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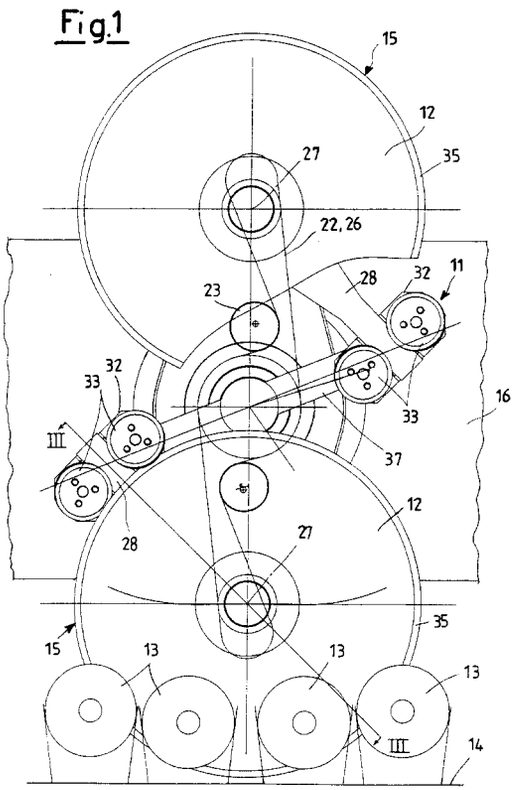
(54) Sharpening unit with disc wear recovery for stick or log cutting machine

(57) A sharpening unit with disc wear recovery for stick or log cutting machine in which the cutting machine is provided with at least one cutting head (15) bearing a motorised cutting disc (12) which cuts transversally into rolls the sticks or logs (13) positioned on a feed surface (14), the head (15) being fitted on a rotating arm (20) with respect to a central shaft (17) positioned on a cross member (16) which can be moved up and/or down with respect to the feed surface (14), where the unit is also arranged coaxial to the central shaft (17) and comprises a first lever (37), hinged to the central shaft (17) and mounted on a secondary shaft (38) coaxial with it, connected by means of an articulated joint (32) to a trolley (31) sliding with respect to a second lever (28) which rotates around a rotation axis (27) of the cutting disc (12), the trolley (31) bearing at least one grinding wheel (33) to sharpen the cutting disc (12), the central shaft (17) and the secondary shaft (38) being connected by synchronised movement elements (40).

Fig.1



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Description

[0001] The present invention refers to a sharpening unit with disc wear recovery for a stick or log cutting machine.

[0002] Both in the field of preparation of cores or sticks for winding kitchen paper and/or toilet roll and in the field of the production of rolls of paper wound on said sticks with pre-established diameter and set height, the individual final rolls have to be subsequently cut to size ready for distribution and use.

[0003] At present, cutting to size of these final rolls is performed by cutting machines which receive the individual log, for example, and cut it in succession into a number of shorter rolls, each with the required dimensions.

[0004] These cutting machines use rotating blades, in the form of cutting discs, which cut the log or stick as it is gradually fed step by step, reducing it into a number of pieces of the required size.

[0005] These disc blades feature a sharpened part or cutting edge which, as it is used, wears out or is lost and must be dressed in order to operate as required.

[0006] For this purpose various systems currently exist for recovery of the wear indicated above.

[0007] The known systems are particularly complicated and do not take account, in a simple and immediate fashion, of the fact that as the disc wears, it becomes smaller in diameter. This involves appropriate movement of the sharpening device which, at the moment, is not simple and requires intervention by skilled operators.

[0008] Up to now devices for sharpening of said discs while they are moving have been proposed which permit recovery of the wear on the disc directly while it is moving after a certain number of pre-set cuts or according to a detection device connected to it.

[0009] These devices suffer from technical problems due to connection of the electrical and electronic parts by means of rotating elements. Furthermore, due to the fact that recovery of the wear is performed while the disc is moving, there are large masses moving which create a number of further problems.

[0010] The main object of the present invention is to produce a sharpening unit that solves the above problems.

[0011] A further object of the present invention is to produce a unit for sharpening the discs of a cutting machine that eliminates the problems with connection of the electrical and electronic parts by means of rotating elements.

