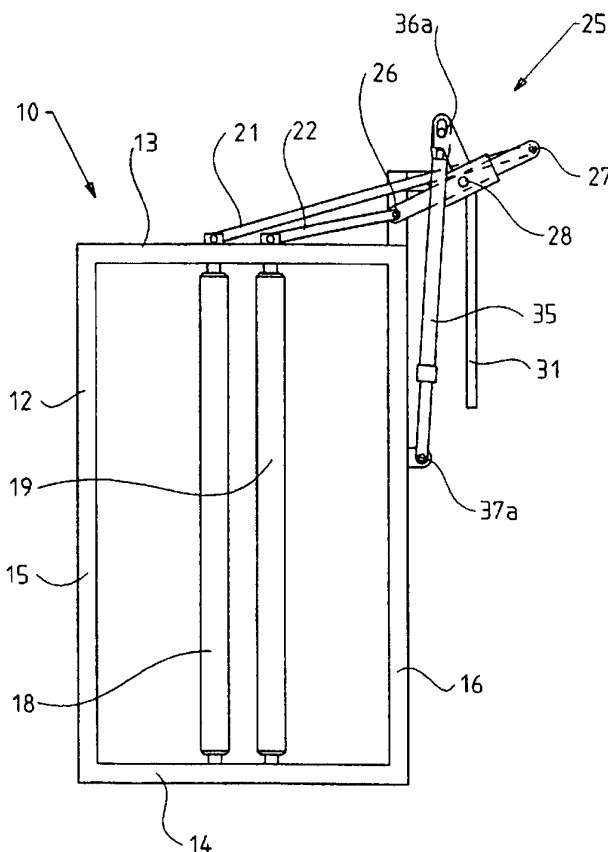




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(21) International Application Number: PCT/AU94/00770 (22) International Filing Date: 13 December 1994 (13.12.94) (30) Priority Data: PM 2907 13 December 1993 (13.12.93) AU PM 7880 5 September 1994 (05.09.94) AU (71) Applicants (for all designated States except US): RURAL PACIFIC MARKETING PTY. LTD. [AU/AU]; 76 Douro Road, Wellington Point, QLD 4160 (AU). RISODA PTY. LTD. [AU/AU]; Tenterfield Street, Deepwater, NSW 2371 (AU). (72) Inventor; and (75) Inventor/Applicant (for US only): TRETHEWEY, Reginald [AU/AU]; Tenterfield Street, Deepwater, NSW 2371 (AU). (74) Agent: PIZZEY & COMPANY PATENT ATTORNEYS; 6/444 Queen Street, Brisbane, QLD 4000 (AU).		(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ). Published <i>With international search report.</i>
(54) Title: RESTRAINING DEVICES (57) Abstract A bail assembly (10) including bail means (18, 19) moveable between operative engaged positions and a disengaged position; bail actuating (25) means for quickly moving the bail means (18, 19) between the operative engaged positions and the disengaged position, and holding means (35) for holding the bail means (18, 19) at any selected operative engaged position. Preferably the holding means (35) is a selectively releasable self locking hydraulic cylinder assembly which includes adjustable holding means (35), a locking chamber (36) associated with the adjustable holding means which may be filled to lock the adjustable holding means; control means (44) for controlling flow of fluid to and from the locking chamber, and actuating means for selectively actuating the control means (46).		



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RESTRAINING DEVICES

This invention relates to restraining devices and holding assemblies.

This invention has particular but not exclusive application to restraining devices such as head bails for animals and holding devices therefore and for illustrative purposes reference will be made hereinafter to such application. However it is to be understood that the restraining devices and holding assemblies of the present invention can be used independently of one another.

Presently utilised restraining devices such as head bails for cattle typically include moveable bails which are arranged to capture a beast by quickly clamping against opposite sides of a beasts neck, behind the ears. In this manner the beast is restrained before it can exit rearwardly from the bails which are maintained in their clamped position by a suitable holding assembly.

Generally the bails are actuated by a single action lever mechanism which affords a sufficiently high speed of operation to capture the beast's neck between the bails. The holding assembly is typically a ratchet and pawl mechanism which maintains the bails in the captured position against the neck of the beast. However, an optimum clamping force on the beast's neck cannot always be achieved because the ratchet mechanism provides only a specific number of discrete holding positions and one of these positions must be engaged. Single action lever mechanisms are utilised as the speed of reversal of a beast generally does not permit performance of more than one operating action by an operator. Beasts which are not captured in the initial pass often become very difficult to handle.

Such ratchet type holding assemblies are prone to wear rapidly as the ratchet must be released whilst under load.

Worn ratchet mechanisms can become liable to pawl slip and accordingly can be dangerous, allowing unexpected release of a secured beast.

Attempts have been made to overcome this problem, for example by the use of larger ratchet teeth. However, when the size of the ratchet teeth is increased the number of discrete holding positions is reduced so that the beast cannot be
5 restrained in the desired position.

In another attempt at reducing the danger of worn or wearing ratchet type holding assemblies the tooth cutback has been increased. However, the increased cutback makes the ratchet mechanism more difficult to release under load,
10 thereby increasing the likelihood of damage to or loss of the beast as well as danger to the operator.

Ratchet type holding assemblies also create undesirable noise as the ratchet pawl travels across the ratchet teeth as the head bail is being moved to the clamped position. Such
15 noise may frighten the beast being clamped in the head bail and also those beasts in the race or holding yard awaiting treatment. This may result in greater difficulty in coaxing or encouraging the waiting beasts to enter the head bail.

