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(54) A support frame

(57) A support frame comprises two elongate members (28 and 30) which have respective portions (32 and 34) which are secured together by securing means (36 and 38). Respective portions (40 and 42) of the elongate members (28 and 30) extend from the secured together portions (32 and 34) and diverge away from one another. The ends of those diverging portions (40 and 42) which are further from the secured together portions (32 and 34) are provided with loop portions (54). A further elongate part (20 or 22) of the frame extends through both loop portions (54).

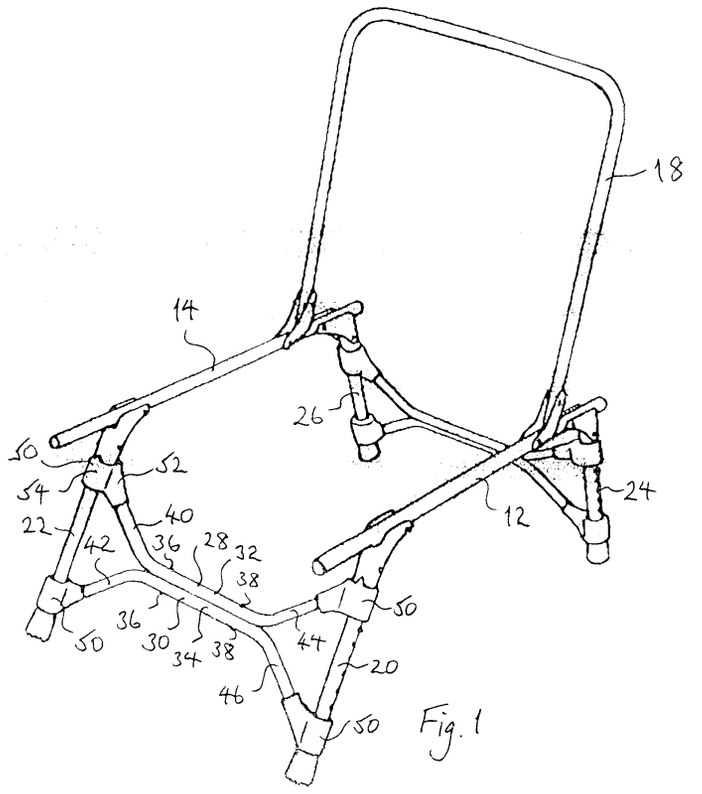

Fig. 1

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Description

[0001] The present invention relates to a support frame, such as may be used to provide the legs of a chair or a bedchair, or for a platform, or a tower, or indeed any other construction, which benefits from the presence of a support frame.

[0002] In one previously proposed support frame, the frame provides the legs of a chair for use in angling, the length of each of four legs of the chair being telescopically adjustable to accommodate uneven ground, with an outer upper tubular leg portion being pivoted to the rest of the chair, and with the two front upper leg portions, as well as the two upper tubular rear leg portions being secured together by cross tubes, one of which is straight and the other of which is bent at two positions along its length, the central portion of which being welded to the straight cross tube, and the ends of both cross tubes being welded to the upper leg parts, so that these cross tubes have the general shape of the letter `K' turned on its side.

[0003] A problem with the welding is partly the cost and partly the possible distortion to the component parts caused by the heat generated by the welding process, which in turn may cause jamming of the telescopically engaging parts.

[0004] The problem is exacerbated if the component parts of the frame are made of aluminium. This is a preferred material in the angling market and generally in the outdoor market because aluminium is light and is not so easily oxidised. However, welding aluminium together can take up to three times as long as welding steel together for any given job.

[0005] Furthermore, when aluminium is welded and no paint finishing or anodising are applied (which are again relatively expensive features), the welding increases the likelihood of the aluminium being attacked by the atmosphere causing discoloration and powder-type corrosion.

[0006] The present invention seeks to obviate one or more of the foregoing disadvantages.

[0007] Accordingly, the present invention is directed to a support frame comprising two elongate members which have respective portions with are secured together by securing means and respective portions that extend from the secured together portions and diverge away from one another, the ends of those diverging portions which are further from the secured together portions being provided with loop portions, a further elongate part of the frame extending through both loop portions.

[0008] With such a frame construction, the portions of the elongate members which are secured together do not have to be held together so strongly, because the various parts of the frame work together synergistically to reduce the likelihood that the frame will come apart. Consequently, the securing means may comprise a very light welding or no welding at all. For example, the securing means may comprise rivets or bolts.

[0009] Preferably, the loop portions may comprise tubular portions. Furthermore, they may each comprise separate components with lugs to enable them to be connected to the ends of the elongate members. These lugs may be generally hollow or tubular to receive the ends of the elongate members within them. They may receive them in this way as a tight fit.

[0010] Furthermore, the loop portions may both receive the said elongate part as a tight fit.

[0011] Further respective portions may extend from said secured together portions at ends thereof opposite those from which the first-mentioned diverging portions extend, said further respective portions also diverging away from one another, the ends of which further diverging portions which are further from the said secured together portions also being provided with loop portions, a further elongate part of the frame extending through both loop portions of the said further respective portions.

[0012] The elongate members and the elongate parts may comprise aluminium. The loop portions may also comprise aluminium, but alternatively they may comprise plastics mouldings, such as nylon or glass filled nylon.

[0013] The loop portions and the said elongate parts may be connected by bonding.

[0014] The said elongate parts may be substantially parallel to one another.

[0015] They may comprise the legs of a chair or a bedchair, in which case they may further be connected to a seat part of such a chair or bedchair by way of a pivotal connection. The present invention therefore extends to such a chair or bedchair.

[0016] The said elongate parts may comprise respective upper outer parts of respective telescopically adjustable legs. The inner portion of each telescopically adjustable leg may be held in a selected position relative thereto by means of a locking plate retained by one of the said loop portions.

[0017] Alternatively, the inner slidable leg part of each telescopic leg may be provided with a spigot which can telescopically engage in any selected one of a plurality of spaced-apart holes in the upper leg part of the telescopic leg. These holes may be located between the two loop portions of that leg.

