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(54) **MOVABLE PLATFORM ASSEMBLY FOR A VESSEL AND VESSEL PROVIDED THEREWITH**

(57) A movable platform assembly for a vessel comprises an assembly base part, two spaced and in parallel extending side arms pivotable with respect to the assembly base part at a horizontally extending side arm pivot axis, at least one step pivotably connected to the side arms and a platform pivotably connected to the side arms. The side arm pivot axis is adapted to be translated substantially horizontally with respect to the assembly base part for allowing the side arms to move between a re-

tracted position substantially coinciding with the assembly base part and an extended position at least partly projecting from the assembly base part and/or wherein the platform is adapted to be translated substantially horizontally with respect to the side arms between a retracted position substantially overlapping the side arms and an extended position projecting from the side arms in a direction away from the assembly base part.

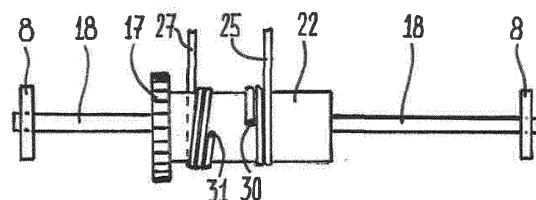


Fig. 3

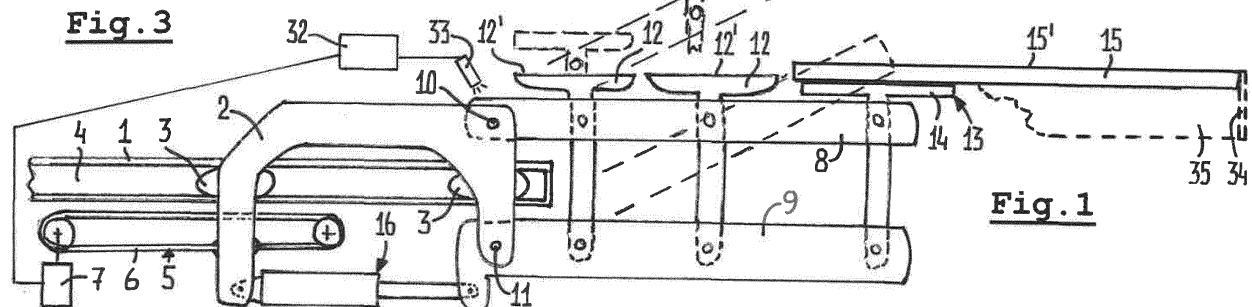


Fig. 1

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Description

[0001] The invention firstly relates to a movable platform assembly for a vessel, comprising an assembly base part intended to be mounted in the vessel, two spaced and in parallel extending side arms of which a first end is pivotable with respect to the assembly base part at a horizontally extending side arm pivot axis, at least one step pivotably connected to the side arms and defining an upper step face, and a platform pivotably connected to an opposite second end of the side arms and defining an upper platform face, wherein the at least one step and platform are pivotably connected to the side arms in such a manner that the upper step face and upper platform face maintain a substantially horizontal position in all pivotal positions of the side arms with respect to the assembly base part.

[0002] A movable platform assembly of such a type, when mounted in a vessel (such as at the stern of a yacht), may be used in a number of ways. For example such a movable platform assembly may be used to haul/launch a tender or other type of small marine vessel (for example a jet ski) on board off/from the vessel. The platform also may be used as a recreational rest area or as a means for allowing an easy access to or departure from the vessel (for example from/to the water when the platform is lowered sufficiently or from/to a quay or jetty when the platform is positioned at the level of the quay or jetty). The platform and at least one step together define an enlarged area when the step and platform substantially extend at the same level (generally when the side arms extend substantially horizontally), and in other positions of the assembly (generally when the side arms are inclined) the at least one step and platform define members similar to a flight of steps.

[0003] It is an object of the present invention to provide an improved movable platform assembly of the above mentioned type.

