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54 Modular elements for constructing disassemblable already equipped containers to be used as working rooms of movable stations.

57 Modular elements comprising:

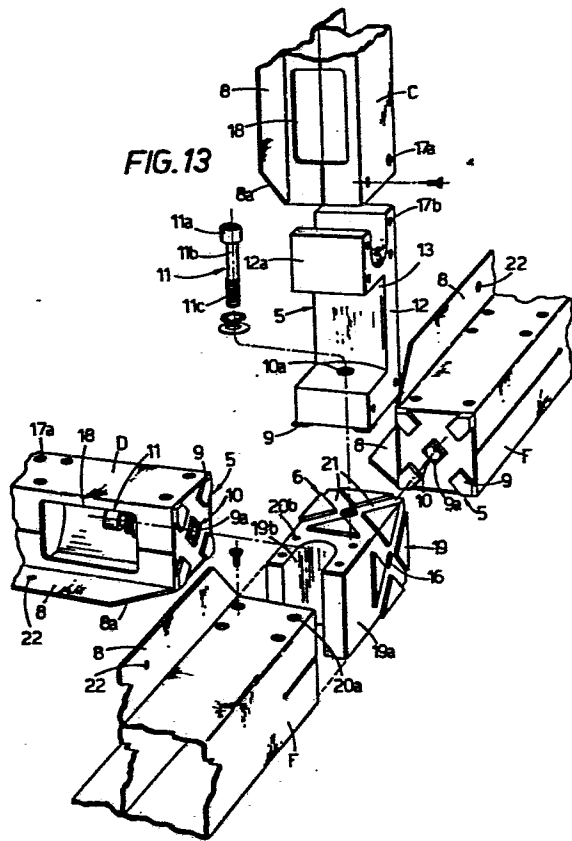
a) hollow metal structural members with a rectangular cross section, provided with inserted end blocks to obtain connections at 90° and/or 180°, some of said structural members having at least a butt male joint piece (5 or 5A) at one of their ends, while the other have a multiple female joint piece (6 or 6A) with five operative faces; and

b) plain (7) or respectively already equipped (7a) panels to be mounted in the spaces defined in the inside of rectangular frames formed by four of said structural members. Said structural members can have longitudinal outer flanges or not.

The structural members differ from one another, owing to their length, and/or to the type of the end joint pieces, and/or to the number and position of the flanges (8). Each butt male joint piece (5 or 5A) has butt teeth (9 and 9a) of a self-centering type and an axial hole (10) provided with means apt to house and to link a tightening bolt (11), while each operative face of a female joint piece (6 or 6A) comprises female openings or seats (21 or 21A) having shapes complementary to those of the teeth (9, 9a) of the male joint piece (5 or 5A), as well as a threaded central hole (16) for lodging the tightening or locking bolt (11).

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FIG. 13



MODULAR ELEMENTS FOR CONSTRUCTING DISASSEMBLABLE ALREADY
EQUIPPED CONTAINERS TO BE USED AS WORKING ROOMS OF
MOVABLE STATIONS

The present invention relates to modular elements comprising hollow metal structural members with a rectangular cross section in each of the end portions of which a female or male joint piece is inserted; and plain
5 or already equipped panels, for composing containers usually called "shelters", which serve as movable or jury stations or as working rooms for other intended purposes as, for instance, temporary shelters in the event of calamities or to be used in place of tents barracks
10 Said shelters can be readily assembled, disassembled and re-assembled in other utilization places while in transport and storage, in a disassembled condition, occupying a minimum space.

These shelters are particularly useful for military and
15 scientific purposes and they can be equipped with specific panels to protect the apparatus housed therein from noise or undesirable or harmful radiations.

20 Containers or shelters for the aforementioned intended purposes were hitherto constructed in a factory as monobloc units In their complete and final condition said units have at least dimensions of 2m x 2m x 2m but

in general. said dimensions can be much larger so that said units are very heavy and occupy a large space as a result. the transport of these units is expensive and difficult. In order to make easier the transport of said 5 monobloc structures the expedient has been used to provide said units with strong vertical legs constituted of threaded rods which can be activated in such a manner as to raise or lower the respective shelter.

Said legs are designed to raise the shelter to such a 10 height that the loading platform of the transport truck can be inserted just below the shelter between said legs. The shelter is then laid down on said platform.

Thereafter, the legs are raised to such a height, that the legs cannot hamper the movement of the automotive 15 vehicle.

Said manoeuvre is then repeated in inverted sequence on unloading at the new emplacement where the legs are entirely retracted upwardly. so as to permit the shelter to rest on the ground.

20 The presence of the legs creates not negligible supplementary costs: they are, however, necessary, since at the utilization sites hoisting apparatus for loading or unloading operations of such shelters are seldom available.

25

The present invention relates to a plurality of modular elements comprising modular metal structural members and panels permitting to construct readily and easily a

container or shelter, directly on the utilization site. Quick disassembling, the transport on common vehicles and new assembling on a different site - even in a different configuration of the shelter, according to different requirements- is thereby possible.

The assembly, the fastening and locking of the structural members in their use position requires the presence of special self-centering joint pieces inserted at each of the ends thereof, as well as the use of strong stud bolts, linked to said structural members, in such a way that said bolts cannot be removed. In addition, common screws or other suitable means are necessary for fastening the panels to the carrying skeleton or latticed framework of the shelter; said panels serve to form curtain walls, partition walls as well as they act as stiffening means for the carrying structure formed by said modular structural members.

The panels can be made of material and types apt to yield thermal and/or acoustic protection as well as a protection against harmful or noxious radiations. In addition, the panels, according to the requirements or depending upon the utilization thereof, can be plain or already equipped in such a way as to embody doors, windows or other fittings required according to the special intended purposes of each shelter.

Given a sufficient selection of modular structural elements, the configuration, the dimensions and the height of the inner room or rooms of a shelter can be varied, as well as the number of the storeys thereof in

each new emplacement.

The modular structural members consist substantially of hollow structural metal members with a rectangular cross section, in particular, a square section, at the ends of which there are inserted blocks shaped in a form of a male self-centering butt joint element, respectively a multiple female joint element, in order to obtain either a butt connection or one or more than four 90° connections in two directions which are set at right angles to one another and perpendicular to the axis of the structural member provided with such a female joint element.

The male joint pieces house, in a linked manner, a fastening stud bolt, coaxial to the structural member.

The structural members differ from each other in length, and/or according to the type of joint piece inserted at each end thereof, and/or according to the fact that they are provided with or are without longitudinal flanges, each of the latter being coplanar with a face of the respective structural members.

