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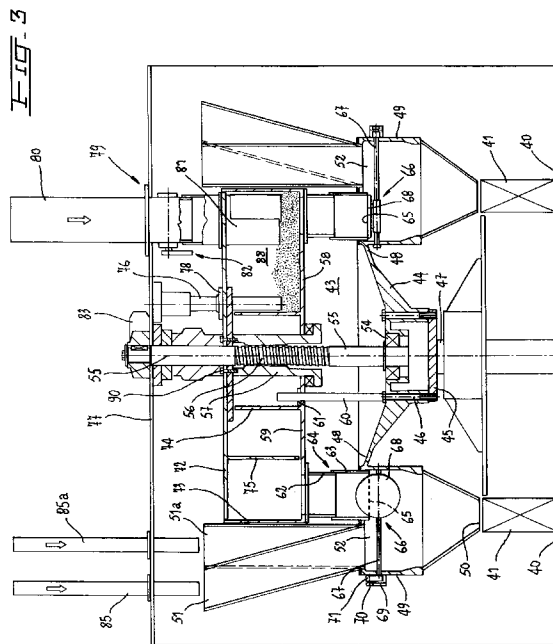
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(54) **Carousel batcher-filler apparatus for filling containers with batched quantities of two different products.**

(57) A carousel batcher-filler apparatus for filling containers with batched quantities of two different products comprising : transport means (40) for feeding and transporting the containers (41) to the inlet, inside and outside of a filling path (42-49); and a rotating tower (43) carrying single batching units situated peripherally around said tower; each of said batching units comprising : first funnel-like supplying means (51, 51a) for the supply of a first product, second batching bucket supplying means (64) for supply of a second product; conveying-filling hopper-like means (49) having the loading mouth (89) situated downstream of the aforementioned first (51, 51a) and second (64) supplying means and the discharge mouth (50) leading into the containers (41) during their transport along said filling path; feeding-batching means (85, 73) for feeding second means (51, 51a) with a first product; and second feeding means (79) for feeding said supply means (64) with second product.



The present invention relates to a carousel batcher-filler apparatus for filling containers with batched quantities of two different products.

At present, in order to be filled with two different products, containers are conveyed to a first filling device, for filling with the first product, then the containers, partially filled, are conveyed to a second filling device, for filling with the second product.

Each of said filling devices is provided with a rotating drum carousel with funnel-like single filling means located peripherally thereon, and equipped with batch feeding system; alternatively bucket batchers are adopted as filling means.

In order to avoid bringing container to two separate filling devices, a filler apparatus has been recently invented, as illustrated schematically in figures 1 and 2 of the enclosed drawings.

With reference to figure 1, the filler apparatus includes a "U"-like horizontal path, indicated with 1, along which the containers 2 are filled.

Said filler apparatus has a conveyor 9 that carries the containers 2 with an endless conveyor 3 situated over the conveyor 9.

The endless conveyor 3 bears a plurality of funnels 4 which are brought along a closed loop path that has a "U"-like horizontal part substantially vertically lined up with the said "U"-like filling path.

The discharge mouth 5 of each funnel 4, conveyed in the aforementioned way, is near the loading mouth 6 of a respective container 2, placed below and conveyed along the filling "U"-like path" path.

Said funnels 4 and containers 2 move with the same speed and in such a way so as to remain vertically lined up one to another along the whole said horizontal "U"-like filling path, delimited by an inlet 7 and an exit 8.

Both the conveyor 9 for the containers 2 and the conveyor 3 for the funnels 4 ride on a sole return cylindrical drum 10, forming a semicircle return arc 7a-8a of said "U"-like path 1.

A plurality of known batching buckets 11 are fastened to the said drum 10, peripherally positioned and equispaced from each other, at a level upper than the level of the funnel 4.

Said buckets 11 move along a peripheral path extending along a semicircle arc, substantially vertically lined up to said return semicircle arc 7a-8a of the conveying path for the containers 2 and the funnels 4.

