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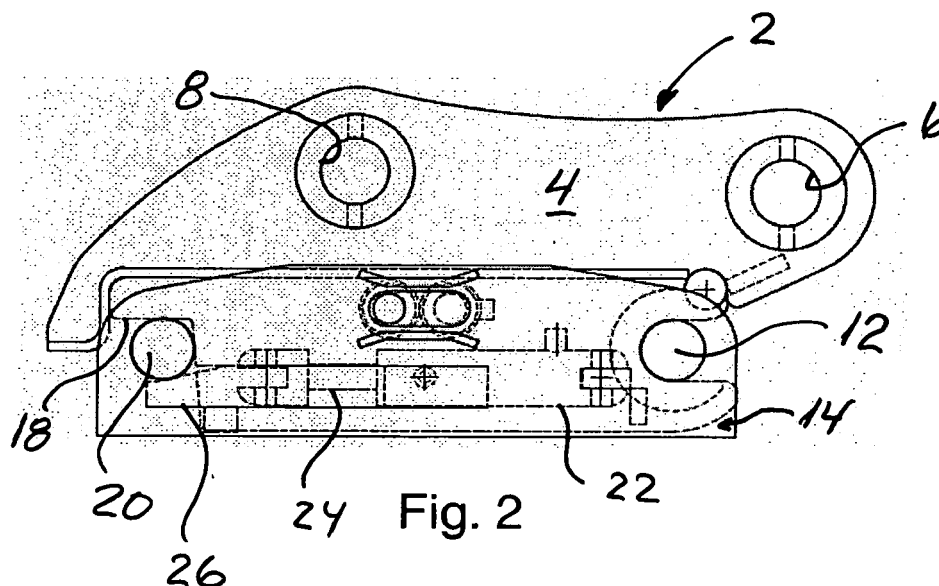
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(54) Quick hitch for a digging or loading tool

(57) A quick coupling (2) for a tool, e.g. a dipper or a loading bucket, and including connecting means adapted to be mounted at an outer end of a digger or loading arm, the quick coupling (2) including coupling means for connecting the quick coupling with complementing means of a connecting part (14) of the tool and a locking mechanism with a displaceable lock wedge (26) which includes locking means adapted to interact with the complementing coupling means (12, 20) of the connecting part (14) of the tool, and which is adapted to displace by means of at least one, preferably hydraulic, cylinder (22), as the coupling means are constituted by fixed hook-shaped

coupling members (10) that are adapted to interact with the connecting means (12) of the connecting member (14) of the tool, and by coupling members adapted to fix the connecting means (20) of the connecting part (14) of the tool when the latter is in contact with a contact face (18) of the quick coupling (2), which further includes a safety lock (28, 50) adapted to provide an additional secure locking function between the quick coupling (2) and the connecting part (14) of the tool. By means of simple technical measures it is hereby possible to achieve good operation and an extraordinary good safety against inadvertent release of the tool.



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Description

Field of the Invention

[0001] The present invention concerns a quick coupling for a tool, e.g. a digger or loading bucket, and of the kind indicated in the preamble of claim 1.

Background of the Invention

[0002] Quick couplings of this kind are widely used for the purpose of rapidly and easily changing between different implements, e.g. between diggers with different widths or between digger and loading bucket. The quick coupling may include a manually operated locking mechanism requiring that the machine operator leaves the operator's cabin, or a remotely controlled locking mechanism that may be operated from the cabin and which, for example, may comprise a hydraulic cylinder.

Object of the Invention

[0003] The invention has the object of providing an improved quick coupling for a digging or loading machine of the kind mentioned in the introduction, and which by means of simple measures enables achieving good function and extraordinary safety against unintended release of the tool.

Description of the Invention

[0004] The quick coupling according to the invention is characterised in that it further includes a safety lock adapted to provide an additional secure locking function between the quick coupling and the connecting part of the tool. By means of simple technical measures it is hereby possible to achieve good operation and an extraordinary good safety against inadvertent release of the tool.

[0005] The quick coupling according to the invention is suitably designed such that the safety lock is constituted by at least one, preferably hydraulic, locking cylinder which is fastened to the quick coupling, and which includes a lock piston adapted to interact with a complementary lock socket formed in the connecting part of the tool.

[0006] The quick coupling according to the invention is preferably designed such that the safety lock is constituted by a double acting hydraulic locking cylinder which is fastened to the quick coupling, and which includes two lock pistons adapted to interact with complementary lock sockets formed at each their side in the connecting part of the tool.

