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(54) Device for transferring brush bodies, respectively brushes, from one machine to another.

(57) This device substantially consists in a combination of, amongst others, means which can make the whole device (3) revolve, respectively pivot, on a shaft (5) which is arranged between the two machines; on this shaft (5) a pressure cylinder (6), the piston rod (8) of which is connected with a sliding carriage (9) which can move to and fro in relation to the aforesaid cylinder, on guides (10-11) which are connected with the aforesaid cylinder (6); assembled with the aforesaid sliding carriage (9) a support (13) which is provided with a guide (16-17) along which a sliding part (18) can move.

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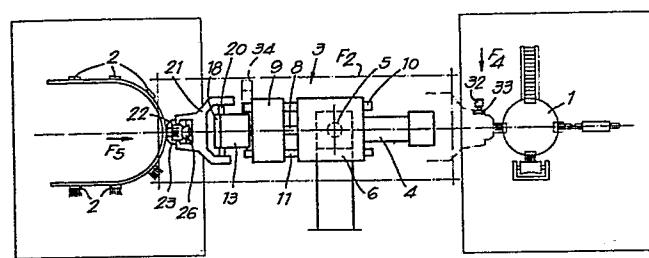


Fig. 1

- 1 -

Device for transferring brush bodies, respectively brushes,  
from one machine to another.

The present invention relates to a device for transferring brush bodies or brushes from one machine to another. Even more especially, this invention relates to such a device which is specifically intended for so transferring brush bodies, respectively brushes, for instance tooth-brushes.

A special application of the device according to the invention is the direct transfer of a brush from a brush body holder of a brush manufacturing machine to a machine for the further completion thereof, as for instance cutting, rounding off the fibres, marking, packing, etc., whilst in many cases it is intended to have this transfer take place as rapidly as possible, in order to keep the efficiency of the machines as high as possible.

15

For this purpose, according to the present invention, one can take the brush bodies from the brush body holder whilst the latter is still moving due to the fact that at that moment one or more other brush bodies which are located in the same brush body holder are still in the course of manufacture, in other words whilst in one or more other brush bodies small holes are still being drilled and/or fibres being planted.

25 Another object of the present invention is to offer a device

which does not only seize the brush body whilst still moving, but from that moment does no more let it go until it is brought into the other machine, in other words until it is taken over by the other machine, so that the transfer  
5 can take place with an extremely great precision.

In this connection, whether the holder to which the brush body is delivered, be moving or not is without importance.

10 Whether the holders of one machine and/or the other machine be horizontal, or be forming a certain angle with one another, in the vertical plane, is also without importance.

15 The device according to the invention which has the aforesaid and other characteristics mainly consists for this purpose in the combination of means which are capable of making the whole device revolve, respectively pivot, on a shaft which is arranged between the two machines in question; on this shaft a pressure cylinder the piston rod of which is  
20 connected with a sliding carriage that can move to and fro in relation to the aforesaid cylinder along guides which are assembled with the aforesaid cylinder; assembled with the aforesaid sliding carriage a support which is provided with a guide along which a sliding part can move; at an angle of  
25 90° in relation to the aforesaid guides one or more passages for guides which are parts of a seizing mechanism proper for the brush body and possibly means allowing to bring the brush bodies into the right position in relation to the machine to which they must be delivered.

30 In order to throw more light on the characteristics of the invention, a preferred embodiment will be presently described, reference being made to the attached drawings, in which :

35 figure 1 shows a schematic front view of a device according to the invention;

figure 2 shows to a larger scale and in section the part

which is indicated as F2 in figure 1;  
figure 3 shows a bird's-eye view of figure 2;  
figure 4 shows to a larger scale a view according to  
the arrow F4 in figure 1;

5 figure 5 shows to a larger scale a view according to  
the arrow F5 in figure 1;  
figure 6 is a view which is similar to the one of fi-  
gure 5, but with the device hanging down.

