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(54) **DEVICE FOR SUPPLYING/DOSING PACKAGED TABLETS FOR THE FOOD INDUSTRY**

(57) The invention relates to a tablet-supply device which allows the use of food additive in the solid phase or, more specifically, in the form of tablets. According to the invention, the tablets are dosed to a series of packages or receptacles used in the food industry and containers for other products that require the inclusion of the aforementioned solid additives. The inventive device is fully automatic and can operate at medium and high distribution speed, such as to produce tablets with a low level of compression therein, in order to facilitate the subsequent dissolution thereof, and without causing any deterioration during handling.

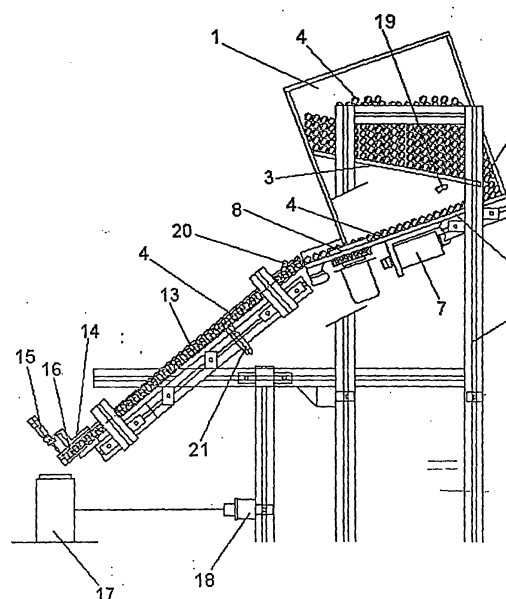


FIG. 1

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Description

OBJECT OF THE INVENTION

[0001] The present invention relates to a device for supplying tablets consisting of solid additives, from a tank or reservoir for supplying said tablets, such that they are delivered in a unitary or multiple dosed form to a series of packages or containers used in the food industry and containers of other products to which said solid additives is required to provide.

[0002] The object of the invention is to ensure a fast process for fully automatically supplying said tablets and without an excessive compactness in said tablets, which might negatively influence on the subsequent dissolution thereof.

BACKGROUND OF THE INVENTION

[0003] In the practice application scope of the invention, that of delivering of food additives to packages containing food products, additives in the liquid phase are mainly used due to feed-dosage problems involved in using additives in the solid phase.

[0004] More particularly, in medium or high speed lines and with the purpose of achieving a suitable functionality, the use of additional vibrant material, for displacement of the tablet-shaped food additives, is always essential at present, which involves that said tablets must have a high compression, so as to prevent collapse thereof caused by said vibration.

[0005] However, compression of said tablets must be low so that its dilution in the package wet environment is facilitated since, as stated above, additives in the liquid phase are mainly used in this field.

[0006] On the other hand, there is a legislation that limits the maximum quantity of additives both by quantity and typology, which makes the use of excipients and binders in the precise quantities for obtaining high collapse strength to be difficult.

DESCRIPTION OF THE INVENTION

[0007] The supplying-dosing device provided by the invention allows the use of food additives in the solid phase, specifically in the form of tablets, at a medium and high distribution speed with a low level of compression in said tablets in order to facilitate the subsequent dissolution thereof, and without causing any deterioration during handling.

[0008] For this purpose and more specifically, the supplying-dosing device is structured from a tablet tank, having a suitable capacity so that its reload frequency is also suitable, the tank having a bottom portion defining a retaining ramp and including a side opening for outlet of tablets, in a layered form, to a down ramp, with a gradual slope, where a vibrator is placed transmitting a slight vibration to said ramp, enough for causing the

gravitational displacement of the tablets but in turn low enough for not to endanger the compactness of said tablets.

[0009] Said down ramp, arranged according to the tank bottom itself, which assumes a sloped arrangement, leads to an extractor mechanism in which a motor element acts on a pair of counter rotating blades and which mutually determine a unitary passageway for the tablets, which are coming in alignment to a second tank, in the form of a closed conduit, having sensors determining at every time the quantity of pills or tablets existing in its interior, and that is closed at its lower portion by means of a pair of pneumatic cylinders, which stems act inside the conduit-tank and do it alternatively, such that while one of them supports the tablets existing in said conduit tank, excluding the first or lower one, the other allows said terminal tablet to drop down into the corresponding reservoir to be dosed, which will be passed down to said conduit tank and which presence will be also detected by a sensor.