Head bails are often makeshift as relatively poor bail
20 performance can be tolerated provided there are adequate persons to control the beast to be bailed. However, many modern farmers have significantly reduced their labour forces and as a consequence they require good performance from their head bails. As such articles are bulky, their transport
25 costs add significantly to the cost of supplying new head bails. Furthermore the addition of a modern head bail assembly to an existing race is often a practical mismatch leading to premature failure of the head bail assembly.

-- SUMMARY OF THE INVENTION --

30 The present invention aims to alleviate at least one of the above disadvantages and to provide beast restraining apparatus which will be reliable and efficient in use.

This invention in one aspect resides broadly in a bail assembly including:-

35 bail means moveable between operative engaged positions and a disengaged position;

bail actuating means for quickly moving said bail means between said operative engaged positions and said disengaged position, and

holding means for holding said bail means at any
5 selected said operative engaged position. The holding means is suitably infinitely variable over at least the engaged positions of the bail means.

The bail means may include one fixed bail and one moveable bail but preferably it includes a pair of opposed
10 moveable bails interconnected for movement towards and away from each other. The bail means may be arranged to move in any manner suitable for engaging a beast. For example the bails may be arranged for parallel sliding movement or pivotal movement. Preferably the bail means are arranged so
15 that in a disengaged position the head of a beast may be passed through the gap between the bails and in an engaged position the bail means may clamp against the neck of the beast.

The bail actuating means may be an electrically operated
20 device such as a motorised screw or solenoid operative to quickly move the bail means to and from the engaged position upon activation of a power supply. Preferably, however the bail actuating means is an operating handle operatively connected to the bail means so as to move the bail means to
25 the engaged position upon movement of the handle in one direction.

The holding means may include a rod or rope operatively connected to the bail means and a clutch adapted to selectively clamp the rod or rope such that the bail means is
30 held in a desired position. Alternatively, the holding means may include a rotary clutch with a pivotable handle allowing movement of the bail means to the engaged position but selectively preventing reverse movement of the restraining means to the disengaged position. Preferably however, the
35 holding means is a hydraulically operated holding assembly which allows passage of hydraulic fluid such as water or oil

from a fluid supply to a locking chamber as the bail means is moved to the engaged position and wherein the fluid is selectively prevented from flowing out of the locking chamber so as to hold the bail means in the engaged position.

5 It is preferred that the bail means includes a pair of bail members connected by concertina type hinges to opposed spaced supports. Suitably the bail members extend upwardly for engagement with guide means for guiding the bail members to and from engagement and wherein the guide members restrain
10 only longitudinal movement of the bail members, lateral and vertical movement being controlled and restrained by the hinges.

In a preferred form the bail assembly is demountable for supply in knocked-down form and adapted for bolted
15 interconnection of major structural components, especially those that provide additional rigidity to the race walls. It is also preferred that the members of the bail assembly, when disassembled, can be packed into a relatively small package. For this purpose it is preferred that the bail assembly
20 include a pair of opposed support posts adapted to be rigidly interconnected by transverse members providing moment transfer about respective longitudinal race axes between support posts and post rotational support about post axes through bolted connections, each including bolts spaced from
25 these respective axes. Preferably the moment transfer about respective longitudinal race axes is provided by a transverse structure at upper ends of the posts and the rotational support about post axes is provided by a transverse structure at the lower ends of the posts.

30 The upper transverse structure is suitably formed by spaced laterally extending bars which form guides for upward extension of the bail members. The rotational support about post axes fixes the posts against rotational movement such that hinge pivots fixed to the posts and spaced from their
35 respective longitudinal axes will remain in a fixed orientation to enable the concertina type hinge members to

hinge across their front faces between operative and inoperative attitudes. The support also relieves such loads from the other said bolted connections.

In relation to the bolted connections it is considered that rigid all-welded head bail structures assume crush loads imparted by heavy beasts to the crush walls because of the relative high rigidity of the head bail compared to the crush. This results in overload of the welded joints and their premature failure.

It is also preferred that one of the support posts provide a lower mounting for the holding means and an upper pivotal mounting for a translation mechanism able to translate pivotal movement of an operating handle thereon to lateral motion of the bail members, the translation mechanism preferably being connected to the upper ends of the bail members which extend between the guide bars.

In a further aspect this invention resides broadly in a method of installing a head bail assembly to an existing race, the method including providing the crush in a knock-down form and bolting the crush components together such that the bolted joints provide moment transfer about respective longitudinal race axes between support posts and post rotational support about post axes through bolted connections, each including bolts spaced from these respective axes. Servicing of such head bail assemblies is also facilitated as parts requiring service may be readily dismantled and sent away for repair.

In another aspect this invention resides in a demountable bail assembly generally of the type described above and utilising any suitable form of holding means such as a ratchet mechanism or a hydraulic mechanism as previously described.

In yet another aspect this invention resides broadly in a holding assembly including:-

- adjustable holding means;
- a locking chamber associated with said adjustable

holding means which may be filled with fluid to lock said adjustable holding means;

control means for controlling flow of fluid from said locking chamber, and

5 actuating means for selectively actuating said control means.

Preferably, the adjustable holding means is an extendable hydraulic ram assembly but it may be a rotary hydraulic actuator or other like device.

10 The locking chamber may be separate to the adjustable holding means and operatively connected to it. Preferably however, the locking chamber is integral with the adjustable holding means.

The control means may be a solenoid or lever controlled
15 gate valve which is closed in the engaged position and is opened to allow movement of the adjustable holding means to the disengaged position. Preferably, the control means is a non-return valve which may be overridden to permit fluid to flow from the locking chamber but which normally operates to
20 admit fluid to the locking chamber and prevent reverse flow therefrom. In one such embodiment there is suitably provided an actuating shaft passing to the non-return valve through the storage chamber.