[0004] In accordance with the present invention the movable platform assembly is characterized in that the side arm pivot axis is adapted to be translated substantially horizontally with respect to the assembly base part for allowing the side arms to move between a retracted position substantially coinciding with the assembly base part and an extended position at least partly projecting from the assembly base part and/or wherein the platform is adapted to be translated substantially horizontally with respect to the side arms between a retracted position substantially overlapping the side arms and an extended position projecting from the side arms in a direction away from the assembly base part.

[0005] Whereas in a state of the art assembly basically only a change of position (or attitude) of the assembly may be obtained by pivoting the side arms, in accordance with the present invention at least one and possibly two additional ways for changing the position (or attitude) of the movable platform assembly are provided. The first one is obtained by a translation of the side arm pivot axis

(and thus of the side arms and of the at least one step and platform) with respect to the assembly base part. The second one is obtained by the translation of the platform with respect to the side arms. Both translations (whether used alone or in combination) allow to increase/decrease the overall dimensions of the assembly (and specifically the amount in which the at least one step and platform project from the assembly base part, and thus from the vessel). As such a movable platform assembly may be obtained which combines a maximum extension or reach (when the side arms and/or platform are in the fully extended positions) with a compact configuration (when the side arms and/or platform are in the fully retracted positions) which allows reduced storage room.

[0006] In an embodiment the movable platform assembly comprises a first drive for causing the translation of the side arm pivot axis and a second drive for causing the translation of the platform, wherein the first and second drives are synchronised in such a manner that the side arm pivot axis and platform are translated simultaneously between the respective retracted and extended positions.

[0007] In said embodiment the translation between the retracted and extended positions (and vice versa) occurs simultaneously for the side arms and platform.

[0008] It is noted that in this context "simultaneously" means that always both translations will occur (without the possibility of having only one translation), but that it is still possible that these translations do not (fully) occur at the same time (for example it would be possible to start/end these translations at different times).

[0009] The platform may comprise a platform base part pivotably connected to the second ends of the side arms (again in such a manner that it maintains a substantially horizontal position in all pivotal positions of the side arms) and a platform main body which is slidable with respect to the platform base part and which is provided with the upper platform face, wherein the second drive comprises a sprocket journaled on the platform base part and engaging a toothed rack that is attached to the platform main body, which sprocket is mounted on a drive shaft which is rotated in correspondence with a translation of the side arm pivot axis.

[0010] Also in this embodiment the rotation of the sprocket not necessarily needs to occur precisely at the same time as the translation of the side arm pivot axis (although this would yield a more complex structure). In preferred embodiments, however, both translations will occur exactly at the same time.

[0011] The synchronisation between the translation of the side arm pivot axis and the rotation of the sprocket (and thus the translation of the platform main body) may be obtained in a number of ways. As a non-limiting example the sprocket may be driven by a motor (for example an electric motor) which receives control signals from a control unit based upon signals of a sensor sensing the translation of the side arm pivot axis.

[0012] Such an embodiment allows to choose different activation schemes: the sprocket may be driven at exactly the same time the side arm pivot axis translates, but as an alternative it may start/end to rotate at different times compared with the start/end of said translation.

[0013] However, also a mechanical synchronisation is conceivable. Thus, in a special embodiment of the movable platform assembly the side arm pivot axis is located on a slide which is adapted to be translated substantially horizontally with respect to the assembly base part and which carries a reversal roller and wherein the second drive further comprises a flexible elongate drive member which has a central part that extends between the reversal roller and the drive shaft, a first end part which extends around the reversal roller and which is attached to a stationary part, and a second end part which in a force transmitting manner engages and extends around the drive shaft and which also is attached to a stationary part.

[0014] When the slide is translated relative to the (stationary) assembly base part, the reversal roller (directly carried by the slide) and drive shaft (indirectly carried by the slide through the side arms) also translate and thus move relative to the elongate drive member. This results in a rotation of the drive shaft and thus in the required rotation of the sprocket which will cause a translation of the platform main body.

[0015] In case of such a mechanical synchronisation the sprocket generally will be driven at exactly the same time the side arm pivot axis translates.

