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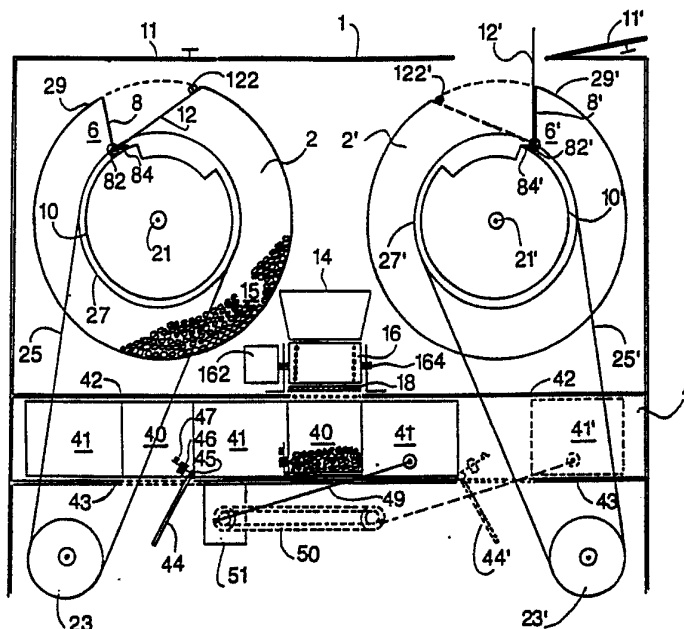
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(54) Title: AUTOMATIC PORTIONING AND WEIGHING ARRANGEMENT



(57) Abstract

An automatic portioning and weighing arrangement for loose products (15) comprises at least one store drum (2) whereby the store drum (2) comprises at least one portioning capacity (6) wherein separate portions of the products (15) are formed. The weighing arrangement (4) comprises at least one collecting capacity (40) for loose products. The store drum (2) has been arranged almost horizontally and the portioning capacity (6) extends over almost the complete length of the store drum (2). As a consequence, the chance for chocking ups is almost non-existent on delivery of the loose products (15).

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⁺ It is not yet known for which States of the former Soviet Union any designation of the Soviet Union has effect.

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Automatic portioning and weighing arrangement.

5 The invention relates to an automatic portioning and weighing arrangement for loose products, the arrangement comprising at least one store drum whereby the store drum comprises at least one portioning capacity wherein separate portions of the products may be formed and whereby the weighing arrangement comprises at least one collecting capacity. Examples of such "loose products" are popcorn, chips, french fries, sweets, 10 pastery, small metal products or products made of a synthetic material.

15 Such automatic portioning and weighing arrangements may be used in automated rapid kitchens, but also in automatons which may be served by means of a coin or insert piece.

20 Such an automatic portioning and weighing arrangement is known from the American patent specification US-A-3,690,247. The store drum of this portioning and weighing device is obliquely arranged so that with a rotating drum the loose products make their way to the lowest part. The portioning capacity is at the level of this lowest part. The portioning capacity consists of parts which radially project from the jacket of the drum. With a rotating drum these parts carry each time a portion of 25 products which is delivered somewhat further in a collecting capacity. This rotation of the drum continues until a specified weight is reached in the collecting capacity. Then the rotation stops.

30 This arrangement according to the state of the art, however, displays different drawbacks :
First, the portioning capacity is rather small, as a consequence the chance for choking ups with the delivery of products is great.

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Next, a lot of space is needed around the store drum because of the structure of the portioning capacities.

The weighing is also mostly inaccurate : Rest product may be wedged at the delivery valve of the portioning capacity and may, after the rotation of the store drum has ended, so after the desired weight has been reached, still fall into the collecting capacity in such a way that the eventually obtained weight is greater than the adjusted weight.

Finally, the store drum is difficult to clean.

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The object of the invention is to avoid the above mentioned drawbacks.

The invention provides an automatic portioning and weighing arrangement for loose products, the arrangement comprising at least one store drum whereby the store drum comprises at least one portioning capacity wherein separate portions of the products may be formed and whereby the weighing arrangement comprises at least one collecting capacity. The store drum is almost horizontally arranged and the portioning capacity extends over almost the complete length of the store drum. Hence, there is a rather large portioning capacity, which makes the chance for choking ups almost non-existent.

