



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 201 308 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.05.2002 Bulletin 2002/18

(51) Int Cl.7: **B02C 4/28, B02C 4/38**

(21) Application number: **01124750.9**

(22) Date of filing: **17.10.2001**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventor: **Fiorini, Maurizio**
26040 Pieve D'Olmi (Cremona) (IT)

(74) Representative: **Forattini, Amelia**
c/o Internazionale Brevetti
Ingg. ZINI, MARANESI & C. S.r.l.
Piazza Castello 1
20121 Milano (IT)

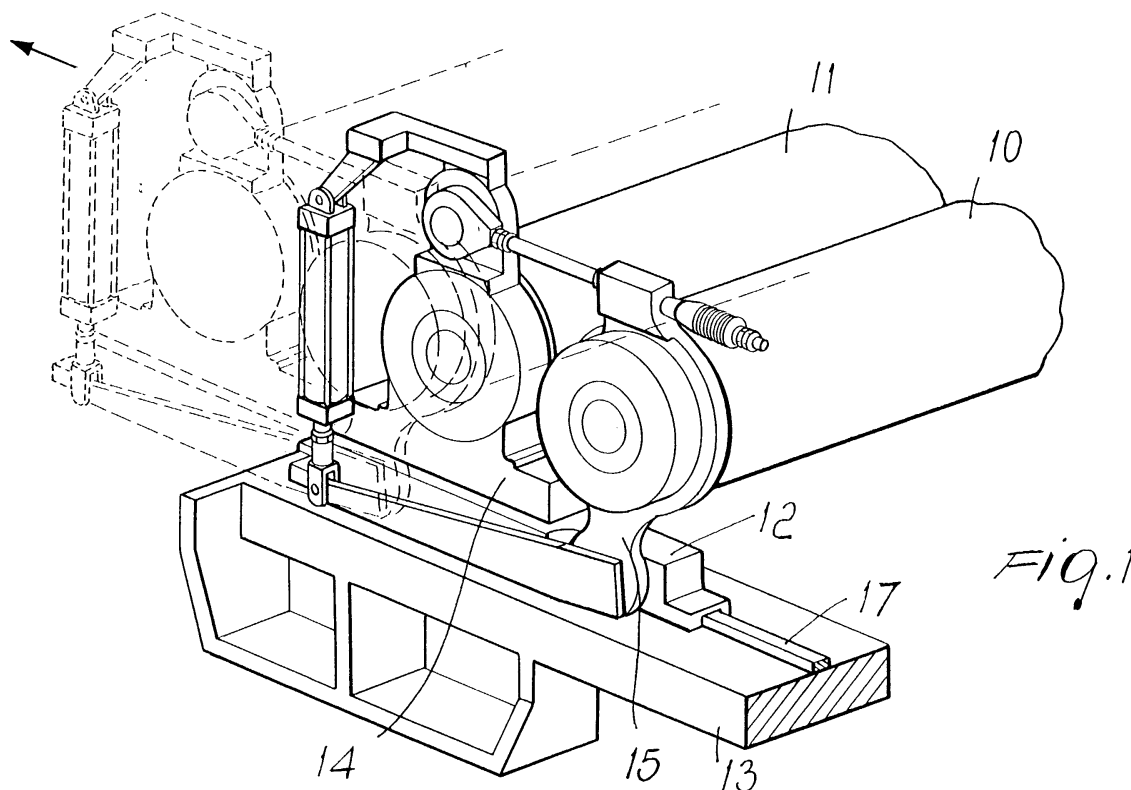
(30) Priority: **25.10.2000 IT MI002307**

(71) Applicant: **OCRIM S.p.A.**
26100 Cremona (CR) (IT)

(54) **Cereal milling device**

(57) A cereal milling device, comprising: two milling rolls (10,11), of which one (10) is movable and the other one (11) is fixed; a footing (12) for the rolls, which rests on a frame (13) of the device; a fixed support (14), which is rigidly coupled to the footing (12) in order to support

the fixed roll (11); a movable support (15), which is supported by the footing (12) in order to support the movable (10) roll; an extraction means which allows the simultaneous extraction of the footing, the supports and the rolls.



EP 1 201 308 A1

Description

[0001] The present invention relates to a cereal milling device.

[0002] More particularly, the invention relates to a mill which uses two milling rolls, a movable one and a fixed one. The fixed roll is motorized by means of a driving pulley. The footing that supports the rolls rests on a frame of the mill. The footing supports the rolls by means of a fixed support, which is rigidly coupled to the footing and supports the fixed roll, and by means of a movable support, which is generally pivoted to the footing and supports the movable roll. In practice, a second footing, a second fixed support and a second movable support are used in order to support the other end of the rolls.

[0003] The set constituted by two footings, two fixed supports, two movable supports and the means for adjusting the distance between the rolls forms a unit which can be inserted in, and extracted from, the frame of the mill without having to disassemble the various parts that form the unit. This is an important characteristic, since it is possible to set up the unit before insertion in the mill, allowing to perform the main adjustments and checks in the workshop instead of directly on the milling plant. Moreover, all the roll replacement operations are speeded up, increasing the productivity of the plant.

[0004] The above is the main field of industrial utilization of the invention but is not a limitation thereof, since the invention can be used in equivalent fields.

