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(54) Tripod stepladder with removable extensions

(57) The present invention (10) discloses a stepladder having a ladder portion (18) that is comprised of rungs (24) and includes two ladder side rails, and a support portion that includes two angularly disposed telescoping support legs (20) that provide mechanism for stabilizing the ladder.

The support legs (20) are interconnected to each other and to the ladder side rails by lockable rigid spanner arms (22). Furthermore, each of the support legs comprises a locking mechanism for securing the support legs to the ladder portion making the tripod stepladder easier to handle and transport.

The present invention (10) also provides a retractable fly assembly (52) at the top of the ladder rails to provide for additional usable working height and alternately removable extension members with the upper stepladder portion having hollow support leg shoes. A safety belt (36) is provided on the retractable handle for additional support. A series of apertures with lock key fasteners (28) in each of the support legs provide mechanism for the user to securely position the legs at a desired length. The lock key fastener (28) includes a locking pin that engages an aperture in the corresponding leg to secure the desired position. Indicia are further provided for aiding in leveling the ladder.

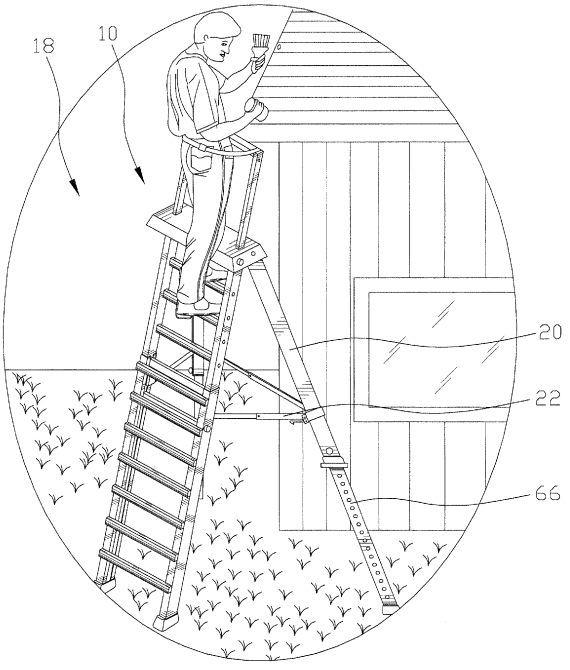

Fig.2

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to ladders and, more specifically, to an extension stepladder with tripod forming support rails. The three legs of the tripod are the two support rails and the ladder which is described as one leg.

[0002] The stepladder of the present invention consists of a ladder portion that is comprised of rungs and includes two ladder side rails, and a support portion that includes two telescoping support rails that provide means for stabilizing the ladder.

[0003] The telescoping support rails are interconnected to each other and to the ladder side rails by lockable rigid spanner arms. When in use, the spreader arms are locked in an open position providing means to form a tripod formation between the rails while additionally limiting the angle of spread between the ladder rails and the support rails.

[0004] When not in use, the spanner arms are pivotally rotated to allow the support legs to retract toward the ladder rails and lock together forming a compact and transportable ladder assembly.

[0005] The tripod style extension stepladder of the present invention provides means for improved safety, increased capability and convenience. The tripod legs maximize the base spans of the stepladder by extending divergently from the ladder portion creating a large base support. The higher the ladder extension the larger the base spans on the floor so that the user does not have to compromise the stability at any elevation setting. Each of the support rails is independently telescopic to allow for use on uneven surfaces.

[0006] Additionally, the stepladder of the present invention also provides a retractable hand support rail at the top of the ladder rails to provide means for additional usable working height. Since the user can easily out of balance when both hands are off of the stepladder creating a safety hazard, a safety belt is provided on the handle for additional support.

[0007] Each of the upper support legs have hollow shoe at the lower end. The hallow shoe allow the retractable lower support leg and function as footing when the extension member is removed. Hence, the upper ladder portion can be used independently as a tripod ladder.

[0008] The ladder system is in most stable position when all the spanners are level. To setup the ladder system in most stable position, there are alignment indicia inscribed on the ladder portion and lower support legs to aid the user in proper lock pin placement when the ladder system is to be used on a substantially level surface.

[0009] A series of apertures with lock key fasteners in each of the support legs provide means for the user to securely position the legs at a desired length. The lock key fastener includes a locking pin that engages an aperture in the corresponding leg to secure the desired position.

2. Description of the Prior Art

[0010] There are other extension ladders and stepladders that provide improved stabilization. Typical of these is U.S. patent No.46,105 issued to Hayes on January 31, 1865.

[0011] Another patent was issued to Bowser on February 19, 1895 as U.S. patent No.534, 463. Another was issued to Bennett on July 25, 1816 as U.S. Patent No. 1,192,734 and still yet another was issued on February 24, 1920 to Brown as U.S. Patent No.1,331,953. Yet another U.S. Patent No.1,670,653 was issued to Cummins on May 22, 1928. Another patent was issued to Harrison on August 25, 1953 as U.S. Patent No. 2,650,014 and still yet another was issued on August 22, 1961 to Wojtowicz as U.S. Patent No. 2,997,127.

[0012] Another patent was issued to Conrad on April 28, 1970 as U.S. Patnet No. 3,508,628. Yet another U.S. Patent U.S. Patent No. 3,856,112 was issued to Stewart on December 24, 1974. Yet another U.S. Patent No. 4,249,637 was issued to Glasgow on February 10, 1981. Another was issued to Beach on February 28, 1984 as U.S. Patent No. 4,433,754 and still yet another was issued on January 17, 1989 to Margolies as U.S. Patent No. 4,798,262.

[0013] Another patent was issued to High, et al. on January 7, 1997 as U.S. Patent No. 5,590,739. Yet another U.S. Patent No. 6,533,071 issued on March 18, 2003 to Smith. Another European Patent was issued to Klenk on April 27, 1981 as EP0039078. WIPO Patent Publication No. WO 00/32900 was filed by Laug and published on June 8, 2000.

SUMMARY OF THE INVENTION

[0014] The present invention discloses a stepladder comprising a ladder portion with divergently extending support legs pivotally attached thereto with rigid spanners extending from the ladder portion to each of the support legs and also between the support legs.

[0015] The ladder portion is comprised of upper ladder portion and lower ladder portion with upper ladder portion terminating at its base in upper ladder footing and at its top end in top cap having rails extending therefrom terminating in hand rail with strap attached thereto. Lower ladder portion has a track in each side rail for receiving the side rails of the upper ladder portion.

[0016] Support legs are comprised of upper support legs terminating in hollow support leg shoes. Lower support legs are sized to be slidable inserted into their respective upper support leg via hollow support leg shoes.

[0017] The height of support legs and ladder portion are adjustable by the lock key includes a locking pin that engages an aperture in the corresponding leg to secure

the desired position. Indicia are further provided for aiding in setting up the ladder on a level surface.

[0018] In addition lower support legs has a plurality of spaced apart apertures whereby one of said apertures is selectively aligned with upper support leg aperture so that lock key can be inserted therein fixing the support legs at a desired height and the upper ladder portion of the present invention can be used independently of its extension members.

[0019] The support legs comprise a locking member for securing the support legs to the ladder portion making the tripod stepladder easier to handle and transport.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] In order that the invention may be more fully understood, it will now be described, by way of example, with reference to the accompanying drawing in which:

Figure 1 is an illustrative view of a prior art stepladder in use.

Figure 2 is an illustrative view of the present invention in use.

Figure 3 is a perspective view of the present invention in its fully unfolded and extended configuration.

Figure 3A is a perspective view of the present invention in its folded configuration.

Figure 4 is a perspective view of the additional form of the present invention wherein the extendable members are removed from the upper ladder portion which can be used independently of its extension members.

Figure 5 is a perspective view of the hollow support leg shoe.

Figure 6 is a cross sectional view taken from Figure 5 as indicated of the hollow support leg shoe.

