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(12) # EUROPEAN PATENT APPLICATION

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(54) **Construction assembly.**

(57) A bed assembly consists of four upright members 10, two cross members 12, the ends of which slide into slots in the upright members 10, and hinged together auxiliary members 16. The auxiliary members 16 brace the cross members and urge the ends of the cross members against the sides of the slots. The members are all formed from lengths of steel tubing suitably bent and shaped at their ends.

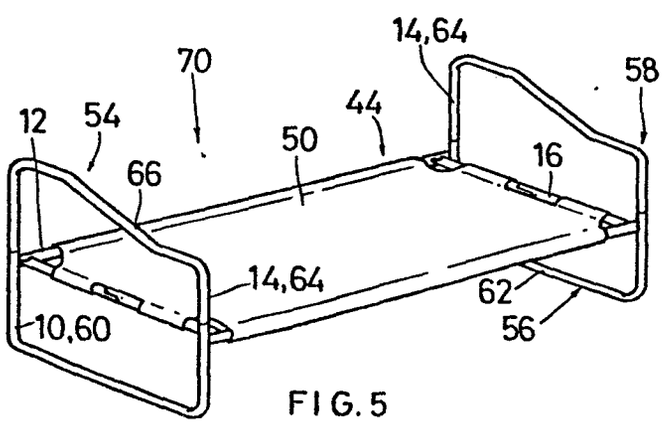

FIG. 5

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THIS INVENTION relates to a construction assembly and to construction members thereof, for constructing furniture.

This invention relates more particularly to a collapsible assembly, that is an assembly that can be assembled and disassembled repeatedly as required. Earlier proposals usually requried special tools or incorporate relatively complicated manufacturing procedures to form the members of the assembly with suitable interconnecting parts.

It is an object of the invention to provide an assembly where the members can be easily formed and together form an assembly which is firm and strong in its assembled form and is easily assembled and disassembled.

According to the invention there is provided a collapsible furniture assembly comprising elongte upright members each having a coupling formation for receiving and supporting a respective end of a cross member, elongate cross members which extend at right angles to the upright

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members and have ends which fit into respective of tne formations, and two part pivoted-together auxiliary members each extending between and transverse to a pair of cross members being arranged when the two parts are co-linear to urge respective enas of cross members in the transverse direction against restraining means to secure the ends in the coupling formations.

The assembly may include a fabric sheet fitted to the pair of cross members and each of the auxiliary members such that the sheet is planar and taut when the two parts of each of the auxiliary members are co linear.

The members may all be formed from lengths of rigid hollow tubing. The hollow tubing may be metallic tubing, including steel.

The upright members may be formed by the limbs of a substantially U-shaped member where the central limb forms a base of the assembly.

An upper sub-assembly may be arranged to fit into the assembly from above and when fitted to inhibit upward movement of the ends of the cross

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members out of the coupling formations.

The effective length dimensions of the auxiliary members may be variable to facilitate locating them in an operative position between two cross members. The auxiliary members, comprising two parts, are pivoted together so as to be displaceable between an operative co-linear configuration where the length dimension is maximised, and an inoperative configuration where the length dimensions is minimised. This allows the cross members where coupled by a fabric sheet for example to fold together for storage and transporation. It is mentioned above that the auxiliary members when the two parts are co-linear, secure the ends of the cross members against restraining means. Thus, where the uprights are formed by U-shaped tubular furniture end units, the cross members tends to urge the uprights slightly outwards from their unstrained position and the restraining means is derived in effect by the natural resilience or springiness of the U-shaped tube. Fabric or links could also be used, extending between the upright members, to biase the uprights against the transverse urging caused by the auxiliary member.

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Embodiments of the invention will now be described by way of example, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of parts of three members of an assembly according to the invention;

Figure 2 is a perspective view of a frame constructed with members of the assembly;

Figure 3 is a side view of a further frame constructed with members of an assembly;

Figure 4 is a side view of an auxiliary member of an assembly;

Figure 5 is a perspective view of a bed assembly;

Figure 6 is a perspective view of a bunk bed assembly, and

Figure 7 is a perspective view of a desk assembly.