[0010] The device may be either unitary, supplying a tablet to a reservoir in each operational cycle thereof, or it may be multiple with several conduit-tanks and several extractor mechanisms receiving the pills from a single tank, in which case dosed provision of additives to several reservoirs may be carried out simultaneously.

DESCRIPTION OF THE DRAWINGS

[0011] For completing the description herein and with the purpose of assisting in a better understanding of the features of the invention, according to one preferred example of a practical embodiment thereof, a set of drawings is herein enclosed forming part of said description in which the following has been depicted for illustrative and non limiting purposes:

Figure 1 shows a side elevational diagrammatic representation of a device for supplying-dosing packaged tablets for the food industry made according to the object of the present invention.

Fig. 2 shows a detail in perspective of the configuration intended as the preferred one for the tablets to be handled with the supplying-dosing device of the above figure.

Fig. 3 shows an enlarged detail of the extractor mechanism.

Fig. 4 shows a plan diagrammatic representation of how the tablets are positionally discriminated by the blades in the extractor mechanism making them to be unitarily passed into the corresponding conduit-tank.

Fig. 5 shows an enlarged detail of the free end of said conduit-tank, with its corresponding ejection

mechanism.

Figs. 6 and 7 show two side elevational views in detail of the assembly depicted in Fig. 5 in the two positions for the ejection mechanism.

PREFERRED EMBODIMENT OF THE INVENTION

[0012] In view of the above figures it may be seen how the supplying-dosing device provided by the invention is formed from a tablet tank 1, having a significant capacity so that its reload frequency is less often in time, mounted in a high position on a supporting frame 2.

[0013] The tank defines a sloped reservoir inside of which a retaining ramp 3 is provided over which the tablets 4 are indiscriminately located, passing to the lower portion of said ramp 3 through the opening 5 formed in correspondence with the lowermost edge thereof, for reaching the bottom 6 of the tank 1, that is sloped in comparison to the ramp 3 y through which the tablets 4 come down also indiscriminately but in a laminar flow, the configuration of the tablets itself facilitating their displacement, specially visible in the detail of the figure 2, and the provision of a vibrator 7 in the bottom of the tank 1 imparting a very slight vibration to said bottom 6 and consequently to the tablets 4 which facilitates gravitational displacement to an extractor mechanism 8 located to the outlet of the tank or reservoir 1.

[0014] This extractor mechanism 8, especially visible in the figure 3, consists of a motor 9 which directly drives one blade 10 and that is provided with a gear wheel 11 in its shaft for synchronous movement transmission, through another gear wheel 12, to a second blade 10' that is rotated in a reverse direction to blade 10.

[0015] Said blades 10-10', as shown in figure 4, have a rounded vertex, equilateral triangular configuration, and they are angularly phase shifted and properly spaced apart for forming a unitary passageway between them for the tablets 4, which are thus forced to leave the extractor mechanism in line for reaching a conduit-tank 13.

[0016] In this conduit-tank, also having a considerable slope, even steeper, an ejection mechanism is also provided fitted on a support 14, located in the vicinity of its lower free end, and consisting of a pair of cylinders, particularly a head cylinder 15 and a tail cylinder 16, very near to each other, so that, e.g. from the location shown in the figure 6, in which the head cylinder 15 is retaining all the line of tablets 4, when the tail cylinder 16 comes down, its stem is located between the last and the last but one tablets 4 as shown started in said figure 6 and at the end of operation as shown in figure 7, the head piston 15 is retracted allowing the last tablet 4 to drop down to the reservoir 7 to be dosed, which will be previously located under the ejection mechanism 14 and which presence will have been detected by a sensor 18.

[0017] As a complement of the structure described in the device there is a pair of air injectors 19 and 20 which

eliminates the possible dust which could result from the tablets 4 when moving, at the time that a sensor 21 located in the conduit-tank 13 detects the need for feeding tablets into said conduit-tank.

