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(71) Applicant: **GRAFOPLAST S.p.A.**
Via Arrivabene 13
I-16154 Genova(IT)

(72) Inventor: **Tortonese, Alfredo**
Via Ruggero Leoncavallo No. 65/8
I-16154 Genova(IT)

(72) Inventor: **Bagnasco, Giorgio**
Via S. Alberto No. 73/6
I-16154 Genova(IT)

(74) Representative: **Ferrarotti, Giovanni**
Studio Consulenza Tecnica Dr. Ing. Giovanni Ferrarotti
Via Alla Porta Degli Archi 1/7
I-16121 Genova(IT)

(54) **Bag-filling machine with tubular wrappen for products.**

(57) This Patent covers a continuous bag-filling machine with tubular wrapper for products. It is consisting of a flat suspended element (1) with properly shaped edges (3, 5, 8, 9), provided with two lateral idlers (4), which element is supported by the corresponding idle rolls (14) fixed on to a supporting plate (12), so that said element (1) is supported suspended by its own rolls (4) while resting on the rolls (14) of the plate (12) and that said element (1) is surrounded by a strip-like tubular envelope (2) passing and running between said neutral rolls (4, 14). A cutting device (6, 7) opens a slit (24) on the outside of the wrapper (2), through which products are introduced in the bag. A device (19, 20) consisting of a double sealing and an intermediate cutting blade ensures progressive advancing of the envelope (2) according to special sequences for cutting, filling, sealing of the bottom and upper opening of the wrapper and subsequent detachment of the filled bag.

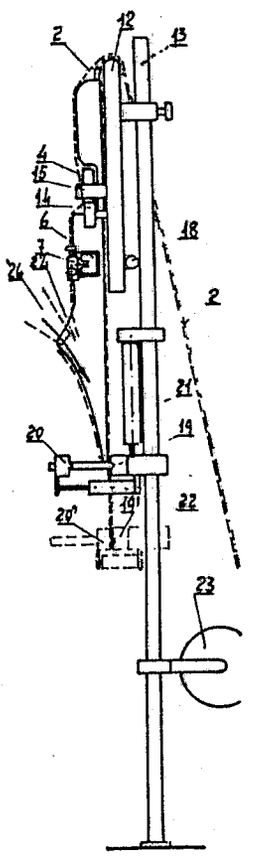

Fig. 6

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Bag-filling machine with tubular wrapper for products

This Patent covers a bag-filling machine for several products by using a strip-like tubular envelope.

Several types of bag-filling machines are known to this day for filling and closing bags containing different kinds of bulk products.

These machines are generally automatic, i.e. they prepare the envelope, fill it with the dosed product and seal it so that the package is ready for distribution. The envelope is usually a plastic film.

These known bag-filling machines use flat strip-like sheet wrappers and this has considerable drawbacks.

These drawbacks are due to the fact that the wrapping sheet has to be folded to create the sides of the bag; consequently the wrapper has to be sealed on three sides, while the fourth side is left for folding.

The known bag-filling machines are therefore particularly complicated and expensive, also in view of the fact that when the dimensions of the bag have to be changed serious difficulties arise and various components have to be replaced by others.

Some known bag-filling machines also use tubular envelopes, but these bag-filling machines are of the artisan type and not automatic so that the tubular wrapper has to be positioned on the opening for product feeding, according to a technique similar so that for producing salami and sausages.

The aim of this Patent is to simplify bag-filling machines while making them more efficient and less expensive. This aim is fulfilled by this Patent, by the fact that a commercial tubular tape wrapper is used to create the bags. Utilization of the tubular strip is made possible by an element with special configuration so that it may be suspended inside the tubular strip, thus allowing the strip to advance and all operations necessary for preparing a full bag. This suspended element located inside the strip-like wrapper, is supported, according to this Patent, by means of two pairs of idle rolls, a closer pair fixed onto the suspended element and another pair with greater spacing fixed onto a support, in which the roll pair of the element is resting on the roll pair of the support and the tubular envelope is placed between these rolls and can run around the internal suspended element and be positioned for horizontal cutting of the outer face of the wrapper, for sealing of the bottom, filling, sealing of the upper opening and detachment of the full bag.

