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(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 roll (10); an extraction means which allows the simultaneous extraction of the footing, the supports and the rolls.

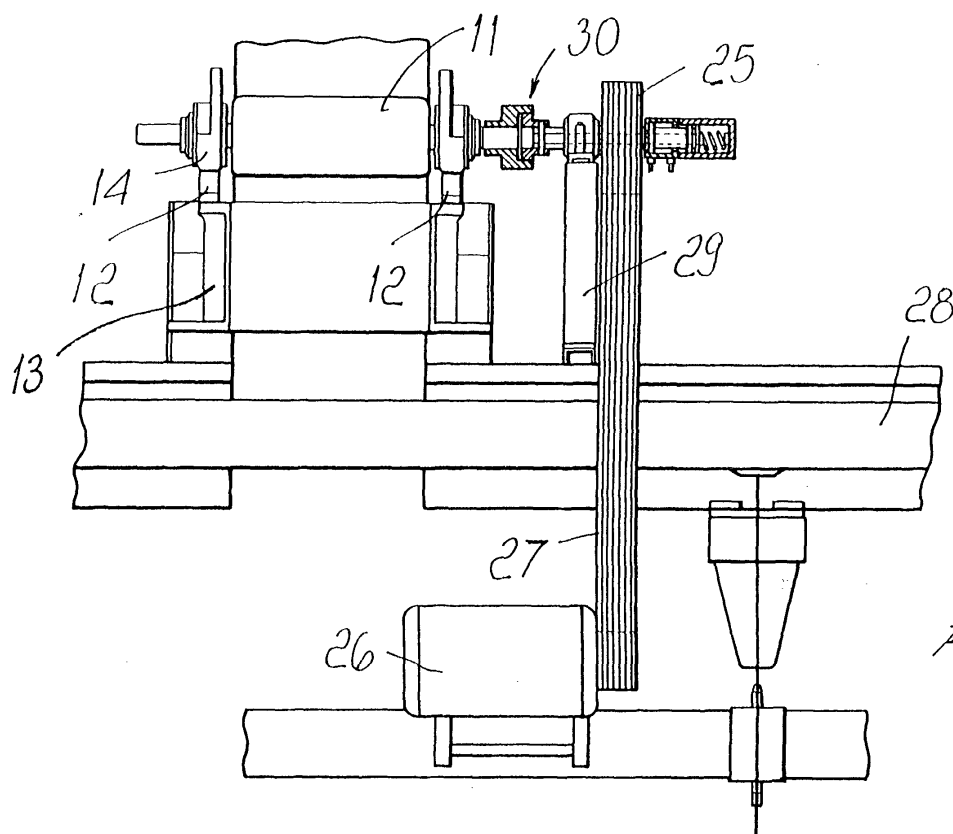


Fig. 3

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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 driving pulley is actuated by means of a set of belts which are driven by a motor drive unit which is generally arranged under the floor on which the mill rests. In this manner, the belts pass through an appropriately provided opening formed in the floor.

[0005] 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.

[0006] 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 during the extraction of the unit it is necessary to release the belts that actuate the driving pulley in order to release it. This entails an intervention on the motor drive unit arranged under the floor and therefore an awkward and delicate operation and a waste of precious time for the productivity of the system. After replacement, it is further necessary to appropriately tension the belts again and it is again necessary to perform a delicate operation in an awkward position.

[0007] From US 3,020,735 it is known a coupling with the shafts of a roller mill operating in the iron metallurgy industry, where the assignee, Demag Aktiengesellschaft, operates. However in an iron metallurgy roller mill both rollers are directly driven, while in a roller mill for milling cereals only one roller is directly driven so the arrangement taught by Demag would be impossible. Also in a roller mill for milling cereals the second roller is driven by the first roller with a particular transmission and also this feature is not compatible with the Demag arrangement. Furthermore this arrangement requires that the

support Sp of the shafts, the motor and the motor shaft are translatable with respect to the roller mill and this involves a very complex manufacturing and a complex operation during working.

