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(54) **Universal equipment for filling valve bags.**

(57) Equipment for erecting, filling and sealing valve bags, particularly for dangerous materials, with which no personnel has to come near the machine, having a filling device (400) which is provided with an obliquely mounted turntable carrying an even number of filling tubes diametrally to the centre line, each extending substantially horizontally in the erected position and substantially vertically in the filling position.

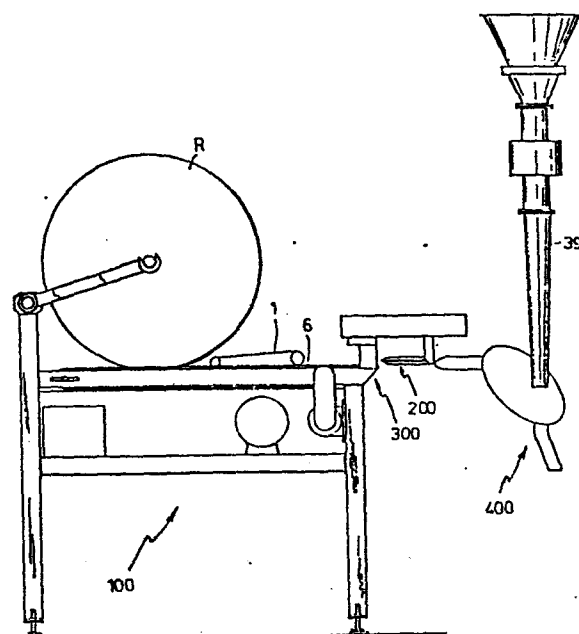


FIG. 1

Universal Equipment for Filling Valve Bags.

The invention relates to universal equipment for erecting, filling and sealing valve bags, consisting of a bag storage magazine, a bag supply device, a device provided with a beak for opening and forming the valve, an erecting device for transferring the empty
5 bag off the beak to a filling tube of a filling device, and a sealing device for sealing the valve.

The explicit aim is to render equipment for completely automatically filling and sealing both paper and plastic valve bags in
10 various embodiments, i.e. sealed, as well as glued, block bottom and sowed, and with various filling systems, both induced by gravity (filling tube), with air transport or mechanical transport (e.g. a propeller). By applying single or multi-walled sealed
15 plastic valve bags, so-called sole-bags or pinch-bottom valve bags respectively, a completely sealed packing is obtained, complying with Bundesbahn, UN specifications respectively, for granular or powdered products up to hazard class 8 (Caustic soda NaOH and the like).

20 Particularly the fact that during filling no personnel has to come near the machine is an important advantage of the present invention. One of the main characteristics of the invented equipment is,

that the filling device is provided with a turntable which can be rotated by a filling tube position-changing device about a centre line enclosing an angle in the order of 45° to the horizontal in a filling tube perpendicular plane of the equipment, said
5 turntable carrying two or a multiple of two filling tubes, each filling tube extending substantially horizontally in the erected position and substantially vertically in the filling position.

With said measure, a gain of time is obtained in the working of
10 the equipment, since it is as if an interim station has been put between erecting and filling. In view of processing substances which are health-hazardous, it is also of major importance that the filling opening is as good as only open if a bag is suspended from the filling tube. In the invented equipment, this moment
15 only occurs when the bag is released and the moment when the turntable rotates, during which it is of major importance that the filling opening is sealed by the disc.

Preferably the turntable and a substantially equally large
20 stationary disc are rollingly associated and adjacent to a supply tube a seal has been applied in the stationary disc which frictionally engages the turntable.

The beak of the erecting device in plan view is adapted to follow
25 a substantially rectangular path, wherein it remains constantly parallel to itself. This can be attained due to the fact that the beak has been mounted in a beak frame and is displaceable in three mutually perpendicular planes in order to transfer the bag to the erection clamp which is reciprocable in the erection clamp perpendicular plane.
30

Preferably the sealing device is provided with a sealing member having a discharge valve. The filling device can also be provided with a bag seat, the bottom of which encloses an angle to the

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horizontal, and if the discharge valve slopes downwardly towards a bag discharge chute, a shunting hill-resembling device is obtained which causes the filled bags to come out on account of the gravity.

5 In an efficient embodiment the filling tube perpendicular plane encloses an angle of about 30° to an erection clamp perpendicular plane of the erecting device. With this measure, space-saving of the entire equipment is obtained.