[0012] A further object of the present invention is to produce a unit for sharpening the discs of a cutting machine in which the moving masses are reduced to a minimum, eliminating all related problems.

[0013] These objects according to the present invention are achieved by producing a sharpening unit with disc wear recovery for stick or log cutting machine as described in claim 1.

[0014] Additional characteristics are described in the dependent claims.

[0015] The characteristics and advantages of a sharpening unit with disc wear recovery for a stick or log cutting machine according to the present invention will be illustrated more clearly in the following description, which is intended as a non-restrictive example, referring to the attached schematic drawings in which:

figure 1 is a front view of a sharpening unit with disc wear recovery fitted on the head of a stick or log cutting machine;
figure 2 is a rear partial enlarged view of part of the unit of figure 1;
figure 3 is a section view along the line III-III of figure 1;
figure 4 is an enlarged view, partly in section, of part of half the unit shown in figure 1 illustrating one single cutting head and the respective part of the sharpening unit.

[0016] With reference to the figures, a sharpening unit 11 is shown with wear recovery of a cutting disc 12 for the head 15 of a stick or log cutting machine, schematised in 13, on a feed surface 14.

[0017] In the example shown, the cutting unit, consisting of two cutting heads 15 arranged diametrically opposite each other, is fitted on a general cross member 16 which can be moved up and/or down with respect to the feed surface 14 by means of a control unit, not shown, and is rotated by means of a central shaft 17. In particular, it should be noted that a sleeve 18 is fixed to the cross member 16 and is positioned coaxial externally to the central shaft 17, which passes inside it. The sleeve 18 supports, revolving via bearings 19, a rotating arm 20 which extends from both sides of the central shaft 17 and is fitted with a pair of cutting heads 15 of the cutting machine. Each cutting head 15 has its own structure and is fitted with the above-mentioned cutting disc 12. The cutting disc 12 is rotated by a kinematic chain (not specifically shown) fitted at the end with a timing pulley 21 moved by a timing belt 22, due also to the presence of relay pulleys 23. A profiled box 24 bearing the moving part of the cutting disc 12 is rotated by a further pulley 25, controlled by a belt 26, with relay pulleys 23, and coaxial to the timing pulley 21. Each cutting disc 12 rotates around a rotation axis 27 which can be moved according to the movements of the rotating arm 20 and profiled box 24.

[0018] According to the present invention, the sharpening unit 11 is positioned in a cutting machine of the type described above.

[0019] In particular, the sharpening unit 11 comprises, revolving axially around the rotation axis 27 of each cutting disc 12, a lever 28 supported at one end by bearings 29. The lever 28 houses a linear guide 30 bearing a trolley 31 on which two grinding wheels 33 are fitted by

means of a supporting plate 32. The two grinding wheels 33 each have X axis slanting in the opposite direction to the other grinding wheel axis thus collaborating from opposite sides with the cutting edge 35 of the cutting disc 12.

[0020] In its turn the trolley 31 bears half of an articulated joint such as a hinged joint or a ball joint 36, the second half of which is positioned on a further lever 37 controlled by a secondary rotation shaft 38 positioned coaxially inside the central shaft 17, which is the fulcrum of the lever 37. The lever 37 is also supported by bearings 39 on the outer surface of the central shaft 17 which bears the rotating arm 20 with the cutting discs 12. The secondary rotation shaft 38 is thus independent of the central or main rotation shaft 17.

[0021] According to the invention, furthermore, the main rotation shaft 17 of the rotating arm 20 and the secondary rotation shaft 38 of the further lever 37 are connected to an angle timing device 40.

[0022] Said angle timing device 40 takes its movement from a main motor 42 and, via a transmission with differential inside the timing device 40, permits transmission in a ratio of 1/1 between the two outlet shafts 17 and 38.

[0023] This angle timing device 40 has the job of angle timing the two shafts 17 and 38 also with the shafts moving.

[0024] Alternatively, synchronised movement elements can be provided such as electronic or electromechanical means for co-ordinating rotation of the central shaft and secondary shaft.

[0025] In the example shown, a retiming motor 41 of the angle timing device 40 varies the angle between the main tool holder arm 20 and the wear control lever 37 on the cutting discs 12.

