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(54) Machine having an anti-slippage means for the diamond cutting belt for cutting stones

(57) The invention relates to a machine for cutting slabs from a stone block (B) by means of at least one endless diamond belt (7), which extends in the cutting plane around a belt guiding arm (14) and is returned about pulleys (6) disposed at the ends of said arm (14), while being slidably guided in grooved guide means (17), which are provided on the longitudinal edges of the arm. According to a characteristic of the invention, at least along the inactive return branch of the diamond belt (7), anti-slippage means are provided, e.g. consisting of wheels (23) arranged over said branch of the diamond belt (7) in such a manner as to prevent it to come off its respective groove/s (17) of the guide means on the belt-guiding arm (14). Moreover, the machine may be mounted on rails or anyway run along a predetermined path transversely to the cutting plane, so that one or more aligned blocks are still and the cutting plane is moved along them by moving the machine.

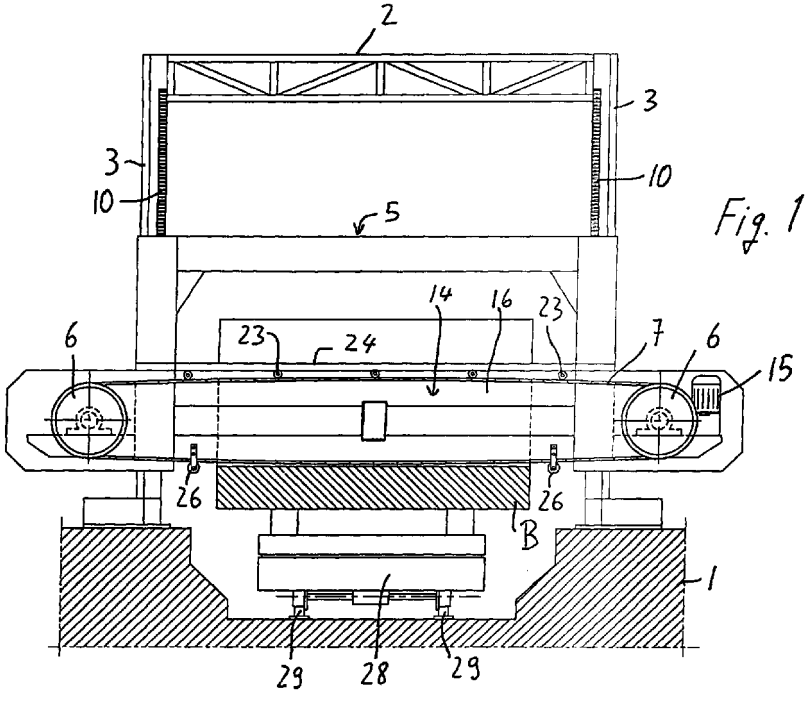

Fig. 1

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Description

[0001] This invention relates to a machine for cutting stones, such as marbles, granites and others, and particularly for cutting slabs from a stone block, for dividing a stone block into slabs having a predetermined thickness, for squaring stone blocks, and for other similar tasks, in which machine cutting operations are performed by at least one endless diamond belt, or the like, which slidably extends in the cutting plane around a belt-guiding arm substantially parallel to the cutting line and is returned on pulleys disposed at the ends of this arm, one of which is a driving pulley, and which diamond belt is guided with its active branch transverse to the cutting plane by grooved guide means provided on the longitudinal edge of the belt-guiding arm turned towards the cutting line and with its inactive return branch in grooved guide means provided on the edge of the belt-guiding arm opposite to the cutting line, the belt-guiding arm being translatable parallel to itself and to the cutting line in the cutting plane, and means being provided for moving the belt-guiding arm so that it can be first engaged with the stone block by the active branch of the diamond belt along the desired cutting line and then advanced through the stone block in the cut advancement direction, at a speed corresponding to the cutting speed, while keeping the active branch of the diamond belt pressed in operating contact with the stone, means being typically also provided for relative movement between the stone block and the belt-guiding arm transversely to the cutting plane, intended to bring them in the desired mutual cutting position.

[0002] In a preferred embodiment of said prior art machines, in order that the diamond belt can be guided transversely to the cutting plane in the grooved guide means provided on the longitudinal edges of the belt-guiding arm, the inner side of the diamond belt, i.e. the side turned towards the belt-guiding arm and not provided with diamond surfaces, and the grooves of the guide means have complementary and coincident cross sectional profiles, preferably tapering towards the bottom of the grooves, and particularly V-profiles, at least partly slidably engaged with each other.

[0003] In such prior art machines, it has been noted that stretching the diamond belt between the return pulleys at the ends of the belt-guiding arm, and profiling in a complementary and coincident way the diamond belt and the grooves of the guide means provided on the longitudinal edges of the belt-guiding arm, is sometimes not sufficient for keeping the inactive return branch of the diamond belt, opposite to the cutting line, safely engaged in the guide means on the corresponding longitudinal edge of the belt-guiding arm, and that it may occur that forces acting on this inactive return branch of the diamond belt cause said branch of the diamond belt to accidentally come or slip off the grooved guide means of the belt-guiding arm associated thereto. So, for example, the slab cut from the stone block may happen to tilt towards the block during the cutting operation or following it, exerting transverse forces on the inactive return branch of the diamond belt, such as to cause this branch to slip, i.e. come off the associated groove/s of the guide means while the cutting operation is still in progress or at the end of it, upon extraction of the belt-guiding arm through the cutting slot between the block and the slab cut therefrom, by a corresponding translatory movement opposite to cut advancement.

[0004] The invention aims at obviating the above drawback and provides, therefore, along the edge of the belt-guiding arm opposite to the cutting line, so-called anti-slippage means, which are arranged at least partially over the inactive return branch of the diamond belt and prevent it from disengaging from the associated groove/s of the guide means provided on the corresponding longitudinal edge of the belt-guiding arm.

[0005] Preferably, according to a further characteristic of the invention, such anti-slippage means may be also provided for the active branch of the diamond belt, at the segments between the stone block and the diamond belt return pulleys, which are disposed at the two ends of the belt-guiding arm.

[0006] The anti-slippage means in accordance with the invention may have any type of construction suitable for this purpose. So, for example, these anti-slippage means may also consist of simple stationary protection means, overlaying laterally and/or above the diamond belt, covering it at least partially, preferably without coming to contact with it, and preventing any action thereon by forces which could cause it to come off the guide groove/s provided on the longitudinal edge of the belt guiding an. These protecting and covering means may be continuous or discontinuous, i.e. may extend continuously as a shield along most of the inactive return branch of the diamond belt and/or along the side segments of the active branch of the diamond belt, or may be arranged at intervals along said branch and/or along said segments of the belt. Preferably, according to a particularly advantageous embodiment of the invention, the anti-slippage means consist of loose guide wheels which are arranged at least partially over the outer surface of the diamond belt and may be also very close thereto and possibly in contact or nearly in contact therewith.