Figure 7A is a perspective view of the locking device on the upper stepladder.

Figure 7B is a perspective view of the locking device on the support leg, the locking member, the locking member for securing the support legs to the stepladder portion making the tripod stepladder easier to handle and transport.

Figure 8 is a top cutaway view of the latching mechanism in a disengaged state.

Figure 9 is a top cutaway view of the latching mechanism in an engaged state.

Figure 10 is a side cutaway view of the latching mechanism in an engage state.

Figure 11 is a perspective view of the ladder section wherein corresponding indicia are placed on the ladder.

Figure 11A is a perspective view of the support leg wherein corresponding indicia are placed on the support legs.

Figure 11B is a lateral view of the support leg wherein corresponding apertures are placed on the support legs.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0021] The following discussion describes in detail one embodiment of the invention. This discussion should not be construed, however, as limiting the invention to those particular embodiments since practitioners skilled in the art will recognize numerous other embodiments as will. For a definition of the complete scope of the invention, the reader is directed to the appended claims.

[0022] Referring to Figure 1, shown therein is an illustrative view of a prior art stepladder in use. Shown is a conventional stepladder 12 being used on an uneven sloped surface 14. When the conventional stepladder 12 is used on an uneven sloped surface 14, it typically becomes unbalanced and prone to tipping, presenting a safety hazard to the user 16. The present invention overcomes the shortcomings of the prior art 12 by eliminating this potentially deadly hazard and providing additional features advantageous to the user 16.

[0023] Referring to Figure 2, shown therein is an illustrative view of the present invention 10 in use (open position). Shown is a tripod stepladder comprises a ladder section 18 with divergently extending support legs 20 pivotally attached thereto with rigid spanners 22 extending from the ladder portion 18 to each of the support legs 20 and also between the support legs 20. As illustrated, the divergence distance between legs 20 is greater than the width of the ladder section 18. Also shown, are individually lower support leg 66 providing means for compensating placement on a surface that is sloped or uneven, and the predetermined angle between the ladder portion 18 and support legs 20 is confined by the spanner 22, thereby preventing movement of the members when the tripod stepladder in the open position and forming a tripod support base having an improved side to side stability that is not currently available.

[0024] Referring to Figures 3, the user is provided with a tripod stepladder having means for setting to a desired height along with the improved stability features that allow the user to extend the lower support leg 66 to a user selected position that places the lower support leg 66 at a width far exceeding the typical width of the ladder portion 18 providing a side to side stability not currently available. In addition, the support legs 20 angular inclination is fixed by multiple, rigid spanners 22 forming structurally integral tripod support members, wherein one end of a spanners 22 of the present invention and the means by which they connect to the outer surface of the support leg 20. The spanner 22 is fastened to support leg bracket 86 by means of a fastener 42 whereby the spanner 22 is pivotally connected thereto, and another end of the spanner 22 is fastened to a ladder bracket 82 fixedly attached to the outer surface of the ladder portion 18. The spanner 22 is connected by means of a fastener whereby the spanner 22 is pivotal. Another spanner 22 has similar connection between the other support leg 20 and the opposing ladder side rail. The third spanner 22 is pivotally

connected between the two support legs 20. In conjunction with the two support legs 20, the three spanners 22 and the ladder portion 18, means is provided for creating an integrally rigid tripod support frame for maintaining the angular divergence of the support legs 20 and an enhanced side to side stability. Additionally, a safety belt 36 is attached to the extendable hand rail 34 which is located at the top to the ladder system. Also shown are rungs 24, adjustment lock keys 28, top cap 32 with pivot 48 for connecting support leg 20, and lower support leg 66 and support leg 20.

[0025] Referring to Figure 3A, is a perspective view of the ladder system in configuration. Shown is the folded spanners 22, the retracted ladder portion 18, the retracted support leg 20 and the unexpended hand rail support 72. Additionally, the locking mechanisms secure the support legs 20 to the ladder portion 18 making the present invention 10 easier to handle and transport.

[0026] Referring to Figure 4, as illustrated, the additional form of the present invention comprises an upper ladder portion and a lower extendable portion. The rung 24 ladder portion 18 is comprised of upper ladder portion 52 and lower ladder portion 56 with upper ladder portion 52 terminating at its base in upper ladder footing 54 and at its top end in top cap 32 having rails 72 extending therefrom terminating in hand rail 34 with safety belt 36 attached thereto. Lower ladder portion 56 has at its base lower ladder portion footing 58 and has a track in each side rail for receiving the side rails of the upper ladder portion 52. Support legs 20 are pivotally attached to pivot 48 of top cap 32 and are comprised of upper support legs 60 terminating in hollow support leg shoes 64 and lower support legs 66 terminating with lower support leg footing 70. Lower support legs 66 are sized to be slidably inserted into their respective upper support leg 60 via hollow support leg shoes 64. In addition lower support legs 66 has a plurality of spaced apart apertures 68 whereby one of said apertures 68 is selectively aligned with upper support leg aperture 62 so that lock key 28 can be inserted therein fixing the support legs 20 at a desired height and the upper ladder portion 52 of the present invention can be used independently of its extension members.

[0027] Referring to Figure 5, shown is a perspective view of the hollow support leg shoe 64. The hollow support leg shoe 64 is fixedly attached to the bottom end of each of the upper support legs 60 serving as support leg footing when the upper stepladder is used without its extension members.

[0028] Referring to Figure 6, shown is a cross sectional view taken from Figure 5 as indicated of the hollow support leg shoe 64. As illustrated the hollow support leg shoe 64 has chamber 74 and socket 76 for receiving upper support leg 60. Also shown is channel 78 for receiving the lower support legs 66 when used. The hollow support leg shoe 64 has base 80 serving as support leg footing when the upper stepladder member is used without its extension members.

[0029] Referring to Figure 7A and 7B, shown is the support leg locking member for securing the support legs 20 to the stepladder portion making the tripod stepladder easier to handle and transport. The locking mechanism 81 comprises a pair of plates 82, 86 with each respectively attached to the step ladder 18/spanner 22 and the support leg 20/spanner 22. The ladder bracket plate 82 is fixedly attached to a side rail of the upper stepladder having a substantially perpendicular portion 84 extending to another plate portion for attachment of one end of a spanner 22. Support leg bracket plate 86 is fixedly attached to a support leg 20 with the plate having a spring 88 tensioned latch comprising latch mechanism 90 with spring 88 tensioned at spring stop 92 and engaging latch 90 with spring end 94 keeping the latch mechanism seated at latch stop 98. Also shown is latch catch 98.

[0030] Referring to Figure 8, shown is a top cutaway view of the latching mechanism in a disengaged state.

[0031] Referring to Figure 9, shown is a top cutaway view of the latching mechanism in an engaged state. When in the closed state latch catch 96 engages stepladder plate portion 84 keeping the support legs in a fixed state relative to the stepladder 18 until selectively released.

[0032] Referring to Figure 10, shown is a side cutaway view of the latching mechanism in an engaged state. Shown is latch catch 96 engaging plate portion 84 and held thereby until selectively released.

[0033] Referring to Figure 11, shown is an additional element of the present invention wherein corresponding indicia 100 is placed on ladder 18 and lower support legs 66 to aid in positioning the ladder on a level surface when using the extension members.

[0034] About the operation process, please see the below information for details:

> Regardless of the desired ladder height is less than the height of ladder current position or greater than the height of ladder current position, user can change the position of lock keys to reach the desired ladder height, at the same time, the user can adjust the lock keys of support rail to match the unleveled ground.

[0035] So the present invention overcomes the shortcomings of the prior art by providing means for telescopic adjustment of both support rails that form a tripod formation that in turn allows a user to adjust the ladder height, stabilize and level the stepladder for use on both an even and uneven surface.