[0008] 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 driving pulley for actuating the fixed roll; a second fixed support for the pulley; a coupling for connecting the pulley to the fixed roll, so as to allow the simultaneous extraction of the footing, the supports and the rolls from the frame.

[0009] 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 side view of the device of Figure 1;

Figure 3 is a partially sectional front view of the device of Figure 2, with the coupling connected;

Figure 4 is a partially sectional front view of a detail of the device of Figure 3;

Figure 5 is a partially sectional front view of the device of Figure 2, with the coupling disconnected; and

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

[0010] With reference to Figures 1 to 6, 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 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.

[0011] The driving pulley 25 actuates the fixed roll 11 and is in turn actuated by the motor drive unit 26 by means of the belt 27. The belt 27 passes through an opening which is formed in the floor slab 28 on which the device is rested.

[0012] The second fixed support 29 supports the pulley 25, supporting the shaft of the pulley 25 with bearings. In particular, the second fixed support 29 supports a shaft 32 of the pulley 25 and allows an axial sliding of the shaft 32.

[0013] The coupling 30 connects and disconnects the pulley 25 with respect to the shaft 31 of the fixed roll 11. The coupling 30 can slide inside the pulley 25. In partic-

ular, the shaft 32 of the pulley 25 is rigidly coupled to the movable part 33 of the coupling 30 and can slide inside the pulley 25 in order to be remotely actuated. In particular, the position of the movable part 33 of the coupling 30 can be remotely actuated, preferably by way of a pneumatic means constituted by the piston 34, which moves coaxially to the axis of the pulley 25.

[0014] The coupling 30 includes a plurality of teeth 35 which are arranged on the movable part 33 and engage a complementary plurality of teeth 36 which are arranged on the fixed part 37, which is provided on a shaft 31 of the fixed roll 11. Each plurality of teeth 35, 36 lies on a plane which is perpendicular to a rotation axis of the fixed roll 11. With particular reference to Figure 4, the plane is shown by the dashed line 38.