[0007] The anti-slippage means according to the invention may be mounted at least partly on the belt-guiding arm and/or at least partly on an an carrier, whereon the belt-guiding arm and the diamond belt return pulleys at the ends of said arm are also mounted, as well as the means for driving said belt and/or the belt-guiding arm, and which arm carrier is guided in a frame in such a way that it can be translated parallel to the cutting plane and transverse to the cutting line.

[0008] According to a further preferred characteristic of the invention, which may be used either in combination with the above anti-slippage means and advantageously even separately therefrom, the belt-guiding arm

is delimited, on the side turned towards the cutting line and on the opposite side, by two corresponding separate substantially parallel longitudinal members, substantially parallel to each other and to the cutting line and connected to each other and/or to the bearing structure of the belt-guiding arm, as well as provided, at their longitudinal edges, with grooved guide means or with mounts for said diamond belt guide means. Thanks to this characteristic of the invention, the advantage is provided that the opposite longitudinal parts of the belt-guiding arm can consist of the same type of longitudinal member prefabricated and used in two upside-down positions, so that the longitudinal side having the grooved guide means is always turned outwards. This is an important advantage even when the two opposite longitudinal edges of the belt-guiding arm having the grooved guide means and hence the corresponding outer edges of the two respective longitudinal members are substantially rectilinear, but it is particularly important when - according to a further characteristic of the invention - the two opposite longitudinal edges of the belt-guiding arm having the grooved guide means and hence the corresponding outer edges of the two respective longitudinal members are curved and slightly outwardly convex. In this case, one type of prefabricated longitudinal member may be used to make the two opposite longitudinal parts of the belt-guiding arm, said type of member having grooved guide means or mounts therefor, on a convex longitudinal edge, and an opposite longitudinal edge which is rectilinear or anyway profiled as appropriate for its integration into the belt-guiding arm or into its bearing structure, and said type of member being mounted on each longitudinal edge of the belt-guiding arm, with its convex side, provided with the grooved guide means or with the mounts therefor, being always turned outwards.

[0009] With reference to the grooved belt guide means, a peripheral groove may be provided, which is continuous or in sections, in the outer longitudinal edges of the arm or in the edges of the longitudinal members which are to form the upper and lower outer sides of the arm. Here, sliding motion is enhanced by supplying a lubricant fluid into the guide groove, particularly forming a slide bearing, for example with an effect known as "aquaplaning".

[0010] In an alternative embodiment, the guide means consist of wheels, pulleys or rollers which are rotatably mounted on the outer peripheral edges of the arm or on the edges of the longitudinal members which are to form the outer peripheral edges of the arm. The rollers have annular coaxial grooves whose section is complementary or substantially coincident with the longitudinal guide rib of the belt. The rollers are aligned and installed along the longitudinal edges of the arm or the outer edges of the longitudinal members so that the rollers and the means for supporting them are narrower than the belt. Also in this case, means for supplying a fluid onto the rollers may be provided, although this fluid is mainly used to wash cutting residues away from the rotational supports of the rollers.

According to a variant embodiment of the invention, the grooved guide means may also consist of combinations of rollers and grooves with or without sliding fluid feed, alternated in any order, either within one of the two outer longitudinal edges of the arm, or between the two opposite longitudinal edges. For instance, the edge associated to the return branch may bear the guide rollers, whereas the edge associated to the cutting branch of the belt may be provided with the grooved wherein the sliding fluid is supplied.

In accordance with an additional characteristic of the invention, the machine, which, thanks to the above characteristics has a comparatively slim and substantially lighter and smaller construction may be mounted in such a manner as to be able to slide on guides, such as rails or the like along a predetermined path and transverse, particularly perpendicular to the cutting plane. In this case, the block to be processed may be stationary, whereas it can be divided into slabs by moving the machine. Also, the machine may follow a path developing along a plurality of aligned blocks to be processed, thereby avoiding the need to load each block on cars.

[0011] These and other characteristics of the invention and the advantages derived therefrom will be explained in greater detail in the following description of an embodiment schematically shown by way of a non-restricting example in the annexed drawings, in which:

Fig. 1 is a front elevational view of a machine according to the invention, with parts in section.

Fig. 2 is a side elevational view of the machine as shown in fig. 1.

Fig. 3 is a front elevational and magnified view of a part of the machine shown in the lower right area of fig. 1.

Fig. 4 is a vertical sectional view as taken across lines IV-IV of fig. 3.

Fig. 5 is a front elevational and magnified view of a part of the machine shown in the upper left area of fig. 1.

Fig. 6 is a vertical sectional view as taken across lines VI-VI of fig. 5.

Fig. 7 is a view as shown in fig. 1, of a variant embodiment of the machine according to the invention, wherein the belt guide means consist of a plurality of wheels, pulleys or rollers, and wherein the machine can run on rails.

Figs. 8 and 9 show, like figs. 3 and 4, magnified construction details of the machine as shown in fig. 7.

[0012] The machine according to the invention, as shown in the drawings, is mainly used to cut up blocks B of stone (marbles, granites, and others) into slabs with a predetermined thickness, and is composed of a base 1,

whereon a portal frame 2 is fitted. A vertical arm carrier 5 is slidably guided on vertical guides 3 of the uprights of the portal frame 2, by means of corresponding brackets 4. At the side ends of the arm carrier 5, return pulleys 6, disposed in a common vertical plane and about which an endless flexible diamond belt 7 is driven, are rotatably mounted.

[0013] The arm carrier 5 may be displaced vertically by means of pinions 8, mounted on the carrier 5, and driven by motor reducers 9, while meshing with vertical racks 10 disposed on the uprights of the mount 2. One of the return pulleys 6 is rotatably driven by a motor reducer 15 installed on the arm carrier 5.

[0014] The arm carrier 5 preferably has an inverted U-shape and in the lower part between the U stems a belt-guiding arm 14 is fastened, which is substantially horizontal and extends in a vertical cutting plane. This belt-guiding arm 14 is as thin as possible transversely to the cutting plane, in so far as mechanical and functional needs of the arm 14 and of the diamond belt 7 allow.

[0015] With reference to the embodiment as shown in figs. 1 to 6, the upper and lower longitudinal edges of the belt-guiding arm 14 may be rectilinear, but - in the illustrated embodiment - are curved, i.e. slightly outwardly convex, each having a longitudinal groove, wherein the corresponding upper or lower branches of the diamond belt 7 are slidably driven.