[0018] The supplying-dosing device of the invention provides a number of advantages which are mainly focused to the following aspects:

[0019] It allows tablets to be dosed even in lines with water vapor emission by using said air injectors 19 and 20 keeping an overpressure in the working area.

[0020] It eliminates the human factor in dosage process, relieving the operator for this task, only with the participation for feeding new tablets when the tank 1 is empty.

[0021] It avoids an unnecessary feeding of tablets when, due to any problem on the feeding chain, no reservoir 17 has been placed under the ejection mechanism 14 and consequently it has not been detected by the sensor 18.

[0022] It improves process and product safety.

[0023] Environment is respected by reducing the emissions to environment of command liquid with acid components, etc.

Claims

1. Device for supplying-dosing packaged tablets for the food industry which has the purpose of unitarily delivering the proper dose of solid additives in the form of a tablet to said packages, **characterized in that** it consists of a tank (1) for said tablets inside of which a retaining ramp (3) is provided indiscriminately leading the tablets (4) to an opening (5) communicating with the bottom (6) of the tank, wherein the tablets (4) keep a indiscriminate location but with a laminar flow to at least one extractor mechanism (8), from which the tablets (4) gain access to the interior of a conduit-tank (13), having a ejection mechanism (14), under which tablets (4) to be dosed are unitarily and sequentially located.
2. Device for supplying-dosing packaged tablets for the food industry, as claimed in claim 1, **characterized in that** under the sloped bottom (6) of the tablet tank (1) a vibrator (7) is provided imparting a slight vibration for facilitating the displacement of the tablets (4) to the extractor mechanism (8).
3. Device for supplying-dosing packaged tablets for the food industry, as claimed in claim 1, **characterized in that** the extractor mechanism (8) consists of a motor (9) which synchronously transmits a rotary movement in a reverse direction to a pair of coplanar blades (10) between which a passageway is defined having a width suitable to the size of the tablets (4), for determining said unitary passage and in alignment of said tablets.

4. Device for supplying-dosing packaged tablets for the food industry, as claimed in claim 1, **characterized in that** the conduit-tank (13) consists of a tube properly sized so that the tablets (4) are located therein in alignment, said conduit-tank (13) being assisted by a sensor (21) which detects the presence of tablets (4) and enables the extractor mechanism (8) when there are no tablets. 5
5. Device for supplying-dosing packaged tablets for the food industry, as claimed in claim 1, **characterized in that** the extractor mechanism consists of a pair of cylinders (15) and (16), one being a head cylinder and the other one being a tail cylinder, working alternately, for allowing the unitary outlet of the tablets (4) through the lower end of the tube that is part of the conduit-tank (13). 10 15
6. Device for supplying-dosing packaged tablets for the food industry, as claimed in claim 1, **characterized in that** it includes a pair of air injectors (19) and (20), one located at the lower portion of the tank (1), in the vicinity of its outlet mouth (5), and another one at the access area to the conduit-tank (13), which eliminate the possible dust resulting from tablets (4) and which cause an overpressure for preventing said tablets from being affected by wet environments. 20 25

