligned in a row in the palette V.

For this purpose the palette (V) usually has a matrix-like structure and moves on a conveyor K (for example a belt conveyor) in a horizontal direction relative to the observation points of Figures 1 to 4.

The palette V is preferably advanced in a stepwise movement whereby, when the items P1 are dropped into the container C, the latter is stationary relative to the overlying duct 2.

On the opposite side of an imaginary vertical plane defined by the central axis of the container C relative to the duct 2 there is an insertion element 6 constituted by a resilient steel tongue mounted on the shaft of a fluid actuator 7, typically an actuating cylinder. The whole arrangement is such that, by actuation of the actuator 7, the tongue 6 may be made to move selectively:

- between a rest position (Figure 1), in which the lower end of the tongue 6 (generally inclined to the vertical at an angle, for example, of the order of 30° so as to extend approximately parallel to the flap 4 when this closes the outlet aperture 3) is located a certain distance above the palette (V) and hence the container C, so as not to interfere with the horizontal path of advance of the palette V on the conveyor K; and

- an active position (Figure 2) in which the tongue 6 extends towards the container C and its lower end is actually inside the container C and against one side thereof, more specifically, against the side facing that side at which items P1 drop into the container from the duct 2.

The operating sequence of the device of the invention is driven by a general control unit U (constituted by an electronic central control unit and typically a programmable logic controller or PLC) which acts on the actuator 5 for the flap 4 as well as on the actuator 7 for the tongue 6 in dependence on general commands imparted by the unit which superintends the operation of the machine of which the apparatus 1 forms part so as to achieve the operating sequence described below.

In a first phase, the conveyor K is advanced so as to bring a container C (or more preferably a row or an array of containers C) into vertical alignment beneath the outlet 3 from the duct 2 (and of the ducts 2 usually combined therewith in a multiple filling station).

In these conditions (Figure 1) the tongue 6 is kept in its rest position and the flap 4 closes the outlet 3 from the duct 2 into which the item P1 is supplied or has just been dropped (as stated above by means which are assumed known or at least are not relevant for the purposes of an understanding of the invention); in particular, it will be appreciated that, as a result of the tubular conformation of the duct 2 and the particular shape of the outlet 3 (cut like a recorder mouthpiece), with the duct 2 being held approximately vertical, the outlet 3 also extends in a plane at an angle with respect to the longitudinal axis of the duct 2 (for example at about 30° to the vertical) whereby the item P1 tends to dispose itself by gravity with its largest dimension oriented vertically, and is supplied into the container C in a vertical direction.

Subsequently, the flap 4 still being kept closed, the unit U activates the actuator 7 to thrust the tongue 6 downwardly into its active position within the container C (Figure 2).

At this point the actuator 5 is actuated so as to open the flap 4 (Figure 3).

The movement of the flap 4 causes two phenomena:

- in the first place, the flap 4 disengages from the outlet 3 whereby the item P1 - no longer retained by flap 4 - is free to fall from the duct 2 into the container C;

- at the same time, the movement of the flap 4 into its open position has the effect of bending the tongue 6 whereby, in bending, the lower end of the tongue 6 moves diametrally across the container C until it reaches a position which is approximately diametrally opposite that previously occupied - "brushing" so to speak - the entire internal volume of the container C and moving the items P2, P3 already in it against the peripheral wall of the container C so as not to interfere with dropping of the item P1.

In other words, the tongue 6 on the one hand thrusts the items P2, P3 with its rear face (this attribute is with reference to the position of the tongue 6 relative

to the duct 2) against the wall of the container C and, on the other hand, creates a free space in front of its front face into which the item P1 may fall into the container C without interfering with the items P2, P3 and with the sheet or sheets F, the item preferably being oriented vertically, that is, with its greatest dimension parallel to the main axis of the container C.

Naturally in order to improve the desired effect, the tongue 6 should be made, particularly with regard to its width, so as to be slightly narrower than the maximum diameter of the container C: the whole arrangement being such as to confine the items P2, P3 without interfering with or pressing against the walls of the container C.

Once also item P1 has been inserted in the container C, the tongue 6 may be withdrawn so as to enable it to take up its rest position shown in Figure 1.

Preferably (see Figure 4) the withdrawal of the tongue 6 (driven by the actuator 7 by the return of its shaft thereinto) is effected while the flap 4 is kept open so that the tongue 6 is kept bent.

This choice has been shown to be preferential in order to prevent the tongue 6 itself accidentally expelling the item P1 from the container C as a result of its return movement to its undeformed condition while it is still projecting into the container.