[0016] In the illustrated embodiment, the diamond belt 7 has one or more longitudinal cables or wires 20, embedded in a body 21 made of a flexible material, particularly or rubber or plastic. As a whole, this body 21 of the diamond belt 7 has, on its outer side, i.e. opposite to the belt-guiding arm 14, a substantially plane surface, wherefrom diamond segments 22, spaced in the longitudinal direction of the belt 7 and fastened to the longitudinal cables or wires 20 thereof, as well as at least partially embedded in the body 21, project slightly. On the substantially plane outer surface of the diamond belt 7, opposite to the belt-guiding arm 14 and turned - at the lower edge of this arm - towards the stone block B to be cut, each diamond segment 22 extends transversely to the belt 7 all over the width of said outer surface. Further, each diamond segment 22 also extends over a part of the two sides of the belt 7, slightly projecting, also on these sides, out of the flexible body 21 of the belt 7. Preferably, but not necessarily, each diamond segment 22 has an extension on one side of the belt 7, towards the thickness of the belt 7 and towards the inner side thereof, which is longer than that on the opposite side. This asymmetric profile is alternately and specularly inverted in the following diamond segments 22, as is evident in figs. 3 and 5. On the inner side, turned towards the belt-guiding arm 14 and opposite to the stone block B to be cut and to the diamond segments 22, the body 21 of the belt 7 has a V-shaped part which is complementary to the cross section of the longitudinal grooves 17 of the upper and lower edges of the belt-guiding arm 14 and is slidably engaged in these grooves 17. The maximum width of the body 21 of the diamond belt 7 (out of the grooves 17 of the belt-guiding arm 14) substantially corresponds to the width of the lower part of the belt-guiding arm 14, whereas the diamond sectors 22 are slightly wider. So, the diamond sectors 22 project on both sides slightly beyond the width of the body 21 of the belt 7 and of the belt-guiding arm 14.

[0017] The belt slides in the guide grooves 17 with the help of fluid supplied with a method known per se, by means of feed nozzles connected to a feed circuit typically provided inside the arm 14. The sliding fluid, particularly water, forms a slide bearing, which reduces sliding friction with an effect similar to the so-called aquaplaning.

[0018] Naturally, the characteristics of this invention are not limited to the above diamond belt, but may be applied with the same advantages to machines having diamond belts made in any other suitable manner.

[0019] According to the invention, the belt-guiding arm 14 is upwardly and downwardly delimited by two separate longitudinal members 16, which may be vertically spaced and are fastened by their ends to the uprights of the arm carrier 5 and possibly even to each other in one or more intermediate locations. These two longitudinal members 16 are made from the same type of prefabricated longitudinal member, which has a rectilinear or slightly convex longitudinal edge, provided with the guide groove 17 for the diamond belt 7 and an opposite longitudinal edge, with no guide groove for the diamond belt thereon, which may have any type of profile, e.g. rectilinear, as shown. This single type of longitudinal member 16 is mounted both at the upper longitudinal edge and at the lower longitudinal edge of the belt-guiding arm 14, with its grooved edge, either rectilinear or convex, turned outwards, as particularly apparent in fig. 1.

[0020] In figs. 3 and 5, numeral 30 denotes reinforcement blocks, which may be fastened at the lower corners of the belt-guiding arm 14, out of the part thereof which is intended for penetration into the stone block B. These reinforcement blocks 30 have, coaxially to the groove 17 of the lower longitudinal edge of the belt-guiding arm 14, lead-in grooves which have the same profiles as the groove 17, but are wider than it and act as an aid for insertion of the diamond belt 7. Obviously, these reinforcement and lead-in grooved blocks may also not be present.

[0021] Under the frame 5, between the uprights of the portal frame 2, the block B of stone (marble, granite, or the like) is positioned, to be cut up, for instance, by the above described machine, into individual slabs having a predetermined thickness. In the embodiment as shown, in which the portal frame 2 is stationary, the stone block B is placed on a car 28, which can run on rails 29 horizontally and transversely to the belt-guiding arm 14 and to the associated active lower branch of the diamond belt 7.

[0022] In order to cut the stone block B, the diamond belt 7 is slid in the direction of its length by its driving return pulley, whereas the arm carrier 5 is lowered to bring the lower active branch of the diamond belt 7 to contact with the stone block B. The arm carrier 5 is further lowered by a continuous vertical translatory motion thanks to the motor reducers 9, to the pinions 8 and to the racks and at a uniform speed, corresponding to the speed whereat the stone block B is cut by the lower active branch of the diamond belt 7. During this cutting operation, the lower active branch of the diamond belt 7 is accurately and safely guided by providing that the inner profiled part of the body 21 of the diamond belt 7 is engaged in the accordingly profiled groove 17 of the belt-guiding arm 14. Besides this guiding action, the belt-guiding arm 14 keeps the associated underlying lower active branch of the diamond belt 7 in contact with the stone block B and presses it with the necessary force against said block, i.e. against the bottom of the cutting slot made in the block B and that the belt-guiding arm 14 penetrates. Once the cutting operation is over, the arm carrier 5 is lifted together with the belt-guiding arm 14 and with the diamond belt 7, and then the stone block B is moved, by the car 28 on the rails 29, one step further, corresponding to the thickness of one slab, whereupon the following cutting operation is performed as described above.

[0023] In order to prevent the upper inactive return branch of the diamond belt 7, slidable along the upper longitudinal edge of the belt-guiding arm 14, from coming, i.e. slipping off its respective longitudinal guide groove 17 provided on said upper edge of the belt-guiding arm 14, by forces acting towards said slippage, for instance when the belt-guiding arm 14 is extracted upwards from the cutting slot formed between the stone block B and the slab cut therefrom, according to a characteristic of this invention, anti-slippage wheels 23 are provided above the belt-guiding arm 14, which are mounted in such a way as to rotate loosely, by support brackets 25, on a part 24 of the arm carrier 5 and are arranged at intervals along the upper grooved longitudinal edge of the belt-guiding arm 14, i.e. of the corresponding longitudinal member 16, as is particularly apparent from figs. 1, 5 and 6. These anti-slippage wheels 23 are arranged at least partly over the upper inactive return branch of the diamond belt 7 and may be at a small distance from said belt 7 or may be in contact therewith. Anyway, these anti-slippage wheels 23 prevent the upper inactive return branch of the diamond belt 7 from being lifted to such an extent as to disengage from its respective longitudinal guide groove 17 formed in the corresponding upper edge of the belt-guiding arm 14, i.e. in its respective longitudinal member 16.

[0024] Also at the lover active branch of the diamond belt 7, which is engaged with the stone block B and cuts it, on each side of this block B, between it and the corresponding return pulley 6 for the diamond belt 7, at least an anti-slippage wheel 26 is provided, which is mounted by a support bracket 27 on the overlying belt-guiding arm 14, i.e. on its respective longitudinal member 16, and is superposed from below to said lower active branch of the diamond belt 7, thereby preventing it to slip, i.e. to come off the longitudinal guide groove 17 of the lower edge of the belt-guiding arm 14, i.e. of its respective longitudinal member 16, as shown, particularly, in figs. 1, 3 and 4.