10 Figure 1 schematically shows a brush body holder 1, from  
which the brush bodies must be removed, after the hairs have  
been planted, for instance in order to bring them into a hol-  
der 2, which is a part of a machine for cutting, shaving,  
rounding off the fibre ends or for a similar operation.

15 For this purpose, there is arranged between two suchlike ma-  
chines a device 3 according to the invention, which in this  
case is formed by a so called turning cylinder 4, which is  
fixed in an appropriate way on a support, which can carry  
20 the device 3, but which, for the sake of simplicity, is not  
shown in the drawings.

On the outgoing shaft 5 of the turning cylinder 4 is fixed  
in this case a housing 6, which forms as if it were a pres-  
25 sure cylinder, the piston 7 of which is connected by means  
of the piston rod 8 with a sliding carriage 9, the latter  
being guided on two guides, respectively 10 and 11, which  
are fixed in the aforesaid housing 6.

30 In the sliding carriage 9, there is mounted, in this case,  
a shaft 12, which can freely rotate, on which is fixed a  
U-shaped support 13. Between the flanges, respectively 14  
and 15, of the latter, two guides, respectively 16 and 17,  
are provided in this case, on which a sliding part 18 can  
35 slide, passages being provided in the latter for two guides,  
respectively 19 and 20, which form an angle of 90° with the  
guides 16 and 17, the ends of these guides 19 and 20 being

connected with one another by means of a bridge-shaped support 21.

The latter is provided with two claws, respectively 22 and 5 23, which can cooperate in an appropriate manner with the brush body and which, for that purpose, pivot around turning points 24 and 25. The rear ends of the claws 22 and 23 cooperate each with a conical pusher 26, which is appropriately connected with the piston of a pressure cylinder 27.

10

In order to always bring the sliding part 18 into a definite position in relation to the U-shaped support 13, a spring 28, on the one hand, and an adjustable stop 29, on the other hand, are provided between the aforesaid sliding part 18 and support 13. In a similar manner, a spring 30 and an adjustable stop 31 are provided between the bridge-shaped support 21 and sliding part 18.

In order, as will be made clear hereinafter, to be able to 20 remove a brush body from the brush body holder 1, whilst this brush body holder is moving, there is fixed on the support on which the brush body holder 1 is fixed and which has the same motions as the holder 1 a projection 32, on which there is an adjustable stop, in the shape of a freely rotatable little wheel 33, with which the bridge-shaped support 25 21 will cooperate.

Finally, for instance with the turning cylinder 4 or another fixed part of the frame of the device, there is connected a 30 projection 34, the free end of which has a support 35, which is adjustable in height, with which for instance the arm 15 of the support 13 can cooperate when same is brought opposite the holder 2, whereas, to the sliding part 18 there is fixed a projection 37, the upper end of which, in the position opposite the holder 2, can cooperate with an oblique stop 38, which is preferably adjustable in relation to the aforesaid lath 34.

The so described embodiment is intended for taking a brush body from the holder 1 and bring it into the holder 2 by turning the whole device  $180^\circ$  on shaft 5, either downwards and up again, or upwards and down again.

5

In order to remove a brush body from the holder 1, one will command the turning cylinder 4 so that the claws 22 and 23 come into a position which is opposite the holder 1, after which the piston 7 pushes the sliding carriage 9 so that the 10 claws become freely placed around the brush body. At this moment, the support 21 places itself behind the stop 33, against the action of the spring 28, in such a way that the bridge-shaped support 21, together with the sliding part 18, become displaced along the guides 16 and 17, their displacement corresponding to the displacement of the brush body 15 holder 1, displacement which is necessary for processing one or more other brush bodies.

At that moment, the conical pusher 26 is pushed out so that 20 the claws 22 and 23 move the one towards the other and seize the brush body whilst it is moving, after which the small brush can be taken out, independently of whether another brush body is being processed or not. The piston 7 is commanded and the sliding carriage 9 is pulled back, together 25 with its support 13, sliding part 18 and bridge-shaped support 21.

