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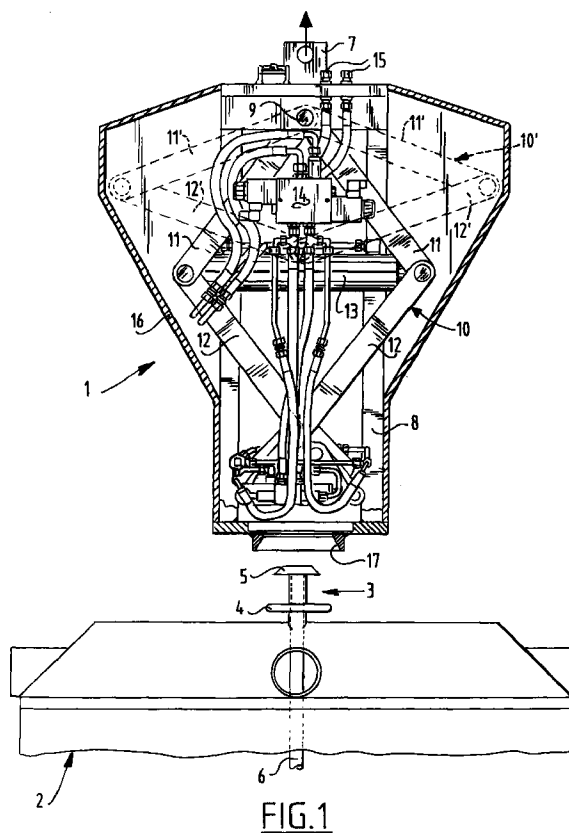
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(54) **Double grab for container**

(57) The invention relates to a double grab (1) for attaching to a crane for engaging and operating a double knob assembly (3) of a container (2) unloadable on the bottom side, comprising:

- a first grab (18) for engaging a first knob (4) of the container,
- a second grab (27) for engaging a second knob (5) of the container,
- a scissor mechanism (10) arranged between the first (18) and second grab (27) for varying the mutual distance between the first and second grab, and
- drive means for operating the grabs (18,27) and the scissor mechanism (10).



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Description

[0001] The invention relates to a double grab for attaching to a crane for engaging and operating a double knob assembly of a container unloadable on the bottom side.

[0002] For displacing and unloading of containers, particularly containers for collecting glass, these latter are provided with a double knob assembly placed on the top of the container. For emptying purposes a container is gripped by a double grab mounted on a crane. Such a crane generally forms part of a truck provided with a relatively large collection space for glass compared to the container. The double grab engages the knob assembly and the bottom of the container is then closed by moving the upper knob away from the lower knob using a spindle mechanism. Once the bottom has been pulled shut, the container is carried above the glass collection space. When the container has been placed in the correct position by the crane, and usually also a rotator head, it is opened by moving the upper knob toward the lower knob. The existing double grabs are provided with a spindle mechanism with which the grabs can be moved relative to each other. When the grabs move toward each other the bottom is opened so that the glass falls out of the container into the collection space. The emptied container is then closed again by moving the knobs apart so that the container can be placed on the ground. Finally, the grabs are moved toward each other again and detached from the container. A drawback of the existing double grabs is that they operate relatively slowly and are susceptible to malfunction.

[0003] The present invention has for its object to provide an improved double grab of the type stated in the preamble while still retaining the existing advantages.

[0004] The invention provides for this purpose a double grab, comprising:

- a first grab for engaging a first knob of the container,
- a second grab for engaging a second knob of the container,
- a scissor mechanism arranged between the first and second grab for changing the mutual distance between the first and second grab, and
- drive means for operating the grabs and the scissor mechanism.