[0025] Fig. 7 shows a variant embodiment of the machine as described hereinbefore with reference to figs. 1 to 6. Here, the differences consist first in that, in lieu of the longitudinal groove 17, the arm 14 has a plurality of peripheral wheels, rollers or pulleys 17', arranged at predetermined intervals along the sliding edges of the inactive and active branches of the diamond belt 7 in any order. Each pulley 17' has an annular coaxial throat 117' and is rotatably fitted in an accommodating throat 114 of the peripheral edge of the arm 14. Obviously, as shown in figs. 8 and 9, the overall thickness of the arm 14 with the wheels 17' and the rotational supports is smaller than that of the diamond teeth of the belt. The construction of the arm 14 may be identical to that of the previous embodiment, providing the same advantages as mentioned above. Furthermore, as regards the arched profile of the two opposite outer edges of the arm 114, associated to the inactive and active branches of the belt 7 respectively, this embodiment allows to obtain this profile by simply changing the diameter of the grooved wheels or rollers 17' depending on their position. By increasing the diameter of the pulleys or rollers 17' symmetrically to the transverse median axis of the arm 14, an arched profile of the corresponding branch of the diamond belt 7 can be obtained from a substantially rectangular shape of the arm, or of the longitudinal members 16 composing it.

[0026] Obviously, one of the two outer edges of the arm 14 may be made according to the embodiment of figs. 1 to 6, i.e. provided with the groove on its longitudinal edge, whereas the other may have the grooved rollers, wheels or pulleys 17'. Also, one or both opposite longitudinal edges of the arm 14 may have combinations of segments of grooves 17 and grooved rollers, wheels or pulleys 17'. Again, in the embodiment which provides the at least partial use of the rollers or wheels 17', a fluid feed, e.g. of water or the like may be provided, though only having, in this case, the function of keeping the rotational supports of said rollers 17' or similar clean.

[0027] Fig. 7 also shows a further difference with respect to the embodiment of figs. 1 to 6. Here, the machine is supported on a car 30, which slides or guides, e.g. rails 31, like the block-carrying car of the previous example. On the contrary, the block B to be cut is stationary. The moving direction is transverse to the cutting plane and the latter is moved relative to the block by moving the machine. Moreover, the path run by the machine may develop along a plurality of successive

aligned blocks to be cut. This is particularly advantageous, because it doesn't require cranes for moving blocks from the storing site onto the cutting car. Blocks may be simply unloaded onto the storing site in the predetermined order for cutting, i.e. in any location of the path run by the machine and may be processed whenever need thereof arises.

[0028] Obviously, the invention is not limited to the above described and illustrated embodiment, but may be greatly varied and modified especially as regards construction and within the range of mechanical equivalents. Particularly, the arrangement of the anti-slippage means and the composition of the belt-guiding arm from two longitudinal members consisting of the same type of prefabricated longitudinal member, may be used, either in combination or separately, in any machine as described herein, regardless of the particular construction thereof and of its respective diamond belt. Moreover, even two or more adjacent and parallel belt-guiding arms 14 may be mounted on the arm carrier 5, each associated to a diamond belt 7, so that two or more parallel cuts may be simultaneously made in the stone block B. In order to perform the cutting operation, the arm carrier 5 may be translated parallel to itself not only in a vertical plane, as described in the illustrated embodiment, but in a plane having any orientation in space and/or not only vertically from top to bottom, but, for instance, even horizontally, from one side to the opposite one, while orienting the belt-guiding arm 14 accordingly. All this without departure from the guiding principle disclosed above and claimed below.

Claims

1. A machine for cutting stones, such as marbles, granites and others, and particularly for cutting slabs from a stone block, for dividing a stone block into slabs having a predetermined thickness, for squaring stone blocks, and for other similar tasks, in which machine cutting operations are performed by at least one endless diamond belt (7), or the like, which slidably extends in the cutting plane around a belt-guiding arm (14) substantially parallel to the cutting line and is returned on pulleys (6) disposed at the ends of this arm (14), one of which is a driving pulley, and which diamond belt (7) is guided with its active branch transverse to the cutting plane by grooved guide means (17, 17') provided on the longitudinal edge of the belt-guiding arm (14) turned towards the cutting line and with its inactive return branch in grooved guide means (17, 17') provided on the longitudinal edge of the belt-guiding arm (14) opposite to the cutting line, the belt-guiding arm (14) being translatable parallel to itself and to the cutting line in the cutting plane, and means (8, 9, 10) being provided for moving the belt-guiding arm (14) so that it can be first engaged with the stone block (B) by the active branch of the diamond belt (7) along the desired cutting line and then advanced through the stone block (B) in the cut advancement direction, at a speed corresponding to the cutting speed, while keeping the active branch of the diamond belt (7) pressed in operating contact with the stone, means (28, 29) being typically also provided for relative movement between the stone block (B) and the belt-guiding arm (14) transversely to the cutting plane, intended to bring them in the desired mutual cutting position, characterized in that, along the edge of the belt-guiding arm (14) opposite to the cutting line, so-called anti-slippage means (23), which are arranged at least partially over the inactive return branch of the diamond belt (7) and prevent it from disengaging from the associated grooved guide means (17, 17') provided on the corresponding longitudinal edge of the belt-guiding arm (14).

2. A machine as claimed in claim 1, characterized in that anti-slippage means (26) are also provided for the active branch of the diamond belt (7), at the segments between the stone block (B) and the return pulleys (6) for the diamond belt (7), which are disposed at the two ends of the belt-guiding arm (14).

3. A machine as claimed in claim 1 or 2, characterized in that the anti-slippage means consist of continuous or discontinuous stationary protection means, overlaying laterally and/or above the diamond belt (7), covering it at least partially, preferably without coming to contact with it, and preventing any action thereon by forces which could cause it to come off the groove/s of the guide means (17, 17') provided on the longitudinal edge of the belt guiding arm (14).

4. A machine as claimed in claim 1 or 2, characterized in that the anti-slippage means consist of loose guide wheels (23, 26) which are arranged at least partially over the outer surface of the diamond belt (7) and may be also very close thereto and possibly in contact or nearly in contact therewith.

5. A machine as claimed in one or more of the preceding claims characterized in that the anti-slippage means (23, 26) are mounted at least partly on the belt-guiding arm (14) and/or at least partly on an arm carrier (5), whereon the belt-guiding arm (14) and the return pulleys (6) for the diamond belt (7), disposed at the ends of said arm are also mounted, as well as the means (15) for driving said belt and/or the belt-guiding arm (14), and which arm carrier (5) is guided in a frame (2) in such a way that it can be translated parallel to the cutting plane and transverse to the cutting line.

6. A machine as claimed in the preamble of claim 1, or in one or more of claims 1 to 5, characterized in that the belt-guiding arm (14) is delimited, on the side turned towards the cutting line and on the opposite side, by two corresponding separate substantially parallel longitudinal members (16), substantially parallel to each other and to the cutting line and connected to each other and/or to the bearing structure of the belt-guiding arm (14), as well as provided, at their longitudinal edges, with grooved guide means (17, 17') for the diamond belt (7) or with mounts and/or housings therefor.