Thus can be either no flange, or one or more flanges according to the requirements of the carrying skeleton of the shelter, and/or according to the fact that the inner space thereof may be separated in two or more rooms and/or in one or more storeys. In fact said longitudinal flanges, in combination with the contiguous side face of each structural member serve to form peripheral frames or shoulders apt to receive the peripheral edges of the panels designed to form the outer curtain walls and optionally also inner partition walls. as well as the

floors and ceilings.

For the particular load conditions, the structural members, which are used as horizontal carrying beams, can have a rectangular cross section. In this event three of the operative faces of the female joint elements are rectangular, while two have a square shape. The male joint elements inserted in the structural members acting as carrying beams have a rectangular shape and those which serve as pillars are square and have square cross section.

These and other characteristics and advantages of the present invention will be better understood in the following description, which concerns the modular elements and some embodiments of containers or shelters which can be constructed thereby, reference being made to the accompanying drawings, in which:

Figures 1, 2A, 2B, 2C, 2D, 3, 4A and 4B show the cross sections of various types of modular structural metal members according to a first variant, in which provision is made to use structural members with a square cross section;

25

Figures 5, 6A, 6B, 7A, 7B, 8, 9, 10A, 10B, 11 and 12 show a longitudinal, partially sectioned view of the various structural members for the most common intended purposes using the structural members, the cross section of which

is shown in Figures 1 to 4B:

Figure 13 is an exploded perspective view of the detail of a junction point of a carrying framework or skeleton of a shelter, at the connection point of three structural members according to a first variant;

Figure 14 shows a longitudinal axial section of a block forming a male joint element;

10

Figure 15 is a perspective diagrammatic view of the simplest shelter which can be obtained according to the first variant, wherein only the panels forming the floor, the covering wall and one of the side walls have been

15 shown;

Figures 16 to 20 show diagrammatically the plans of some embodiments of shelters which can be constructed with the use of the modular elements of the invention;

20

Figure 21 is a diagrammatic perspective view of a two-storey-shelter having the plan as shown in Figure 19; in this Figure, for clarity purpose, the flanges of the structural members as well as the panels have been

25 omitted; and

Figure 22 is a view similar to that of the Figure 13, but concerns the case of the use of modular structural members having a rectangular cross section, when they act

as horizontal carrying beams.

In Figures 1 to 4 the more common cross sections of the structural members are shown. In particular, all the structural members consist of hollow metal bodies, which, according to a first variant, have a square cross section, the length of each side being given as "d". This variant is designed for the cases in which provision is made that limited stresses will act on the carrying structure; that has the advantage that the smallest number of structural members different from each other is required.

These structural members differ from each other by having, either no longitudinal flange, or several longitudinal flanges 8, each coplanar with a side face of the structural member and provided with end portions 8a cut at 45°, so as to permit the connections of said flanges 8 to each other at the corners defined by two adjacent structural members, which serve to form a rectangular frame.

In particular, the structural member A, shown in Figure 5, has a cross section 1a (Figure 1) without any flange. The structural members D and C (Figures 6A and 6B) have a cross section 2a (Figure 2A) with two longitudinal flanges 8 extending outwardly from both sides of a same face. The structural members F and E of Figures 7A and 7B respectively have a cross section 2b (Figure 2B) with two flanges 8 extending outwardly from two contiguous faces

of a structural member, but from the different corners of the same face. The structural member G (Figure 8) has a cross section 2c (Figure 2C), but the two flanges 8 extend outward from the same corner.

5 The structural member H (Figure 9) has a cross section 2d (Figure 2D), the two flanges 8 of which extend from contiguous faces, but passing from opposite corners. The structural members M and N of Figures 10A and 10B have a cross section 3a (Figure 3) and three flanges 8, two of
10 which are coplanar to one another and the third flange extends from the face contiguous to the former and from the common corner of said faces.

The structural member B of Figure 11 has a cross section 4a (Figure 4A) and four flanges 8, extending, in pairs
15 from two opposite corners of the structural member, while the structural member I (Figure 12) has a cross section 4b (Figure 4B), with four flanges 8, each extending from a face thereof.

The types of the shown cross sections of the structural
20 members are those which are more commonly used, but it is obvious that, for special intended purposes longitudinal flanges 8 could be provided in a different number and/or differently positioned, according to the same informing principle.

25 The structural members are provided, at their ends with inserted pieces or blocks. Said inserted pieces can be so shaped as to form a male butt joint element, generically marked at 5. or the other is shaped so as to form a female joint element having five operative faces and

which is indicated generically 6

The main characteristic of this invention is constituted of the specific feature of said male 5 and female 6 joint elements which can be inserted and fastened at the ends 5 of the structural metal members according to the different requirements.

Thus the modular structural members differ from one other, either according to the type of the joint piece which is inserted at each end thereof, and/or to the 10 number and position of the longitudinal flanges 8, and/or to their length, that depending upon the intended purposes thereof.

Now referring, in particular, to Figures 13 and 14, a male butt joint 5 is described at first. It consists of a 15 parallelepiped shaped body 12 with a square cross section that is of such dimensions as to permit this body to be inserted with force into the inner cavity of the end portion of the structural member. Said body 12 has a plurality of frusto-pyramidal self-centering teeth 9 20 extending from its head face, as well as a not essential central tooth 9a, at the central portion of which a hole is provided, generically indicated as 10, and designed to receive a tightening bolt 11. In the body 12 a wide cavity 13 is arranged adapted to define an opening large 25 enough to permit to reach the bolt 11. Each bolt 11 comprises a head 11a, a shank having a first smooth portion 11b, while the portion 11c thereof has an outer diameter greater than that of portion 11b and which is externally threaded.

The hole 10 is coaxial with the body 12 and it will become also coaxial with the structural member on which it will be inserted, said hole 10 opening in the inner space of the cavity 13 (Figure 14). Starting from the 5 cavity 13, said hole 10 comprises a first threaded section 10a and a second smooth section 10b of a diameter slightly greater than the outer diameter of the threaded portion 11c of the bolt 11. Thence, when the bolt 11 is introduced in the hole 10, it must be first screwed into 10 the portion 10a of the hole 10. then as the bolt 11 comes out of this second section 10a, it can freely advance along the portion 10b, while guided by the side wall thereof and it can be threaded successively into one of the central threaded holes 16 of a female joint element 15 6. Even when the locking is released, the bolt remains always linked to the block 12 (see Figures 13 and 14). The block 12 is inserted by pressure into the inner cavity of the end portion of the structural member, to which it may be fastened by means of screws, screwed into 20 the pairs of coaxial holes 17a, 17b provided for such a purpose (Figure 13) or by other suitable fastening means: a narrow shoulder will be provided near the head of the block 12 in order to stop this latter with regard to the respective structural member so as to correctly position 25 the teeth 9, 9a so that they extend out of the end thereof alternatively, there are portions of said teeth 9, which perform said task.

