

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number:

0 375 631
A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 89830537.0

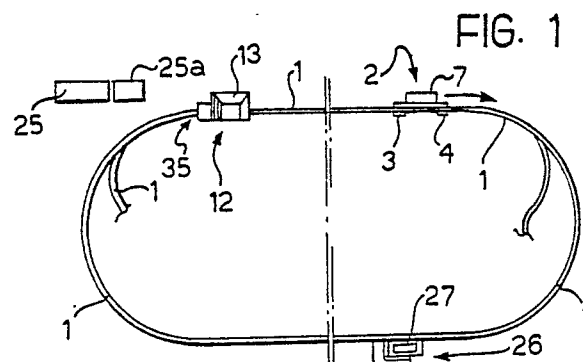
(51) Int. Cl.⁵: **A24C 5/39**

(22) Date of filing: 06.12.89

(30) Priority: 19.12.88 IT 6812488

(43) Date of publication of application:
27.06.90 Bulletin 90/26(34) Designated Contracting States:
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I-10121 Torino(IT)(54) **A system for supplying tobacco to cigarette-making machines.**

(57) The system includes an overhead conveyor (1,2) including a guide rail (1) and a plurality of motor-driven carriages (2). Each carriage (2) carries a container (7) having an outlet (7b) at its lower end with a shut-off device (8-11) which can be opened as a result of the coupling of the outlet (7b) with the loading hopper (27) of a cigarette-making machine (26). A loading station (12) is located in a fixed position near the conveyor rail (1) and includes discharge means (15-23) adapted to pour a predetermined quantity of tobacco into the container (7) of each carriage (2). There is a resetting device (35) near the loading station (12) for reclosing the shut-off devices (8-11) for the outlets (7b) of the carriages (2). A control system (25, 25a) regulates the movement of the carriages (2) along the rail (1) between the loading station (12) and the cigarette-making machines (26) in a predetermined manner.



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A system for supplying tobacco to cigarette-making machines

The present invention relates to a system for supplying tobacco to cigarette-making machines with loading hoppers at the top.

According to the prior art, the devices which supply the tobacco to cigarette-making machines provide for the pneumatic transportation of the tobacco but this results in the deterioration and the inevitable separation of its various components.

The object of the present invention is to provide a system for supplying tobacco to cigarette-making machines which avoids the disadvantages of the prior-art devices.

According to the invention, this object is achieved by means of a system characterised in that it comprises:

an overhead conveyor including at least one guide rail and a plurality of motor-driven carriages, each of which carries a container having an outlet at its lower end with a shut-off device which can be opened as a result of the coupling of the outlet with the loading hopper of a cigarette-making machine, a loading station located in a fixed position near the rail, the station including loading means adapted to pour a predetermined quantity of tobacco into the container of each carriage,

at least one resetting device located near the loading station and adapted to reclose the shut-off devices of the outlets of the carriages, and control and operating means arranged to cause the movement of the carriages along the rail between the loading station and the cigarette-making machines in a predetermined manner.

Further characteristics and advantages of the system according to the invention will become clear from the detailed description which follows with reference to the appended drawings, provided by way of non-limiting example, in which:

Figure 1 is a schematic plan view of a system according to the invention,

Figures 2 and 3 are perspective views of a carriage of the overhead conveyor which forms part of the system according to the invention,

Figures 4 and 5 are two partial views, a perspective view and a side view respectively, of the loading station of the system according to the invention,

Figure 6 is a partially-sectioned partial view showing the coupling between the outlet of a carriage and the hopper of a cigarette-making machine, and

Figure 7 is a partially-sectioned partial view showing the station for resetting the shut-off devices of the outlets of the carriages of the overhead conveyor.

Figure 1 is a very schematic view of a system

according to the invention. The system includes an overhead conveyor comprising, in known manner, at least one monorail guide 1 along which electrically-driven carriages 2, only one of which is visible in Figure 1, can slide. As can be seen in Figures 2 and 3 in particular, each carriage 2 includes two guide units 3 and 4 which can slide along the rail 1, of which the first is motor-driven and the other is idle. The two units are interconnected beneath the rail 1 by a beam 5 to which is fixed a bracket 6 on which an upwardly-open, substantially parallelepipedal container 7 is cantilevered. The container has a flange 7a at its upper end and an outlet 7b with a flange 7c at its lower end.