[0007] With the object of minimising the built-in dimensions, the quick coupling according to the invention may advantageously be designed such that the safety lock is constituted by two joined hydraulic locking cylinders which are fastened to the quick coupling, and which in-

clude two lock pistons adapted to interact with complementary lock sockets formed at each their side in the connecting part of the tool.

[0008] The quick coupling according to the invention may particularly suitably be designed such that the two joined locking cylinders are disposed side by side and designed with a common inlet connection for hydraulic pressure liquid.

[0009] With the object of counteracting inadvertent returning of lock pistons by impact against external obstacles, the quick coupling according to the application may advantageously be designed such that at opposing outer sides and in the vicinity of the lock sockets, the connecting part of the tool is provided with at least one projecting collar.

[0010] With the object of simplifying the connecting part at each their side of the tool, the quick coupling may advantageously be designed such that the lock sockets are constituted by elongated central lock holes that are formed in opposing sides of the connecting part, and which extend substantially in parallel with a longitudinal edge part of the connecting part. The connecting parts at each their side of the tool may hereby be designed identical whereby production and storage are simplified as well.

[0011] With the object of enabling visual checking of the lock pistons by the machine operator, the quick coupling according to the application may further be designed such that at opposing outer sides and in the vicinity of the elongated lock holes, the connecting part of the tool is provided with projecting collars along opposing sides of the lock holes.

[0012] With the object of ensuring that the machine operator may visually supervise correct locking engagement between lock pins and lock sockets, it may be suitable if the quick coupling is designed such that the projecting collars are formed with outwardly bent end parts.

Description of the Drawing

[0013] The invention is described more closely in the following with reference to the drawing, on which:

Fig. 1 shows a plan view of an embodiment of quick coupling according to the invention, as seen from one side thereof;

Fig. 2 shows a plan view of the quick coupling on Fig. 1, coupled to an embodiment of a connecting part intended for being welded to a tool, e.g. a digger or a loading bucket, as seen from the side;

Fig. 3 shows a plan view of the connecting part shown in Fig. 2;

Fig. 4 shows a plan view of the connecting part shown in Fig. 2, as seen from the top;

- Fig. 5 shows a plan view of the quick coupling shown on Fig. 2, connected with the connecting part - as seen from the top - with inactivated safety lock;
- Fig. 6 shows a plan view of the quick coupling shown on Fig. 2, connected with the connecting part - as seen from the top - with activated safety lock;
- Fig. 7 shows a plan view of a preferred embodiment of a safety lock for a quick coupling according to the invention, shown in inactivated condition;
- Fig. 8 shows a plan view of a preferred embodiment of a safety lock for a quick coupling according to the invention, shown in activated condition; and
- Fig. 9 shows a plan view of another embodiment of a safety lock for a quick coupling according to the invention, shown in activated condition.

Detailed Description of Embodiments of the Invention

[0014] The quick coupling 2 shown in Fig. 1 includes two parallel bearing plates 4 with bearings 6, 8 provided for mounting the quick coupling 2 at steel plate support holders 4 projecting at an outer end of a digger or loading arm, or to connect a yoke for a hydraulic cylinder for pivoting the quick coupling and the tool, respectively, e.g. a digger or a loading bucket.

[0015] At one end, the quick coupling 2 is designed with hook-shaped coupling parts 10 which are adapted to grip around a first transverse connecting rod 12 that extend between plate-shaped connecting parts 14 (Figs. 3, 4) which at longitudinal edge parts 16 are adapted for being welded to a back side of the tool, e.g. a digger or a loading bucket, with such spacing that the quick coupling 2 can be inserted between the connecting parts 14 (Figs. 2, 5, 6).

[0016] At the opposite end of the quick coupling 2 there is formed two abutment surfaces 18 against which a second transverse connecting rod 20 is extending between the plate-shaped connecting parts 14. When the connecting rod 20 bears against the abutment faces 18, a hydraulic cylinder 22 is activated such that a hydraulic piston 24 displaces a double lock wedge 26 to a position behind the connecting rod 20, such that the latter is pressed against the abutment faces 18, whereby the connecting parts 14 and the tool are securely connected to the quick coupling 2.

