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(72) Inventor: **Giacomo, Cappiello**
70022 Altamura (BA) (IT)

(74) Representative: **Russo, Saverio, Dott. Ing.**
Ing. S. Russo & C. s.r.l.,
Via Ottavio Serena, 37
70126 Bari (IT)

(71) Applicant: **Trixlet di Cappiello, Giacomo**
70022 Altamura (BA) (IT)

(54) **Mobile frame to obtain a sofa-bed with two incorporated extractable easychairs**

(57) The aim of the articulated frame is to form a suite which comprises a sofa-bed with two easy-chairs.

The articulated frame is formed by three small metal frames with bedsprings or staves reciprocally hinged and mounted with devices for their reciprocal blockage and by two smaller frames (32) constituting the structure of the two easy-chairs.

The fundamental achievement of the invention lies in its multifunctionality.

In fact with a single structure it is possible to realise the following: a sofa with armrests, a sofa without armrests and two easy-chairs, a bed with two easy-chairs, a dormeuse and an easy-chair.

The main characteristics of the invention are the devices which permit the insertion of the easy-chairs under the seating frame of the sofa so as to remain incorporated into it and the devices which block the structure in the sofa position.

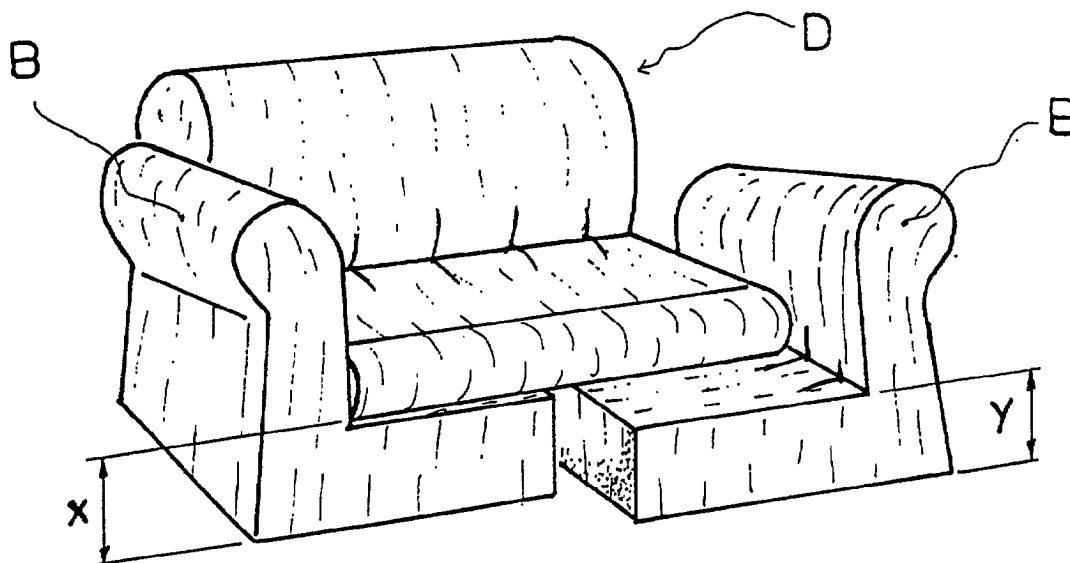


FIG. 12

Description

[0001] The invention concerns a metal articulated frame to support a sofa which is convertible into a bed, incorporating two extractable easy-chairs.

[0002] In particular it concerns a sofa-bed which is entirely assembled on a metal frame formed by three secondary component frames hinged to each other, without using fixed parts, like for example a wooden structure in which the whole sofa-bed is inserted.

[0003] The state of the art comprises numerous examples of traditional sofa-beds comprising rather complex structures or frameworks.

[0004] Among these the following international patents and patent applications are cited:

a) Italian patent application BA97A000017 entitled. "Improvement on an articulated or folding structure for a sofa-bed".

b) International Patent Application PCT/EP98/01695 entitled: "Improvements to an articulated folding structure for sofa-bed" deposited on 23/03/1998.

c) European Patent Application no. 98917059.2-2316 by Loiudice Giuseppe.

d) International Patent Application PCT WO9320732 entitled "Sofa-bed" deposited on 07/04/1993.

e) UK Patent Application N. GB 2186792A entitled "Convertible Sofa-bed" deposited on 25/02/1986.

f) International Patent Application in France N. 2656204 entitled "Bati pliant pour canapés-lits et similaires" (Folding frame for sofa-beds and similar structures) deposited on 14/09/1990.

g) United States patent N. 5,075,909 entitled "Anti-tilt Sofa sleeper mechanism" deposited on 24/04/1991.

h) European Patent Application N. 0406044A1 entitled "Mécanisme de canapé-lit perfectionné" (Improved mechanism for sofa-bed) deposited on 11/06/1990.

i) European Patent Application N. EP0628269B1 entitled "A sofa-bed having an articulated folding structure" deposited on 09/07/1993.

