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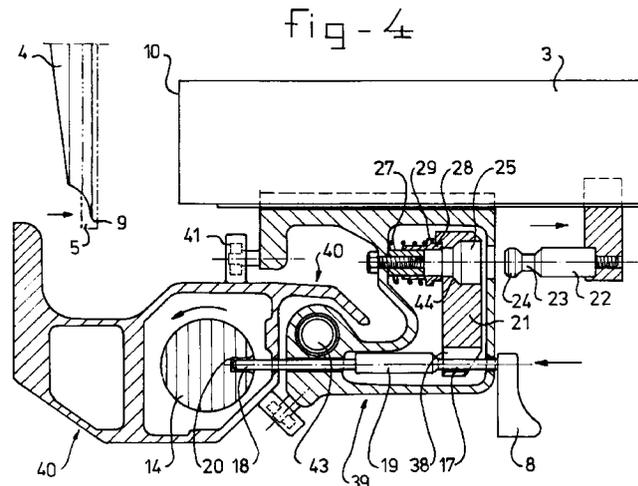
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(54) Interlock mechanism for a slicer

(57) Cutting device for cutting discs of material, comprising a rotating blade (4), in line with which a stop plate (5) is arranged. This stop plate (5) also serves as a protective plate during cleaning of the device. In order, on the one hand, to be able to perform this protective action well and, on the other hand, to be able to provide a zero position when cutting, in which the table (3) used bears against the cutting member (4) without a signifi-

cant gap, it is proposed to design the adjustment means for the stop plate (5) such that the above-described two desired positions are produced by means of a stop on the adjustment means. Moreover, removal of the table can be carried out only if the stop plate (5) is located in the position in which it protects the cutting member (4).



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Description

The present invention relates to a cutting device in accordance with the preamble of Claim 1.

A cutting device of this kind is known from DE-3,728,062 A1. In this case, the support table is designed such that it can be tilted away from the frame for the purpose of cleaning the various components. Recent safety regulations have made it necessary here for the thickness plate to function as a protective plate in the position in which the support table is removed, that is to say the protective plate has to broadly overlap the cutting edge of the cutting member so that, during cleaning, it is not possible for fingers or the like to come into contact with that part of the cutting member which is situated by the stop/protective plate.

In order to meet these requirements, it is proposed in DE-3,728,062-A1 to design the adjustment means such that, in the removal position thereof, the stop/protective plate covers the cutting edge of the cutting member. In order to be able to achieve this position, however, it is necessary for the distance by which the protective plate protrudes past the cutting edge in the direction of the support table inevitably at least to correspond to the distance between the support table and the cutting member. This means that during operation of the device at least some degree of play, which corresponds to the safety travel to be covered by the protective plate, is present between the support table and the cutting member, even in the so-called zero position. The presence of such a gap has an adverse effect on cutting. The material to be cut, such as sausage, will in fact be "mangled" in the gap between the cutting plate and the cutting member (burring). This is undesirable.

The object of the present invention is, firstly, to provide a cutting device which fulfils the abovementioned safety requirements, i.e. the stop plate can function as a protective plate in the cleaning position of the cutting device, i.e. on removal of the table. A further object of the present invention is to avoid the formation of the abovementioned gap between the support table and the cutting member during operation.

This object is achieved in a device as described above by means of the characterizing features of Claim 1.

The insight underlying the invention is to provide, in addition to the usual zero stop, a second "negative" stop of the adjustment means. This means that during removal of the support table, the stop/protective plate must be moved past the zero point of the operating position into the safety position in which the cutting edge of the cutting member is essentially covered by the thickness plate, which is then acting as a protective plate. Only then or after this can the table be removed or tilted away.

The safety of the above-described device can be improved still further if the support table is taken off in stages. During a first step, there is a first, partial dis-

placement away from the cutting member. To be able to move the support table still further away from the cutting member and then to be able to remove it entirely, it is necessary, in a second stage, to move the thickness plate into the protective position. Only then can the table be removed by further unlocking.

Naturally, it is possible to implement the inventive idea in other ways. It is essential for the invention that, during the first stage of removal, tilting away or other removal of the support table, the latter move away from the rotating cutting blade in order thus to make room for the displacement of the thickness plate so as to provide protection for the cutting blade. A movement of this kind may be realized in any conceivable manner.

It will be understood that the above-described unlocking of the table can be performed in a wide variety of ways known in the prior art.

It will be understood that the above-described cutting device can be used to cut all kinds of materials, such as foodstuffs and other substances.