The invention in question is illustrated in its practical implementation in the enclosed drawings in which:

Fig. 1 shows a front view of the suspended element to be placed inside the tubular strip-like envelope,

Fig. 2 shows a lateral view of the element illustrated in Fig. 1,

Fig. 3 shows a top view of the support and accessory components of the bag-filling machine,

Fig. 4 shows a lateral view of the support illustrated in Fig. 3,

Fig. 5 shows a top view of the complete bag-filling machine,

Fig. 6 shows a lateral view of the bag-filling machine illustrated in Fig. 5.

With reference to the above illustrations, the suspended element 1 is to be placed inside the tubular strip-like envelope 2. This element has a flat bottom, delimited by shaped side edges. The shaping of the edges illustrated in detail has a protruding upper part 3, which expands the tubular strip 2, a recess for positioning of each lateral idler 4, a part 5 virtually an extension of part 3, followed by a recess apt to receive the fixed guide 6 of cutting device 7; which is followed by a raised cusp-shaped section 8, to enlarge the slit 24 cut in the tubular wrapper for filling with the

product. The side edges become gradually lower and larger so as to form the two tips of a horn 9, useful to narrow the sides of the bag until they are superimposed for sealing while leaving an air outlet when the package is sealed.

The bottom of the suspended element 1 has a slot 10 supporting by means of a bent peduncle 11 the guide 6 of the cutting device 7. The support of the bag-filling machine features a vertical plate 12 sustained by special columns 13. The front face of this plate 12 is provided with two symmetrical idle rolls 14, with a centre distance slightly greater than the centre distance of the rolls 4 of the suspended element 1.

Element 1 is supported by its idle rolls 4, which are resting on the rolls 14 of the plate 12 and a front bar 15 or similar component preventing the suspended element 1 from being moved or from falling.

This supporting plane 12 is fitted with a cutting component 7, traversing on a guide 16 and moved by cable 17 properly reversed and operated by a double acting oil hydraulic piston 18.

The same columns 13 sustaining plate 12 also support in a lower position the double sealing and cutting

device of the filled bag.

This device features the cutting and sealing line 19 and the cutting and sealing counterline 20, in which the unit is vertically mobile by means of the double acting oil hydraulic pistons 21, from the continuous line position to the dashed line position 19', 20' and viceversa while the cutting and sealing counterline 19 is moved horizontally, by means of the double acting oil hydraulic pistons 22 from the continuous line position 19 to the dashed line position 19' and viceversa. The two sealing lines are astride the cutting line.

Thus, based upon the above, the following procedures for the use of the bag-filling machine in question are evident. The tubular envelope 2, indicated by the dashed line, wrapped around the reel 23, is previously unwound until it reaches, from the top, the suspended element 2, which is surrounded by the wrapper as indicated in Figures 5 and 6.

The tubular envelope 2 passes between the two pairs of rolls 4, 14 and reaches the sealing and cutting line and counterline 19, 20.

At this point the bag-filling machine is ready for a continuous operation in automatica mode, featuring

the following operations:

a) cutting of the external face of the envelope 2 by means of cutting device 7, so as to create opening 24,

b) entraining towards the bottom of the wrapper by means of the sealing and cutting device which from position 19, 20 is transferred to position 19', 20' while the previously cut opening 24 moves towards the cusps 8, thus enlarging the lips of the opening,

c) Continuous sealing of the wrapper bottom by means of the continuous sealing line (device) 19, 20 located in the raised position of the continuous line (and simultaneous upper sealing of the bag previously filled, its cutting to size and detachment),

d) filling of the bag sealed at the bottom with the products, which filling can be by means of hopper 26 or by means of an automatic dispenser,

e) moving down by means of the sealing and cutting device while shifting from position 19, 20 to position 19', 20' and simultaneous positioning of the opening 24 at the cusp 8 level for a new filling operation,

f) return of the sealing and cutting device in the raised position 19, 20 for sealing of the upper opening of the full bag and sealing of the bottom of the empty bag to be filled; while at the same time the full bag is cut, falling into a special storage tray,

g) filling of the new bag already sealed at the

bottom and subsequent repetition of the operations e), f), g).

According to the type of product to be filled in bags, the transverse dimensions of the tubular strip 2 and the depth of the bag will have to be changed.

It should be noted that only one suspended element 1 allows for the use of tubular envelopes having different transverse dimensions within a wide range so that few suspended elements 1 can fill a variety of bags according to normal requirements.

According to the objectives of this Patent, these various elements 1 having different dimensions can be mounted on the same supporting plate 12, by adjusting the rolls 14 in the horizontal slots 25.

