

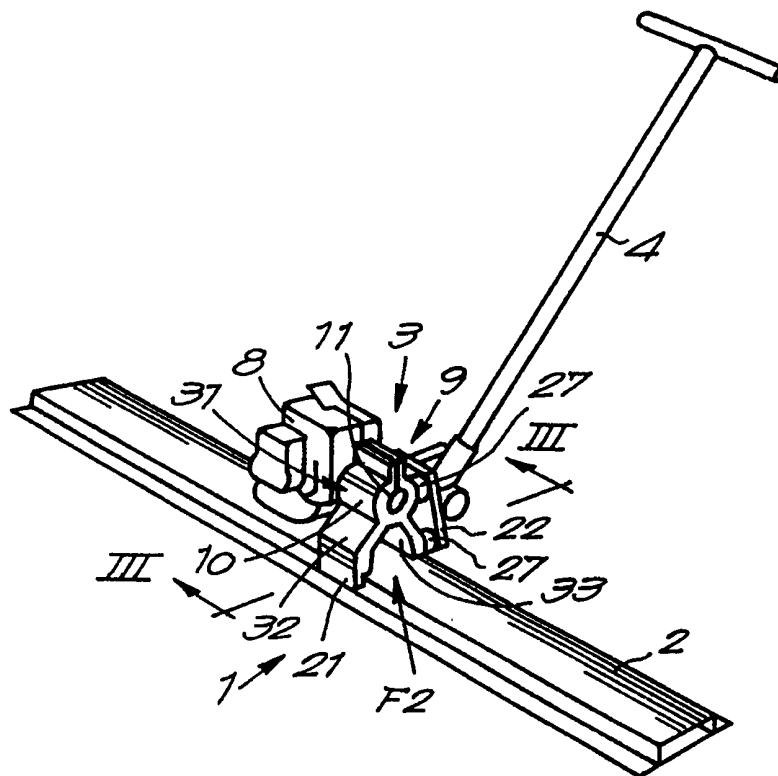


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(21) International Application Number: PCT/BE98/00117 (22) International Filing Date: 28 July 1998 (28.07.98) (30) Priority Data: 9700662 5 August 1997 (05.08.97) BE (71) Applicant (for all designated States except US): B-MAC, BESLOTEN VENNOOTSCHAP MET BEPERKTE AANSprakELIJKHEID [BE/BE]; Achel-Statie 97/B, B-3930 Hamont-Achel (BE). (72) Inventor; and (75) Inventor/Applicant (for US only): RIJKERS, Wilhelmus, Cornelus, Henricus, Maria [NL/BE]; Broes einderdijk 19, B-3910 Neerpelt (BE). (74) Agent: DEBRABANDERE, René; Bureau de Rycker N.V., Arenbergstraat 13, B-2000 Antwerpen (BE).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>

(54) Title: VIBRATING DEVICE AND METHOD FOR ITS CONSTRUCTION**(57) Abstract**

Vibrating device for processing a floor layer, more particularly a so-called vibrating beam, of the type substantially consisting of a vibrating board (2), a vibrating mechanism (3) cooperating with the vibrating board (2), and a handle (4), whereby the vibrating mechanism (3) substantially consists of an eccentric (7) seated in bearings (5-6) and a motor (8) for driving the eccentric (7), characterized in that the bearings (5-6) and the eccentric (7) beared therein are fixed by means of a clamping mechanism (9).



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VIBRATING DEVICE AND METHOD FOR ITS CONSTRUCTION

5 This invention relates to a vibrating device for processing a floor layer, more particularly a so-called vibrating beam.

10 In particular, it relates to a vibrating device of the type substantially consisting of a vibrating board, a vibrating mechanism cooperating with the vibrating board, and a handle, whereby the vibrating mechanism substantially consists of an eccentric seated in bearings and a motor for driving the eccentric.

15 Such vibrating devices are applied for spreading and smoothing of hardenable materials when forming a floor layer, more particularly materials such as concrete and similar.

20 The known embodiments of such vibrating devices show the disadvantage that the mounting thereof is rather complicated and, consequently, time-consuming.

25 The invention aims at a vibrating device, more particularly a vibrating beam, which does not show this disadvantage.

30 The invention also aims at a vibrating device in which the eccentric is fixed in the vibrating device in a very efficient manner.