[0017] The quick coupling 2 is also provided with at least one safety lock which has the task of establishing an extra mechanical connection between the connecting parts 14 and the quick coupling 2, why it is provided with a double acting safety lock 28 consisting of two joined hydraulic locking cylinders 30, 32 with lock pistons 34,

36 and lock pins 38, 40 (Figs. 7, 8). At a back side, the latter are both actuated by strong compression springs 42, 44 that have the task of ensuring correct locking engagement between the lock pins 38, 40 and lock sockets 46, 48 complementary therewith and formed in connection with the connecting parts 14 - also in case of missing hydraulic liquid pressure.

[0018] In other words, the safety lock 28 is self-locking in such a way that locking engagement is established by pressure relief of the hydraulic locking cylinders 30, 32, i.e. the locking engagement is maintained if the hydraulic liquid pressure disappears, or put in other words, a hydraulic liquid pressure has to be present in order to deactivate the locking engagement.

[0019] As shown in Figs. 7 and 8, the safety lock 28 is preferably designed such that the hydraulic locking cylinders 30, 32 are joined and disposed mutually off-set side by side such that the total built-in length is minimised. Hereby may be achieved that even relatively small quick couplings with less spacing between the bearing plates 4 may be equipped with safety locks according to the invention.

[0020] Fig. 9 shows an alternative design of a safety lock 50 with greater built-in length and two lock pins 52, 54 arranged in continuation of each other, and which are operated by a common, floatingly arranged, locking cylinder 56 with built-in compression spring 58.

[0021] As shown in Figs. 2-6, at opposing sides of the elongated central lock sockets 46, 48 there are mounted projecting collars 60, 62 having outwardly bent end parts 64, 66 that enables the machine operator to visually supervise correct locking engagement of the lock pins 38, 40 with the connecting parts 14. The collars 60, 62 have the primary task of preventing the lock pins 38, 40 from inadvertently being pressed back and out of engagement with the connecting parts 14 in case that the quick coupling 2 hits an external obstacle by a lateral movement.

Reference numbers of the drawing

[0022]

- 2 quick coupling
- 4 bearing plates
- 6 bearings
- 8 bearings
- 10 hook-shaped coupling parts
- 12 first connecting rod
- 14 connecting parts
- 16 longitudinal edge parts
- 18 abutment surfaces
- 20 second connecting rod
- 22 hydraulic cylinder
- 24 hydraulic piston
- 26 double locking wedge
- 28 safety lock
- 30 locking cylinder
- 32 locking cylinder

34 locking piston
 36 locking piston
 38 lock pin
 40 lock pin
 42 compression spring
 44 compression spring
 46 lock socket
 48 lock socket
 50 safety lock
 52 lock pin
 54 lock pin
 56 locking cylinder
 58 compression spring
 60 projecting collar
 62 projecting collar
 64 outwardly bent end parts
 66 outwardly bent end parts

Claims

1. A quick coupling (2) for a tool, e.g. a dipper or a loading bucket, and including connecting means adapted to be mounted at an outer end of a digger or loading arm, the quick coupling (2) including coupling means for connecting the quick coupling with complementing means of a connecting part (14) of the tool and a locking mechanism with a displaceable locking wedge (26), which includes locking means adapted to interact with the complementing coupling means (12, 20) of the connecting part (14) of the tool, and which is adapted to displace by means of at least one, preferably hydraulic, cylinder (22), as the coupling means are constituted by fixed hook-shaped coupling members (10) that are adapted to interact with the connecting means (12) of the connecting part (14) of the tool, and by coupling members adapted to fix the connecting means (20) of the connecting part (14) of the tool when these abut on a contact face (18) of the quick coupling (2), **characterised in that** it further includes a safety lock (28, 50) adapted to provide an additional secure locking function between the quick coupling (2) and the connecting part (14) of the tool.
2. A quick coupling (2) according to claim 1, **characterised in that** the safety lock (28) is constituted by at least one, preferably hydraulic, locking cylinder which is fastened to the quick coupling, and which includes a lock piston (34) with associated lock pin (38) adapted to interact with a complementary lock socket (46) formed in the connecting part (14) of the tool.
3. A quick coupling (2) according to claim 1, **characterised in that** the safety lock (28) is constituted by double acting hydraulic locking cylinder (30, 32) which is fastened to the quick coupling, and which

includes lock pistons (34, 36) with associated lock pins (38, 40) adapted to interact with complementary lock sockets (46, 48) formed at each their side of the connecting part (14) of the tool.