[0018] The section of each elongate part and, correspondingly, the internal section of each loop portion may be circular. In the case of the spigot and hole construction, this has the benefit that, with a multiplicity of holes, the inner leg part can be rotated a little after the spigot has been disengaged from one of the holes so that a sliding of the inner leg by an amount which is more than one spacing between successive holes does not require engagement of the spigot in each and every hole between the one it was in and the one that is to be selected.

[0019] Alternatively, the section may be oval, or it may be generally square, which provides the advantage that relative rotation between the said elongate part and the

said loop portion is inhibited.

[0020] The two elongate members may be arranged symmetrically with one another, with the said diverging portions being generally at 60° to one another. The diverging portions may be substantially 150mm long and the tubing from which the elongate members are made may be substantially 16mm in diameter.

[0021] If the support frame provides pivotable legs for a chair or bedchair, the upper end of each elongate part may be received in a pivot member which is pivoted to the seat part of the chair or bedchair, and each upper loop portion and each pivot member may be provided with interengaging portions to inhibit relative rotation. The interengaging portions may comprise a V-shaped notch and a V-shaped protuberance.

[0022] An example of a chair embodying the present invention is shown in the accompanying drawings, in which:

Figure 1	shows a perspective view of the chair from above and from one side, with the seat fabric removed to show more of the parts of the chair frame;
Figure 2	shows a further perspective view of the chair from above and to one side with the seat fabric in place;
Figure 3	shows a front view of the chair shown in Figure 1;
Figure 4	shows a rear view of the chair shown in Figure 1;
Figure 5	shows a top view of the chair shown in Figure 1;
Figure 6	shows an underneath view of the chair shown in Figure 1;
Figures 7 and 8	show respective side elevational views of the chair shown in Figure 1; and
Figure 9	shows parts of the chair shown in Figure 1, drawn to a larger scale.

[0023] The upper part of the chair shown in Figures 1 to 8 is constructed in a conventional fashion. Thus, it comprises two parallel lengths of aluminium tubing constituting side bars 12 and 14, across which is stretched a web of seat fabric 16. A generally inverted U-shaped length of aluminium tubing 18 provides for a backrest, a further portion of the fabric 16 also being stretched across and over this tubing 18. The latter is pivotally connected to the side bars 12 and 14 to enable the backrest to be folded down onto the seat for stowaway purposes.

[0024] Two telescopically adjustable front legs 20 and 22 are pivotally connected to forward regions of the side bars 12 and 14, respectively, and two telescopically adjustable rear legs 24 and 26 are pivotally connected to rearward portions of the side bars 12 and 14.

[0025] The two front legs are held together in such a fashion as to create a frame which embodies the present invention and therefore avoids the need for welding. Likewise, the two rear legs are held together in such a manner as to form a support frame which also embodies the present invention and therefore avoids the need for welding.

[0026] Thus, the two front legs 20 and 22 are connected together by two lengths of aluminium tubing 28 and 30 which are substantially 18mm in diameter. They have respective straight parallel contiguous central portions 32 and 34 which are secured together by rivets 36 and 38. Both ends of both central portions are terminated by a bend in the aluminium tubing through 30° relative to the straight portions. Thus, at both ends of the straight portions, there are diverging portions 40,42; 44,46 of the aluminium tubing 28 and 30. Thus, each pair of diverging portions 40,42; 44,46 diverge at substantially 60° to one another.

[0027] The ends of the lengths of aluminium tubing 28 and 30 are received in respective aluminium die-cast blocks 50, each block 50 having a lug 52 which is generally tubular so that it has a blind recess which receives the associated end of one of the lengths of aluminium tube 28 or 30. Each block 50 also has a short tubular section 54, to provide a loop portion, through which extends the associated telescopic leg 20 or 22. The connections between the tubular sections 54 and the legs 20 and 22, and also between the lugs 52 and the ends of the aluminium tubing 28 and 30, are of tight fits. Internal axially extending ribbing formed in the blocks 50 facilitates this. The angle between the axis of the tubular section 54 and the axis of the lug 52 for each block 50 is substantially 60°.

[0028] As is more readily apparent from Figure 9, the upper end of each leg 20 or 22 is connected to its associated side bar 12 or 14 by way of a pivot member 60. The leg is provided at an upper end with flanges 62 and 64 between which the associated side bar 12 or 14 extends when the chair is ready for use. Rearwardly projecting ends of these flanges 60 and 64 are connected to the side bar 12 by a pivot pin 66. The pivot member 60 is also provided with a tubular portion 68, upwardly from which the flanges 62 and 64 extend, the tubular portion 68 receiving an upper end of the leg 20 or 22 which is secured therein by means of a rivet 70. The lower end of the tubular portion 68 abuts the upper end of the connecting block 50. The latter is provided with an inverted V-shaped projection 72 which engages a V-shaped notch 74 in the lower end of the tubular portion 68 to inhibit relative rotation between the block 50 and the tubular portion 68.

[0029] It will further be seen from Figure 9 that the connecting blocks 50 are connected to an outer upper tubular part 80 of the leg 20. The lower inner part (not shown) of the telescopic leg 20 is slidable within the upper outer part 80, and is held in a selected position by means of a spigot 82 (resiliently attached to the inner leg part) selectively engaging one of a series of through holes 84 spaced apart along the length of the upper part

80 of the leg 20 between the blocks 50. The lower inner part of each leg is terminated at its lower end by a foot 86.

[0030] The manner in which the two rear legs 24 and 26 are connected together is precisely the same as for the two front legs 20 and 22, and therefore will not be described separately.

[0031] Numerous variations and modifications to the illustrated construction will occur to the reader without taking the resulting construction outside the scope of the present invention. For example, the inner lower leg part of each telescopic leg could be held in place relative to its associated upper outer leg part by means of an angled plate retained in a modified construction of the lower block 50, the angle plate being brought into right angles with the leg to enable a relative sliding motion between the two telescopic leg parts and then released back to its angled position so that it bites into the inner lower leg part.

Claims

1. A support frame comprising two elongate members (28 and 30) which have respective portions (32 and 34) which are secured together by securing means (36 and 38) and respective portions (40 and 42) that extend from the secured together portions (32 and 34) and diverge away from one another, **characterised in that** the ends of those diverging portions (40 and 42) which are further from the secured together portions are provided with loop portions (54), a further elongate part (20 or 22) of the frame extending through both loop portions (54).