In order to allow that the bolt 11 may be screwed or unscrewed from the outside, an opening 18 is arranged on

the side wall of the structural member in the zone facing the recess 13.

The female joint element 6, in turn, is a part of a parallelepiped block with a square cross section and 5 which comprises a cubic body 19 having the outer side of a length equal to "d" and which extends backwardly into a tang 19a having an outer outline complementary to that of the inner cavity of the structural members so as to allow that said tang 19a, preferably provided with a longitudinal 10 opening 19b, can be inserted by force into the end portion of the respective structural member, to which it can be fixedly connected by means of screws passing through pairs of coaxial holes 20a, 20b. Thus out of such a structural member only the cubic head 19 extends 15 outwards. The outer five faces of said head 19 are identical to each other, and each comprises female joint seats 21, the shape and the size of which are designed to match the teeth 9 and 9a, while at the center of said faces threaded holes 16 are arranged apt to receive the 20 threaded end portion 11c of one of the locking bolts 11. It may be noted that the self-centering teeth 9, 9a and seats 21, both having frusto-pyramidal complementary shapes, may be easily obtained in the blocks 12 and 19 by a simple milling operation, or directly formed by a 25 pressure die-casting.

Now we proceed to describe the selection of modular members needed to construct the carrying structure or latticed framework of a shelter, according to a first embodiment, as it is required for the most common

intended purposes, in which the minimum number of modular structural members has to be employed.

As already mentioned, said modular structural members in this embodiment have a square cross section and differ 5 from each other, either in the number of the longitudinal flanges 8, and/or in their length, and/or in the type of the joint elements 5 and 6 which are inserted at the ends of said structural members.

According to this embodiment, it is assumed that the 10 carrying skeleton has a plan formed by square meshes.

As "L" we indicate the width of the space defined by a square or rectangular frame which is formed by four modular structural members, selected according to their function and/or location, while "h" is the height of the 15 structural members acting as pillars or posts; the value "h" could be equal or different from "L". Of course, in the case of $h = L$, the number of the different types of the structural members required will be reduced. The base of the shelter may be formed by one or more square meshes 20 connected longitudinally and/or transversally among them so as to obtain rectangular, square, L or T-shaped, or cross-like or similar floor plans, some examples of which are diagrammatically shown in Figures 16 to 20. The shelter can be constituted of one or more storeys, by 25 means of superposed frames or meshes.

The structural member A (Figure 5) has no longitudinal flange, two end male joint pieces 5 and a length "h" and serves to form an inner post. The structural member D of Figure 6A has a length equal to $L + d$ and is provided, at

its ends, with a male joint piece 5 and a female joint piece 6 respectively and serves to form a beam, while the structural member C (Figure 6B), which serves to form an outer pillar or post, differs from the preceding one, 5 only in having a length "h" and has two male joint pieces 5 at its ends. The structural member F (Figure 7A) has a length $L + d$ and has a male joint piece 5 and a female joint piece 6 respectively at its ends. The structural member E has two male joint pieces 5 at its ends and has 10 a length L. The structural member G (Figure 8) has two male joint pieces 5, a length h and serves to form a pillar, while the structural member H (Figure 9) has a length h and two male pieces 5 at its ends and serves to form a pillar. The structural member M of Figure 10A has 15 a length L and two male joint pieces 5 at its ends, while the structural member N (Figure 10B) has a length $L + d$ and at its ends thereof are mounted respectively a male joint piece 5 and a female joint piece 6. The structural member B (Figure 11) as well as the structural member I 20 (Figure 12) have at each end a male joint piece 5 and have a length h and can be used for the same purpose of obtaining an inner pillar or post, where inner partition walls are provided.

It may be noted that in the case of structural members 25 having female joint end pieces 6, the longitudinal flanges 8, if any provided with beveled corners 8a extend only until the beginning of the head 19, since this latter is designed to form the intersection point of the frame or the frames concerned, while the flanges 8

together with the respective adjacent side walls of the structural members form the peripheral shoulders of each frame, shoulders which are designed to receive the edges of a panel 7. Therefore said flanges 8 may be provided with a plurality of holes 22 (Figure 22) for the fastening of the respective panels 7, by means of screws or other suitable fastening means.

By employing the aforementioned modular members, the carrying skeleton or latticed framework of the shelter can be constructed which have plans as those shown, for instance, in Figures 16 to 20.

In Figure 15 the simplest type of shelter is shown, the carrying skeleton of which is formed by eight modular members of the type F and four structural members of the type G. In Figure 15 a floor panel 7 is shown only partially represented, while a roofing panel 7 is shown in an exploded position, said roofing panel being fixed on the upper frame of the carrying latticed structure. Of course, such a roofing panel could have larger dimensions so as to form peripheral eaves around the shelter; it may also be provided with at least one opening for the passage for ducts for the discharge of the exhaust gases of a combustion apparatus.

Nothing prevents, of course, a pent roof or a saddle roof or the like from being mounted above the covering panel.

In this case this panel acts only as a ceiling wall of the inner room. The panel 7a, which has been shown in an exploded position and which is designed to form the right-hand front wall, includes a door opening in which a

door 23 is mounted. The other panels designed to form the remaining side walls have not been represented, but at least one of them will include a window.

The panels 7 or 7a are constructed in such a manner as to offer the required protective characteristics. In general, these panels may be of the type formed by two plates or sheets between which a foamed material or a layer of insulating alveolar material is sandwiched. Figure 21 shows a more complicated two-storied shelter having the plan, as shown in Figure 19, the carrying structure of which is constructed by the use of the following structural members, assuming that one room has to be obtained in each of the two storeys. For such a purpose the following structural members are required: eight members C, twelve members D, ten members F, six members E, eight members G, two members A, five members N and three members M. In the event that each storey should be subdivided so as to obtain four chambers, the structural members A would be substituted with the structural members B and I, which are functionally equivalent (Figure 21). Of course, also the structural members D should be substituted with structural members M. It will be very easy, for any other different distribution of the inner rooms to think to the new correct substitution of some of the structural members with other members which could be required. Of course in the event of shelters for intended purposes which have not been considered as included in the cited most common intended purposes, other structural members, which have

not been shown. could be considered, provided with a different number of flanges or of differently positioned flanges, in addition of those which have been already illustrated and described, on the base of the same

5 informing principle of this invention, consisting in the provision of a shelter comprising a carrying latticed framework or skeleton wherein in each intersection point of the latticed framework there is a structural member having a female joint element 6, while all the other ones

10 have a joint element 5 of a male type. In addition said structural members must have longitudinal flanges 8 apt to form in combination a peripheral shoulder in each rectangular frame, designed to be closed by a panel, as in the case, for example, of outer curtain walls, and in

15 the case in which the space inside each storey must be separated in chambers by means of partition walls constructed by means of panels 7, 7a. If, on the contrary, the inner partition walls would be obtained by means of prefabricated equipped walls, fixedly connected

20 to the carrying skeleton by locking means of adjustable length, it will be not necessary to modify the composition of the carrying skeleton. as shown in Figure 21, in which, for clarity reasons, the longitudinal flanges 8 of the structural members have been omitted.