25 According to a preferable embodiment, the store drum is cylindrical and the portioning capacity is completely within the circumference of the store drum. This has the advantage that the store drum takes little space.

30 Preferably, the portioning capacity is formed by a part of the outer jacket of the store drum and by the delivery valve. Preferably, the delivery valve is rotatable around an axle which is excentric and almost parallel to the axis of the store drum over the whole length of the store drum and the rotation

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of the delivery valve is commanded by means of a cam.

Preferably, the arrangement is further provided with a filling valve which is rotatable around the same axle as the delivery valve and whereby the delivery valve rests on the filling valve in the delivery position.

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To fill the store drum the delivery valve is not in the delivery position and the filling valve is brought against the delivery valve.

The advantage of such a system of valves is that there is a minimum amount of machine parts and that cleaning is easy.

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According to a preferable embodiment, the portioning and weighing arrangement is further provided with an endless conveyor belt where the loose products fall on on delivery from the portioning capacity. This belt carries the products to the weighing arrangement. Such an embodiment has as an advantage that the belt functions as a kind of buffer between the store drum with the portioning capacity and the weighing arrangement : The weighing arrangement does no longer order the rotation of the store drum. Rest product falls always on the belt and not in the collecting capacity of the weighing arrangement such that accurate measurements may be done.

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Preferably, the circumferential velocity of the belt and the rotation of the store drum are so regulated that the belt receives one portion of loose products every half revolution.

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According to another preferable embodiment, the weighing arrangement is provided with a blocking slide which may block all possible delivery of loose products to the collecting capacity of the weighing arrangement. Such an embodiment also increases the chance for accurate measurements : Once the adjusted weight has been reached, the blocking slide closes and no products, even no rest product, may enter the collecting capacity.

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According to a particular and preferable embodiment, the portioning and weighing arrangement is provided with two cylindrical store drums which are in parallel positioned adjacent to one another in such a way that both may deliver portions of loose products to the same weighing arrangement. Such a positioning allows for a continuous working if one of both store drums must be filled or cleaned.

According to another particular and preferable embodiment the portioning and weighing arrangement is provided with two collecting capacities which are horizontally movable and which may serve two separate working up installations. Such an embodiment leads to an accelerated working : while the one quantity is being weighed, the other quantity may already be delivered to the working up installation.

The invention will now be further illustrated by way of an example of an embodiment and with reference to figures whereby

FIGURE 1 is a front view of a portioning and weighing arrangement;

FIGURE 2 is a side view of a portioning and weighing arrangement;

FIGURE 3 is an upper view of a weighing arrangement alone;

FIGURES 4(a) to 4(d) show different positions of the store drum of the portioning and weighing arrangement.

Referring to FIGURES 1 and 2 an embodiment of a portioning and weighing arrangement according to the invention comprises a housing 1, wherein two horizontally arranged store drums 2,2' are arranged. Through a small door 11 the store drums 2,2' can be reached in order to fill or to clean them.

The store drums 2,2' each rotate around a horizontal axis 21,21' and may be driven by means of a driving wheel 23,23', a chain 25,25' and a toothed wheel 27,27'. In front of the store

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drums 2,2' and somewhat lower is the weighing arrangement 4.

5 Within the circumference of the store drum 2,2' is the portioning capacity 6,6' which is formed by a delivery valve 8,8' and by the nearest part 29,29' of the outer jacket of the store drum 2,2'. This portioning capacity 6,6' extends over the length of the store drum 2,2'.

10 The delivery valve 8,8' is fixedly connected to an axle 82,82' which is rotatably mounted through both extremities of the drum. The delivery valve 8,8' is further provided with a protruding part 84,84' which cooperates with a cam 10,10' and which determines in this way the position of the delivery valve 8,8'.

15 Further there is provided a filling valve 12,12' which is rotatable around the same axle 82,82' as the delivery valve 8,8'. In closed position the filling valve 12,12' is maintained by means of a pawl 122,122' (see left drum 2 on FIGURE 1). In open position the filling valve 12,12' is rotated against the delivery valve 8,8' (see right drum 2' on FIGURE 1).