[0016] The stationary parts to which the first and second end parts of the elongate drive member are attached may be parts of the assembly base part (although also stationary parts of the vessel are conceivable).

[0017] In one embodiment the second end part of the elongate drive member defines more than a half revolution around the drive shaft. This results in sufficient friction between said second end part and the drive shaft for transmitting sufficient force for driving the sprocket.

[0018] In an alternative embodiment the elongate drive member at the drive shaft is divided into two separate elongate drive member parts defining their inner ends attached to the drive shaft and each defining a number of revolutions around the drive shaft. Such an embodiment not only makes mounting and dismounting operations of the elongate drive member easier, but also securely avoids any slip between said drive member and the drive shaft.

[0019] Further it is conceivable that at least one of the first and second end parts is attached to the respective stationary part of the assembly in a settable manner. This allows to cope with changing conditions.

[0020] The flexible elongate drive member may be a cable, preferably a steel cable. The second end part of the flexible elongate drive member may engage the drive shaft through a drum mounted on said drive shaft.

[0021] In one embodiment the movable platform assembly according to the present invention further com-

prises a control unit adapted for controlling the translation of the side arm pivot axis with respect to the assembly base part and the translation of the platform with respect to the side arms in such a manner that such translations only are possible when the side arms extend substantially horizontally and substantially aligned with the assembly base part and platform.

[0022] Such a control unit may cooperate with sensor means (for example for sensing the position of the side arms) and may be useful in avoiding damage to the assembly.

[0023] When the platform main body defines a substantially box-like structure having a top face defined by the upper platform face, a forward face depending from said top face and facing away from the assembly base part and two opposite side faces depending from said top face, said platform main body in the retracted position may surround a major part of the remaining structure (such as the side arms).

[0024] The movable platform assembly may be provided with at least one piston-cylinder assembly for causing a pivotal movement of the side arms. Also, the movable platform assembly may be provided with a toothed belt drive for causing the translation of the side arm pivot axis.

[0025] In a second aspect the invention relates to a vessel provided with a movable platform assembly according to the present invention.

[0026] Next the invention will be elucidated while referring to the drawings, in which

Figure 1 in a schematic side elevational view shows an embodiment of the movable platform assembly according to the present invention;

Figure 2 in a schematic side elevational view illustrates part of a movable platform assembly according to the present invention with a drive for the platform, and

Figure 3 shows a part of the drive of figure 2 in a top plan view.

[0027] Firstly referring to figure 1 an embodiment of a movable platform assembly for a vessel is illustrated in a very schematic side elevational view which only intends to show the functional cooperation between constitutive parts of the assembly without intending to give constructional details. It is noted that some of the parts discussed are provided in pairs, as will be readily understood, but only one of such parts is illustrated.

[0028] The assembly comprises an assembly base part 1 intended to be mounted in the vessel. As an alternative the base part 1 also may be a part of the vessel. A slide 2 is provided which is adapted to be translated substantially horizontally with respect to the assembly base part 1. For example said slide 2 comprises slide shoes 3 cooperating with a guide channel 4 in the assembly base part 1. A first drive 5, for example comprising a toothed belt 6 driven by an electric motor 7, causes a (substantially horizontal) translation of the slide 2 with

respect to the assembly base part.

[0029] At each side of the slide 2 two pairs of side arms 8,9 are provided, of which corresponding ones extend in parallel. A first end of said side arms 8,9 is pivotably connected to the slide 2 at corresponding horizontally extending side arm pivot axes 10,11.

[0030] In the illustrated embodiment two steps 12 are pivotably connected to the side arms 8,9 in such a manner that these steps 12 together with the side arms 8,9 and the slide 2 define parallelogram mechanisms. Each step 12 defines an upper step face 12' which for example may support a person.

[0031] A platform 13 is provided comprising a platform base part 14 which is pivotably connected to an opposite second end of the side arms 8,9. This platform 13 further comprises a platform main body 15 which is slidable relative to the platform base part 14, essentially in a direction in parallel to the direction in which the slide 2 is movable relative to the assembly base part 1. One possible embodiment for causing such a sliding of the platform main body 15 using a second drive will be explained later with respect to figures 2 and 3. The platform main body 15 defines an upper platform face 15' which likewise may support a person (or other things, such as a tender, jet ski or alike).