The invention will be explained in more detail below with reference to exemplary embodiments depicted in the drawings, in which:

Fig. 1 shows a perspective view of a first embodiment of the cutting device according to the invention;

Fig. 2 shows a cross-section on the line II-II in Fig. 1, in the locked position of the support table;

Fig. 3 shows a section in accordance with Fig. 2 in a first step of unlocking the table;

Fig. 4 shows a section in accordance with Fig. 2 in the completely unlocked position of the table;

Figs. 5a-5c show various positions of the adjustment device;

Fig. 6 shows a cross-section on the line VI-VI in Fig. 1;

Figs. 7a and 7b show sections on the line VII-VII in Fig. 6 in two different positions of the adjustment device; and

Fig. 8 shows a second embodiment of the cutting device according to the invention.

Fig. 1 shows a first embodiment of the cutting device according to the invention, denoted overall by 1. The cutting device comprises a frame 2 provided with legs 42. A guide 40, along which a carriage 39 provided with table 3 can be moved to and fro, is arranged on the frame 2. The device is used for cutting with a blade 4. It should be understood that any other cutting device, such as a saw, may be used instead of a blade. It can be seen from Fig. 4 that to this end the table is provided with support bearings 41 and a guide rod 43, which is fastened to the frame 2. A conventional pressure plate 7 is arranged on the table 3.

Moreover, in a manner not illustrated in more detail, a cutting blade 4, which rotates with the aid of a motor 6, is arranged on the frame. A stop plate or protective

plate 5 is present. The position of the thickness plate 5 determines the thickness of the product to be cut. This position is set with the aid of an adjustment knob 12.

Table 3 can be removed from frame 2 and this removal takes place with the aid of a locking mechanism, of which handle 8 can be seen in Fig. 1.

Fig. 2 shows a cross-section on line II-II in Fig. 1. The protective plate or thickness plate 5 is illustrated diagrammatically in the zero position, that is to say in the position in which the right-hand (in the drawing) part of this plate 5 is in line with cutting edge 9. In this position, the edge 10 of table 3, when moved against the thickness plate 5, may have a negligible clearance between it and the cutting blade 4. This is important since, as in the position illustrated in Fig. 5a, in which plate 5 lies at a distance from the cutting edge 9, the product to be cut, which in that figure is denoted by 11, is supported over as great a length as possible as far as the cutting edge 9. If there were to be any clearance between the edge 10 and cutting edge 9, the product 11 could be drawn into this gap and could lead to a less pleasing appearance of the product to be cut.

The position corresponding to Fig. 2 is illustrated in Fig. 5b. Moreover, it can be seen from Fig. 2 that handle 8 is adjoined by a pin 17, in line with which is situated an eccentric 19, which in turn is extended by a pin 18. Handle 8 can be moved in rotation and in translation. Eccentric 19 engages in an opening 38 in a clamping plate 21. This clamping plate is provided with a further opening 25 on the other side. This opening 25 is of stepped design with an inclined transition part 44. As can be seen from Fig. 4, table 3 is provided with a locking pin 22, in the region of the free end of which a recess 23 is formed, followed by a thickened end portion 24 lying at the free end. In the position shown in Fig. 2, the "thickest" part of eccentric 19 is situated at the bottom, i.e. the clamping plate is moved downwards as far as possible, as a result of which that part of opening 25 which has the smallest diameter moves into the recess 23. A pressure dish 26, which is arranged on the carriage 39 and is operated by a spring 27, engages on thickened end portion 24. This pressure dish is provided with an edge 29 of larger diameter and an edge 28 of smaller diameter.

Fig. 6 depicts the adjustment means for displacement of thickness plate 5 in more detail. It can be seen from this figure that thickness plate 5 interacts, via a pin part with rack 15, with a pinion 16, which is connected via an axle to a gearwheel 14. Gearwheel 14 is provided with an accommodation 20, which can be brought into line with an opening 37 formed in frame 40. Gearwheel 13 arranged on shaft 30, on the other hand, is connected to adjustment knob 12. Spring 45 is present, which tends to push the adjustment knob into the position shown in Fig. 6. As is also apparent from Figs. 7a and b, a stop sleeve 34 is present on gearwheel 14, which sleeve is provided with a first stop face 35 and a second stop face 36. By turning adjustment knob 12,

rack 15 will move to and fro and the distance of the protective/thickness plate from the blade will vary.

Starting from the position shown in Fig. 2, handle 8 is moved downwards for the purpose of removing the table. As a result, the "thinner" part of eccentric 19 comes to lie at the underside of opening 38 and moves clamping plate 21 upwards slightly, as shown in Fig. 3. Under the effect of spring 27, the thickened end portion 24, and thus the table 3, is moved a short distance to the right. This distance at least corresponds to the desired displacement of the protective/thickness plate 5 from the position shown in Fig. 2 to the "safe" position of Fig. 3. A displacement of this kind may be a few millimetres. For the reasons given above, this position is particularly undesirable for the cutting of material. In any case, the design is such that, although in the position of Fig. 3 the table cannot be removed from the carriage, since recess 23 cannot move out of opening 25, the table is nevertheless fastened "loosely" to the guide.