10 The invention will be further elucidated herebelow on the basis of the drawing, in which as an example a number of embodiments of equipment according to the invention is shown. In the drawing,

Fig. 1 illustrates a schematic side view of the equipment
15 except for the sealing device,

Fig. 2 illustrates a schematic plan view of the equipment of fig. 1 but then inclusive of the sealing device,

20 Fig. 3 shows a cross-section according to the line III-III of figures 2 and 4,

Fig. 4 illustrates a cross-section according to the line IV-IV of fig. 3,
25

Fig. 5 illustrates a cross-section according to the line V-V of fig. 4,

Figures 6A and B illustrate a side view of two embodiments of
30 the filling device, and

Fig. 7 illustrates a view of the sealing device in the direction of the arrows VII-VII of fig. 2.

The equipment shown in the drawing consists of a bag supply device 100 for supplying empty bags from a bag storage magazine, a device 200 for opening and forming the bag, an erecting device 300 for transferring an empty bag to a filling device 400, a sealing device 500 for sealing the valve of a filled bag, and a bag-ejecting device.

The bag supply device 100 is generally illustrated by figures 1 and 2, while a few details have been made visible in a larger scale in figures 3 and 4.

In figures 1 and 2 the empty bags are supplied from a roll R, but this can also be replaced by another known supply of empty bags, e.g. a supply in packages. Since this is not important to the invention, the matter has not been entertained any further.

The bag supply device 100 is provided with a supply upper belt 1 and a supply lower belt 6 between which the empty bags in figures 1 - 3 are supplied from the left to the right and in fig. 4 from the top to the bottom.

The supply upper belt 1 is supported in the lower section by a sliding table 5 and moves about a turning roller 3 and a hold-down roller 3 loaded by a hold-down cylinder 2.

The hold-down cylinder 2 through a cylinder hinge 8 rests on a frame 7 also supporting a linear cylinder unit 9 and a straight-guide 10 of the device 200 for opening and forming the valve.

The supply lower belt 6 moves according to fig. 3 about a turning driving roll driven by for example an electro motor 22. This puts the empty bags on a table 21, with which they are guided by a guiding means 23, and a photo cell 12 situated above the table 21 is activated.

- 5 -

In the table 21, a stationary vacuum bowl 20 has been incorporated which can cooperate with a movable upper vacuum bowl 14 being connected to a cylinder 13 for reciprocating said vacuum bowl. This is operated by the photo cell 12 mentioned before.

5

The device 200 for opening and forming the valve substantially consists of a beak 19 mounted on a supporting frame 17. The beak 19 is reciprocable by a beak cylinder 15 along vertical straight guides 18 in the supporting frame 17. The supporting frame 17 itself is reciprocable in a straight line in the direction of the side centre line of the equipment through a straight guide/drive 16 (fig. 3).

So the beak 19 is stuck into the valve of the bag and subsequently moves from the left to the right over the straight guide 10.

15

The erection device 300 consists in figures 4 and 5 of an erection clamp 24 having been mounted on a straight guide/drive 25 in order to transfer the bag in an erection clamp perpendicular plane A (fig. 2 and 4) to a filling tube 31/32 of the filling device 400, wherein a curve roll 27 connected to the erection clamp and a curve track 26 attached to the frame 7 cooperate in order to twist the valve before it is stuck onto the filling pipe. The erection clamp 24 consists of a bag support or underframe 28 supporting the bag during the erection movement and which is provided with a drive 29 for performing its sealing movement. The upper portion of the erection clamp is provided with a similar drive 30.

25

The filling device 400 shown in fig 6A has two filling tubes 31 and 32 which through connecting flanges 33 are connected to a turntable 38 to be rotated by a drive 40, said turntable being rollingly associated to a stationary disc 37 which has been connected to a chute tube flange 35. A seal (not shown) has been

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mounted about the outlet of the chute tube, said outlet frictionally engaging the turntable 38. The chute tube flange 35 can be connected through a corresponding flange 36 to any chute tube 39. It is also possible to connect the stationary disc 37 through a
5 connecting option 34 indicated by a dotted line to another filling system 45.