Along said common semicircle arc 7a-8a, the discharge mouths 12 of said batching buckets 11 are located over, and vertically lined up with, the loading mouth 13 of said funnels 4, which have their discharge mouths vertically lined up with the loading mouths 6 of the containers 2.

Summing up what has been said above, the filling "U"-like path of the containers provides:

- a first rectilinear section 7-7a in which the loading mouths 6 of the containers 2 are vertically

lined up with the discharge mouths 5 of the respective funnels 4;

- a return semicircle section 7a-8a, in which the containers 2 remain vertically lined up with the respective funnels 4 and the loading mouth 13 of the each of these latters is vertically lined up with the discharge mouth 12 of a respective batching bucket 11;
- and another rectilinear section 8a-8, in which the containers 2 are still vertically lined up with the respective funnels 4.

The above mentioned apparatus operates as described in the following.

Along the first rectilinear section 7-7a of said "U"-like path, the loading mouth 13 of the funnel 4 is fed, by means of an Archimedean screw 15, with a first half of a unitary dose of the first product, said dose being conveyed inside the container 2.

The discharge mouth 12 of the batching bucket 11 is opened in a semicircle section 7a-8a of said "U"-like path; the bucket 11 contains the dose, predetermined in a known way, of the second product fed by the feeder 16.

The dose of the second product is discharged inside a respective funnel 4, which, on its turn, leads it into the container 2.

In the second rectilinear section 7a-8a of said "U"-like path, the loading mouth 13 of the funnel 4 is fed, by means of an Archimedean screw 15, with a second half of a unitary dose of the first product, said half-dose being conveyed inside the container 2 by the funnel 4.

Said apparatus resolves the problem of filling a container with two different products, but it brings about various disadvantages.

The main disadvantage relates to the enormous size of the apparatus resulting from addition, to the usual filling apparatus, of a longitudinal part, having length equal to the length of the filling "U"-like path.

Another disadvantage results from the fact that the funnels are conveyed by closed loop conveying means, what causes high realisation, assembly and maintenance costs, as well as much time for the substitutions of the same.

The principal object of the present invention is to avoid the above mentioned disadvantages.

The invention, characterised by the claims, resolves the problem of realisation of a carousel batcher-filler apparatus for filling containers with batched quantities of two different products, of the type comprising:

- transport means for feeding and conveying the containers at the entrance, inside and outside of the filling path;
- funnel-like supplying means for supplying a first product;
- batching buckets-like supplying means for supplying a second product;

- feeding-batching means for feeding said funnel supplying means with a first product;
- and second feeding means for feeding said batching buckets-like supplying means with second product.

The apparatus is characterised by the fact that it is equipped with only one rotating tower with single batching units located peripherally thereon.

Each batching unit comprises:

- first funnel-like supplying means for supplying a first product;
- second batching buckets-like supplying means, spaced apart radially in respect to said first funnel supplying means, for supplying of a second product;
- hopper conveying-filling means that have their loading mouth downstream of the above mentioned first and second supplying means and the discharge mouth leading into the containers during their convey along said filling path.

The following results are obtained by using this type of apparatus:

- a reduced size that can be not bigger than the size of machines designed to fill with one product, since the filling path is included in the semicircle of the containers transmission and, moreover,
- endless transport means are not used for transport of product supplying means along the closed loop path.

Further characteristics and advantages of the present invention will be more evident in the following detailed description of the preferred embodiment, given as a mere example, not limitative, with reference to the attached figures, in which:

- figure 3 is a schematic plan view of the filler apparatus being the object of the present invention;
- figure 4 is a front view along the section line IV-IV of the figure 3.

With reference to the figures 3 and 4, the apparatus, according to the present invention, is provided with a transport belt 40, that is to convey empty containers 41, with their loading mouth open upwards, to the entrance 42 of a rotating tower 43, around said tower 43 for the return motion, and away from the same tower through an exit 91.

The rotating tower 43 is formed by circular flange 44 bound to a flange 45 by screws 46.

Said flange 45 is keyed onto a shaft 47 rotatably driven by motor means, which are not shown. The flange 44 is wider in its upper part and it has a peripheral support edge 48, to which a plurality of hoppers 49 are peripherally and equidistantly bound.