Claims

1. Drop-feed apparatus for dropping items (P1) into an underlying container (C), including:

   - a tubular duct (2) defining a path through which the items (P1) drop into the container (C), the duct (2) having an outlet opening (3) which, in use, overlies the underlying container (C), and

   - closure means (4) associated with the lower outlet (3) and movable between a closed position, in which the closure means (4) close the lower outlet (3), and an open position, in which the closure means (4) disengage from the lower outlet (3) to allow the items (P1) to fall freely from the duct (2) into the underlying container (C),
   characterised in that it includes:

   - a tongue-shaped body (6) movable selectively (7) between a rest position, in which the tongue-shaped body (6) is disengaged from the container (C), and at least one active position in which the tongue-shaped body (6) projects into the container (C), and

   - actuator means (4, 5) for selectively moving the tongue-shaped body (6) held in the active position in a substantially radial direction between the opposite sides of the container (C) whereby further items (P2, P3), which may already be present in the container (C) are moved by the tongue-shaped body (6) into a position in which they do not interfere with the dropping of the items (P1) supplied from the said duct (2).

2. Apparatus according to Claim 1, characterised in that the lower opening (3) is made by cutting the duct (2) in the general configuration of a recorder mouthpiece whereby the cut open end (3) extends in a plane at an angle with respect to the longitudinal axis of the duct (2).

3. Apparatus according to Claim 1 or Claim 2, characterised in that the closure means comprise a flat pivoted flap (4).

4. Apparatus according to any one of Claims 1 to 3, characterised in that the closure means (4) are generally elongate and cooperate with the outlet openings (3) of a plurality of tubular ducts (2) arranged in a row for supplying the items (P).

5. Apparatus according to Claim 1, characterised in that the tongue-shaped body (6) is generally flexible whereby the substantially radial movement is effected by the bending of the tongue-shaped body (6) itself.

6. Apparatus according to Claim 1 or Claim 5, characterised in that the actuator means (4) are actuated by the closure means (4).

7. Apparatus according to Claim 3 and Claim 6, characterised in that the actuator means are constituted by the flat pivoted flap (4) which can exert a force on the tongue-shaped body (6).

8. Apparatus according to Claim 1, characterised in that, after the dropping of the items (P1) into the container (C) from the duct (2), the tongue-shaped body (6) is returned to its rest position; the return of the tongue-shaped body (6) to its rest position starting from the condition reached by the tongue (6) itself after the substantially radial movement between opposite sides of the container (C).

9. A method for dropping items (P1) into an underlying container (C), comprising the steps of:

   - providing a tubular duct (2) defining a path through which the items (P1) drop into the container (C), the duct (2), including an outlet opening (3),

   - arranging the outlet opening in a position overlying the container (C) in use,

- associating closure means (4) with the lower outlet (3), and

- moving the closure means selectively between a closure position, in which the closure means (4) close the lower outlet (3), and an open position, in which the closure means (4) are disengaged from the lower outlet (3), allowing the items (P1) to fall freely from the duct (2) into the underlying container (C),
characterised in that it includes the steps of:

  - providing a tongue-shaped body (6) which is movable selectively (7) between a rest position in which the tongue-shaped body (6) is disengaged from the container (C), and at least one active position in which the tongue-shaped body (6) projects into the container (C), and

  - moving the tongue-shaped body (6) while held in the active position, selectively in a substantially radial direction between opposite sides of the container (C) whereby further items (P2, P3) which may already be present in the container (C) are moved by the tongue-shaped body (6) into positions in which they do not interfere with the dropping of the items (P1) supplied from the duct (2).

10. A method according to Claim 9, characterised in that it includes the step of forming the lower outlet (3) by cutting the duct (2) to the general configuration of a recorder mouthpiece and the step of maintaining the duct (2) approximately vertical in use the cut open end (3) extending in a plane at an angle with respect to the longitudinal axis of the duct (2).

11. A method according to Claim 9 or Claim 10, characterised in that the closure means are formed as a flat pivoted flap (4).

12. A method according to any one of Claims 9 to 11, characterised in that it includes the step of forming the closure means (4) in a generally elongate shape and the step of making the closure means cooperate with the outlet openings (3) of a plurality of tubular ducts (2) arranged in a row for supplying the items (P).

13. A method according to Claim 9, characterised in that the tongue-shaped body (6) is made of a generally flexible material whereby the substantially radial movement is effected by the bending of tongue-shaped body (6) itself.

14. A method according to Claim 9 or Claim 13, characterised in that it includes the step of activating the actuator means (4) by means of the closure means (4).