[0005] A main aim of the present invention is to provide a structure for sofa-beds completely innovative above all for its versatility; in particular it concerns the creation of a multifunctional structure that may be called suite-bed.

[0006] In fact the invention comprises a single metal structure which may be converted into a support for: a bed with two easy-chairs, a sofa with two arm-rests, a sofa with one armrest, like a dormeuse, and an easy-chair, a suite including a sofa without armrests and two easy-chairs.

[0007] The advantage gained, both in terms of cost and space, is evident, since the structure is ideal for

small and restricted rooms.

[0008] Moreover the multifunctionality and versatility of the invention is also evident.

[0009] For this purpose the invention solves the following problems:

1) Realisation of special easy-chairs, each one having a backrest suitable to function as an armrest for the sofa when incorporated to it, remaining blocked in that position.

2) Reciprocal single action of the component frames to form the articulated frame to block each other and form the backrest of the sofa.

3) Formation of the sofa without using fixed structures, that is, without the use of a container in which to insert the frame.

[0010] The invention is described in detail as follows, reference being made to the attached figures and designs which provide respectively:

Fig. 1) Articulated frame in bed position.

Fig. 2) Articulated frame in folding phase so as to form the sofa.

Fig. 3) Articulated frame folded into the sofa position.

Fig. 4) Top view of the bed articulated frame and smaller easy-chair frames with legs folded.

Fig. 5) Frontal view of the bed headboard supporting frame.

Fig. 6) Top view of the feature of the frame blocking device to form the sofa.

Fig. 7) Section of the blocking device of fig. 6 with the blocking wheel inserted.

Fig. 8) Frontal view of the smaller frame and of the seating frame of the easy-chair when the same is inserted under the sofa.

Fig. 9) Top view of the smaller frame of one easy-chair with legs folded.

Fig. 10) Frontal view of the smaller frame of fig. 9 if used as an easy-chair.

Fig. 11) Sofa with armrests with partial view of an easy-chair supporting legs when inserted under the sofa.

Fig. 12) Sofa and easy-chair in extracting phase so as to form a dormeuse.

Fig. 13) Easy-chair extracted.

[0011] As a whole the articulated frame comprises three component secondary metal frames, each hinged to its adjacent one, and another two separate smaller frames which form the bases of the easy-chairs.

[0012] The component frames 1 and 2, respectively those at the head and centre of the articulated frame, are moved horizontally and translationally and rise vertically until becoming almost parallel so as to form the backrest of the sofa.

[0013] The anterior component frame 3, connected to

frame 2 by hinges 37, only executes horizontal translational movements and that, by means of suitable devices, connects to and blocks to the other two frames when said frames are in a vertical position.

[0014] Each frame supports a bedspring 4 or, in alternative, staves.

[0015] Frame 3 rests on two supporting legs 5 and 6 which initially are vertical, but which are curved at their lower end, forming two horizontal barriers 7 and 8 furnished with two casters 9.

[0016] The supporting legs are welded to a horizontal rod 10 to which two short rods 11 are solid, terminating in two wheels 12 whose rotational axis is fixed and parallel to the same rod.

[0017] The pantographic structure is characteristic of the invention which allows for the rising and lowering movements of the component secondary frames 1 and 2, formed by sides 1.1 of frame 1, by the bars 13 and of the upper parts 14.1 and 15.1 of the supports 14 and 15 of the frames 1 and 2, the entire body being hinged at points 16, 17, 18 and 19.

[0018] Realisation of the backrest, and therefore of the sofa, is facilitated by a return-spring coil 23 positioned between the component frames 1 and 2; therefore this coil is an integral part of the aforementioned pantographic structure.

[0019] Another characteristic of the invention are the two devices 20 welded to the frontal horizontal part 21.1 of the resting bar 21 of the component frame 1, each of which ends with a spoon-shaped hollow 20.1, into which the wheels 12 of the seating frame 3 position themselves thus when in sofa position, preventing the seat from slipping out from under the backrest formed by component frames 1 and 2.

[0020] The devices 20 are essentially runners made of ERTOLAN material or similar, fixed to 21.1 by means of a plate 20.3, and furnished at their frontal end with a flared opening 20.2 in order to facilitate insertion of the wheel 12, while at their other extremity with a spoon-shaped hollow 20.1 in order to block the wheel.

[0021] Characteristics of the easy-chair frames are:

1) Support legs 22 and 24 each terminating with a wheel respectively 22.1 and 24.1.