7. A machine as claimed in claim 6, characterized in that the two opposite longitudinal members (16) of the belt-guiding arm (14) consist of the same type of longitudinal member prefabricated and used in two upside-don positions, so that the longitudinal side having the grooved guide means (17, 17') or the mounts and/or housings therefor (114) are always turned outwards.

8. A machine as claimed in claim 6 or 7, characterized in that the two opposite longitudinal edges of the belt-guiding arm (14) having the grooved guide means (17, 17'), and hence the corresponding outer edges of the two respective longitudinal members (16) provided with the guide means (17, 17') are substantially rectilinear.

9. A machine as claimed in claim 6 or 7, characterized in that the two opposite longitudinal edges of the belt-guiding arm (14) having the grooved guide means (17, 17'), and hence the corresponding outer edges of the two respective longitudinal members (16) provided with the guide means (17, 17') are curved and slightly outwardly convex..

10. A machine as claimed in one or more of the preceding claims characterized in that the grooved guide means consist of an end groove (17) provided along or in the outer longitudinal edges of the arm (14) or of the longitudinal members (16) associated to the active and inactive branch of the belt (7) respectively, and that fluid feed means are associated to those grooves, for generating a fluid slide bearing.

11. A machine as claimed in one or more of the preceding claims 1 to 9, characterized in that the guide means (17') for one or both active and return branches respectively of the diamond belt (7) around the arm (14) consist of a plurality of rollers, wheels or pulleys, arranged at predetermined intervals and in a predetermined number along the longitudinal edges of the arm (14), associated to said branches of the diamond belt (7).

12. A machine as claimed in one or more of the preceding claims characterized in that a fluid feed is associated to the arm (14) for lubricating and/or cleaning the guide rollers, pulleys or wheels (17') for the diamond belt (7).

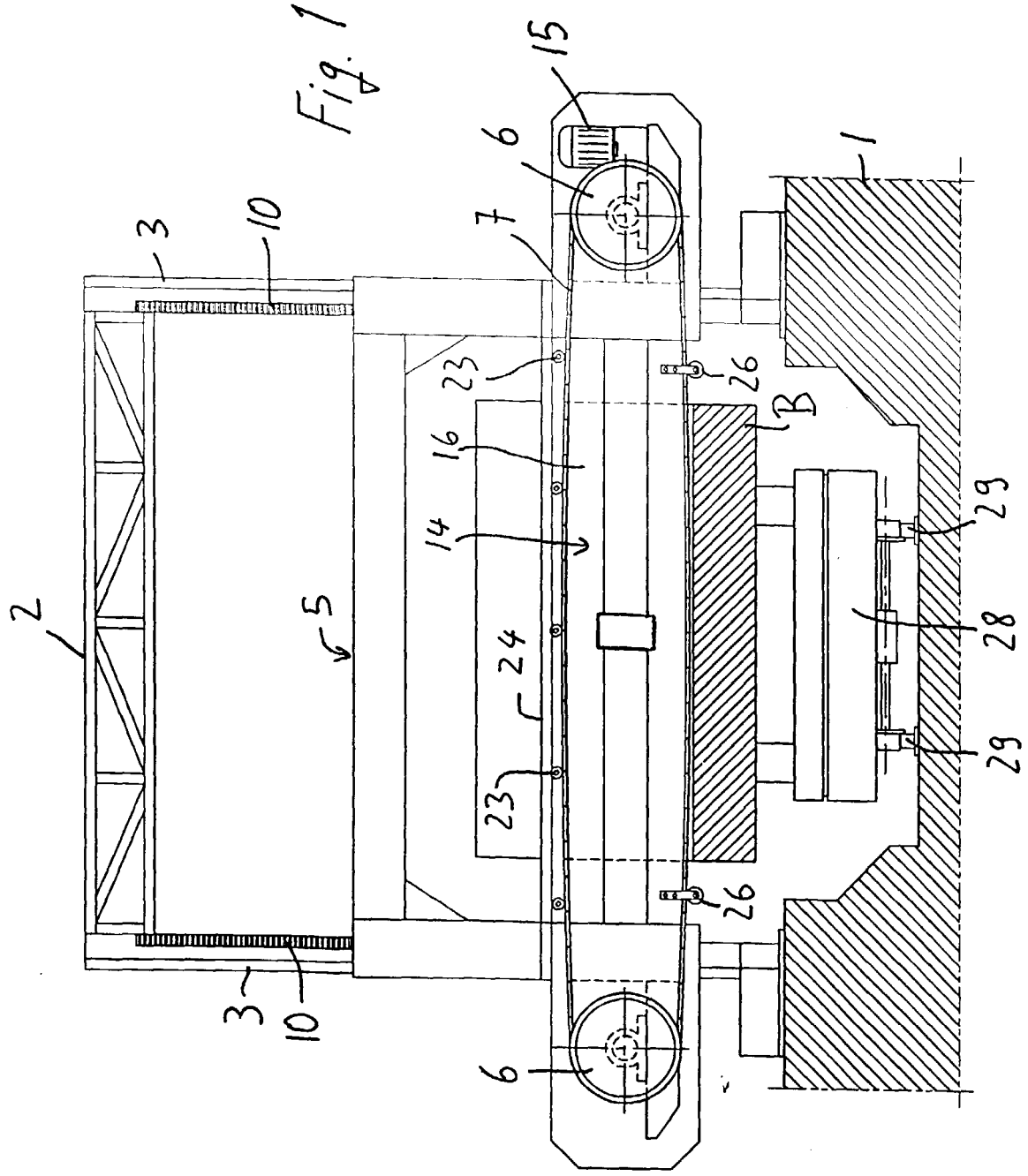
13. A machine as claimed in one or more of the preceding claims characterized in that the arm has opposite outer edges along which the active and return branches of the diamond belt (7) respectively slide, and particularly a substantially rectangular shape, whereas the radii of the guide pulleys, rollers or wheels (17') for the diamond belt (7) are changed depending on the position thereof on the arm, to obtain the desired profile of the corresponding branch of the diamond belt, particularly an arched profile, symmetric to the median transverse axis of the arm.

14. A machine as claimed in one or more of the preceding claims characterized in that it has a combination of guide rollers, wheels or pulleys (17') and end grooves (17) on one or the other outer edge of the arm (14) or within the same outer edge of the arm (14)

15. A machine as claimed in one or more of the preceding claims characterized in that it is mounted on a slidable car along a predetermined path, preferably rails, and in a direction which is at least transverse to the cutting plane, along one or more blocks arranged along said path of the machine.

16. A machine having a diamond belt, driven in the cutting plane around a belt-guiding arm, which is translatable parallel to itself in the cutting plane and transverse to the cutting line, wholly or partly substantially as described, illustrated and for the purposes stated herein.