Plate 12 and the sealing and cutting device 19, 20 can also be moved vertically along the columns 13 and the stroke of the oil hydraulic pistons 21, which regulate the height of the bags, can be varied accordingly. Procedures as well as the accessories required to vary the dimensions of the bags are therefore simplified.

As previously mentioned, the lower horn-like projections 9 allow for the creation of containers

with air-vents at the ends of the upper sealing.

Should airtight containers be required (for example, for liquid, pasty or powder products), the projections 9 will be kept shorter and will not affect the sealing area.

Claims:

1. Bag-filling machine for products using a tubular envelope, c h a r a c t e r i z e d by the fact that a suspended flat element (1) with shaped lateral edges (3, 5, 8, 9) and fitted with lateral idle rolls (4), in which this element (1) supports the fixed part (6) of a cutting device (7), provides for a supporting plate (12) sustained by columns (13) featuring two idle rolls (14) having a slightly greater centre distance than the idle rolls (4) of the suspended element (1), so that said element (1) is located in such a way as to rest its own rolls (4) on the rolls (14) of the plate (12), featuring a mobile cutting device (7) which can be moved by means of a cable (17), this plate being controlled by an oil hydraulic piston (18) and provides for a double sealing and cutting device (19, 20) of the envelope, fixed onto and adjustable on the supporting columns (13) and operated by oil hydraulic pistons (21, 22) so that the tubular shaped envelope (2) containing the product can be wrapped around the suspended element (1), and run, passing in between the pairs of idle rolls (4, 14), and can be slit (24) on the outer surface for filling with the products, can provide for sealing of the bottom and of the upper lip of the envelope and can cut and detach the packed bag.

2. Bag-filling machine as described in claim 1, c h a r a c t e r i z e d by the fact that lateral shapings of the suspended element (1) consist of a first projecting part (3) which enlarges the envelope (2) slipped from the top and over the above said element, of a subsequent recessed part containing the idler (4), of a part (5) being an extension of the first (3), of a recess receiving the fixed guide (6) of the cutting device (7), of a raised cusp shaped section (8) apt to enlarge the slit (24), forming the inlet opening for the product and finally of a part which is gradually growing lower and larger so as to create two tips of a horn (9) to flatten and enlarge the sides of the bag for closing, while leaving an air outlet along the upper seal of the package.

3. Bag-filling machine as described in claim 1, c h a r a c t e r i z e d by the fact that the fixed part (6) of the cutting device is hooked onto the suspended element (1).

4. Bag-filling machine as described in claim 1, c h a r a c t e r i z e d by the fact that the suspended element is provided with a device (15) which keeps it in place by means of its idler rolls (4) resting on the rolls (14) of the supporting plate (12).

5. Bag-filling machine as described in claim 1, c h a r a c t e r i z e d by the fact that the sealing and cutting device is provided with two sealing lines astride the cutting line and is moved vertically by means of oil hydraulic pistons (21) from an upper position (19, 20) to a lower position (19', 20') and viceversa, so that, in the upper position, the bottom of the bag to be filled is sealed, the opening of the full bag is sealed and the full bag is detached, while lowering of the device moves the tubular envelope (2) forward so that the slit (24) is located on the cusps (8) which enlarge the slit thus allowing for the bag to be filled.

6. Bag-filling machine as described in claim 1, c h a r a c t e r i z e d by the fact that the sealing and cutting device can be opened and closed by means of the oil dynamic pistons (22), so that the closed position (19', 20') allows for sealing, cutting as well as progress of the envelope while the device returns to its raised position under open conditions (19, 20).

7. Bag-filling machine as described in claim 1, c h a r a c t e r i z e d by the fact that every suspended element can operate with transverse measures of the envelope (2) within a wide range, beyond which

a suspended element (1) of different dimensions is to be provided, and which can be interchanged and mounted on the same supporting plate (12) featuring idler rolls (14) which can be approached or spaced by means of slots (25).

8. Bag-filling machine as described in claim 1, c h a r a c t e r i z e d by the fact that the supporting plate (12) and the sealing and cutting device (19, 20) can be moved along the supporting columns (13), and the stroke of the oil hydraulic pistons (21) can be adjusted for vertical movement of the sealing and cutting device to change the depth of the bag.

9. Bag-filling machine as described in claim 2, c h a r a c t e r i z e d by the fact that the horn tips (9) are shorter and do not affect the upper sealing area, so that the bags are airtight sealed.