[0005] The grabs are preferably placed such that two substantially plan-parallel knobs placed in line can be engaged simultaneously with the double grab, in that one of the grabs in opened position passes over a first knob before engaging a second knob located therebehind. In the preferred embodiment the double grab comprises a frame to which one of the grabs is connected for pivoting at least at one fixed position and to which the scissor mechanism is also connected for pivoting at least at one fixed position, which scissor mechanism is

coupled on the free end to the other grab. Using this grab a double knob assembly can be engaged in the usual manner but moving apart of the two grabs takes place in a different way. The grabs can be moved relative to each other at relatively high speed by the scissor mechanism. The advantage hereof is that the double grab can close and open a container comparatively quickly. The handling time for emptying a glass container can hereby be shortened by roughly one minute. This is particularly advantageous because emptying of glass containers generally takes place on the public highway, wherein dangerous traffic situations can occur. A reduction in the handling time thus improves road safety. Another advantage of this scissor mechanism is that it can take a solid form such that it is little susceptible to breakdown. Particularly in the aggressive environment in which the double grab functions, for instance in respect of glass fragments, a robust construction is useful. The construction wherein one grab is pivotally connected at a fixed position to a frame and the scissor mechanism is also pivotally connected at a fixed position to the frame is very simple to manufacture and little susceptible to breakdown.

[0006] In the preferred embodiment the frame is provided with a housing which encloses the scissor mechanism in all positions. The scissor mechanism is thus protected from the environment so that the danger of accidents is limited. An additional advantage is that the scissor mechanism will become dirtied less quickly.

[0007] The drive means for grabs and/or scissor mechanisms preferably contain at least one operating cylinder. Precise and rapid operation in inexpensive manner is possible with an operating cylinder.

[0008] In another preferred embodiment the double grab comprises a stop element for co-action with one of the knobs. The double grab can thus be positioned quickly and accurately. Another advantage is that in combination with a grab the stop can provide a precise coupling between double grab and container. The less freedom of movement there is between double grab and container, the more precisely the latter can be controlled and positioned.

[0009] In a particular preferred embodiment, at least one of the grabs comprises at least one pivotable clamping member, the pivot point of which in an active position lies at a distance from the centre line through the engaged knob which is shorter than the distance from the engaging position of the clamping member on the knob to the centre line of the engaged knob. A stable engagement of the knob is obtained using this geometry. If for instance the pressure on an operating cylinder of the grab is cut off, the latter will continue to engage the knob. This geometry therefore provides an enhanced safety of the double clamping member since a container cannot drop involuntarily out of the double grab when the container is raised.

[0010] In yet another preferred embodiment, at least one of the grabs comprises at least one pivotable

clamping member which in active position co-acts in close-fitting manner with a knob. This measure also has the advantage of preventing the grab being involuntary released from the engaged knob. This measure also contributes to improved safety during use of the double grab.

[0011] The present invention will be further elucidated with reference to the non-limitative embodiments shown in the following figures. Herein:

Figure 1 shows a side view of a cut-away grab and a part of the container for engaging,

Figure 2 is a perspective detail view of two grabs in operating position, and

Figure 3 shows a cross-section through a detail view of the two grabs in two different operating positions.

[0012] Figure 1 shows a double grab 1, also referred to as a knob gripper. Double grab 1 is adapted to engage a double knob assembly 3 of a glass container 2. A lower knob 4 is rigidly connected to container 2 and an upper knob 5 is vertically displaceable relative to lower knob 4 for the purpose of opening and closing the bottom (not shown) of container 2 via an actuating rod 6.

[0013] Double grab 1 can be suspended from a crane by means of an eye 7. Double grab 1 comprises a frame 8. Frame 8 is connected on the top side to a shaft 9 on which is mounted a scissor mechanism 10. This latter is formed by a rod mechanism built up of rods 11, 12, the position of which can be altered by a cylinder 13. A position of scissor mechanism 10' is thus shown in which rods 11', 12' are co-displaced upward. An upper grab is shown on the underside of scissor mechanism 11, although it is not clearly discernible in this figure. This is further elucidated with reference to figure 2.

[0014] Figure 1 shows clearly a hydraulic system for controlling double grab 1. Hydraulic system 14 can be coupled by means of connecting nipples 15 to the hydraulic system of a crane on which double grab 1 is suspended.

[0015] Also shown in this figure is a housing 16 which is rigidly connected to frame 8. Housing 16 takes such a wide form at the top that scissor mechanism 10, 10', irrespective of its position, is always enclosed by housing 16. Double grab 1 is opened at the bottom by means of an opening provided with a positioning edge 17, so that double grab 1 can be placed over the double knob assembly 3.

[0016] Figure 2 shows a lower grab 18, the arms 19, 20 of which are connected for pivoting on shafts 21, 22 at a fixed position to a protruding part 23 of frame 8. Arms 19, 20 can be pivoted round shafts 21, 22 by means of one cylinder 24. Arms 19, 20 are provided on their free end with a gripping edge 25. Only one of these is shown in this figure.