Next, it suffices to command the turning cylinder 4, by means of the shaft 5, to turn the whole device so that the 30 claws 22 and 23 move towards the holder 2, after which the piston 7 is pushed out again, resulting in the claws 22 and 23 moving towards the holder 2, which seizes the brush body, after which the conical pusher 26 is pulled back to free the brush body from the claws 22 and 23.

35

When the clamps 22 and 23 take the brush body from the brush body holder 1 whilst small holes are being drilled or fibres



are being planted, along the longitudinal direction, the support 21, together with the sliding part 18, will become displaced along the guides 16 and 17, whereas, when the brush body is being seized whilst the so called breadth motion takes place, or for instance during a zigzag motion or similar, the support 21 will become displaced in the sliding part 18 by means of the guides 19 and 20.

It goes without saying that, at some moments, or for certain applications, the two aforesaid motions may possibly be made to take place together whilst seizing a brush body.

The provision according to which the support 13 is freely rotatable in the sliding carriage 9 is only necessary when the position of the brush body in the brush body holder 1, on the one hand, and in the aforesaid holder 2, on the other hand, are not parallel, in other words when the brush body must be taken in the holder 2 for instance exactly horizontally, whereas the brush body in the holder 1 forms a certain angle in the vertical plane.

When the device moves from the position opposite the brush body holder 1 to the position opposite the holder 2, the aforesaid arm 15 of the support 13 will come against the stop 35 at the end of that displacement, on the one hand, whereas, at the same time, the projection 37 will come against the oblique stop 38, on the other hand, whereby the concerned brush body is brought in the right position in relation to the holder 2.

30

It is clear that one has obtained in this way a device which allows to transfer brush bodies from one machine into another without having to drop them, whereby the correct transfer is ensured, it being possible to take over brush bodies whilst the brush manufacturing machine proper is still in motion. As a matter of fact, by means of this device, one obtains that the brush bodies are seized whilst they are



still clamped in the brush body holder 1 and are only released after they have been clamped in the holder 2.

In an embodiment which is a variant, one will provide a

5 double device, in which, at one end as well as at the other, claws 22 and 23 are provided, so that taking off a brush body and delivering a brush body can take place with a greater speed still.

10 The present invention is by no means limited to the embodiments described as examples and shown in the attached drawings, but such a device can be made with various shapes and dimensions without going outside the scope of the invention.

## Claims.

1.- Device for transferring brush bodies from one machine to another, characterized in that it mainly consists in the  
5 combination of means which can make the whole device (3) revolve, respectively pivot, on a shaft (5) which is arranged between the two machines in question; on this shaft (5) a pressure cylinder (6) the piston rod (8) of which is connected with a sliding carriage (9) that can move to and fro in  
10 relation to the aforesaid cylinder, on guides (10-11) which are assembled with the aforesaid cylinder (6); assembled with the aforesaid sliding carriage (9) a support (13) which is provided with a guide (16-17) along which a sliding part (18) can move; at an angle of 90° in relation to the afore-  
15 said guides (16-17), one or more passages for guides (19-20), which are parts of a seizing mechanism for the brush body and possibly means allowing to bring the brush bodies into the right position in relation to the machine to which they must be delivered.

20

2.- Device according to claim 1, characterized in that on the aforesaid shaft (5) two devices (3) are provided as described hereinabove, which are arranged on a common center line but in opposite directions.

25

3.- Device according to claim 1 or 2, characterized in that the means that command the aforesaid shaft (5) are constituted by a so called turning cylinder (4).

30

4.- Device according to claim 1 or 2, characterized in that the connection between the aforesaid support (13) and aforesaid sliding carriage (9) is constituted by the turning shaft (12).

35

5.- Device according to claim 4, characterized in that the aforesaid turning shaft (12) is freely rotatably mounted in the aforesaid sliding carriage (9) and arranged coaxially

with the piston rod (8) of the aforesaid pressure cylinder (6)

6.- Device according to one of the preceding claims, characterized in that the aforesaid support (13) is formed by a U-shaped frame, the flanges (14-15) of which are connected with one another by one or more guides (16-17), for instance in the shape of cylindric pins.