The discharge mouths 50 of the hoppers 49, turned downwards, are changeable in size so that they can be adapted to the loading mouths of the containers 41 to be filled.

Such discharge mouths 50 are peripherally distanced by a pitch equal to the convey pitch of the containers 41.

The loading mouths 89 of the hoppers 49, turned upwards, support, on their radial end, with reference to the rotating tower 43, a plurality of funnels 51, 51a, equal in number to the number of hoppers 49, in which the funnels 51 are situated peripherally outwards and the funnels 51a are situated peripherally but more inwards in respect of the funnels 51.

The respective discharge mouths 52, 52a lead to the loading mouth 89 of the relative hoppers 49.

The loading mouths 53, 53a of said funnels 51, 51a, situated in this way, are turned upwards and each mouth 53, or 53a, extends peripherally according to a circumference arc equal to a double pitch of the hoppers 49 and/or to a double pitch of the containers 41.

On the central part of the flange 44 there is supported, by means of bearings 54, an axis 55, vertically and rotatably free, centrally threaded in 56 to engage an internally threaded sleeve 57.

The sleeve 57, by means of axial bearings 58, supports a disc 59 that is rotatably left free in respect to the sleeve 57.

The flange 44 makes the disc 59 to rotate by a driving pin 60, which is fixed to said flange 44 and slides vertically into a bush 61 fixed to the disc 59.

The disc 59, on its radial ends, supports a plurality of cylinders 62, equal to the number of the hoppers 49, each of hoppers engaging telescopically with a respective cylinder 63, supported by the funnel 49.

In this way, a cylindrical bucket 64 is defined, with a size that can be changed in accordance of said relative vertical position between said two cylinders 62 and 63.

The discharge mouths 65 of the buckets 64 leads into a respective hopper 49, and each hopper 49 supports closing means 66 of the same discharge means 65.

Said means 66 comprises a shaft 67, supported by the hopper 49 walls, carrying a cap 68 keyed thereto and slightly spaced apart radially in respect to its axis.

Said cap 68, as a consequence of shaft 67 rotation, goes in abutment on the discharge mouth 65 of the bucket 64 and closes it; alternatively, always due to the rotation of the shaft 67, the cap 68 is kept away from the same discharge mouth 65 and leaves it open.

The shaft 67 is made rotate by a roll 70, rotatably pivoted to a lever 71 keyed to said shaft 67, that runs along a fixed track 69.

The plate 59 carries, bound thereon, a first containment wall 73 that extends peripherally, and a wall 74 also extending peripherally for the reasons explained in the following.

On the top of the sleeve 57 there is bound, by

screws 90, a plate 72, inside which the axis 55 can rotate.

Said plate 72 is vertically movable but its rotation is hindered by a pin 76, carried by an upper wall 77 fixed to the apparatus structure, in which the pin 76 slides inside a bush 78 fixed to the same plate 72.

The plate 72, projecting downwards, carries an "omega"-like containment wall 75 having two rectilinear parts 86 and 87.

On one side, the right one in the figure 4, the upper wall 77 supports, a hopper-like feeder 79, formed by two telescopic cylinders 80, 81, the first of which is fastened to the upper wall 77 and the second one is fastened to the plate 72.

On the other side, the wall 77 supports two feeders 85, 85a, vertical in respect to the peripheral course of the loading mouths 53, 53a of the funnels 51, 51a.

With said apparatus structure a rotating drum is obtained, delimited by a rotating flange 44-48 and by the plate 59 having a plurality of batching buckets 64.

While said buckets 64 are carried along a circular path under a chamber 88, delimited by the "omega"-like wall 75-86-87, by the wall 73 and by the wall 74, said chamber 88 is filled, by means of the feeder 79, with the second type of product B so as to fill the same buckets 64 with said product B.

Said bucket 64, still on the circular path, passes under the scraper wall 86, thus defining the unitary quantity of product B to be loaded.

In order to change the unitary dose obtained in this way, the axis 55 is made rotate by the ratiomotor 83.