Claims

1. An apparatus for providing a tripod extension ladder having removable extensions depending from a pair of support legs (20) pivotally connected to the top cap (32) of the ladder portion (18) with the support legs (20) divergently angularly disposed with respect to the ladder portion (18) and with respect to each

other and wherein said support legs (20) and ladder portion (18) are telescopic to permit the height of the ladder to be selectively adjusted.

2. The apparatus of Claim 1, further comprising a pair of hollow support leg shoes (64) fixed to the base of the upper support legs (60) whereby the upper support legs (60) and upper ladder portion (52) can be separated from the extension members and thereby used independently as a tripod ladder.

3. The apparatus of Claim 1, further comprising a locking mechanism (81) with a support leg bracket (86) fastened to each of the support legs (20) and mating ladder bracket (82) attached to the ladder portion (18) whereby when the support legs (20) are collapsed against the ladder portion (18) the locking members engage until selectively released by the user.

4. The apparatus of Claim 1, further comprising alignment indicia (100) inscribed on the stepladder portion (18) and correspondingly inscribed on the supporting telescopic support members (66) to aid the user in proper lock pin (28) placement when the ladder is to be used on a substantially level surface.

5. The apparatus of Claim 1, further comprising a handrail portion being disposed on said upper end of the upper ladder portion (52) having first and second hand rail supports (72) and a hand rail (34) extending therein between, said lower end of hand rail supports (72) can slide into the side rails of the upper ladder portion (52) via the top cap (32), wherein said hand rail (34) is disposed on said upper end of hand rail support (72) to permit a user to grip the hand rail (34) for stability.

6. The apparatus of Claim 5, further comprising a safety belt (36) being disposed on said hand rail portion (34) or top of the ladder system to permit a user to be strapped to the ladder system.

7. The apparatus of Claim 1, wherein said stepladder is fully open, the spanner (22) between the two support legs (20) is significantly longer than the ladder rung (24) and wherein said spanner (22) is foldable so that said support legs (20) can be stored contiguous to said ladder portion (18) of the apparatus.