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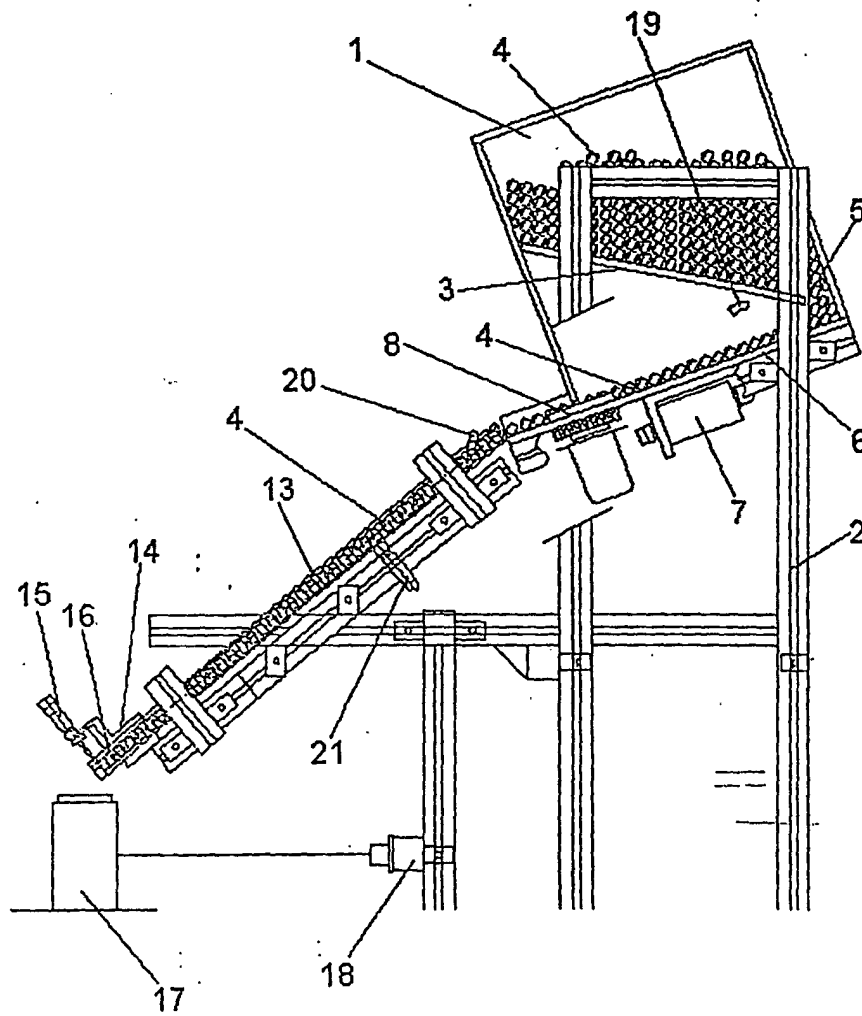


FIG. 1

FIG. 2

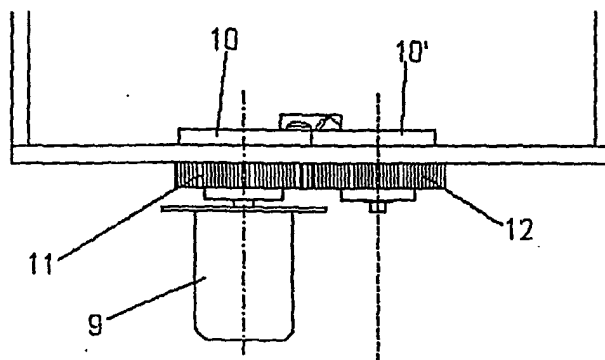
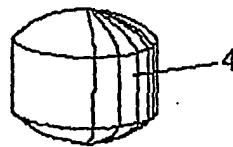