In the drawings, like components or members of different assemblies are indicated by like reference numberals. Further, for brevity and ease of description, embodiments of the invention are hereinafter described in their in use orientation as shown in the drawings, and words such as "downwardly", "upwardly", "vertical", etc. which generally indicate relative position or

direction of assemblies are used.

In the drawings, reference numerals 10, 12, 14 and 16 generally indicate an upright member, a cross member, a locking member and an auxiliary member respectively, that are all formed from lengths of tubing, and constitute members of an assembly according to the invention.

The upright member 10 has a connecting end portion 18 in which there are two longitudinal spaced slots 20. The cross member 12 has an end portion 22 formed by flattening the ends of the cross member 12, which is bifurcated to provide two substantially planar connecting formations 24 receivable into the slots 20 in the upright member 10. (The ends of the cross member may also be provided as one flat formation or divided into more than two planar formations). The under-surface at the base of each of the connecting formations 24 defines a recess 26 engagable with the lower portion 28 of the peripheral wall of its associated slot 20.

The locking member 14 has a connecting end portion 32 that is narrower than an adjacent

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portion 34 thereof, and formed by rolling the end of the member 14, to define a spigot 36. The spigot fits inside the connecting end portion 18 of the upright member 10 such that in use the spigot 36 inhibits upward displacement of the end portion 22 of the cross member 12 and hence inhibits disconnection of the cross-member 12 from the upright member 10.

It will be appreciated when viewing Figure 3 that if the locking member 14 is, as is preferred, made to spring into position into the upright members 10 then the locking member jams as it enters further. This ensures that there is little or no tendency for the member 14 to slide upwards and out of the upright members 10.

The auxiliary member 16 has a somewhat flattened engaging portion 38 at each end thereof to be receivable in longitudinally spaced engaging slots 40 in the cross member 12 adjacent the end portions 22 thereof. The auxiliary member 16 comprises two lengths of tubes 42 (ie 42.1 and 42.2) which are pivotally connected to one another such that they are pivotal between an operative configuration where they are co-linear, and an

inoperative configuration in which they are inclined to one another thereby to reduce their effective length. (see Figures 2 and 4).

In Figure 2, a frame for a bed or settee is indicated generally by reference numeral 44. The frame 44 comprises two, spaced, parallel cross-members 12 connected to one another by means of two auxiliary members 16 which extend transversely across the overall assembly in use with their engaging portions 38 located in the engaging slot 40 of the cross member 12. The auxiliary members 16 serve to maintain the cross-members 12 parallel to and spaced from one another and to press the ends 22 transversely against the sides of the slots 20. This imparts rigidity to the overall assembly as well as security to the connection between the ends 22 on the slots 20.

The members 12 and 16 are threaded through hemmed portions 48 of a fabric sheet 50 of a suitably strong, stretch resistant material which defines a supporting surface 52 for supporting a user of the furniture in a reclining or sitting position. The fabric also improves the overall

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strength and rigidity of the assembled furniture by being stretched taut and inhibiting relative displacement of members 12 and 16.

In Figure 3, an end frame for a bed or settee, or desk is shown generally by reference numeral 54. The frame 54 formed of a length of tubing comprises a base portion 56 and an upper portion 58. The base portion 56 is substantially U-shaped with spaced arms 60 projecting upwardly from a base element 62, and each of the arms 60 comprises one of the upright members 10 of the assembly. Further, the upper portion 58, or sub-assembly, is an inverted substantially U-shape, with spaced arms 64 projecting downwardly from an upper element 66, and each of the arms 64 comprises a locking member 14 consisting of a spigot 36 which fits inside the upper end of one of the arms 60 of the base portion 56. It can be seen from Figure 3 that the spigots 36 are of a length such that they extend to a position in the respective upper slots 20.1 of the arms 60.

In Figure 5, a bed or settee assembly is indicated generally by reference numeral 70, the bed or settee 70 comprises two of the frames 54 of

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Figure 3 that are connected to one another via the frame 44 of Figure 2.