15. A method according to Claim 11 and Claim 14, characterised in that it includes the step of making the pivoted flap (4) exert a thrust on the tongue-shaped body (6).

16. A method according to Claim 9, characterised in that, after the dropping of the items (P1) into the container (C) from the duct (2), the tongue-shaped body (6) is returned to its rest position; the return of the tongue-shaped body (6) to its rest position thus starting from the condition reached by the tongue-shaped body (6) itself after the substantially radial movement between the opposite sides of the container (C).

Patentansprüche

1. Vorrichtung zum Zuführen von Teilen (P1) durch Fallenlassen in einen darunterstehenden Behälter (C), mit:

- einem röhrenförmigen Kanal (2), welcher eine Bahn festlegt, durch welche die Teile (P1) in den Behälter (C) hineinfallen, wobei der Kanal (2) eine Auslaßöffnung (3) aufweist, die im Einsatz über dem darunterstehenden Behälter (C) liegt, und

- Verschlußeinrichtungen (4), welche dem unteren Auslaß (3) zugeordnet und zwischen einer Verschlußstellung, in welcher die Verschlußeinrichtungen (4) den unteren Auslaß (3) verschließen, und einer Öffnungsstellung, in welcher die Verschlußeinrichtungen (4) von dem unteren Auslaß (3) außer Eingriff kommen, bewegbar sind, wodurch der freie Fall der Teile (P1) aus dem Kanal (2) in den Innenraum des darunterstehenden Behälters (C) ermöglicht wird,
dadurch gekennzeichnet, daß die Vorrichtung aufweist:

- ein zungenförmiges Teil (6), das selektiv (7) zwischen einer Ruhestellung, in welcher das zungenförmige Teil (6) von dem Behälter (C) außer Eingriff ist, und mindestens einer Wirkstellung beweglich ist, in welcher das zungenförmige Teil (6) in den Behälter (C) ragt, und

- Betätigungseinrichtungen (4, 5) zum selektiven Bewegen des zungenförmigen Teils (6), das in der Wirkstellung im wesentlichen radial zwischen gegenüberliegenden Seiten des Behälters (C) gehalten ist, wodurch weitere Teile (P2,

P3), die sich gegebenenfalls bereits im Behälter (C) befinden, von dem zungenförmigen Teil (6) in eine Position bewegt werden, in welcher sie das Fallen der aus dem Kanal (2) zugeführten Teile (P1) nicht stören.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die untere Öffnung (3) dadurch gebildet ist, daß der Kanal (2) entsprechend einer Ausformung im wesentlichen in Form eines Flötenmundstücks geschnitten ist, wodurch sich das geschnittene offene Ende (3) in einer Ebene unter einem Winkel bezüglich der Längsachse des Kanals (2) erstreckt.

3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Verschlußeinrichtungen eine flache angelenkte Klappe (4) aufweisen.

4. Vorrichtung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Verschlußeinrichtungen (4) im allgemeinen eine langgestreckte Form aufweisen und mit den Auslaßöffnungen (3) einer Vielzahl rohrförmiger Kanäle (2) zusammenwirken, die zur Zuführung der Teile (P) in einer Reihe angeordnet sind.

5. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das zungenförmige Teil (6) im allgemeinen biegsam ist, wodurch die Bewegung in im wesentlichen radialer Richtung infolge der Biegung des zungenförmigen Teils (6) selbst bewirkt wird.

6. Vorrichtung nach Anspruch 1 oder 5, dadurch gekennzeichnet, daß die Betätigungseinrichtungen (4) von den Verschlußeinrichtungen (4) betätigt werden.

7. Vorrichtung nach Anspruch 3 und 6, dadurch gekennzeichnet, daß die Betätigungseinrichtungen aus der flachen angelenkten Klappe (4) bestehen, durch welche das zungenförmige Teil (6) mit einer Kraft beaufschlagbar ist.

8. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß nach der Zuführung der Teile (P1), die aus dem Kanal (2) in den Behälter (C) fallen, das zungenförmige Teil (6) in Richtung zur Ruhestellung zurückgeführt wird, wobei die Rückführung des zungenförmigen Teils (6) in Richtung zur Ruhestellung aus dem Zustand heraus erfolgt, den das zungenförmige Teil (6) nach der Bewegung in im wesentlichen radialer Richtung zwischen gegenüberliegenden Seiten des Behälters (C) erreicht.