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4. A quick coupling (2) according to claim 1, **characterised in that** the safety lock (28) is constituted by joined hydraulic locking cylinders (30, 32) fastened to the quick coupling, and which include lock pistons (34, 36) with associated lock pins (38, 40) adapted to interact with complementary lock sockets (46, 48) formed at each their side of the connecting part (14) of the tool.

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5. A quick coupling (2) according to claim 4, **characterised in that** the two joined locking cylinders (30, 32) are disposed side by side and designed with a common inlet connection for hydraulic pressure liquid.

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6. A quick coupling (2) according any preceding claim with a complementary connecting part (14) of the tool, **characterised in that** at opposing outer sides and in the vicinity of the lock sockets (46, 48), the connecting part (14) is provided with at least one projecting collar (60, 62).

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7. A quick coupling (2) according to claim 6, **characterised in that** the lock sockets (46, 48) are constituted by elongated central lock holes that are formed in opposing sides of the connecting part (14), and which extend substantially in parallel with a longitudinal edge part (16) of the connecting part (14).

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8. A quick coupling (2) according to claim 6 and 7, **characterised in that** at opposing outer sides and in the vicinity of the elongated lock sockets (46, 48), the connecting part (14) of the tool is provided with projecting collars (60, 62) along opposing sides of the lock holes (46, 48).

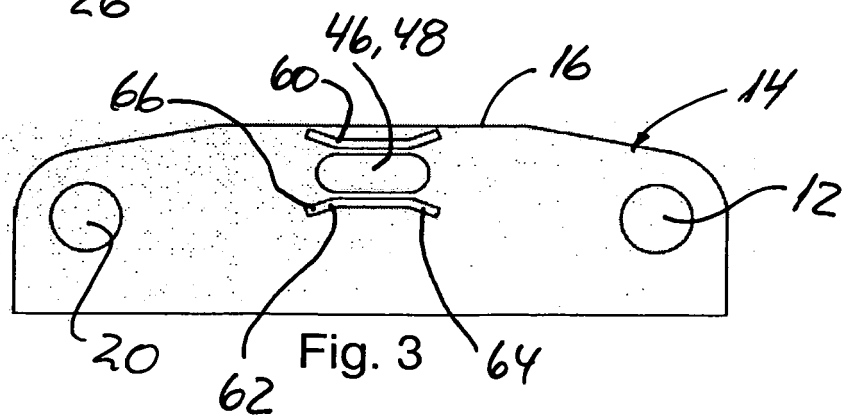
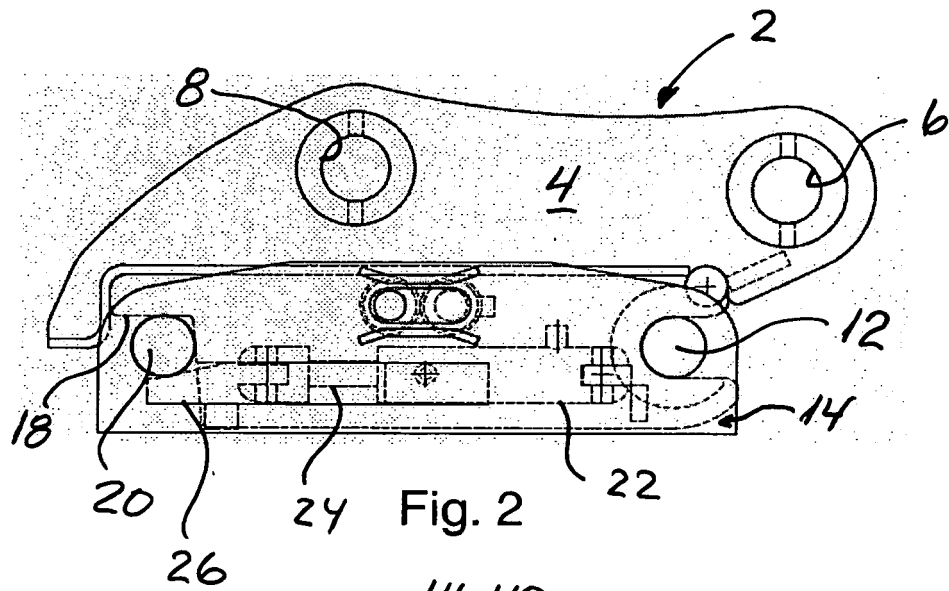
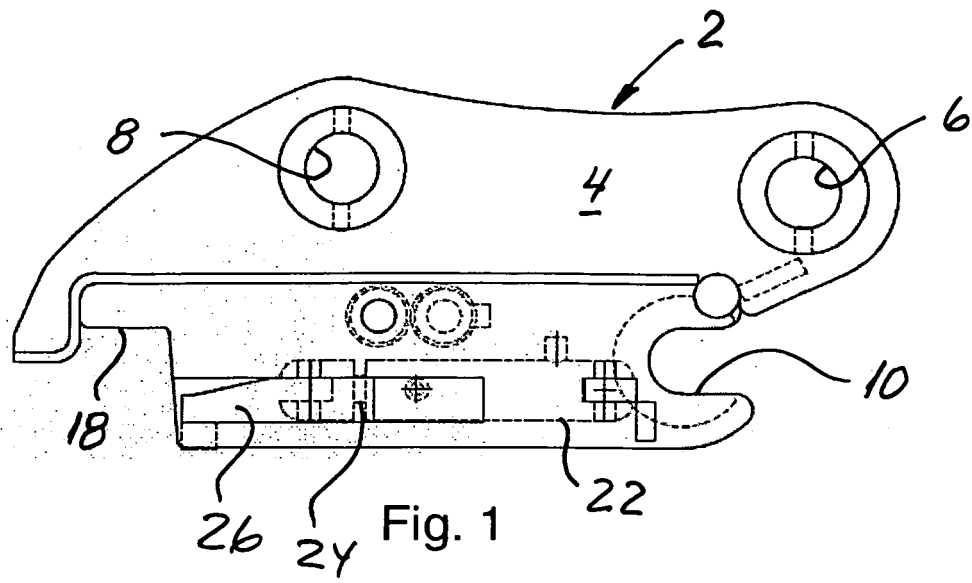
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9. A quick coupling (2) according to claim 6 and 7, **characterised in that** the projecting collars (60, 62) are designed with outwardly bent end parts (64, 66).