Fig. 1



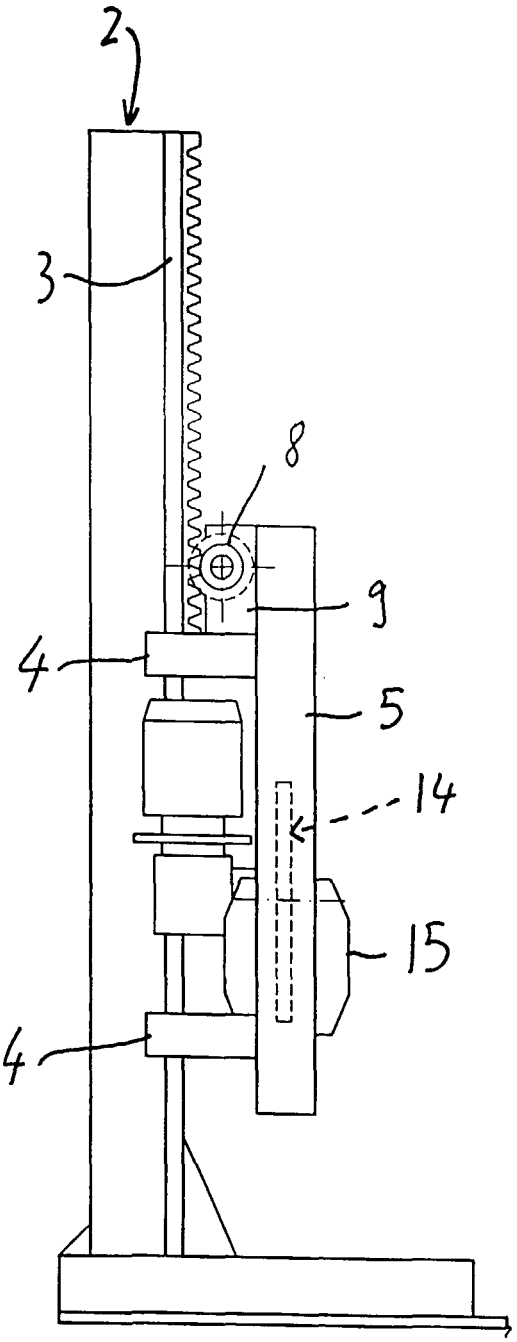
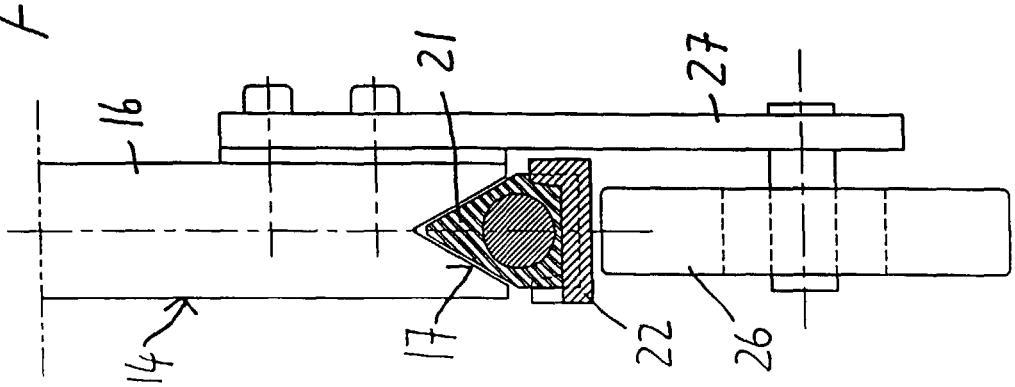