2) The legs 22 and 24 are respectively joined by two rods 26 and 27 to which are fixed respectively two small rods 30 ending in two wheels 30.1 and a small rod 28, whose function is to connect to and therefore slide along the floor when the legs 22 and 24 have been folded, so as to slip them below the seating frame of the sofa; sliding on the floor is also made possible due to the two casters 31.1. positioned at the extremities of the two short rods 31 welded to the seating frame, at the extremity of which the legs 24 are hinged at point 35.

3) Solid to the bar 33, and welded to it, there is a U-shaped profile 34 which goes over and slides on one of the two bars 8 which frontally support the

seating frame 3 of the sofa.

4) The headboard 25 of the bed is furnished at its lower extremity with two horizontal bars which insert into the tubular rests 21 of the frame 1.

5) Beginning with the bed position, the sofa position is obtained out as follows:

[0022] The secondary frame 3 is horizontally pushed forwards.

[0023] Frames 1 and 2 begin to rise, aided in this movement by the pantographic structure 1.1, 14.1, 15.1, 13 hinged at points 16, 17, 18 and 19, and by the return-spring coil 23.

[0024] At the same time, the wheels 12, moving forwards together with the frame 3, to which they are solid, enter the devices 20 through the flared opening 20.2 see figures 6 and 1, in order to be blocked in the hollow 20.1: the framework is blocked into the sofa position, in which the frames 1 and 2 are raised and come back to back vertically forming the backrest of the sofa.

[0025] To position the easy-chairs below the frame 3, first of all the legs 22 and 24 of the small frame are folded, see figures 9 and 10, then the profiles 34 are positioned over the bars 8, thus sliding them on the said bars: sliding on the floor is made possible by the wheels 28.1, 30.1 and 31.1.

[0026] The articulated frame supporting the sofa and the small frames of the easy-chairs can be furnished with reciprocal blocking and unblocking devices.

[0027] Fundamental to this operation is the fixing action carried out by the stoppers 21.1 positioned throughout the structure.

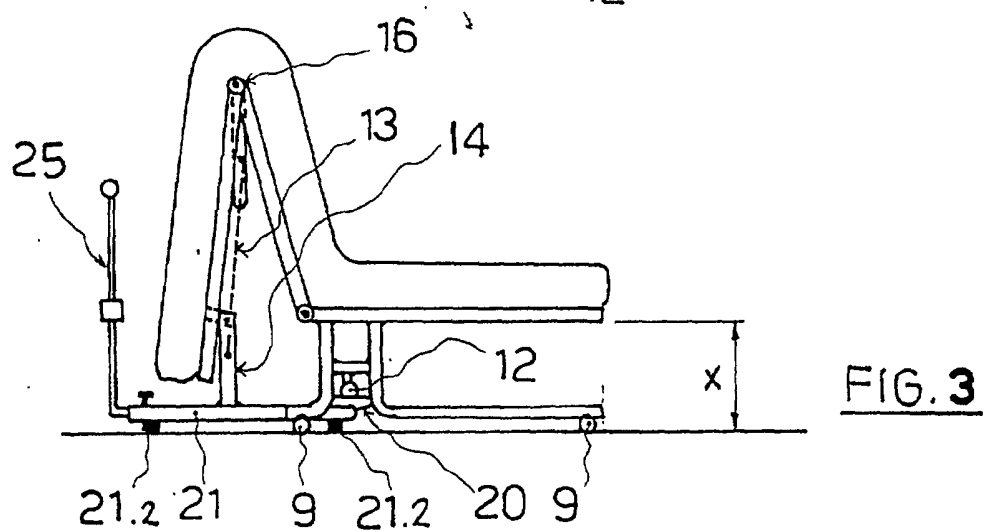
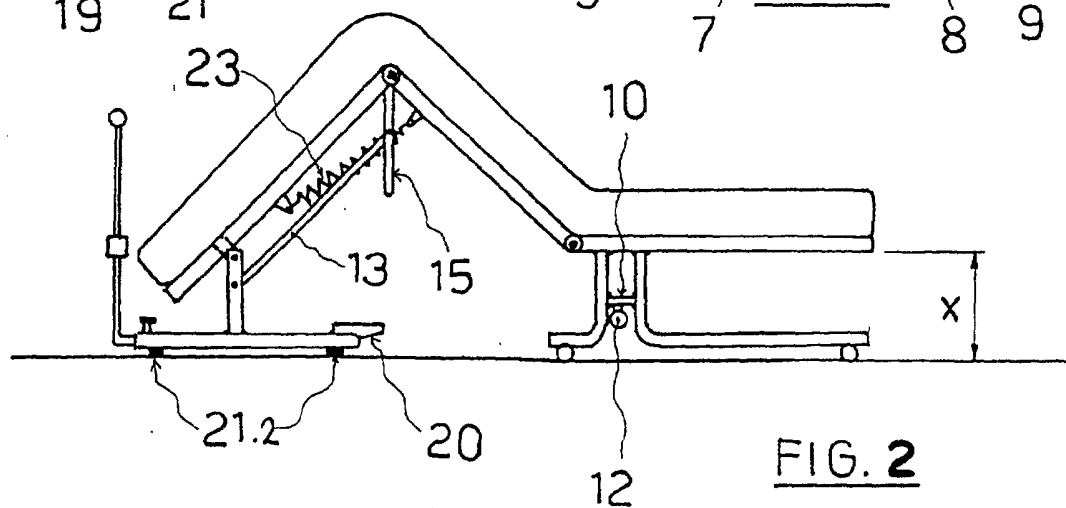
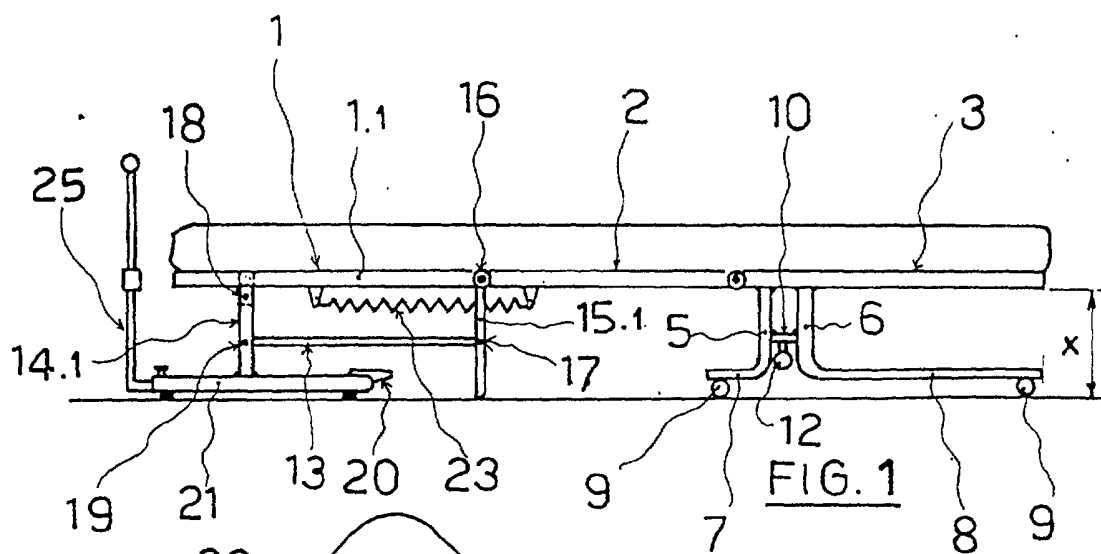
Claims