[0005] Devices of this type are known and are disclosed for example in US patents 4,101,083, 4,225,093, 4,339,083 and 5,673,864. These conventional devices, however, are not free from drawbacks, since the above-cited unit is very heavy, for example approximately one thousand kilograms, and its handling requires an adequate means which is generally constituted by an electrohydraulic structure which lifts the unit and then extracts it. This structure is significantly expensive and the entire operation is complicated and delicate because of the risk of damaging parts of the device; accordingly, it is difficult to replace the unit with the swiftness that would be desirable.

[0006] The aim of the present invention is to overcome the above drawbacks with a cereal milling device which includes: two milling rolls, of which one is movable and the other one is fixed; a footing for the rolls, which rests on a frame of the device; a fixed support, which is rigidly coupled to the footing in order to support the fixed roll; a movable support, which is supported by the footing in order to support the movable roll; a sliding means for sliding the footing on the frame, so as to allow simultaneous extraction of the footing, the supports and the rolls from the frame.

[0007] The invention will become better apparent with reference to the description of an embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a schematic perspective view of the device according to the invention;

Figure 2 is a partially sectional side view of the device of Figure 1;

Figure 3 is a sectional front view, taken along the line III-III, of a detail of the device of Figure 2;

Figure 4 is a sectional front view, taken along the line IV-IV of Figure 2;

Figure 5 is a partially sectional side view of a detail of the device of Figure 1;

Figure 6 is a partially sectional front view of a detail of the device of Figure 5;

Figure 7 is a partially sectional front view of a detail of the device of Figure 2 in a fixed position;

Figure 8 is a partially sectional front view of a detail of Figure 7 in a sliding position; and

Figure 9 is a side view of a detail of the device of Figure 2.

[0008] With reference to Figures 1 to 9, the device according to the invention has two milling rolls 10 and 11: the roll 10 is movable and the roll 11 is fixed. The footing 12 supports the rolls 10 and 11 and rests on the frame 13 of the device. The fixed support 14 is rigidly coupled to the footing 12 and supports the fixed roll 11. The movable support 15 is supported by the footing 12 by means of a hinge 16 and supports the movable roll 10. The structure is symmetrical on the two sides of the rolls, so that a footing 12, a fixed support 14 and a movable support 15 are present on each side.

[0009] A sliding means 17, 18 is provided in order to make the footing 12 slide on the frame 13, so as to allow simultaneous extraction of the footing 12, of the supports 14 and 15 and of the rolls 10 and 11 from the frame 13. The sliding means is formed by two guides 17 which are engaged by wheels 18. Accordingly, each footing 12 has a guide 17 and wheels 18. In the illustrated embodiment, the wheels 18 are formed by bearings. In particular, the wheels 18 are supported by the footing 12 and the guides 17 are supported by the frame 13.

[0010] The lifting means 19 allows to lift the footing 12 with respect to the frame 13. In particular, the lifting means is formed by the wheels 18 and by a means 19 for vertically moving a plurality of axles of the wheels 18. In particular, the wheels are supported by the eccentric members 19. By turning the shafts of the eccentric members 19 by means of the levers 20 it is possible to lift the footing 12 with respect to their support on the frame 13.

[0011] As an alternative, the lifting means is formed by a plurality of wheels made of elastomeric material and by a compression means for compressing the wheels, pushing the footing 12 against the frame 13 so that when the compression means is released the wheels can freely lift, by elastic thrust, the footing 12. The compression means can be formed for example by bolts which pass through holes formed in the footing 12 and thus grip the frame 13. As an alternative, it is possible to use an automatic locking means shown with par-

ticalar reference to Figures 5 and 6, which allow to lock and release the position of the footing 12 on the frame 13. In particular, the locking means includes two levers 21 which can be actuated remotely, preferably by means of a pneumatic piston 22.

[0012] The sliding means further includes a carriage 23 which is as high as the frame 13, so that the footing 12 can slide on the carriage 23. The guides 24 provided on the carriage form an extension of the guides 17 that are present on the frame. In particular, the guides 17 and the guides 24 are at the same height.

[0013] The invention has several advantages. In particular, it is possible to easily extract from the milling device according to the invention the unit formed by two footings 12, two fixed supports 14, two movable supports 15 and two rolls 10 and 11.

[0014] It is in fact sufficient to lift the footing by turning the eccentric members 19 and then slide it on the guides 17 up to the guides 24 of the carriage 23. This operation can be performed very quickly without requiring any other special equipment.

[0015] As an alternative, the footing 12 can be lifted and then extracted simply by releasing the levers 21 and using wheels 18 made of elastomeric material.

[0016] In any case, the time required for the replacement of one unit with another is reduced substantially, with important advantages for the productivity of the plant.

[0017] Surprisingly, this is achieved with a means which is simpler and far less costly than the electrohydraulic systems used by the prior art.

[0018] The invention further allows an important increase in the reliability of the procedure for replacing the roll unit, since in practice it is very difficult, if not impossible, to damage the device during replacement because there are no suspended loads as in the prior art.

[0019] The invention is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept. Thus, for example, the sliding and lifting means can be provided in many different manners.

Claims

1. A cereal milling device, comprising: two milling rolls, of which one is movable and the other is fixed; a footing for said rolls, which rests on a frame of said device; a fixed support, which is rigidly coupled to said footing in order to support said fixed roll; a movable support, which is supported by said footing in order to support said movable roll; a sliding means for sliding said footing on said frame, so as to allow simultaneous extraction of said footing, said supports and said rolls from said frame.