[0026] Variation of this angle involves sliding of the grinding wheel trolley 31 on the linear guide 30 positioned on the lever 28 hinged coaxially to each cutting disc 12. Sliding of the trolley 31 causes the grinding wheels 33 fitted on the same to move nearer or farther away from the centre of the disc.

[0027] In this way it is possible to control with an accuracy of one hundredth of a millimetre the position of the grinding wheels with respect to the cutting disc.

[0028] It is also important to note that all electrical and electronic contacts in the moving part have been eliminated.

[0029] Furthermore, the presence of elements with non-significant mass minimises the rotating masses employed in said grinding wheel sharpening unit.

[0030] A sharpening unit according to the present invention therefore permits sharpening of the cutting discs while they are moving, without any problem, directly preparing for said operation as the cutting disc diameter is gradually reduced by wear.

Claims

1. A sharpening unit with disc wear recovery for stick or log cutting machine in which said cutting machine is provided with at least one cutting head (15) bearing a motorised cutting disc (12) which cuts transversally into rolls the sticks or logs (13) positioned on a feed surface (14), said head (15) being fitted on a rotating arm (20) with respect to a central shaft (17) positioned on a cross member (16) which can be moved up and/or down with respect to said feed surface (14), **characterised in that** it too is fitted coaxial to the central shaft (17) and comprises a first lever (37), hinged to the central shaft (17) and mounted on a secondary shaft (38) coaxial with it, connected by means of an articulated joint (32) to a trolley (31) sliding with respect to a second lever (28) which rotates around a rotation axis (27) of the cutting disc (12), said trolley (31) bearing at least one grinding wheel (33) to sharpen said cutting disc (12), said central shaft (17) and said secondary shaft (38) being connected by synchronised movement elements (40).

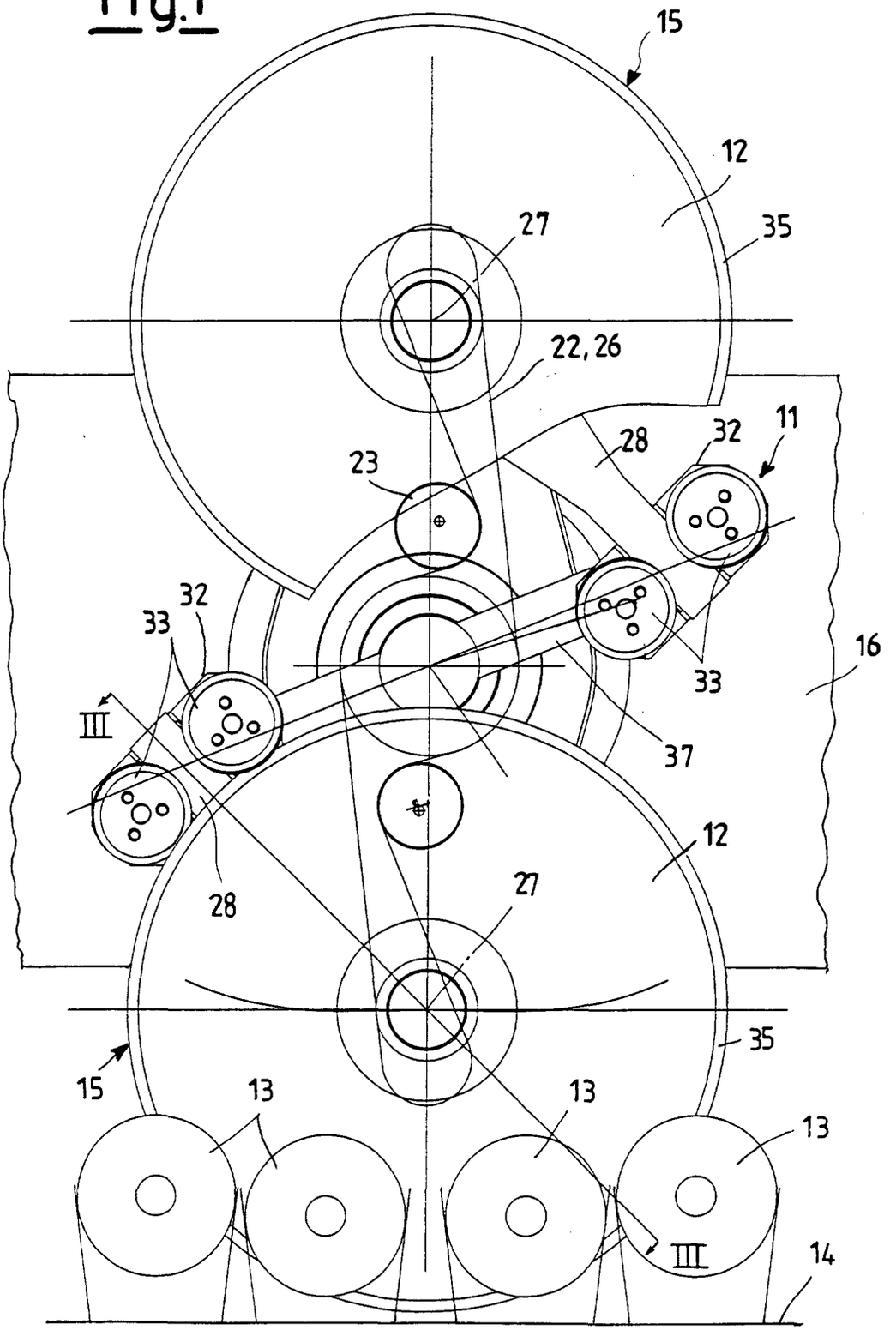
2. Sharpening unit according to claim 1, **characterised in that** said trolley (31) features a supporting plate (32), integral with it, bearing two grinding wheels (33), each of which features an axis (X) slanting in the opposite direction thus interacting from opposite sides with the cutting edge (35) of said cutting disc (12).