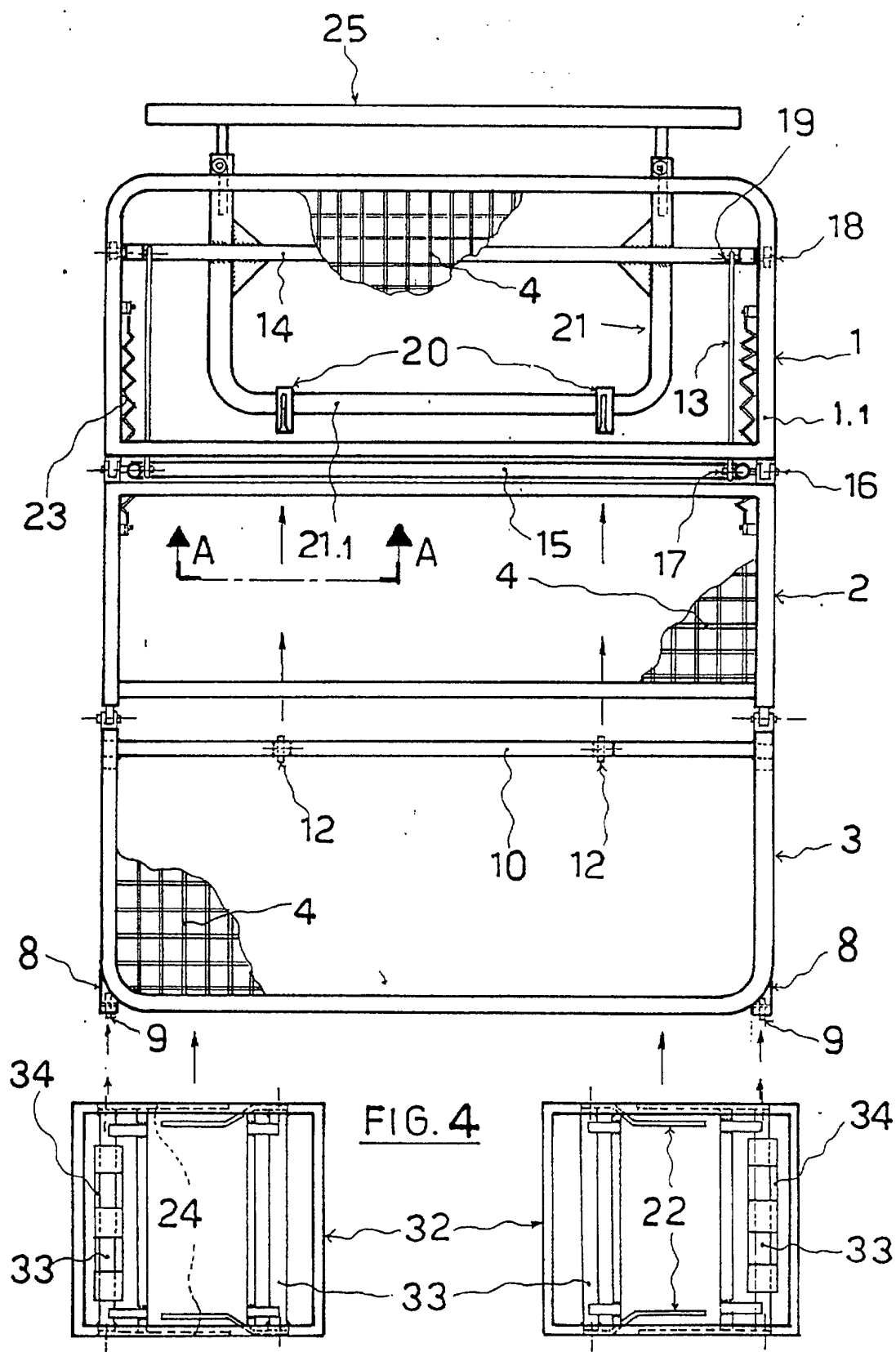
1. "Mobile frame to obtain a sofa-bed with two incorporated extractable easy-chairs", the articulated frame being an articulated metal structure comprising three component secondary frames, each hinged to its adjacent one, and including a bedspring (4) or staves, the head frame (1) and the central frame (2) being foldable around their respective hinges, with a translational and rising angular movement so as to form the backrest, **characterised by** the fact that the anterior component frame (3) is simultaneously moved by a translational movement together with the secondary frames (1) and (2), when the sofa position is required, and blocking to the above mentioned frames being made possible by one or more wheels (12) which enter a spoon-shaped hollow (20.1) of a runner (20) welded to the front part (21.1) of the bar (21) which constitutes the support base of the frame (1), the component frame (3) being furnished with two pairs of support legs, each one made of two initially vertical bars (5) and (6), subsequently, after a curvature, becoming horizontal (7) and (8) parallel to the