2. The device according to claim 1, wherein said sliding means comprises two guides.

3. The device according to claim 2, wherein said guides are engaged by wheels.

4. The device according to claim 3, wherein said wheels are formed by bearings.

5. The device according to claim 3, wherein said wheels are made of elastomeric material.

6. The device according to at least one of the preceding claims, wherein said wheels are supported by said footing and said guides are supported by said frame.

7. The device according to claim 1, comprising a lifting means for lifting said footing with respect to said frame.

8. The device according to at least one of the preceding claims, wherein said lifting means comprises a plurality of wheels and a means for vertically moving a plurality of axles of said wheels, said means being preferably formed by a plurality of eccentric members.

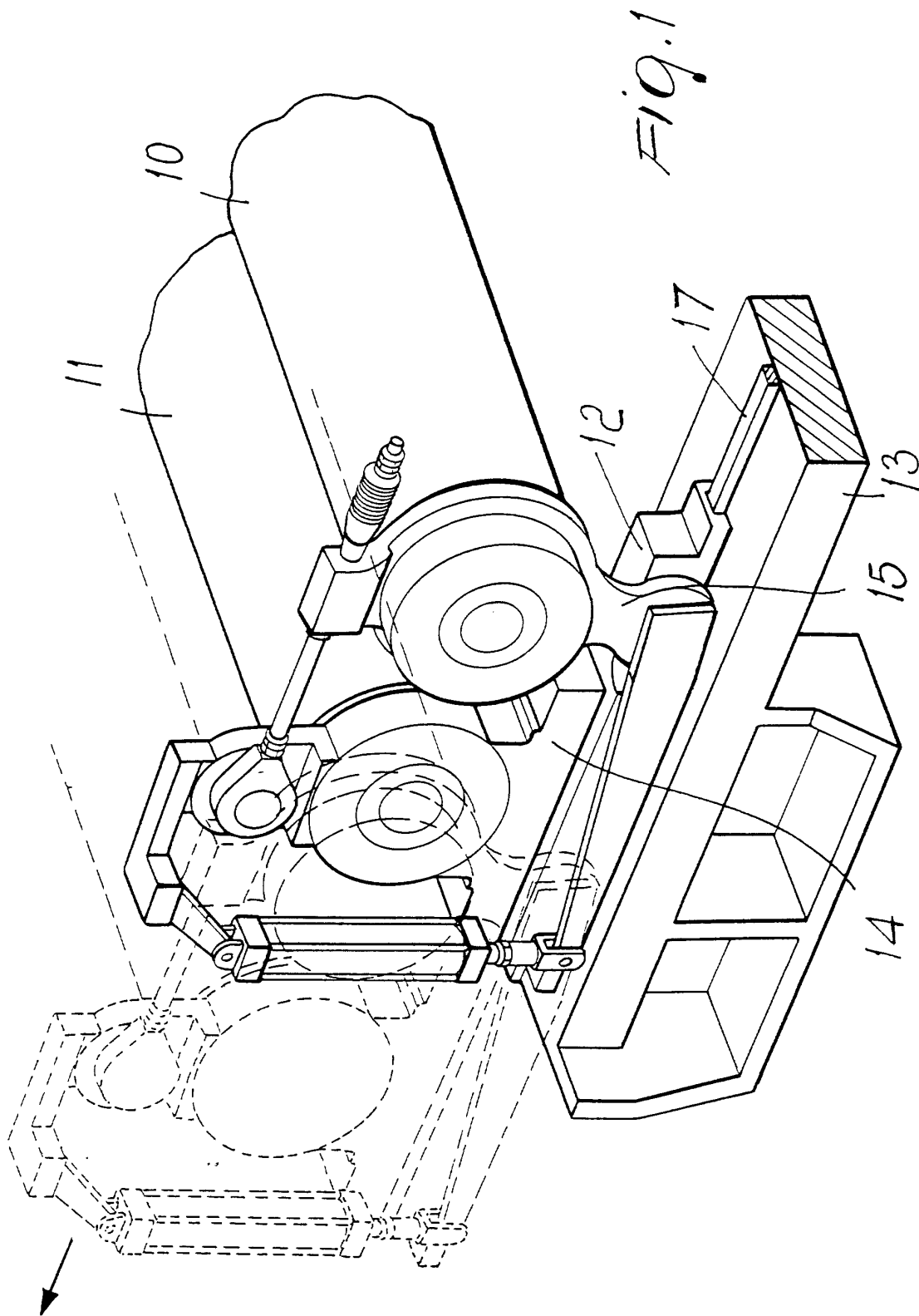
9. The device according to at least one of the preceding claims, wherein said lifting means comprises a plurality of wheels made of elastomeric material and a compression means for compressing said wheels, pushing said footing against said frame so that by releasing said compression means said wheels can freely lift said footing by elastic thrust.