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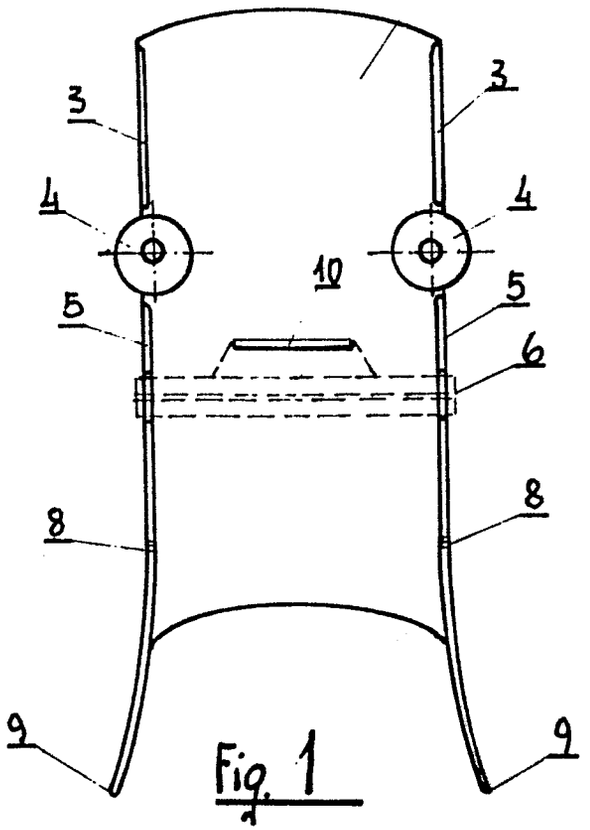