9. Verfahren zum Fallenlassen von Teilen (P1) in einen darunterstehenden Behälter (C), mit folgenden Schritten:

- Vorsehen eines röhrenförmigen Kanals (2), der eine Bahn festlegt, durch welche die Teile (P1) in den Behälter (C) hineinfallen, wobei der Kanal (2) eine Auslaßöffnung (3) aufweist,

- Anordnen der Auslaßöffnung in einer Stellung, in der sie im Gebrauch über dem verwendeten Behälter (C) liegt,

- Zuordnen von Verschlußeinrichtungen (4) zu dem unteren Auslaß (3), und

- Bewegen der Verschlußeinrichtungen wahlweise zwischen einer Verschlußstellung, in der die Verschlußeinrichtungen (4) den unteren Auslaß (3) verschließen, und einer offenen Stellung, in der die Verschlußeinrichtungen (4) von dem unteren Auslaß (3) außer Eingriff sind, wobei ermöglicht wird, daß die Teile (P1) frei von dem Kanal (2) in den darunterliegenden Behälter (C) fallen,

dadurch gekennzeichnet, daß das Verfahren ferner folgende Schritte aufweist:

- Vorsehen eines zungenförmigen Teils (6), das wahlweise (7) zwischen einer Ruhestellung, in der das zungenförmige Teil (6) von dem Behälter (C) außer Eingriff ist, und wenigstens einer Wirkstellung bewegbar ist, in der das zungenförmige Teil (6) in den Behälter (C) ragt, und

- Bewegen des zungenförmigen Teils (6), während es in der Wirkstellung gehalten wird, wahlweise in einer im wesentlichen radialen Richtung zwischen gegenüberliegenden Seiten des Behälters (C), wodurch weitere Teile (P2, P3), die bereits in dem Behälter (C) vorhanden sein können, durch das zungenförmige Teil (6) in Stellungen bewegt werden, in denen sie das Fallen der Teile (P1) nicht stören, die von dem Kanal (2) zugeführt werden.

10. Verfahren nach Anspruch 9, dadurch gekennzeichnet, daß dieses den Schritt der Ausbildung des unteren Auslasses (3) durch Schneiden des Kanals (2) in die allgemeine Gestalt eines Flötenmundstückes und den Schritt des Haltens des Kanals (2) etwa vertikal in der Verwendung aufweist, wobei sich das geschnittene offene Ende (3) in einer Ebene unter einem Winkel bezüglich der Längsachse des Kanals (2) erstreckt.

11. Verfahren nach Anspruch 9 oder 10, dadurch gekennzeichnet, daß die Verschlußeinrichtungen als eine flache angelenkte Klappe (4) ausgebildet sind.

12. Verfahren nach einem der Ansprüche 9 bis 11, dadurch gekennzeichnet, daß dieses den Schritt der Ausbildung der Verschlußeinrichtungen (4) in eine im allgemeinen längliche Form und den Schritt der Veranlassung, daß die Verschlußeinrichtungen mit den Auslaßöffnungen (3) von mehreren röhrenförmigen Kanälen (2) zusammenwirken, die für die Zuführung der Teile (P) in einer Reihe angeordnet sind, aufweist.

13. Verfahren nach Anspruch 9, dadurch gekennzeichnet, daß das zungenförmige Teil (6) aus einem im allgemeinen biegsamen Material besteht, wodurch die Bewegung in im wesentlichen radialer Richtung infolge der Biegung des zungenförmigen Teils (6) selbst bewirkt wird.

14. Verfahren nach Anspruch 9 oder 13, dadurch gekennzeichnet, daß es den Schritt der Betätigung der Betätigungseinrichtungen (4) mittels der Verschlußeinrichtungen (4) aufweist.

15. Verfahren nach Anspruch 11 und 14, dadurch gekennzeichnet, daß dieses den Schritt der Veranlassung, daß die angelenkte Klappe (4) das zungenförmige Teil (6) beaufschlagt, aufweist.

16. Verfahren nach Anspruch 9, dadurch gekennzeichnet, daß nach dem Fallen der Teile (P1) in den Behälter (C) von dem Kanal (2) das zungenförmige Teil (6) zu seiner Ruhestellung zurückgeführt wird; wobei die Rückführung des zungenförmigen Teils (6) zu seiner Ruhestellung somit von dem Zustand beginnt, der durch das zungenförmige Teil (6) selbst nach der im wesentlichen radialen Bewegung zwischen den entgegengesetzten Seiten des Behälters (C) erreicht wird.