[0017] During placing of double grab 1 the arms 19, 20

are pivoted as far outward as possible. Gripping edges 25 can thus pass over knobs 4, 5 without any problem. Double grab 1 is moved downward until a stop ring 26 comes to lie against the lower knob 4. Stop ring 26 is rigidly connected to frame 8 of double grab 1. Arms 19, 20 are then moved toward each other by cylinder 24 such that lower knob 4 is enclosed between stop ring 26 and gripping edges 25. Container 2 is thus engaged. Container 2 can only be picked up once both knobs 4, 5 are clamped.

[0018] Figure 2 also shows an upper grab 27, the arms 28, 29 of which are rotatably coupled to shaft 30 supported by rods 12 of scissor mechanism 10. A cylinder 31 makes it possible to open and close the arms 28, 29 of upper grab 27 such that gripping edges 32 fixed to the ends of arms 28, 29 can engage as required on upper knob 5.

[0019] When the lower knob 4 is engaged with lower grab 18, the upper knob 5 will generally be engaged simultaneously with upper grab 27. Grabs 18, 27 are in practice always opened and closed simultaneously.

[0020] By subsequently displacing scissor mechanism 10 as shown in figure 1, it is possible to vary the mutual distance between lower grab 18 and upper grab 27. After engagement the upper knob 5 is moved upward with upper grab 27. Actuating rod 6 will hereby lock the bottom side of container 2. Container 2 can now be lifted and for instance displaced to above for instance a truck into which it can be emptied. After reaching the correct position, container 2 will be opened by moving the upper knob 5 downward relative to the lower knob 4. Actuating rod 6 hereby opens the bottom of container 2. Once container 2 has been emptied the upper grab 2 will once again move the upper knob 5 upward such that the bottom of container 2 is closed. Double grab 1 can then place container 2 in the desired position on the ground. Before releasing container 2, upper grab 27 will move the upper knob 5 downward relative to lower knob 4 such that upper and lower knob 5, 4 are situated in the shown starting position.

[0021] For safe use it is very important in practice that lower grab 18 and upper grab 27 are always opened and closed simultaneously.

[0022] Figure 3 shows in cross-section the double grab 1 in a situation where upper knob 5 and lower knob 4 are moved further apart than in the position shown in figure 2. It can be seen herein that upper knob 5 is provided on the underside with an edge which co-acts with an open part of gripping edges 32. This form-fitting co-action of upper knob 5 and gripping edges 32 prevents the upper grab 27 involuntarily releasing from upper knob 5. In the position shown here the upper grab 27 does not in fact engage upper knob 5 but upper grab 27 is moved slightly downward. Gripping edges 25 in any case lie against the underside of upper knob 5.