The filling tubes 31 and 32 point, due to a filling tube position-changing device (not shown) alternately substantially horizontally
10 in the erection position and substantially vertically in the filling position. The fact that there are two filling tubes results in a gain of time during filling. Also the passage through the stationary disc 37 and the turntable 38 is as good as only open if a bag is suspended from the filling tube 31 and 32. This is
15 a matter of switch technology which is not further elucidated in this application.

The rotation centre line L of the turntable 38 lies in fig. 6A in a perpendicular plane B (fig. 2) and encloses an angle α with respect
20 to the horizontal H. The angle α preferably is in the order of 45°. In the straight filling tubes of fig. 6A the filling tube perpendicular plane B will coincide with the erection clamp perpendicular plane A of the erection device 300.

25 Of an embodiment in which the filling tube clamp plane B encloses an angle in the order of 30° to the erection clamp perpendicular plane A (fig. 2), it can be expected that it will render some space-saving for the equipment as a whole. Then it is necessary to execute the filling tubes 31/32 in the manner shown in fig. 6B.

30

In fig. 6B the filling tube 31/32 is connected through a rubber bellows with a ring clamp 42 and on the portion between the ring clamp 42 and the connecting flange 33 a branch conduit 43 for the bellows and a suction conduit is connected.

The closing device 500 shown in fig. 7 consists of a vibrating unit 46 being mounted under a bottom 47 of a bag seat Z which supports the bag in a bag seat frame 52 during filling through the filling tube 31/32.

5

The bag seat Z furthermore has a side 49 and a bag bottom support 50 and the entire construction is reciprocable by means of straight guide/drive 48. During its descent the bag, and thus also the valve thereof, is cleared from the filling tube. In order to be able to automatically empty the bag in case of wrong filling, a cylinder 51 has been mounted which operates the bottom lid of the bag seat.

A transport clamp 57 with pertaining drive cylinder 56 and straight guide 58 transfers the filled bag to a sealing member S, where the valve can be sealed in any manner, e.g. ultrasonic welding, heatsealing or hotmelt.

A plate 47a prevents a filled and sealed bag to slide back into the bag seat Z after said bag has been released by the transport clamp 57.

In fig. 7 the sealing part S consists of a welding horn/anvil 59 with pertaining cutting device, welding unit 61 respectively. The sealed bag then rests on a discharge valve 54 of a bag ejecting device which is tiltable by a discharge valve 53 in the direction of a bag discharge chute 60. When processing health-hazardous substances it is useful to cover the sealing part S by a protective plate 55.

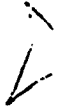
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Thus the sealing device 500 has between the bag seat Z and the sealing part S a shunting hill-resembling device causing the sealed bags to come out on account of the gravity.

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Within the spirit of the claims, other embodiments than those shown in the drawing are also included.

 HV/AB

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C L A I M S

1. Universal equipment for erecting, filling and sealing valve bags, consisting of a bag storage magazine, a bag supply device, a device provided with a beak for opening and forming the valve, an erecting device for transferring the empty bag off the beak to a filling tube
5 of a filling device, and a sealing device for sealing the valve, characterized in that the filling device (400) is provided with a turntable (38) which can be rotated by a filling tube position-changing device about a centre line (L) enclosing an angle in the order of 45° to the horizontal (H) in a filling tube perpendicular
10 plane (B) of the equipment, said turntable carrying two or a multiple of two filling tubes (31, 32) mounted diametrically to the center line, each filling tube extending substantially horizontally in the erected position and substantially vertically in the filling position.
- 15 2. Equipment as in claim 1, characterized in that the turntable is rollingly associated to a substantially equally large stationary disc (37) and in that adjacent to a supply tube (39) a seal has been applied in the stationary disc which frictionally engages the
20 turntable.
3. Equipment as in claim 1 or 2, characterized in that the beak (19) of the erecting device (300) in plan view is adapted to follow a substantially rectangular path, wherein it remains constantly parallel to itself.

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4. Equipment as in claim 3, characterized in that the beak (19) has been mounted in a beak frame (17) and is displaceable in three mutually perpendicular planes in order to transfer the bag to the erection clamp (24) which is reciprocable in the erection clamp perpendicular plane (A).
- 5
5. Equipment as in one of the claims 1-3, characterized in that the sealing device (500) is provided with a sealing member (S) having discharge valve (54).
- 10
6. Equipment as in claim 5, characterized in that the filling device is provided with a bag seat (v), the bottom (47) of which encloses an angle to the horizontal (H), and in that the discharge valve (54) slopes downwardly towards a bag discharge chute (60) when in its
- 15
- discharging position.
7. Equipment as in one of the previous claims, characterized in that the filling tube perpendicular plane (B) encloses an angle of about 30° to an erection clamp perpendicular plane (A) of the erecting
- 20
- device (300).
8. Equipment as shown in the drawing and/or as discussed on the basis of it.