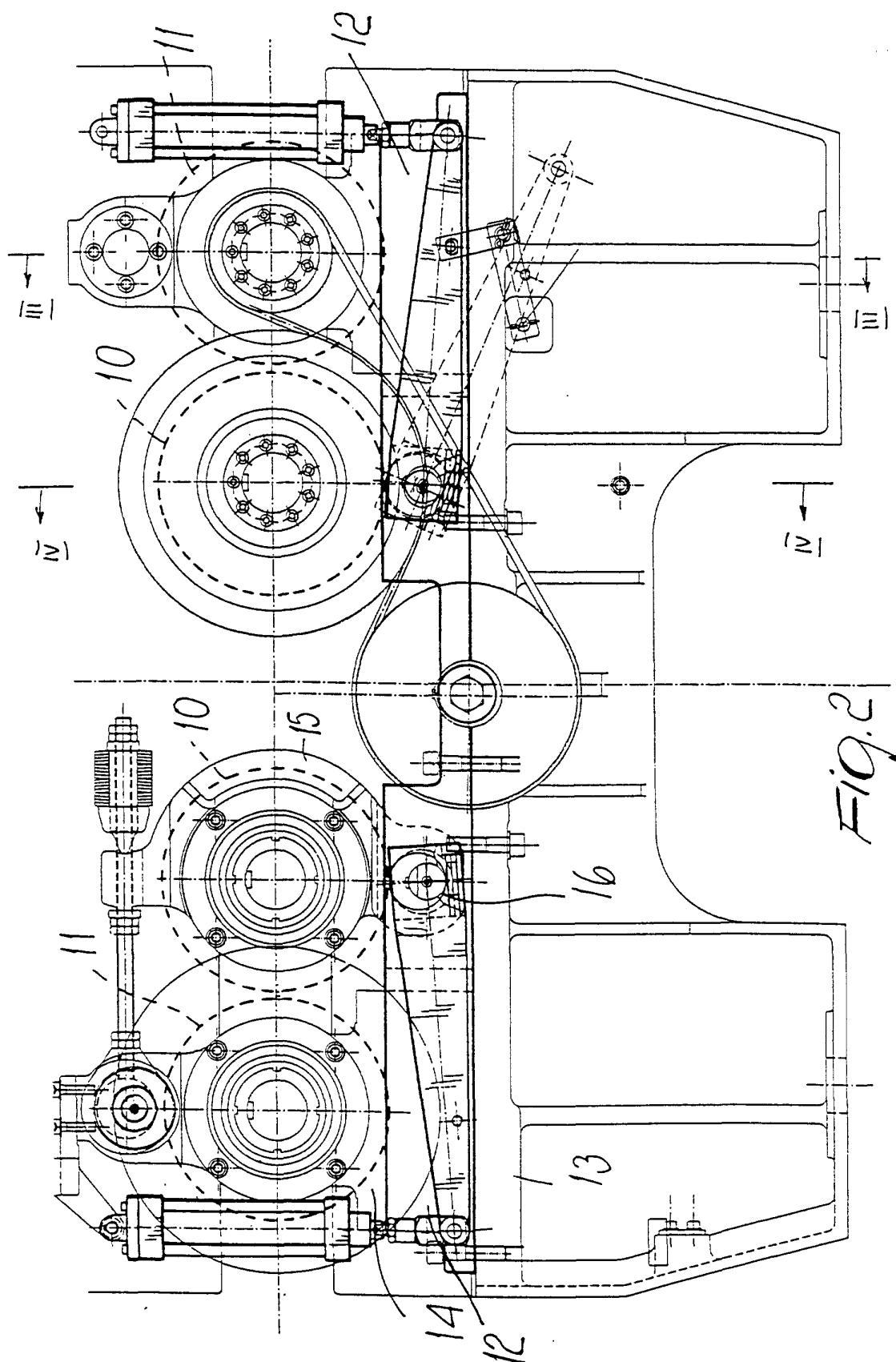
10. The device according to at least one of the preceding claims, comprising a locking means for locking and releasing the position of said footing on said frame.

11. The device according to claim 10, wherein said locking means comprises at least one lever which can be actuated remotely, preferably by means of a pneumatic piston.

12. The device according to at least one of the preceding claims, wherein said sliding means comprises a carriage which has the same height as said frame, so that said footing can slide on said carriage, said guides preferably extending on said carriage.