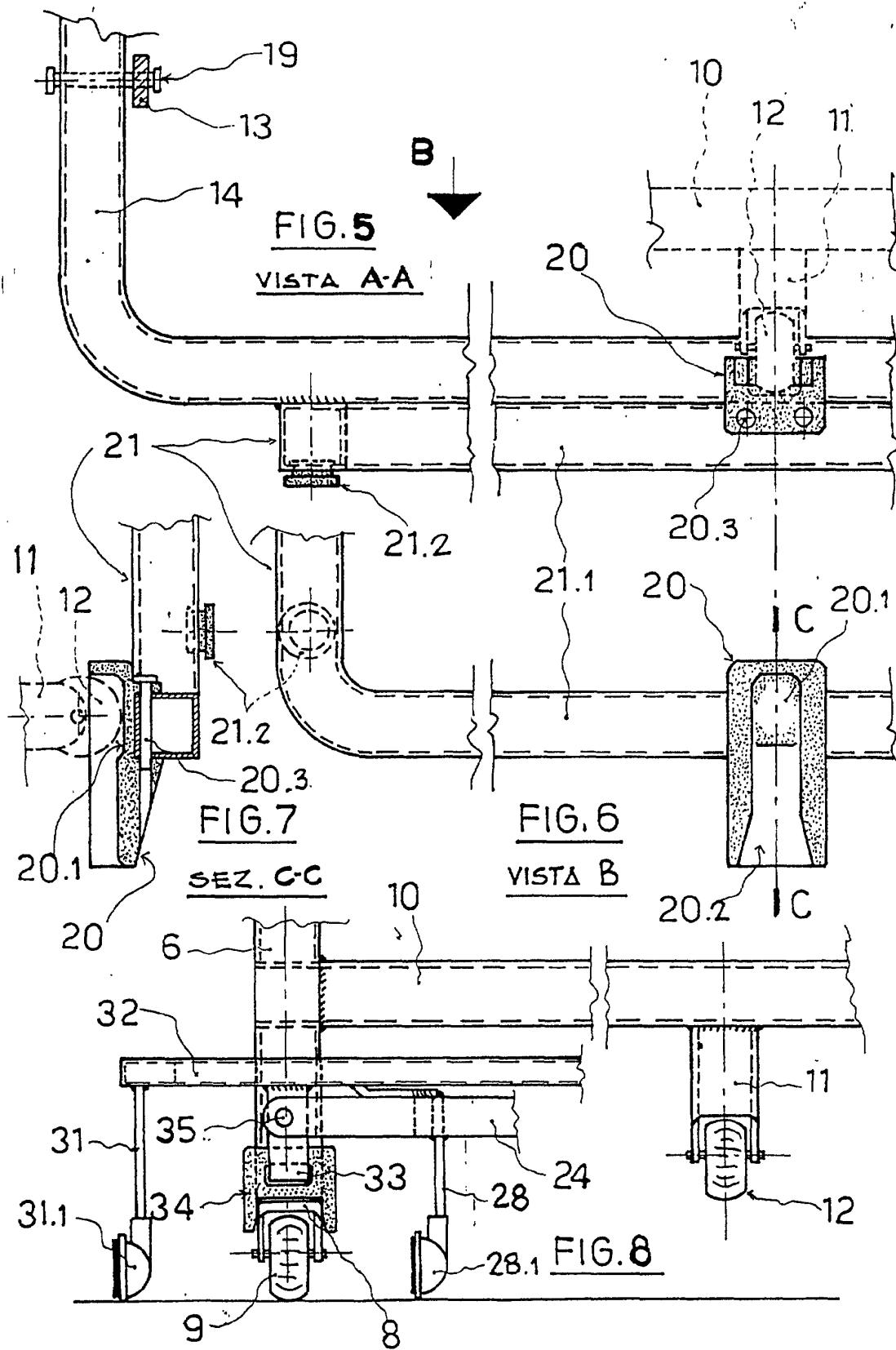
longitudinal axis of the articulated frame, at the extremities of which two wheels are mounted (9), the support bar of the frame (1), adjacent to the headboard (25) of the bed, being mounted with stoppers (21.2) which keep the structure still during conversion into sofa and bed. 5