20 A funnel like guiding 14 takes care that loose products 15 fall on a conveyor belt 16 at their delivery. This conveyor belt 16 is moved on over two wheels 164,166 one of which is driven. At the end of the conveyor belt 16 the products 15 fall on a blocking slide 18 or in the weighing capacity 40.

25 This slide 18 is commanded by means of an electromagnetic draw-spring 182 and may close the supply to the weighing capacity 40. Is the supply to the weighing capacity not closed, then the piston 184 of the electromagnetic draw-spring 182 is completely in the cylinder 186.

30 The weighing arrangement 4 consists of two weighing capacities 40 which are formed by three blocks 41 which are fixedly

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connected to one another. These blocks 41 may be guided horizontally between an upper guiding 42 and an under guiding 43. At the bottom the weighing capacities are closed each time by means of a weighing valve 44 which is rotatable around a horizontal axle 45. This axle 45 is provided with an adjustable counter-weight 46 and with a point of contact 47 which may command a switch (not shown). This switch may give a signal to the above-mentioned electromagnetic draw-spring 182. By means of an axle 48 which is fixedly connected with a block 41, a rod 49, a chain 50 and a motor 51 the blocks may be moved between two extreme positions : on Figure 1 one position is presented in full lines and the other position in dotted lines.

The filling of the weighing capacity 40 takes place through one central opening in the upper guiding 42, the emptying of the weighing capacities 40 takes place at the right or at the left side. As a consequence, two working up units may be served. Moreover, one processing unit may be served from one weighing capacity 40, while the other weighing capacity 40 is being filled.

Referring to FIGURE 4, the working of the storage drum 2 is as follows : in the position presented in FIGURE 4(a) the filling valve 12 is held by means of a pawl 122 and the delivery valve has just come from the delivery position. The store drum 2 (together with the valves 8 and 12) rotates in the direction of the arrow, while the loose products 15 remain more or less at the bottom in the store drum 2. The cam 10 does not rotate. When the delivery valve 8 comes at the bottom, it takes the loose products 15 with (see FIGURE 4(b)). The loose products 15 are then in the portioning capacity 6 which is formed by a part of the outer jacket 29 and by the delivery valve 8. When the delivery valve 8 is brought somewhat higher than the point shown by FIGURE 4(b) then the protruding part 84 is released in the recess of the cam 10 and the delivery valve 8 overturns

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until against the filling valve 12 and, in this way, releases the formed portion of loose products, such as shown on FIGURE 4(c).

5 The loose products 15 land on the conveyor belt 16 and are brought to one of the two weighing capacities. The number of loose products is gradually growing until the desired weight - which is adjustable by means of the counterweight 46 - is reached. Then contact point 47 loses a determined contact, which gives a signal to the electromagnetic draw-spring 182
10 which has the blocking slide close the weighing capacity such that no product can fall anymore into the weighing capacity. Rest product 15 which has possibly still been supplied, is heaping up on the blocking slide 18. As a consequence, the weighing is accurate because it cannot be falsified by rest
15 product which has sporadically stayed behind.

Subsequently, the blocks 41 are moved to the other extreme position such that the weighing valve 44 may supply the products 15 to the one working up unit (not shown) through an opening in the under guiding 43. In the meantime the other
20 weighing capacity 40 has taken position under the central opening and the blocking slide 18 releases this weighing capacity 40, after which this may also be filled with the desired quantity of products 15.

25 Preferably, the whole may be provided with time switches and synchronisation means (both not shown), which are well known from the prior art.

30 For example, the switching from the one store drum 2 to the other store drum 2' may be carried out automatically : this may be done at the beginning of each weighing activity by having a time switch run from zero until the end of a time period corresponding to the duration for one portioning (is equal to the time the conveyor belt 16 needs to make half a

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circulation). If the weighing has not ended hereafter, this means that the one drum 2 is empty. By means of a switch the rotation of this one drum 2 is ended and the motor of the other drum 2' is started.

