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(54) **DEVICE FOR DISPLACING A FIRST PART RELATIVE TO A SECOND PART.**

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Description

FIELD OF INVENTION AND PRIOR ART

This invention is related to a device according to the preamble of enclosed claim 1. The device in question is preferably a lifting device, in which case the second part forms a base part whereas the first part is designed for abutment against or connection to objects to be lifted. The lifting device is in particular adapted for vehicles.

The piston cylinder mechanisms of such vehicle lifting devices are subject to considerable wear. More specifically, the sealings between the piston and the cylinder must relatively often be replaced to avoid unacceptable leakage of pressurized fluid. In most lifting devices known, it is necessary for dismantling the piston from the piston cylinder mechanism to remove an end wall at one end of the cylinder to allow withdrawal of the piston, which normally comprises a piston head widened relative to the piston rod, said piston head restricting the maximally allowed expansion of the mechanism during normal operation by co-operating with a portion arranged on the cylinder at the exit end of the piston rod and projecting radially inwardly from the cylinder wall. This dismounting of the end wall requires a considerable amount of time before the sealings are available and may be replaced by new ones.

In the kind of devices contemplated in accordance with the present invention the cylinders are fixedly secured to the second part and connected by lines to a power exerting arrangement for delivering fluid under pressure and also fixedly secured to the second part.

However, a device according to the preamble of claim 1 is disclosed in the German patent 31 36 242. In that device the piston cylinder mechanism forms part of a unit also comprising a pump arrangement. This entire unit is loosely inserted between the first and second parts in order to make it possible to use the unit with another device. Such a concept is entirely unsuitable for application on devices having to carry out frequent lifting operations, for instance in a vehicle test plant, since a lot of time and effort is required for moving the unit between different lifting devices. Furthermore, it is relatively risky to have the unit loosely inserted between the first and second parts since an operator may carry out such insertion inadequately. Furthermore, the tensile force transmitting arrangement comprises two telescopic supports, which act between the first and second parts and which may be fixed as to their adjusted length by means of locking pins. The first part is described as being attached, for instance by welding, to the upper elements of the telescopic supports. Thus, in order to carry out service of the piston cylinder mechanism, the entire unit comprising said mechanism and its related pump must be removed from the device and thereafter the mechanism will apparently have to be dismantled since the piston cannot apparently simply be withdrawn from the cylinder.

BRIEF DISCLOSURE OF THE INVENTION

The object of the present invention is to devise ways to reduce the amount of time and work necessary when service has to be carried out of the piston cylinder mechanism in such devices, wherein the cylinder of the mechanism is fixedly secured to the second part.

This object is achieved in accordance with the invention by the features defined in the characterizing portion of claim 1.

With such a design of the device the piston may freely be withdrawn from the cylinder without additional measures for dismantling the piston cylinder mechanism after having released the first part from the piston and moved it sidewardly out of the path for withdrawal of the piston. Furthermore, there is no need to carry out any dismantling of the tensile force transmitting arrangement since it is so arranged that its engagement members may maintain their mutual engagement when the first part is lifted off of the piston and moved sidewardly. The invention of course presupposes a piston cylinder design, in which the piston may be withdrawn from the cylinder without dismantling thereof, for instance by the portion of the piston received in the cylinder having generally uniform cross sections. Thus, there is preferably no other means for restricting movement of the piston out of the cylinder in addition to the tensile force transmitting arrangement.

BRIEF DESCRIPTION OF THE DRAWINGS

With reference to the enclosed drawings a more specific description of an embodiment example of the invention will follow hereinafter.

In the drawings:

Fig 1 is a perspective overall view of the device according to the invention;

fig 2 is a section viewed along the line II-II in fig 1;

fig 3 is a view similar to fig 2 but illustrating the first part disengaged from the piston of the piston cylinder mechanism and moved sidewardly for allowing withdrawal of the piston;

fig 4 is a partly cut view of the device viewed from above, the first part and certain further components of the device having been eliminated for clarity; and

fig 5 is a partly cut view taken along the line V-V in fig 4.

DETAILED DISCLOSURE OF A PREFERRED EMBODIMENT

The device according to the invention comprises in practice two piston cylinder mechanisms 1 arranged to provide displacement of a first part 2 relative to a second part 3. The latter part forms a base part whereas the first part 2 is designed for abutment against objects to be lifted. In the following, the device will be described as a vehicle lifting device. The base part 3 has an elongated shape and comprises at its ends means 4 known per se for supporting base part 3 on suitable supports, e.g. upwardly projecting edge flanges of spaced tracks. The part 3 comprises two mutually spaced beams 5, 6, which in the embodiment are hollow and telescopically receive beams 7 contained in means 4 so that the space therebetween may be adjusted as desired.

The first part 2 comprises an elongated beam 8, which is in releasable force transmitting engagement with the pistons 9 of mechanisms 1. More specifically, the pistons have as appears from fig 3 a flat end portion 10 projecting into a respective recess 11 in beam 8. The means for engagement between pistons 9 and beam 8 are so designed that pistons 9 may apply lifting forces on beam 8 but the latter is prevented from moving perpendicularly to the axial direction of mechanisms 1. Beam 8 receives telescopically components 12 having at their extreme ends members 13 for suitable supporting contact with vehicles. The members 13 are preferably replacable so that such may always be chosen which are best suitable for the vehicle in question. As appears from figs 1 and 2, pistons 9 project through the lower wall portion 14 of the hollow beam 8 and also through the interior of the beam. Components 12 comprise two interconnected and spaced plates receivable in beam 8 so that these two plates will be located on either sides of the portion of the respective piston 9 present within hollow beam 8. Adjacent to the recesses 11 suitable reinforcements may if needed be arranged within hollow beam 8 and the pistons abut with their shoulders 14 against these reinforcements.

The cylinders 15 of the mechanisms are rigidly attached to beams 5, 6 of part 3 by means of plate shaped pieces 16, which may be welded to the cylinders and beams 5, 6. The cylinders 15 are more specifically attached to beams 5, 6 so as to extend vertically therebetween.