35 To this end, the invention aims at a vibrating device of the aforementioned type, with the characteristic that the bearings and the eccentric beared therein are fixed by means of a clamping mechanism. By utilizing a clamping

mechanism, a very efficient fixation of the eccentric can be guaranteed.

5 In a preferred form of embodiment, the clamping mechanism is constructed in such a manner that it shows a minimum of parts, which allows for a rapid mounting and dis-
mounting. To this aim, the clamping mechanism according to the invention substantially consists of, on one hand,
10 a body in which a seat for the bearings is provided, whereby said body is split apart at one side of the seat, such that the body shows at least two portions which can be drawn towards each other, and, on the other hand,
15 tensioning means for drawing the aforementioned portions towards each other and thereby clamping the bearings of the eccentric in the seat.

Preferably, the aforementioned body consists of an extruded body, whereas the aforementioned seat is formed by a through channel in this body.

20 Furthermore, this body preferably comprises also a number of provisions which allow to establish a connection with the other components, such as the motor, the handle, and the vibrating board. These provisions may consist of
25 profiles for the attachment of the handle and the motor, as well as flanges, for example, for connecting the body to the vibrating board. The use of such profiles and flanges offers the advantages that these can easily be formed at the body by means of extrusion, and that they
30 allow for a relatively simple connection with the other components.

The invention also relates to a vibrating device of the above-mentioned type which is characterized in that it is
35 provided with a body which is formed of an extruded element, whereby this body is provided with a seat for

the eccentric, as well as with provisions formed at this body, such as profiles, which allow for a connection with other components. The use of such an extruded body allows for a rapid mounting of the device during manufacturing and during an eventual inspection and/or repair.

The invention also relates to a method for the construction of such a vibrating device, with the characteristic that it consists of extruding a profile, whereby this profile, during the extrusion, is provided with a cylindrical channel; forming of a body out of the profile by separating a well-defined length from the profile; applying a recess in the body, which continues up into the channel, in such a manner that tensionable portions are formed; and finally assembling the body, the vibrating board, the vibrating mechanism and the handle, whereby the eccentric is clamped at its bearings into the aforementioned body.

With the intention of better showing the characteristics according to the invention, hereafter, as an example without any limitative character, a preferred form of embodiment is described, with reference to the accompanying drawings, wherein:

figure 1, in perspective, schematically represents a vibrating device according to the invention;
figure 2 represents the part which is indicated by arrow F2 in figure 1, in exploded view;
figure 3 represents a cross-section according to line III-III in figure 1;
figure 4, in cross-section, represents the extruded profile from which the body is formed which is indicated by arrow F4 in figure 2.

As represented in figure 1, the vibrating device 1 of the

invention substantially consists of a vibrating board 2, a vibrating mechanism 3 cooperating with the vibrating board 2, and a handle 4. As represented in figure 2, the vibrating mechanism 3 substantially is formed by an eccentric 7 seated in bearings 5-6, and a motor 8 for driving the eccentric 7.

The particularity of the invention consists in that the bearings 5-6 and the eccentric 7 beared therein are fixed by means of a clamping mechanism 9.

The clamping mechanism 9 substantially consists of, on one hand, a body 10 in which a seat 11 for the bearings 5-6 is provided, whereby the body 10 is split apart at one side of the seat 11, more particularly, comprises a through recess 12, in such a manner that the body 10 shows at least two portions 13-14 which can be drawn towards each other, and, on the other hand, tensioning means 15 for drawing the aforementioned portions 13-14 towards each other and thereby clamping the bearings 5-6 of the eccentric in the seat 11.

The seat 11 is formed by a through channel. As represented, the tensioning means 15 preferably consist of flanges 16-17, formed at the body 10, which can be drawn towards each other by means of bolts 18.

In the most preferred form of embodiment, the body 10 consists of an extruded body.

As shown in the represented form of embodiment, the body 10 preferably comprises various provisions which allow to make a connection with the other components, such as the motor 8, the handle 4, and the vibrating board 2.

Amongst others, these provisions comprise profiles 19 for

the fixation of the handle 4; profiles 20 for the fixation of the motor 8, and flanges 21 which allow to connect the body 10 to the vibrating board 2.