3. Sharpening unit according to claim 1, **characterised in that** said articulated joint is a ball joint (32).

4. Sharpening unit according to claim 1, **characterised in that** the rotating arm (20) bears two cutting heads (15) positioned diametrically opposite to each other and each of said heads (15) is provided with a respective first lever (37) which can rotate around the respective rotation axis (27) of each cutting disc (12).

5. Sharpening unit according to claim 1, **characterised in that** said synchronised movement elements consist of an angle timing device (40).

Fig.1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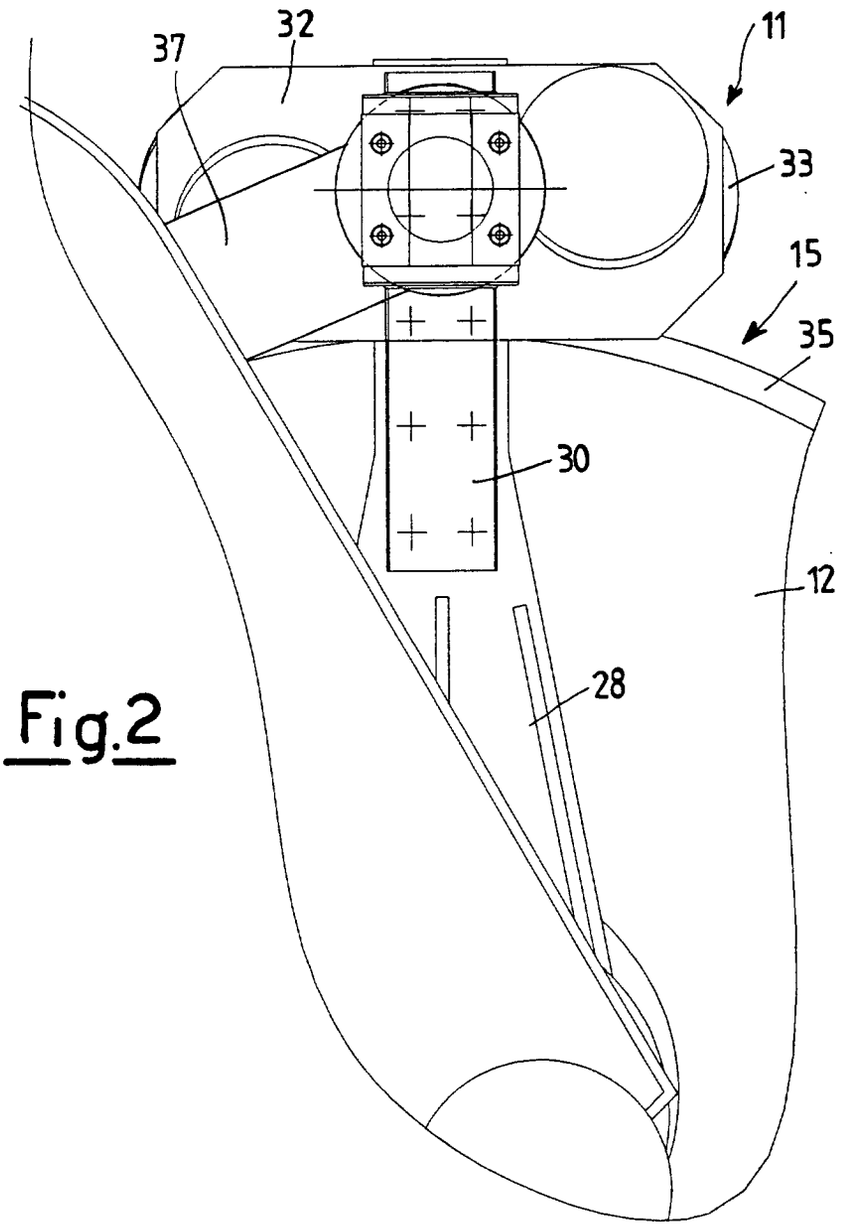