13. Every new characteristic or new combination of characteristics described or illustrated herein.





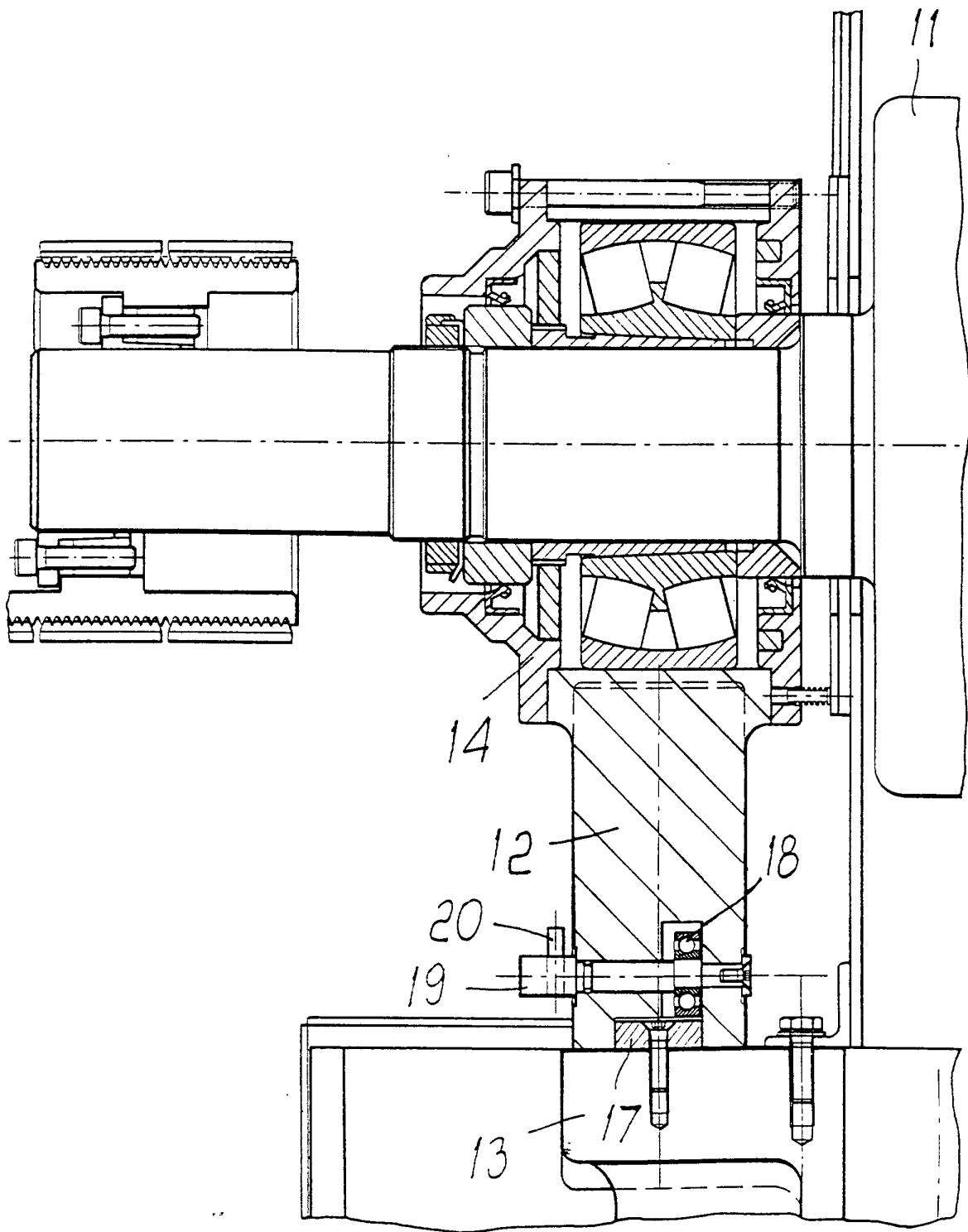
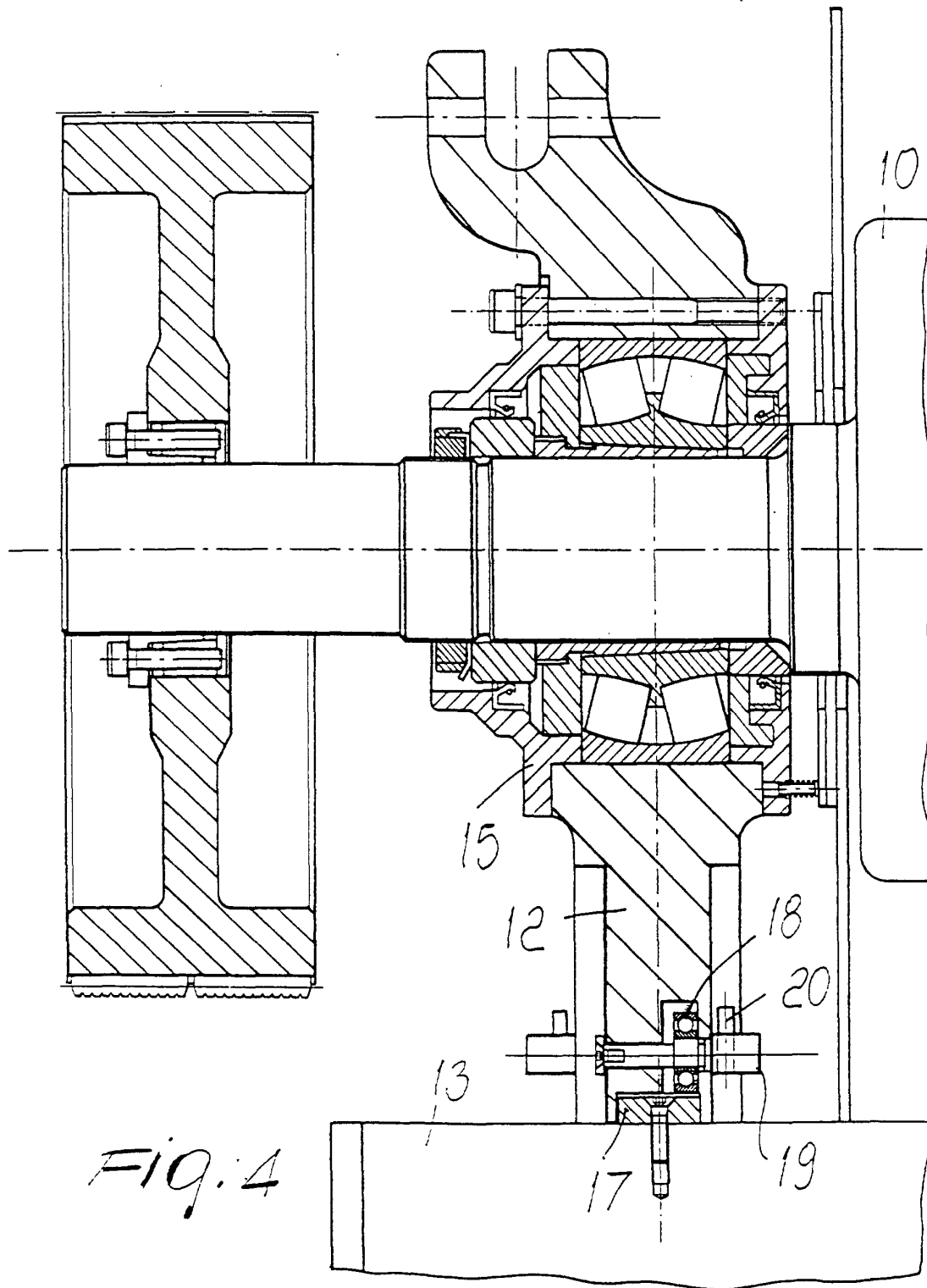