As can be seen in Figure 7, a shut-off device is provided inside the lower end of the container 7 of each carriage and includes a plate-shaped obturator 8, articulated at 9. The obturator is held in the horizontal, closed position shown in Figure 7 by a locking device 10 of known type with a locking rod 11 whose lower end 11a passes through and projects beyond the lower face of the flange 7c. When the rod 11 is pushed in the direction of the broken arrow of Figure 7, the locking device 10 releases the obturator 8 which moves by gravity to the open position shown in broken outline in Figure 7.

With reference again to Figure 1, a system according to the invention also includes a loading station 12 located in a fixed position near the monorail 1. In the embodiment illustrated in Figures 4 and 5, the loading station 12 includes a loading hopper 13 with an outlet 14 at its lower end. An obturator element 15 is provided in the lower part of the hopper 13, above its outlet 14, and is articulated at 16 (Figure 5). The obturator 15 is movable between a closed position and an open position, shown in continuous outline and in broken outline respectively in Figure 5, as a result of the operation of the drive cylinder 17 carried externally by the hopper. A window (indicated 18 in Figure 4) is formed in a side wall of the hopper and is closed by a transparent element so as to enable the level of the tobacco poured into the hopper in use to be checked visually.

The outlet of the hopper 13 of the loading station has a particular shape which will now be described. The outlet includes a box-shaped body 19 which is open at the bottom and is connected at the top to the hopper 13 (Figure 5). A duct 20 extends within the box-shaped body and constitutes an extension of the lower portion of the hopper. The lower end of the duct 20 is connected by means of a bellows 21 of elastomeric material to a quadrangular collar 22 whose position is controlled

by means of cylinders 23 housed in the aforesaid box-shaped body 19. When these cylinders are operated, the quadrangular collar 22 is moved downwardly beyond the lower edge of the box-shaped body 19, consequently extending the bellows 21.

The cylinders 23 are operated each time the container 7 of a carriage 2 of the overhead conveyor is situated beneath the outlet of the loading hopper 13, as seen in Figure 5: the quadrangular collar 22 is lowered until it abuts the flanged edge 7a of the container of the carriage 7. This prevents any loss or leakage of tobacco during the loading of the container 7 when, as a result of the operation of the cylinder 17, the obturator 15 is brought into the lowered, open position to allow a predetermined quantity of tobacco to fall into the container 7.

The system according to the invention also includes an electronic control and operating unit, indicated 25 in Figure 1, which supervises the operation of the entire system.

When the container of a conveyor carriage has been loaded, the control unit 25 moves the carriage towards a cigarette-making machine, such as that indicated 26 in Figure 1. The top part of a cigarette-making machine, shown in Figure 6, has a loading hopper 27 with an opening 28 surrounded by a box-shaped body 29 which is open at the top. The upper end of the opening 28 is connected to a bellows 30 of elastomeric material and this is in turn connected to an annular quadrangular element 31 situated in the opening at the top of the box-shaped body 29. Within the body are cylinders 32 which act on the annular element 31. When, as shown in Figure 6, the container 7 of a carriage arrives above the opening of a cigarette-making machine, the cylinders 32 of the latter are activated so as to thrust the annular element 31 into abutment with the lower flange 7c of the container of the carriage. The outlet of the container, the loading hopper and the cigarette-making machine are thus sealingly coupled to prevent any loss of tobacco during the loading operation. As a result of the extension of the cylinders 32, the annular quadrangular element 31 also operates the rod 11 which releases the mechanism 10 holding the obturator 8 in the closed position: the obturator therefore falls under gravity to the position shown in Figure 6, allowing the tobacco to fall into the loading hopper of the cigarette-making machine (Figure 6) from the container 7 of the carriage.