Relatively to its direction, said rotation brings about the lowering or rising of the sleeve 57, which moves vertically and therefore moves vertically also the plate 59 and, consequently, the cylinder 62 in respect to the cylinder 63, thus changing the dose size in the bucket 64.

Moreover, since the sleeve 57 supports also the plate 72, the latter displaces vertically by a distance equal to the vertical displacement of the plate 59, keeping unchanged the distances between the ends of the walls 73, 75 and 74 in respect to respective plates 72 and 59.

Also the distance from the lower end of the cylinder 81 of the feeder 79 to the plate 72 remains unchanged.

In this way, the change of the dose quantity of the batching bucket does not demand further adjustment operations.

Operation of the apparatus includes first, the discharge mouths 50 of the hoppers 49 being adjusted in accordance with the loading mouths of the containers 2 and setting into registry the containers 40, (by known apparatus that lies outside the object of the present invention) so that they result positioned spaced apart from each other by a distance equal to

the pitch between the discharge mouths 50 of the hoppers 49.

When the apparatus is set in this way, each container 41, carried by the conveyor 40, reaches the point, indicated with 42, see Figure 3, where said container 41 is situated under the hopper 49, and the discharge mouth 50 of the same hopper 49 is vertically lined up with the same container 41 in order to discharge therein.

As soon as the above mentioned vertical alignment is obtained, the feeder 85 (or the feeder 85a) discharges the unitary dose of the first product A inside the loading mouth 53 (or the mouth 53a) of the funnel 51 (or of the funnel 51a), this dose of product being conveyed inside the hopper 49 by the discharge mouth 52.

As seen from the figure 3, the time available for the feeder 85 to discharge the dose is equal to the time requested by the tower for an about 90 degrees rotation, i.e. almost equal to time necessary for the performing a double advancement step for the containers 41.

Simultaneously with the above mentioned alignment, the cam follower roll 70 strikes against the track 69 and makes the shaft 67 to rotate.

Said shaft 67 moves the cap 68 until it reaches a vertical position and opens the discharge mouth 65 of the batching bucket 64, so that also the second product B contained therein and pre-dosed, can be discharged into the hopper 49.

The hopper 49, filled in this way, discharges, through its discharge mouth 50, the products A and B into the container 41 until the same does not reach the exit point 91 of the filling drum, i.e. in a time equal to the time requested by the drum 43 to complete a 180 degrees rotation, that is equal to performing four steps.

After having reached said exit point 91, the filled container 41 is conveyed in a straight path on the belt 40 for further manipulations, while the discharge mouth 65 of the respective batching bucket 64 is closed by the cooperation of control track 69, roll 70, link rod 71, shaft 67 and cap 68.

After the mouth 65 has been closed, the batching bucket 64, while passing under the wall 87, goes in connection with the chamber 88 loaded with the product B fed by the feeder 79.

The product B falls inside the cavity of the batching bucket 64 until it is full and some more.

Keeping on its circular course, the batching bucket 64 passes under the scraper wall 86, that determines its exact dose. Then the batching bucket is thus ready to discharge into the respective hopper 49 as soon as a container 41 becomes vertical to the said hopper 49, i.e. near to the point 42.

Claims

1. Carousel batcher-filler apparatus for filling containers with batched quantities of two different products of the type comprising:

- conveying means for feeding and conveying the containers at the entrance, inside and outside of a filling path;
- funnel supplying means for supplying a first product;
- batching bucket supplying means for supplying a second product;
- feeding-batching means for feeding said funnel supplying means with a first product; and
- second feeding means for feeding said batching bucket supplying means with a second product; said apparatus characterised in that it provides a single rotating tower (43) supporting single dosing units situated peripherally around the said tower, each of said units comprising:
- first funnel supplying means (51, 51a) for the supply of a first product;
- second batching bucket supplying means (64) radially spaced apart from the said first funnel supplying means (51, 51a) for supplying a second product;
- hopper conveying-filling means (49) that have its load mouth (89) situated downstream of the above mentioned first (51, 51a) and second (64) supplying means, and the discharge mouth (50) leading into the containers (41) during their convey along said filling path.