25 It may be noted that a base of the shelter of a square plan or formed by a combination of substantially square meshes is preferred only for reducing the number of the required modular structural members.

Of course, provision could be made also that the plan of

each mesh may be of a rectangular shape. In this case, other structural members D', E', F', M' and N' should be provided having a length $L' + d$, since the dimensions of each frame forming a mesh are now L' and L , and $L' \neq L$.

5 This could not give any trouble, because the male butt joint pieces and the female joint pieces 6 will be identical so that it will be sufficient to cut some structural members in the new desired lengths.

It will be apparent that for other different configuration
10 of the shelters and according to the same informing principle, other different types of structural members can be easily obtained, since the joint pieces 5 and 6 are yet the same. It will be only sufficient to change the position of the longitudinal flanges 8 in each
15 structural member which is used, by making a suitable choice of the end joint pieces required in each modular member.

As has been aforementioned, it may be noted that the square cross section of the structural members, as well
20 as that of the blocks 12 and 19 of said joint pieces 5 and 6 is provided only for the purpose of reducing the number of the necessary modular elements, and is valid, when the stresses acting on the carrying structure are not high. In the event of higher stresses and in the case
25 of the structural members which are designed to act as carrying beams, the structural members must have a resisting section of a rectangular shape, the dimensions of which will be $d \times Y$, where $Y > d$. Also in this case the informing principle of the invention can be

identically used: in this case it is necessary to modify only the shape of the cross sections of the blocks 12A and 19A, which sections will be now rectangular instead of using a square section.

5 Therefore the butt mail joint piece 5A will have a rectangular shape with teeth 9A, while each multiple female joint piece 6A has yet five operative faces, but its butt face 24A will have a rectangular shape with seats 21A having shape and position complementary to
10 those of the teeth 9A of the male joint element 5A, while the two side faces of the piece 6A which are placed in prosecution of the two side faces of the structural member which have the height equal to Y and which are vertical in the case of horizontal beams, are identical
15 to the head face 24A. On the contrary, the other two faces 24B, which are horizontally positioned, are of a square shape with seats 21 and are substantially identical to those of the female joint pieces 6 of the first embodiment, since the modular structural members
20 designed to form the pillars are not modified and then have butt male joint pieces 5.

In Figure 22 an intersection point of a carrying structure or framework is shown, in which the structural members F' acting as beams have a rectangular cross
25 section, while the structural member G acting as pillar is unvaried according to this second embodiment.

No further detail is given of this second embodiment, since each carrying structure for the construction of shelters, will be obtained in a substantially identical

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manner, as already shown and described with regard to the first embodiment.

CLAIMS

1 -Modular elements for composing already equipped
shelters constituted of a latticed carrying structure or
framework, having a plan formed by one or more
rectangular frames or meshes, in which frames, panels are
5 inserted for obtaining walls, floors or ceilings,
characterized by the fact that the modular elements
comprise:

i) a plurality of hollow structural metal members with a
rectangular cross section ($d \times H$), where $H \geq d$, said
10 structural members housing at least partially at their
end portions, blocks so shaped as to form either a butt
male joint piece (5 or 5A) or a multiple female joint
piece (6 or 6A), this latter projecting outwardly from
the head of the structural member and having five
15 operative faces, in order to obtain the connection of
said member with another member at 90° or 180° , wherein
said structural members have either no longitudinal
flange or one or more longitudinal flanges (8), each
extending outwards in alignment with one of the side
20 faces of the structural member; and

ii) plan panels (7) or already equipped panels (7a) to be
inserted into the inner space defined by a rectangular
frame, formed by four of said structural members, said
panels (7 or 7a) abutting against said flanges (8)
25 extending towards the inner space of said frames and
against the walls of said structural members facing said
space, panels which serve for obtaining curtain walls,

partition walls, floors or ceilings and which act in the same time as means for stiffening said frames, each butt male joint piece (5 or 5A) being arranged in a block (12 or 12A) having a parallelepiped shape with such a cross section as to be apt to be inserted into the end portion of the inner cavity of a structural member, while in the head face of said block (12 or 12A) tapered outwardly extending teeth (9 or 9A) are arranged as well as a central hole (10) designed to receive a bolt (11) for locking the junction, said bolt (11) being provided with means apt to link permanently said bolt (11) to the respective block (12 or 12A), while each female joint piece (6 or 6A) consists of a parallelepiped body extending outwardly from the respective structural member and having a head (19 or 19A), having five operative faces in each of which seats (21 or 21A) are arranged for receiving the teeth (9 or 9A), and a central threaded hole (16) for receiving a bolt (11) said head (19 or 19A) extending backwards with a tang (19a) apt to be inserted in the hollow end portion of the respective structural member.

2 -Modular elements according to claim 1, wherein the teeth (9 or 9A) of the male joint piece (5 or 5A) are frusto-pyramidal and the female corresponding seats (21 or 21A) in each of the five operative faces of each female joint piece (6 or 6A) have shape and disposition complementary to those of the teeth (9 or 9A).

3 -Modular elements according to claim 1, wherein the tang (12a) of each block (12 or 12A) of a male joint

piece (5 or 5A) is provided with a large lateral recess (13), into which an axial hole (10) opens for receiving the axial locking bolt (11), said recess being dimensioned so as to permit to the operator's hand to reach the head (11a) of the bolt (11) so as to push this latter forward so as to be screwed in the coaxial hole (16) of one of the operative faces of the female joint piece (6 or 6A), in the end portion of the structural member, where is housed the tang (12a) of said block (12 or 12A) and just in the front of the recess (13), a window or opening (19) is arranged in one of the side walls of the structural member, in order to permit the operator's hand to enter said recess (13) for activating said bolt (11).

4 -Modular elements according to claim 1, wherein the blocks (12) of the male joint piece (5) and the blocks (19, 19a) of the female joint pieces (6), as well as the structural members (A, B, C, D, E, F, G, H, I, M and N) have a square cross section.