HV/AB/HH

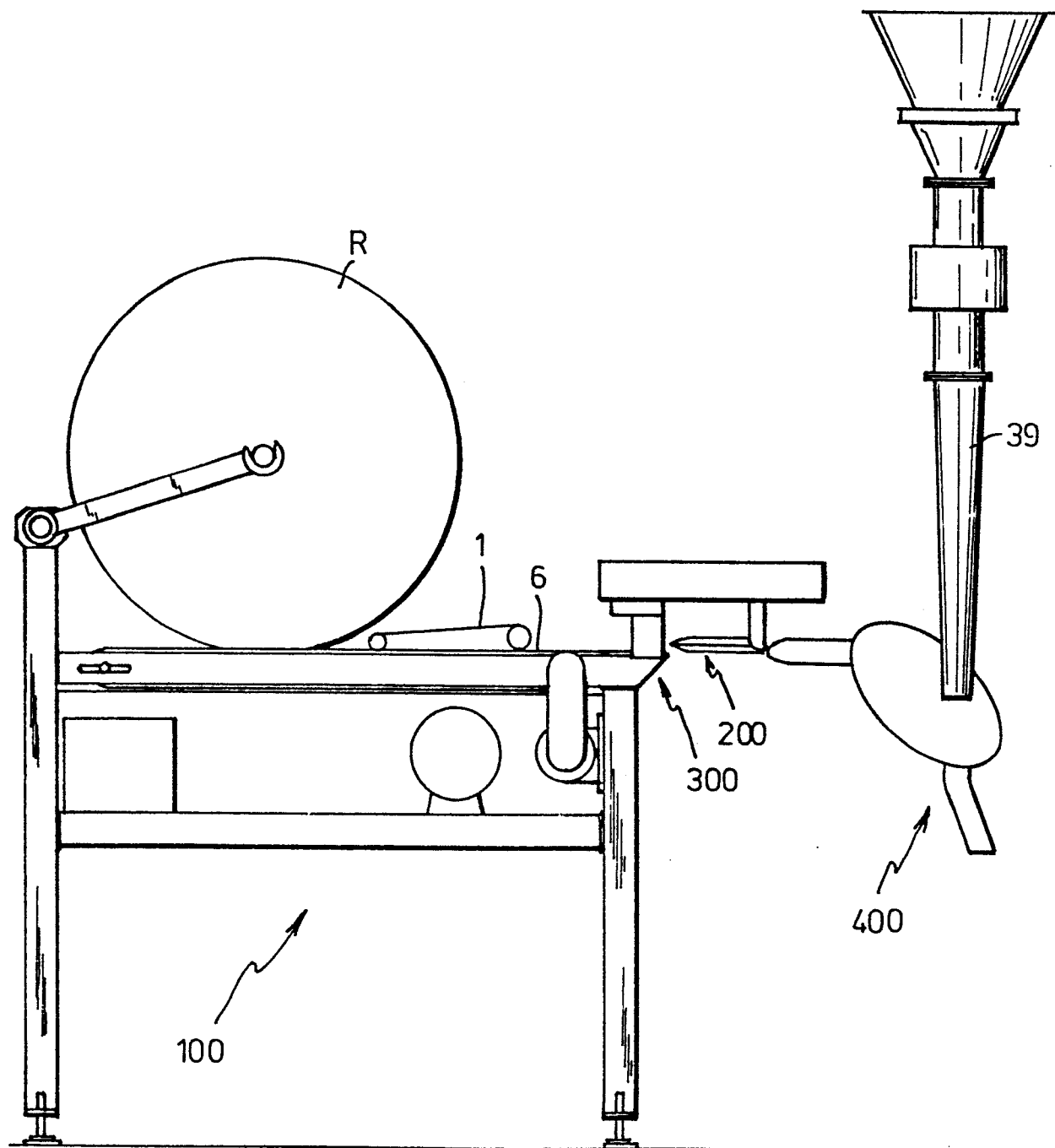


FIG. 1