2. Device according to claim 1, characterised in that said rotating tower comprises:

- a rotatably movable circular flange (44-48);
- an axis (55) situated and supported centrally by said flange, rising upwards and rotatably movable in respect to said flange 44-48;
- a plate (59) supported vertically by said axis (55) and rotatably movable in unison with said flange (44-48).

3. Device, according to claim 3, characterised in that said plate (59) is vertically supported by a sleeve (57) that cannot rotate and can be screwed to the axis (55).

4. Device, according to claim 2, characterised in that said flange (44-48) and said plate (58) are connected for the rotation in unison by a driving pin (60) carried by one of the two parts rotatable and vertically sliding one in the other.

5. Device, according to claim 3, characterised in that said sleeve (57) supports, bound on its top, a further plate (72) that is movable vertically but that cannot rotate.

6. Device, according to claim 1, characterised in that said first supply funnel means (51, 51a) for supplying a first product comprise:

- a first series of funnels (51) having their loading mouths (53) situated along an outer circumference and their discharge mouths (52) situated in a circumference radially more internal; and
- a second series of funnels (51a) having their loading mouths (53a) situated along a circumference radially more internal than the circumference of the precedent mouths (53) and their discharge mouths (52a) situated along a circumference coincident with the precedent discharge mouths (52).

7. Apparatus, according to claims 1 or 6, characterised in that said first funnel-like supplying means (51, 51a) are supported by hopper conveying-filling means (49).

8. Apparatus, according to claim 1, characterised in that said second bucket-like supplying means (64) comprise:

- a first cylinder (63);
- a second cylinder (62) movable vertically and telescopically along with said first cylinder (63);
- closing means (66) for closing, upon suitable command, the discharge mouth (65) of said supplying means (64).

9. Apparatus, according to claim 8, characterised in that said closing means comprise:

- a shaft (67), supported by hopper means (49), carrying, keyed thereonto, a cap (68) designed to close or free the discharge mouth (65) of the aforementioned second supplying means (64) as a consequence of a corresponding rotation of the shaft (67), and in that one end of said shaft (67) comes out of said hopper (49) in order to cooperate with the rotation control means (71, 70, 69).

10. Apparatus, according to claim 1, characterised in that said hopper conveying-filling means (49) comprise a hopper (49) whose loading mouth is designed to contain the discharge mouth (52) of the first funnel-like supplying means (51, 51a) and the discharge mouth of the second bucket-like batching means (64); and in that the discharge mouth of said hopper means (49) has a changeable size.