5 -Modular elements according to claim 1, wherein the blocks (12A) for obtaining the butt male joints (5A) as well as the blocks (19A, 19aA) for obtaining the female joints (6A) have a rectangular cross section, the block (12A) and the tang (19aA) of the block (19A) being apt to be inserted into the hollow end portions of the structural members (D', E', F', M' and N') acting as carrying beams, having a rectangular cross section, while the female joints (6A) have the head face and the two vertical opposite side faces with a rectangular shape and

are provided with female seats (21A) complementary to the teeth (9A) of the male joint (5A), and the two horizontal side faces have a square shape and are provided with seats (21) complementary to the teeth (9) of the male joints (5) of the structural members (A, B, C, G, H and I).

6 -Modular elements according to claim 1, wherein the modular structural members for the construction of the latticed framework or skeleton of a shelter, the base of which is formed by rectangular meshes defining rooms having a plan the sides of which have the length L and L' respectively, where $L' \geq L$, comprise modular structural members having a rectangular cross section, the lengths of the sides thereof are d and H respectively, where $H \geq d$ and differ from each other either in their end joint pieces (5 or 5A) and (6 or 6A), and/or in the number and/or position of their longitudinal flanges (8) and/or in having a length equal to $(L \text{ or } L')$ or $(L \text{ or } L' + d)$ or (h) , this latter being the height of the vertical pillars of the carrying structure constructed by the use of the structural members, and where $h \geq L$.