Means are provided for restricting extensioning of mechanisms 1. Said means form more specifically arrangements 17 acting tensile force transmitting between part 2 and cylinders 15 when pistons 9 have been pushed out to a maximally allowed extent and by said tensile force transmittance preventing continued pushing of the piston outwardly. The arrangements 17 comprise each in the embodiment a first member 18 connected to part 2 and a member 19 attached to the cylinder. These two members 18, 19 engage limitedly displacable with each other since member 18 defines a space 20 having an elongated extent in the direction of expansion of mechanism 1, said space receiving member 19, which has the character of a projection received in space 20 and attached exteriorly of cylinder 15. Member 18 has preferably the character of a yoke, the legs of which are secured to part 2 and the base of which serves for movement restricting abutment against the projection 19.

Each mechanism 1 is so designed that the portion of piston 9 intended to be received in cylinder 15 has generally uniform cross sections as indicated in fig 3. More specifically, the portion of piston 9 receivable in cylinder 15 is in the embodiment entirely cylindrical, which means that piston 9 in a non-expensive manner may be manufactured starting from rod material with necessary diameter. Cylinder 15 has its interior chamber designed with one and the same diameter from the end of the cylinder, where the piston enters, and to the bottom of the chamber, i.e. the end wall of the cylinder. The only exception is possible ring shaped recesses for housing required sealings 21 adjacent to the open end of the cylinder. Lines or conduits 22 and 23 are connected to cylinders 15 and communicate via holes in their walls with the chambers within the cylinders. When the pistons are considerably pushed into the cylinders, pressurized fluid may flow to and from the space between the bottoms of the cylinders and the adjacent piston end via the small clearing present between the pistons and the cylinder walls.

The tensile force transmitting arrangements 17 are adapted to allow disengagement of part 2 from the pistons and such movement of part 2 that, as appears from fig 3, pistons 9 are set free to be drawn out of the cylinders, such withdrawal freely being possible without additional measures for dismantling mechanisms 1 due to the uniform cross sections of the portions of the pistons received in the cylinders. More specifically, part 2 is loosely laid on to piston ends 10, 14 in normal operation so that when pistons 9 are lowered relative to their uppermost position, part 2 may be lifted off the pistons and displaced sidewardly to the position according to fig 3. Part 2 could of course also be displaced to a removed position, in which part 2 is located to the left of pistons 9 as the device is viewed in fig 3. Although it has been put forth as an example hereinabove that part 2 is laid loosely on the piston ends 10, 14, there is of course no

hindrance to providing, if there is need therefor, a suitable type of fixing members, which have to be released before part 2 may be lifted off pistons 9.

A guide arrangement 24 for avoiding mutual inclination of parts 2 and 3 acts therebetween. This guide arrangement is of a mechanical nature and ensures that parts 2 and 3 are held correctly orientated relative to each other even if mechanisms 1 would get in inbalance, e.g. by minor fluid leakage, jamming or the like. More specifically, the guide arrangement comprises a shaft 25 rotatably supported on part 3 and two spaced arms 26 rigidly secured to said shaft, said arms engaging at a distance from shaft 25 with part 2 such that shaft 25 will be rotated on elevation and lowering of part 2. Thus, if one of mechanisms 1 would tend to expand before the other, compensating forces are transmitted via arms 26 and shaft 25. More specifically arms 26 comprise engagement means 27 engaging with corresponding engagement means on part 2, said engagement means being so designed that they allow arms 26 to carry out their arcuate movement although part 2 moves up and down in one and the same plane. In the embodiment, the engagement means 27 on arms 26 are designed as projections, which are received in slots 28, the width of which along the longitudinal direction of mechanisms 1 exceeds to a small extent the width of projections 27 but the width of which in the transverse direction is considerably greater than the corresponding width of projections 27. Slots 28 are provided in members 29, e.g. plate pieces, attached to part 2. It would also be possible to arrange the slots in the arms 26 and arrange the projections attached to part 2 or its members 29.

The shaft 25 is with its ends rotatably supported in the plates 16 also connecting beam 6 to cylinders 15.

The device comprises a power exerting arrangement generally denoted 30 for supplying fluid under pressure to mechanisms 1. As appears primarily from fig 4, this arrangement comprises a fluid pump 31 with a cylinder 32 and a piston 33 received therein. More specifically, the arrangement 30 comprises a cylindrical housing 34 and two end walls 35, 36. Tie rods 37, in the embodiment four, press end walls 35 and 36 towards each other so that cylinder housing 34 is locked therebetween. Fluid pump has its cylinder 32 sealingly inserted into a recess 38 in end wall 35 and at its other end the cylinder comprises a disc portion 39 sealingly adjoining relative to cylinder housing 34. A radially outer portion of disc 39 may as is illustrated in fig 4 be clamped in a sealing manner between two cylindrical portions forming housing 34. Externally of cylinder 32 and between end wall 35 and disc portion 39 there is a space 40 serving as a pressure fluid reservoir. The pressure fluid is more specifically formed by hydraulic fluid, which is also the fluid delivered to mechanisms 1.

Piston 33 of pump 31 is connected to second piston 41 having a considerably larger diameter and sealingly adjoining to the inside of cylinder housing 34 while defining two chambers 42 and 43 respectively on either sides thereof. Pressure fluid conduits 44 and 45 respectively run to chambers 42 and 43, said conduits being connected to a valve 46, to which also a pressure fluid supply conduit 47 is connected. The pressure fluid for bringing piston 41 in movement is preferably pressurized air. Between chamber 42 and reservoir 40 there is a connection 64, which is diagrammatically indicated in fig 4 and which in practice preferably opens into the reservoir above the fluid level therein.

End wall 35 comprises a channel 49, which communicates with recess 38 and in which there is provided a non-return valve 50 closing against flow in a direction towards recess 38, the degree of opening of said valve preferably being controlled by means of a control member indicated in fig 5. Fluid from space 38 is intended to flow to mechanisms 1 via channel 49 and non-return valve 50. To channel 49 downstream of non-return valve 50 there is connected a further channel 48, 66, 65 serving for return flow of hydraulic fluid from mechanisms 1 to reservoir 40. This channel is more specifically formed by a channel portion 65, a space 66 and a connection 48 between the same and reservoir 40. In space 60 there is provided a valve 53 controllable by means of an operating member 52, said valve thus being openable for hydraulic fluid return by means of operating member 52. Operating member 52 may preferably comprise a threaded portion engaging with an internal thread in space 66. A channel 51 is connected to channel 48, 66, 65 downstream of valve 53 as concerns the direction of flow for return, said channel 51 extending to space 38 and having a non-return valve 54 arranged therein, which opens in the direction towards space 38. Channel 49 opens at its end turned away from space 38 into an opening 55 in end wall 35.