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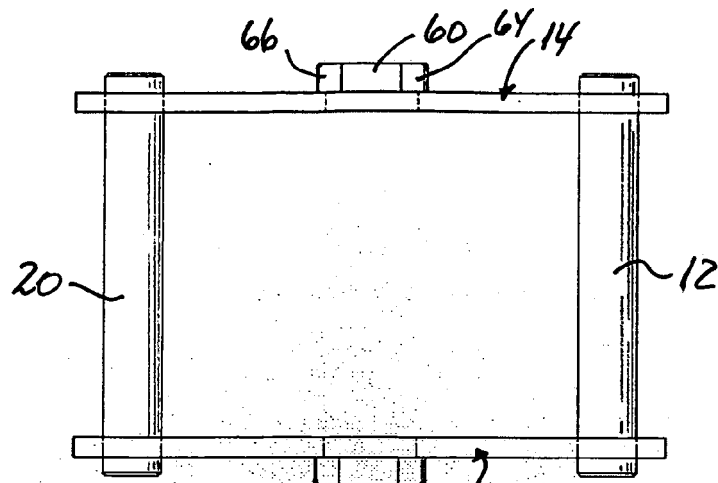


Fig. 4

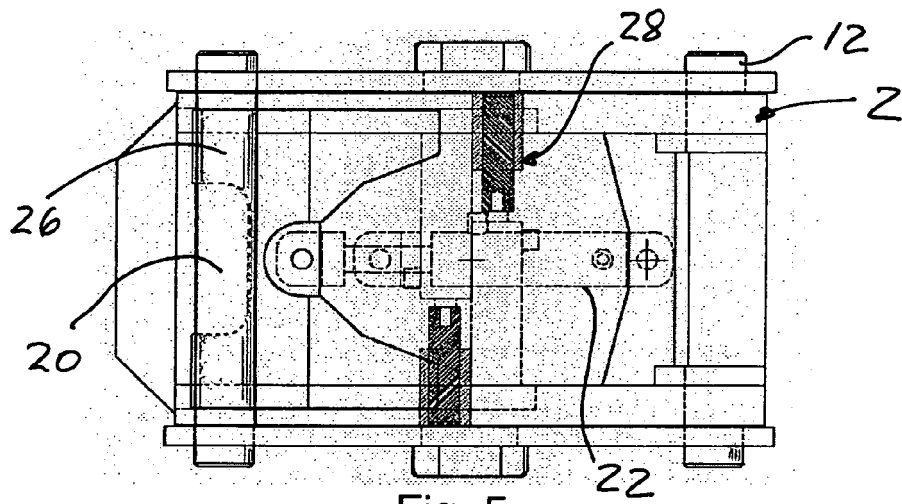


Fig. 5

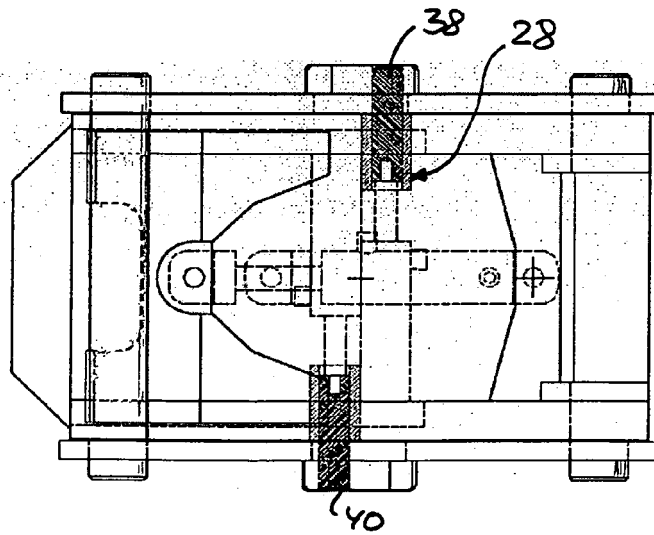