FIG. 1

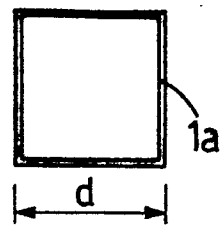


FIG. 2A

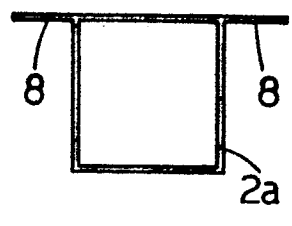


FIG. 2B

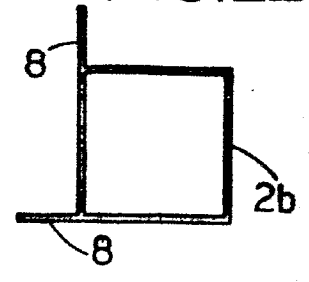


FIG. 2C

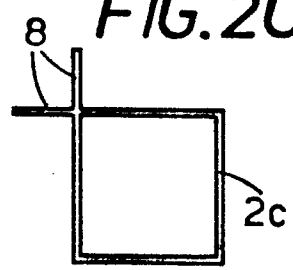


FIG. 2D

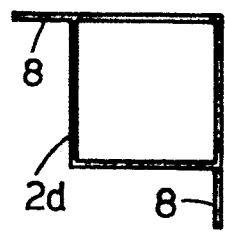


FIG. 3

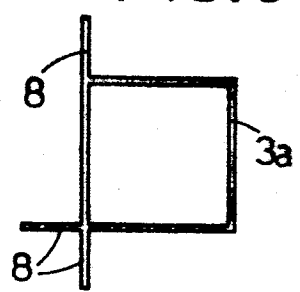


FIG. 4A

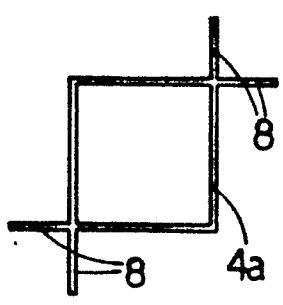


FIG. 4B

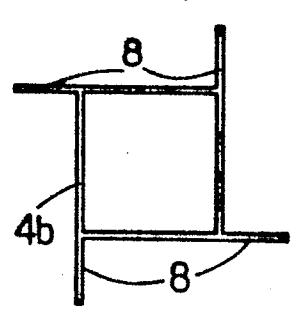


FIG. 5

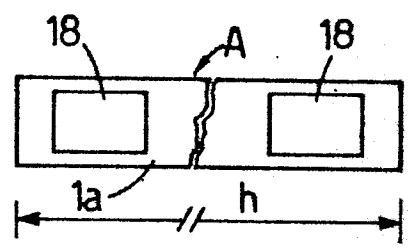


FIG. 6A

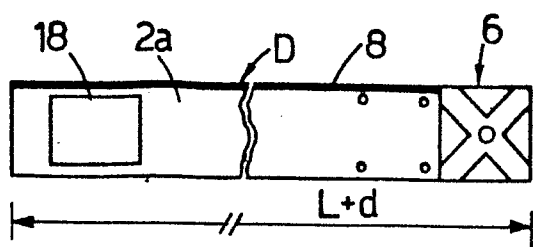


FIG. 6B

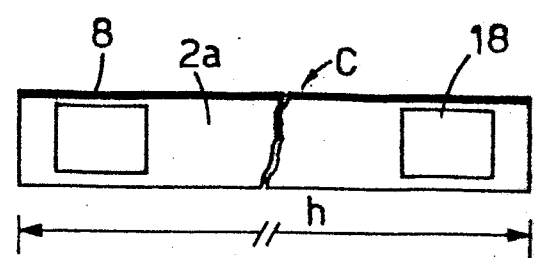