Starting from the position in Fig. 3, handle 8 is then pressed inwards. In the process, pin 18 moves through opening 37. Further movement inwards is possible only if gearwheel 14 is situated in such a position that pin 18 can enter accommodation 20. To do this, it is necessary for gearwheel 14 to move from the position shown in Fig. 7a to the position shown in Fig. 7b. Movement of adjustment knob 12 out of the position shown in Fig. 7a is not possible without further measures, since first stop face 35 determines the limit position of the adjustment. Further rotation of the adjustment knob is possible only by moving knob 12 in the direction of arrow 32, as a result of which the stop edge 46 moves along the first stop face 35 and comes to lie in front of stop face 36, resulting in further play. This results in the position which is depicted in Fig. 7b and Fig. 5c. This is the safety position. Only in this position can pin 18 be pressed completely inwards. In this position, pin 17 lies in opening 38 and clamping plate 21 can be moved upwards still further with respect to Fig. 3, so that opening 25 releases the second end portion 24 and table 3 can be removed.

In this position, handle 8 can no longer be moved back, that is to say cannot be pulled out, since eccentric 19 cannot enter opening 38. This is caused by the fact that opening 25 is held at the top, due to the fact that pressure dish 26 engages by means of stop edge 28 in clamping plate 21. Only by pressing away edge 28, which is achieved by inserting the thickened end portion 24, can clamping plate 21 be moved downwards, so that eccentric 19 can be moved into opening 38. By rotating handle 18, the eccentric action of eccentric 19 results in automatic centring of the table, that is to say the recess 23 comes to lie in the position in accordance with Fig. 2.

It will be understood that in this way it is possible to remove the table only if the cutting edge and the thickness plate are situated in a position with respect to one another which corresponds to that which is shown in Fig. 5c, that is to say the safety position.

It will also be understood that details of the action of the locking mechanism may differ from those described above.

In the embodiment in accordance with Fig. 1, the legs 42 are essentially perpendicular to the cutting member 4.

However, it is possible, in a particularly simple manner, to position the device in an inclined manner by the addition of an intermediate piece. A design of this kind is shown in Fig. 8, in which 51 indicates the cutting device, 52 the frame and 54 the intermediate piece.

On studying the drawings, it will be clear that a very large number of components of the above-described device can be produced from extruded sections. This increases efficiency. One reason for this is that, unlike the case of castings, scarcely any parts are rejected for reasons of porosity. Moreover, these parts can be constructed with different dimensions without changing the basic form of the invention. Finally, the resultant shape is considered by many to be attractive.

Although the invention is described above with reference to a preferred embodiment, it will be understood by those skilled in the art that many variants which lie within the scope of the appended claims are possible and are obvious in view of the above.

Claims

1. Cutting device (1, 51) for cutting slices or discs, comprising a frame (2, 52) with a rotating cutting member (4) which is driven by a motor (6), an adjustable stop/thickness plate (5), which lies parallel to the said cutting member, adjustment means (12-15) being present in order to adjust the distance between the thickness plate and the cutting member in order in this way to set the thickness of the slice/disc to be cut, and also a support table (3), which is displaceable with respect to the frame and in the use position is locked securely to the frame, these adjustment means comprising a first stop (35), which is active in the deployed position of the support table, and a second stop (36), which is active in the unlocked position of the support table, that part of the thickness plate which lies adjacent to the circumference of the cutting member being essentially covered by the cutting member in the second stop position, characterized in that the support table (3) is displaceable in the displacement direction of the thickness plate (5) between a first and second position, the said thickness plate being closer to the cutting member in the first position than in the second position, and the support table being at least partially locked to the frame in the second position.
2. Device according to Claim 1, the surface of the thickness plate against which the product to be cut is placed being situated essentially in line with the cutting edge in the first stop position (Fig. 5b).
3. Device according to one of the preceding claims, the unlocking means for the table being operable only in the second stop position.
4. Device according to one of the preceding claims, the said unlocking means comprising:
 - means for displacing the table away from the cutting member;
 - means for releasing the adjustment means in order to move the latter from the first to the second stop; and
 - means for releasing the table plate from the frame, which means can be operated only after operating said first two means.
5. Device according to Claim 4, comprising blocking means, which are designed such that the locking means can be operated in the direction of removal of the table only in the second stop position.
6. Device according to Claim 5, the locking means blocking the said adjustment means in the said second stop position.
7. Device according to one of the preceding claims, said locking means comprising a locking pin (17) which can be moved to and fro and has a free end (18) and an operating end as well as an eccentric part (19) arranged on the pin, said pin being accommodated in an opening (38) in a clamping plate (21), which drawing plate (21) is provided with a further opening (25) for accommodating, in a locking manner, the fastening (22) of the table, in which, in a first position of the locking pin, the eccentric lies within the said opening and, in a second position, a part (17) of the pin which has substantially smaller dimensions lies in the said opening (38), the free end (18), in the said second position, moving into an accommodation in the said adjusting means and blocking the latter.
8. Device according to one of the preceding claims, the support table being provided with a carriage (39), which is displaceable in a corresponding guide (40) of the cutting device, and both the carriage (39) and the guide (40) being designed as extruded sections.