Fig. 1

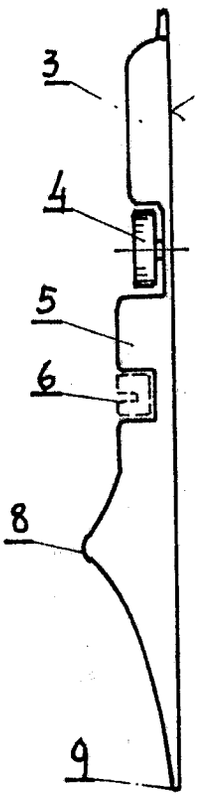

Fig. 2

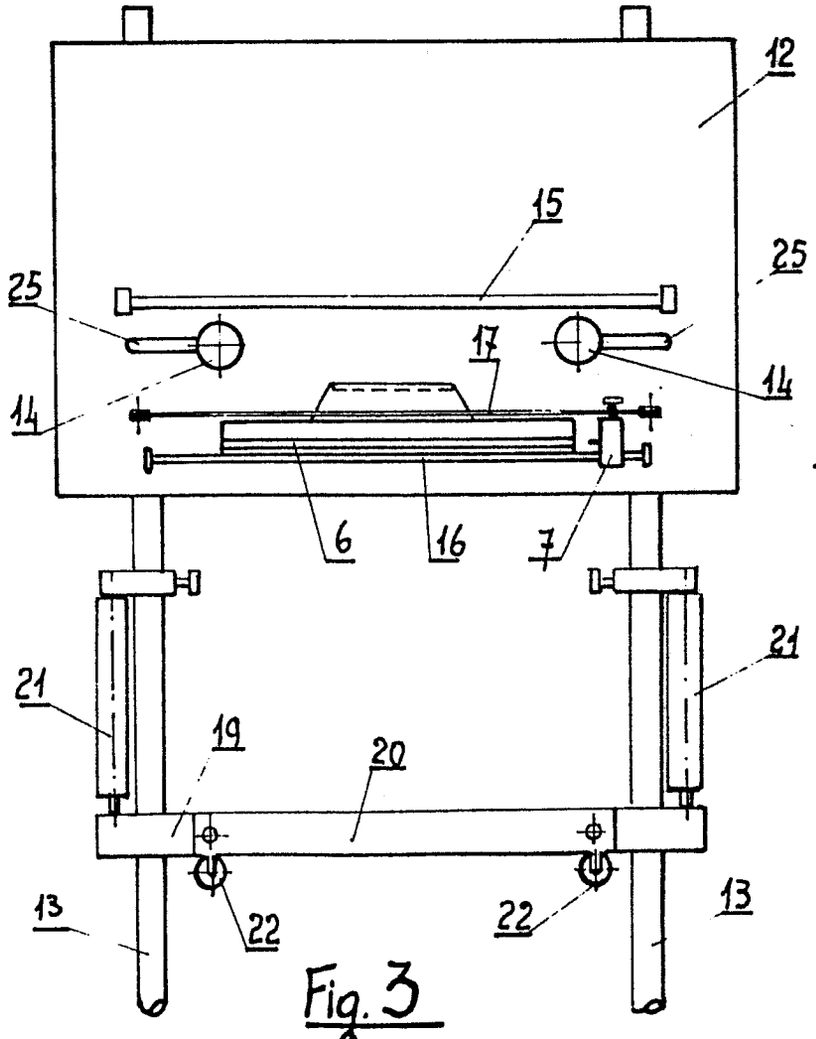

Fig. 3

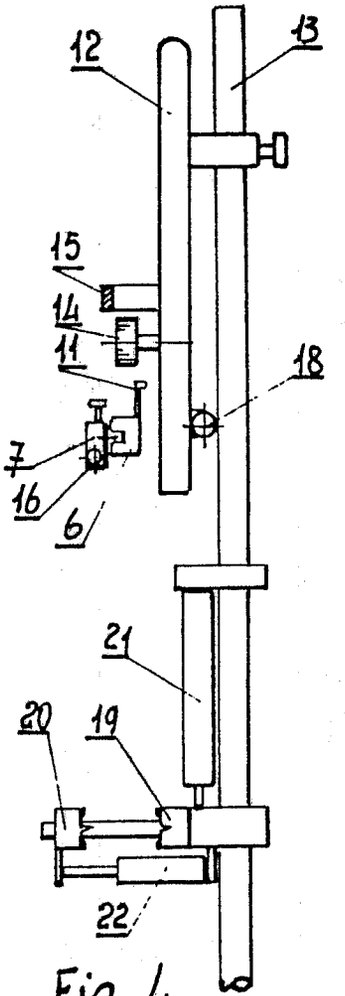

Fig. 4

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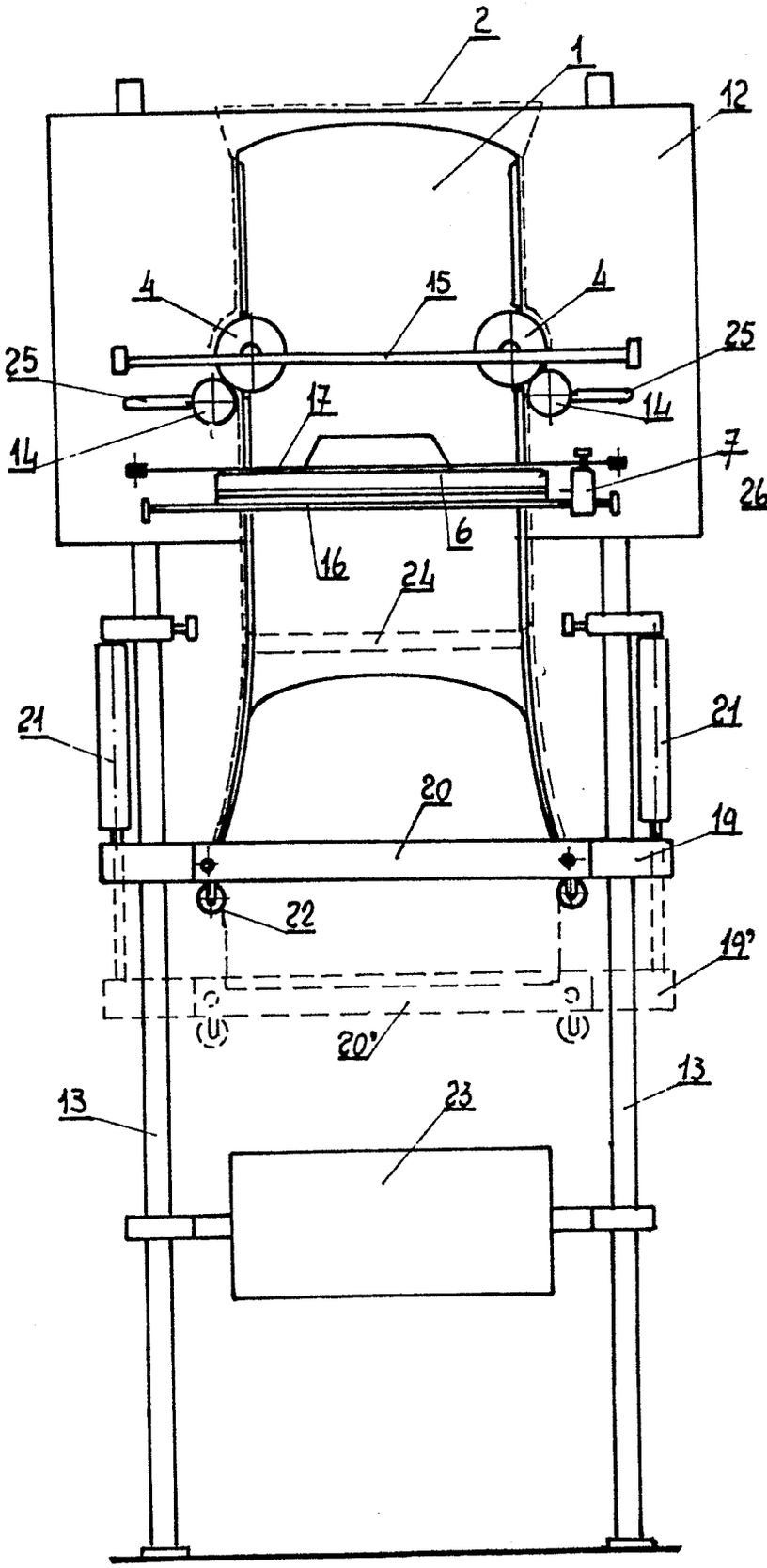