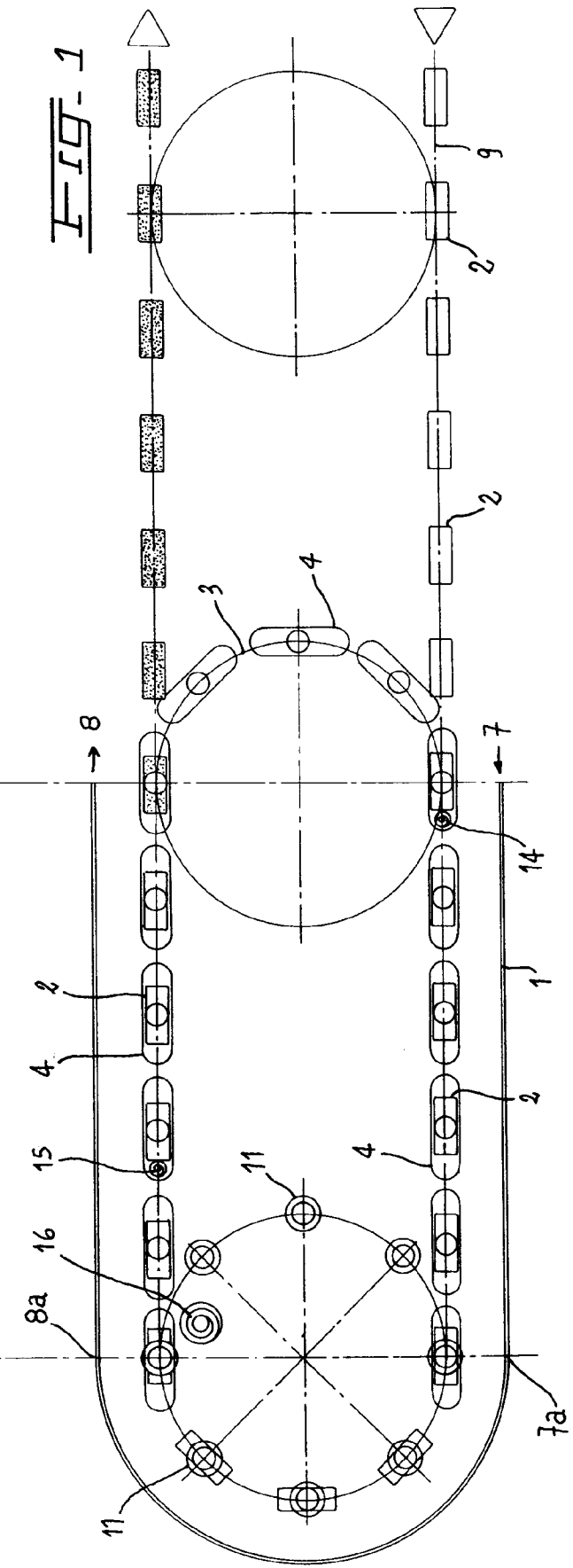
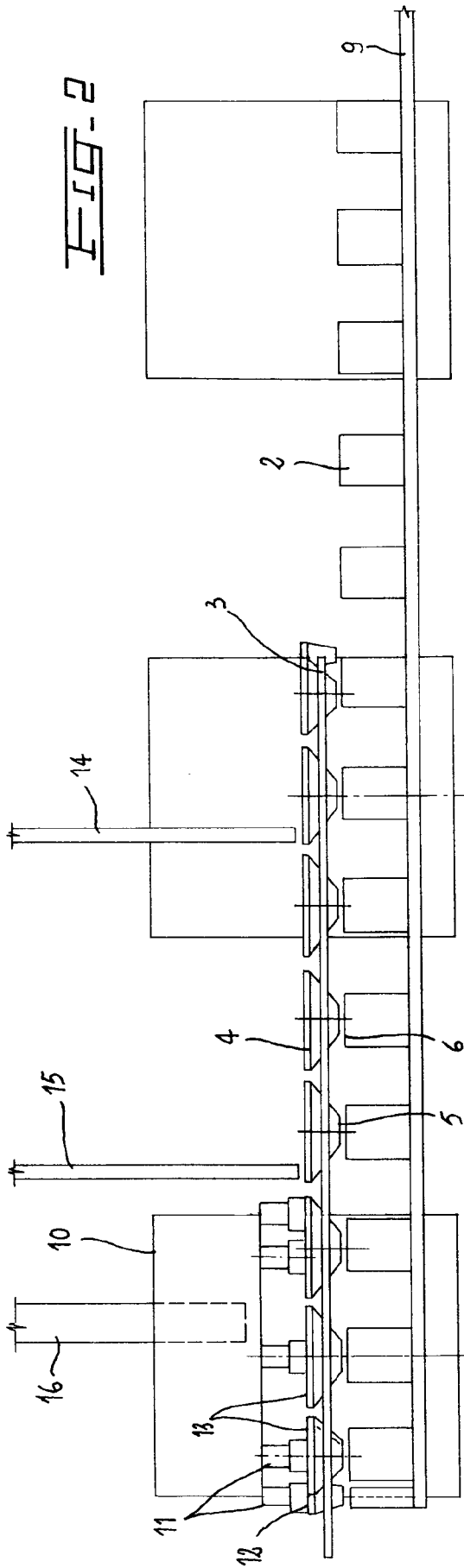