fig - 1

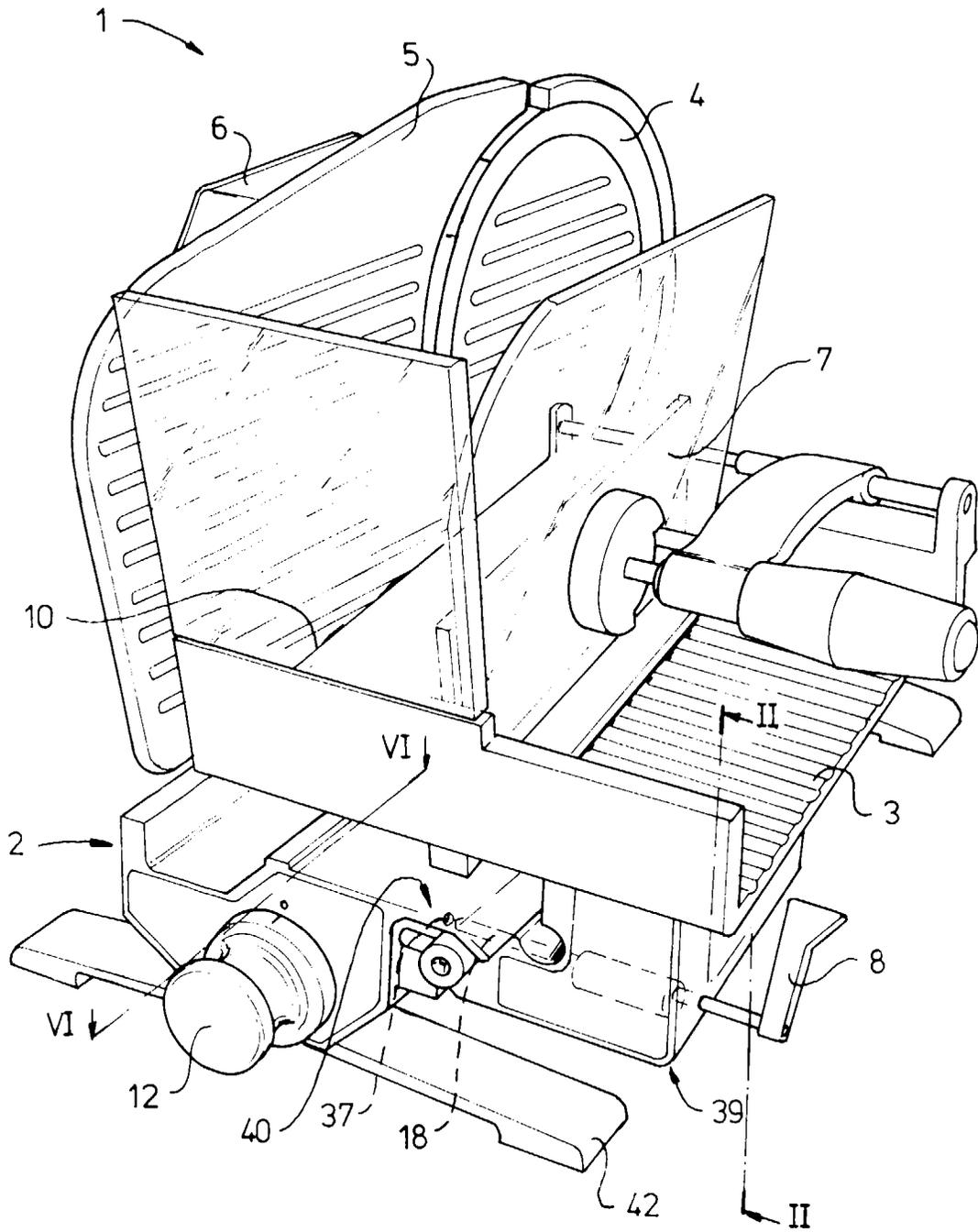


fig-2

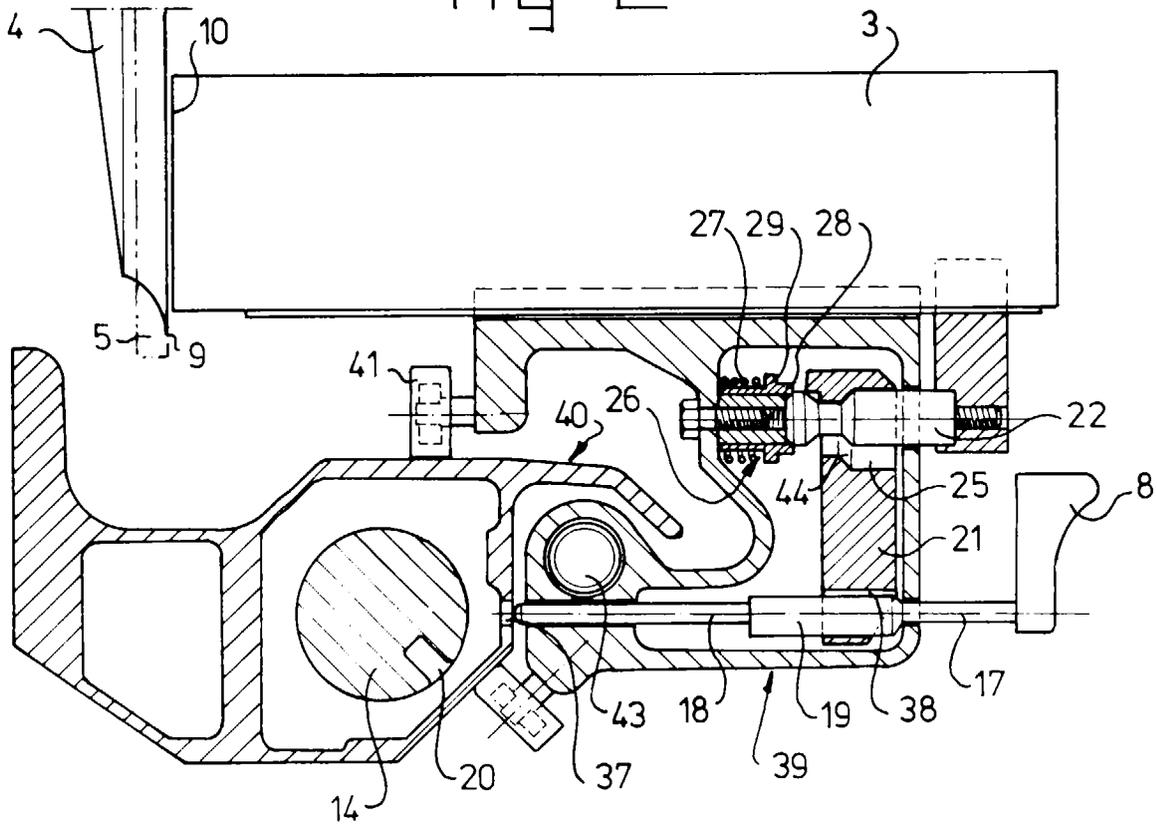


fig-3

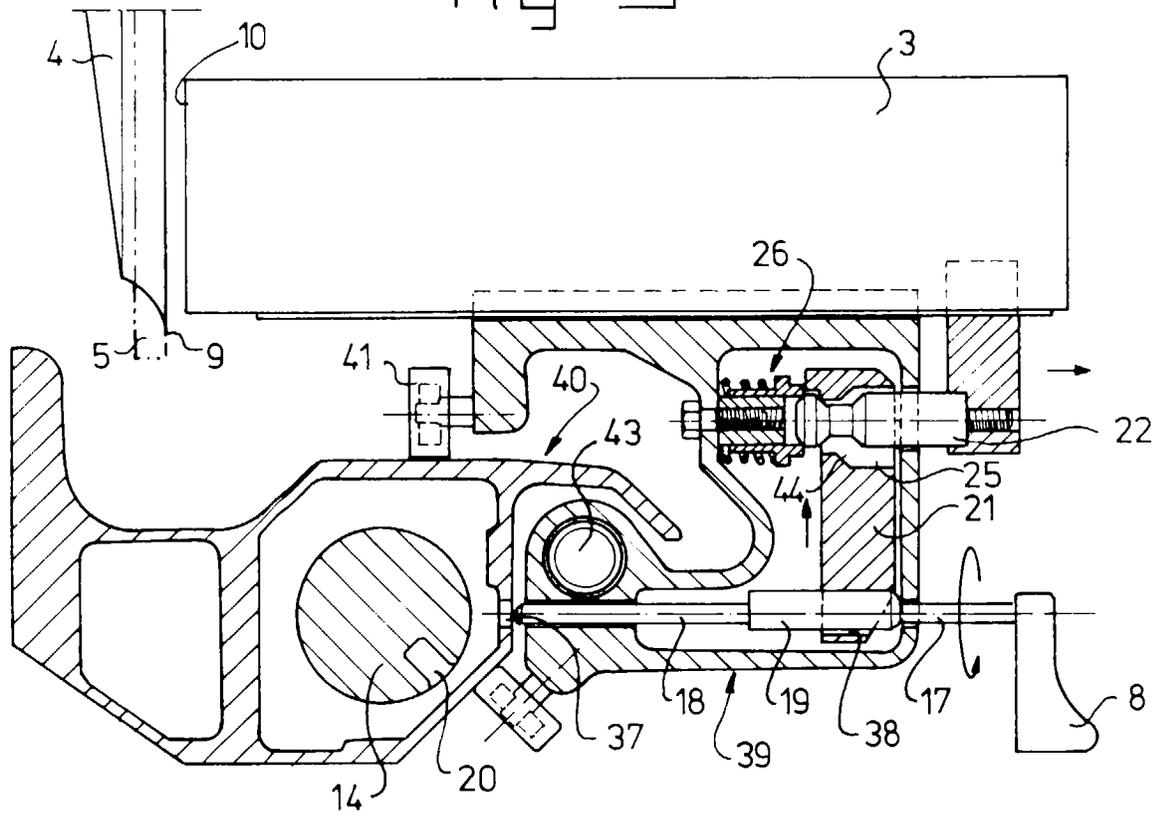


fig - 4

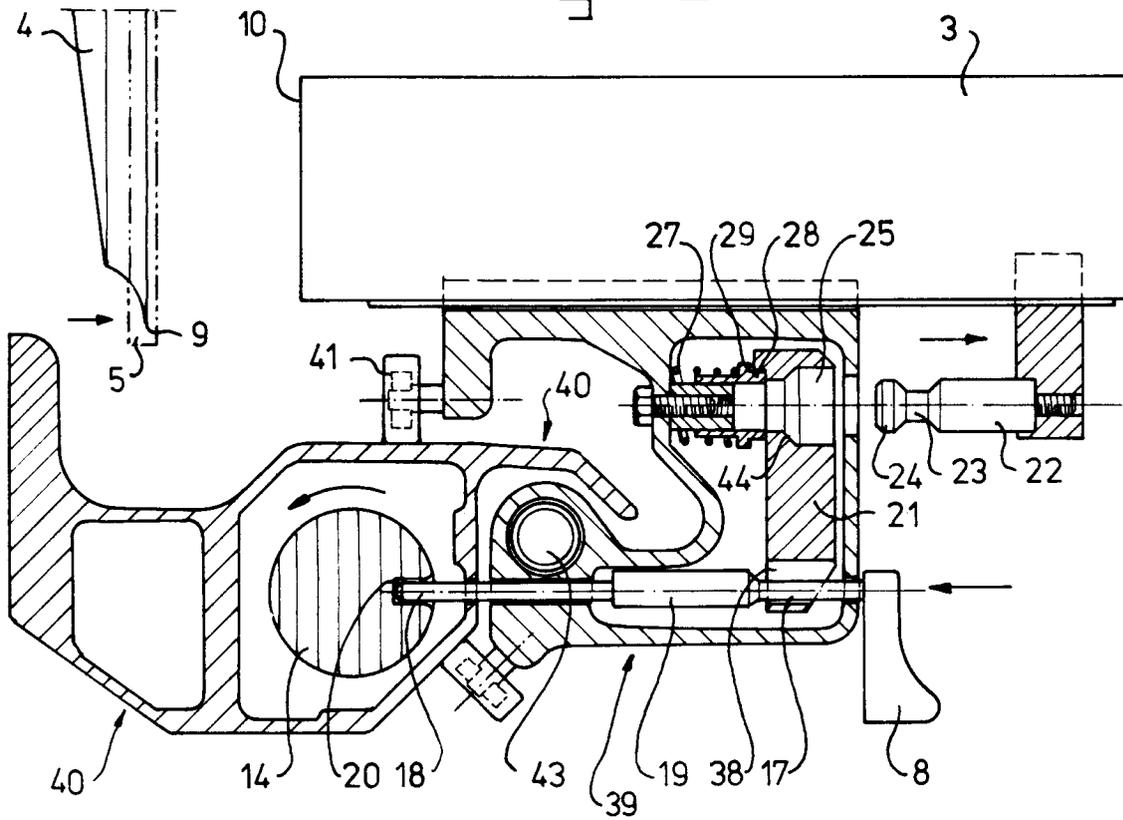


fig - 5a

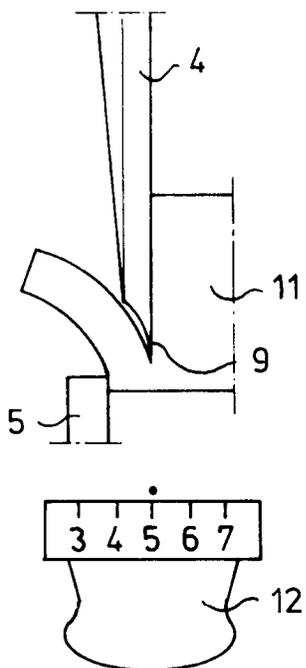