The conduits 22 and 23 extending to mechanisms 1 have their ends directed away from the mechanisms attached, e.g. welded, to an attachment member 56. As appears from fig 4, conduit 23 is supported by means of a carrying member 57, e.g. by the conduit passing through a hole therein. Carrying member 57 has the character of a plate secured to beam 5.

A connecting element 58 arranged for mechanical interconnection of arrangement 30 and beam 5 of part 3 is also arranged to establish, in its connecting state, fluid communication between arrangement 30 and conduits 22, 23 in that connect-

ing element 58 comprises an internal fluid channel 59. More specifically, connecting element 58 has the character of a screw arranged to protrude through a hole 60 through attachment member 56 and to engage with a threaded portion with an internal thread in opening 55 in end wall 35. The internal channel 59 in screw 58 has an axial portion and a transverse portion communicating therewith, the transverse portion opening into a widened part of hole 60 in attachment member 56 between two portions 61 arranged on screw 58 and having larger diameter than the portion, wherein the transverse portion of channel 59 opens. Within attachment member 56 there are openings 62 (see fig 4), via which conduits 22 and 23 communicate with hole 60 opposite to the widened hole portion, in which the transverse portion of channel 59 opens. Screw 58 is provided with a widened head abutting against attachment member 56 on the side thereof turned away from end wall 35.

As appearas from figs 4 and 5, the arrangement 30 is received between beams 5 and 6 and also between mechanisms 1, which results in a very compact embodiment.

The mechanical connection of arrangement 30 relative to beam 5 obtained by screw 58 should preferably be supplemented with any further mechanical connection device. In the embodiment this has been realized in that a lower of the tie rods 37 (fig 4) comprises an extended portion protruding through a hole in carrying member 57. Nuts 63 engage with the thread of tie rod 37 and fix the tie rod and accordingly the entire arrangement 30 relative to carrying member 57.

When there is a need for elevating part 2 relative to part 3, valve 46 is operated so that pressurized air is introduced into chamber 42 and further via channel 64 to reservoir 40. The piston 41 now moves to its right end position in fig 4 and at the same time an overpressure is created above the fluid level in reservoir 40. This overpressure forces fluid to pass via connection 48, space 66, channel 51, valve 54, space 38, channel 49, valve 50, opening 55 and connecting element 58 to mechanisms 1. Pistons 9 and part 2 now move outwardly into contact with the object to be lifted; the lifting force is restricted to the overpressure present in reservoir 40. By moving valve 46 to another position, pressurized air is supplied to chamber 43 via conduit 45 at the same time as chamber 42 is deairated via conduit 44. Pistons 41 and 33 now pump liquid from cylinder 32 to mechanisms 1, the liquid passing via channel 49 and valve 50. The overpressure in mechanisms 1 and accordingly the lifting force now increase in proportion to the difference in area between pistons 41 and 33. By reversing valve 46, the pumping operation may be repeated a desired number of times. When the operating arm on valve 46 is released, it is automatically returned to a neutral position, whereby chambers 42 and 43 are deairated and the inlet 47 on the valve blocked. The load on pistons 9 is now entirely carried on the hydraulic fluid enclosed in cylinders 15 in that valves 50 and 53 are closed.

For lowering of part 2, valve 53 is opened by screwing operating member 52 and accordingly its valve spindle outwardly. Hydraulic fluid may now flow back from the mechanisms 1 to reservoir 40 via connecting element 58, channel 49, channel portion 65, valve 53, space 66 and connection 48, the part 2 returning to its lowest position due to its own weight.

When there is a need for service on mechanisms 1, pistons 9 are lowered at least somewhat from their upper positions so that part 2 may be lifted off the pistons and be moved sidewardly to the position according to fig 3. Thereafter pistons 9 may freely be drawn out of the cylinders without any other dismantling measures and e.g. the sealings 21 may be replaced. Subsequently, the pistons 9 may easily be introduced into the cylinders and part 2 again put in place. It is of course essential that the engagement between projections 27 and slots 28 as well as between yoke 18 and projection 19 is so designed that the movement sidewardly of part 2 to the position according to fig 3 is allowed without having to release said engagement.

On need for demounting of the power exerting arrangement 30, conduits 44, 45 are released therefrom, which is easily carried out by means of quick couplings. Thereafter the one visible to the right in fig 4 of the nuts 63 is released and finally screw 58 is screwed out, whereupon arrangement 30 after some displacement to the left in fig 4 is entirely disengaged. On mounting one proceeds in analogous,reversed manner.

The invention is of course not only restricted to the embodiment illustrated. For instance, it is not necessary to use two piston cylinder mechanisms but only one as well as more than two could be used. The movement restricting arrangement 17 may not necessarily have the character of cooperating yoke and projection but instead other arrangements with such tensile force transmitting function that they restrict extension of mechanisms 1 to a maximum value could be used. It is to be mentioned that the projections 19 or other corresponding components may be arranged directly on part 3 as well as on cylinders 15.

Claims

1. A device comprising at least one piston cylinder mechanism (1) arranged for providing

displacement of a first part (2) relative to a second part (3), said first part (2) being in releasable force transmitting engagement with the piston (9) whereas the second part (3) is in force transmitting coordination with the cylinder (15), an arrangement (17) for restricting extensioning of the mechanism acting tensile force transmitting between the first part (2) and the second part (3) when the mechanism has been expanded to a maximally allowed extent and by this tensile force transmittance preventing continued extensioning, said arrangement (17) comprising at least one first engagement member (18) connected relative to the first part (2) and at least one second engagement member (19) connected relative to the second part (3), said two members engaging limitedly relatively displacable with each other, **characterized** in that the tensile force transmitting arrangement (17) is adapted to allow, while maintaining the engagement between the engagement members (18, 19), release of the first part (2) from the piston (9) and such movement sidewardly of the first part that the piston is set free to be drawn out of the cylinder (15) fixedly secured to the second part (3).

2. A device according to claim 1, **characterized** in that the first engagement member (18) defines a space (20) having a longitudinal extent in the direction of expansion of the mechanism, said space receiving the second engagement member (19) having the character of a projection.

3. A device according to claim 2, **characterized** in that the first engagement member (18) has the character of a yoke having legs attached to the first part (2) and a base serving for movement restricting abutment against the second engagement member (19) designed as a projection.

4. Device according to claim 1, **characterized** in that the piston (9) and the first part (2) engage relative to each other by means of male and female formations (10, 11) allowing lifting of the first part off of the piston.