2. Mobile frame as claimed in claim 1) **characterised by** the fact that the two bars (8) constitute longitudinal guides along which two small frames (32) forming the seats of the easy-chairs slide, to this end the small frames being furnished with appropriate U-shaped profiles (34) which slide along the above mentioned bars (8), then connecting to them during the sliding action, said small frames being furnished with four foldable legs (22) and (24) to allow for their insertion below the component frame (3) after the folding of the same legs, the sliding along the floor being made possible by means of auxiliary casters (28.1), (30.1) and (31.1) applied to the ends of small supporting rods (28), (30) and (31) shorter than said four foldable legs. 10 15 20
3. Mobile frame as claimed in claims 1) and 2) **characterised by** the fact that the caster (28.1) is applied to the mid-section of bar (27) which joins the legs (24) by means of a small bar (28). 25
4. Mobile frame as claimed in claims 1), 2) and 3), **characterised by** the fact that insertion of the small frames under the seating frame of the sofa is carried out in the direction of the longitudinal axis of the articulated frame, after having folded the legs (22) and (24), by means of a U-shaped profile (34) solid to the bar (33), which, with a sliding movement, is positioned over the bars (8) of the anterior frame support (3). 30 35
5. Mobile frame as claimed in claim 1) **characterised by** the fact that the armrests of the sofa are constituted by the backrest of the easy-chairs. 40
6. Mobile frame as claimed in claim 1) **characterised by** the fact that insertion or not of the two small frames (32), which form the easy-chairs below the sofa, allows arrangement of the following structure: 45
 - a) A sofa with armrests;
 - b) A suite, formed by a sofa without armrests and two easy-chairs; 50
 - c) A suite formed by a dormeuse type sofa with one armrest and one easy-chair;
 - d) A bed, with headboard and two easy-chairs.