Preferably the hydraulic holding assembly includes a
25 fluid supply reservoir integral with the adjustable holding means. However, the fluid supply may be a continuous supply such as piped water or oil which is operatively connected to the locking chamber from an external source.

In another aspect this invention resides broadly in a
30 beast restraining assembly including:-

restraining means moveable between operative engaged positions and a disengaged position;

low noise holding means for holding said restraining means in an operative engaged position.

35 The restraining means may be a gate, clamp, cradle or the like but preferably it is a bail assembly adapted to

engage the neck of a beast as previously described.

The low noise holding means may be a ratchet and pawl mechanism, screw mechanism or the like suitably housed in a sound attenuation module such as an oil bath or insulated chamber. Preferably, however the holding means is a hydraulic holding assembly as described herein.

-- BRIEF DESCRIPTION OF THE DRAWINGS --

In order that this invention may be more readily understood and put into practical effect reference will now be made to the accompanying drawings which illustrate a preferred embodiment of the invention and wherein:-

Fig. 1 is a front view of a bail assembly according to the invention adapted to clamp on both sides of a beast's neck;

Fig. 2 is an enlarged front view of a yoke assembly adapted to operate the bail assembly of Fig. 1;

Fig. 3 is a sectional view of the hydraulic holding assembly utilised in the bail assembly of Fig. 1, and Figs. 4 and 5 illustrate a knock-down form of head bail assembly according to the invention.

-- DESCRIPTION OF THE PREFERRED EMBODIMENT --

The bail assembly 10 illustrated in Fig. 1 includes a rectangular frame assembly 12 having opposed top and bottom members 13 and 14 and opposed vertical side members 15 and 16. Head bails 18 and 19 are slideably connected between the top and bottom members 13 and 14 so as to be movable towards and away from the vertical side members 15 and 16.

A yoke assembly 25 is pivotally mounted to an extended portion of the frame member 15 and includes a yoke member 24 having opposed ends 26 and 27 which are linked to the respective upper end portions of the head bails 18 and 19 by link members 21 and 22 such that upon rotation of the yoke assembly about its pivot point 28, the link members move the head bails 18 and 19 inwardly or outwardly so as to be able to clamp on the neck of a beast. A holding arm 29 and a sleeve 30 are loosely fitted around the yoke member 24 and

are connected to pivot point 28 so as to allow pivotal movement between the sleeve and the yoke arm. An operating handle 31 is rigidly connected to the sleeve 30.

The bail assembly also includes a hydraulically operated 5 holding assembly 35 pivotally connected at one end to the holding arm 29 of the yoke assembly 25 and at the other end pivotally connected to a mid portion of the frame member 16 through holes 36a and 37a respectively.

The holding assembly 35 includes an outer cylindrical 10 wall 40 having an upper end cap 41 and a piston rod 42 slidably and sealably engaged within the outer cylindrical wall in a lower portion thereof so as to form a fluid chamber between the upper end cap 41 and the piston face of piston rod 42. A 'J' seal 43 is positioned at the piston rod end of 15 the cylinder to prevent the ingress of contaminants such as dust.

A control means 44 is arranged in a mid portion of the chamber so as to divide it into a locking chamber 36 on the piston rod side of the control means 44 and a fluid reservoir 20 46 on the other side. The control means 44 includes a one-way ball valve 47 arranged to allow fluid flow from the fluid reservoir to the locking chamber but to prevent flow in the reverse direction unless the ball valve 47 is manually held in the open position. For this purpose there is provided a 25 shaft 48 extending at one end through the upper end cap 41 and at the other end slidably engaging with the ball valve 47 so as to be able to move the ball valve to an open position when the shaft 48 is depressed, and wherein fluid may flow from the locking chamber to the reservoir. The upper end of 30 the shaft 48 is encapsulated in a shaft cap 49 attached to the upper end cap 41 to prevent the shaft 48 from becoming disengaged from the ball valve 47. The shaft is maintained in a non-engaged position by a spring 50 located between the shaft cap 49 and the end cap 41.

35 The shaft 48 may be engaged at its upper end by an engaging portion 31a of the operating handle 31 which is

arranged to depress the shaft 48 upon initial pivotal movement of the operating handle about the pivot point 28 thereby opening the ball valve 47.

The fluid reservoir 46 can be charged with fluid through filling cap 51 positioned at an upper end thereof. The filling cap includes a vent to atmosphere which may be closed to prevent ingress of moisture when the hydraulic holding assembly is not in use.

The upper end portion of the outer cylindrical wall 40 is connected to a mounting portion 36 suitably adapted for pivotal connection to the yoke assembly 25 whilst the lower end of piston 42 includes a mounting portion 37 adapted for pivotal connection to the frame member 16.

In use, the head bails 18 and 19 are moved towards the side members 15 and 16 to enable the neck of a beast to be accommodated therebetween. The operating handle 31 is then pivoted to pivot the yoke assembly 25 in a direction causing opposing movement of the link members 21 and 22 which slide the head bails 18 and 19 towards each other wherein they clamp against the neck of the beast.

While the link members 21 and 22 are moving the head bails towards each other the holding arm 29 coincidentally moves the outer cylindrical wall 40 of the hydraulic assembly 35 upwardly thereby extending the holding assembly. As the hydraulic holding assembly 35 begins to extend, the ball valve 47 opens and allows fluid to flow into the locking chamber 36 from the vented reservoir 46 as the holding assembly extends.

As rotation of the yoke member 24 ceases the ball valve 47 closes to prevent fluid returning from the locking chamber to the reservoir so that the yoke assembly cannot be rotated in the reverse direction by movement of the head bails 18 and 19 thereby holding them in any desired engaged position against the neck of the beast.