[0032] Due to the parallelogram mechanisms (to which the platform base part 14 belongs too) the steps 12 and platform 13 are pivotably connected to the side arms 8,9 in such a manner that the upper step face 12' and upper platform face 15' maintain a substantially horizontal position in all pivotal positions of the side arms 8,9 with respect to the slide 2 and thus with respect to the assembly base part 1.

[0033] The pivotal motion of the side arms 8,9 in this embodiment is caused by at least one cylinder-piston assembly 16 provided between the slide 2 and the lower side arm 9. Figure 1 as an example shows two of many possible pivotal positions: in full lines a position in which the side arms 8,9 substantially extend horizontally and in broken lines an upwardly pivoted position).

[0034] From the above it appears that, due to the movement of the slide 2 along the guide(s) 4 in the assembly base part 1 (as caused by the first drive 5), the side arm pivot axes 10,11 are adapted to be translated substantially horizontally with respect to the assembly base part 1 for allowing the side arms 8,9 to move between a retracted position (not shown) substantially coinciding with the assembly base part 2 and an extended position (illustrated in figure 1) at least partly projecting from the assembly base part. Further the platform main body 15 (as caused by a second drive to be explained later) is adapted to be translated substantially horizontally with respect to the platform base part 14 (thus with respect to the side arms 8,9) between a retracted position (not shown) substantially overlapping the side arms 8,9 and an extended position (illustrated in figure 1) projecting from the side arms in a direction away from the assembly base part 1 or slide 2.

[0035] In the illustrated embodiment the first drive 5 for causing the translation of the slide 2 with side arm pivot axes 10,11 (and thus the side arms 8,9) relative to the assembly base part 1 and the second drive for causing the translation of the platform main body 15 relative to the platform base part 14 (and thus relative to the side arms 8,9) are synchronised in such a manner that the side arm pivot axes 8,9 and platform main body 15 are translated simultaneously between the respective retracted and extended positions relative to the assembly base part 1 and platform base part 14, respectively. The manner in which this synchronisation is achieved, will be explained while referring to figures 2 and 3.

[0036] Figure 2 shows a schematic side elevational view of parts of an embodiment of the assembly which are responsible for achieving such a synchronisation using a second drive. This figure 2 also only intends to show the functional cooperation between those parts of the assembly without intending to give necessary constructional details.

[0037] As part of the second drive a sprocket 17 is journaled on the platform base part 14 through a drive shaft 18. Preferably the position of said drive shaft 18 in the illustrated side elevational view coincides with the position of a pivot defining the connection between the platform base part 14 and upper side arm 8. The sprocket 17 engages a toothed rack 19 that is attached to the platform main body 15. The drive shaft 18 further carries a drum 22. The drum 22 and sprocket 17 cannot rotate relative to each other.

[0038] For accurately defining the sliding movement of the platform main body 15 relative to the platform base part 14, latter may be provided with slide shoes 20 or alike cooperating with a guide channel 21 of the platform main body 15.

[0039] The slide 2 not only carries the side arm pivot axes 10, 11 but also a reversal roller 23 around which, as a further part of the second drive, a flexible elongate drive member 24 (for example a steel cable) extends. This elongate drive member 24 has a central part 25 that extends substantially between the reversal roller 23 and the drum 22, a first end part 26 which extends around the reversal roller 23 and which is attached to a stationary part 28 (for example part of the assembly base part 1), and a second end part 27 which in a force transmitting manner engages and extends around the drum 22 and which also is attached to a stationary part 29 (for example too part of the assembly base part 1).

[0040] As a result of this configuration, when the slide 2 (and thus the side arm pivot axes 10,11 and side arms 8,9) moves (translates) relative to the assembly base part 1, the elongate drive member 24 causes the drum 22 and sprocket 17 to rotate. This rotation is such that when (as seen in figure 2) the slide 2 moves to the right (for moving the side arms 8,9 towards an extended position) the platform main body 15 in a fully synchronised manner also moves to an extended position (to the right relative to the platform base part 14), and vice versa.