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In the position shown on FIGURE 4(d) the delivery valve 8 is no longer in the delivery position (protruding part 84 is no longer in the recess of cam 10) and the filling valve is no longer held by the pawl 122, but rests against the delivery valve 8. In this position the store drum 2 can be cleaned or filled.

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Claims

1. An automatic portioning and weighing arrangement for loose products (15) which comprises at least one store drum (2) whereby the store drum (2) comprises at least one portioning capacity (6) wherein separate portions of the products (15) are formed and whereby the weighing arrangement (4) comprises at least one collecting capacity (40), characterized in that
- the store drum (2) has been arranged almost horizontally and that the portioning capacity (6) extends over almost the complete length of the store drum (2).
2. A portioning and weighing arrangement according to claim 1 whereby the store drum (2) is cylindrical and whereby the portioning capacity (6) is completely within the circumference of the store drum (2).
3. A portioning and weighing arrangement according to claim 2 whereby the portioning capacity (6) is formed by a part (29) of the outer jacket of the store drum (2) and by a delivery valve (8).
4. A portioning and weighing arrangement according to claim 3 whereby the delivery valve (8) is rotatable around an axle (82) which is excentric and almost parallel to the axis (21) of the store drum (2) over the whole length of the store drum (2) and whereby the rotation of the delivery valve (8) is commanded by means of a cam (10).
5. A portioning and weighing capacity according to claim 4 whereby the store drum (2) is further provided with a filling valve (12) which is rotatable around the same axle (82) as the delivery valve (8) and whereby the delivery valve (8) rests on

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the filling valve (12) in the delivery position.

5 6. A portioning and weighing capacity according to claim 5 whereby the filling valve (12) is brought against the delivery valve (8) in the filling position of the filling valve (12).

10 7. A portioning and weighing capacity according to one of the preceding claims whereby the portioning and weighing capacity is further provided with an endless belt (16) where the loose products (15) fall on on delivery from the portioning capacity (6) and which carries the loose products (15) to the weighing arrangement (4).

15 8. A portioning and weighing arrangement according to one of the preceding claims whereby the weighing arrangement (4) is provided with a blocking slide (18) which may block all possible delivery of loose products (15) to the collecting capacity (40) of the weighing arrangement.

20 9. A portioning and weighing arrangement according to any of claims 2 to 8 whereby the portioning and weighing arrangement is provided with two cylindrical store drums (2) which are positioned in parallel adjacent to one another in such a way that both may
25 deliver portions of loose products (15) to the weighing arrangement (4).

30 10. A portioning and weighing arrangement according to one of the preceding claims whereby the weighing arrangement (4) is provided with two collecting capacities (40) which are horizontally movable and which may serve two separate working up installations.