Fig. 3



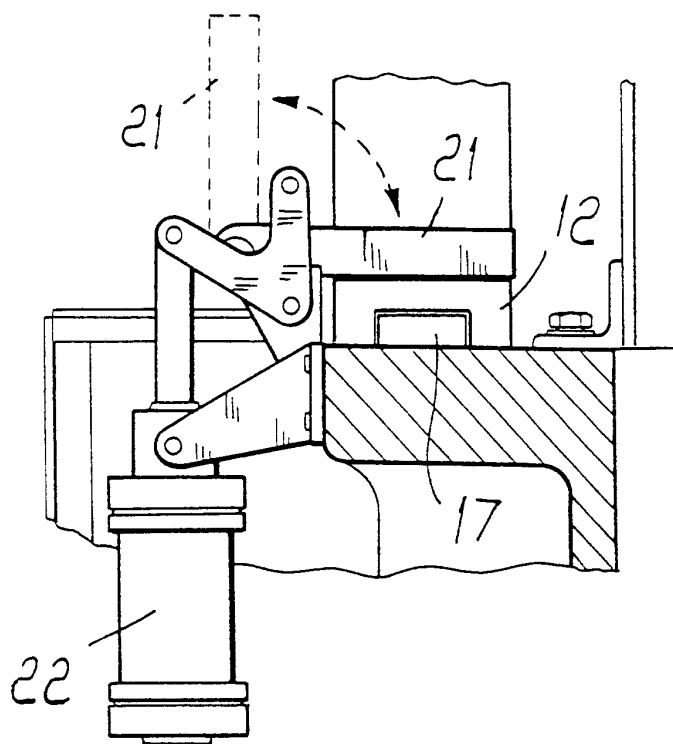


Fig. 6

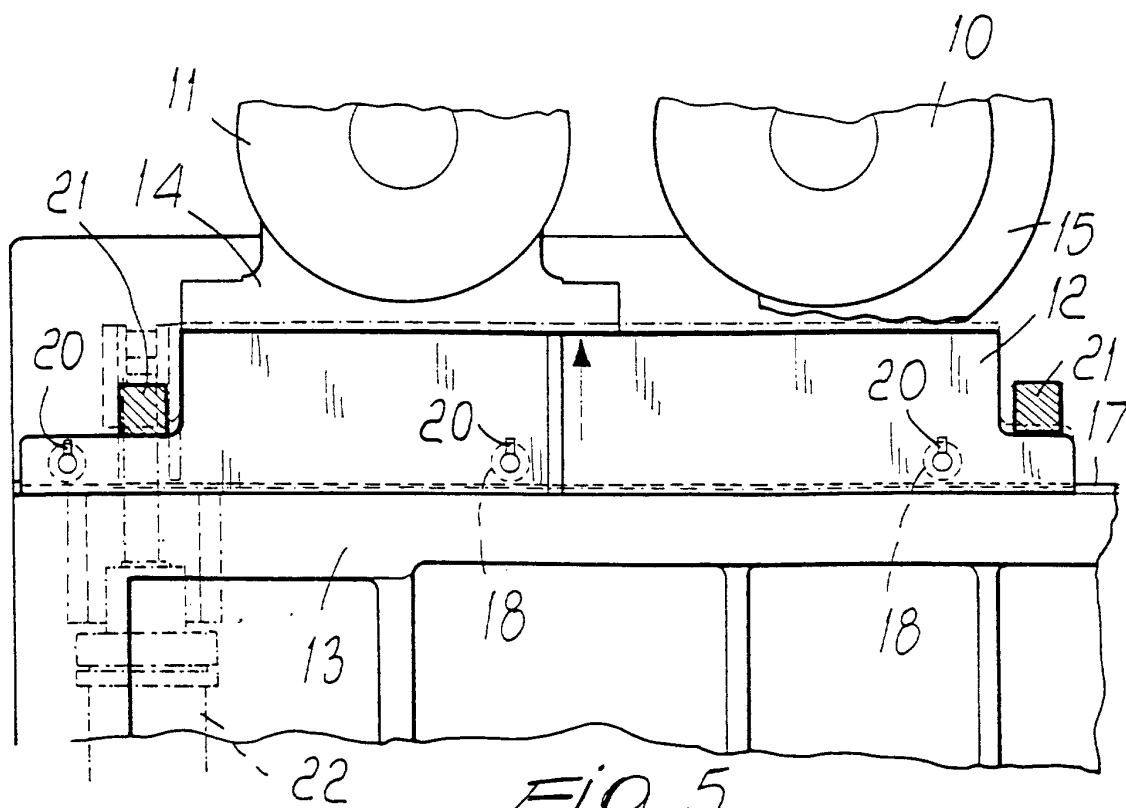


Fig. 5

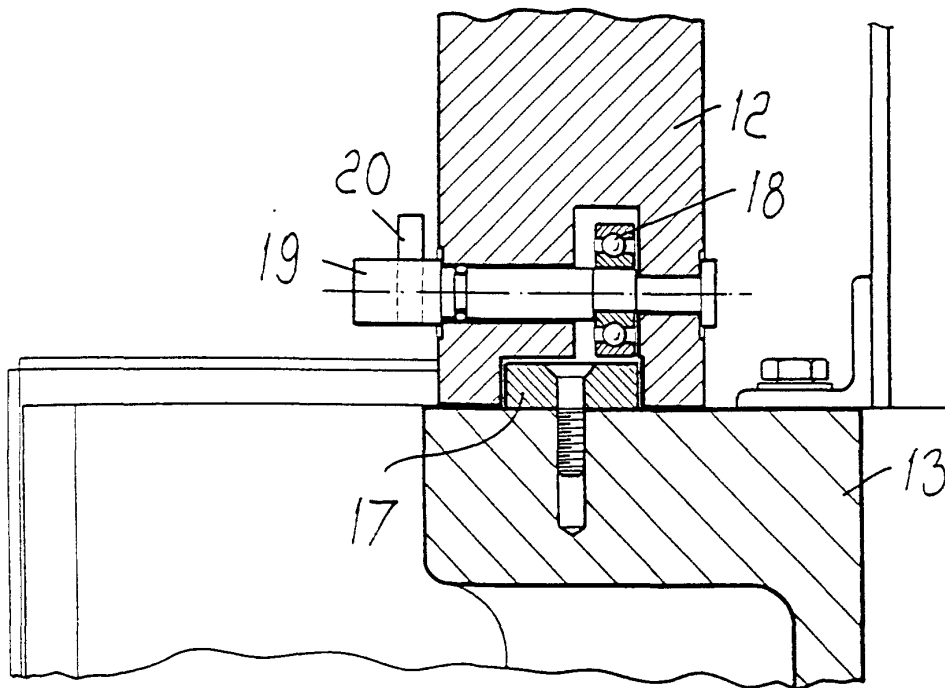


Fig. 7

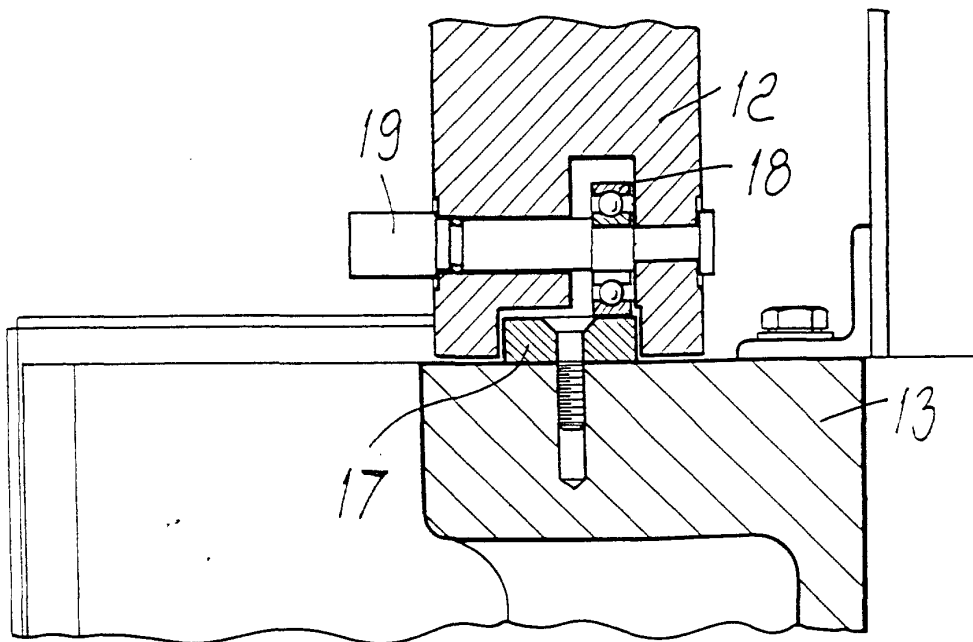
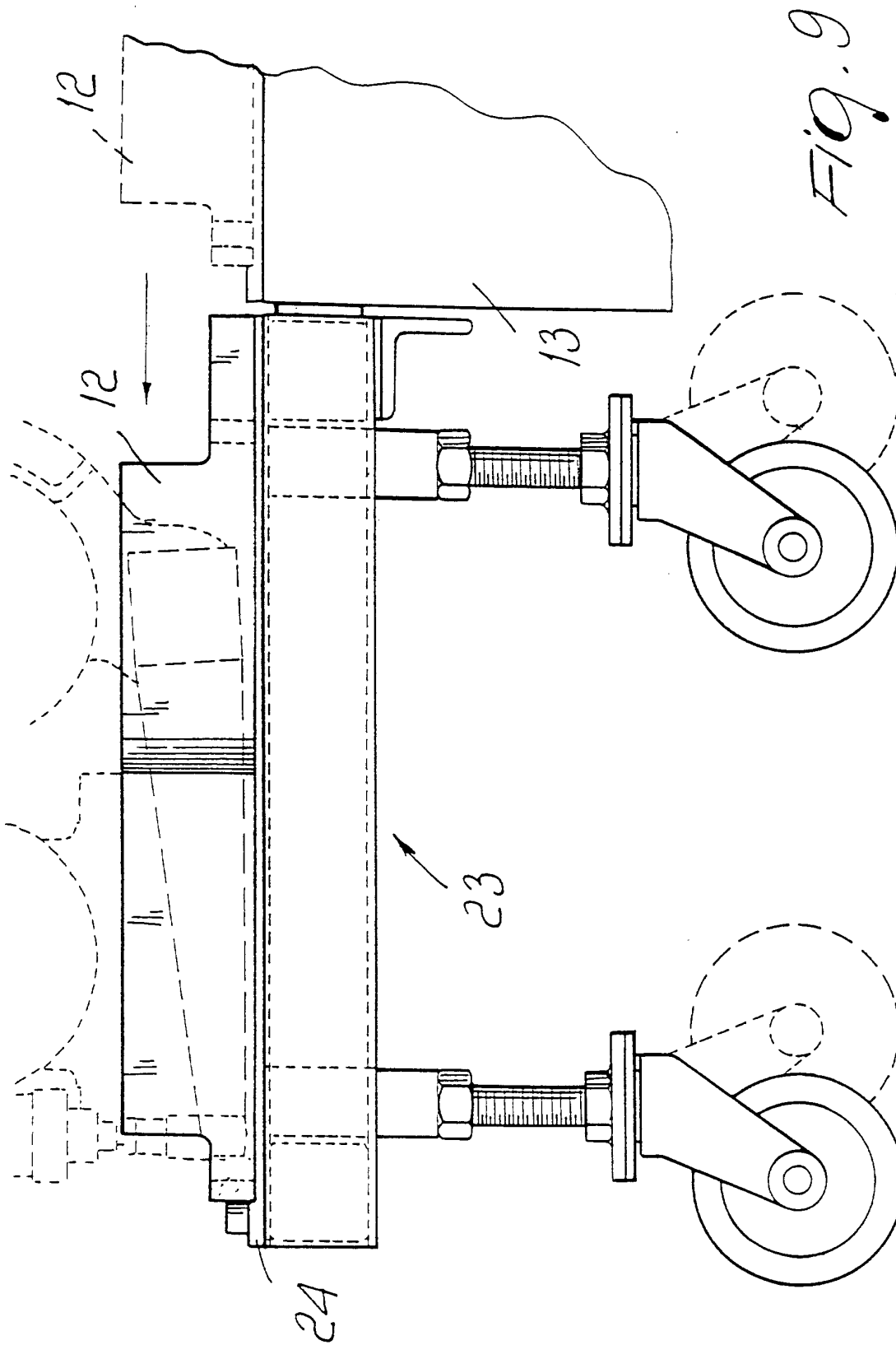


Fig. 8





European Patent
Office

PARTIAL EUROPEAN SEARCH REPORT

Application Number

which under Rule 45 of the European Patent Convention shall be considered, for the purposes of subsequent proceedings, as the European search report

EP 01 12 4750

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.C1.7)
X,D	US 4 101 083 A (FAIST WALTER) 18 July 1978 (1978-07-18) * column 3, line 10 - column 4, line 60; figures 1-3 *	1,2,10	B02C4/28 B02C4/38