fig - 5b

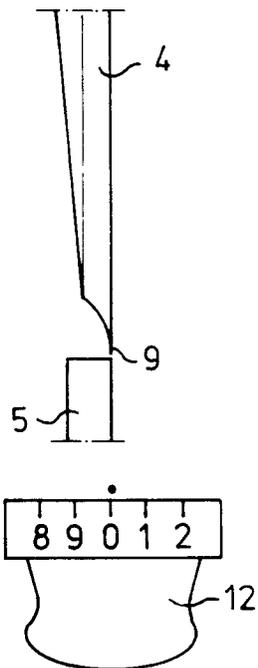


fig - 5c

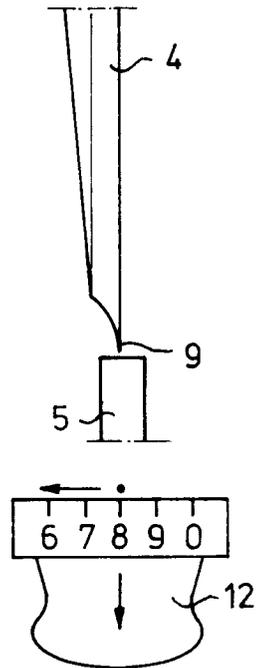


fig - 6

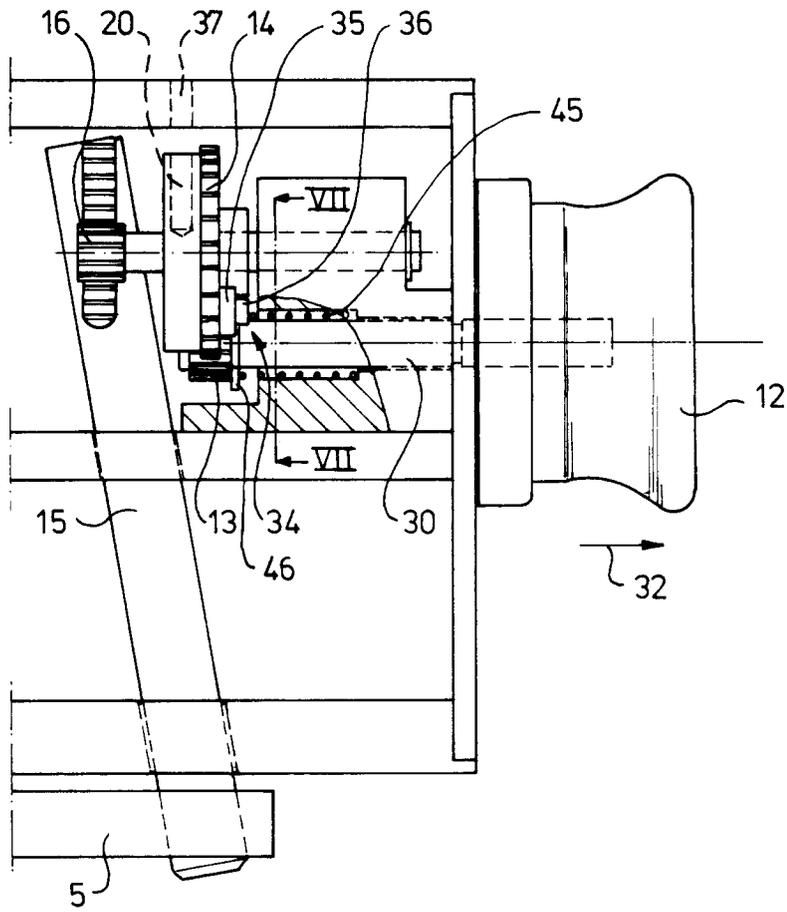


fig - 7a

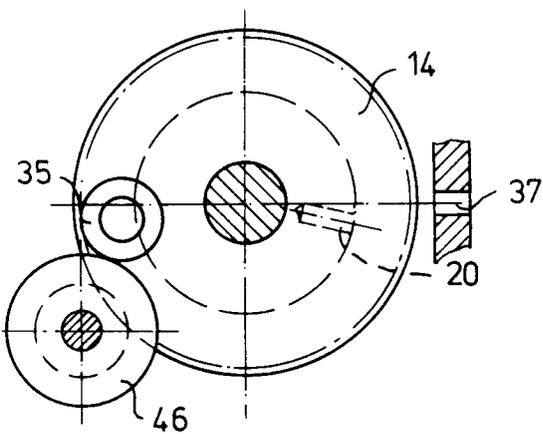


fig - 7b