FIG. 3

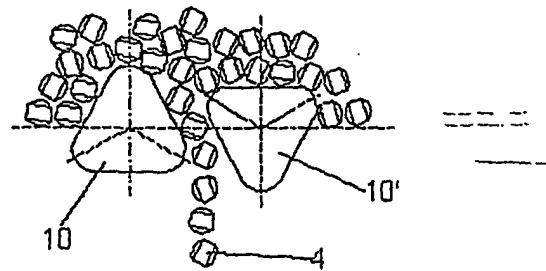


FIG. 4

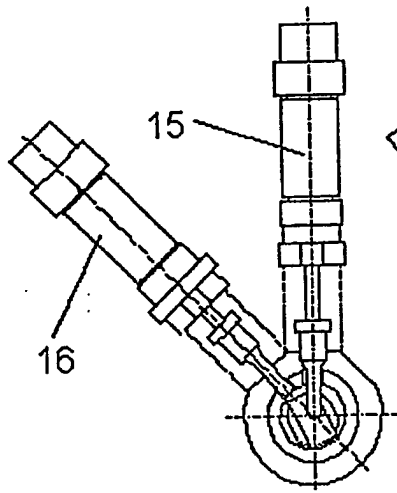


FIG. 5

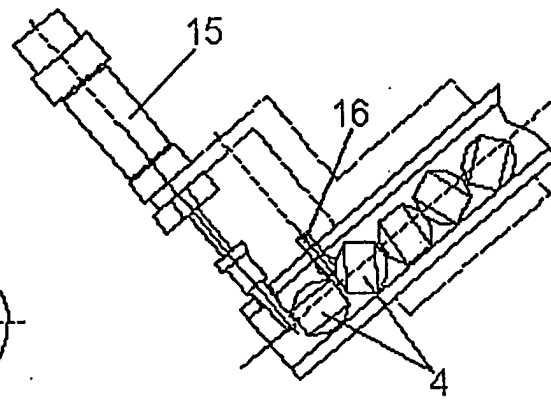


FIG. 6

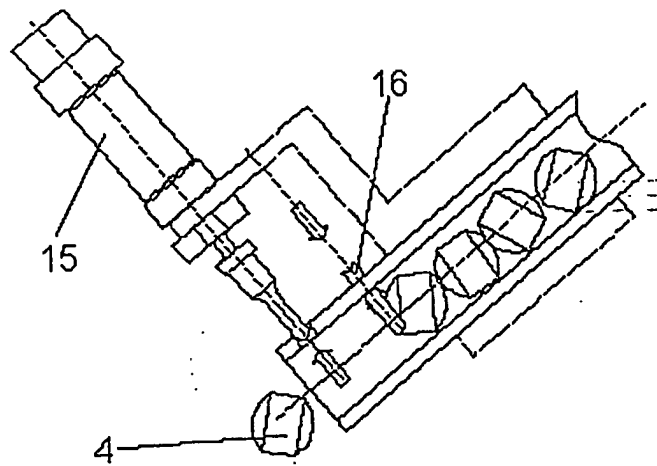


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES03/000642

A. CLASSIFICATION OF SUBJECT MATTER		
IPC ⁷ B65B 35/06, B65G 47/14, B65B 5/10, B65B 35/32		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC ⁷ B65B, B65G		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
ES		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
CIBEPAT, EPODOC, WPI, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	GB 716026 A (NICOLLE) 29.09.1954, the whole document	1 3, 4
Y A	US 6357495 B (BARONCINI) 19.03.2002, the whole document	1 4
A	US 2656962 A (DANIELS) 27.10.1953, column 4, line 69-column 5, line 41; figures	1, 2
A	US 2002108356 A (AYLWARD) 15.08.2002, page 4; paragraph 48; figures 1, 3	1, 2, 6
A	PATENT ABSTRACTS OF JAPAN, PAJ/B24-29, 1976-1988 (1/2)/12, JP 63-280608 A (NEC Corp.) 17.11.1988	1, 4
A	DE 443359 C (UHLIG) 27.04.1927, page 3, lines 41-46; figures	5
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
12 February 2004 (12.02.04)		20 February 2004 (20.02.04)
Name and mailing address of the ISA/ S.P.T.O.		Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES03/000642

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0412806 A (SANYO EKECTRIC CO. Ltd.) 13.02.1991, column 8, lines 8-48; figures 5-11	1, 5
A	US 2786566 A (TAGGART) 26.03.1957, the whole document	1

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT
 Information on patent family members

 International Application No
 PCT/ES03/000642

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 716026 A	29.09.1954	NONE	
US 6357495 B	19.03.2002	ITBO980485 A	03.02.2000
		WO2000007881A	17.02.2000
		IT 304471 B	19.03.2001
		EP 1117592 A	25.07.2001
		CN 1311741 T	05.09.2001
		DE 69904354 D	19.03.2002
		JP 2003516279 T	13.05.2003
		DE 69904354 T	09.10.2003
US 2656962 A	27.10.1953	NONE	
US 2002108356 A	15.08.2002	US 6185901 B	13.02.2001
		US 6266946 B	31.07.2001
		US 6269612 B	07.08.2001
		US 2001045081A	29.11.2001
		US 6401429 B	11.06.2002
		US 6505460 A	14.01.2003
JP 63280608 A	17.11.1988	NONE	
DE 443359 C	27.04.1927	NONE	
EP 0412806 A	13.02.1991	JP 3069406 A	25.03.1991
		JP 3079516 A	04.04.1991
		US 5097652 A	24.03.1992
		DE 69014257 D	05.01.1995
		DE 69014257 T	24.05.1995
		KR 9609009 B	10.07.1996
US 2786566 A	26.03.1957	NONE	