To release the beast from the bail assembly, the operating handle 31 is rotated in a reverse direction wherein

initially an engaging portion 31a of the operating handle contacts the upper end of shaft 48 and forces it downwardly to open the ball valve 47 so that fluid may return to the reservoir from the locking chamber as illustrated in dashed line in fig. 2. As the operating handle is forced further in a reverse direction, the yoke 25 pivots and the oil is forced out of the locking chamber by the piston rod 42. Coincidentally the head bails 18 and 19 move apart.

It is preferred that the head bail assembly 60 illustrated in Figs. 4 and 5 include head bails 61, 62 connected to opposed support posts 63 by concertina type hinge linkages 64. These linkages include respective pairs of straight outer links 65 connected to brackets at the front of the support posts 63 and cranked inner links 66 connected rigidly at their inner ends to the head bails 61, 62. The respective pairs of outer links are rigidly connected to upright members 67 so as to maintain the upper and lower ends of the head bails parallel. As illustrated the hinge links support and guide the head bails for movement between their engaged and disengaged positions, the upper guide members 68 only restraining longitudinal movement of the bail members. Furthermore in their disengaged positions the linkages 65, 66 protrude laterally only a short distance from the outer faces of the support posts 63.

It will be appreciated that the bail assembly 60 is demountable for supply in knocked-down form whereby the members of the bail assembly may be packaged into a relatively small package. For this purpose the opposed support posts 63 are rigidly interconnected at their upper ends to longitudinally spaced laterally extending bars 68 which form guides for upward extension 70 of the head bails. The bars 68 have upper and lower bolt connections 72 providing moment transfer about respective longitudinal race axes 71 between the support posts 63. The bottoms 73 of the posts 63 are non-rotatably bolted to a lower bail member 74 by laterally spaced bolts 75 such that hinge pivots 76

extending from the front of the posts 63 remain in a fixed orientation to enable the concertina type hinge members to hinge across their front faces. One support post 63a is provided with a lower mounting 77 for the holding means 78 5 and an upper pivotal mounting 79a for the translation mechanism 79 which operates the bail link members 80, it being understood that the operation of the bail assembly 60 is by the mechanism described in relation to Figs. 1 to 3.

In order to maintain ruggedness in the assembled bail 10 assembly in use, the guide bars 68 are pre-assembled as a rigid parallel frame bolted at its outer end to the front face of the posts 63 and the lower bar 74 is a flat bar through bolted through widely spaced pairs of bolt apertures formed on mounting wings welded to the lower ends of the 15 posts 63.

It will of course be realised that the above has been given only by way of illustrative example of the invention and that all such modifications and variations thereto as would be apparent to persons skilled in the art are deemed to 20 fall within the broad scope and ambit of the invention as is defined in the appended claims.

-- CLAIMS --

1. A bail assembly including:-
bail means moveable between operative engaged positions
and a disengaged position;
- 5 bail actuating means for quickly moving said bail means
between said operative engaged positions and said disengaged
position, and
holding means for holding said bail means at any
selected said operative engaged position.
- 10 2. A bail assembly as claimed in claim 1, wherein the bail
actuating means includes one or more link members operatively
connected to said bail means for moving said bail means to an
engaged position and a disengaged position upon movement of
said one or more link members.
- 15 3. A bail assembly as claimed in claim 1 or claim 2,
wherein the bail means includes a pair of opposed moveable
bails interconnected for movement towards and away from each
other.
4. A bail assembly as claimed in any one of the preceding
20 claims, wherein the holding means is infinitely variable over
at least the engaged positions of the bail means.
5. A bail assembly as claimed in any one of the preceding
claims wherein, the bail actuating means is an operating
handle operatively connected to the bail means so as to move
25 the bail means to the engaged position upon movement of the
handle in one direction.
6. A bail assembly as claimed in any one of the preceding
claims, wherein said holding means is a selectively
releasable self locking hydraulic cylinder assembly.

7. A bail assembly as claimed in claim 6, wherein said self locking hydraulic cylinder assembly includes:-
adjustable holding means;
a locking chamber associated with said adjustable
5 holding means which may be filled to lock said adjustable holding means;
control means for controlling flow of fluid to and from said locking chamber, and
actuating means for selectively actuating said control
10 means.
8. A bail assembly as claimed in claim 7, wherein said adjustable holding means is a hydraulic ram and said locking chamber is a variable volume chamber closed by the piston of said hydraulic ram.
- 15 9. A bail assembly as claimed in claim 8, wherein said hydraulic ram includes a storage chamber remote from said locking chamber and wherein said control means is a one-way valve assembly which permits free flow from said storage chamber to said locking chamber and is selectively actuated
20 by said actuating means to permit reverse flow between said storage chamber and said locking chamber.
10. A bail assembly as claimed in claim 9, wherein said valve means is disposed in a closure wall opposing said piston and said actuating means is a shaft extending through
25 the storage chamber to an external location.
11. A bail assembly as claimed in claim 10, wherein said shaft is adapted for connection to operating means at said external location.
12. A bail assembly as claimed in claim 7, wherein said
30 actuating means includes an operating handle which actuates a

release means of said selectively releasable self locking hydraulic cylinder assembly upon movement of said operating handle towards the disengaged position.

13. A bail assembly as claimed in any one of the preceding 5 claims, wherein said holding means is a low noise holding means.

14. A bail assembly as claimed in any one of the preceding claims wherein, the bail means includes a pair of bail members connected by concertina type hinges to opposed spaced 10 supports and which extend upwardly to engage with guide means for guiding the bail members to an engaged position and a disengaged position upon movement of said one or more link members and wherein said guide members prevent longitudinal movement of the bail members.