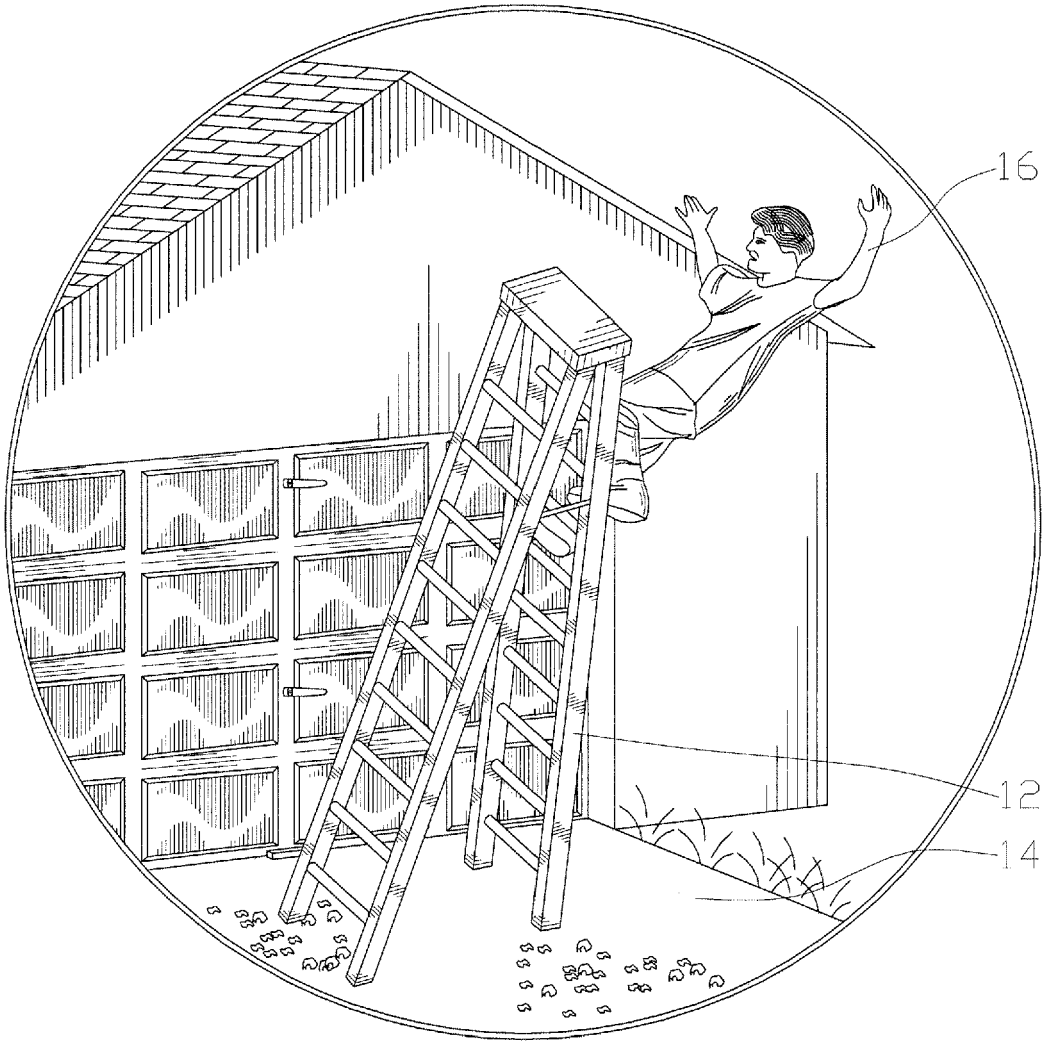

Fig.1
PRIOR ART

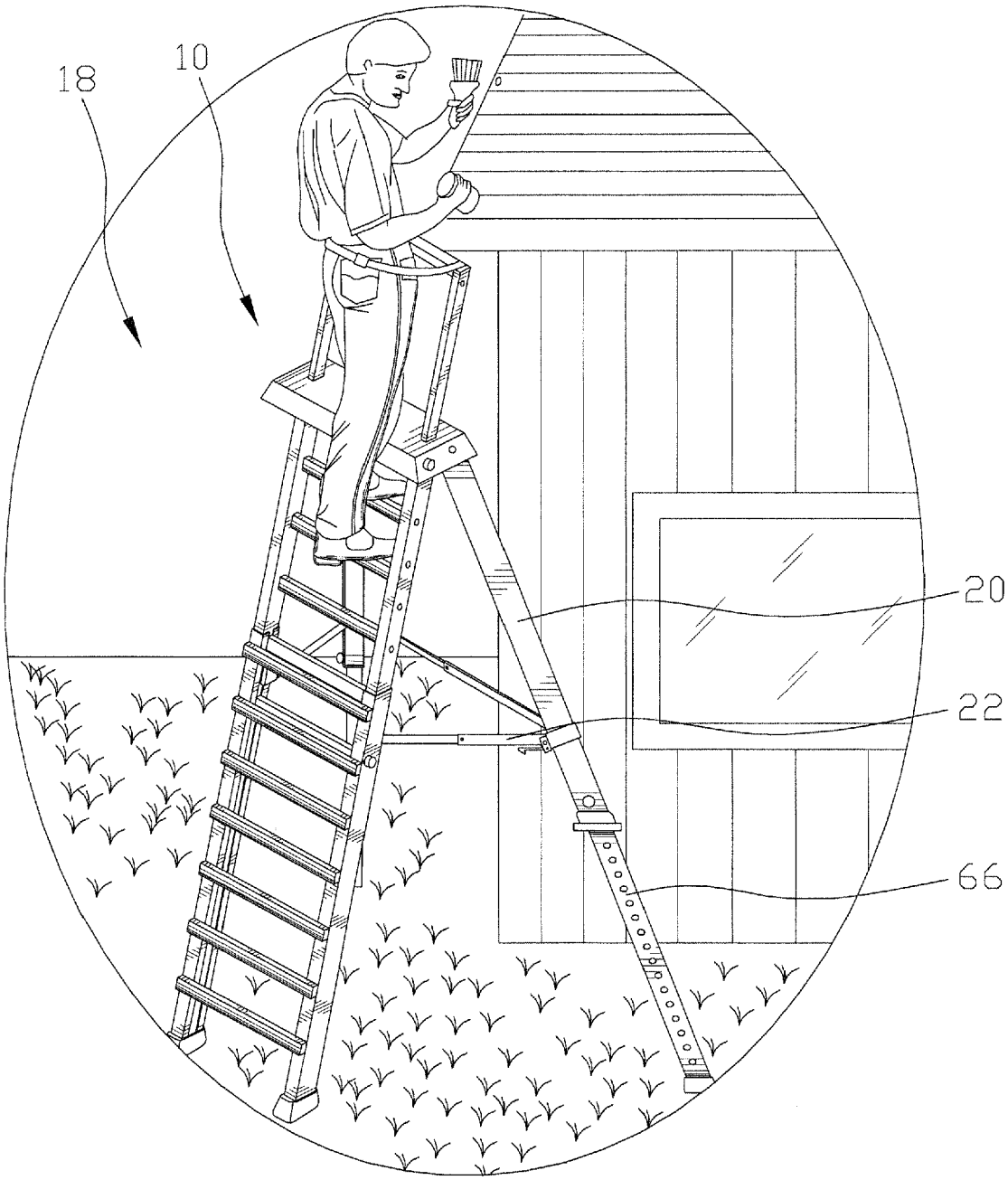

Fig.2

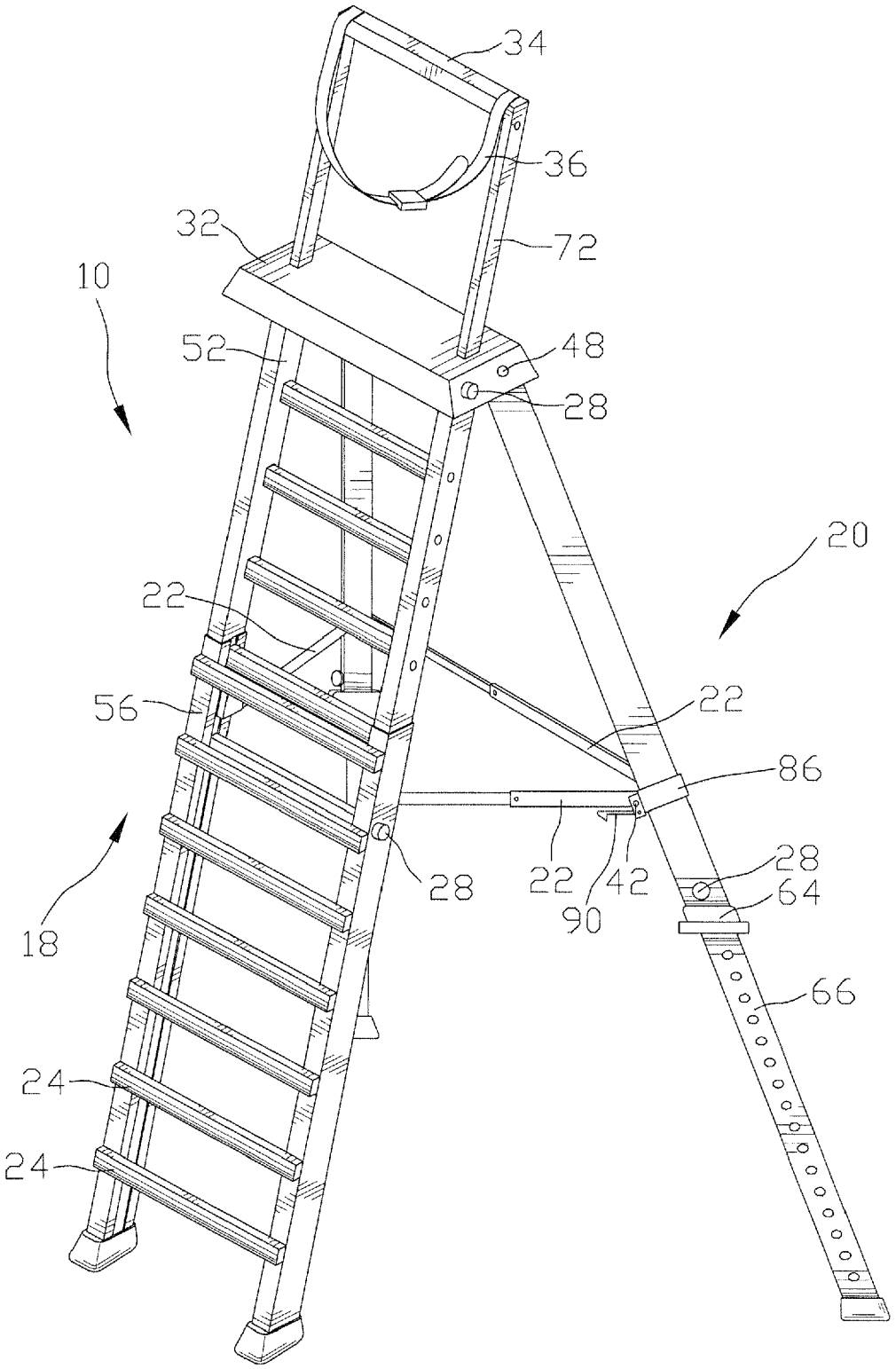

Fig.3