Fig. 6

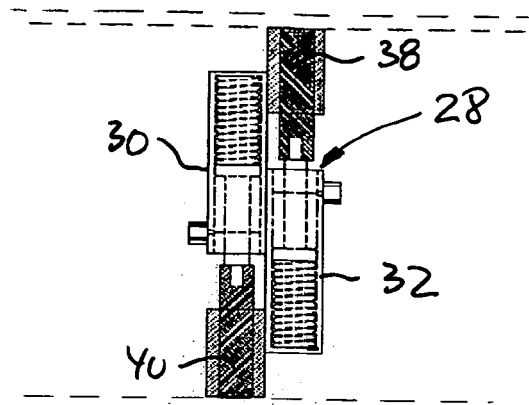


Fig. 7

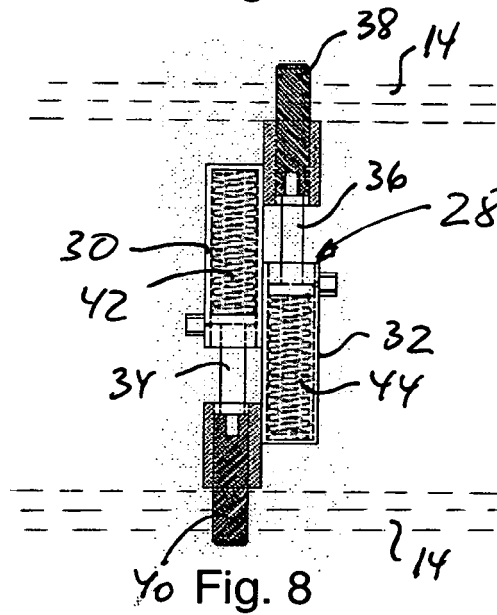


Fig. 8

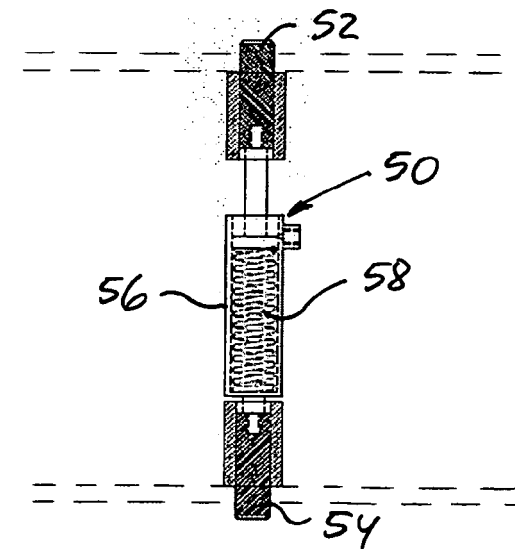


Fig. 9