15 15. A bail assembly as claimed in any one of the preceding claims wherein, the bail assembly is demountable for supply in knocked-down form and adapted for bolted interconnection of major structural components.

16. A bail assembly as claimed in claim 15 wherein, 20 the members of the bail assembly, when disassembled, package into a relatively small package.

17. A bail assembly as claimed in claim 15 or claim 16 wherein, the bail assembly includes a pair of opposed support posts adapted to be rigidly interconnected by transverse 25 members providing moment transfer about respective longitudinal race axes between support posts and post rotational support about post axes through bolted connections, each including bolts spaced from said respective axes.

18. A bail assembly as claimed in claim 17 wherein, the moment transfer about respective longitudinal race axes is provided by a transverse structure at upper ends of the posts and the rotational support about post axes is provided
5 by a transverse structure at the lower ends of the posts.

19. A bail assembly as claimed in claim 18 wherein, the upper transverse structure is formed by spaced laterally extending bars which form guides for upward extension of the bail members.

10 20. A method of fitting a head bail assembly as claimed in any one of claims 15 to 19 to an existing race including:-
providing the head bail assembly in a knock-down form and bolting the components of the head bail assembly together such that the bolted joints provide moment transfer about
15 respective longitudinal race axes between support posts and post rotational support about post axes, each bolted joint including bolts spaced from said respective axes.

21. A self locking hydraulic cylinder assembly including:-
adjustable holding means;
20 a locking chamber associated with said adjustable holding means which may be filled to lock said adjustable holding means;
control means for controlling flow of fluid to said locking chamber, and
25 actuating means for selectively actuating said control means.

22. A self locking hydraulic cylinder assembly as claimed in claim 21, wherein said adjustable holding means is a hydraulic ram and said locking chamber is a variable volume
30 chamber closed by the piston of said hydraulic ram.

23. A self locking hydraulic cylinder assembly as claimed in claim 22, wherein said hydraulic ram includes a storage chamber remote from said locking chamber and wherein said control means is a one-way valve assembly which permits free
5 flow from said storage chamber to said locking chamber and is operable by said control means to permit reverse flow between said storage chamber and said locking chamber.

24. A self locking hydraulic cylinder as claimed in claim 23, wherein said valve means is disposed in a closure wall
10 opposing said piston and said control means is an actuating shaft extending through the storage chamber to an external location.

25. A self locking hydraulic cylinder as claimed in claim 24, wherein said control means is adapted for connection to
15 actuating means at said external location.

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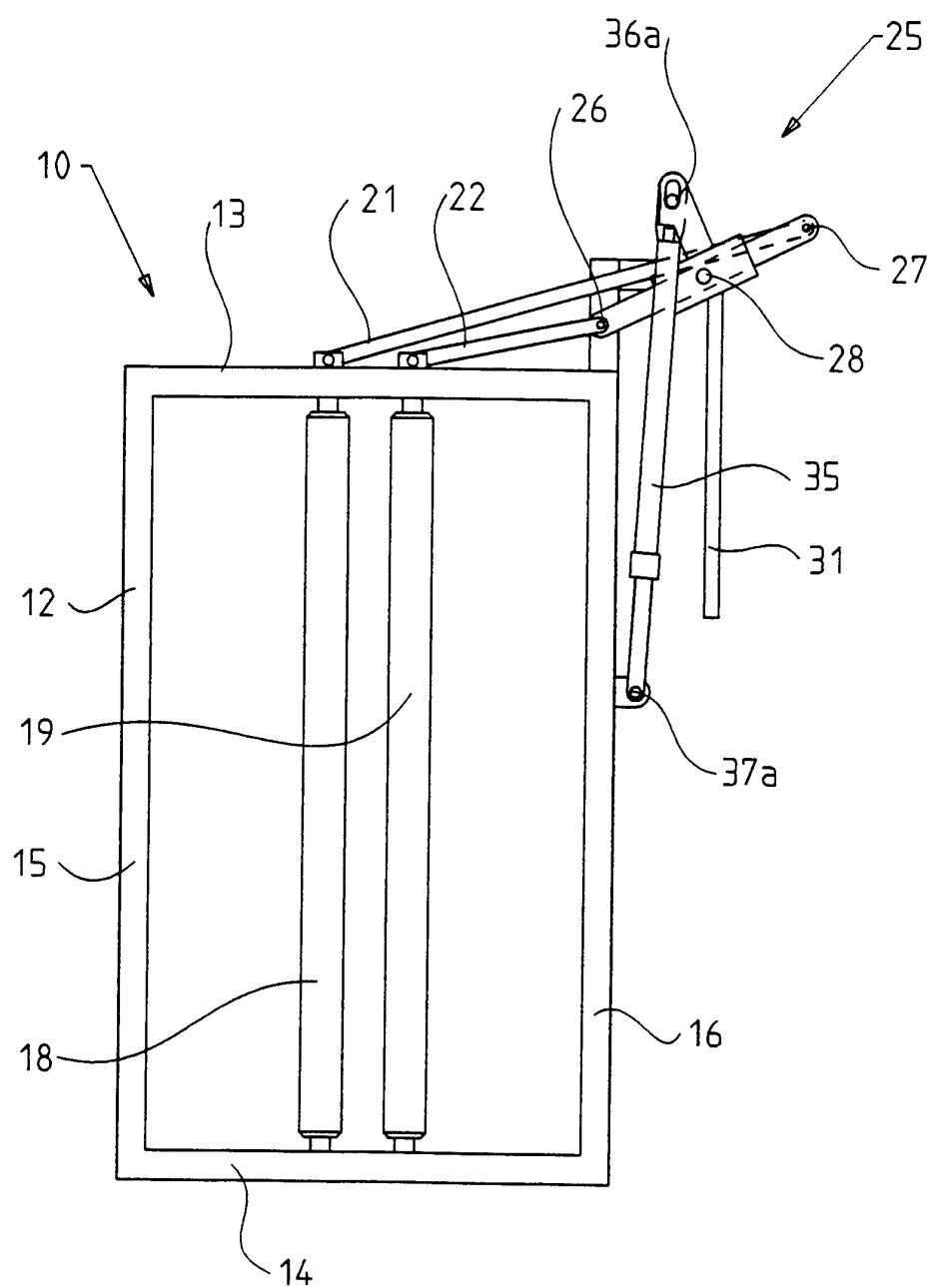