Upon completion of this operation, the control unit 25 of the system causes the conveyor carriage 2 to return to the loading station 12. As it nears the loading station 12, the carriage 2 first passes adjacent a resetting device, generally indicated 35 in Figures 1 and 7.

In the embodiment illustrated in Figure 7, the resetting device 35 comprises a casing 36 which is carried by a support structure 37 fixed to the ground, and in which a pneumatic motor 38 is mounted for rotating a shaped operating member, generally indicated 39. This member comprises an arm 40 which extends radially from the shaft of the motor 38 and an arcuate extension 41 which extends substantially along an arc of a circle concentric with the shaft of the motor 38.

As a result of the operation of the motor 38, the shaped operating element 39 can move from a rest position, shown in broken outline in Figure 7, to a working position, shown in continuous outline in the same drawing, in which the arcuate element 41 projects out of the casing 36 through an aperture 42 formed in the side of the casing which faces the outlet of the container 7 of the carriage. The outlet in turn has a corresponding aperture 43 through which the arcuate element 41 extends to come into contact with the obturator 8 and thus thrust the latter back from its open position to its closed position in which it is again retained by the locking mechanism 10.

When the obturator 8 has been reset, the container 7 of the carriage can be refilled.

As stated previously, the operation of the entire system is regulated by the control unit 25: this unit receives signals from sensors (not shown) indicative of the positions of the carriages, the completion of the loading and discharging operations, etc. The same control unit 25 gives commands to the various pneumatic actuators, such as the cylinders 17, 23, 32 and the motor 38, by means of an electropneumatic interface unit, indicated 25a in Figure 1. The operation of the system is therefore fully automated.

Claims

1. A system for supplying tobacco to cigarette-making machines (26) with loading hoppers (27) at the top, characterised in that it comprises:
 - an overhead conveyor (1, 2) including at least one guide rail (1) and a plurality of carriages (2) which are driven by electric motors and each of which carries a container (7) having an outlet (7b) at its lower end with a shut-off device (8-11) which can be opened as a result of the coupling of the outlet (7b) with the loading hopper (27) of a cigarette-making machine (26),
 - a loading station (12) located in a fixed position near the rail (1); the station (12) including loading means (15-23) adapted to pour a predetermined quantity of tobacco into the container (7) of each carriage (2),
 - at least one resetting device (35) located near the

rail (1) and adapted to reclose the shut-off devices (8-11) of the outlets (7b) of the carriages (2, 7), and control and operating means (25, 25a) arranged to cause the movement of the carriages (2) along the rail (1) between the loading station (12) and the cigarette-making machines (26) in a predetermined manner. 5

2. A system according to Claim 1, characterised in that the loading station (12) includes a hopper (13) with an outlet (14) which is adapted (20-23) to be coupled sealingly with the inlet apertures of the containers (7) of the carriages (2). 10

3. A system according to Claim 1, characterised in that the loading hopper (27) of each cigarette-making machine (26) has means (29-32) for coupling it sealingly to the outlets (7b) of the containers (7) of the carriages (2). 15

4. A system according to Claim 3, characterised in that the sealed coupling means (28-32) of the cigarette-making machines (26) are also adapted to open the shut-off devices (8-11) of the containers (7) of the carriages (2). 20