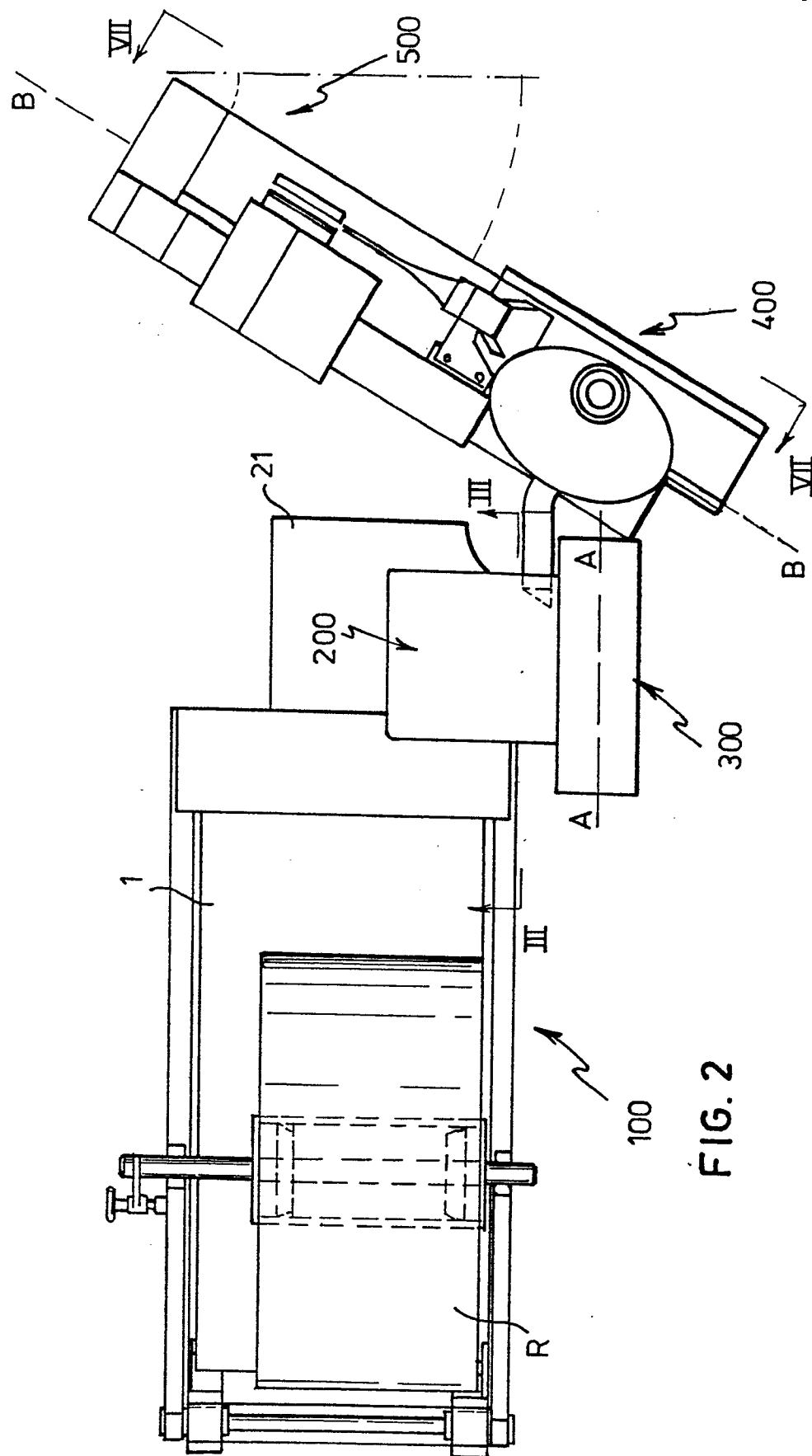
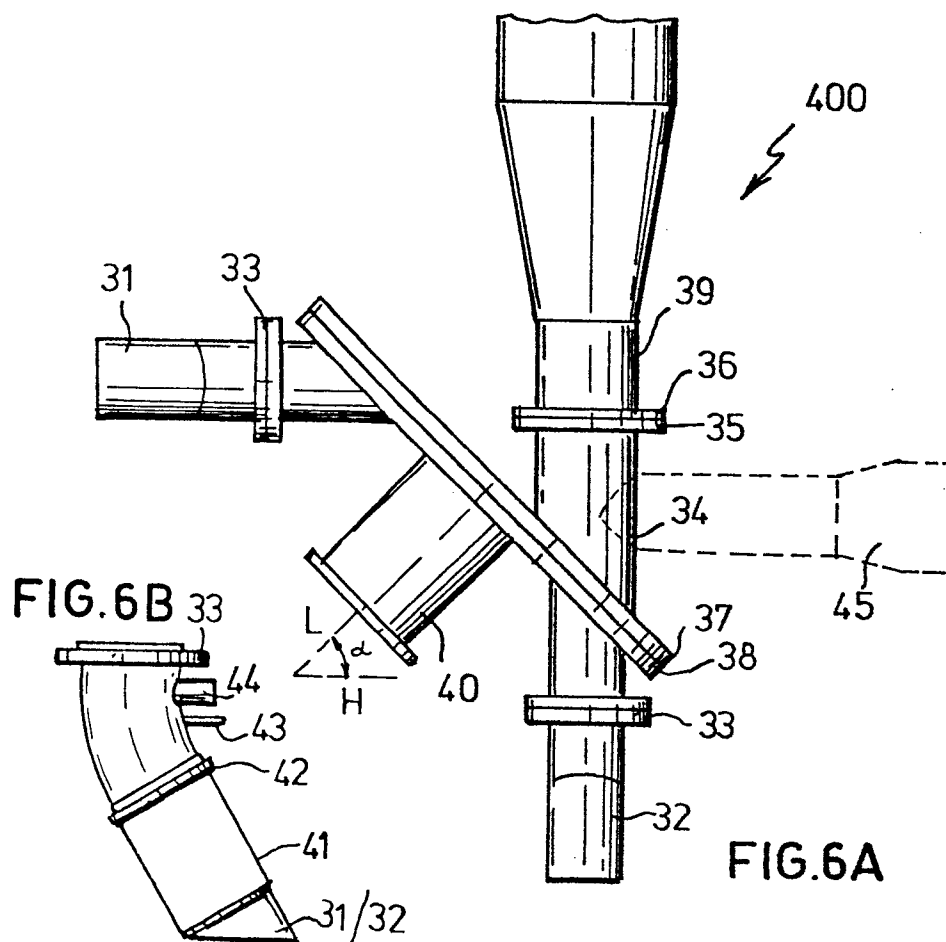