FIG. 7A

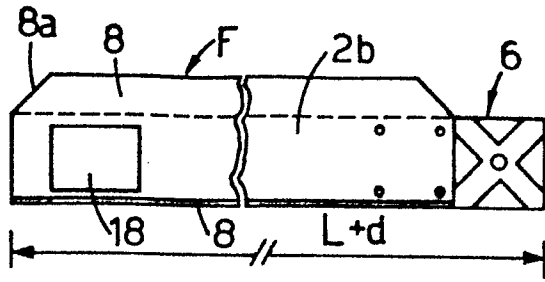


FIG. 7B

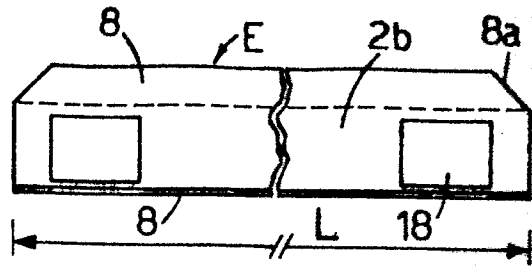


FIG. 8

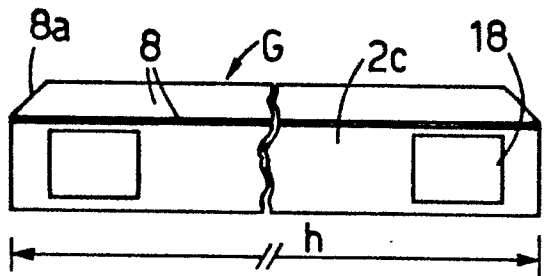


FIG. 9

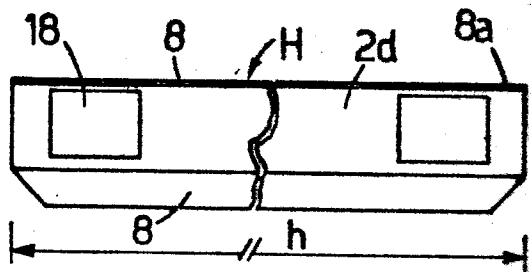


FIG. 10A

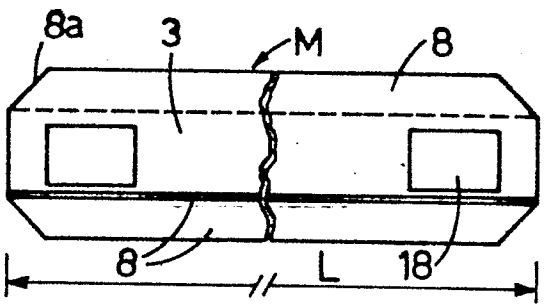


FIG. 10B

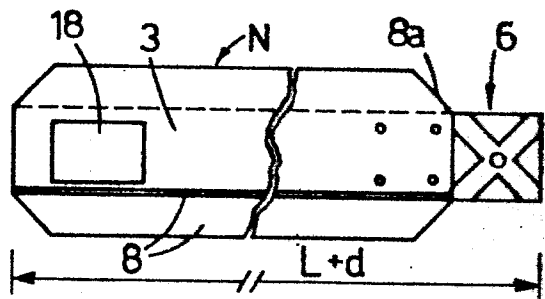


FIG. 11

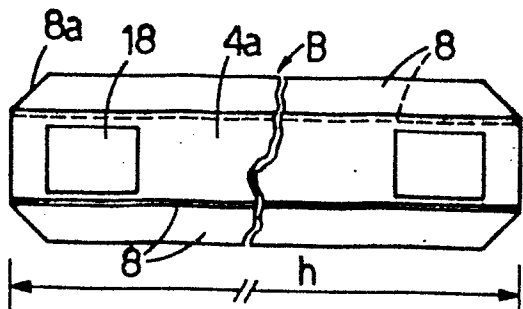


FIG. 12

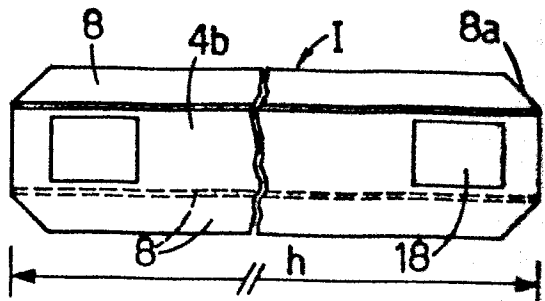


FIG. 13

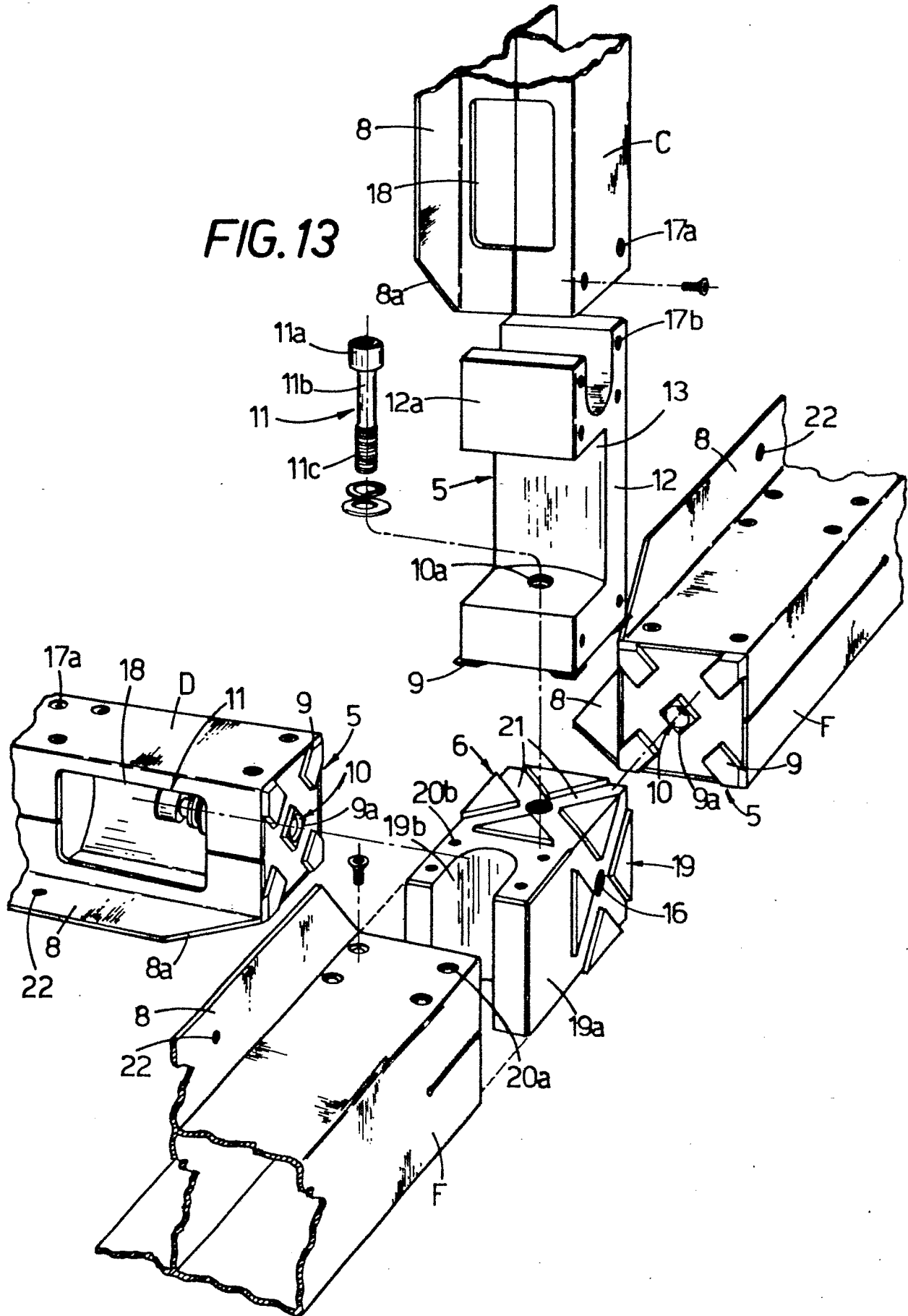


FIG. 14

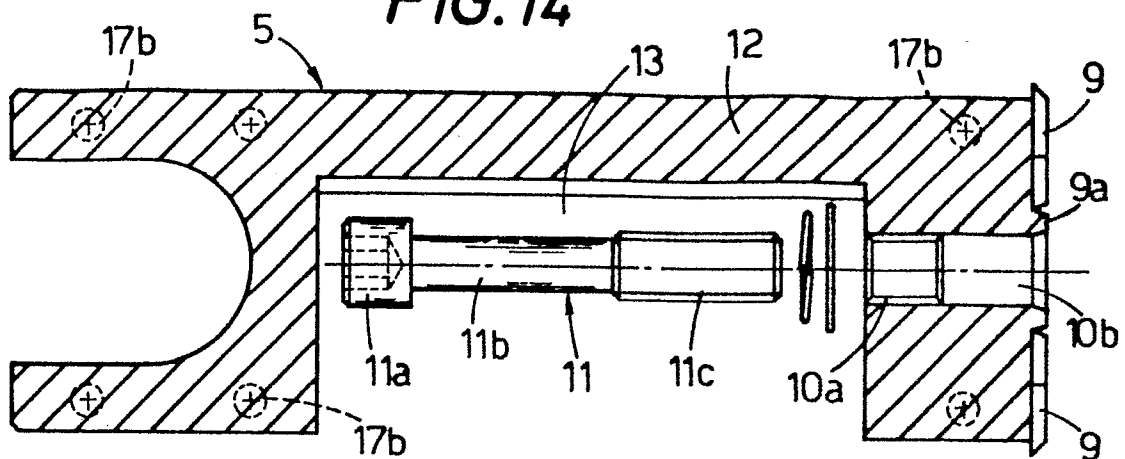
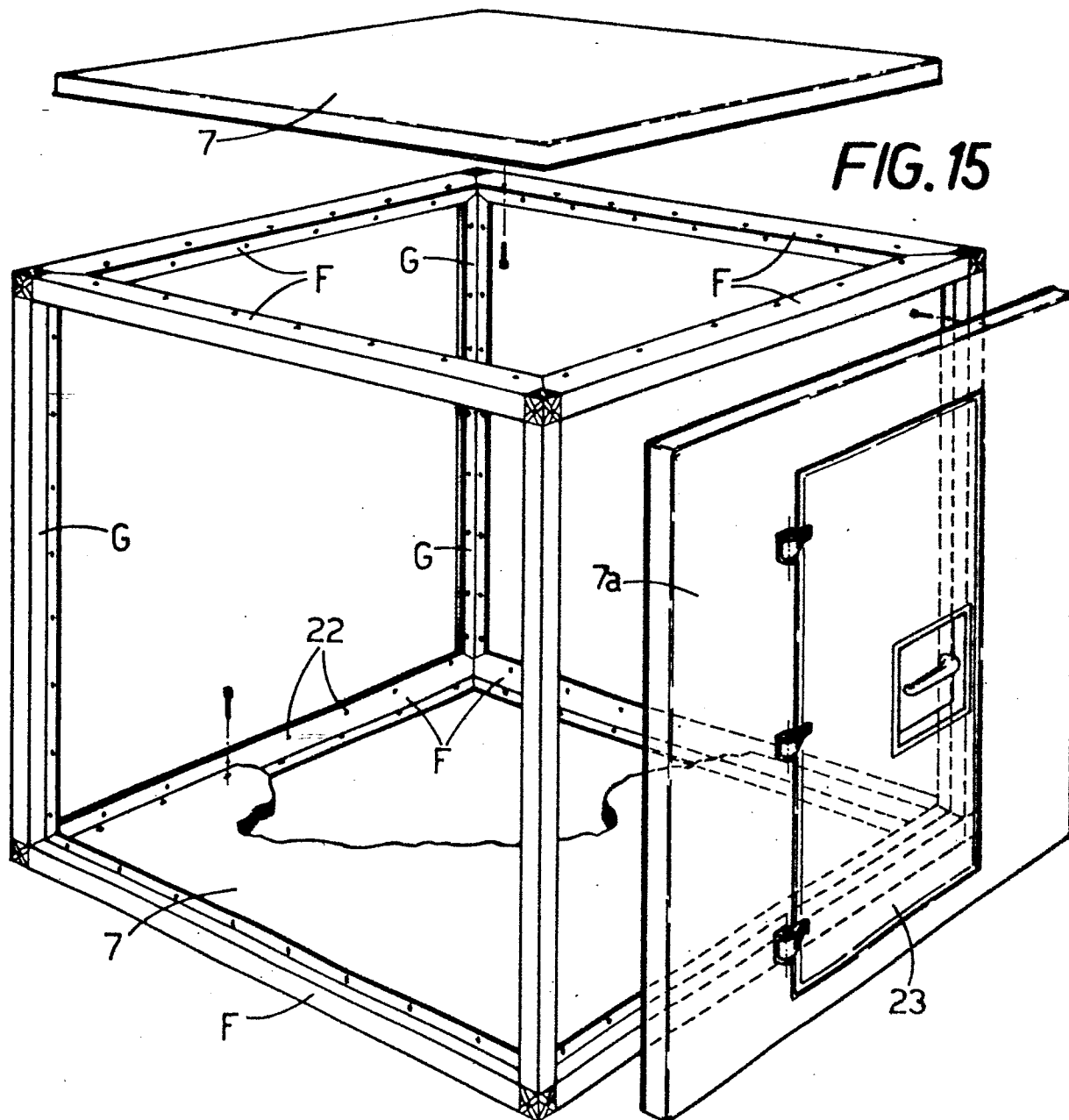