Fig. 2

Fig. 4



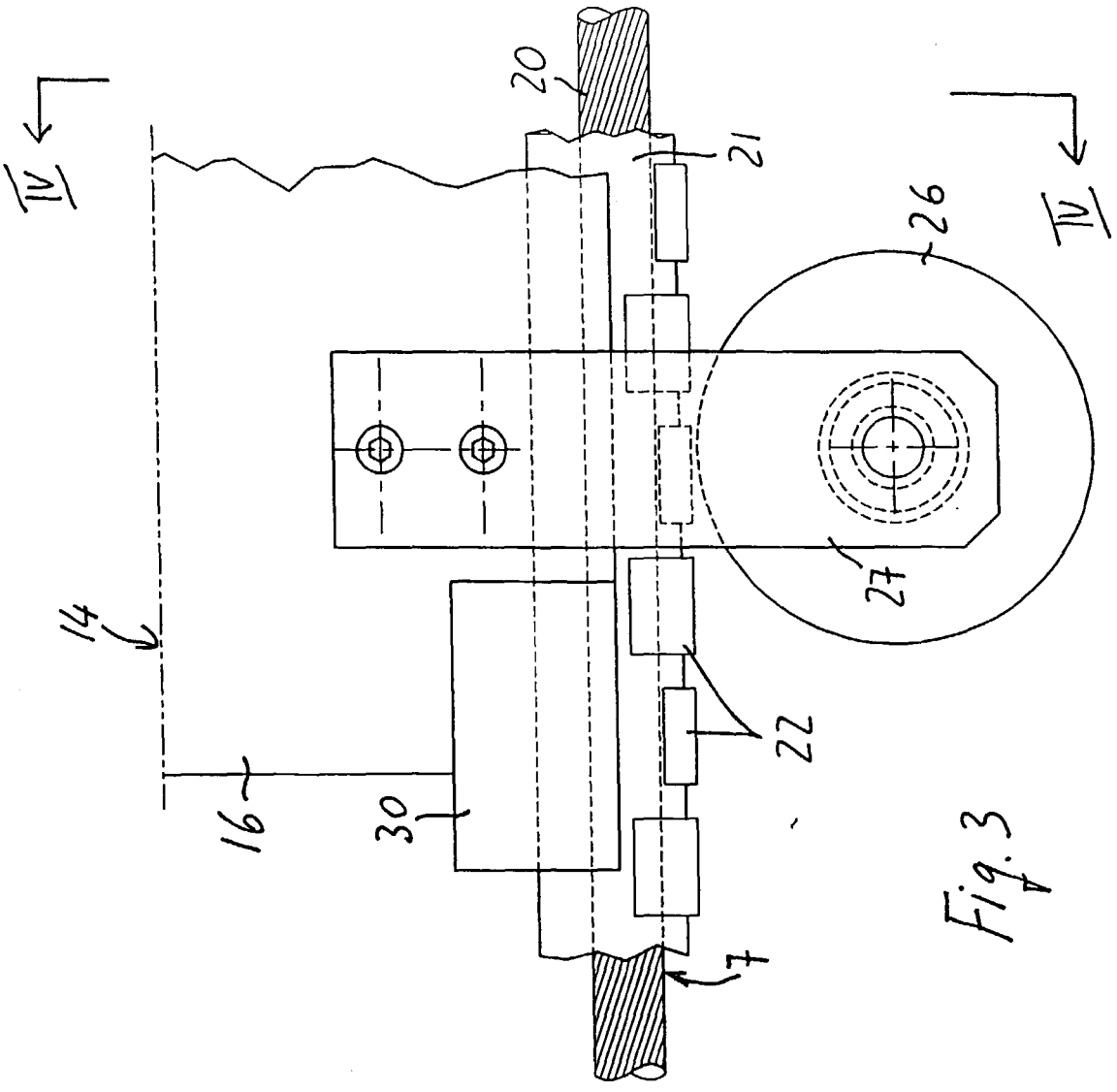


Fig. 3

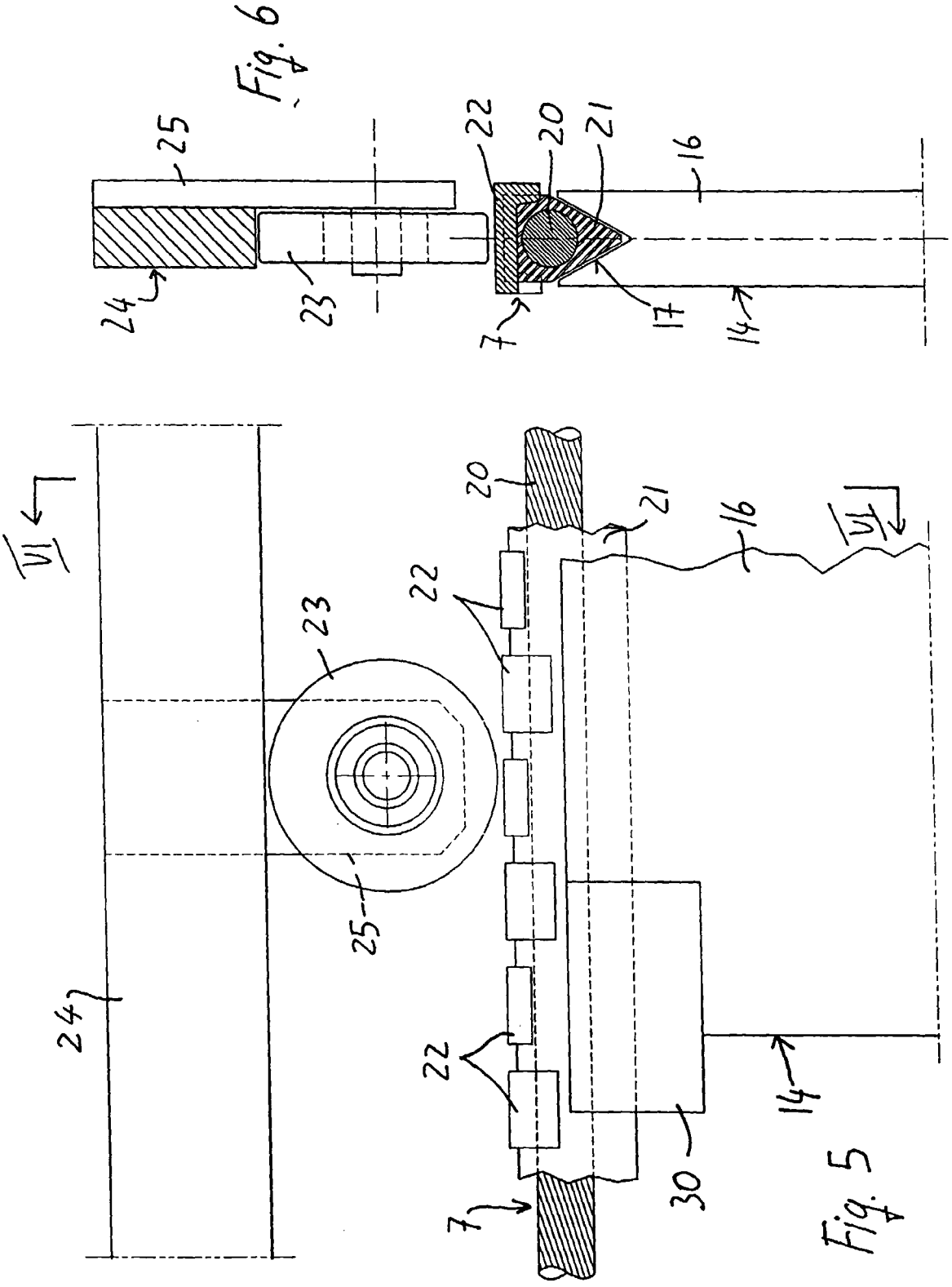
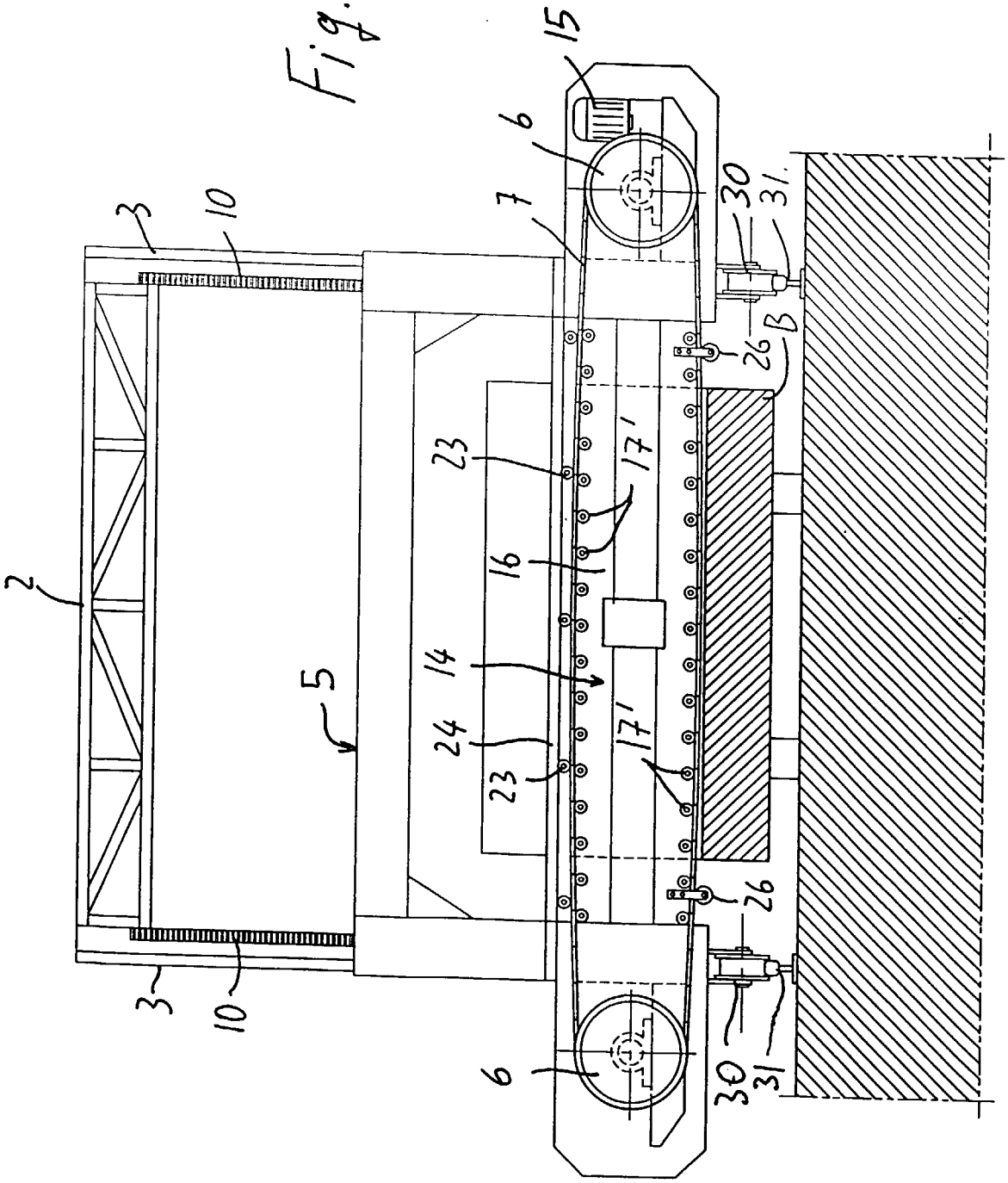