5. A device according to claim 1, **characterized** in that a guide arrangement (24) acts between the first and second parts (2, 3) for avoiding mutual inclination of the parts, said guide arrangement connecting the first and second parts by means of engagement means (27, 28), and that the guide arrangement (24) is adapted to allow, while maintaining the engagement between the engagement means (27, 28), release of the first part (2) from the piston (9) and such movement sidewardly of the first part that the piston is set free to be withdrawn out of the cylinder (15) fixedly secured to the second part (3).

6. A device according to claim 5, **characterized** in that the guide arrangement (24) comprises a shaft (25) rotatably supported on the second part (3) and at least two mutually spaced arms (26) ridigly secured to said shaft, said arms (26) engaging with the first part at a distance from the shaft (25) by means of said engagement means (27, 28).

7. A device according to claim 1, **characterized** in that the second part (3) forms a base part of a lifting device, in particular for vehicles, whereas the first part (2) is designed for abutment to objects, in particular vehicles, to be lifted.

8. A device according to claim 1, **characterized** in that at least two mutually spaced piston cylinder mechanisms (1) working in parallel act between first and second parts (2, 3).

9. A device according to claim 1, **characterized** in that a power exerting arrangement (30) for delivering fluid under pressure to the mechanism (1) is connected to the second part (3), a line (22, 23) connected to the mechanism being arranged on the second part (3), and that a connecting element (58) for mechanical interconnection of the power exerting arrangement (30) and the second part (3) also is adapted to, in its state of connection, establish fluid communication between the power exerting arrangement and the line (22, 23) by presenting an internal fluid channel (59).

10. A device according to claim 1, **characterized** in that the second part (3) comprises two mutually spaced beams (5, 6), that the piston cylinder mechanisms are at least two in number and arranged protruding in between the beams, and that a power exerting arrangement (30) för delivering fluid under pressure to the mechanisms is arranged between the beams and also received between the mechanisms.

11. A device according to claim 8, **characterized** in that the power exerting arrangement (30) has a longitudinal extent and is provided with an end wall (35) comprising fluid channels and possible also fluid control means and that the connecting element (58) is arranged to pene-

trate through an attachment member (56) secured to the second part (3) and engage with the end wall while mechanically interconnecting the power exerting arrangement and the attachment member.

Patentansprüche

1. Vorrichtung mit wenigstens einer Kolben-Zylinder-Einheit (1) für die Bewegung eines ersten Teils (2) relativ zu einem zweiten Teil (3), wobei das erste Teil (2) in lösbarer Kraftübertragungsverbindung mit dem Kolben (9) und das zweite Teil (3) in Kraftübertragungsverbindung mit dem Zylinder (15) ist, mit einer Einrichtung (17) zur Begrenzung der Ausfahrbewegung der Kolben-Zylinder-Einheit durch Zugkraftübertragung zwischen dem ersten Teil (2) und dem zweiten Teil (3), wenn die Kolben-Zylinder-Einheit bis zu einem maximal zulässigen Wert ausgefahren ist, wodurch die Zugkraftübertragung ein weiteres Ausfahren verhindert, wobei die Einrichtung (17) wenigstens ein erstes, mit dem ersten Teil (2) verbundenes Eingriffselement (18) und wenigstens ein zweites, mit dem zweiten Teil (3) verbundenes Eingriffselement (19) aufweist, welche beide miteinander so in Eingriff sind, daß begrenzte Relativbewegungen möglich sind, dadurch gekennzeichnet, daß die Einrichtung (17) für die Zugkraftübertragung während der Beibehaltung eines Eingriffs zwischen den beiden Eingriffselementen (18, 19) ein Lösen des ersten Teils (2) vom Kolben (9) und eine seitliche Bewegung des ersten Teils zuläßt, so daß der Kolben frei wird und aus dem Zylinder (15) herausgezogen werden kann, welcher fest mit dem zweiten Teil (3) verbunden ist.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das erste Eingriffselement (18) einen Raum (20) begrenzt, der eine Längserstreckung in Richtung der Ausfahrbewegung der Kolben-Zylinder-Einheit hat und das zweite Eingriffselement (19) aufnimmt, das als Vorsprung ausgebildet ist.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß das erste Eingriffselement (18) als Bügel mit am ersten Teil (2) angebrachten Armen und einer Basis ausgebildet ist, die zur Begrenzung der Ausfahrbewegung gegen das zweite, als Vorsprung ausgebildete Eingriffselement (19) zum Anschlag kommt.

4. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Kolben (9) und das erste Teil (2) über eine Nut-Feder-Verbindung (10, 11) miteinander gekoppelt sind, die ein Abheben des ersten Teils (2) vom Kolben (9) zuläßt.

5. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß zwischen dem ersten Teil (2) und dem zweiten Teil (3) eine Führungseinrichtung (24) zur Vermeidung einer Kippbewegung zwischen den Teilen vorgesehen ist, die das erste Teil und das zweite Teil durch Eingriffsmittel (27, 28) miteinander verbindet und die unter Beibehaltung des Eingriffs zwischen den Eingriffsmitteln (27, 28) eine Trennung des ersten Teils (2) von dem Kolben (9) sowie eine seitliche Bewegung des ersten Teils zuläßt derart, daß der Kolben frei wird und aus dem mit dem zweiten Teil (3) fest verbundenen Zylinder (19) herausnehmbar ist.

6. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß die Führungseinrichtung (24) eine drehbar am zweiten Teil (3) gelagerte Achse (25) und wenigstens zwei fest mit dieser Achse verbundene, voneinander beabstandete Arme (26) hat, welche in einem Abstand von der Achse (25) über die Eingriffsmittel (27, 28) mit dem ersten Teil verbunden sind.

7. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der zweite Teil (3) die Basis einer Hubeinrichtung bildet, insbesondere für Fahrzeuge, während der erste Teil (3) als Abstützung der anzuhebenden Gegenstände, insbesondere Fahrzeuge, dient.

8. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß wenigstens zwei voneinander beabstandete Kolben-Zylinder-Einheiten (1) vorgesehen sind, die parallel zueinander zwischen dem ersten Teil (2) und dem zweiten Teil (3) arbeiten.

9. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß mit dem zweiten Teil (3) eine Krafterzeugungs-Arbeitseinheit (30) für die Druckmittelzuführung zu der Kolben-Zylinder-Einheit (1) verbunden ist und eine mit der Einheit verbundene Leitung (22, 23) an dem zweiten Teil (3) vorgesehen ist, und daß zur mechanischen Verbindung der Arbeitseinheit (30) mit dem zweiten Teil (3) ein Anschlußelement (58) vorgesehen ist, das im angeschlossenen Zustand über einen inneren Kanal (59) eine Druckmittelverbindung zwischen der Arbeitseinheit (30) und der Leitung (22, 23) herstellt.

10. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der zweite Teil (2) zwei voneinander

ander beabstandete Balken (5, 6) aufweist, daß wenigstens zwei Kolben-Zylinder-Einheiten vorgesehen sind und zwischen die Balken (5, 6) eingreifen, und daß zwischen den Balken eine Krafterzeugungs-Arbeitseinheit (30) für die Druckmittelzufuhr zu den Einheiten angeordnet ist, die zwischen den Einheiten angeordnet ist.

11. Vorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß die Krafterzeugungs-Arbeitseinheit (30) sich in Längsrichtung erstreckt und an einem Ende eine Stirnwand (35) mit Druckmittelkanälen und ggf. Druckmittelsteuerorganen hat, und daß das Anschlußelement (58) durch ein am zweiten Teil (3) befestigtes Anschlußstück (56) hindurchgreift und mit der Stirnwand (35) verbunden ist und dadurch eine mechanische Verbindung zwischen der Krafterzeugungs-Arbeitseinheit (30) und dem Anschlußstück (56) herstellt.

Revendications

1. Dispositif comprenant au moins un premier mécanisme à cylindre et piston (1) agencé pour assurer le déplacement d'une première partie (2) par rapport à une seconde partie (3), ladite première partie (2) étant en engagement de transmission de force dégageable avec le piston (9) alors que la seconde partie (3) est en coordination de transmission de force avec le cylindre (15), un agencement (17) pour restreindre l'extension du mécanisme agissant en tant que force de traction transmise entre la première partie (2) et la seconde partie (3) quand le mécanisme a été soumis à une extension sur une étendue maximale permise et empêchant par cette transmission de force de traction la poursuite de l'extension, ledit agencement (17) comprenant au moins un premier organe d'engagement (18) relié à la première partie (2) et au moins un second organe d'engagement (19) relié à la seconde partie (3), les deux organes étant en engagement l'un avec l'autre et déplaçables l'un par rapport à l'autre de façon limitée, caractérisé en ce que l'agencement de transmission de force de traction (17) est adapté à permettre, tout en maintenant l'engagement entre les organes d'engagement (18, 19), le dégagement de la première partie (2) hors du piston (19) et un mouvement latéral de celle-ci par rapport à la première partie de manière que le piston soit libéré et puisse être tiré hors du cylindre (15) fermement fixé à la seconde partie (3).

2. Dispositif selon la revendication 1, caractérisé en ce que le premier organe d'engagement (18) définit un espace (20) présentant une extension longitudinale dans la direction d'expansion du mécanisme, ledit espace recevant le second organe d'engagement (19) qui présente la forme d'une saillie.

3. Dispositif selon la revendication 2, caractérisé en ce que le premier organe d'engagement (18) a la forme d'un étrier comprenant des branches fixées à la première partie (2) et une base servant de butée de limitation de mouvement contre le second organe d'engagement (19) se présentant sous la forme d'une saillie.

4. Dispositif selon la revendication 1, caractérisé en ce que le piston (9) et la première partie (2) sont en engagement l'un avec l'autre au moyen de formations mâle et femelle (10, 11) permettant le soulèvement de la première partie hors du piston.

5. Dispositif selon la revendication 1, caractérisé en ce qu'un agencement de guidage (24) agit entre les première et seconde parties (2, 3) pour éviter une inclinaison mutuelle des parties, ledit agencement de guidage reliant les première et seconde parties au moyen de moyens d'engagement (27, 28), et en ce que l'agencement de guidage (24) est adapté à permettre, tout en maintenant l'engagement entre les moyens d'engagement (27, 28), le dégagement de la première partie (2) hors du piston (9) et un mouvement vers le côté de la première partie qui libère le piston et le dégage du cylindre (15) qui est fixé fermement sur la seconde partie (3).

6. Dispositif selon la revendication 5, caractérisé en ce que l'agencement de guidage (24) comprend un arbre (25) supporté de façon rotative sur la seconde partie (3) et au moins deux bras mutuellement espacés (26) et fermement reliés audit arbre, lesdits bras (26) étant en engagement avec la première partie à une distance de l'arbre (25) au moyen desdits moyens d'engagement (27, 28).

7. Dispositif selon la revendication 1, caractérisé en ce que la seconde partie (3) forme une partie de base d'un dispositif de levage, en particulier pour véhicules, alors que la première partie (2) est conçue pour venir en butée contre des objets, en particulier des véhicules, à soulever

8. Dispositif selon la revendication 1, caractérisé en ce qu'au moins deux mécanismes à cylindre et piston mutuellement espacés (1) et tra-

vaillant en parallèle agissent entre les première et seconde parties (2,3).

9. Dispositif selon la revendication 1, caractérisé en ce qu'un agencement d'application de puissance (30) pour envoyer un fluide sous pression au mécanisme (1) est relié à la seconde partie (3), une conduite (22, 23) reliée au mécanisme étant montée sur la seconde partie (3), et en ce qu'un élément de connexion (58) permettant l'interconnexion mécanique de l'agencement d'application de puissance (30) avec la seconde partie (3) est également adapté, dans cet état de connexion, à établir une communication pour le fluide entre l'agencement d'application de puissance et la conduite (22, 23) en présentant une canalisation à fluide interne (59).

10. Dispositif selon la revendication 1, caractérisé en ce que la seconde partie (3) comprend deux poutres (5, 6) mutuellement espacées, en ce que les mécanismes à cylindre et piston sont au moins au nombre de deux et disposés de façon à faire saillie entre les poutres, et en ce qu'un agencement d'application de puissance (30) pour envoyer un fluide sous pression aux mécanismes est disposé entre les poutres et est reçu également entre les mécanismes.

11. Dispositif selon la revendication 8, caractérisé en ce que l'agencement d'application de puissance (30) a une extension longitudinale et est muni d'une paroi d'extrémité (35) comprenant des canalisations à fluide et éventuellement également des moyens de commande de fluide, et en ce que l'élément de connexion (58) est agencé pour passer à travers un organe de fixation (56) fixé à la seconde partie (3) et venir en engagement avec la paroi d'extrémité toit en interconnectant mécaniquement l'agencement d'application de puissance et l'organe de fixation.