10 7.- Device according to one of the preceding claims, characterized in that in the aforesaid sliding part (18) passages are provided, forming an angle of 90°, by means of which it can be made to slide on guides (19-20) connected with the clamping means.

15 8.- Device according to one of the preceding claims, characterized in that the aforesaid sliding part (18), mounted on the aforesaid guide (19-20), is connected by means of a spring (28) with the aforesaid support (13), an adjustable stop (29) being provided on this support, so that the aforesaid sliding part (18) is always pulled into a definite position.

9.- Device according to one of the preceding claims, characterized in that the aforesaid sliding part (18) is connected by means of a spring (30) with the bridge-shaped support (21) of the clamping device proper.

10.- Device according to one of the preceding claims, characterized in that on the support (21) of the brush body holder of the brush manufacturing machine there is provided a stop (31) which follows all the motions of the brush body holder and with which, against the action of the spring (30) between the aforesaid sliding part (18) and aforesaid support (21), the aforesaid clamping means cooperate.

11.- Device according to one of the preceding claims, charac-

terized in that at the place where the brush bodies must be delivered, there is provided, above the aforesaid support (13), an adjustable stop (35) with which this support (13) can cooperate in order to bring the brush body into

5 the correct position in the vertical plane.

12.- Device according to one of the preceding claims, characterized in that at the place where the brush bodies must be delivered, there is provided, above the aforesaid support,

10 an adjustable stop (38) for the clamping means, with which this support can cooperate in order to bring the brush body into the correct position in the horizontal plane.

13.- Device according to claim 1, characterized in that the

15 aforesaid stop (38) is formed by an oblique plane.

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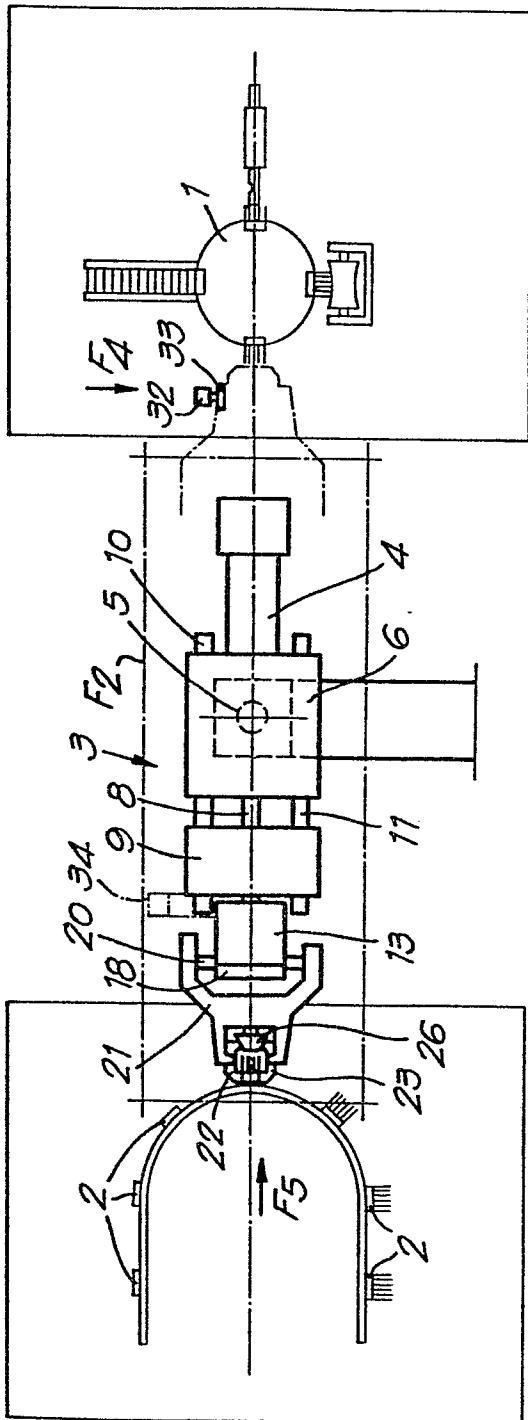