In Figure 6, a bunk beds assembly is indicated generally by reference numeral 70 and 74 respectively. The lower bunk bed 70 has already been described above with reference to Figure 5, and is shown in Figure 6 with a mattress 76 located on the material sheet 50.

The upper bunk bed 74 is similar in most respects to the lower bunk bed 70. However, the upper bunk bed has a frame 78 at the head and at the foot of the bed, and the frame 78 includes a base portion 80 that is substantially U-shaped with spaced arms that project upwardly from a base element 84 that is complementary to the upper element 66 of the upper portion 58 of one of the frames 54 of the lower bunk bed 70. The upper bunk bed 74 has a safety rail 86 on each side thereof with engaging formations (not shwon) at the ends thereof similar to the engaging portions 38 of the auxiliary cross-member 16. The engaging portions 38 are receivable in further engaging slots (not shown) appropriately located in the walls of the cross members 14.

In Figure 7, a desk assembly is indicated generally by reference numeral 90. The desk assembly 90 includes two spaced frames 54 connected by two cross-members 12, having two auxiliary members 16 located between the respective corresponding ends 22 thereof to impart rigidity to the resulting assembly on which a conventional desk top 92 is supported.

To construct the bed or settee 70 of Figure 5, the cross-members 12 are threaded through the hems 48 along the long sides of the material sheet 50. Thereafter the auxiliary members 16 are threaded through the hems 48.2 along the short sides of the sheet 50, and are engaged with the cross-members 12 as shown in Figure 2. The base portions 56 of the two frames 54 of Figure 3 are connected to the connecting end portions 22 of the cross-members 12 with the parts of the auxiliary cross-members 16 occupying their inoperative configuration. The upper portions 58 of the frames 54 are then engaged with the base portions 56 such that the spigots 36 are located in the connecting end portions 18 thereof to lock the cross-members 12 to the upright membets 10 of the base portion 56. Finally, the parts 42 of the auxiliary members

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16 are pivoted with respect to one another and to the cross-members 12 and frames 54 to their operative configuration, thereby increasing the rigidity of the bed or settee 70 and inhibiting movement of the cross-members 12 and/or the upright members 10 with respect to one another by urging the ends 22 transversely against the sides of the slots 20. The cross members 12 urge the ends 22 against the natural resistant or opposite restraint of the upright members 10 to remain in their natural vertical position. In other words the natural separation of the members 10 is chosen to resist the urging caused by the cross members 12 and forms the restraining means.

In oroer to construct the bunk beds 70, 74 of Figure 6, each of the beds 70, 74 is constructed separately as described above for the bed or settee 70. Thereafter, the bed 74 is located above the bed 70 and retained thus by means of connectors (not shown) engageable with the upper elements 66 of adjacent frames 54.

The frame 54 for the desk 90 is constructed in a similar manner to the bed or settee 70.

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In order to construct a double bed (not shown), corresponding uprights 10 of two of the frames 54 can be connected to one another by means of a connector (not shown) to provide a frame for the head of the bed. Similarly a frame for the foot of the bed can be provided. Thereafter cross-members 12 and auxiliary cross-members 16 can be used to construct the remainder of the bed.

Embodiments of the invention enable the formation of assemblies which are simple and versatile and which can be constructed and dismantled easily. It will be noted further that except for the pivot pin for the auxiliary members all the parts of the described assemblies are formed out of and by machining lengths of tubing. The tubing must be cut to length, bent, and end formed as required, but in general all such operations can be carried out in a relatively poorly equipped workshop. In other words non-expensive and non-dedicated machines only are required to form assemblies according to the invention.

The tubing may be formed of steel or other metals as well as of plastics material where desired.

CLAIMS

1. A collapsible furniture assembly comprising elongate upright members each having a coupling formation for receiving and supporting a respective end of a cross member, elongate cross members which extend at right angles to the upright members and have ends which fit into respective of the formations, and two part pivoted-together auxiliary members each extending between and transverse to a pair of cross members adjacent the ends thereof, the auxiliary members being arranged when the two parts are co-linear to urge respective ends of cross members in the transverse direction against restraining means to secure the ends in the coupling formations.