- 5 The profiles 19 consist of T-shaped grooves. The handle 4 is provided with a fixation plate 22 which is fixed at the body 10 by means of bolts 23, the heads 24 of which engage behind the edges 25 of the T-shaped grooves.
- 10 The profiles 20 consist of laterally partially open channels which are situated at the circumference of the body 10. The motor 8 is fixed at the body by means of bolts or threaded rods 26 extending through these channels in longitudinal direction.
- 15 The handle 4 as well as the motor 8 are fixed at the aforementioned body 10 by means of damping elements 27-28 which, for example, are formed of rubber.
- 20 The aforementioned flanges 21 are constructed in such a manner that they fit over a fixing portion 29 provided at the vibrating board 2 and can be connected thereto by means of bolts 30.
- 25 In general, the aforementioned body 10 preferably consists, as represented, of a split-apart cylindrical part 31 and two legs 32-33 extending downward, whereby the lower parts thereof form the flanges 21. Hereby, the motor 8 preferably is fixed against the axial end of the
- 30 cylindrical part 31. The handle 4 is fixed laterally against the body 10.

It is noted that below in the seat 11, preferably a recess 34 is provided for the draining of water.

35

It is also noted that additional profiles, such as the

grooves 35-36, can be provided in the body 10. By then providing these profiles symmetrical in respect to the profiles 19, it is obtained that the body 10 can be mounted in two directions.

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In the body 10, recesses, such as grooves and similar, may be provided, in such a manner that thinned material sections are created in the body 10 which provide for a good bending of the portions 13-14 during tensioning of the clamping means 15. In the represented example, these
10 grooves are formed by the upper profile 19, the groove 35 opposed thereto, the recess 34, and the profiles 20.

More particularly, each of both aforementioned portions
15 13-14 will be provided with recesses which, in this case, are formed by the upper profile 19 and the groove 35 which are constructed in such a manner that thinned wall portions are created which extend in the circumferential direction of the seat 11 over a well-defined distance A-
20 B. These wall portions, thus, in the represented example the bottom of the profile 19 and of the groove 35, preferably have a constant thickness D over the distance A-B. These thinned wall portions form bending surfaces which allow to distribute the tension concentrations
25 which are created when the bearings 5-6 are clamped.

As represented, the body 10 preferably will have an axial length L which is so large that the complete eccentric 7, together with the bearings 5-6 present at the extremities
30 thereof, is located within this body 10.

When constructing the vibrating device 1, one preferably starts with an extruded profile, more particularly a profile 37 as represented in figure 4, which is provided
35 with a channel 38 which is intended for subsequently forming the aforementioned seat 11. In this profile 37,

more particularly between the flanges 16-17, a recess 12 continues up into the through channel 38. By sawing off, before or after providing the recess 12, a well-defined length from the profile, a body 10, as represented in figure 2, is obtained.

During the assembly, the eccentric 7 is slid into the seat 11 together with the bearings 5-6, and subsequently the portions 13-14 around the bearings 5-6 are tensioned by means of tensioning the bolts 18. It is obvious that in this manner, a very rapid mounting is enabled.

The other components, too, can be fixed very fast at the body 10.

The motor 8, for example, is fixed by sliding the bolts or threaded rods 26 through the profiles 20 and tensioning the motor 8 against the axial surface 39 of the body 10, with the inclusion of the damping elements 28.

The manner of fixation of the vibrating board 2 and the handle 4 at the body 10 can simply be deduced from the figures.

It is obvious that different variants of the invention are possible, whereby one or two of the additional characteristics have been omitted.

The present invention is in no way limited to the form of embodiment described by way of example and represented in the figures, on the contrary may such vibrating device, as well as the method for the construction thereof, be realized in various variants without leaving the scope of the invention.

Claims.