[0041] At least one of the first and second end parts 26,27 may be attached to the respective stationary part 28,29 in a settable manner, as indicated schematically at 36.

[0042] It is possible that the central part 25 and second end part 27 of the elongate drive member 24 are integrally interconnected (thus form a single, continuous part) and preferably define more than a half revolution (for example two and a half revolutions) around the drum 22 on the drive shaft 18 for assuring that sufficient friction is caused between the elongate drive member 24 and drum 22.

[0043] As an alternative, however, and as illustrated in figure 3, the elongate drive member 24 at the drum 22 is physically divided into said central part 25 and second end part 27 (which thus define two separate elongate drive member parts) which define respective inner ends 31,30 attached to the drum 22 of the drive shaft 18 and which each define a number of revolutions around the drive shaft or drum. The number of revolutions must be sufficient to allow the drum 22 to rotate in an amount for achieving all possible positions of the platform main body 15 relative to the platform base part 14.

[0044] It is noted that there may be provided guide means (not illustrated) for the flexible elongate drive member 24 for assuring that the pivotal movement of the side arms 8,9 does not influence the rotational position of the sprocket 17 and thus the translational position of the platform main body 15. In the illustrated embodiment in which the drive shaft 18 coincides with the position of a pivot defining the connection between the platform base part 14 and (upper) side arm 8, such guide means may coincide with the position of the (upper) side arm pivot axis 10. This means that both the central part 25 and the second end part 27 of the elongate drive member 24 may cooperate with (be guided by) such a guide means.

[0045] The movable platform assembly further may comprise a control unit 32 adapted for controlling the translation of the side arm pivot axes 10,11 with respect to the assembly base part 1 (through the first drive 5 for the slide 2) and also the translation of the platform main body 15 with respect to the platform base part 14 (or side arms 8,9) through the second drive (in this embodiment among others the elongate drive member 24, sprocket 17 and toothed rack 19), in such a manner that such translations only are possible when the side arms 8,9 extend substantially horizontally and substantially aligned with the assembly base part 1 and platform main body 15. For example, such a control unit may cooperate with one or more sensors 33.

[0046] Finally, again referring to figure 1, the platform main body 15 may define a substantially box-like structure having a top face defined by the upper platform face 15', a forward face 34 (only schematically illustrated in broken lines) depending from said top face and facing away from the assembly base part 1 and two opposite side faces 35 (only one schematically and partly illustrated in broken lines) depending from said top face. In a

retracted position the forward face 34 and side faces 35 may at least partially surround or cover the side arms 8,9 and steps 12 (giving the assembly an attractive appearance and protecting parts of the assembly, for example against environmental influences).

[0047] The invention is not limited to the embodiments described before which may be varied widely within the scope of the invention as defined by the appending claims.

Claims

1. Movable platform assembly for a vessel, comprising an assembly base part intended to be mounted in the vessel, two spaced and in parallel extending side arms of which a first end is pivotable with respect to the assembly base part at a horizontally extending side arm pivot axis, at least one step pivotably connected to the side arms and defining an upper step face, and a platform pivotably connected to an opposite second end of the side arms and defining an upper platform face, wherein the at least one step and platform are pivotably connected to the side arms in such a manner that the upper step face and upper platform face maintain a substantially horizontal position in all pivotal positions of the side arms with respect to the assembly base part, **characterized in that** the side arm pivot axis is adapted to be translated substantially horizontally with respect to the assembly base part for allowing the side arms to move between a retracted position substantially coinciding with the assembly base part and an extended position at least partly projecting from the assembly base part and/or wherein the platform is adapted to be translated substantially horizontally with respect to the side arms between a retracted position substantially overlapping the side arms and an extended position projecting from the side arms in a direction away from the assembly base part.
2. Movable platform assembly according to claim 1, comprising a first drive for causing the translation of the side arm pivot axis and a second drive for causing the translation of the platform, wherein the first and second drives are synchronised in such a manner that the side arm pivot axis and platform are translated simultaneously between the respective retracted and extended positions.
3. Movable platform assembly according to claim 2, wherein the platform comprises a platform base part pivotably connected to the second ends of the side arms and a platform main body which is slidable with respect to the platform base part and which is provided with the upper platform face, wherein the second drive comprises a sprocket journaled on the plat-

form base part and engaging a toothed rack that is attached to the platform main body, which sprocket is mounted on a drive shaft which is rotated in correspondence with a translation of the side arm pivot axis.