2. An assembly according to Claim 1, including a fabric sheet fitted to the pair of cross members and each of the auxiliary members such that the sheet is planar and taut when the two parts of each of the auxiliary members are co-linear.

3. An assembly according to Claim 1 or 2, in

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which the members are all formed form lengths of rigid hollow tubing.

4. An assembly according to Claim 3, in which the hollow tubing is metallic tubing.

5. An assembly according to any one of Claims 1 to 4 in which the upright members are formed by the limbs of a substantially U-shaped member and the central limb forms a base for the assembly.

6. An assembly according to any one of Claims 1 to 5, in which an upper sub-assembly is arranged to fit into the assembly from above and when fitted to inhibit upward movement of the ends of the cross members out of the coupling formations.

7. A furniture assembly comprising four upright hollow tubular members having slots formed therein to receive and support respective ends of cross members, two hollow tubular cross members, which extend at right angles to the upright members, with flattened ends which fit into respective of the slots, and two

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auxiliary members each comprising two lengths of tube pivoted together and extending in a direction transverse to and between the cross members adjacent respective ends thereof, the auxiliary members being dimensioned so that when the two lengths of tube are co-linear the respective flattened ends are urged in the transverse direction against the sides of the slots to secure the ends in the slots.

8. An assembly according to Claim 7 including a fabric sheet which fits tautly between the cross members and the auxiliary members when the said two lengths are co-linear.

9. An assembly according to Claims 7 or 8, including a sub-assembly formed of hollow tubular members having spigots formed at terminations thereof which fit inside the upright members and when fitted inhibit upward movement of respective flattened ends in the slots.

10. An assembly according to any one of Claims 7 to 9, on which the upright members are formed in pairs, each pair comprising a length of

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tube formed as a substantially U-shape, the limbs of which each comprise an upright member.

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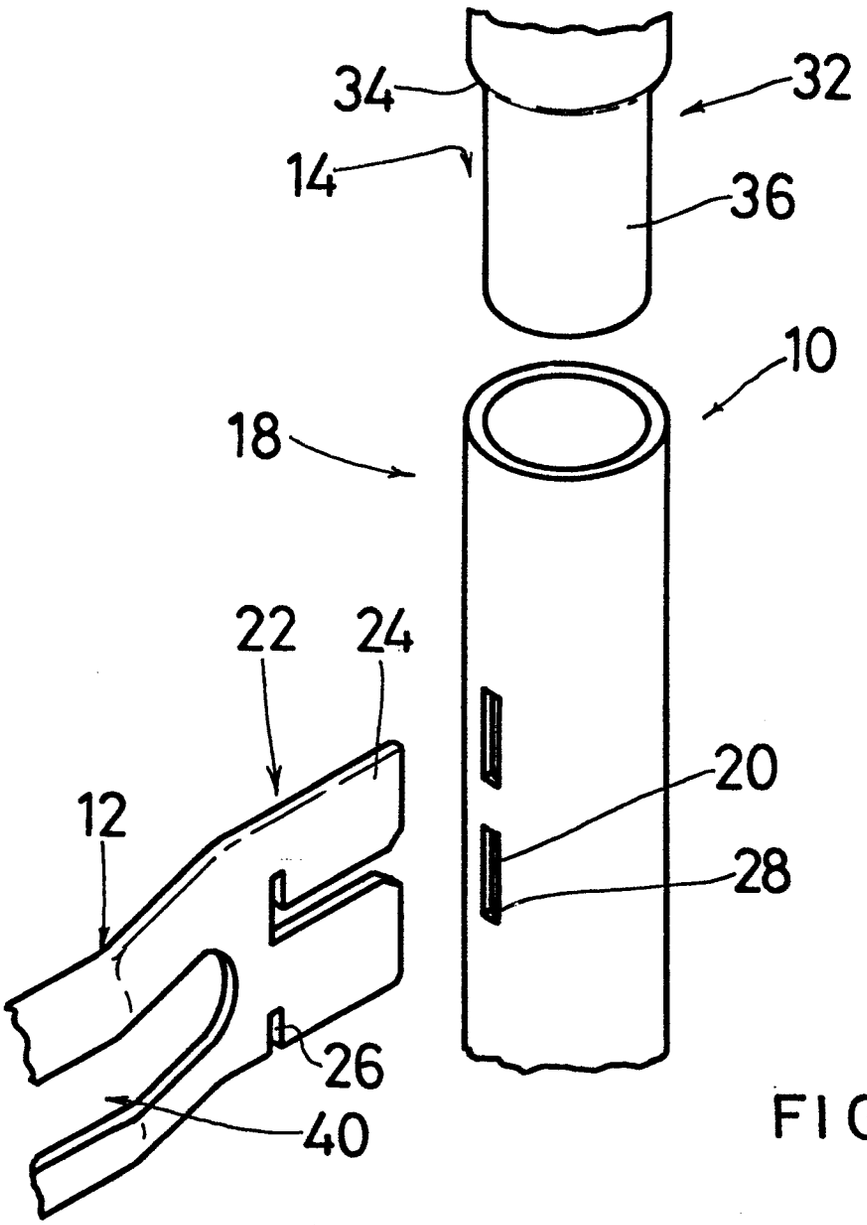