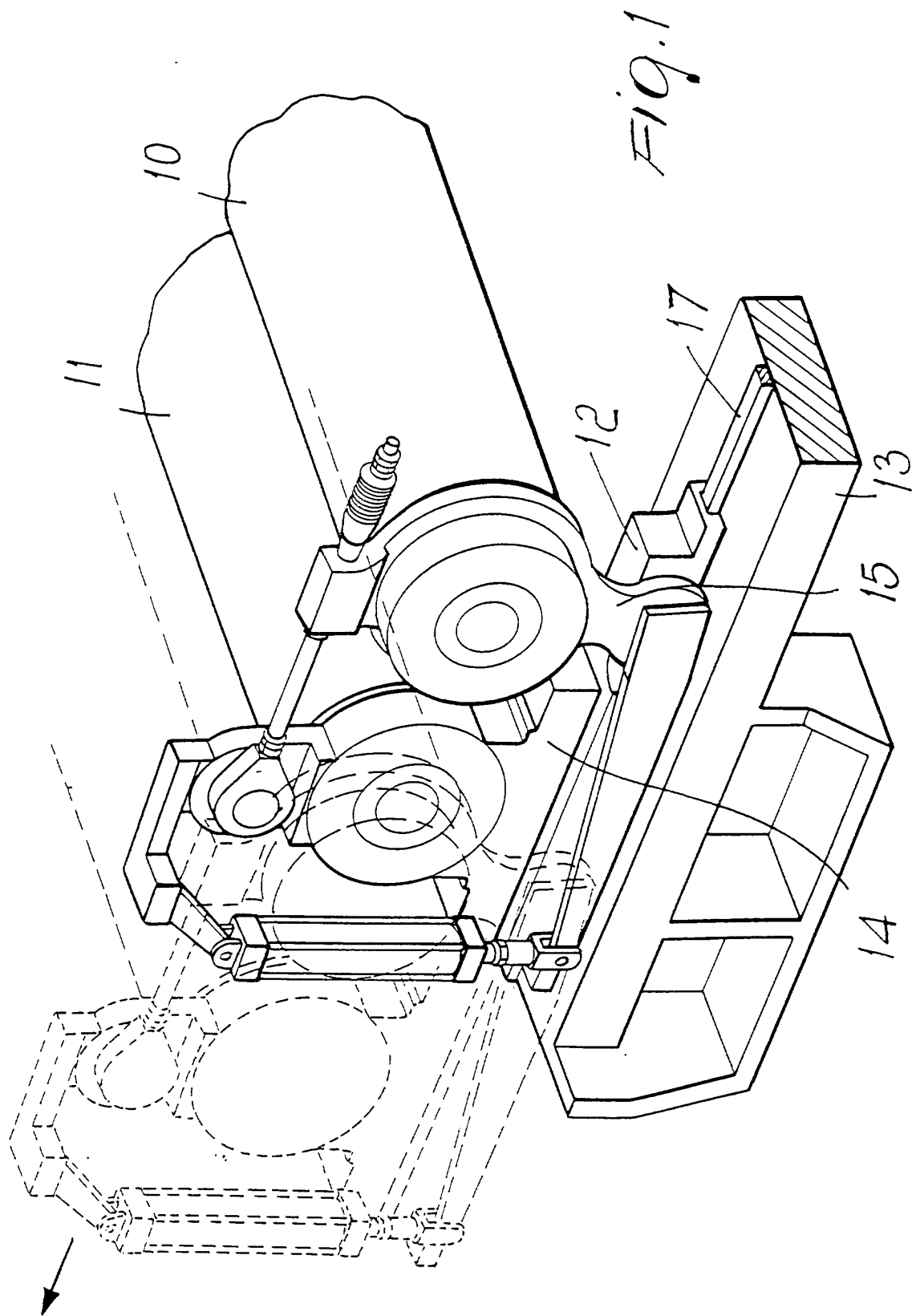
[0015] The invention allows to achieve the aim and all of the intended objects. In particular, it is possible to achieve simultaneous extraction of the footing 12, of the supports 14 and 15 and of the rolls 10 and 11 from the frame 13 with a particularly simple operation. It is in fact not necessary to release the belt 27 by acting on the motor drive unit 26, as customary according to the prior art. Rather, by simply actuating the piston 34 it is possible to contrast the spring 39 and release the coupling 30. In practice, therefore, during the replacement of the roll unit the pulley 25 remains in the same position and with the same tension of the belt 27. This simplifies and greatly speeds up the operations for replacing the unit.

[0016] This can be achieved, according to the invention, with simple and inexpensive means.

[0017] The invention is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept. In particular, for example, the type of coupling can be different, using various available systems, such as for example knurled couplings or others. Likewise, the second fixed support 29 can be connected to the frame 13 or can be fixed in other equivalent manners in order to achieve the intended aim and objects of the invention.

Claims

1. A cereal milling device, comprising: two milling rolls, of which one is movable and the other one 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 driving pulley for actuating said fixed roll; a second fixed support for said pulley; a coupling for connecting said pulley to said fixed roll, so as to allow the simultaneous extraction of said footing, said supports and said rolls from said frame.
2. The device according to claim 1, wherein said coupling can slide within said pulley.
3. The device according to at least one of the preceding claims, wherein said coupling comprises a plurality of teeth which engage a complementary plurality of teeth provided on a shaft of said fixed roll.
4. The device according to claim 3, wherein said plurality of teeth lies on a plane which is perpendicular to a rotation axis of said fixed roll.
5. The device according to at least one of the preceding claims, wherein a position of said coupling can be remotely actuated, preferably by way of a pneumatic means.
6. The device according to claim 5, wherein a position of said coupling can be actuated by means of a piston which moves coaxially with respect to the axis of said pulley.
7. The device according to at least one of the preceding claims, wherein said second fixed support supports a shaft of said pulley.
8. The device according to at least one of the preceding claims, wherein said second fixed support allows an axial sliding of a shaft of said pulley.
9. Every new characteristic or new combination of characteristics.