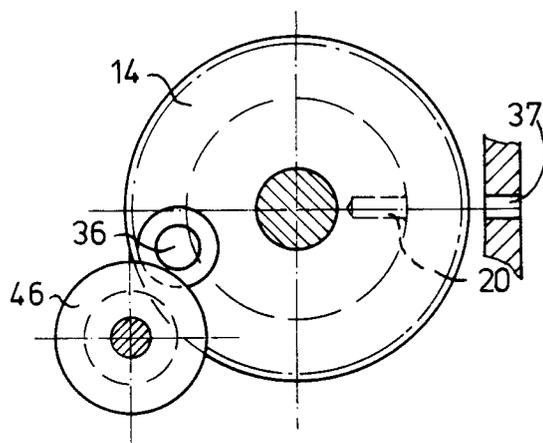
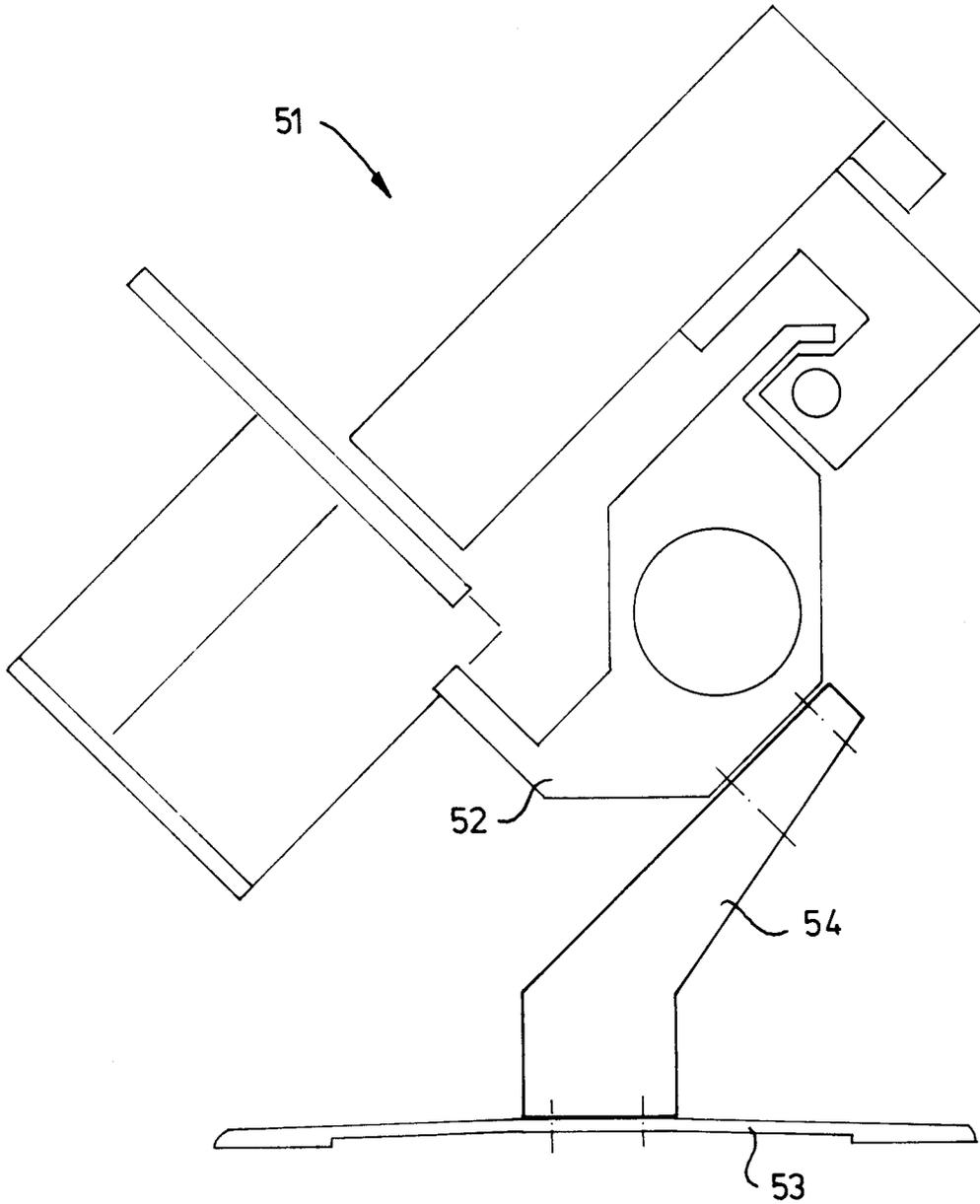


fig - 





European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 20 2446

| 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.6) |
| X | DE 44 29 628 A (BIZERBA GMBH & CO. KG) 22 February 1996 | 1 | B26D7/22 |
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| A | --- EP 0 503 168 A (ARCONADA) 16 September 1992 ----- | | |
| The present search report has been drawn up for all claims | | | TECHNICAL FIELDS SEARCHED (Int.Cl.6) |
| | | | B26D |
| Place of search | Date of completion of the search | Examiner | |
| THE HAGUE | 18 November 1997 | Vaglianti, G | |
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