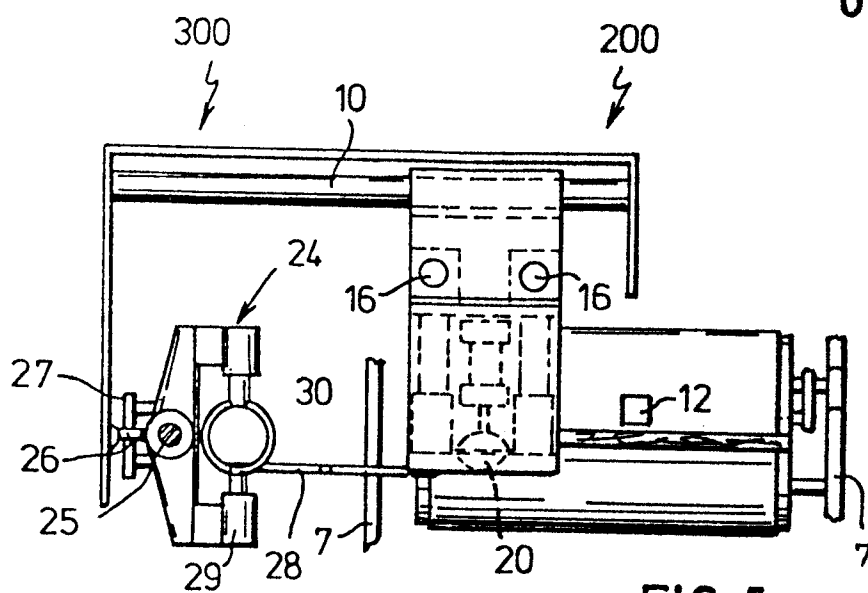