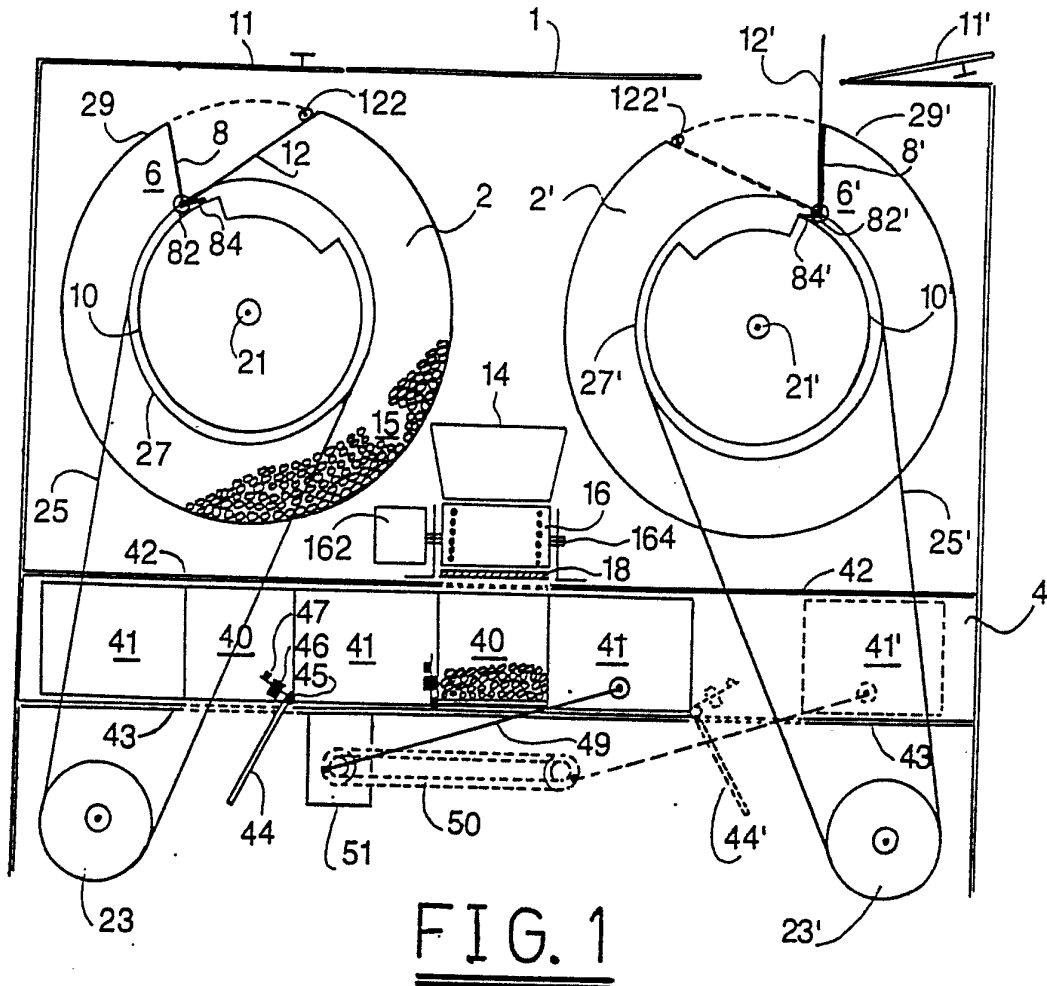


FIG. 1

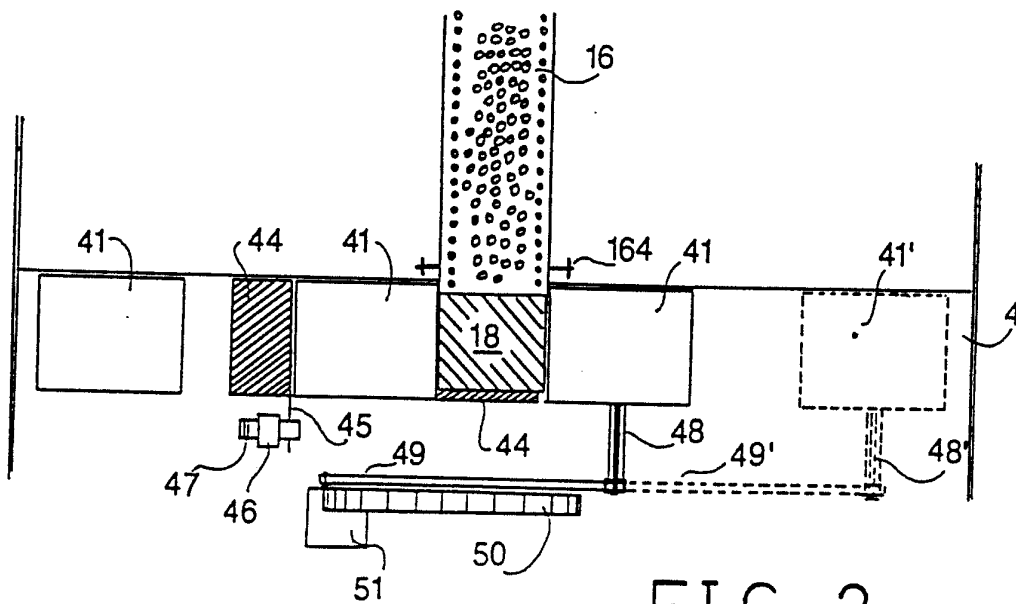


FIG. 3

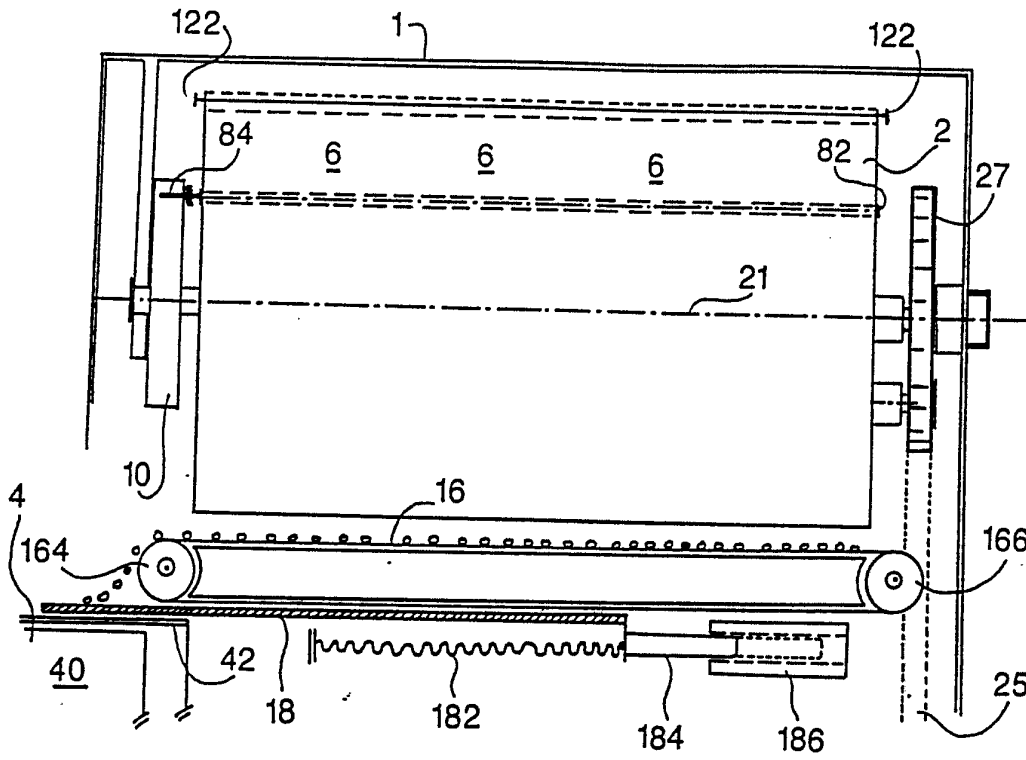