FIG. 1

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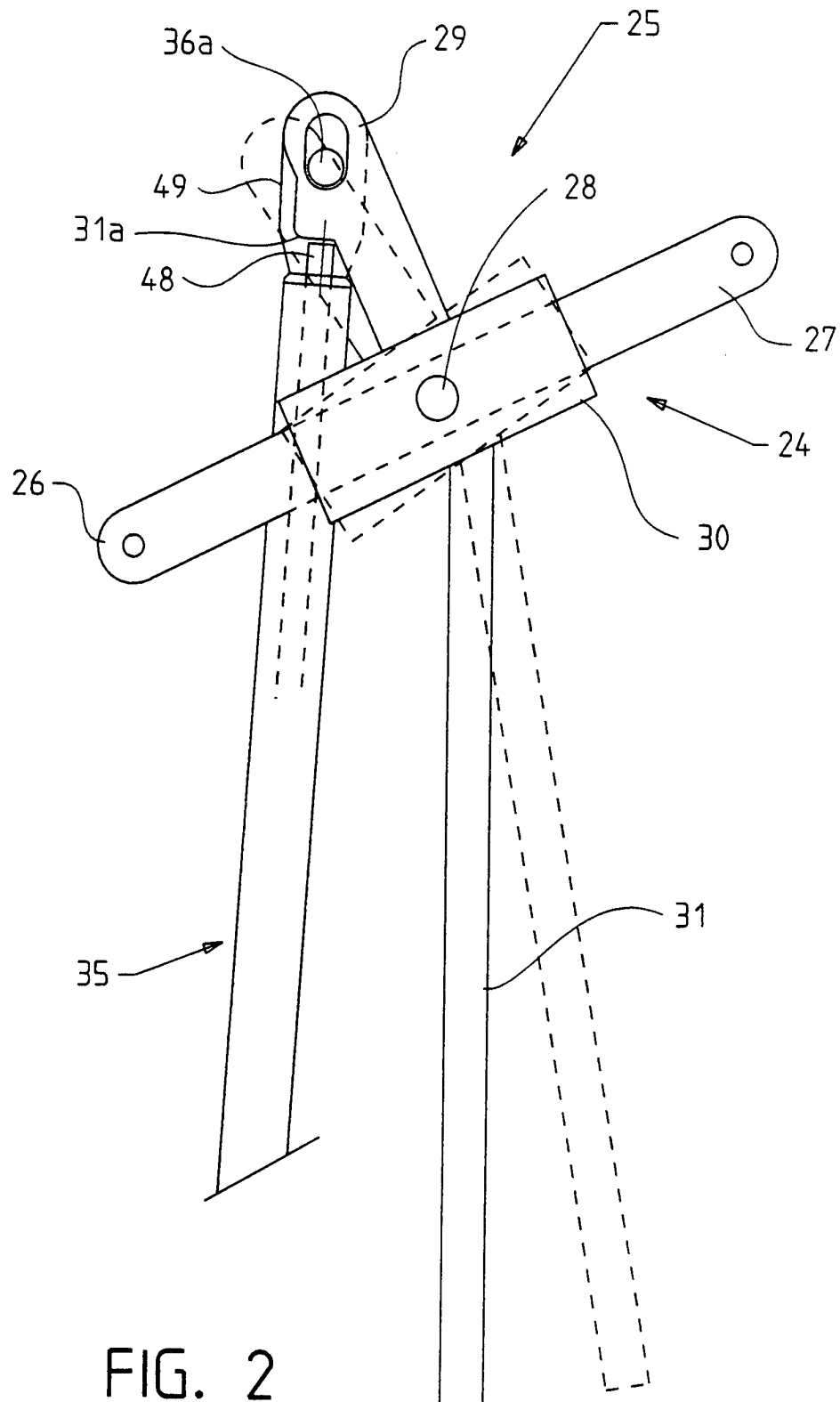