FIG.1

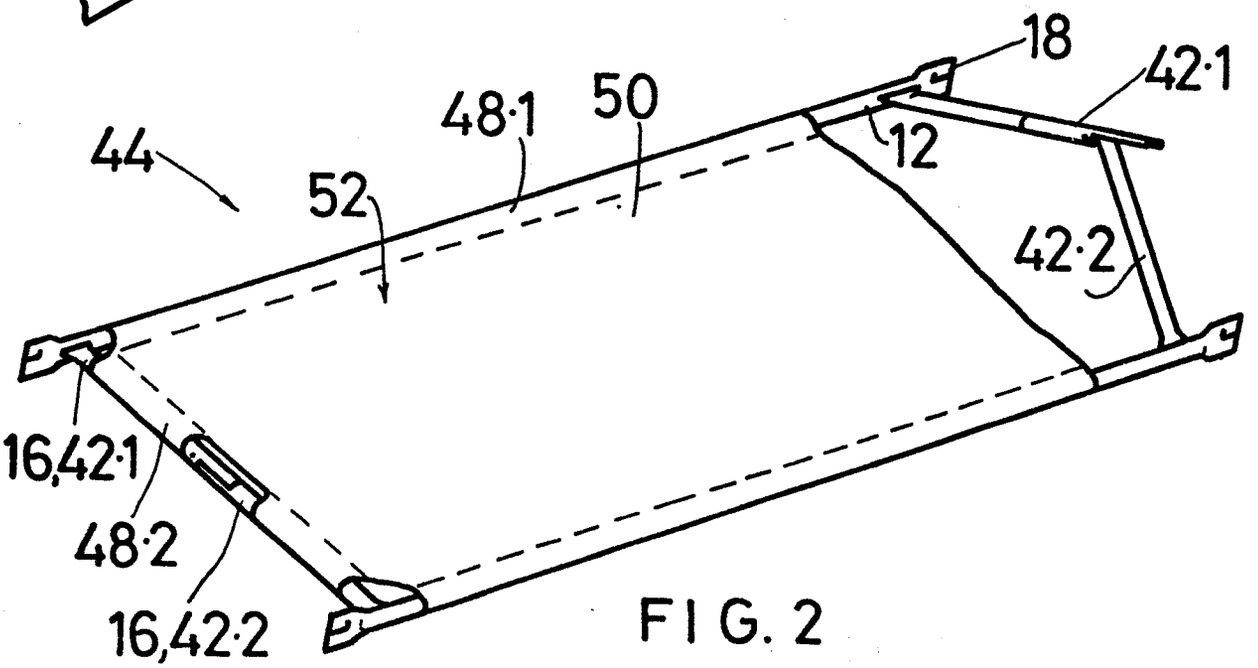


FIG. 2

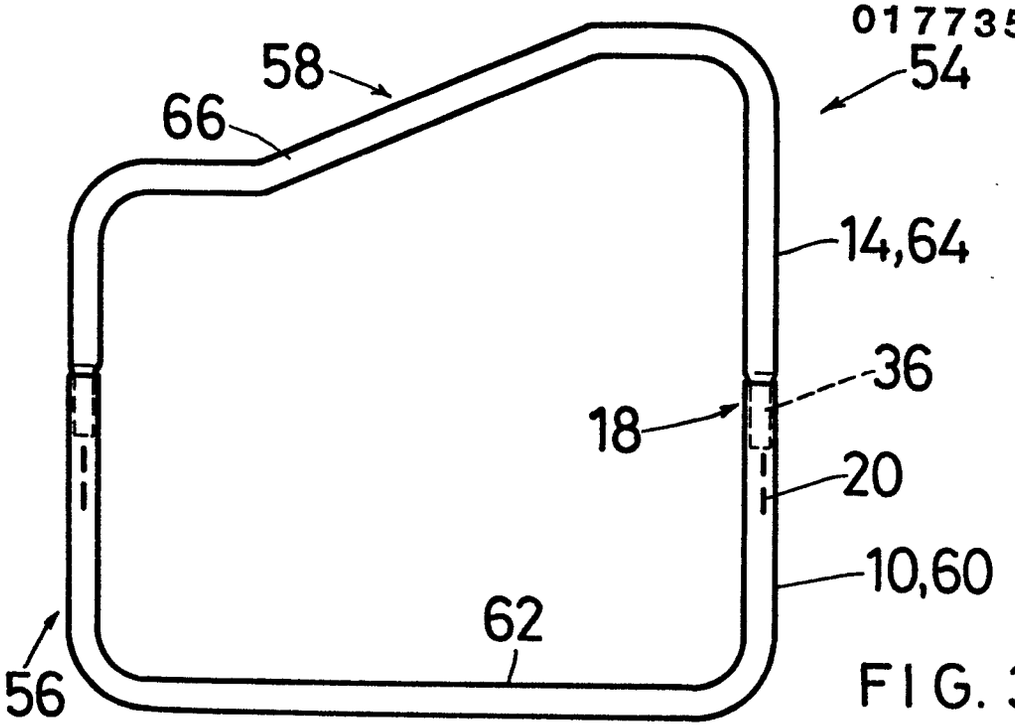