2. A support frame according to claim 1, **characterised in that** the securing means (36 and 38) comprise rivets (36 and 38) or bolts.

3. A suport frame according to claim 1 or claim 2, **characterised in that** the loop portions (54) comprise tubular portions (54).

4. A support frame according to any preceding claim, **characterised in that** the loop portions (54) comprise components (50) with lugs (52) to enable them to be connected to the ends of the elongate members (28 and 30).

5. A support frame according to claim 4, **characterised in that** the lugs (52) are generally hollow or tubular to receive the ends of the elongate members (28 and 30) within them.

6. A support frame according to claim 5, **characterised in that** the lugs (52) receive the ends of the elongate members (28 and 30) as a tight fit.

7. A support frame according to any preceding claim, **characterised in that** the loop portions (54) receive the said elongate part (20 or 22) as a tight fit.

8. A support frame according to any preceding claim, **characterised in that** further respective portions (44 and 46) extend from the said secured together portions (32 and 34) at ends thereof opposite those from which the first-mentioned diverging portions (40 and 42) extend, said further respective portions (44 and 46) also diverging away from one another, the ends of which further diverging portions (44 and 46) which are further from the said secured together portions (32 and 34) also being provided with loop portions (54), a further elongate part (22 or 20) of the frame extending through both loop portions (54) of the said further respective portions (44 and 46).

9. A support frame according to any preceding claim, **characterised in that** the elongate members (28 and 30) and the elongate part or parts (20 and 22) comprise aluminium.

10. A support frame according to any preceding claim, **characterised in that** one or more of the loop portions (54) comprise aluminium.

11. A support frame according to any one of claims 1 to 9, **characterised in that** one or more of the loop portions (54) comprise plastics mouldings.

12. A support frame according to claim 11, **characterised in that** the loop portions (54) comprise nylon.

13. A support frame according to any preceding claim, **characterised in that** the loop portions (54) and the said elongate part or parts (20 and 22) are connected by bonding.

14. A support frame according to claim 8 or any one of claims 9 to 13 read as appendant to claim 8, **characterised in that** the said elongate parts (20 and 22) are substantially parallel to one another.

15. A support frame according to any preceding claim, **characterised in that** the said elongate part or parts (20 and 22) comprise an upper outer part of a telescopically adjustable leg (20 or 22).

16. A support frame according to claim 15, **characterised in that** the inner portion of each telescopically adjustable leg (20 or 22) is held in a selected position relative thereto by means of a locking plate retained by one of the said loop portions (54).

17. A support frame according to claim 15, **characterised in that** the inner slidable leg part of each telescopic leg (20 or 22) is provided with a spigot (82)

which can telescopically engage in any selected one of a plurality of spaced-apart holes (84) in the upper leg part (80) of the telescopic leg (20 or 22).

18. A support frame according to claim 17, **characterised in that** the holes (84) are located between the two loop portions (54) of that leg (20 or 22).

19. A support frame according to any preceding claim, **characterised in that** the cross-section of each elongate part (20 or 22) and, correspondingly, the internal section of each loop portion (54) is circular.

20. A support frame according to any one of claims 1 to 18, **characterised in that** the cross-section of each elongate part (20 or 22) and, correspondingly, the internal section of each loop portion (54) is non-circular.

21. A support frame according to any preceding claim, **characterised in that** the two elongate members (28 and 30) are arranged symmetrically with one another.

22. A support frame according to claim 21, **characterised in that** the said diverging portions (40 and 42) are generally at 60° to one another.

23. A support fram4e according to any preceding claim, **characterised in that** the diverging portions (40 and 42) are substantially 150mm long.

24. A support frame according to any preceding claim, **characterised in that** the elongate members (28 and 30) are made of tubing which is substantially 16mm in diameter.

25. A chair or bedchair, **characterised in that** the said elongate parts (20 and 22) of a support frame as claimed in claim 8 and in any one of claims 9 to 24 read as appended to claim 8, are connected to a seat part (12 and 14) of such a chair or bedchair by way of pivotal connections means (60).

26. A chair or bedchair according to claim 25, **characterised in that** the upper end of each elongate part (20 and 22) is received in a pivotal member (60) which is pivoted to the seat part (12 and 14) of the chair or bedchair.

27. A chair or bedchair according to claim 26, **characterised in that** each upper loop portion (54) and each pivot member (60) is provided with interengaging portions (72 and 74) to inhibit relative rotation.

28. A chair or bedchair according to claim 27, **characterised in that** the interengaging portions (72 and 74) comprise a V-shaped notch (74) and a V-shaped protuberance (72).