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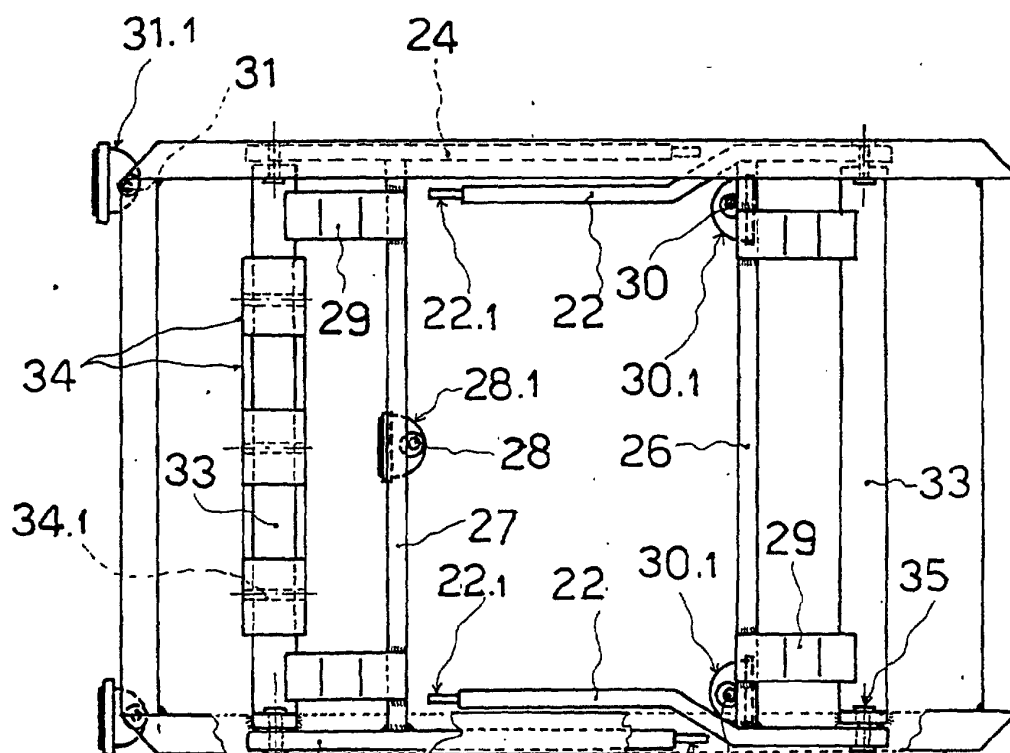