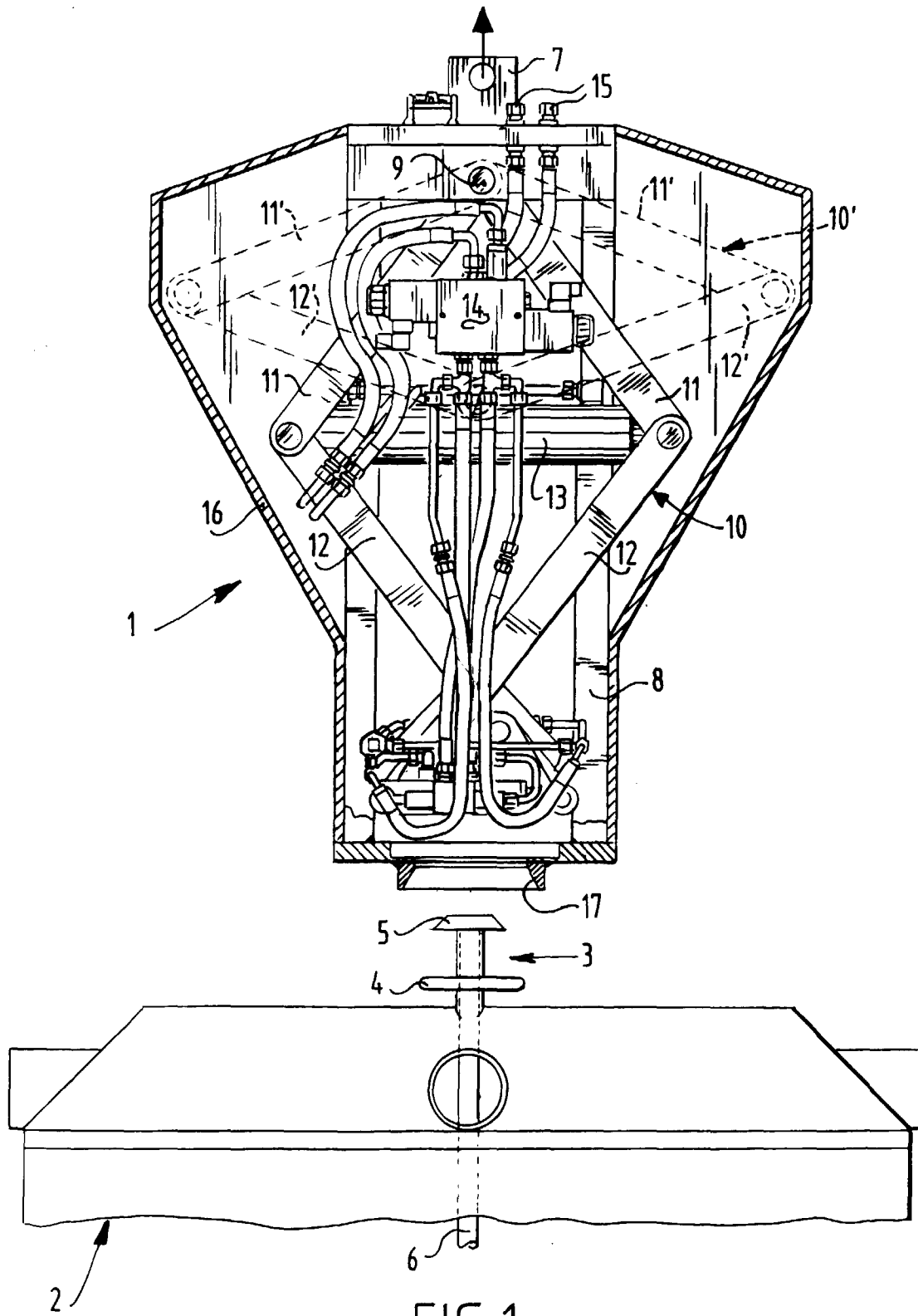
[0023] By way of elucidation of the operation of upper grab 27, this latter is also shown in dashed lines 27'.

[0024] Lower grab 18 engages on lower knob 4.

Herein can be seen that the distance between the rotation shaft 21 of arm 19 and the centre line of actuating rod 6 is (already) smaller than the average distance between the position in which the gripping edge engages on lower knob 4 and the centre line of actuating rod 6. Stable engagement of lower knob 4 is hereby obtained, at least when a tensile force is exerted on lower knob 4. If the pressure of cylinder 24 is cut off, the lower grab will hereby always remain in closed position. By way of elucidation the lower grab 18 is also shown in an opened position 18'.

Claims

1. Double grab for attaching to a crane for engaging and operating a double knob assembly of a container unloadable on the bottom side, comprising:
 - a first grab for engaging a first knob of the container,
 - a second grab for engaging a second knob of the container,
 - a scissor mechanism arranged between the first and second grab for changing the mutual distance between the first and second grab, and
 - drive means for operating the grabs and the scissor mechanism.
2. Double grab as claimed in claim 1, wherein the grabs are placed relative to each other such that two substantially plan-parallel knobs placed in line can be engaged simultaneously with the double grab, in that one of the grabs in opened position passes over a first knob before engaging a second knob located therebehind.
3. Double grab as claimed in either of the foregoing claims, wherein the grab comprises a frame to which one of the grabs is connected for pivoting at least at one fixed position and to which the scissor mechanism is also connected for pivoting at least at one fixed position, which scissor mechanism is coupled on the free end to the other grab.
4. Double grab as claimed in any of the foregoing claims, wherein the frame is provided with a housing which encloses the scissor mechanism in all positions.
5. Double grab as claimed in any of the foregoing claims, wherein the drive means for grabs and/or scissor mechanisms comprise at least one operating cylinder.
6. Double grab as claimed in any of the foregoing claims, wherein the double grab comprises a stop element for co-action with one of the knobs.
7. Double grab as claimed in any of the foregoing claims, wherein at least one of the grabs comprises at least one pivotable clamping member, the pivot point of which in an active position lies at a distance from the centre line through the engaged knob which is shorter than the distance from the engaging position of the clamping member on the knob to the centre line through the engaged knob.
8. Double grab as claimed in any of the foregoing claims, wherein at least one of the grabs comprises at least one pivotable clamping member which in active position co-acts in close-fitting manner with a knob.