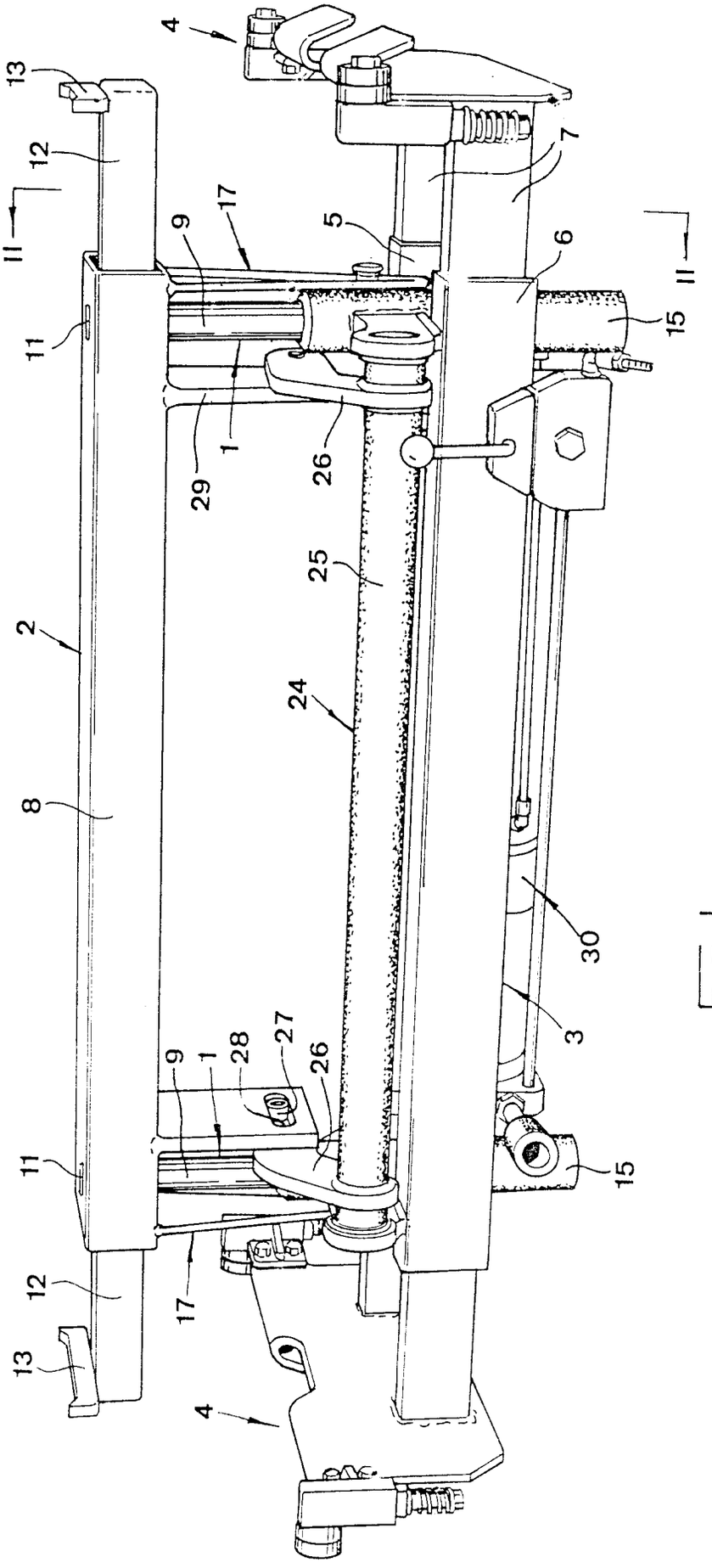
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Fig 1