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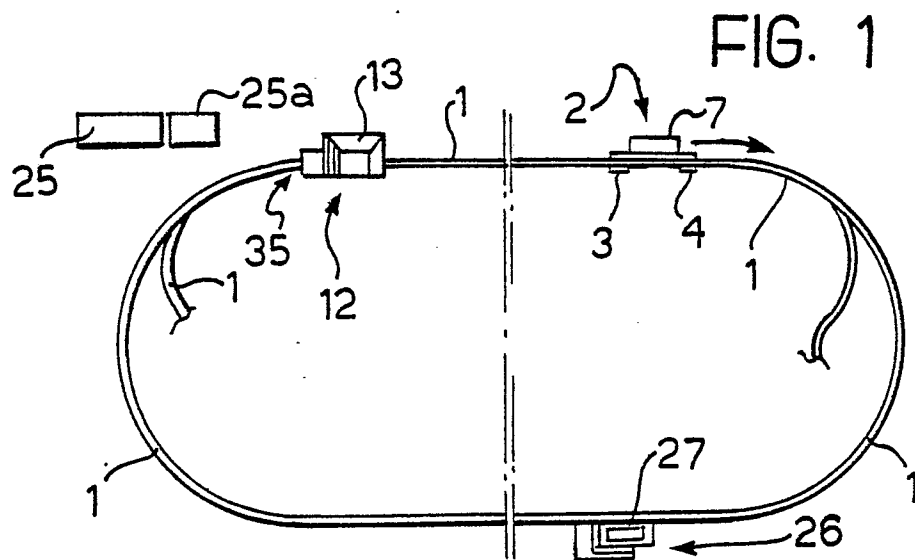
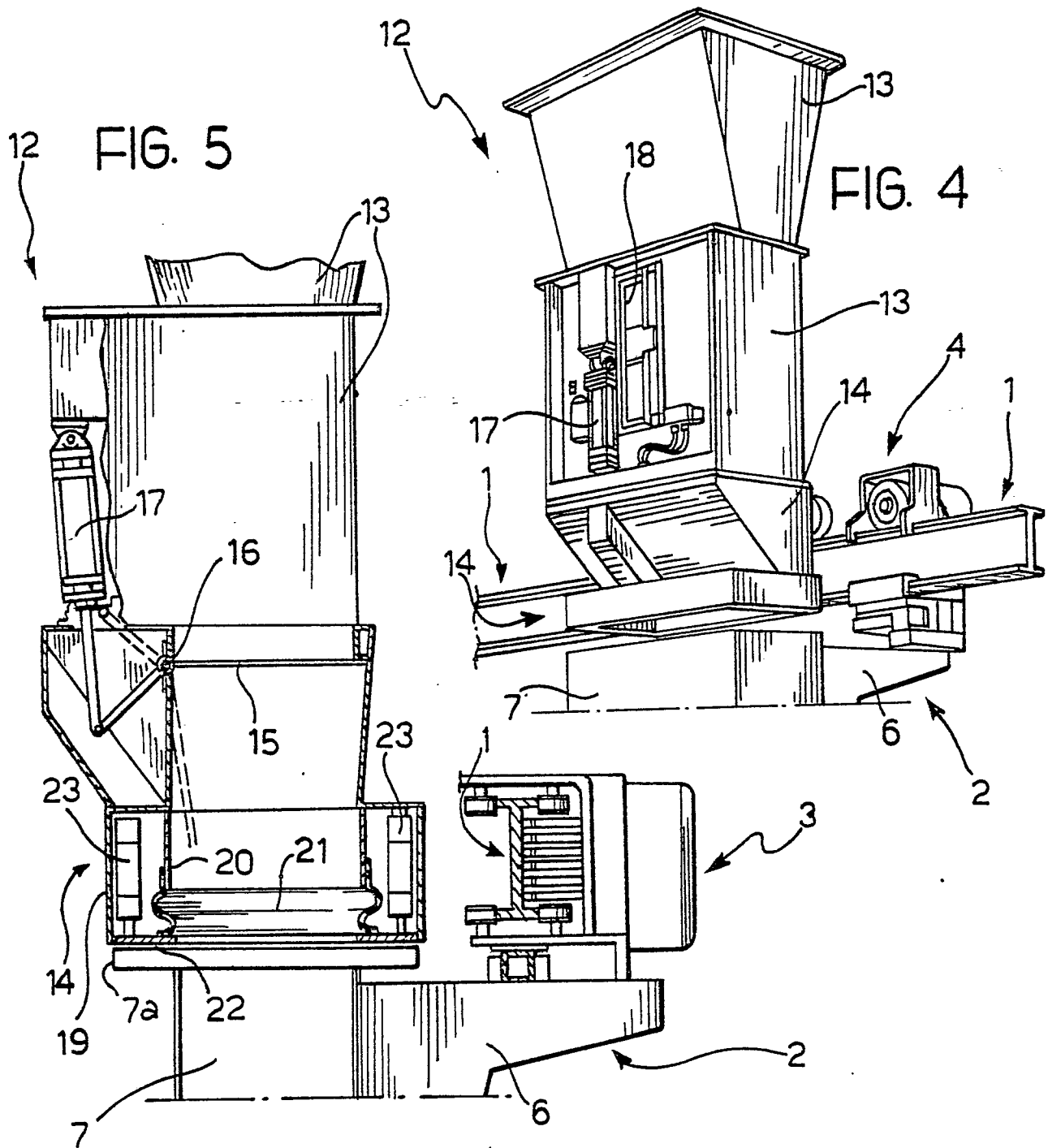