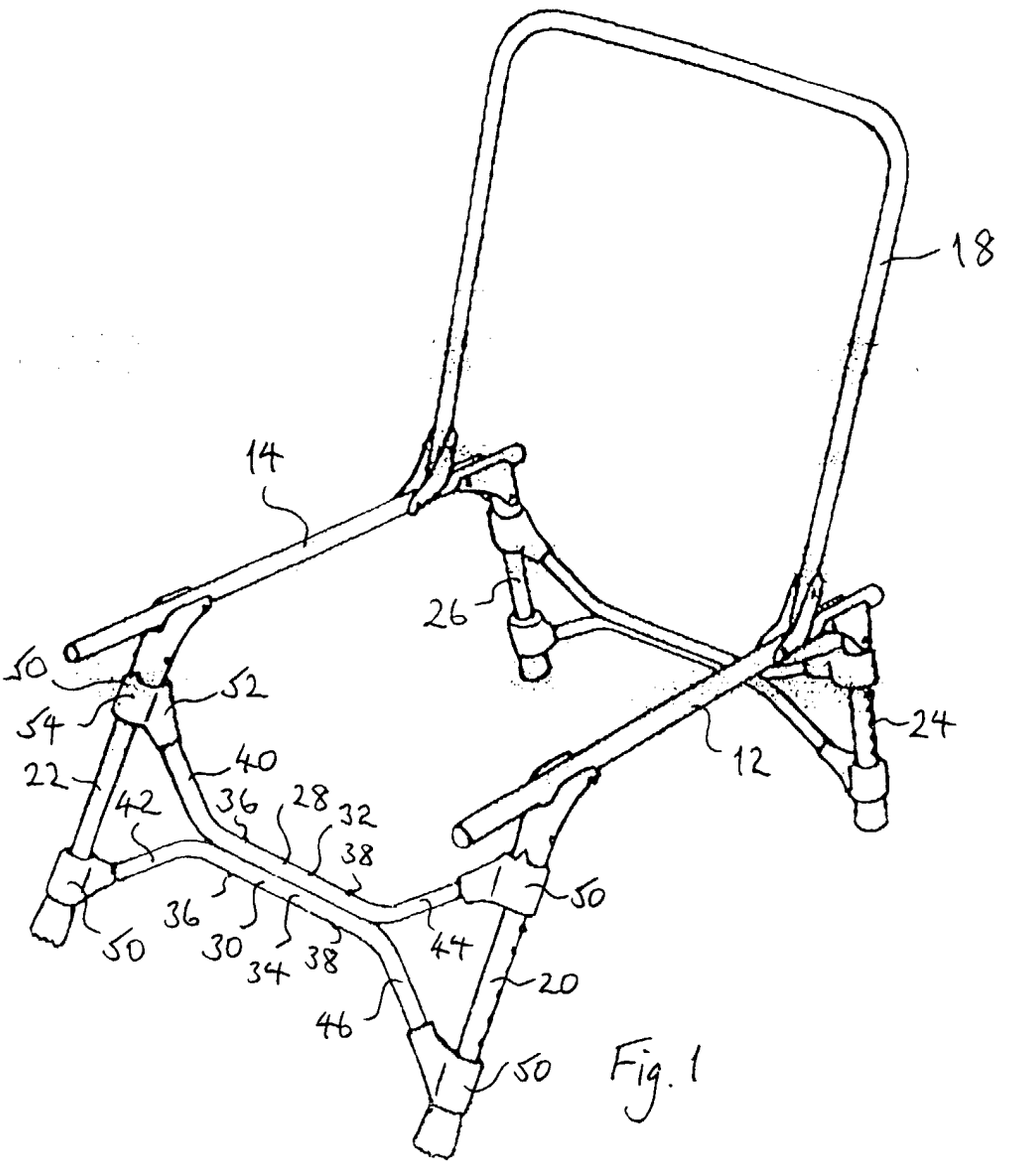
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Fig. 1