FIG. 3

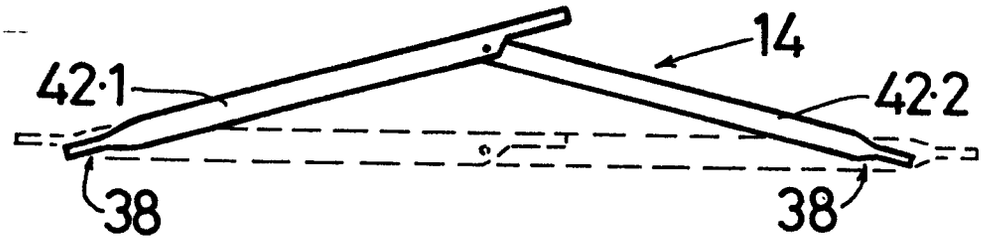


FIG. 4

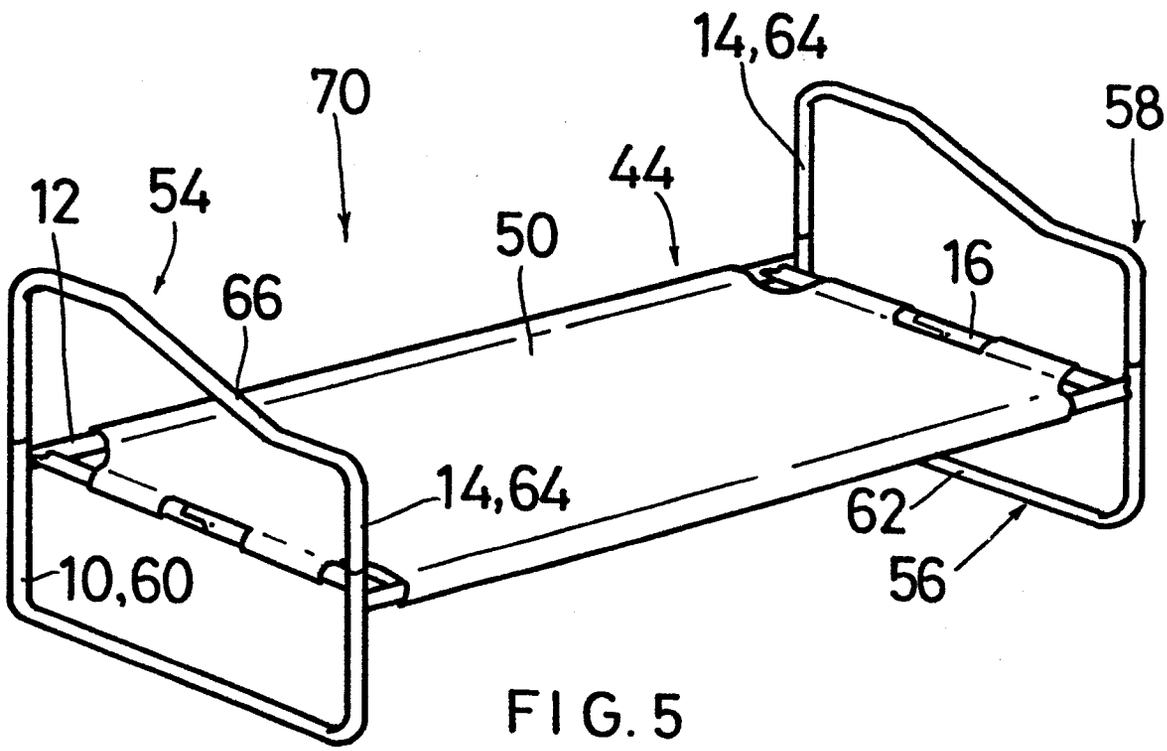
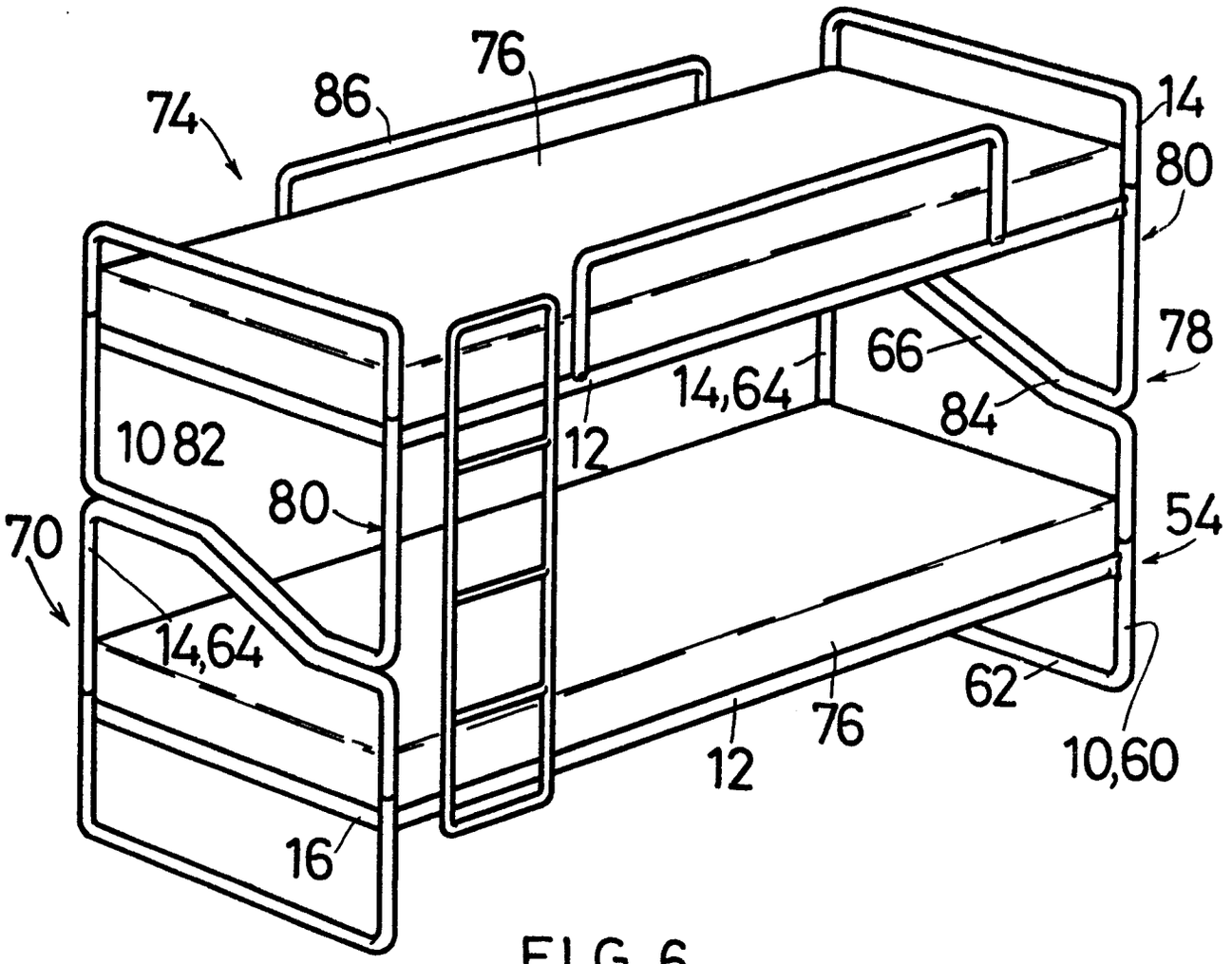