Fig.2

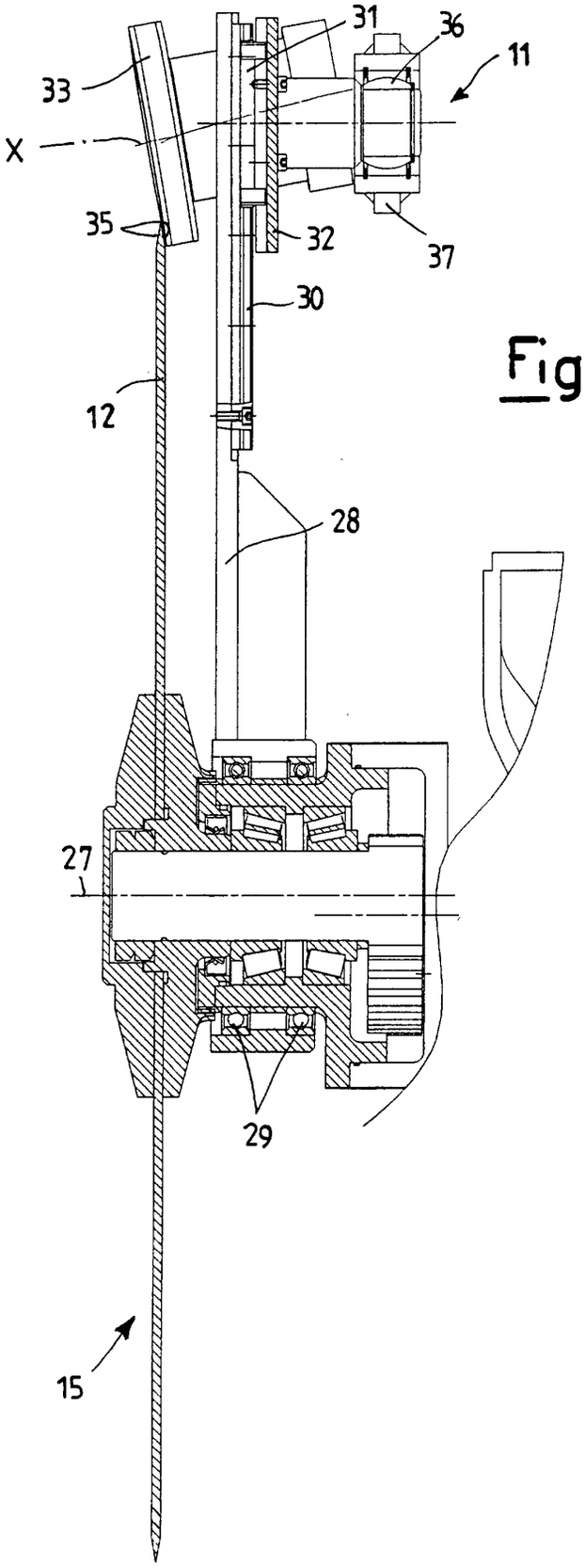