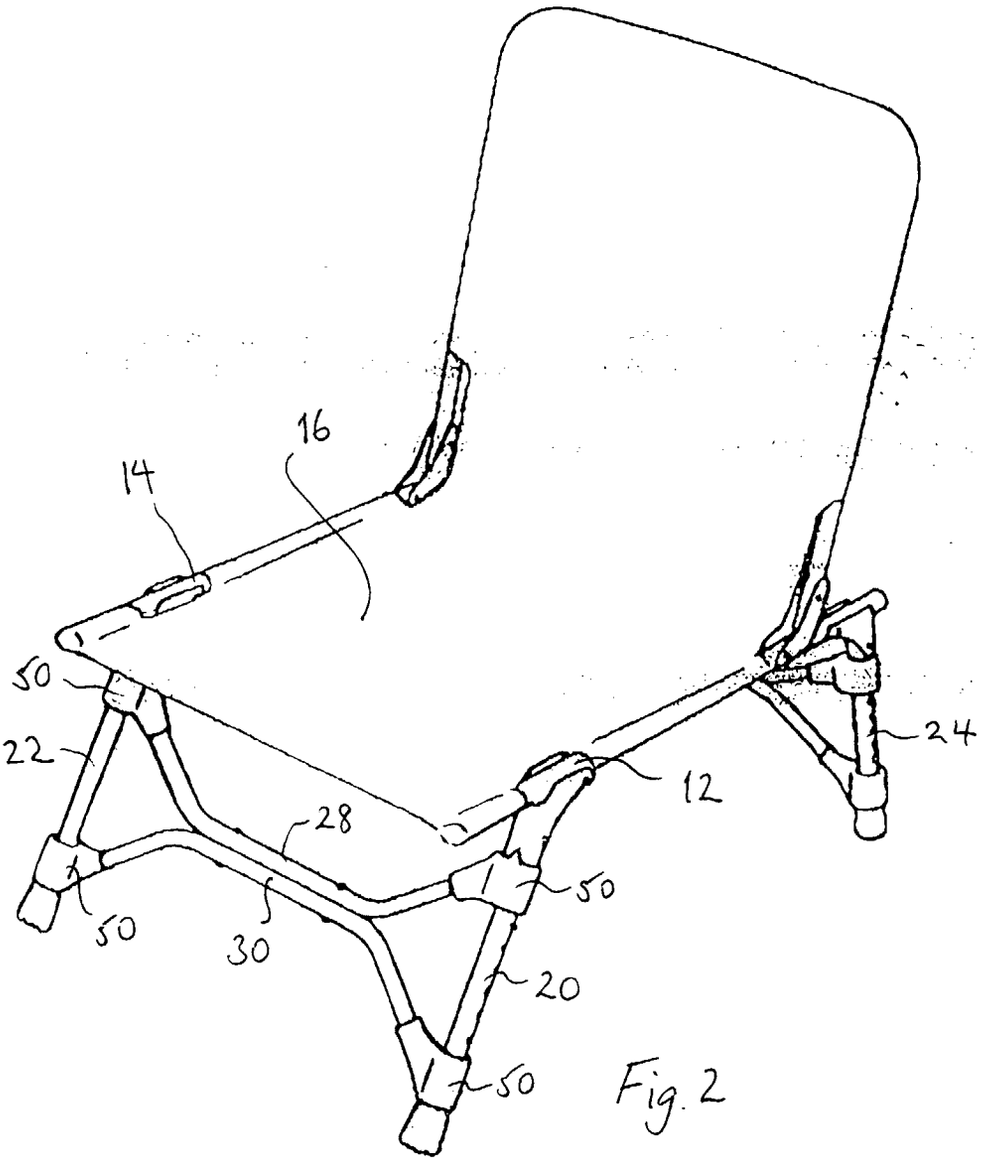

Fig. 2

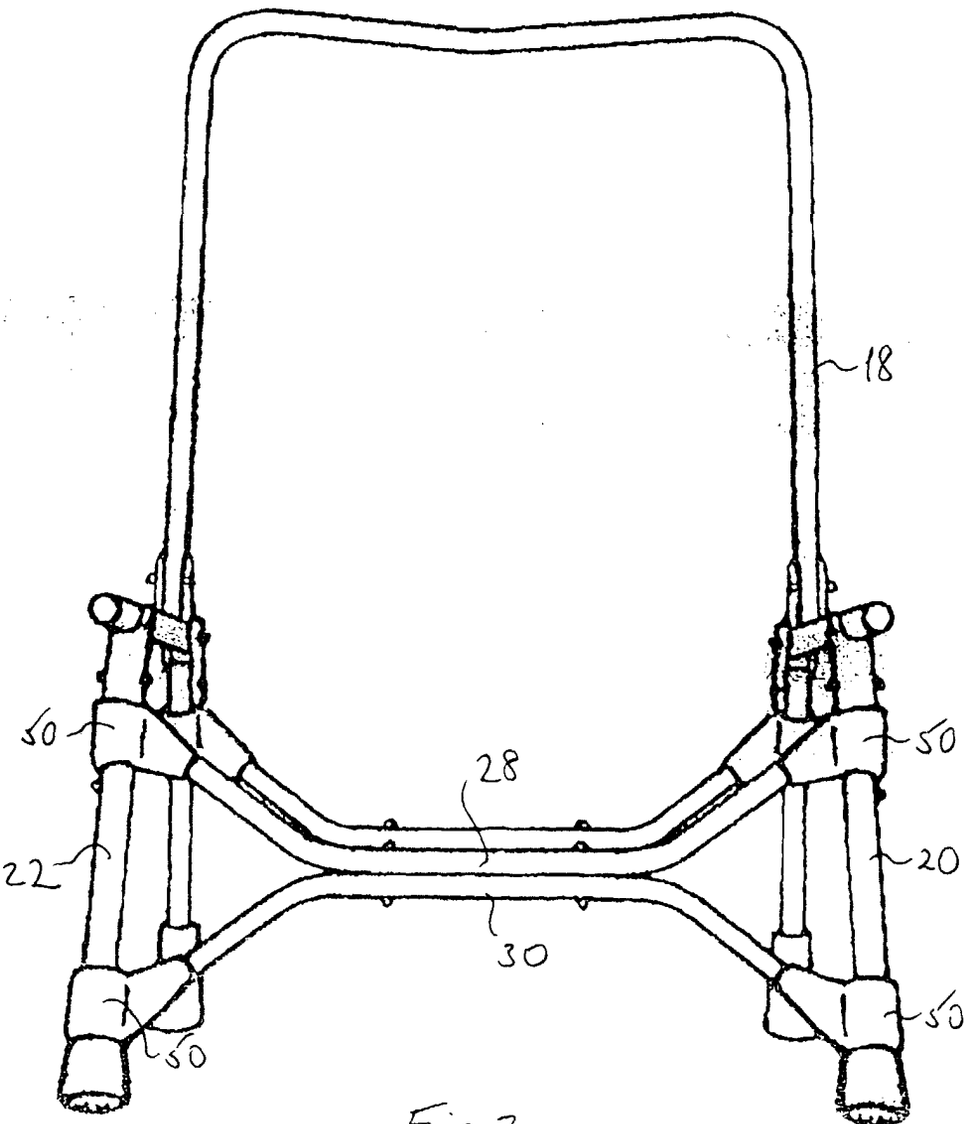

Fig. 3

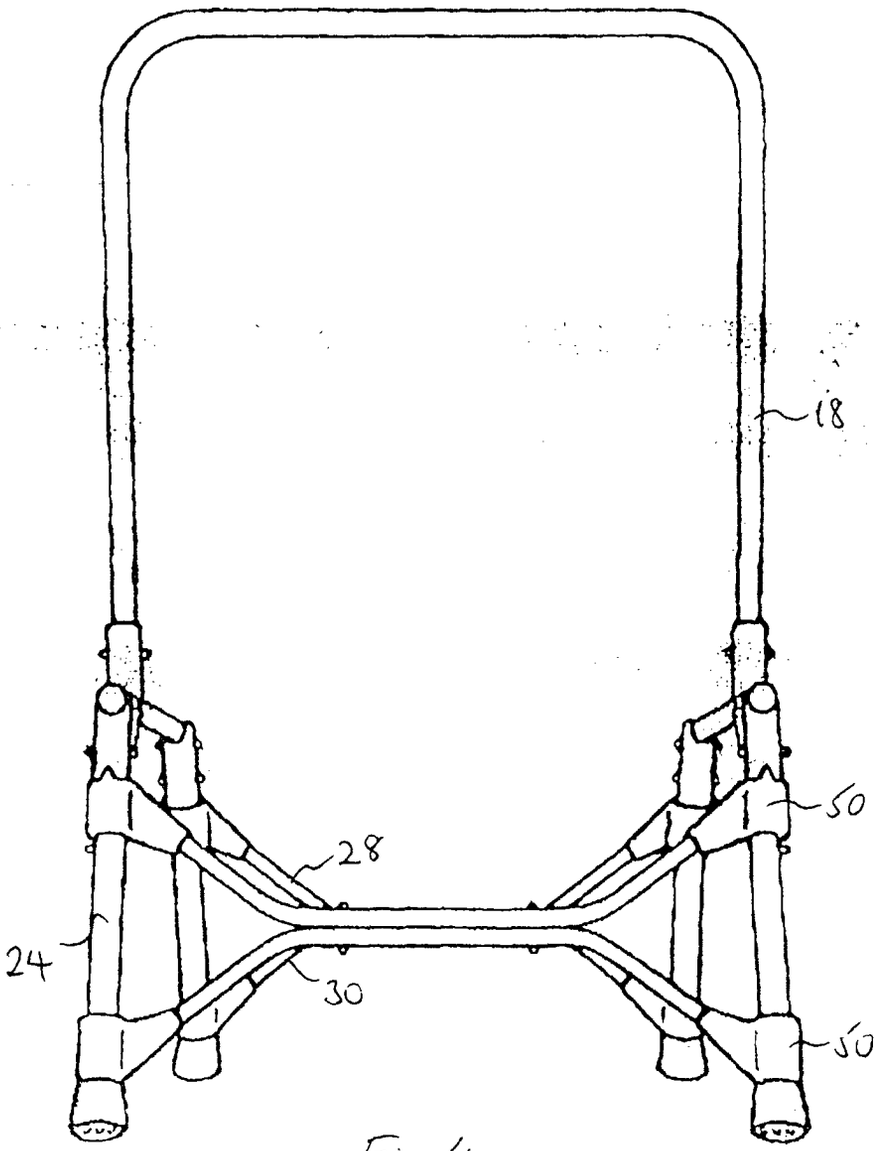

Fig. 4

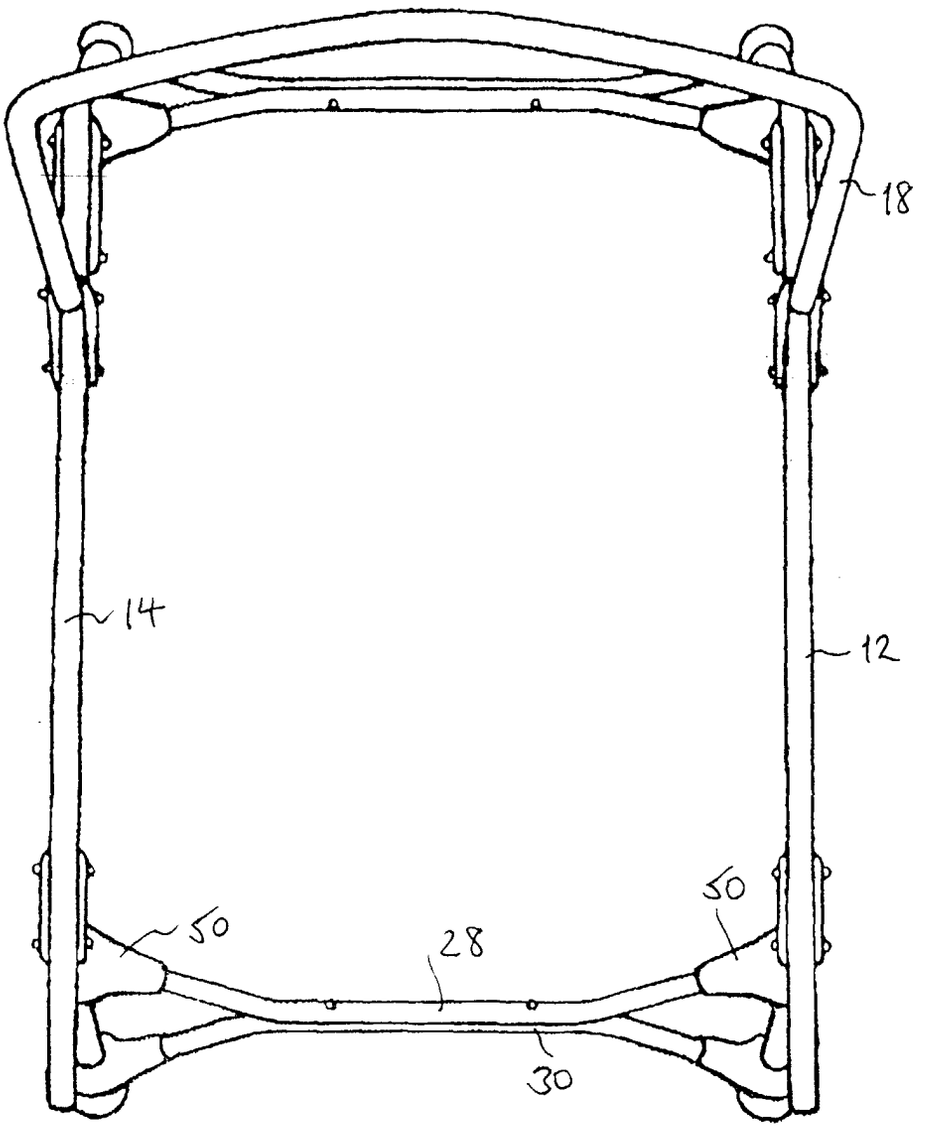

Fig. 5

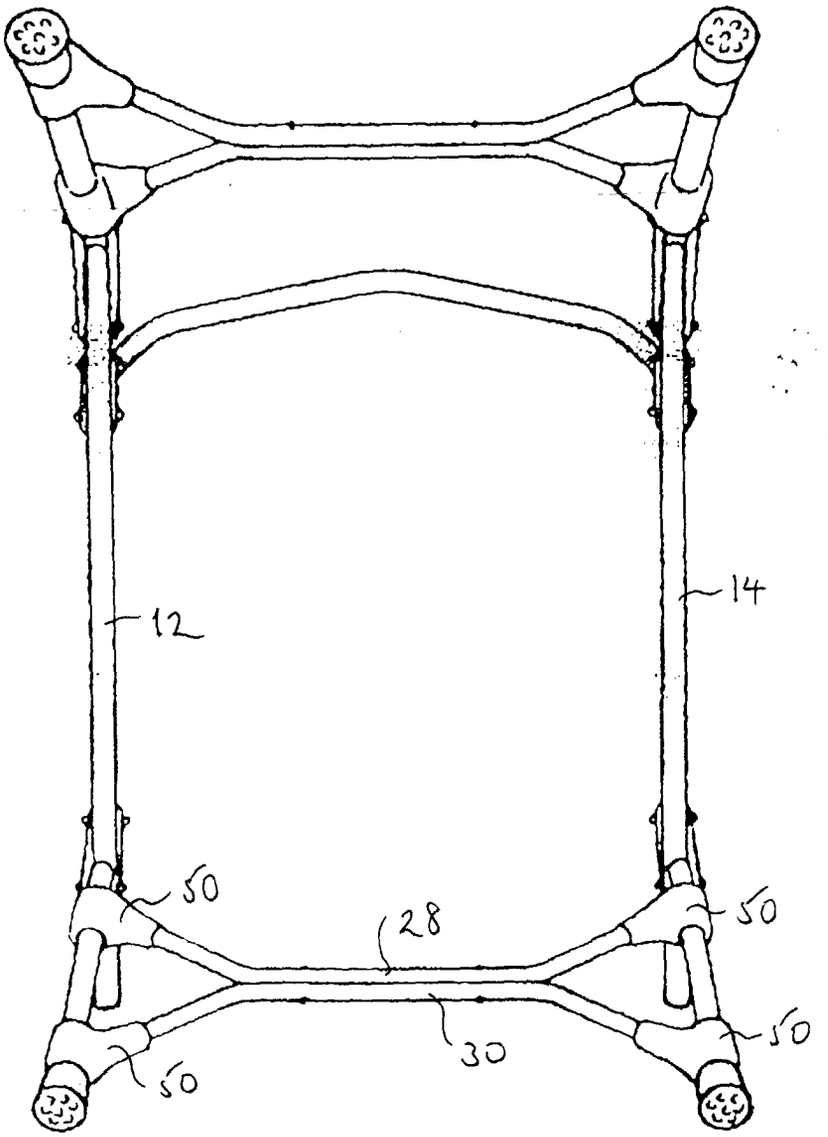

Fig. 6

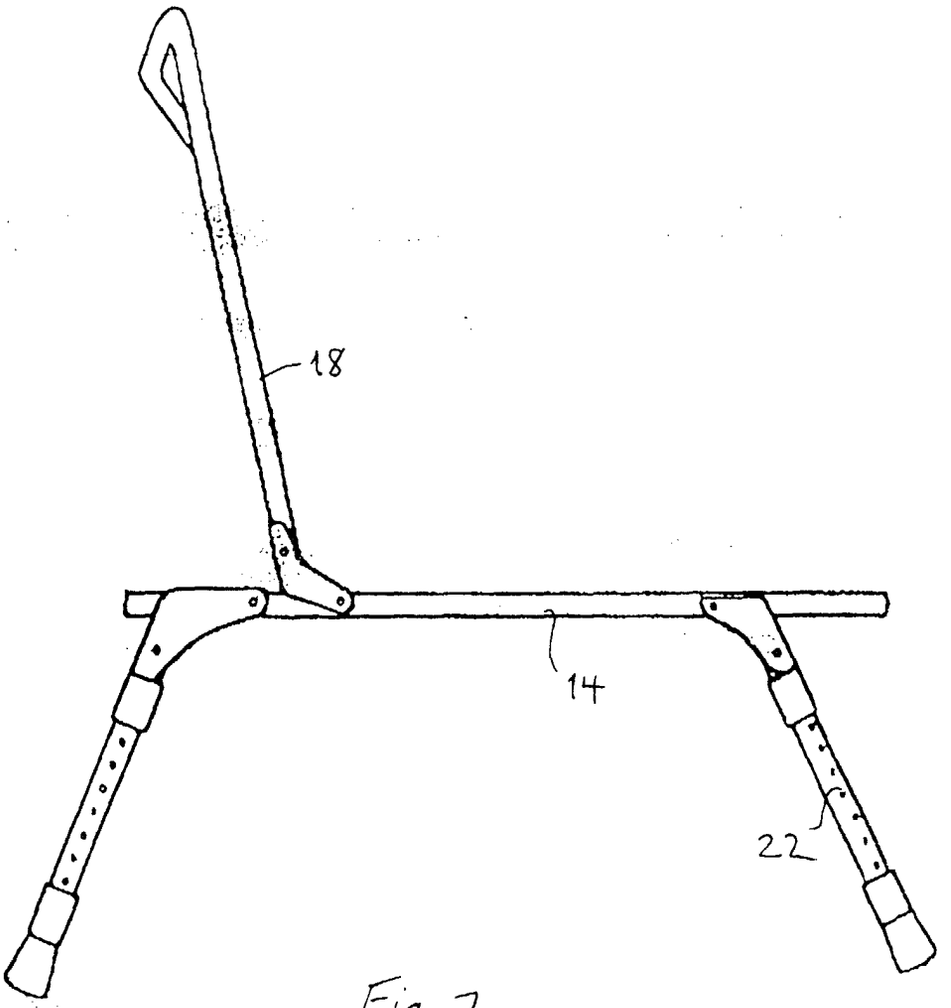

Fig. 7

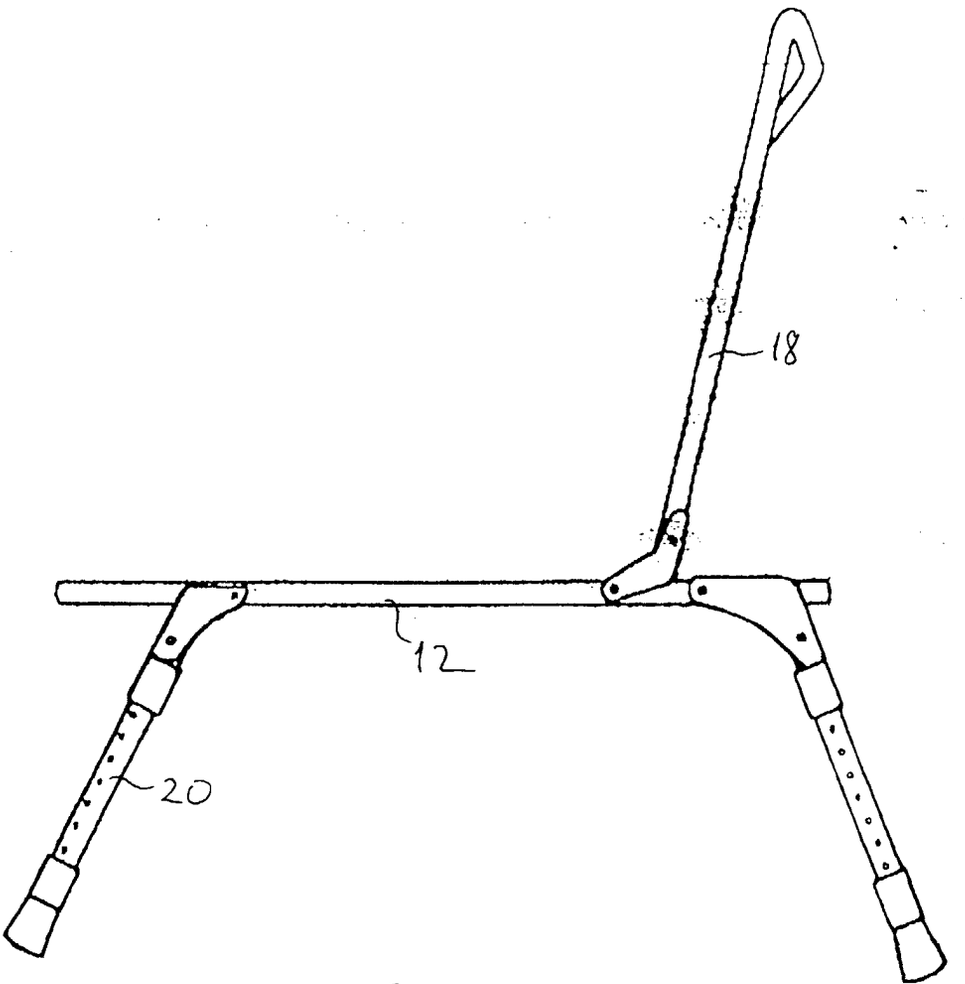

Fig. 8

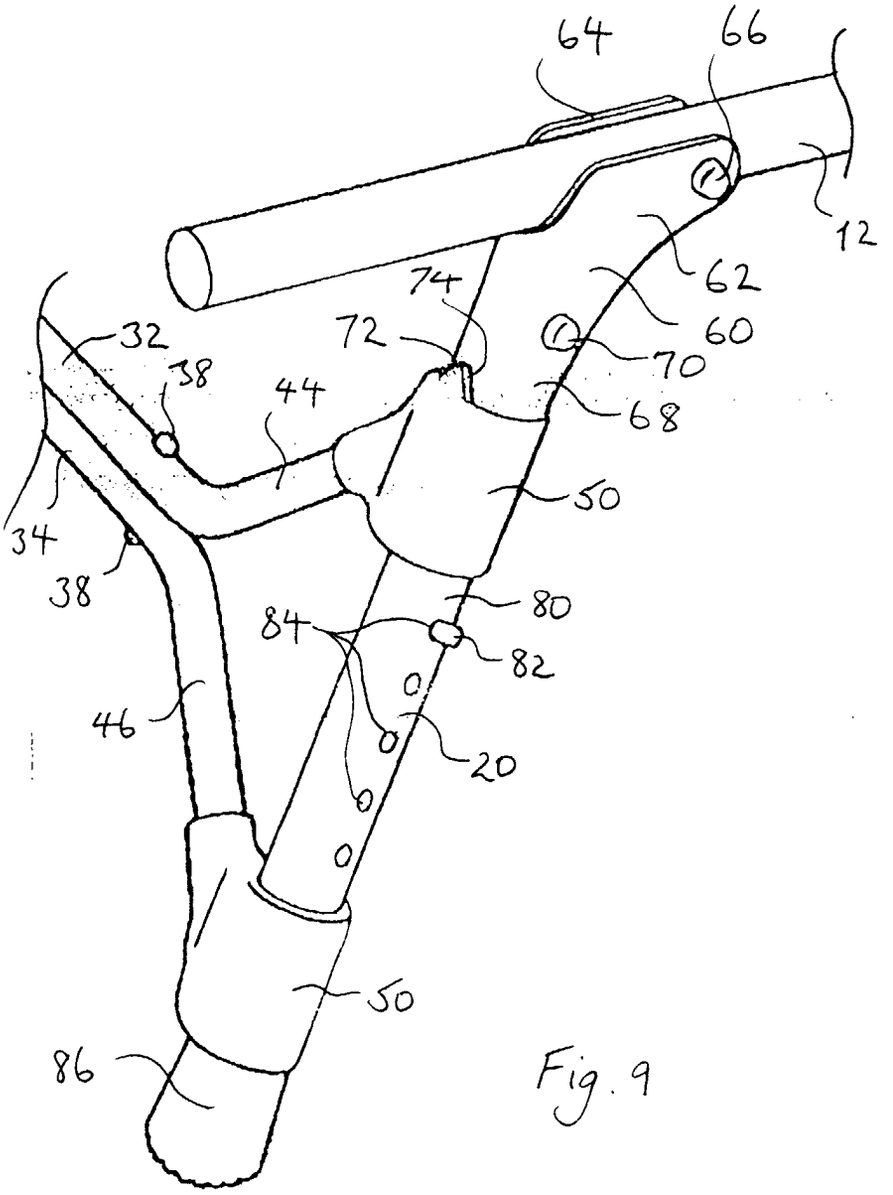

Fig. 9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 30 8979