Fig. 1

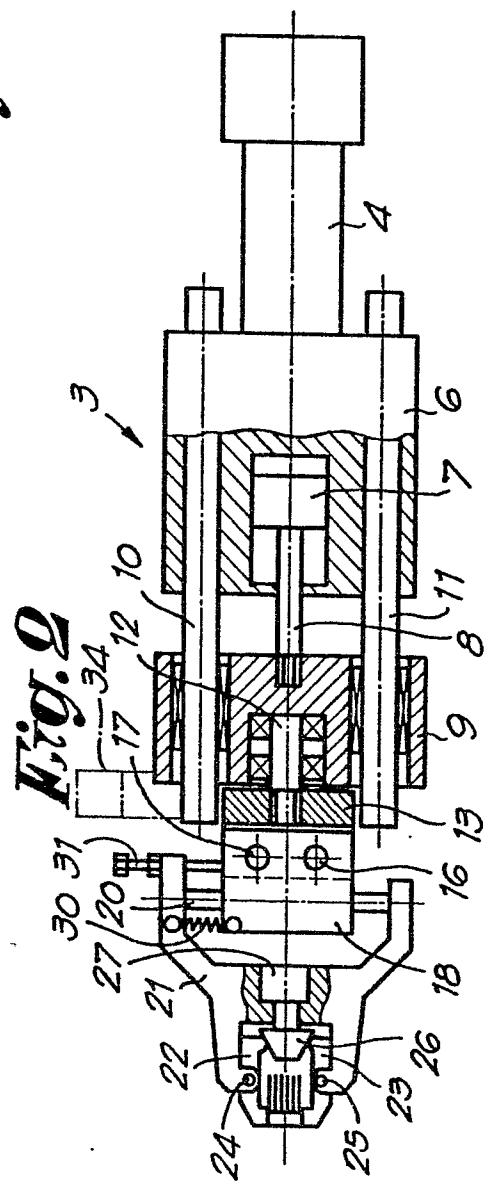