FIG. 5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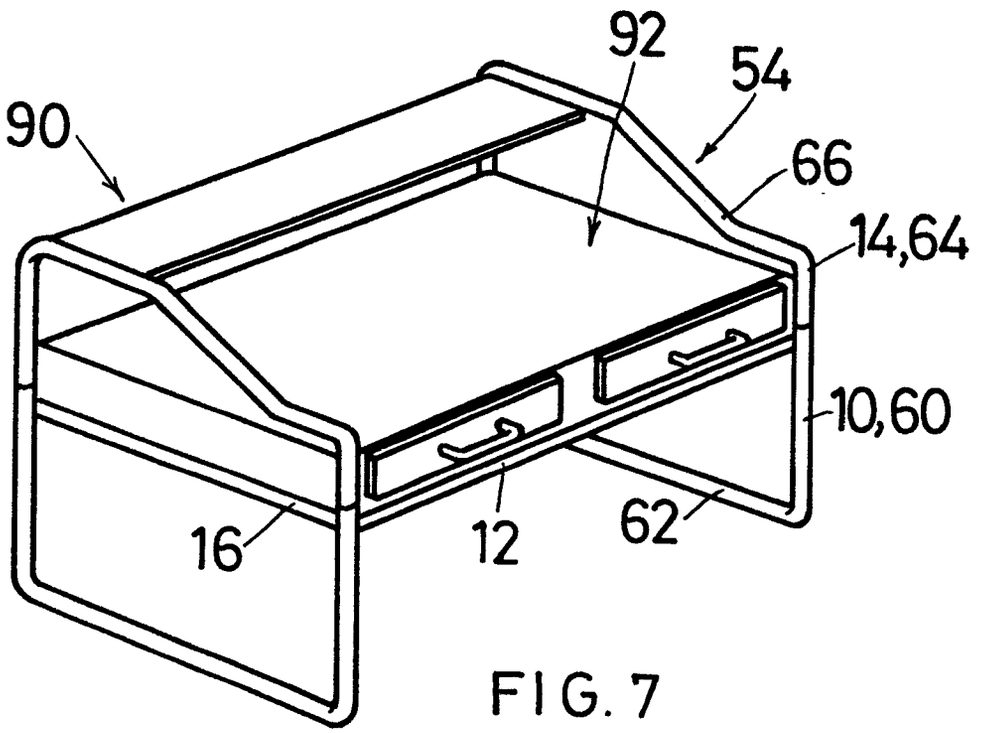
16

FIG. 6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66
14,64
10,60
16
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FIG. 7