4. Movable platform assembly according to claim 3, wherein the side arm pivot axis is located on a slide which is adapted to be translated substantially horizontally with respect to the assembly base part and which carries a reversal roller and wherein the second drive further comprises a flexible elongate drive member which has a central part that extends between the reversal roller and the drive shaft, a first end part which extends around the reversal roller and which is attached to a stationary part, and a second end part which in a force transmitting manner engages and extends around the drive shaft and which also is attached to a stationary part. 10
5. Movable platform assembly according to claim 4, wherein the stationary parts are parts of the assembly base part. 15
6. Movable platform assembly according to claim 4 or 5, wherein the second end part of the elongate drive member defines more than a half revolution around the drive shaft. 20
7. Movable platform assembly according to claim 4, 5 or 6, wherein the elongate drive member at the drive shaft is divided into two separate elongate drive member parts defining there inner ends attached to the drive shaft and each defining a number of revolutions around the drive shaft. 25
8. Movable platform assembly according to any of the claims 4-7, wherein at least one of the first and second end parts is attached to the respective stationary part of the assembly in a settable manner. 30
9. Movable platform assembly according to any of the claims 4-8, wherein the flexible elongate drive member is a cable, preferably a steel cable. 35
10. Movable platform assembly according to any of the claims 4-9, wherein the second end part of the flexible elongate drive member engages the drive shaft through a drum mounted on said drive shaft. 40
11. Movable platform assembly according to any of the previous claims, further comprising a control unit adapted for controlling the translation of the side arm pivot axis with respect to the assembly base part and the translation of the platform with respect to the side arms in such a manner that such translations only are possible when the side arms extend substantially horizontally and substantially aligned with the as-

sembly base part and platform.

12. Movable platform assembly according to claim 3, wherein the platform main body defines a substantially box-like structure having a top face defined by the upper platform face, a forward face depending from said top face and facing away from the assembly base part and two opposite side faces depending from said top face. 5
13. Movable platform assembly according to any of the previous claims, provided with at least one piston-cylinder assembly for causing a pivotal movement of the side arms. 10
14. Movable platform assembly according to any of the previous claims, provided with a toothed belt drive for causing the translation of the side arm pivot axis. 15
15. Vessel provided with a movable platform assembly according to any of the previous claims. 20