FIG. 2

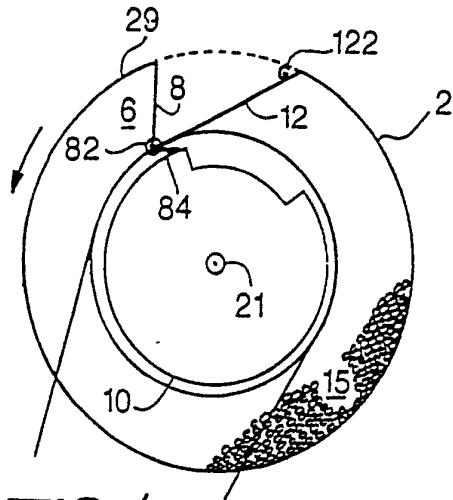


FIG. 4(a)

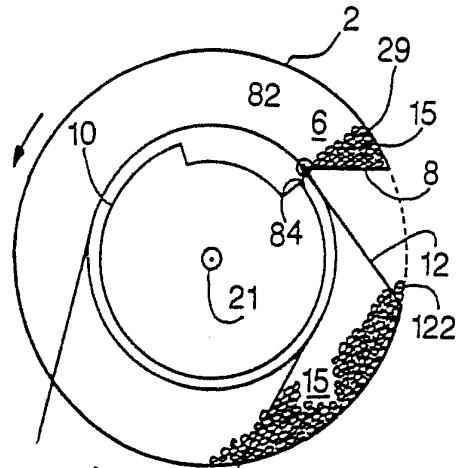


FIG. 4(b)