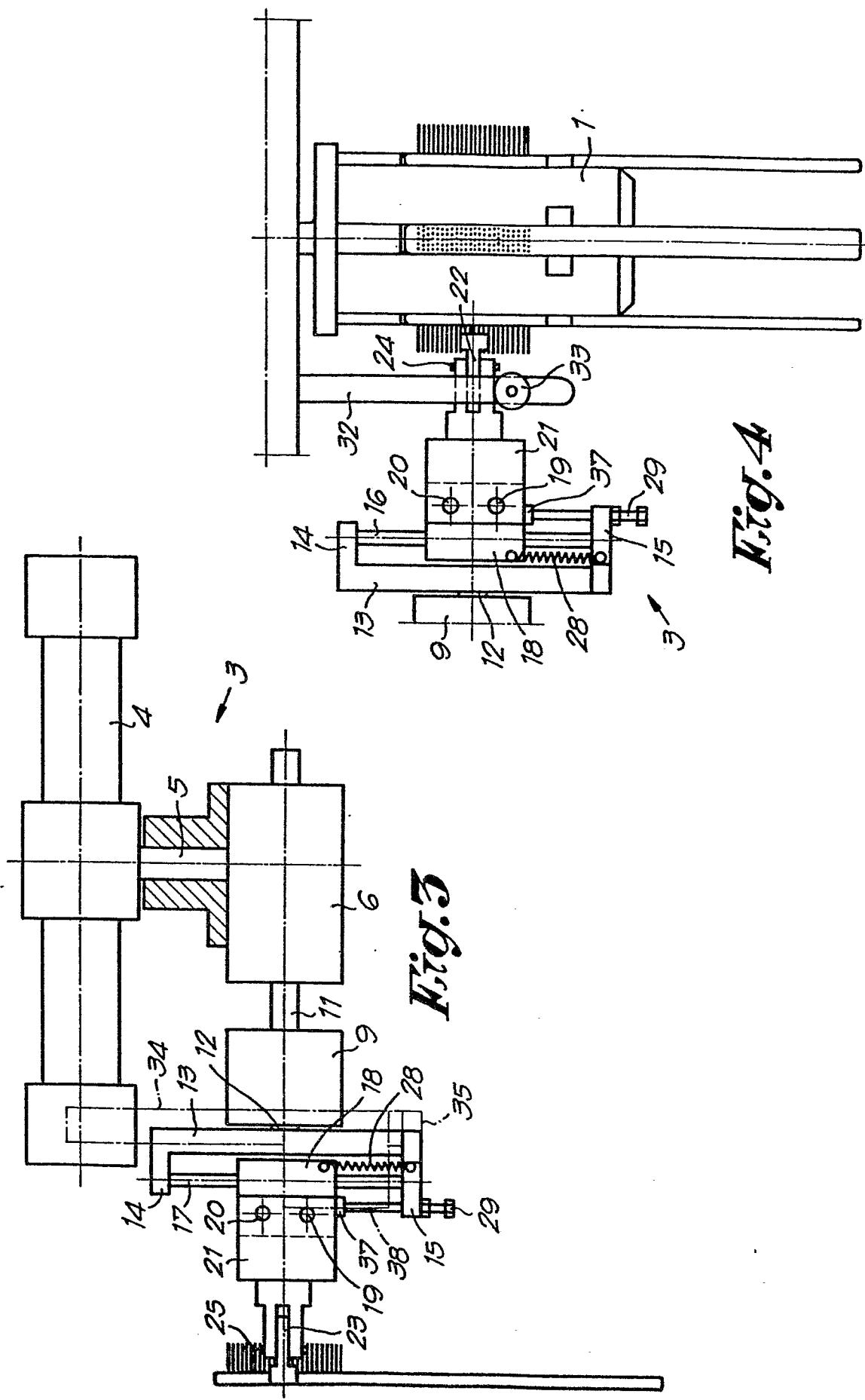