FIG. 3

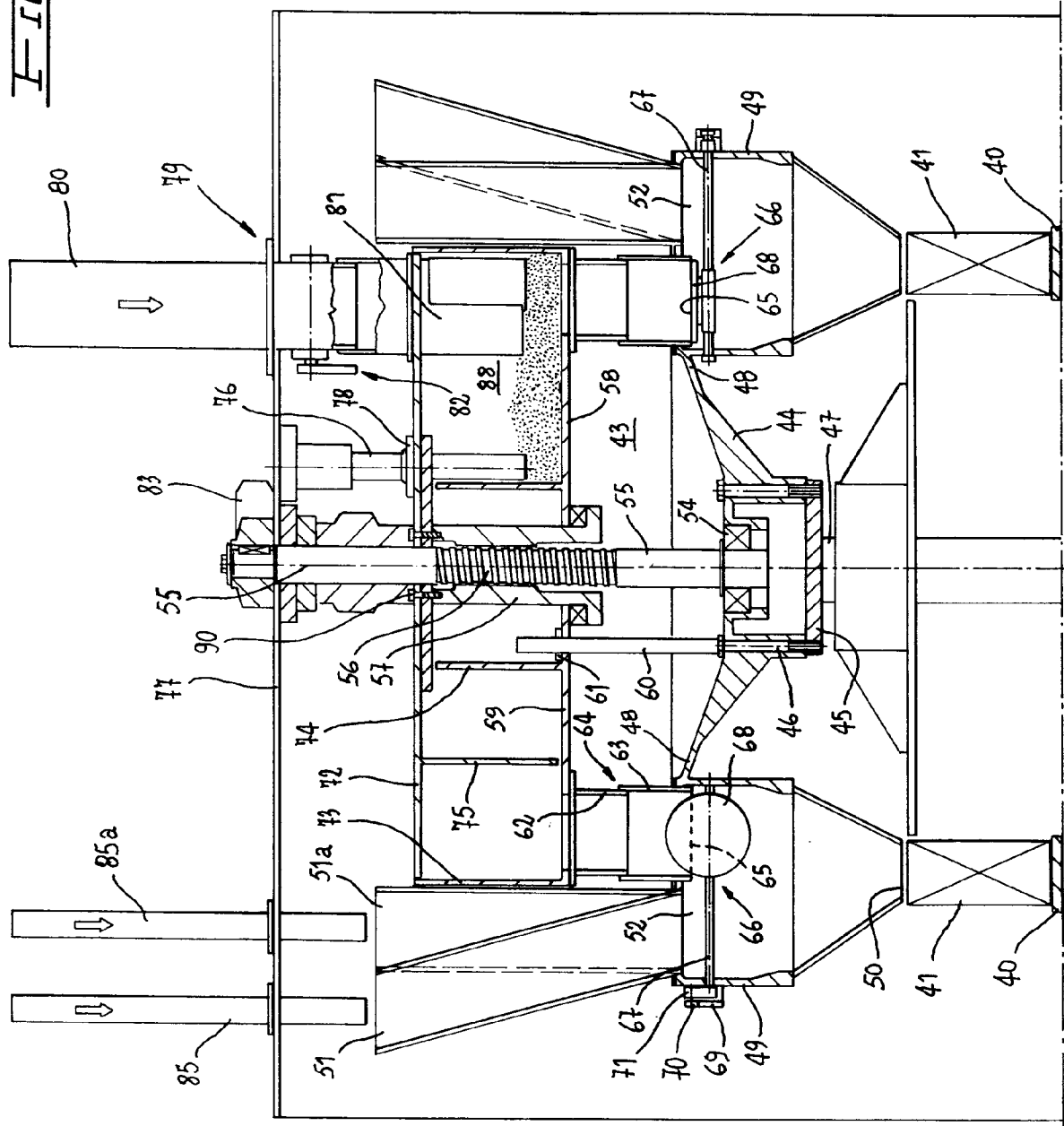
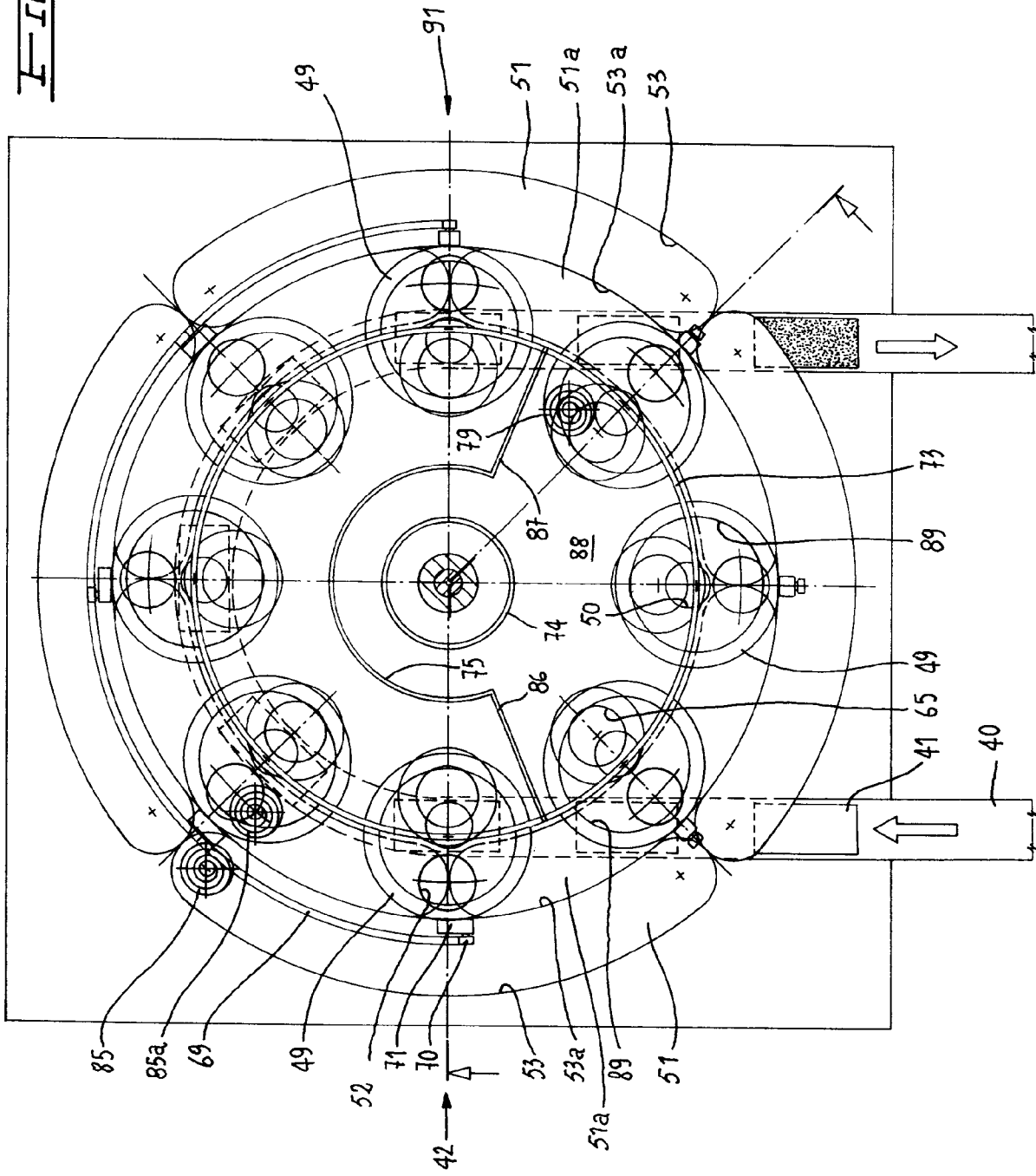


Fig- 4





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 83 0260

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	US-A-2 158 767 (AYARS) * page 2, column 1, line 44 - column 2, line 60; figure 1 *	1,6	B65B39/14 B65B1/36
Y		8,9	
A		10	
Y	GB-A-692 549 (ROSE) * page 2, line 24 - line 30; figure 1 * -----	8,9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30 August 1994	Examiner Claeys, H
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