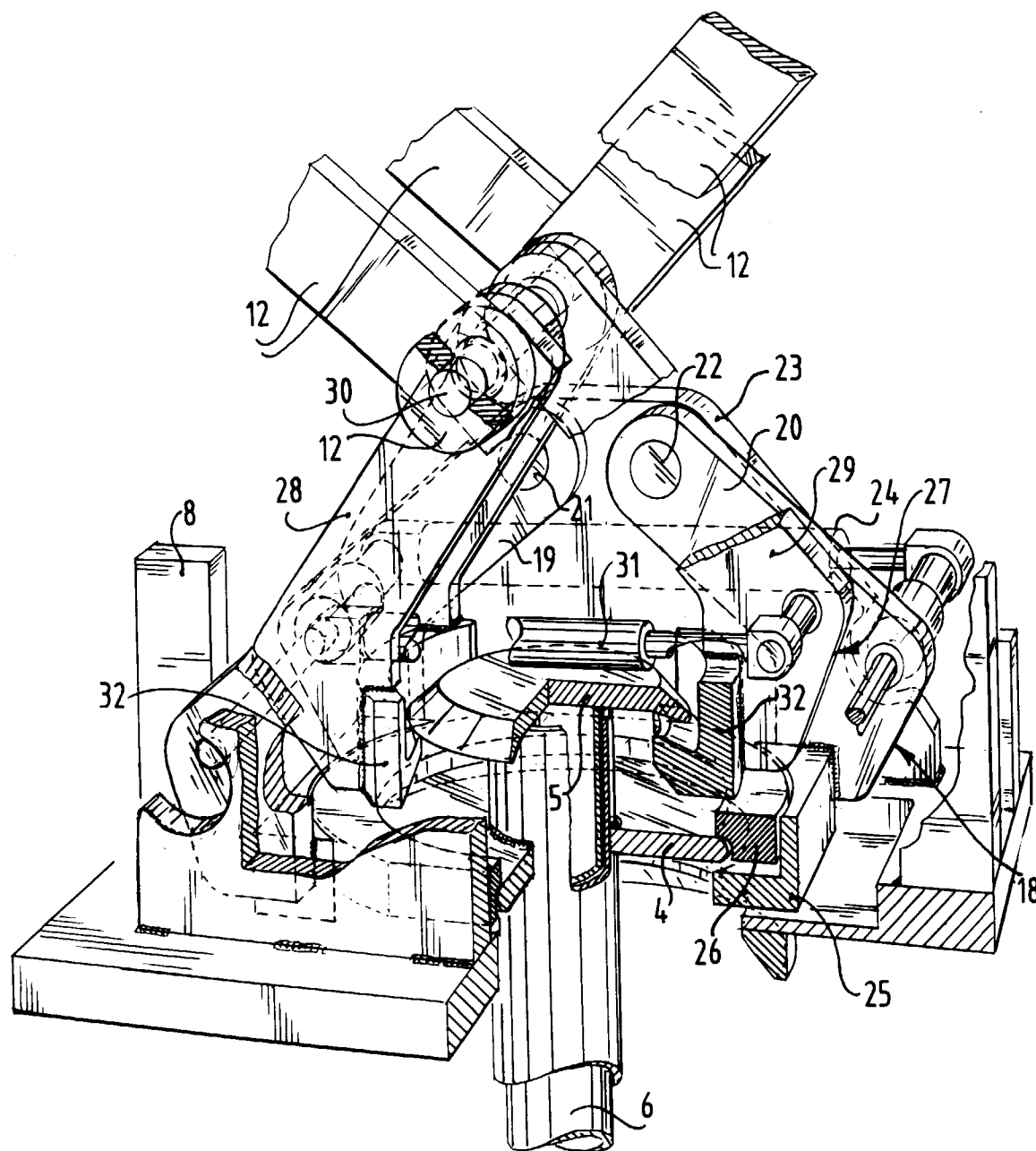


FIG.2