Fig. 5

Fig. 6

Fig. 7



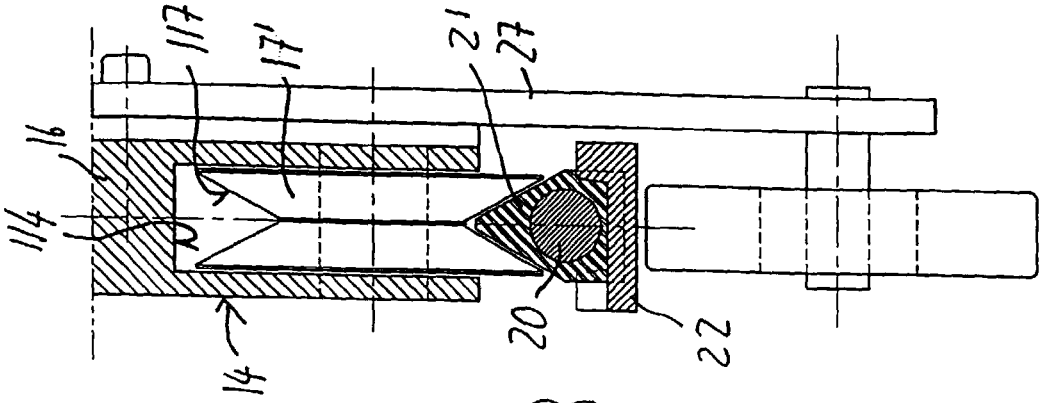


Fig. 9

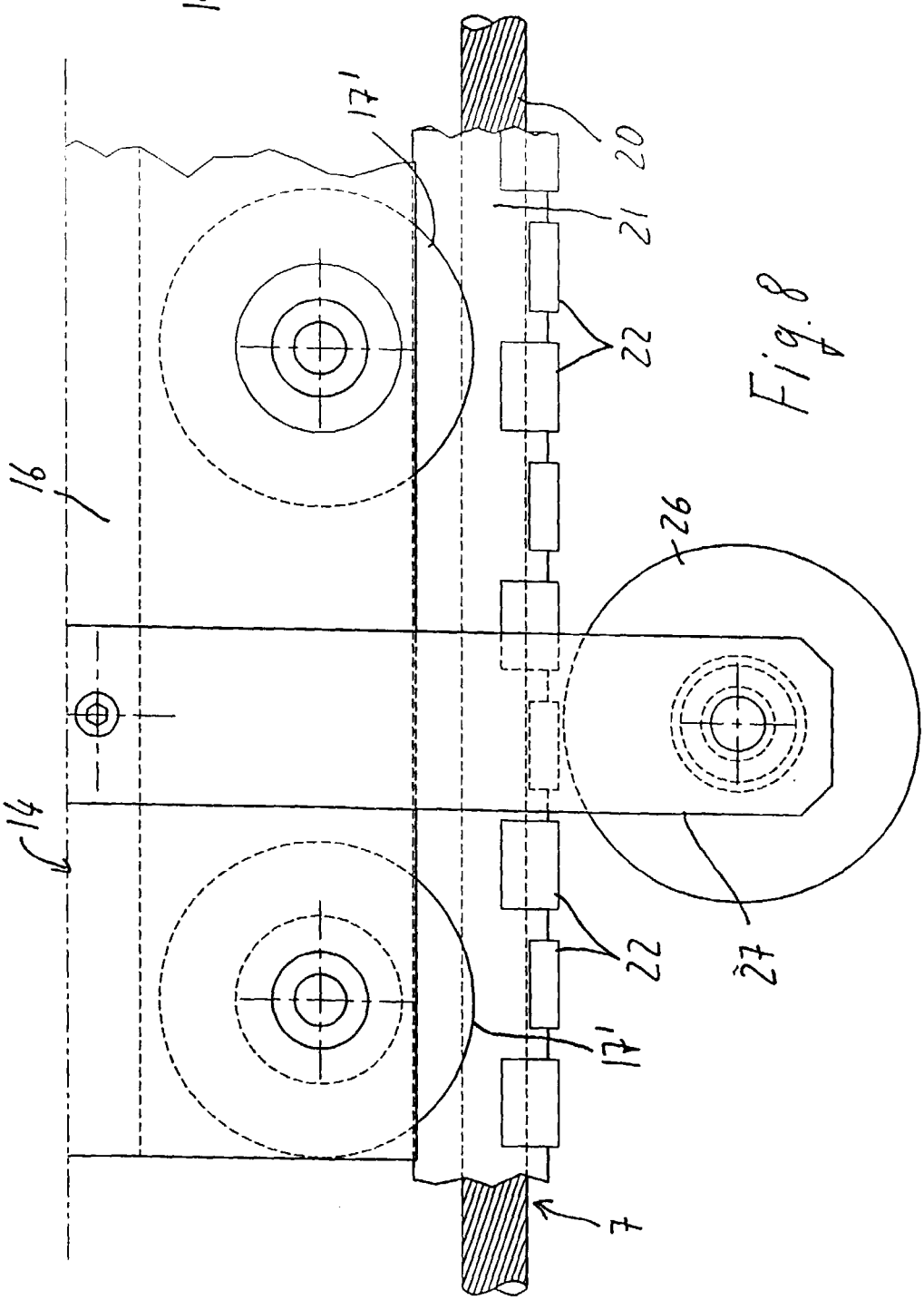


Fig. 8