Fig. 2



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Fig.5

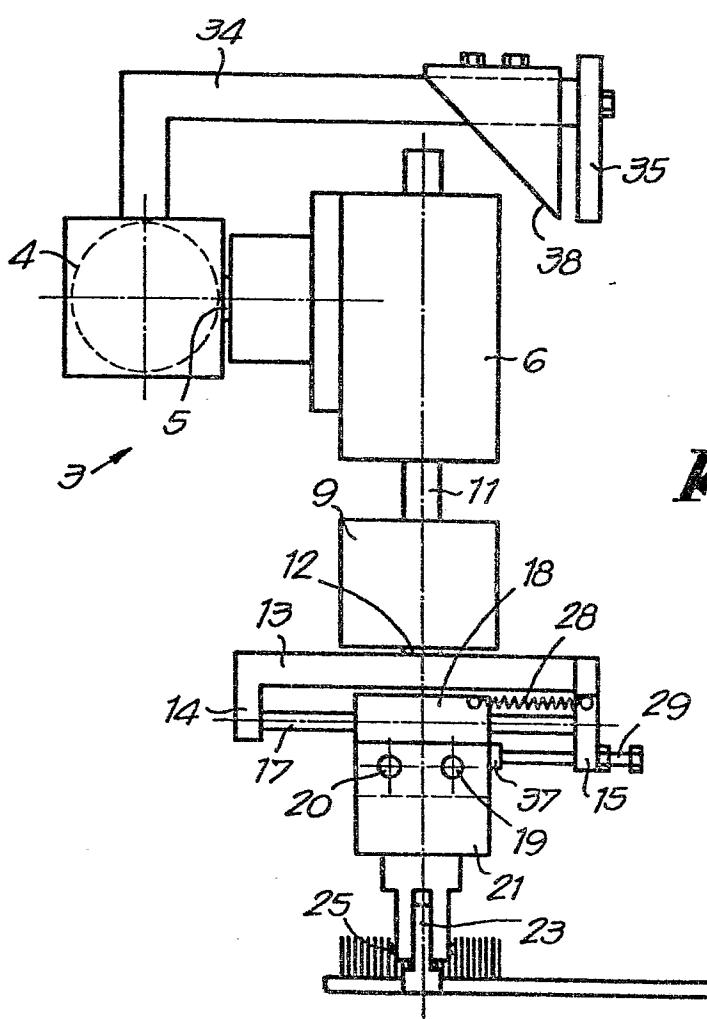
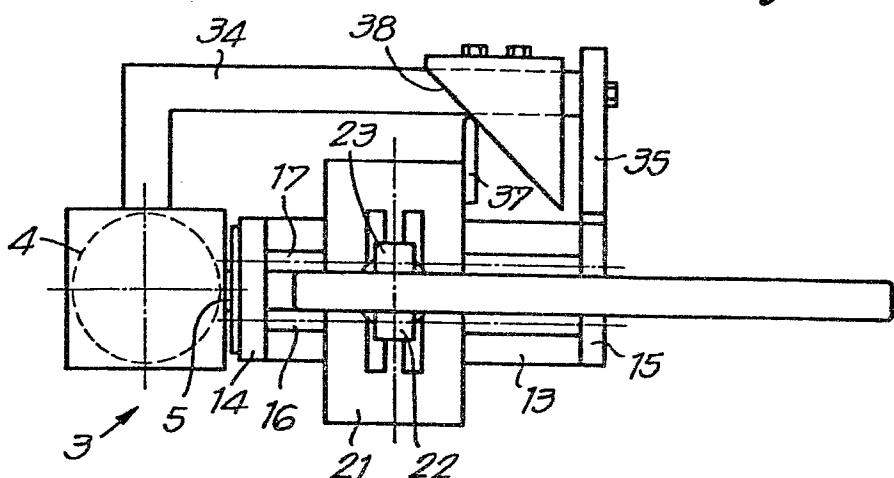


Fig.6



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<p><u>FR - A - 2 121 335</u> (A. ZAHORANSKY) * Figures 1-14 *</p> <p>---</p> <p><u>FR - A - 1 086 446</u> (A. ZAHORANSKY) * Figures 7-11 *</p> <p>---</p>	1,3,14	A 46 D 3/08
A	<p><u>DE - A - 2 630 858</u> (VOLKSWAGEN-WERK)</p> <p>* Claims; figure *</p> <p>---</p>	1,12	TECHNICAL FIELDS SEARCHED (Int.Cl.3)
A	<p><u>FR - A - 2 257 513</u> (CHARLES MANIG-LEY &amp; CIE.)</p> <p>* Figures 1,2 *</p> <p>---</p>	1	A 46 D B 65 G
A	<p><u>FR - A - 2 173 331</u> (BLATT)</p> <p>* Figures 1-7 *</p> <p>---</p>	1	
A	<p><u>US - A - 3 648 854</u> (POTTER)</p> <p>* Complete document *</p> <p>----</p>	1	CATEGORY OF CITED DOCUMENTS
			<p>X: particularly relevant</p> <p>A: technological background</p> <p>O: non-written disclosure</p> <p>P: intermediate document</p> <p>T: theory or principle underlying the invention</p> <p>E: conflicting application</p> <p>D: document cited in the application</p> <p>L: citation for other reasons</p>
			<p>&amp;: member of the same patent family, corresponding document</p>
<p><input checked="" type="checkbox"/> The present search report has been drawn up for all claims</p>			
Place of search	Date of completion of the search	Examiner	
The Hague	15-09-1980	AUER	