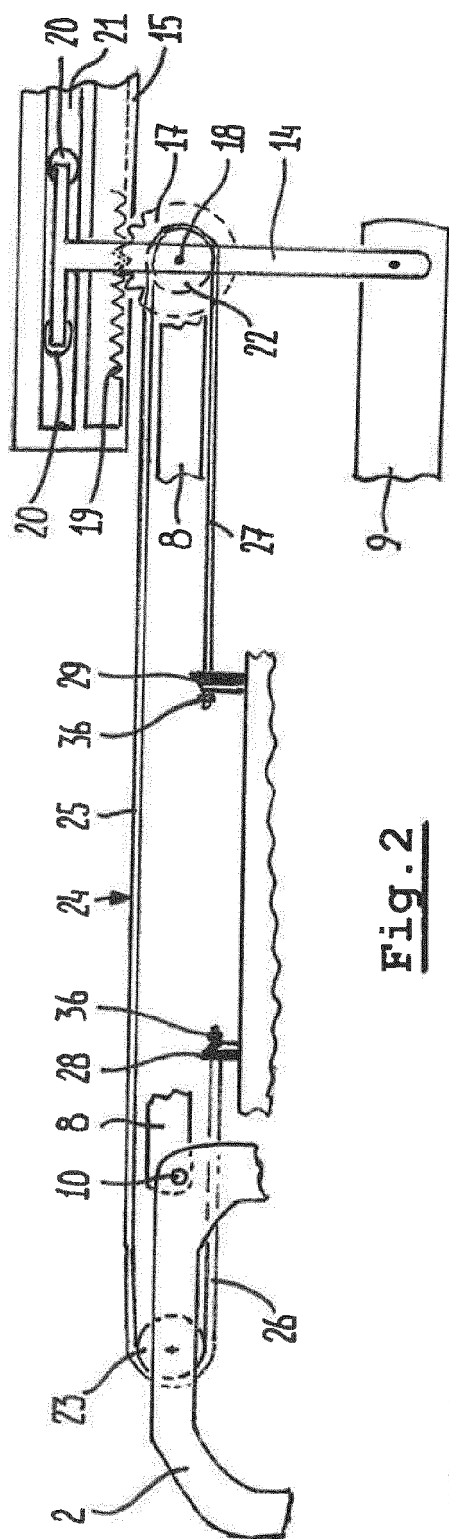


Fig. 2

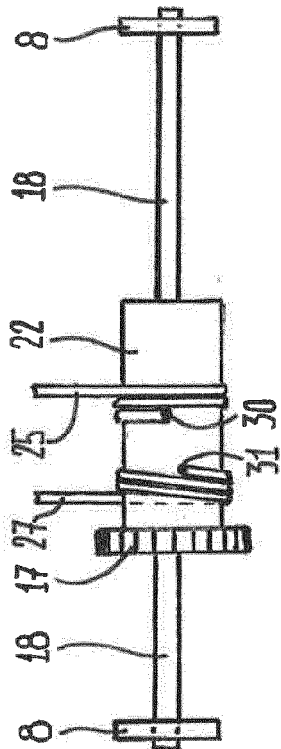


Fig. 3

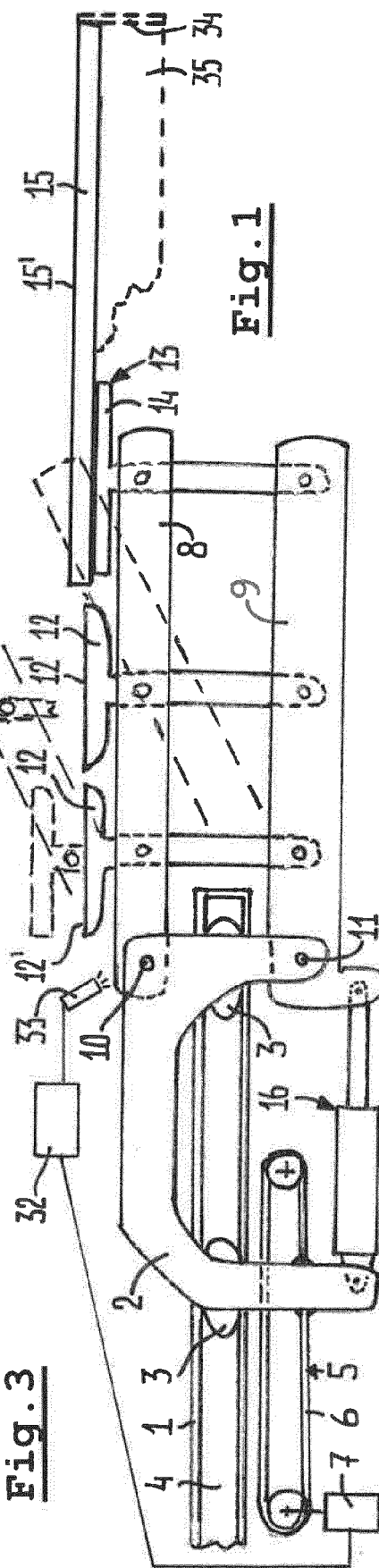


Fig. 1



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**ANNEX TO THE EUROPEAN SEARCH REPORT
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