FIG. 9

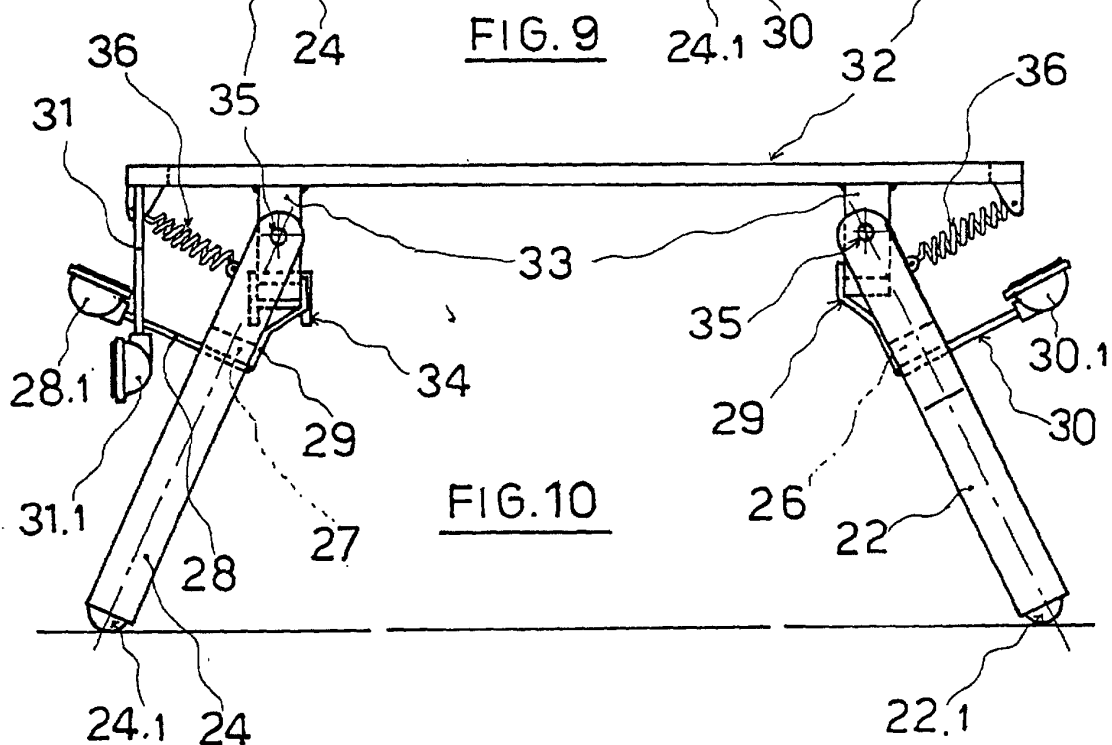
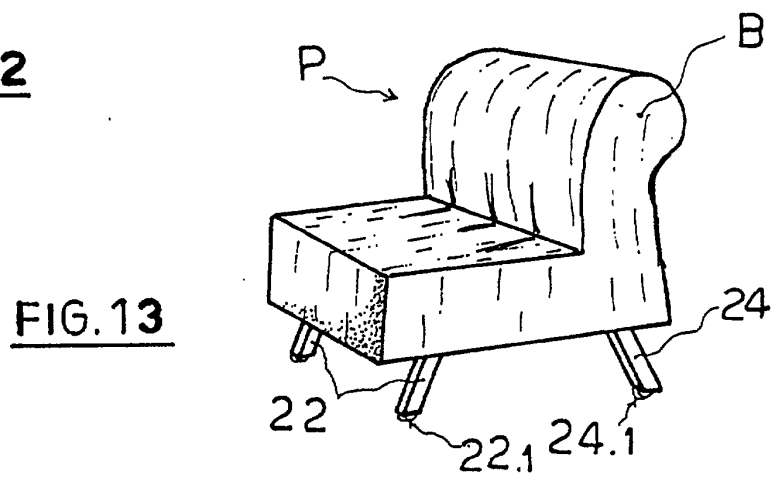
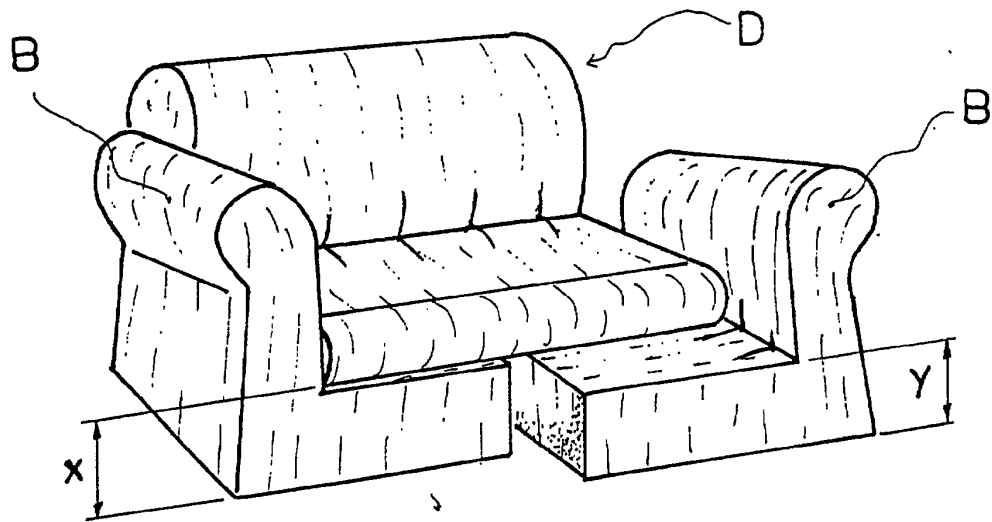
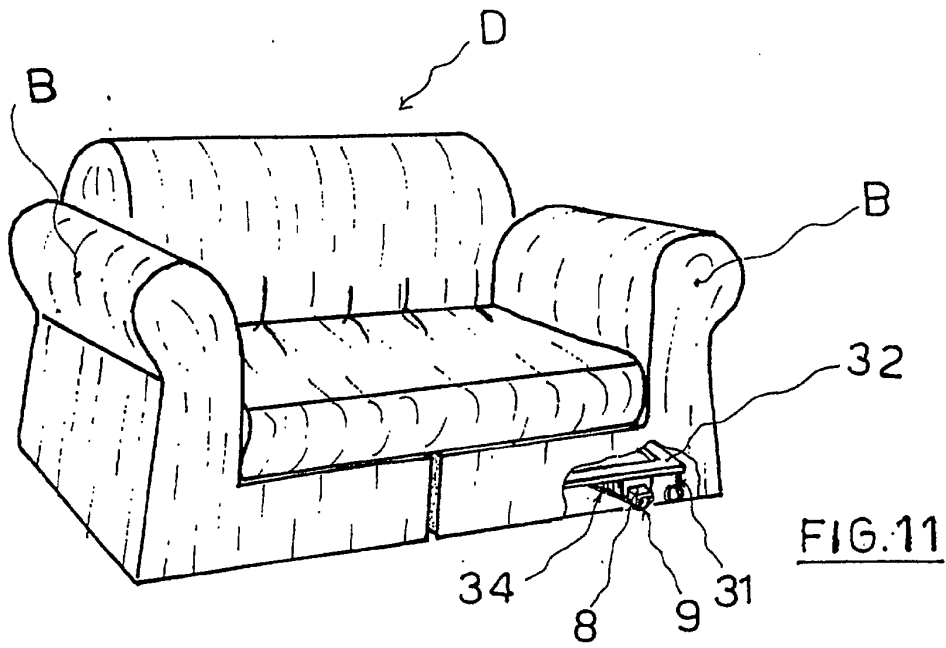


FIG. 10





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EUROPEAN SEARCH REPORT

Application Number
EP 00 20 3944

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)
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10 April 2001	Examiner VandeVondele, J
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EPC FORM 1503 03/92 (P04001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 20 3944

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