Revendications

1. Dispositif d'alimentation par gravité pour faire tomber des articles (P1) dans un récipient sous-jacent (C), comprenant :

   un conduit tubulaire (2) définissant un passage par lequel les articles (P1) tombent dans le récipient (C), le conduit (2) comportant une ouverture de sortie (3) qui, à l'utilisation, surplombe le récipient sous-jacent (C), et
   un moyen de fermeture (4) associé à l'ouverture de sortie inférieure (3) et adapté à se déplacer entre une position fermée, dans laquelle le moyen de fermeture (4) ferme l'ouverture de sortie inférieure (3), et une position ouverte, dans laquelle le moyen de fermeture (4) se dégage de l'ouverture de sortie inférieure (3) pour permettre aux articles (P1) de tomber librement du conduit (2) dans le récipient sous-jacent (C), caractérisé en ce qu'il comprend :
   un corps en forme de languette (6) adapté à être déplacé sélectivement (7) entre une position de repos, dans laquelle le corps en forme de languette (6) est dégagé du récipient (C), et au moins une position active dans laquelle le corps en forme de languette (6) se projette dans le récipient (C), et
   des moyens d'actionnement (4, 5) pour déplacer sélectivement le corps en forme de languette (6) maintenu dans la position active dans une direction sensiblement radiale entre les faces opposées du récipient (C) de manière que d'autres articles (P2, P3), qui peuvent déjà être présents dans le récipient (C) soient déplacés par le corps en forme de languette (6) dans une position dans laquelle ils n'entravent pas la chute des articles (P1) distribués depuis ledit conduit (2).

2. Dispositif selon la revendication 1, caractérisé en ce que l'ouverture de sortie inférieure (3) est formée en découpant le conduit (2) en la configuration générale d'un bec de flûte de manière que l'extrémité ouverte découpée (3) s'étende dans un plan à un angle par rapport à l'axe longitudinal du conduit (2).

3. Dispositif selon la revendication 1 ou la revendication 2, caractérisé en ce que le moyen de fermeture comprend un volet plat pivotant (4).

4. Dispositif selon l'une quelconque des revendications 1 à 3, caractérisé en ce que le moyen de fermeture (4) est généralement allongé et coopère avec les ouvertures de sortie (3) d'une pluralité de conduits tubulaires (2) agencés en une rangée pour distribuer les articles (P).

5. Dispositif selon la revendication 1, caractérisé en ce que le corps en forme de languette (6) est généralement flexible de manière que le déplacement sensiblement radial soit effectué par la flexion du corps en forme de languette (6) même.

6. Dispositif selon la revendication 1 ou la revendication 5, caractérisé en ce que le moyen d'actionnement (4) est actionné par le moyen de fermeture (4).

7. Dispositif selon la revendication 3 et la revendication 6, caractérisé en ce que le moyen d'actionnement est constitué par le volet plat pivotant (4) qui peut exercer une force sur le corps en forme de languette (6).

8. Dispositif selon la revendication 1, caractérisé en

ce que, après la chute des articles (P1) dans le récipient (C) depuis le conduit (2), le corps en forme de languette (6) est ramené dans sa position de repos, le retour du corps en forme de languette (6) dans sa position de repos se faisant à partir de la condition atteinte par le corps (6) même après le déplacement sensiblement radial entre les faces opposées du récipient (C).

9. Procédé pour faire tomber des articles (P1) dans un récipient sous-jacent (C), comprenant les phases consistant à :

prévoir un conduit tubulaire (2) définissant un passage par lequel les articles (P1) tombent dans le récipient (C), le conduit (2) comportant une ouverture de sortie (3),
agencer l'ouverture de sortie dans une position surplombant le récipient (C) à l'utilisation,
associer un moyen de fermeture (4) à l'ouverture de sortie inférieure (3), et
déplacer le moyen de fermeture sélectivement entre une position fermée, dans laquelle le moyen de fermeture (4) ferme l'ouverture de sortie inférieure (3), et une position ouverte, dans laquelle le moyen de fermeture (4) se dégage de l'ouverture de sortie inférieure (3), permettant aux articles (P1) de tomber librement du conduit (2) dans le récipient sous-jacent (C),

caractérisé en ce qu'il comprend les phases consistant à :

prévoir un corps en forme de languette (6) qui est adapté à être déplacé sélectivement (7) entre une position de repos dans laquelle le corps en forme de languette (6) est dégagé du récipient (C), et au moins une position active dans laquelle le corps en forme de languette (6) se projette dans le récipient (C), et
déplacer le corps en forme de languette (6) tandis qu'il est maintenu dans la position active, sélectivement dans une direction sensiblement radiale entre les faces opposées du récipient (C) de manière que d'autres articles (P2, P3), qui peuvent déjà être présents dans le récipient (C) soient déplacés par le corps en forme de languette (6) dans des positions dans lesquelles ils n'entravent pas la chute des articles (P1) distribués depuis le conduit (2).