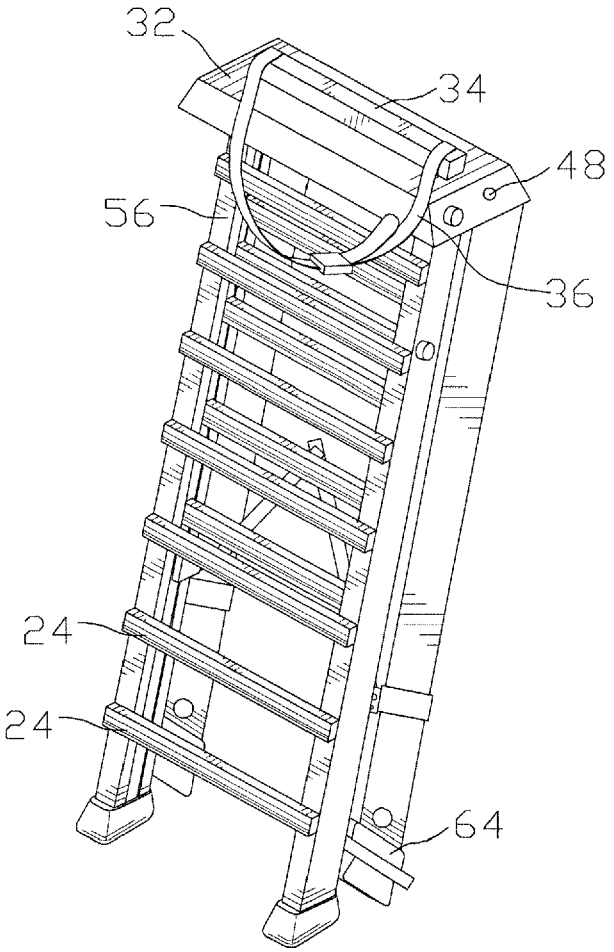

Fig.3A

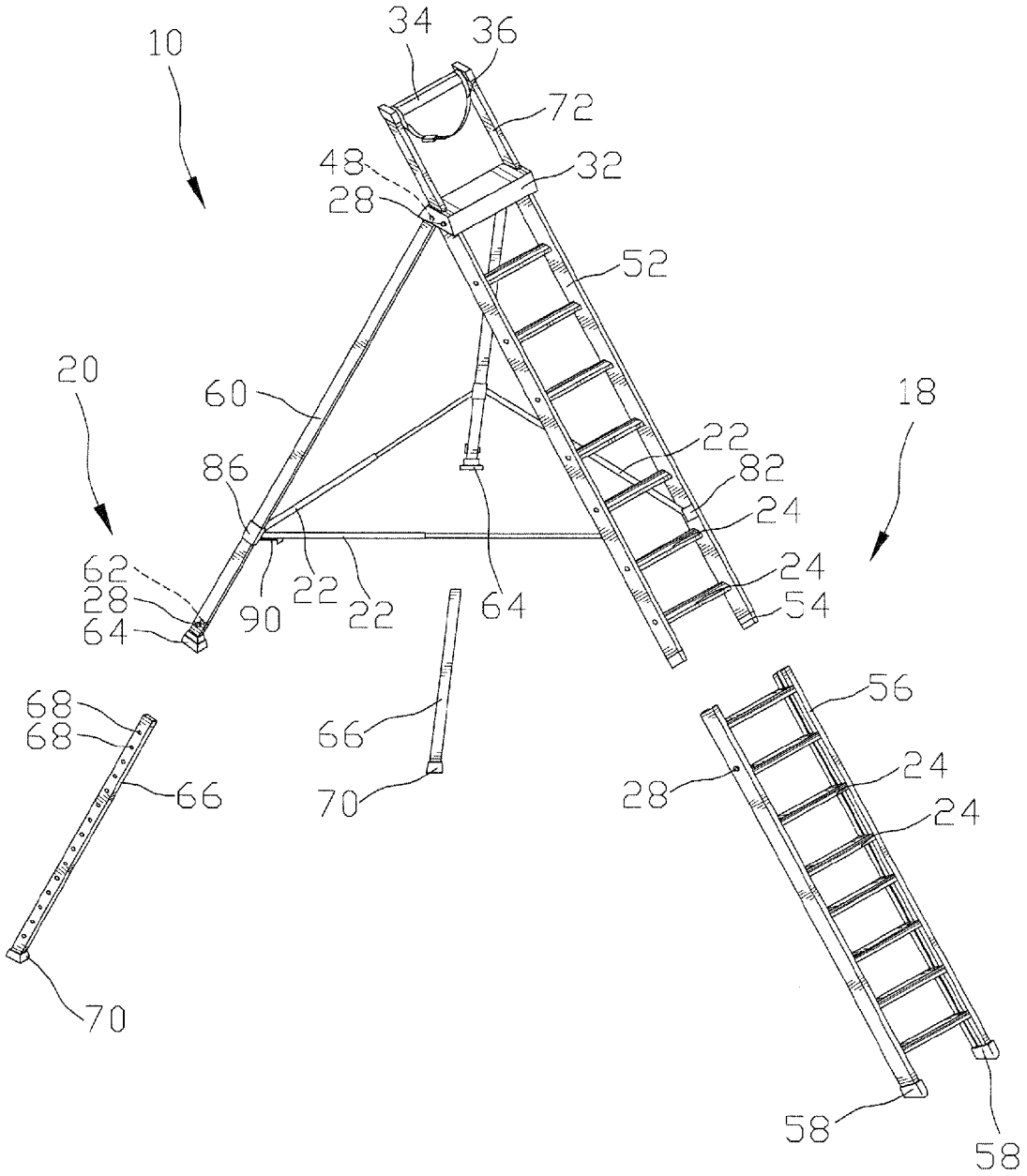
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Fig.4