FIG. 2

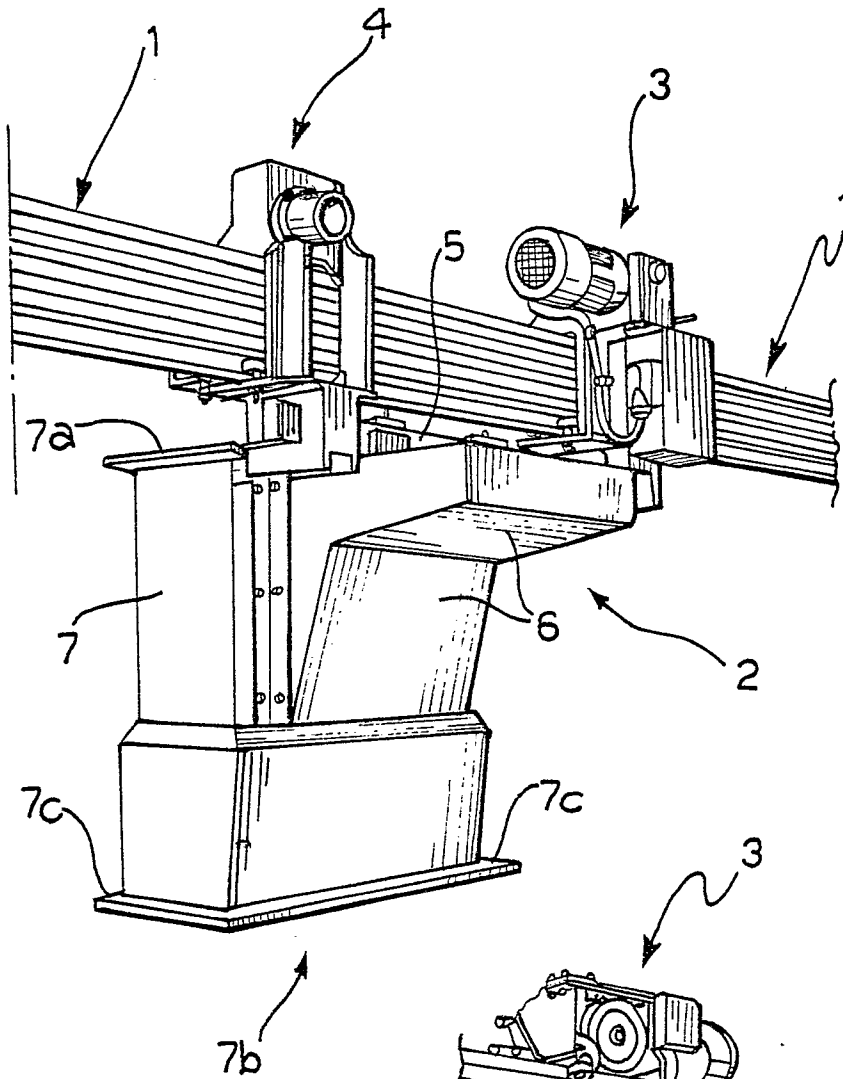


FIG. 3

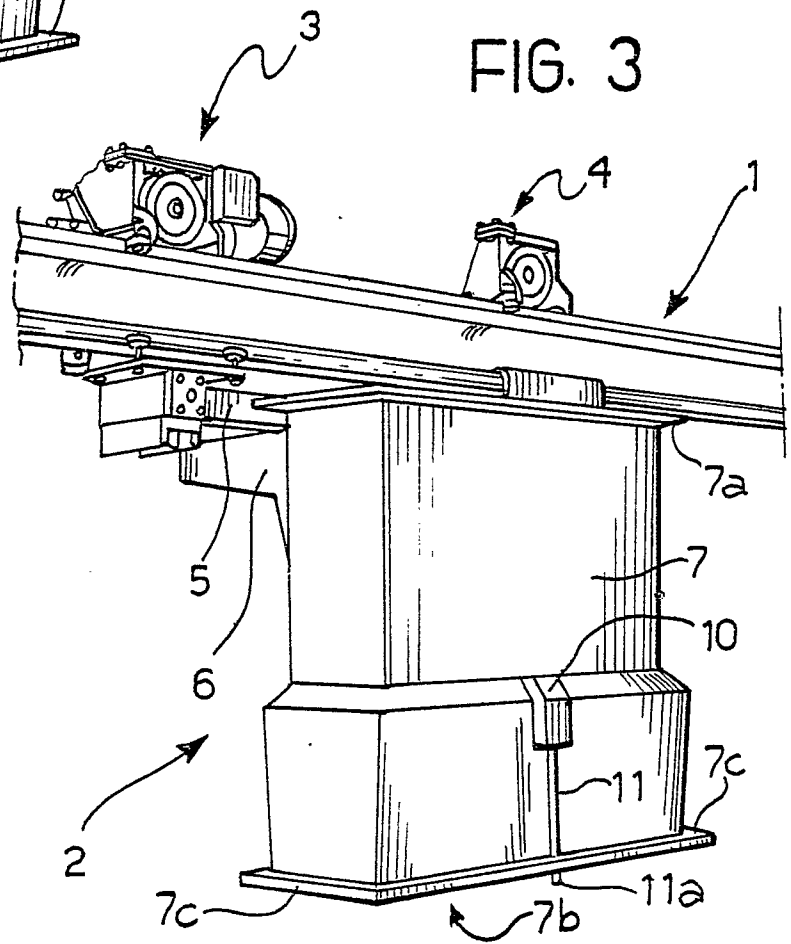


FIG. 7

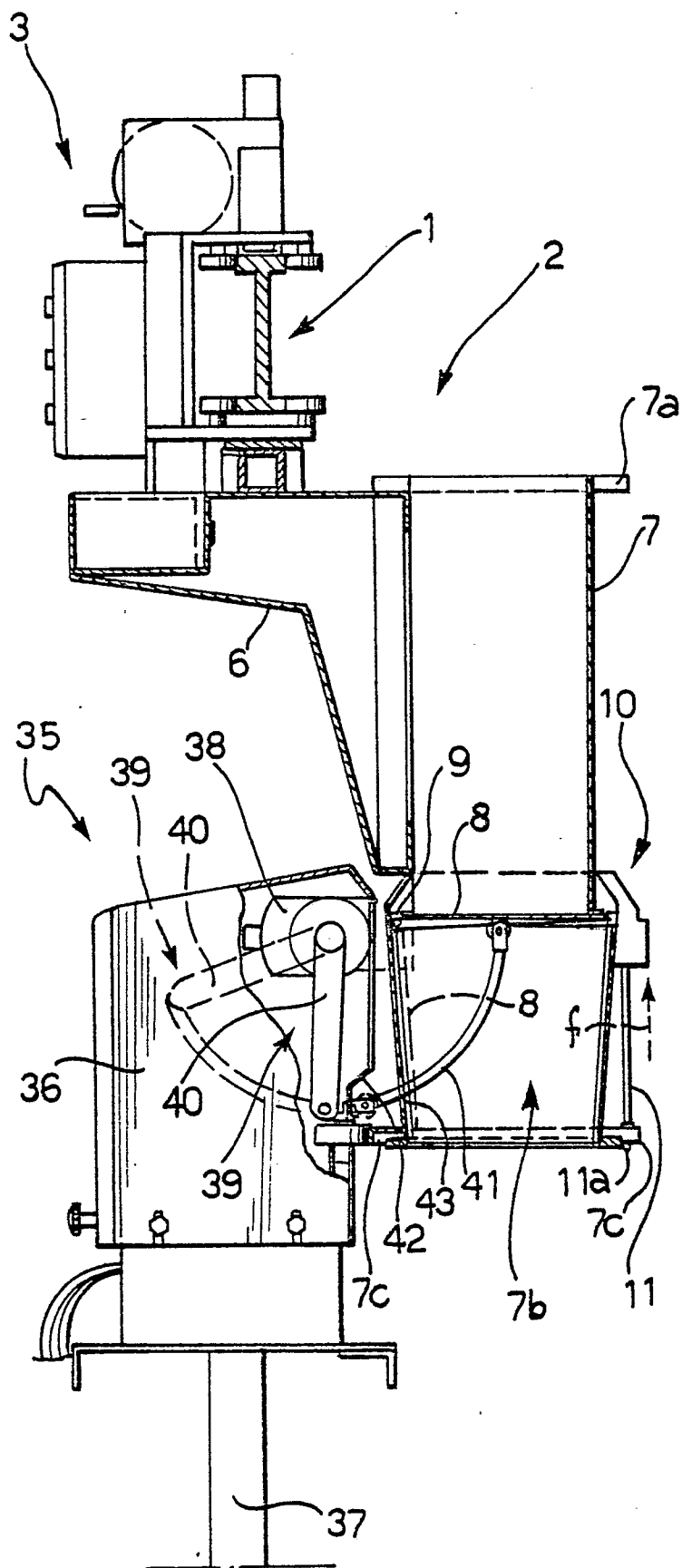
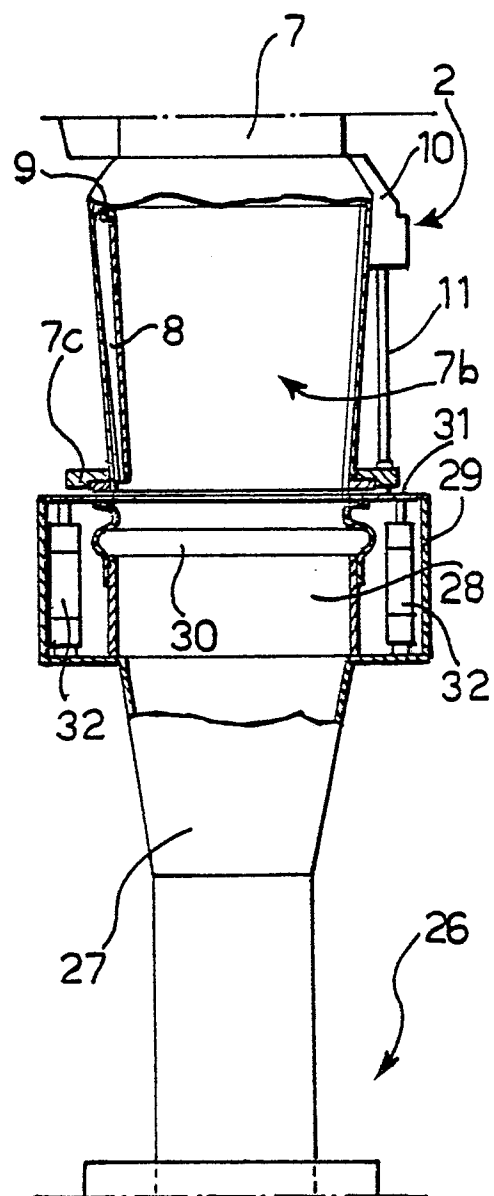


FIG. 6





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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)
A	FR-A-1245649 (SERVICE D'EXPLOITATION INDUSTRIELLE DES TABACS ET DES ALLUMETTES) * the whole document *	1	A24C5/39
A	GB-A-600237 (MOLINS) * page 4, line 69 - page 5, line 46; figures 1-3 *	1	
A	FR-A-1088432 (QUESTER) * the whole document *	1	
A	FR-A-1170854 (QUESTER) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A24C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 MARCH 1990	Examiner RIEGL R. E.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			