Fig. 5

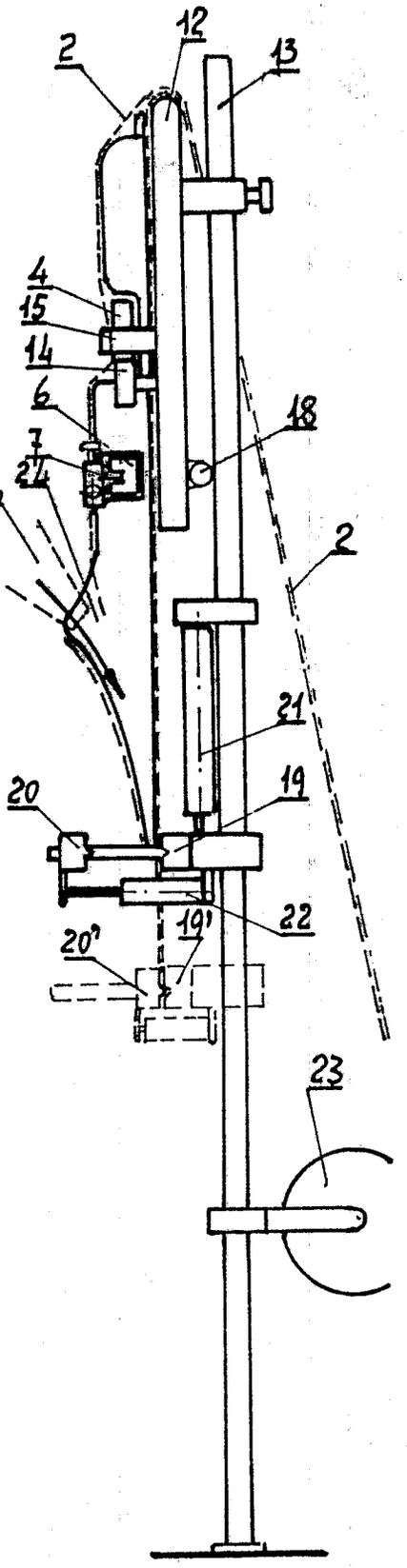

Fig. 6

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EUROPEAN SEARCH REPORT

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. Application number

EP 87108770.6

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)
X	DE - A1 - 2 919 567 (ANIDRITI) * Totality *	1	B 65 B 9/14
A		2,3	
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X	EP - A1 - 0 109 105 (INTERMATE B.V.) * Totality *	1	
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X	US - A - 4 347 950 (ONISHI) * Totality *	1	
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	--		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	US - A - 3 760 558 (KAMINSKY et al.) * Totality *	1	B 65 B 9/00 B 65 B 43/00 B 65 B 59/00
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A	US - A - 3 390 617 (CLOUD) * Totality *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	11-09-1987	MELZER

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