FIG. 2

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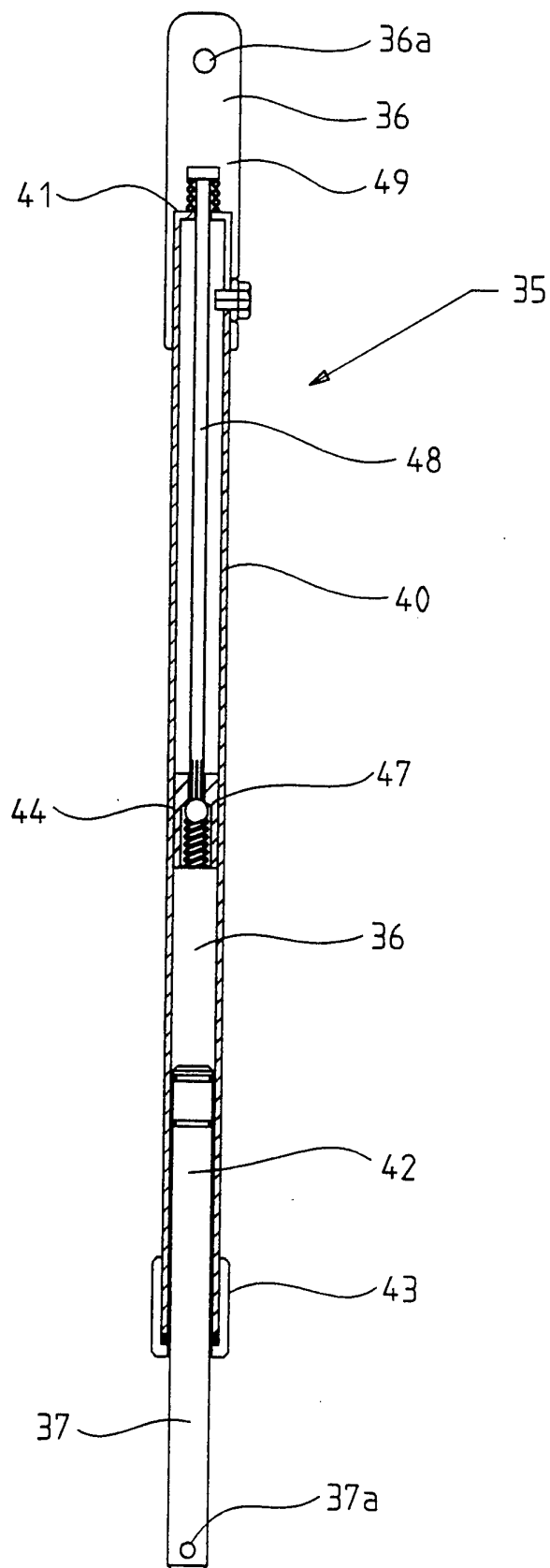


FIG. 3

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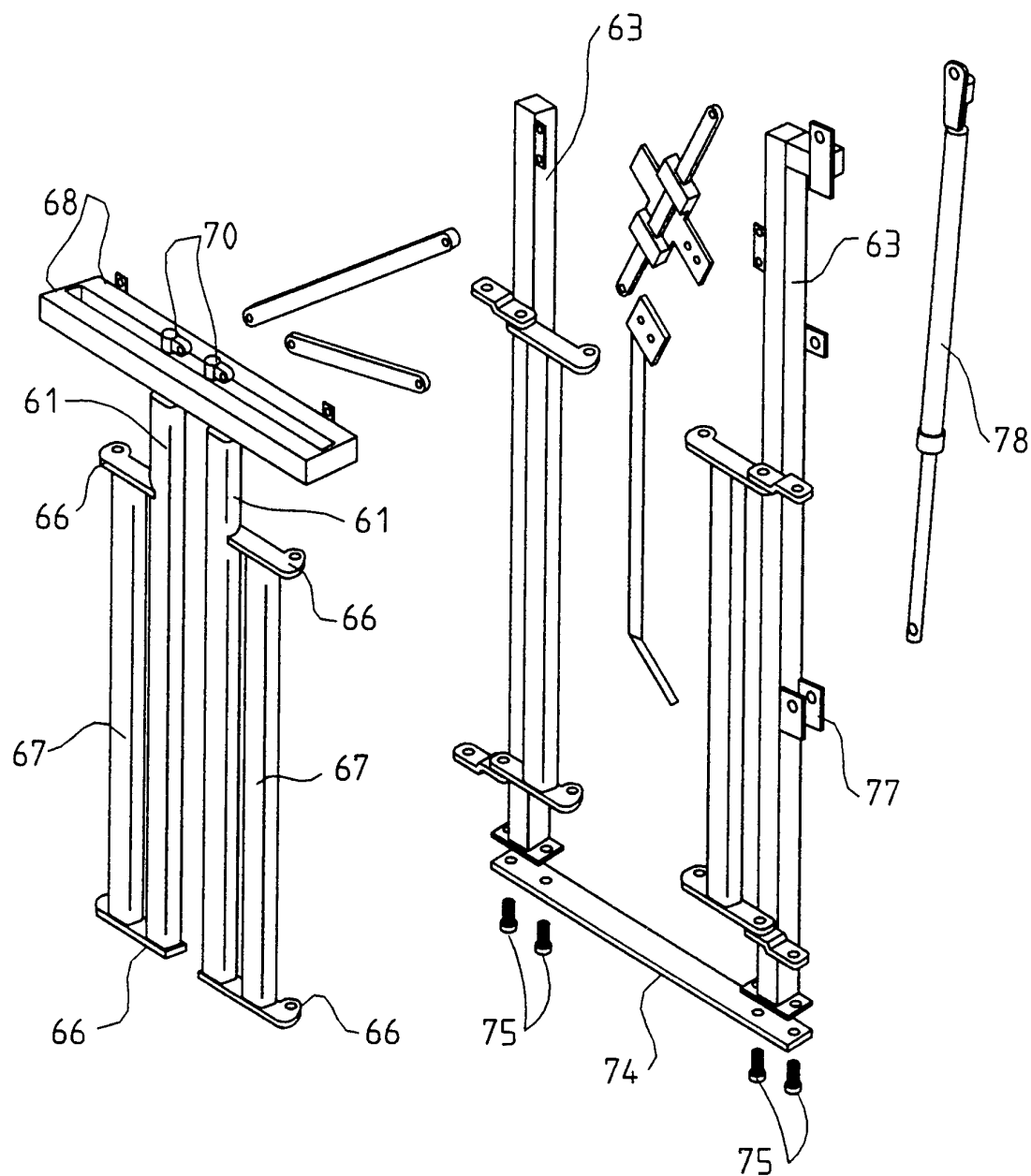