FIG. 2



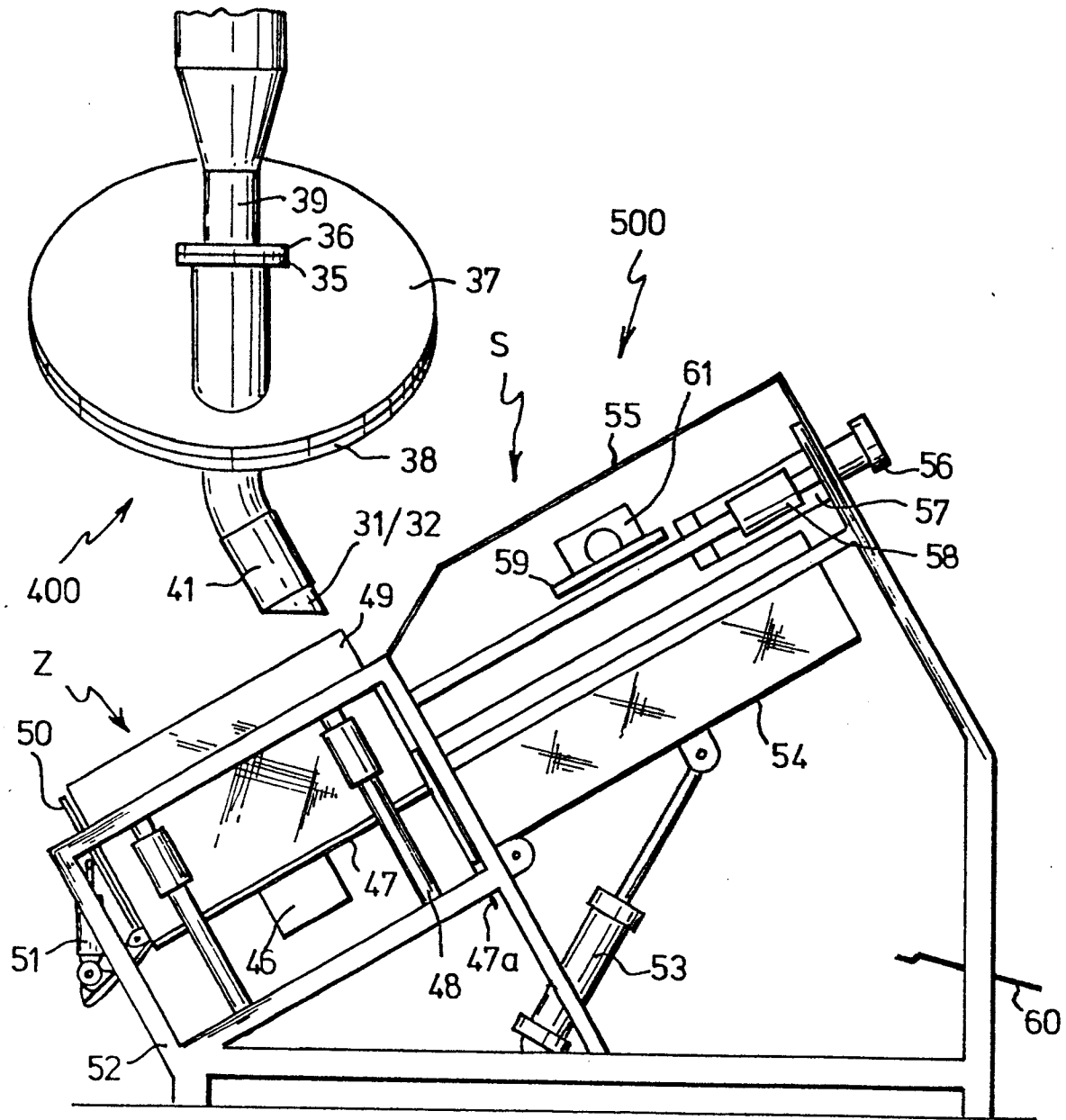


FIG. 7



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.4)
A	FR-A-2 504 494 (BATES VENTILSAEKKE) * Whole document *	1	B 65 B 1/18 B 65 B 43/26
A	DE-A-2 332 845 (GREIF-WERK ERNST MAHLKUCH) * Page 8, lines 1-9; figures 1,2 *	1	
A	DE-A-2 056 678 (HAVER & BOECKER)		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 65 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 11-04-1986	Examiner CLAEYS H.C.M.
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			