10. Procédé selon la revendication 9, caractérisé en ce qu'il comprend la phase consistant à former l'ouverture de sortie inférieure (3) en découpant le conduit (2) en la configuration générale d'un bec de flûte et la phase consistant à maintenir le conduit (2) à peu près verticalement à l'utilisation, l'extrémité ouverte découpée (3) s'étende dans un plan à un angle par rapport à l'axe longitudinal du conduit (2).

11. Procédé selon la revendication 9 ou la revendication 10, caractérisé en ce que le moyen de fermeture est formé en un volet plat pivotant (4).

12. Procédé selon l'une quelconque des revendications 9 à 11, caractérisé en ce qu'il comprend la phase consistant à donner au moyen de fermeture (4) une forme généralement allongée et la phase consistant à faire coopérer le moyen de fermeture avec les ouvertures de sortie (3) d'une pluralité de conduits tubulaires (2) agencés en une rangée pour distribuer les articles (P).

13. Procédé selon la revendication 9, caractérisé en ce que le corps en forme de languette (6) est fait d'un matériau généralement flexible de manière que le déplacement sensiblement radial soit effectué par la flexion du corps en forme de languette (6) même.

14. Procédé selon la revendication 9 ou la revendication 13, caractérisé en ce qu'il comprend la phase consistant à actionner le moyen d'actionnement (4) par le moyen de fermeture (4).

15. Procédé selon la revendication 11 et la revendication 14, caractérisé en ce qu'il comprend la phase consistant à amener le volet pivotant (4) à exercer une poussée sur le corps en forme de languette (6).

16. Procédé selon la revendication 9, caractérisé en ce que, après la chute des articles (P1) dans le récipient (C) depuis le conduit (2), le corps en forme de languette (6) est ramené dans sa position de repos, le retour du corps en forme de languette (6) dans sa position de repos se faisant donc à partir de la condition atteinte par le corps en forme de languette (6) même après le déplacement sensiblement radial entre les faces opposées du récipient (C).