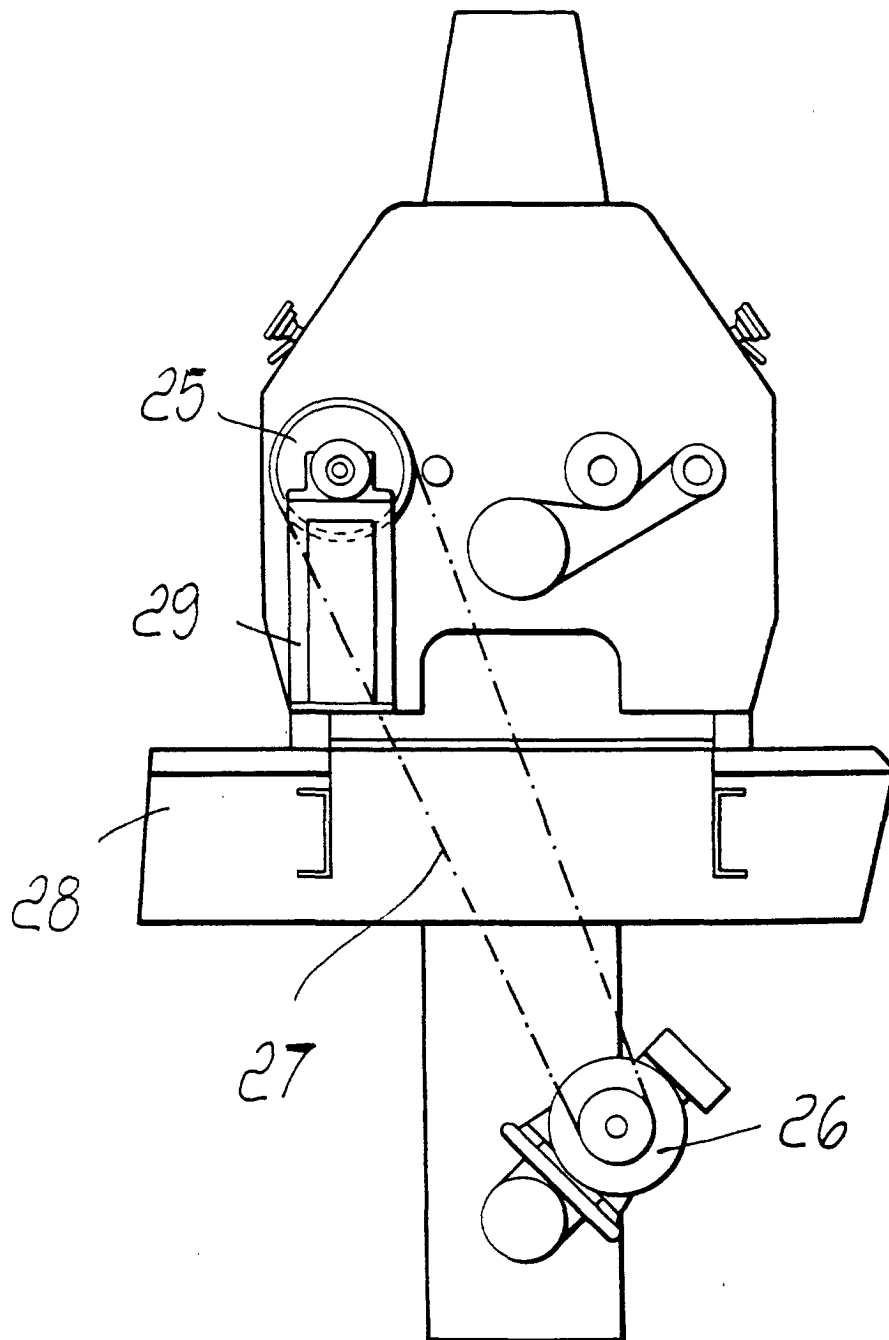


Fig. 2

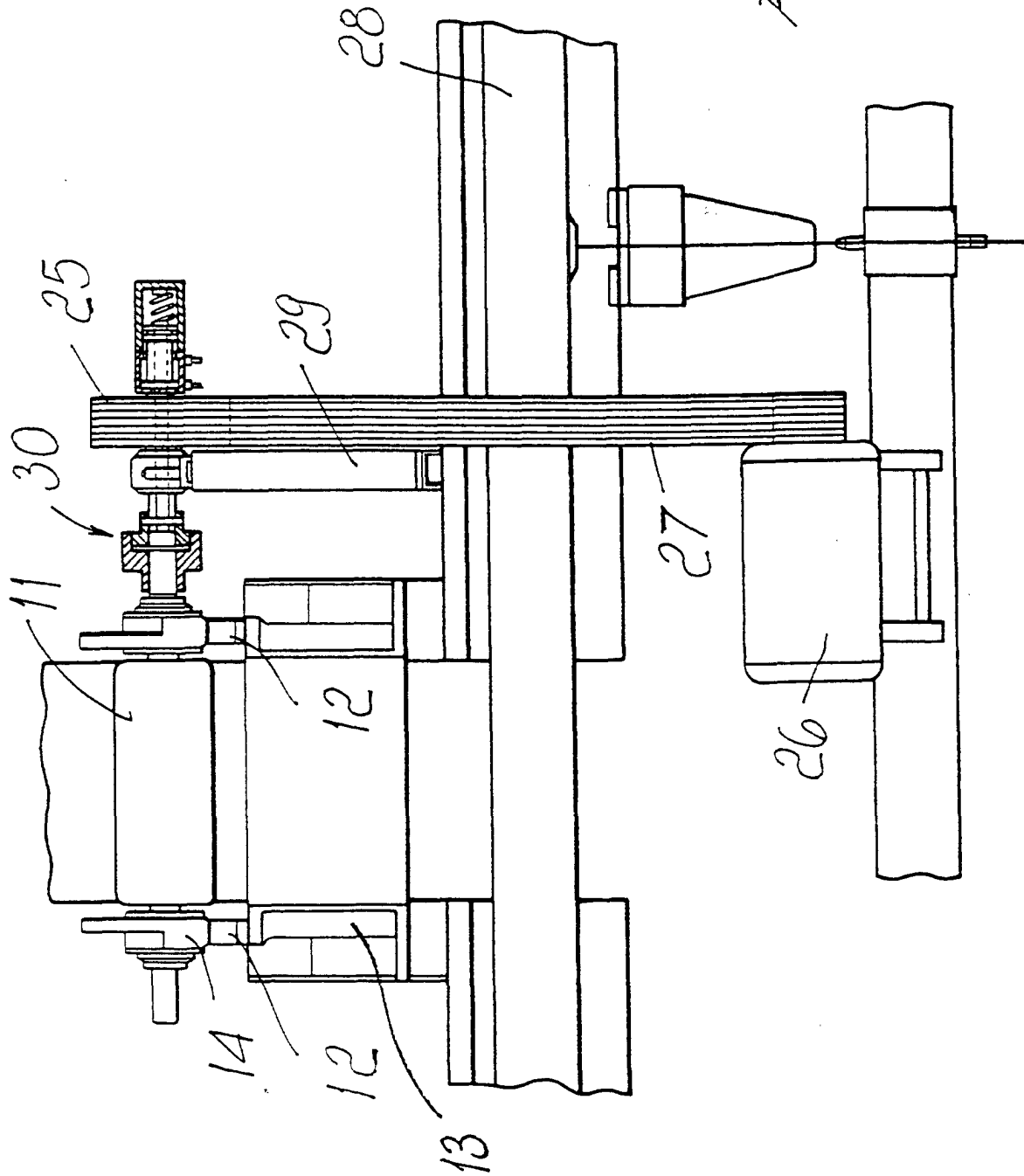


Fig. 3

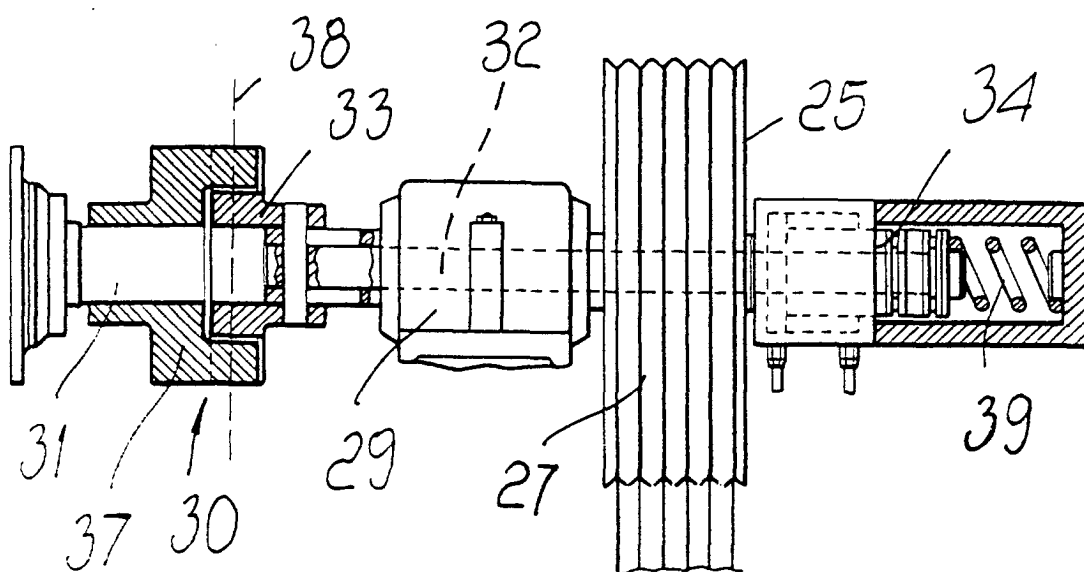


Fig. 4

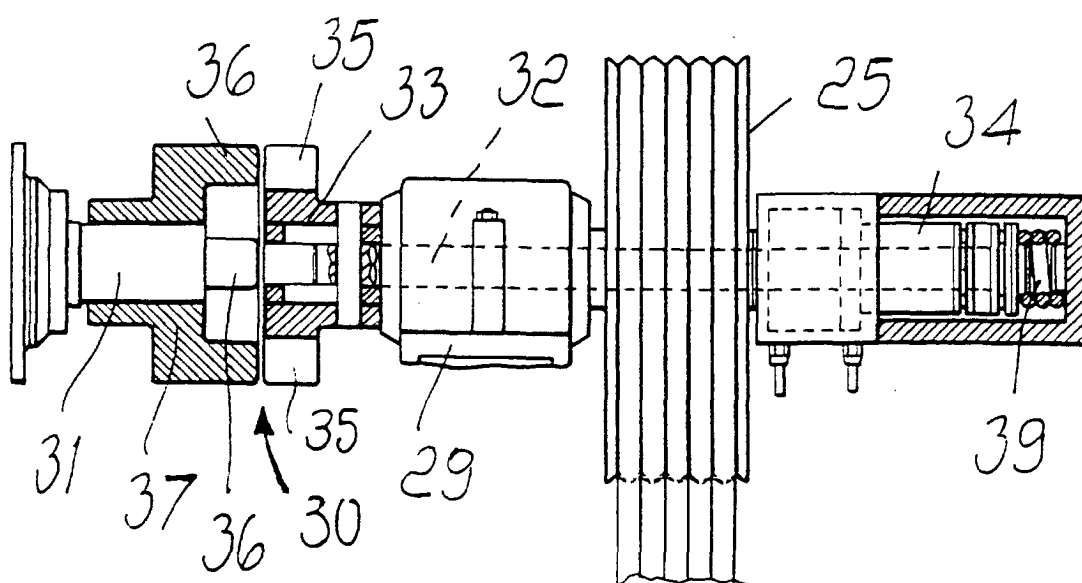
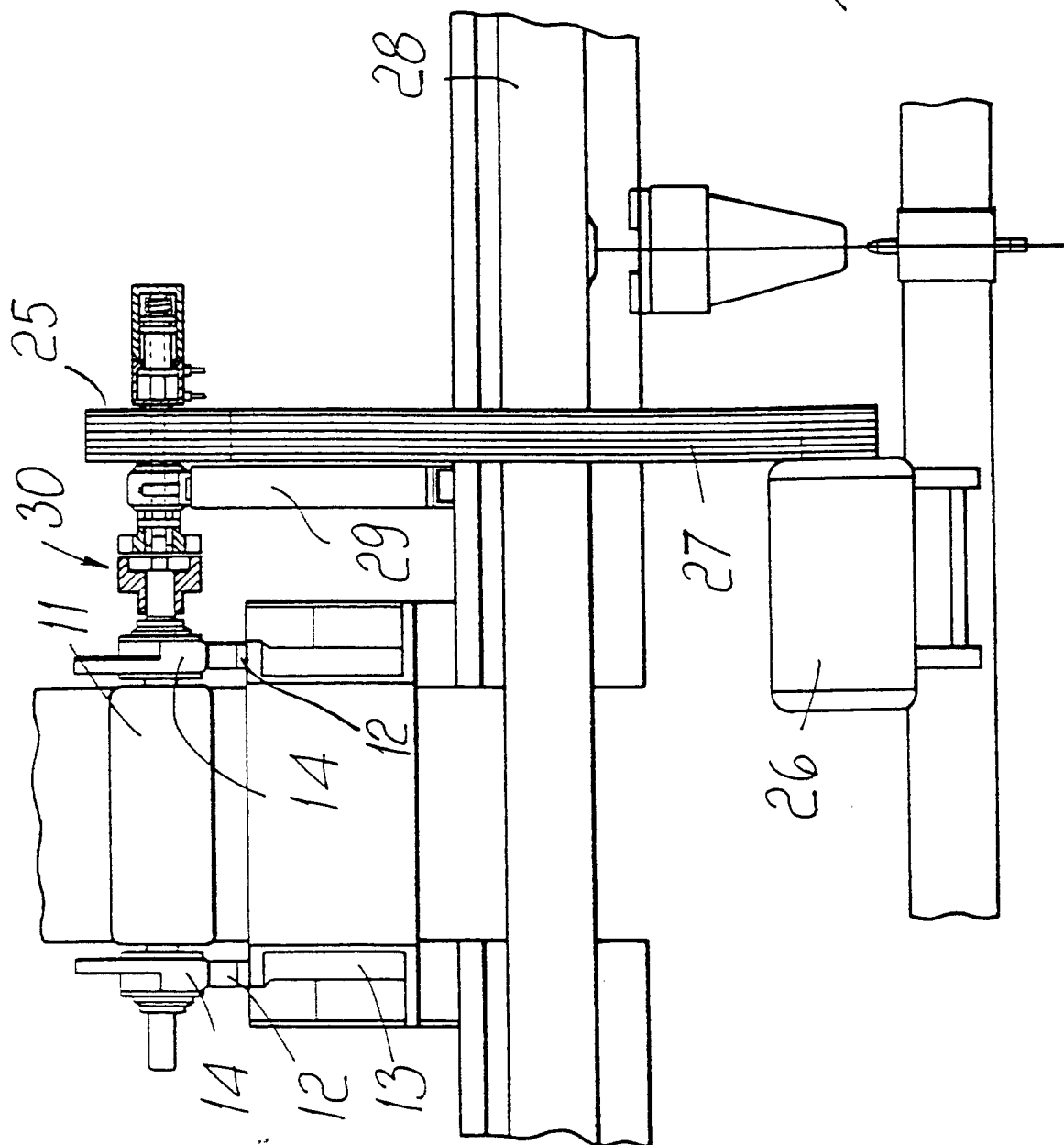


Fig. 6





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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

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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.7)
Y,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 *	1,2,7,8	B02C4/42
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Y,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 *	1,2,7,8	
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A	----	3-6	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B02C B23D
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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 : 1-8 Claims searched incompletely : Claims not searched : 9 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 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 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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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
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