FIG 4

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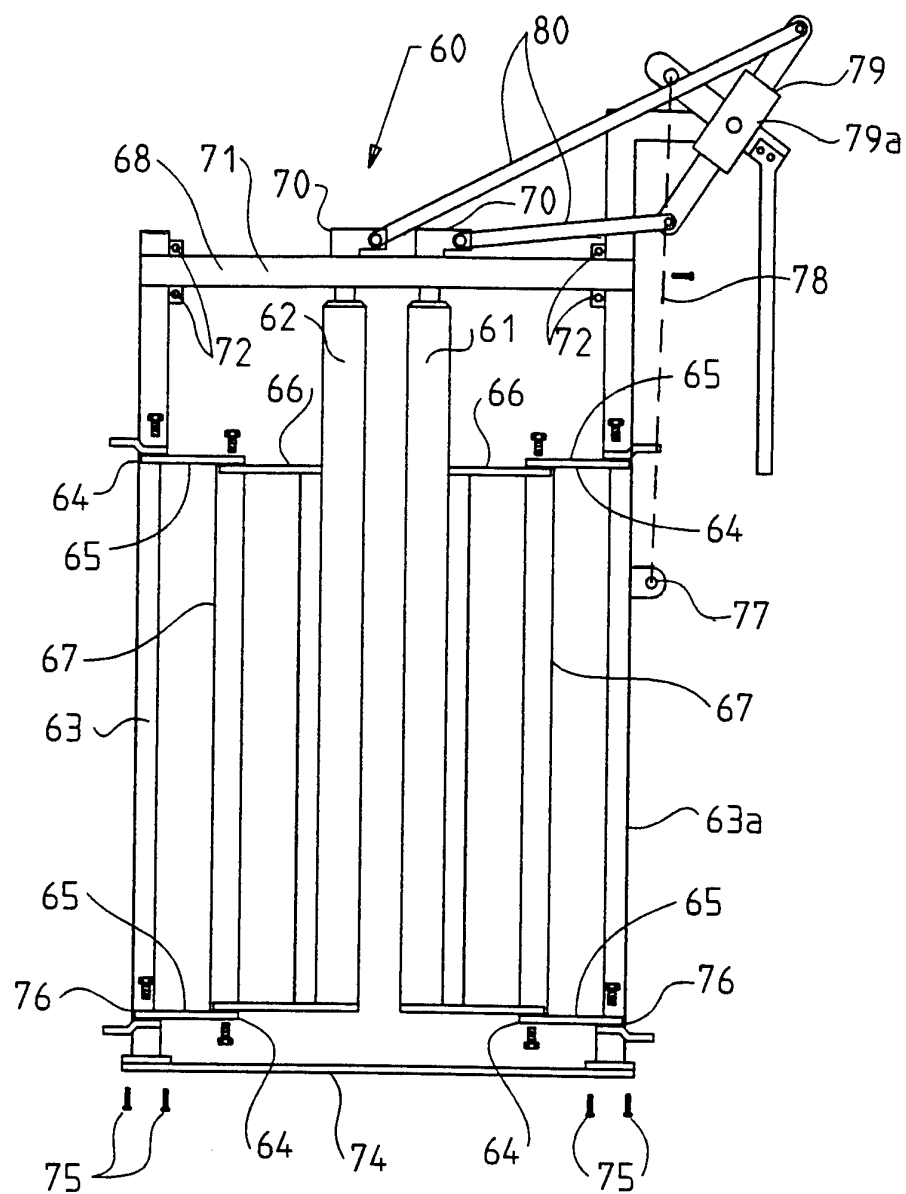


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 94/00770

A. CLASSIFICATION OF SUBJECT MATTER Int. Cl. ⁶ A01K 15/04 1/062 According to International Patent Classification (IPC) or to both national classification and IPC					
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC: A01K 1/06, 1/062, 15/00, 15/04 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU : IPC as above Electronic data base consulted during the international search (name of data base, and where practicable, search terms used) DERWENT JAPIO					
C. DOCUMENTS CONSIDERED TO BE RELEVANT					
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.			
X	Derwent Abstract Accession No. A7739B/04, Class P14, SU,A, 596194 (LITH AGRIC ELEC MEC) 28 March 1978 (28.03.78) abstract	1-5			
X	DE,A, 2322088 (SCHMID) 21 November 1974 (21.11.74) figure 1	1-4			
X Y	AU,B, 41566/89 (626914) (HANS WELDING WORKS PTY LTD) 29 March 1990 (29.03.90) figure 1	1-3, 5 15-19			
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.					
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; vertical-align: top;"> * Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 33%; vertical-align: top;"> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> <td style="width: 33%;"></td> </tr> </table>			* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family				
Date of the actual completion of the international search 27 February 1995 (27.02.95)		Date of mailing of the international search report 13 Mar 1995 (13.03.95)			
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. 06 2853929		Authorized officer  A. ALI Telephone No. (06) 2832607			

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 94/00770

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
X	US,A, 5109802 (PRIEFERT) 5 May 1992 (05.05.92) column 1 line 43 - column 2 line 2	1-3, 5
X	US,A, 2722911 (WELLS) 8 November 1955 (08.11.55) figure 1	20
Y		15-19
X	US,A, 2778334 (MOORE) 22 January 1957 (22.01.57) figure 1	20
Y		15-19
A	US,A, 1402902 (SHERWIN) 10 January 1922 (10.01.22) whole document	20

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international search report has not established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-19
Bail assembly
 2. Claim 20
Method of fitting head bail assembly
 3. Claims 21-25
Self locking hydraulic cylinder
-
1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
 2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
 4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-20

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU 94/00770

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report			Patent Family Member				
DE	2322088						
AU	4156689						
US	5109802	AU NZ	12972/92 241999	CA	2063199	EP	505173
END OF ANNEX							