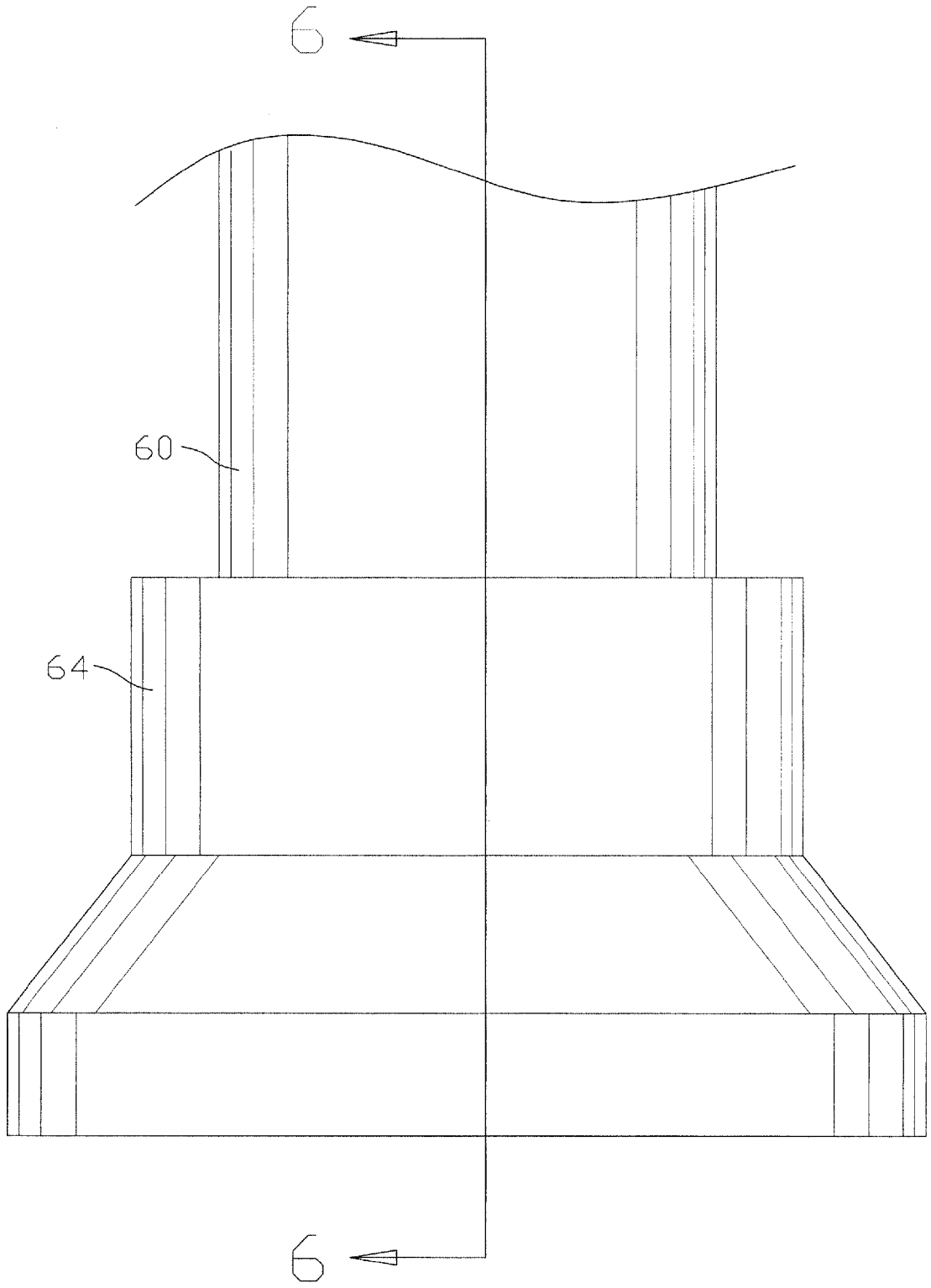

Fig.5

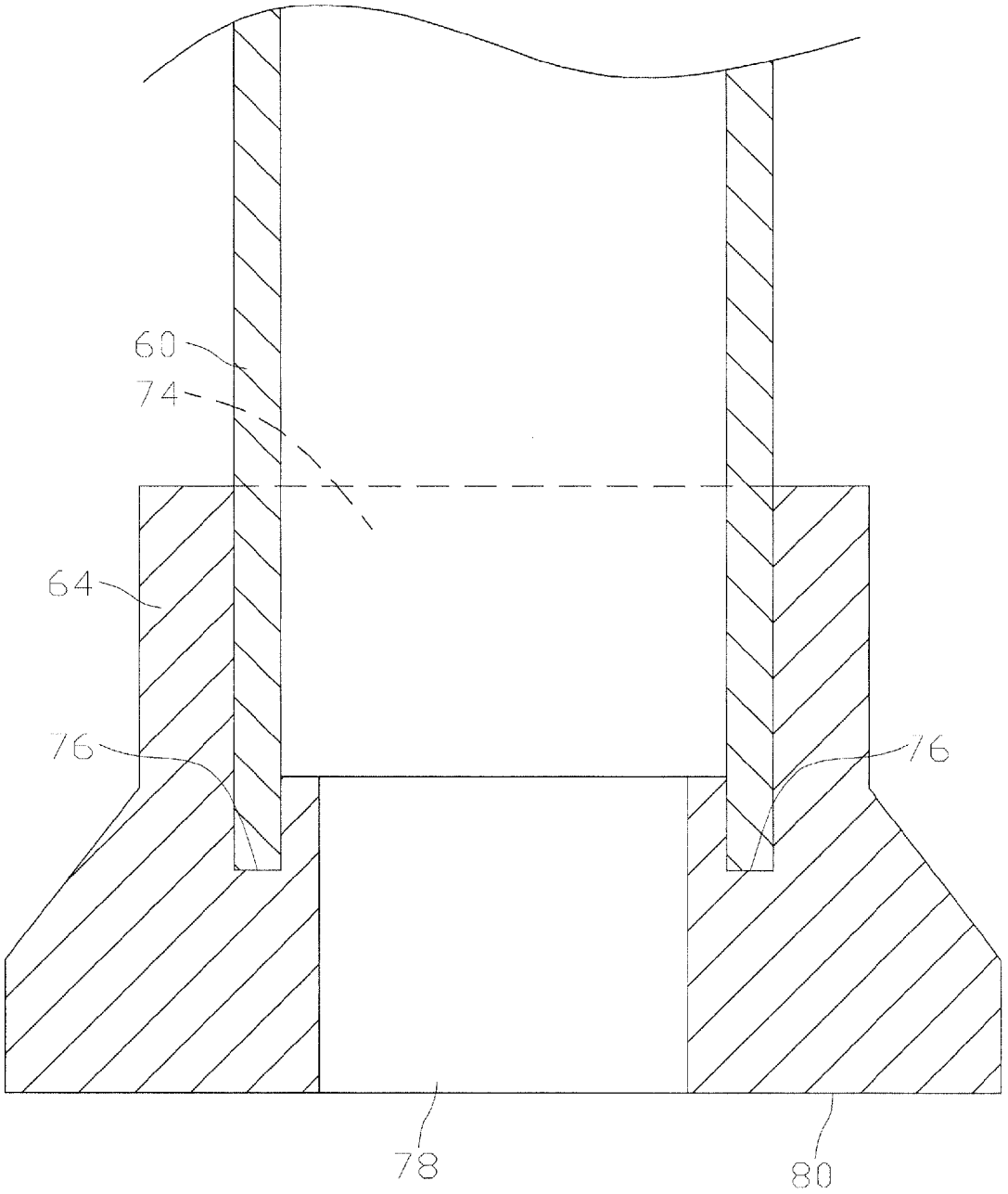

Fig 6

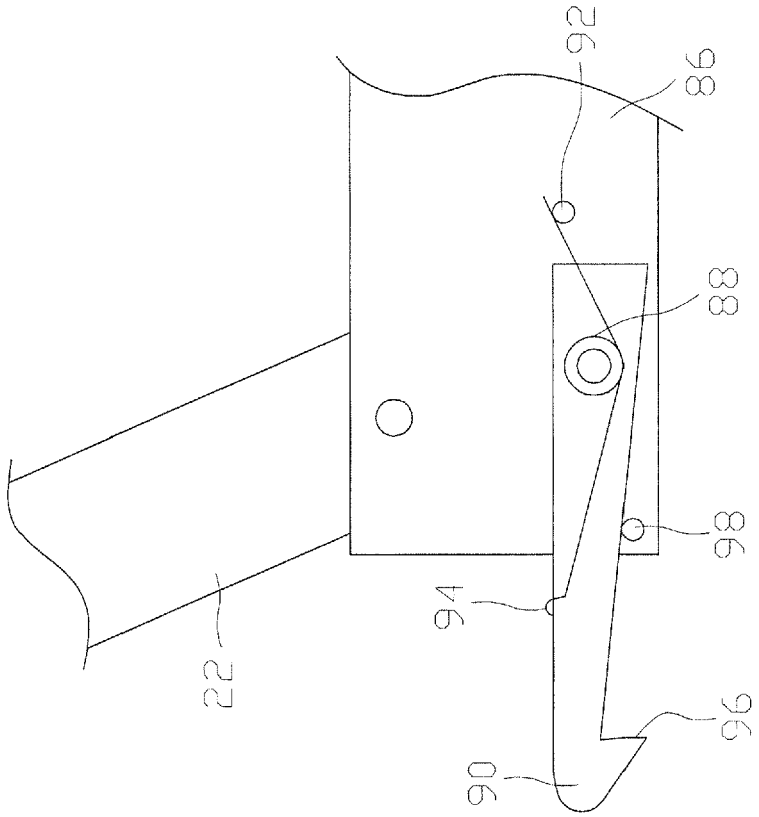

Fig.7B

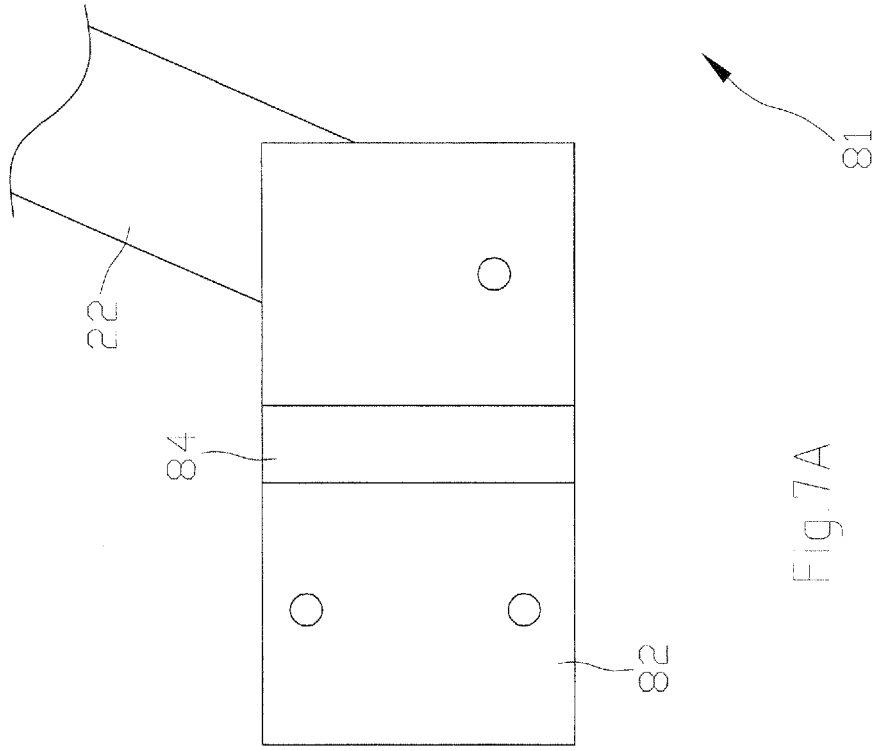

Fig.7A

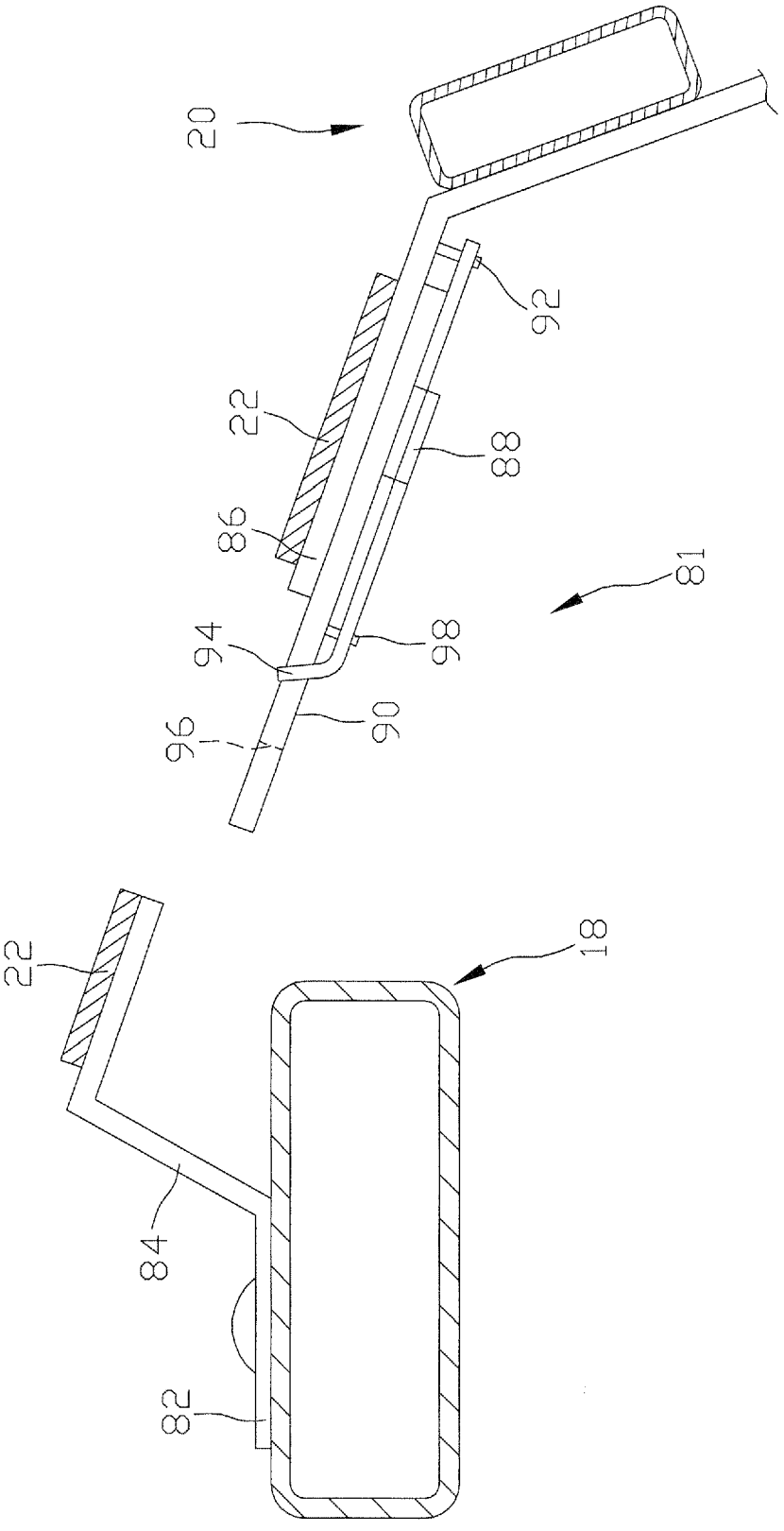

Fig.8

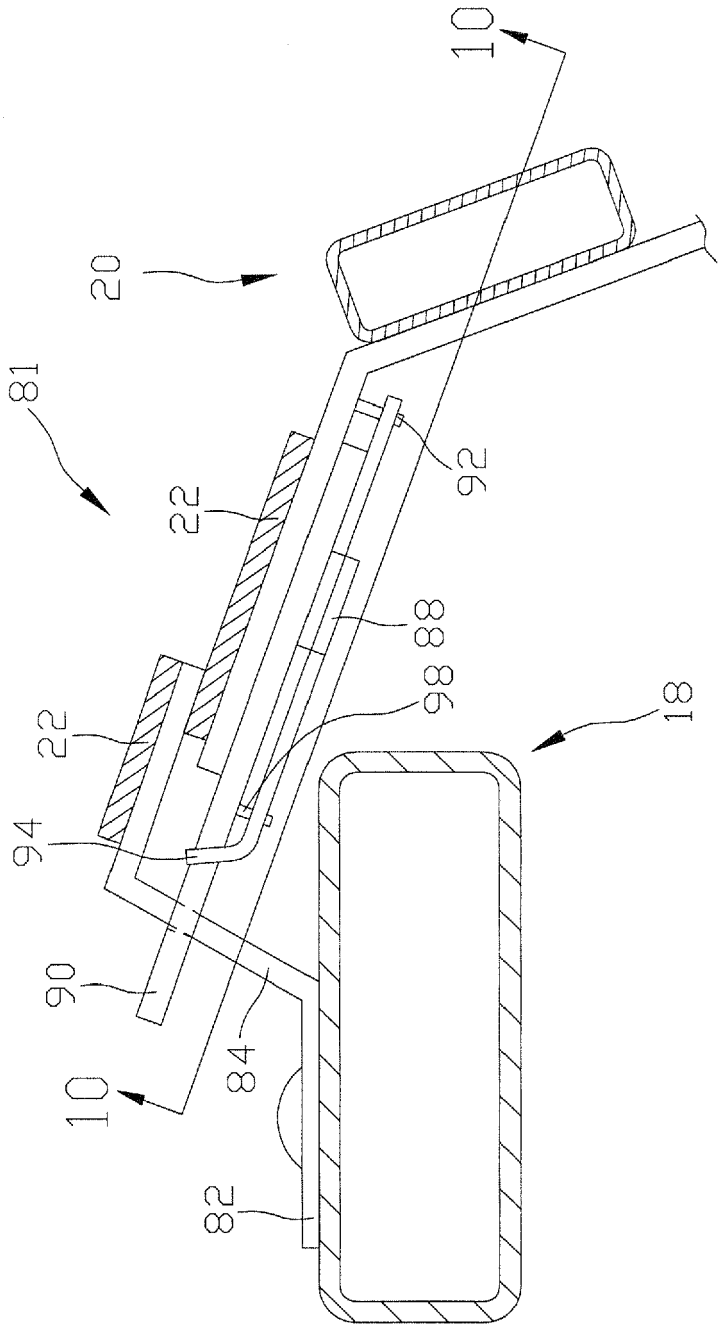

Fig.9

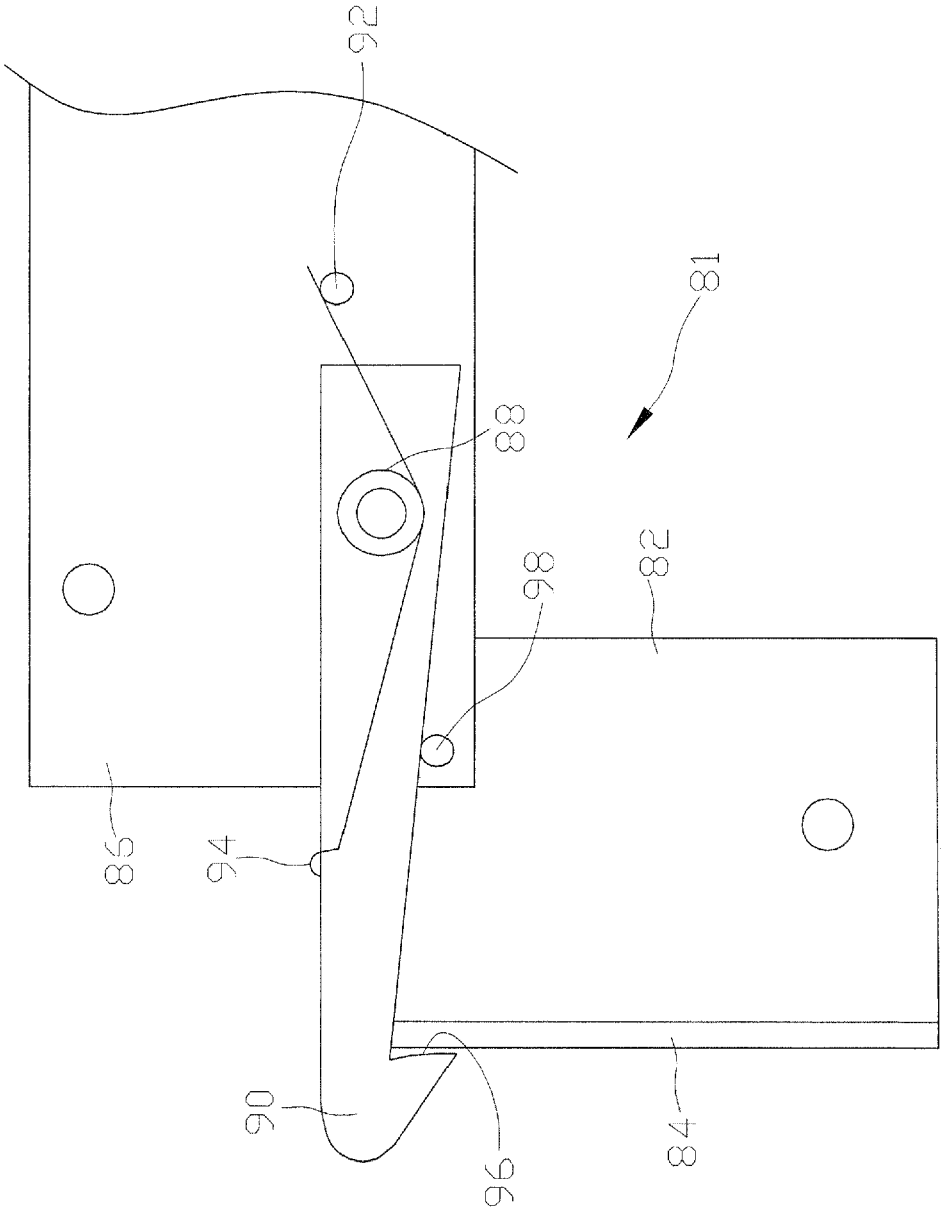

Fig.10

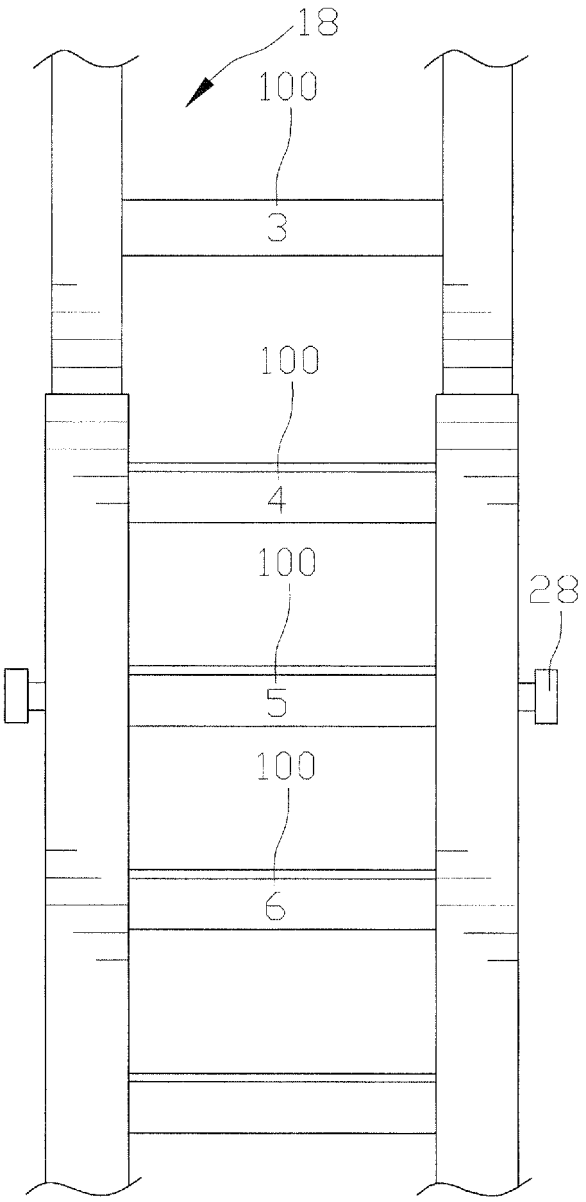

Fig.11

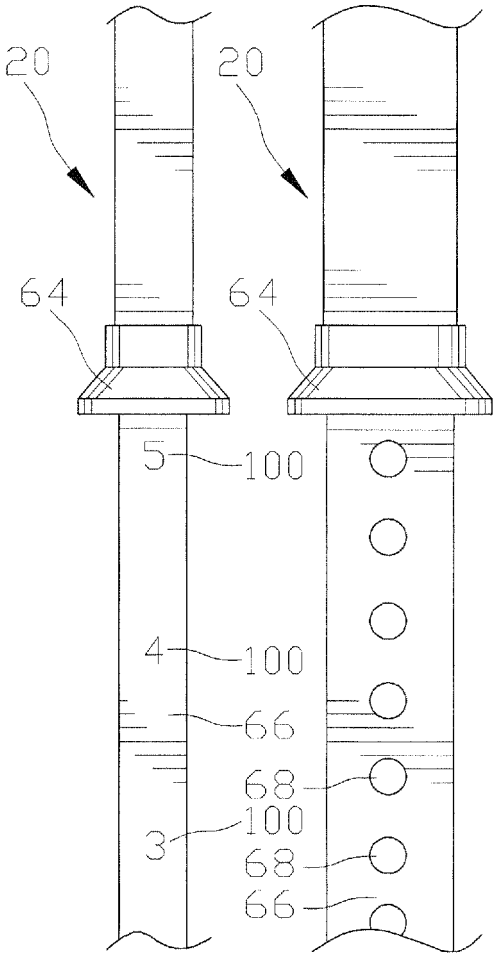

Fig.11A

Fig.11B

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 12 1000

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 7 255 198 B1 (LO JENNHWA ALAN [US]) 14 August 2007 (2007-08-14) * figures 1-4 *	1-5	INV. E06C1/22
A	FR 2 068 180 A (STALON RENE) 20 August 1971 (1971-08-20) * figures 1,3 *	2	
A	CH 290 834 A (REITZER CHARLES [FR]) 31 May 1953 (1953-05-31) * figures 1,2 *	2	
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A	FR 2 832 755 A (SEVYLOR INTERNAT [FR]) 30 May 2003 (2003-05-30) * figures 1,2a-2e *	3	
A	US 2005/045423 A1 (MEEKER PAUL K [US]) 3 March 2005 (2005-03-03) * figures *	3	TECHNICAL FIELDS SEARCHED (IPC) E06C
A	GB 2 130 289 A (QUICK SET INC) 31 May 1984 (1984-05-31) * page 2, line 7 - line 9; figure 1 *	4	
A	DE 25 746 C (CARL GOTTLIEB SCHELLER) 8 November 1884 (1884-11-08) * figure 14 *	4	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	15 May 2008	Demeester, Jan

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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P : intermediate document

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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 12 1000

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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15-05-2008

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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