- 1.- Vibrating device for processing a floor layer, more particularly a so-called vibrating beam, of the type substantially consisting of a vibrating board (2), a vibrating mechanism (3) cooperating with the vibrating board (2), and a handle (4), whereby the vibrating mechanism (3) substantially consists of an eccentric (7) seated in bearings (5-6) and a motor (8) for driving the eccentric (7), characterized in that the bearings (5-6) and the eccentric (7) beared therein are fixed by means of a clamping mechanism (9).
- 2.- Vibrating device according to claim 1, characterized in that the clamping mechanism (9) substantially consists of, on one hand, a body (10) in which a seat (11) for the bearings (5-6) is provided, whereby said body (10) is split apart at one side of the seat (11), such that the body (10) shows at least two portions (13-14) which can be drawn towards each other, and, on the other hand, tensioning means (15) for drawing the aforementioned portions (13-14) towards each other and thereby clamping the bearings (5-6) of the eccentric (7) in the seat (11).
- 3.- Vibrating device according to claim 2, characterized in that the body (10) consists of an extruded body, whereas the aforementioned seat (11) is formed by a through channel.
- 4.- Vibrating device according to claim 2 or 3, characterized in that the body (10) shows provisions which allow to establish a connection with other components, such as the motor (8), the handle (4), and the vibrating board (2).

5.- Vibrating device according to claim 4, characterized in that the aforementioned provisions consist of one or more of the following means:

- 5 - profiles (19) for the attachment of the handle (4);
- profiles (20) for the attachment of the motor (8);
- flanges (21) which allow to connect the body (10) to the vibrating board (2).

10

6.- Vibrating device according to claim 5, characterized in that the profiles (19) for the fixation of the handle (4) consist of T-shaped grooves, whereby the handle (4) is provided with a fixation plate (22) which is fixed at
15 the body (10) by means of bolts (23), the heads (24) of which engage behind the edges (25) of the T-shaped grooves.

7.- Vibrating device according to claim 5 or 6,
20 characterized in that the profiles (20) for the fixation of the motor (8) consist of laterally partially open channels at the circumference of the body (10), and that the motor (8) is fixed at the body (10) by means of bolts (26) or similar which extend through the aforementioned
25 channels in longitudinal direction.

8.- Vibrating device according to any of the claims 2 to 7, characterized in that the body (10), at the height of the aforementioned portions (13-14), is provided with
30 recesses extending in the axial direction of the eccentric (7), for example, in the form of grooves, profiles (19-20-35) or similar, in such a manner that thinned material sections are created in the body (10) which provide for a good bending of the portions (13-14).

35

9.- Vibrating device according to claim 8, characterized

in that each of the two aforementioned portions (13-14) is provided with recesses (19-35) which are constructed in such a manner that thinned wall portions are created which extend in the circumferential direction of the seat (11) over a well-defined distance (A-B), in order to distribute the tension concentrations which are created when the bearings (5-6) are clamped.

10.- Vibrating device according to any of the claims 2 to 9, characterized in that the aforementioned tensioning means (15) consist of flanges (16-17) formed at the body (10) which can be drawn towards each other by means of bolts (18).

11.- Vibrating device according to any of the claims 2 to 10, characterized in that the handle (4) and the motor (8) are fixed at the aforementioned body (10) by the inclusion of damping elements (27-28).

12.- Vibrating device according to any of the claims 2 to 11, characterized in that the aforementioned body (10) substantially consists of a split-apart cylindrical part (31) and two legs (32-33) extending downward, whereby the the motor (8) is fixed against an axial end of the cylindrical part (31), whereby the body (10) is fixed at the vibrating board (2) by means of the aforementioned two legs (32-33) and whereby the handle (4) is fixed laterally against the body (10).

13.- Vibrating device for processing a floor layer, more particularly a so-called vibrating beam, of the type substantially consisting of a vibrating board (2), a vibrating mechanism (3) cooperating with the vibrating board (2), and a handle (4), whereby the vibrating mechanism (3) substantially consists of an eccentric (7) driven by means of a motor (8), characterized in that it

is provided with a body (10) which is formed by an extruded element, whereby this body is provided with a seat (11) for the eccentric (7), as well as with provisions formed at this body (10), such as profiles
5 (19-20) which allow for a connection with other components.

14.- Vibrating device according to any of the claims 2 to 13, characterized in that the body (10) has an axial
10 length (L) which is so large that the eccentric (7), together with the bearings (5-6), is completely located within this body (10).

15.- Method for the construction of a vibrating device
15 according to any of the claims 2 to 14, characterized in that it consists of extruding a profile (37), whereby this profile (37), during the extrusion, is provided with a cylindrical channel (38); forming of a body (10) out of the profile (37) by separating a well-defined length from
20 the profile (37); applying, before or after the separation of the body (10), a recess (12) in the body (10) which continues up into the channel (38); and finally assembling the body (10), the vibrating board (2), the vibrating mechanism (3), and the handle (4),
25 whereby the eccentric (7) is clamped at its bearings (5-6) into the aforementioned body (10).