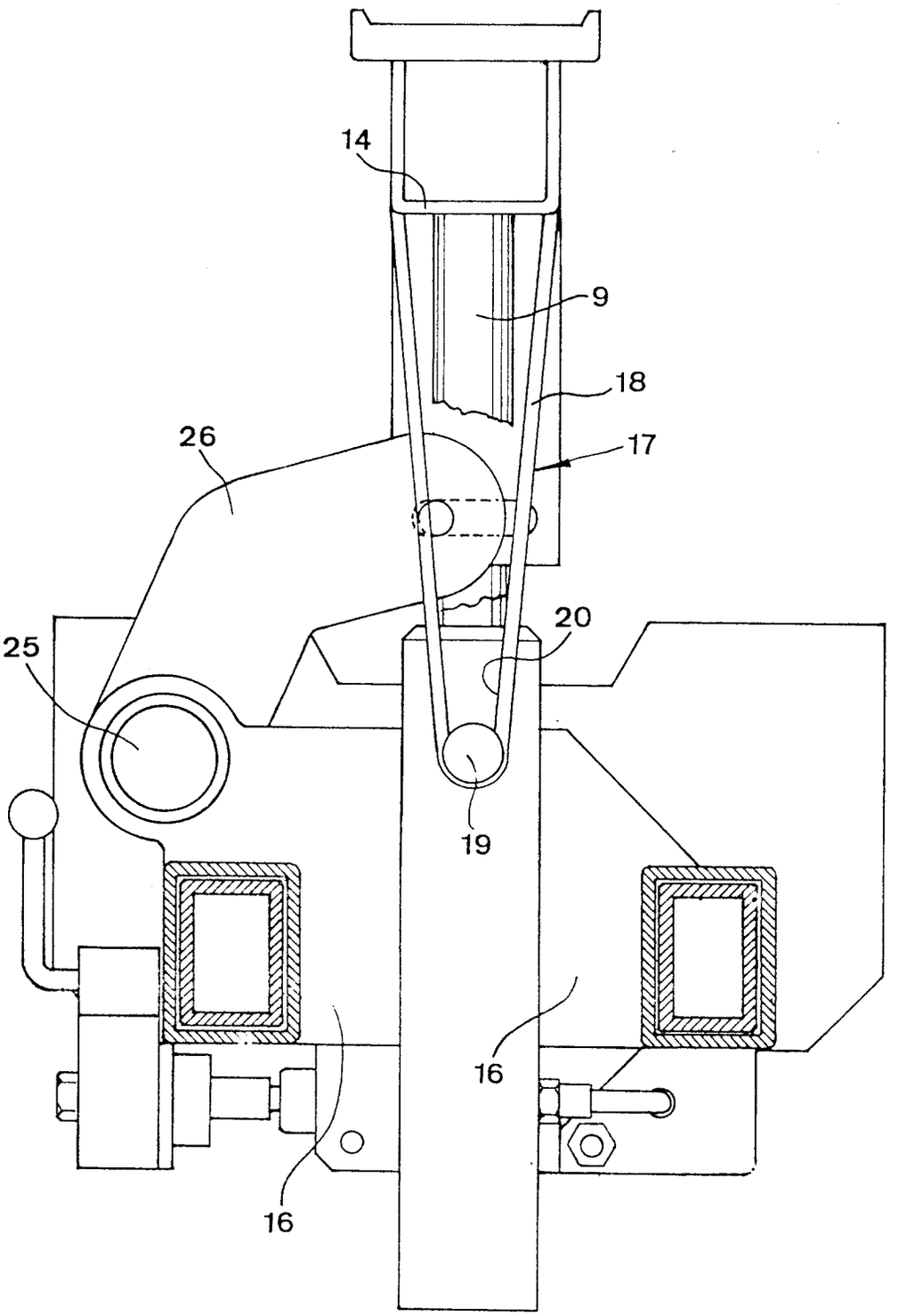

Fig 2

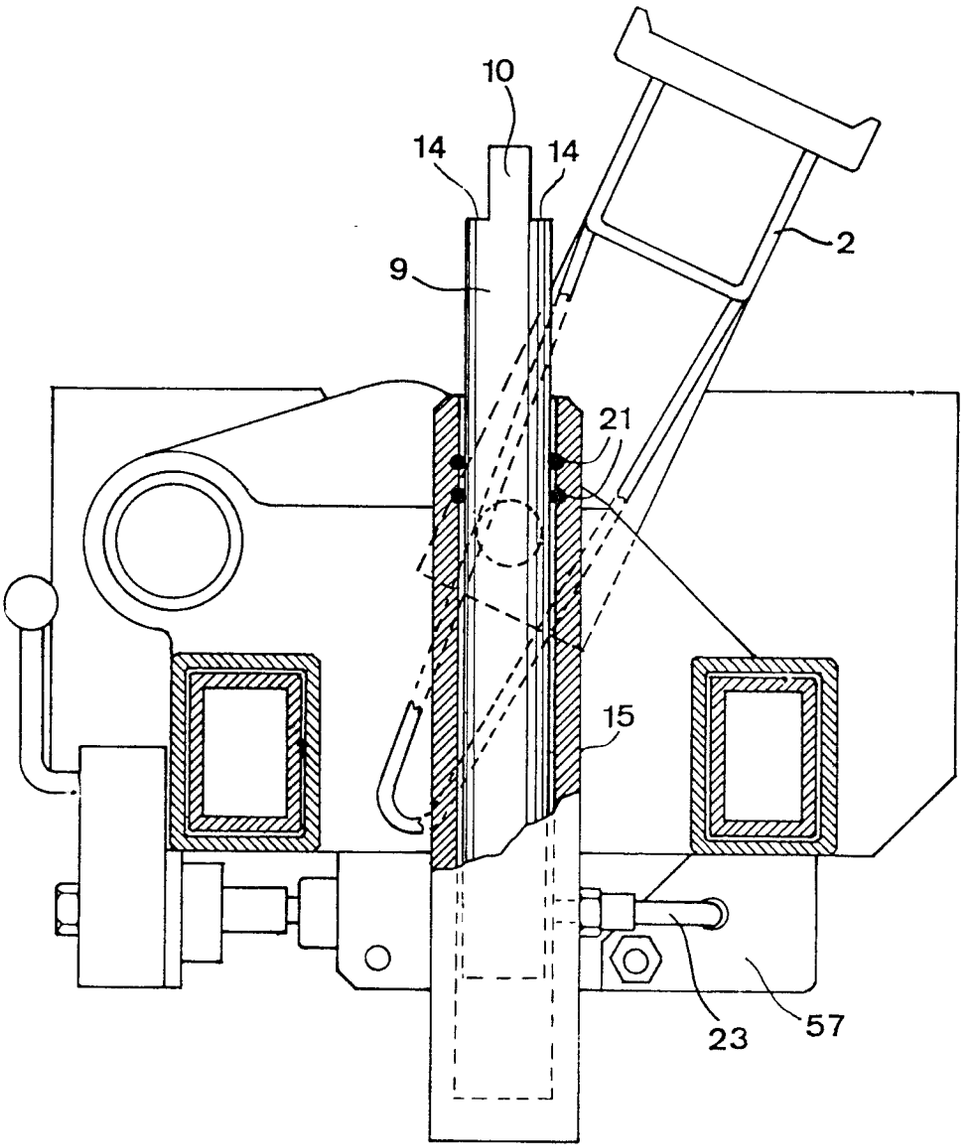

Fig 3

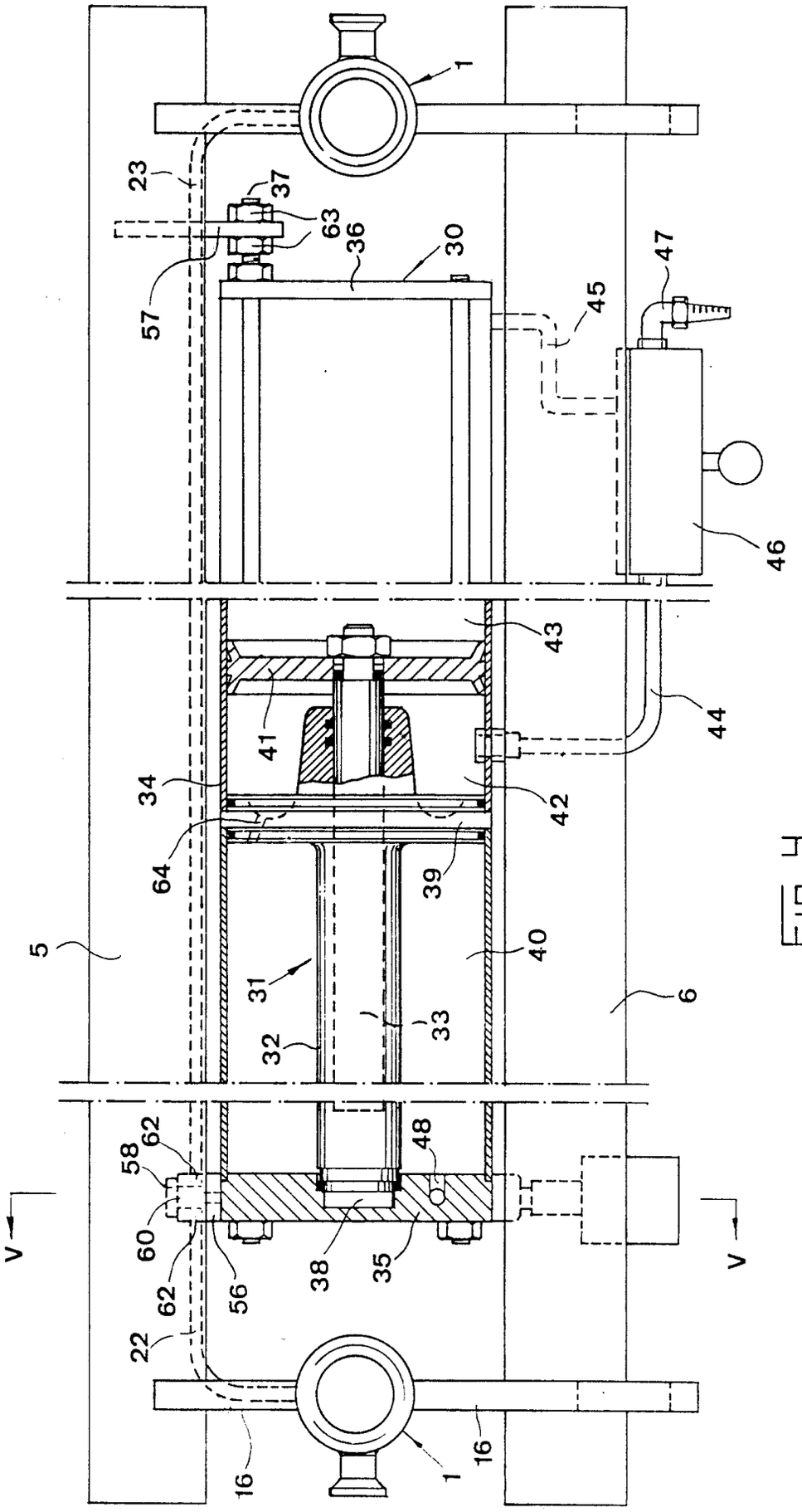