A	---	3-9,11, 12	
X,D	US 4 225 093 A (RUESCH FRIEDRICH-WILHELM ET AL) 30 September 1980 (1980-09-30) * column 3, line 41 - column 4, line 49; figures 1-3 *	1,2,10	
A	---	3-9,11, 12	
A	US 5 018 960 A (SINGER ROY E) 28 May 1991 (1991-05-28) * column 4, line 3 - line 29; figure 7 *	8	
			TECHNICAL FIELDS SEARCHED (Int.C1.7)
			B02C
INCOMPLETE SEARCH			
The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims. Claims searched completely : 1-12 Claims searched incompletely : Claims not searched : 13 Reason for the limitation of the search: R. 29(1),(6)			
Place of search		Date of completion of the search	Examiner
THE HAGUE		15 January 2002	Verdonck, J
CATEGORY OF CITED DOCUMENTS		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	
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			

EPO FORM 1503 03 82 (P04007)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 12 4750

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-01-2002

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 4101083	A	18-07-1978	DE	2610742 A1	15-09-1977
			DD	128769 A5	07-12-1977
			FR	2343508 A1	07-10-1977
			GB	1524792 A	13-09-1978
			IT	1077359 B	04-05-1985

US 4225093	A	30-09-1980	NONE		

US 5018960	A	28-05-1991	AU	6262590 A	18-07-1991
			CA	2025488 A1	13-07-1991
			EP	0436782 A2	17-07-1991
			JP	3213153 A	18-09-1991