FIG. 1

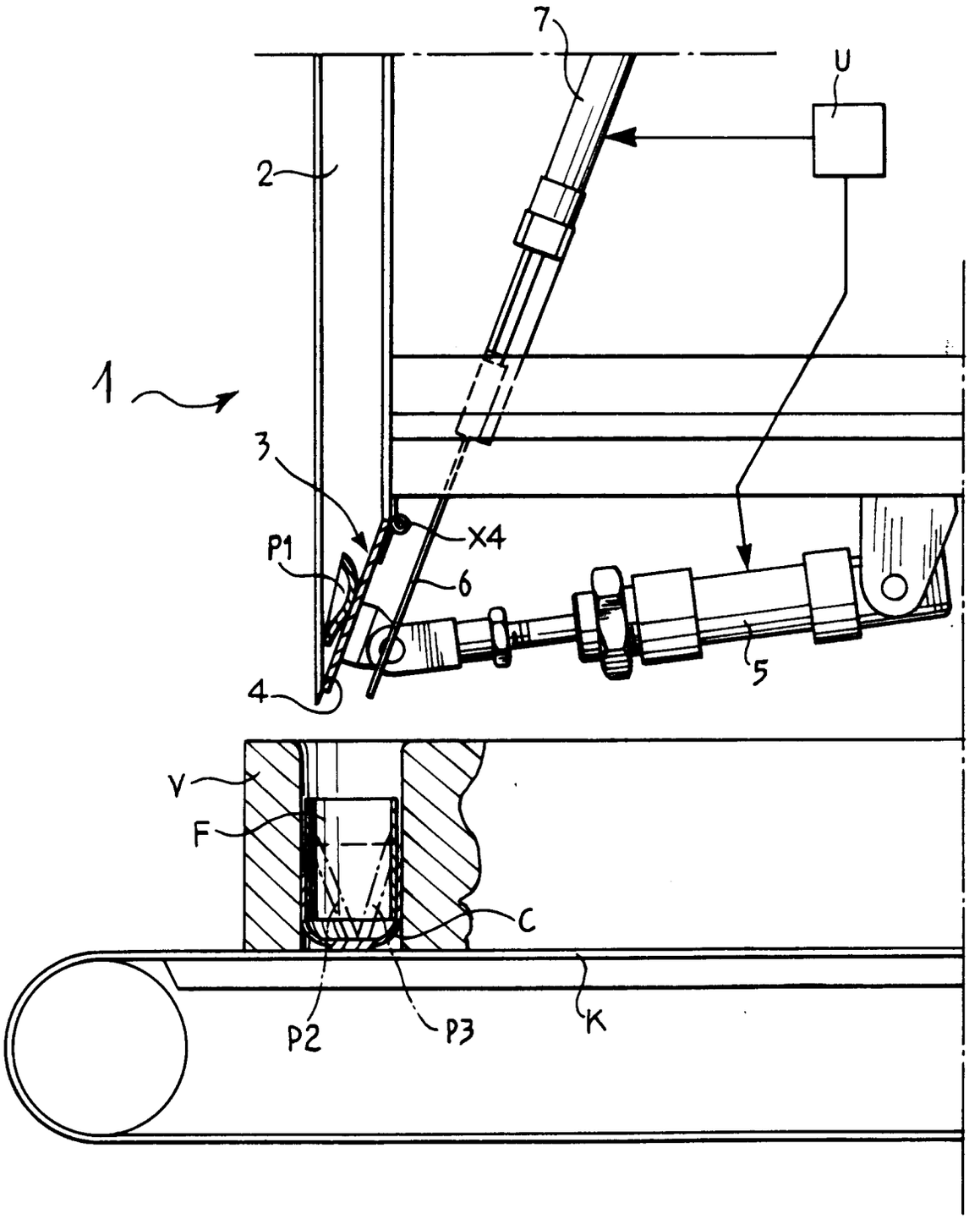


FIG. 2

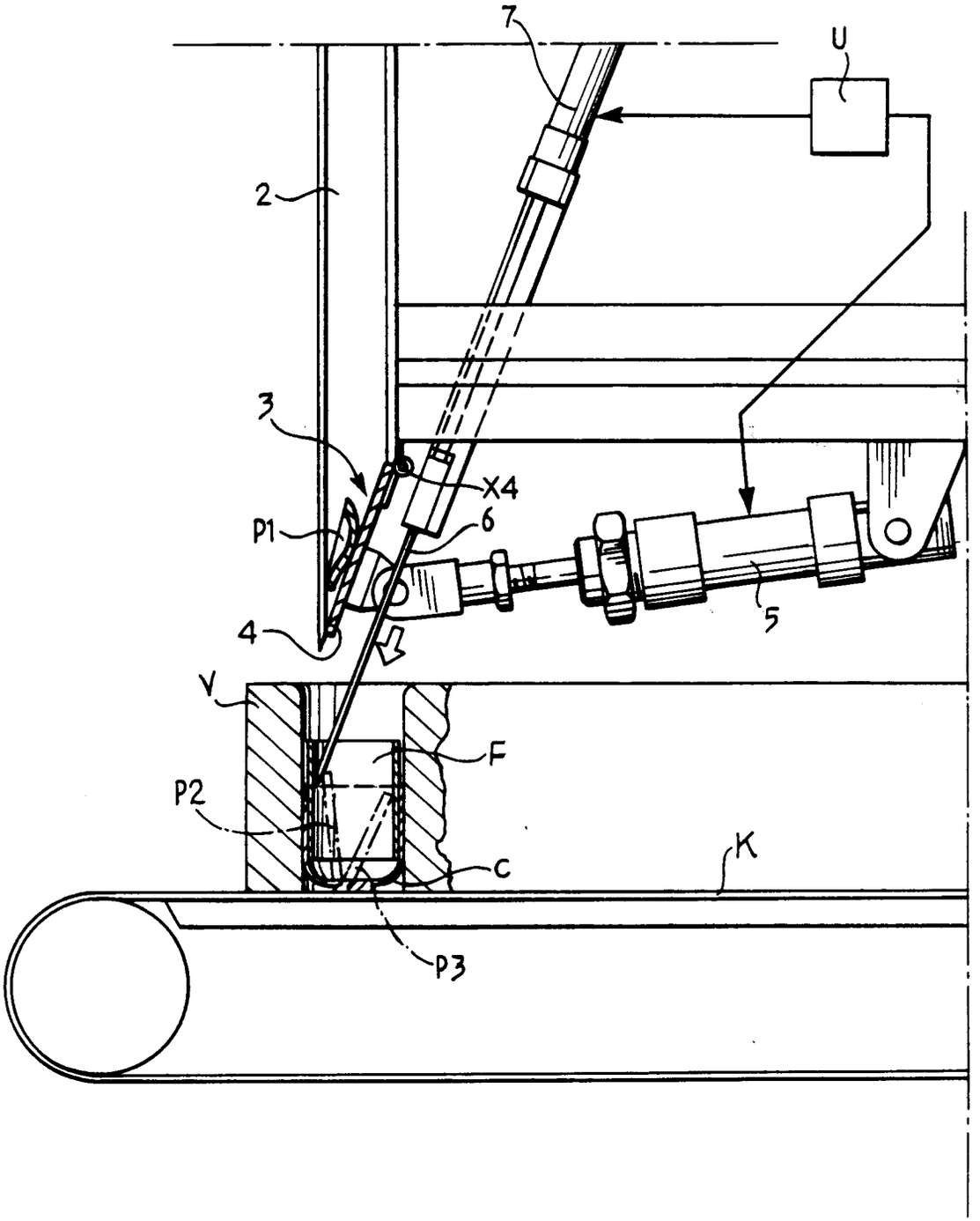