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FIG 4

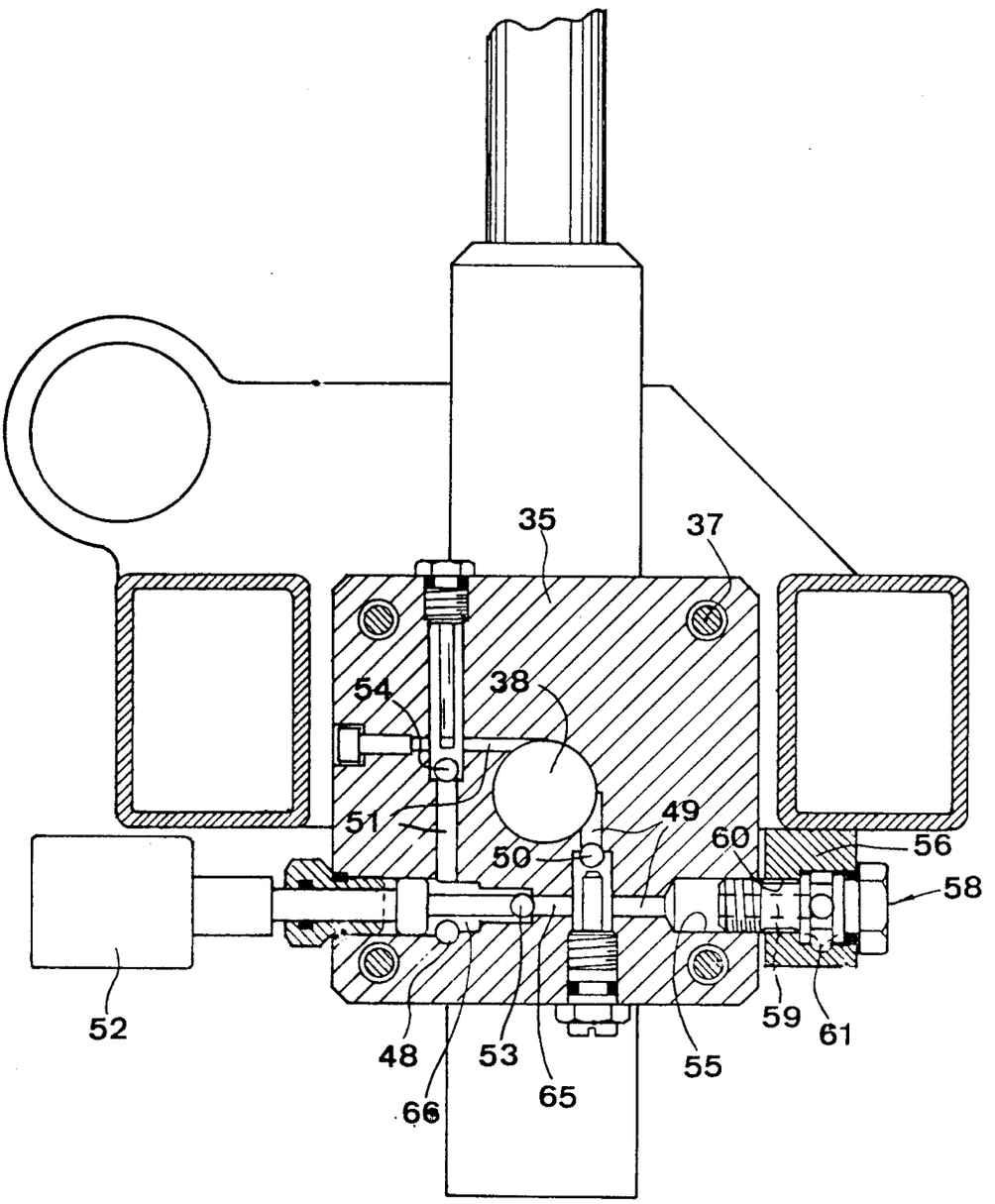

Fig 5