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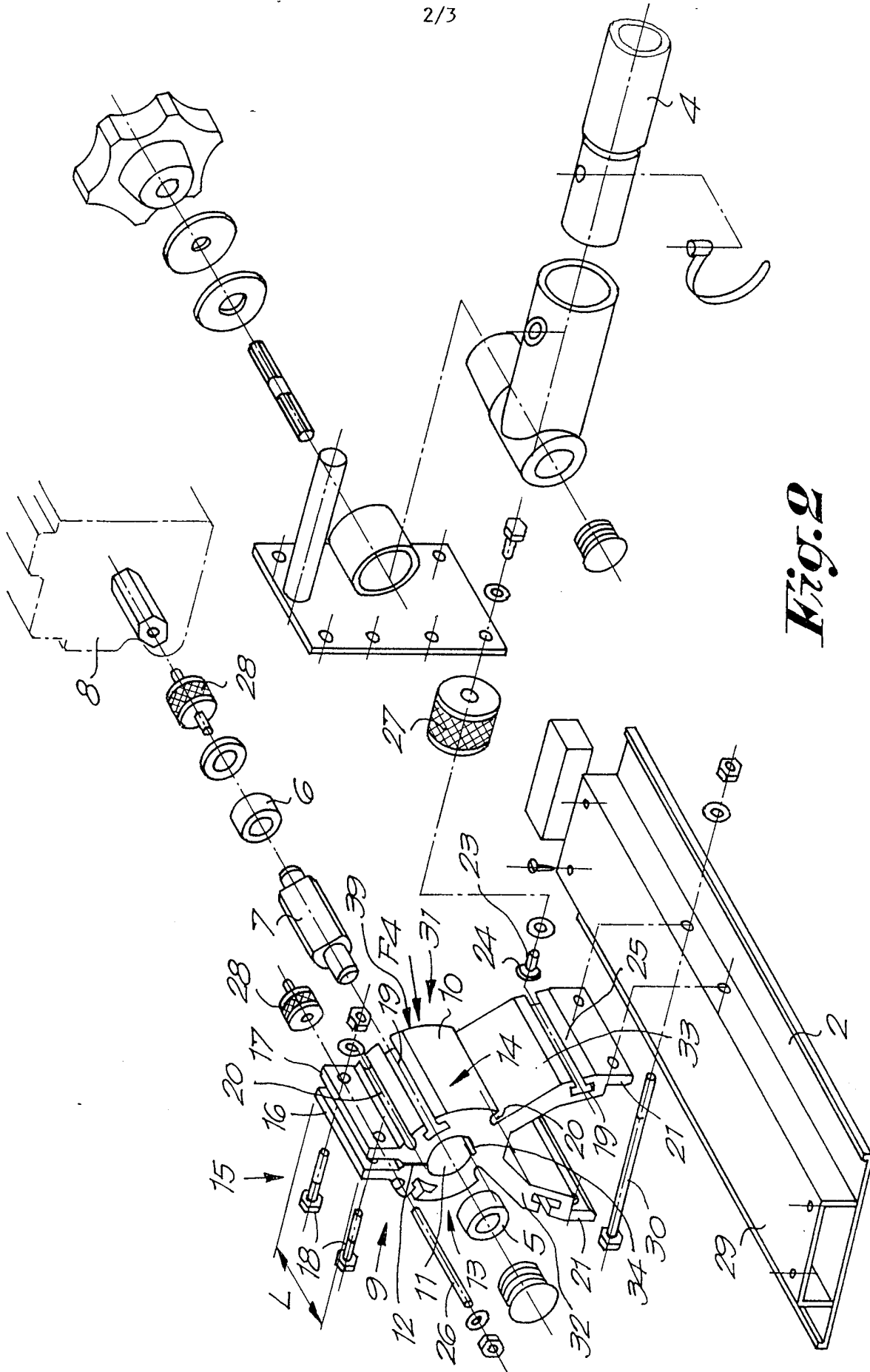
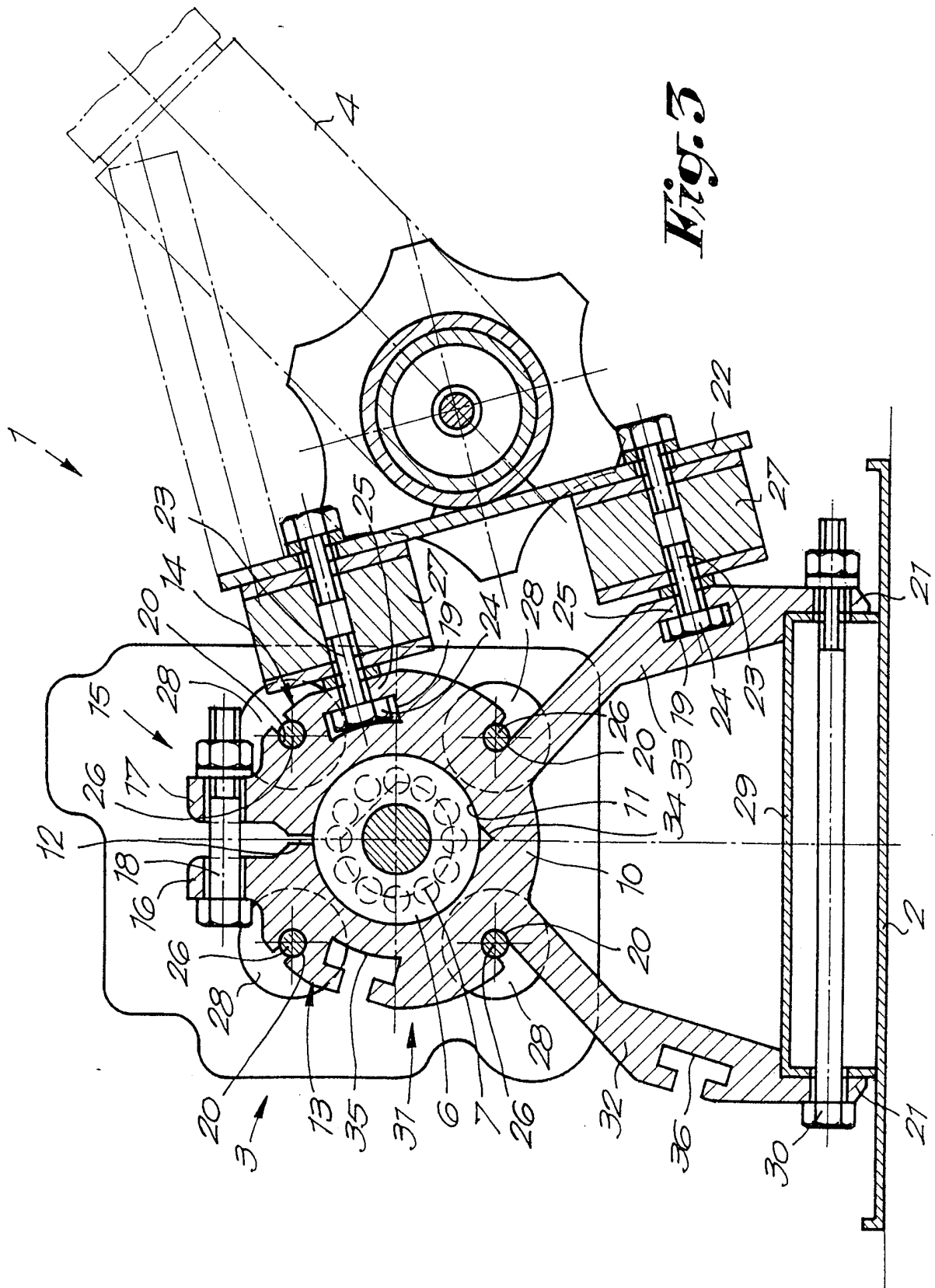


Fig. 2



INTERNATIONAL SEARCH REPORT

International Application No

PCT/BE 98/00117

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 E01C19/40 E04G21/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 E01C E04G E04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 650 366 A (MORRISON DONALD R) 17 March 1987	13, 14
A	see the whole document ---	1, 15
A	US 5 244 305 A (LINDLEY THOMAS R) 14 September 1993 see the whole document -----	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4650366 A	17-03-1987	US 4701071 A	20-10-1987
US 5244305 A	14-09-1993	US 5375942 A	27-12-1994