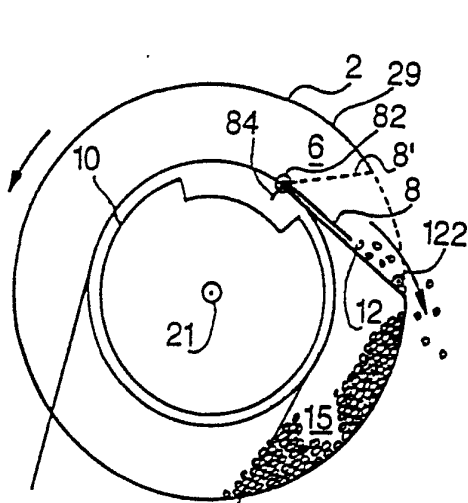


FIG. 4(c)

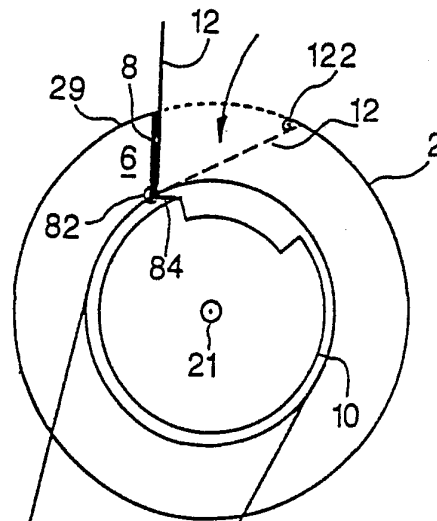
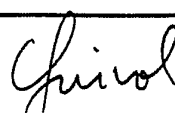


FIG. 4(d)

INTERNATIONAL SEARCH REPORT

PCT/BE 91/00055

International Application No

| I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ | | |
|---|---|-------------------------------------|
| According to International Patent Classification (IPC) or to both National Classification and IPC | | |
| Int.Cl. 5 G07F11/44 | | |
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| III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹ | | |
| Category ¹⁰ | Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹² | Relevant to Claim No. ¹³ |
| A | FR,A,2 593 308 (INGENIERIE TECHNIQUES ELECTRIQUES ELECTRONIQUES APPLIQUEES) 24 July 1987 see abstract; claims 1-5; figure 1 --- | 1-9 |
| A | WO,A,8 402 457 (CUBI-CUBES PTY-LTD.) 5 July 1984 see abstract; claims 1,7-10; figures 2-5 --- | 1-6 |
| A | DE,A,2 256 108 (MASCRET ALBERT) 24 May 1973 see page 6, line 21 - page 7, column 16; claims 1-4,7; figure 1 --- | 1-6 |
| A | FR,A,1 431 228 (WURTEMBERGISCHE METALLWARENFABRIK) 31 January 1966 see the whole document --- | 1-5 |
| A | FR,A,2 515 959 (LABORATOIRES BOIRON) 13 May 1983 see claims 1-5; figures 2-4 --- | 1-3 |
| | -/-- | |
| <p>¹⁰ Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"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</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"&" document member of the same patent family</p> | | |
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| III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET) | | |
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| Category ° | Citation of Document, with indication, where appropriate, of the relevant passages | Relevant to Claim No. |
| A | EP, A, 0 313 037 (METATRON INVESTMENTS INC.) 26 April 1989 see abstract; claims 1,4-5,7; figure 1 --- | 1 |

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. BE 9100055
SA 49777**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 10/12/91

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|--|------------------|--|--|
| FR-A-2593308 | 24-07-87 | None | |
| WO-A-8402457 | 05-07-84 | AU-B- 576747 EP-A, B 0129565 US-A- 4586429 | 08-09-88 02-01-85 06-05-86 |
| DE-A-2256108 | 24-05-73 | FR-A- 2159837 FR-A- 2188431 BE-A- 791224 CA-A- 958242 GB-A- 1375614 US-A- 3896715 | 22-06-73 18-01-74 01-03-73 26-11-74 27-11-74 29-07-75 |
| FR-A-1431228 | | None | |
| FR-A-2515959 | 13-05-83 | None | |
| EP-A-0313037 | 26-04-89 | JP-A- 1126928 | 19-05-89 |