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X Y A	US 3 690 652 A (SCHNEIDER JOSEPH C) 12 September 1972 (1972-09-12) * column 2; figure 1 * --- US 4 993 446 A (YARBROUGH GLEN A) 19 February 1991 (1991-02-19) * column 2, line 35-54; figure 1 * ---	1-3, 7-10, 13-17, 19-24 4-6,11, 25-27 18,28 1	A47C1/14 A47C4/22
Y	GB 2 294 388 A (CHUB LEISURE LIMITED) 1 May 1996 (1996-05-01) * page 8, line 2-13; claim 1; figure 1 * ---	25-27	
Y	WO 84 02560 A (POLYMOD AUSTRALIA PTY LTD) 5 July 1984 (1984-07-05) * page 1, line 1-17 * * page 4, line 22-25; claims 1,4; figure 4 * ---	4-6,11	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	GB 2 219 934 A (CBM DISPLAY GROUP LTD) 28 December 1989 (1989-12-28) * abstract; figure 3 * -----	1,25	A47C F16B A61H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	7 February 2000	Amghar, N

CATEGORY OF CITED DOCUMENTS

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07-02-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3690652 A	12-09-1972	NONE	
US 4993446 A	19-02-1991	NONE	
GB 2294388 A	01-05-1996	NONE	
WO 8402560 A	05-07-1984	EP 0131008 A JP 60500344 T	16-01-1985 14-03-1985
GB 2219934 A	28-12-1989	BE 1002790 A NL 8901417 A	11-06-1991 02-01-1990

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