Fig.3

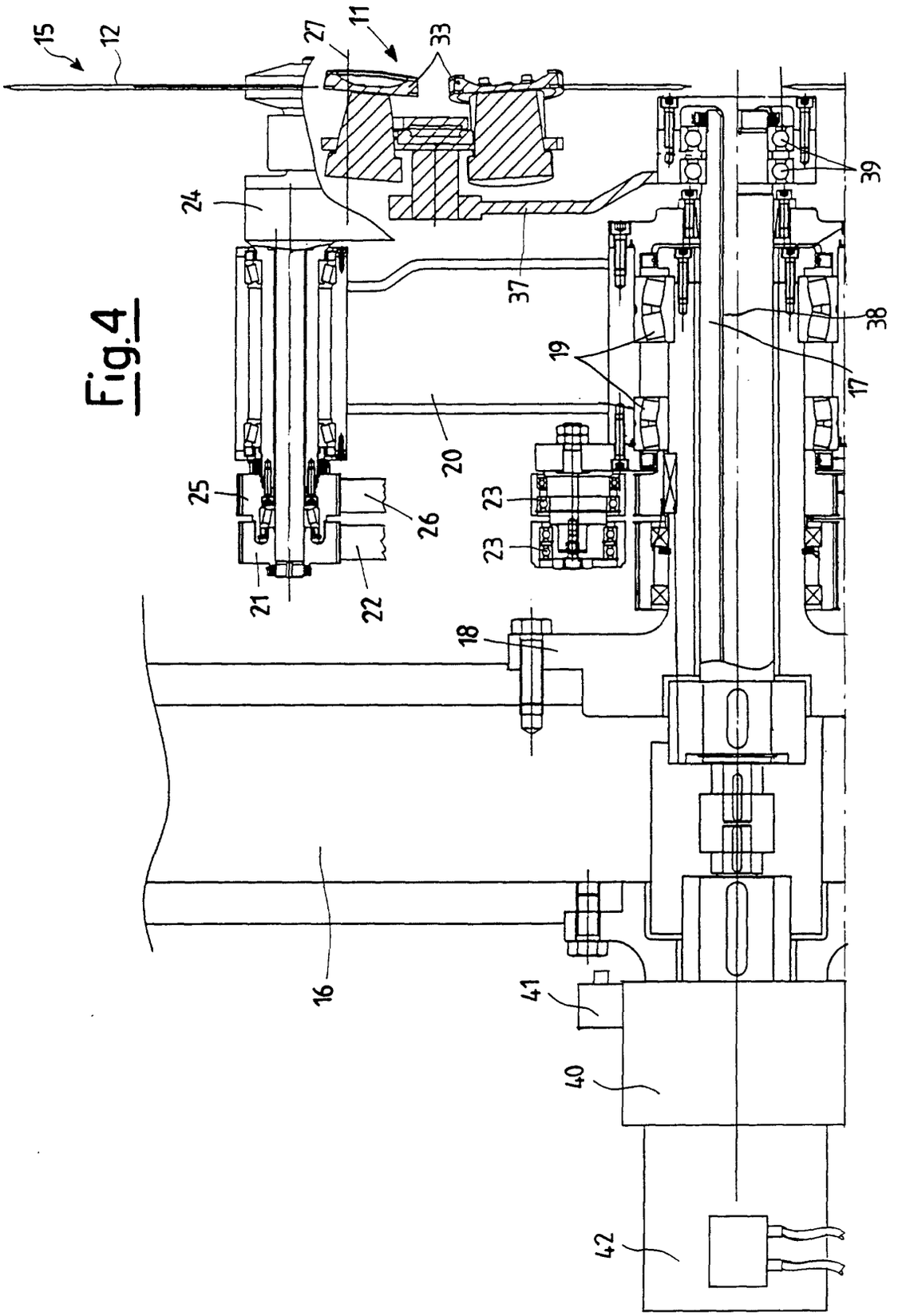

Fig.4