FIG. 15



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FIG. 16

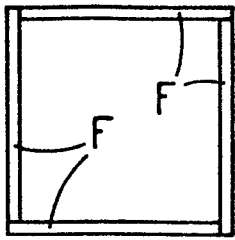


FIG. 17

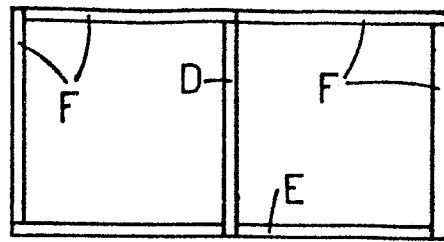


FIG. 18

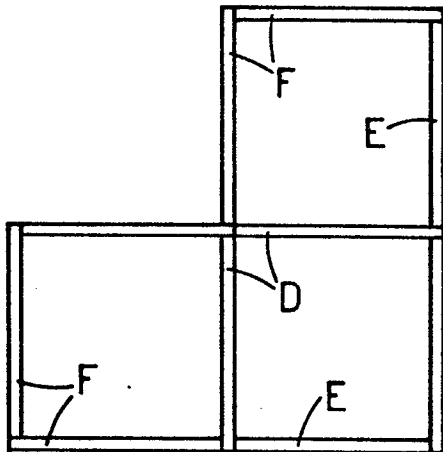


FIG. 19

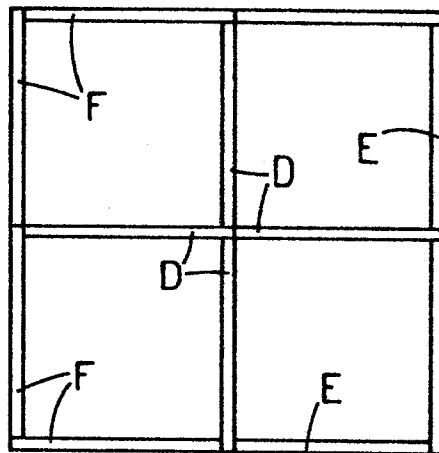
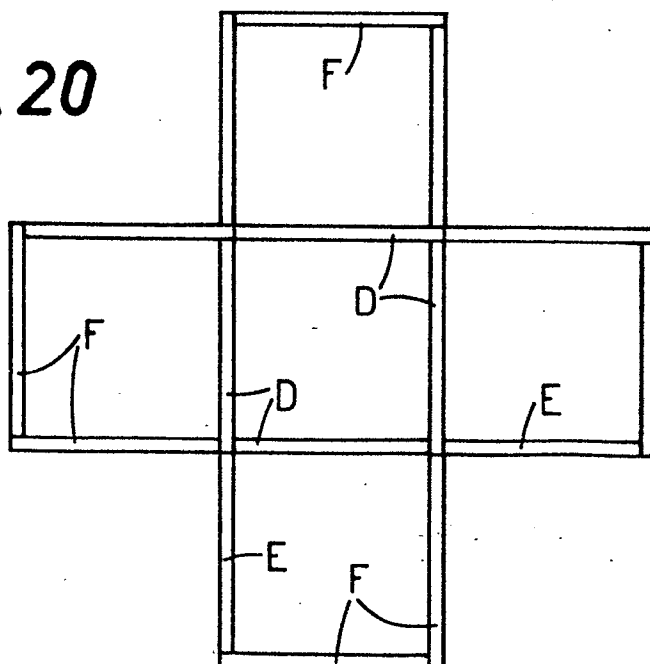


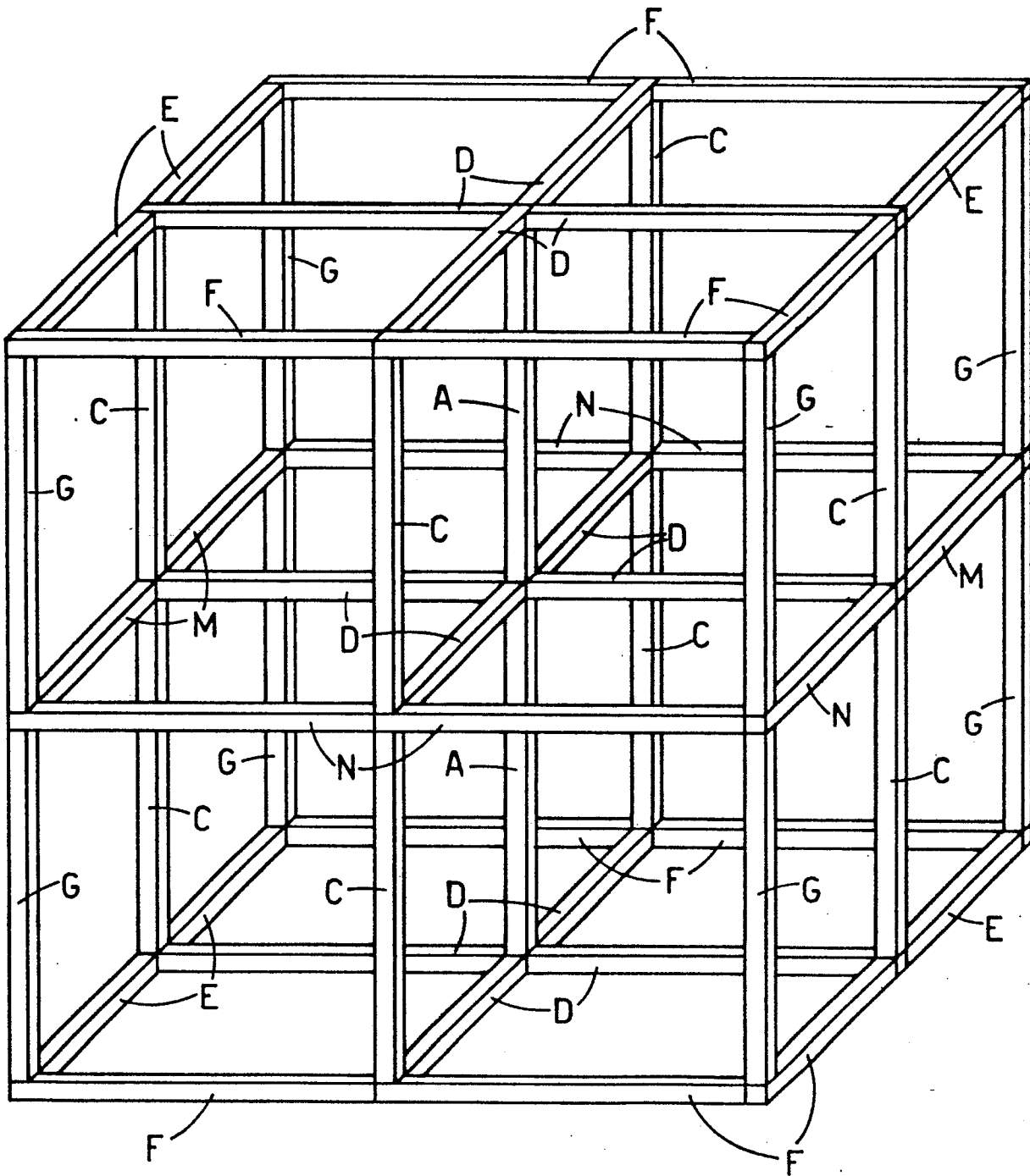
FIG. 20



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FIG. 21



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FIG. 22