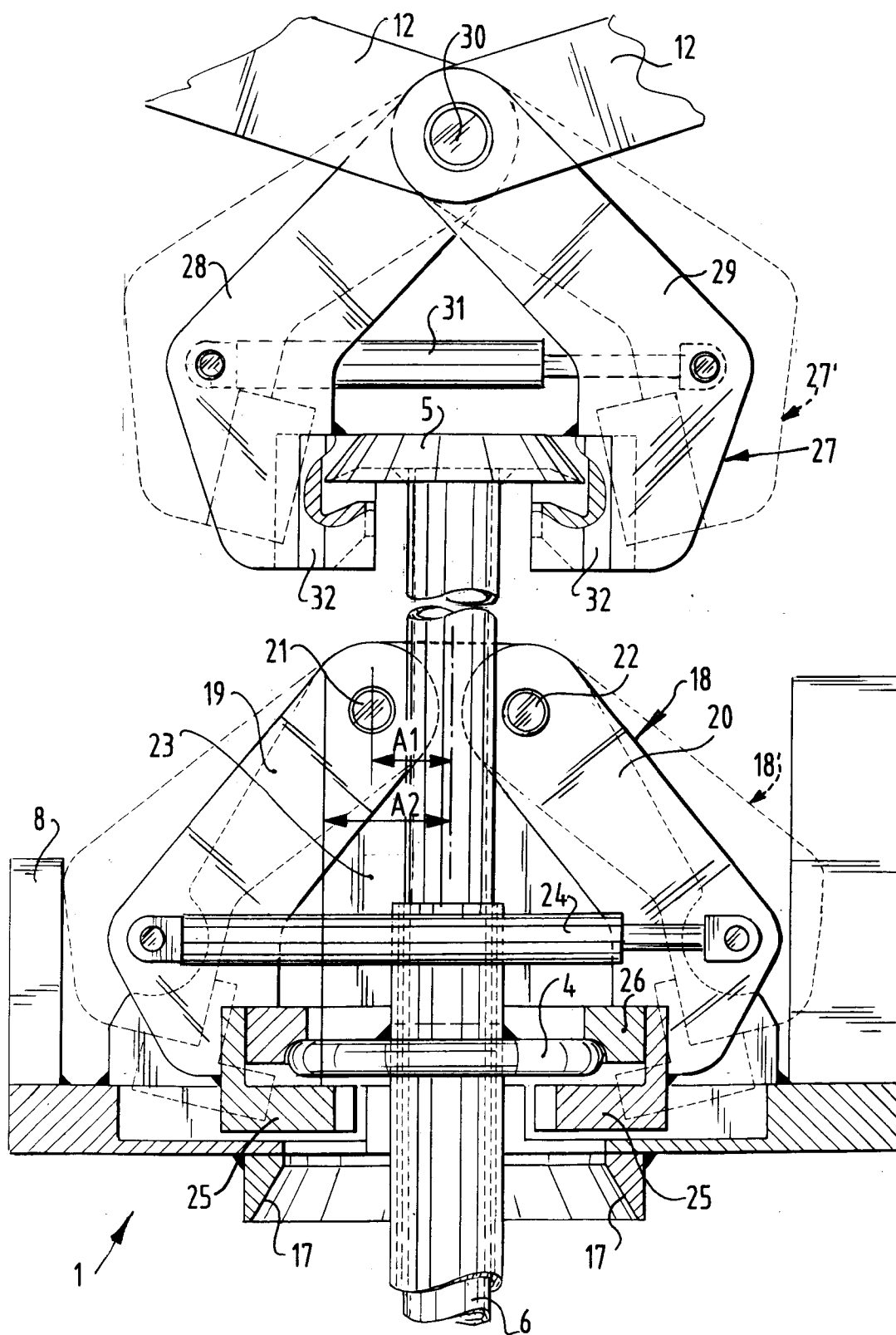


FIG.3