FIG. 3

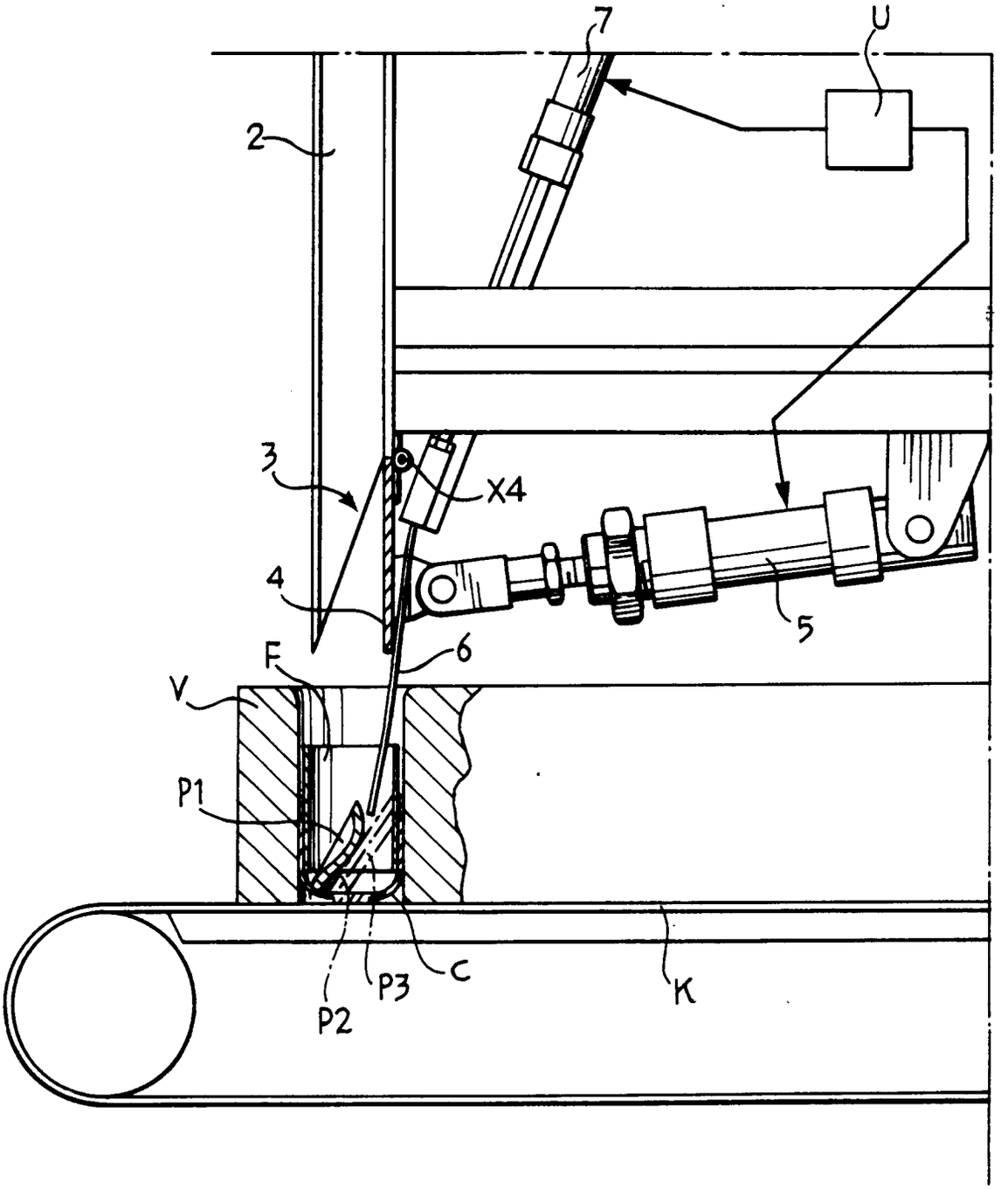


FIG. 4

