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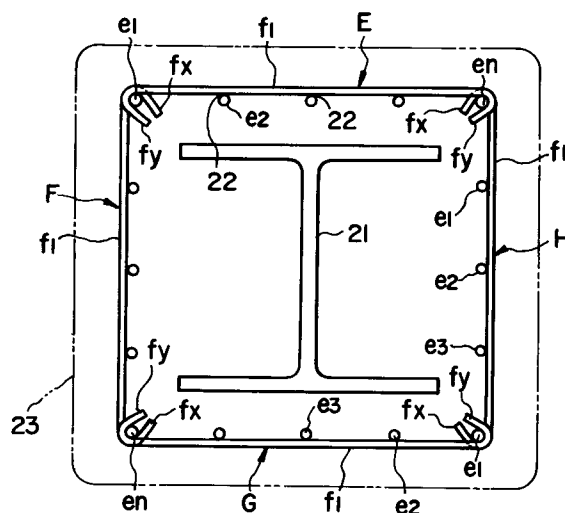
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(54) **Ferroconcrete constructing frame.**

(57) A ferroconcrete constructing frame (12) comprising a constructing frame (12) having four side frames (E, F, G, H) linked together to surround a beam (21) forming a pillar or similar structural parts, each of the side frames (E, F, G, H) being independent from the other and comprising a plurality of lateral bars (f1, f2...) and a plurality of longitudinal bars (e1, e2...) perpendicular to the lateral bars (f1, f2...), cross points (21) of the lateral bars and longitudinal bars being welded to fix.

FIG. 4**EP 0 517 107 A1**

Field of the Invention

The present invention relates to a ferroconcrete constructing frame. More particularly, it relates to a ferroconcrete constructing frame for winding around reinforcing steels forming a pillar or similar structural parts in reinforced concrete buildings, bridges, or similar structures.

Background of Invention

So far as the inventor is aware, prior ferroconcrete constructing frame has been constructed in the way that profile steel or similar bar of 10 or 13 mm thick having ring-like convex and concave is cut out to desired lengths, which are combined laterally and longitudinally or vertically around a beam or similar structural part to form a constructing frame by binding them at the crossing points with wires, belts, or the like.

This frequently proves to be a great inconvenience in a construction site, since it needs hard work on site and the constructing frame is weak as bound by hand. Also, it is troublesome that the lateral bars have to be inserted in the beam in advance before putting the beam in place.

In view of the foregoing, it is an object of the present invention to provide a ferroconcrete constructing frame of which side frames can be fabricated at factory and to which they can be assembled around a beam or similar structural part on site.

It is another object of the present invention to provide a ferroconcrete constructing frame of which side frames can be fabricated by spot or arc welding at factory and assembled together and folded horizontally if necessary for transportation or similar purpose.

Brief Description of the Invention

Briefly, the foregoing objects are accomplished in accordance with aspects of the present invention by the ferroconcrete constructing frame comprising a constructing frame having four side frames linked together to surround a beam forming a pillar or similar structural parts, each of the side frames being independent from the other and comprising a plurality of lateral bars and a plurality of longitudinal bars perpendicular to the lateral bars, cross points of the lateral bars and longitudinal bars being welded to fix.

Also, for the ferroconcrete constructing frame described above, the constructing frame is formed on site in a way that the lateral bars have a ring formed on a plane perpendicular to the longitudinal bars at each of ends thereof, and that rings of one side frame are made to align the ones of an

adjoining side frame, and that a stick bar is passed through the aligned rings to link the side frames.

Alternatively, for the ferroconcrete constructing frame described above, lateral bars of the side frame have a ring formed on a plane perpendicular to the longitudinal bars at one end thereof and a hook formed on the plane at the other end, and the constructing frame is formed on site in a way that the lateral bars have a ring formed on a plane perpendicular to the longitudinal bars at each of ends thereof, and that the rings of one side frame are made to align the ones of an adjoining side frame, and that a stick bar is passed through the aligned rings to link the side frames, and that the hooks are made to hook the stick bar passed through the rings of the adjoining side frame.

Alternatively, in the ferroconcrete constructing frame described above, lateral bars of the side frame have a ring formed on a plane perpendicular to the longitudinal bars at one end thereof and a hook bent from the longitudinal bars on a plane parallel with the lateral bars at the other end, and the constructing frame is formed on site in a way that the lateral bars have a ring 8 formed on a plane perpendicular to the longitudinal bars at each of ends thereof, and that the rings of one side frame are made to align the ones of an adjoining side frame, and that a stick bar is passed through the aligned rings to link the side frames, and that the hooks are made to hook the rings of the adjoining side frame.

Alternatively, for the ferroconcrete constructing frame described above, bars of the side frame have a hook formed on a plane perpendicular to the longitudinal bars at each of ends thereof, and the constructing frame is formed on site in a way that the hook on each end of the side frame is made to hook the respective stick bars passed through the rings of the adjoining side frames on both sides thereof.

Alternatively, for the ferroconcrete constructing frame, lateral bars of the side frame have one hook at each of ends thereof, which are bent reversely from each other on a plane parallel with the lateral bars, and the constructing frame is formed on site in a way that the hook on each end of the side frame is made to hook the respective rings of the adjoining side frames on both sides thereof.

Alternatively, for the ferroconcrete constructing frame, lateral bars of the side frame have a hook formed on a plane perpendicular to the longitudinal bars at one of ends thereof and a hook bent from the longitudinal bars on a plane parallel with the lateral bars at the other end, and the constructing frame is formed on site in a way that the hook on one end of the side frame is made to hook the stick bar passed through the ring at a free end of the adjoining side frame, and that the hook on the

other end of the side frame is made to hook the ring at a free end of the other adjoining side frame.

Further alternatively, for the ferroconcrete constructing frame comprising four side frames for surrounding a beam forming a pillar or similar structural parts, each of the side frames has longitudinal bars and lateral bars combined to form a grill along a side of the beam, and each of cross points of the longitudinal bars and the lateral bars is welded, and the lateral bars of two of the side frames extend perpendicular to a longitudinal direction of the beam, and ends of the lateral bars are bent obliquely inward so as to hook the longitudinal bars at ends of the adjoining side frame.

Alternatively, for the ferroconcrete constructing frame described above, the said four side frames are hinged to two pairs, and the lateral bars of two opposing side frames are turnably coupled with the end longitudinal bars of the other two opposing side frames.

Alternatively, for the ferroconcrete constructing frame described above, the two side frame pairs may be formed L shape by integrating their lateral bars.

Alternatively, for the ferroconcrete constructing frame described above, three adjoining side frames of the said four are formed U shape by integrating their lateral bars.

Alternatively, for the ferroconcrete constructing frame described above, all the four side frames are turnably coupled together, and only one of the side frames is made detachable.

With the above mentioned and other objects in view, including inexpensiveness of construction, foolproofness in operation, and general superiority of the ferroconcrete constructing frame, the present invention consists in the novel and useful provision. Formation, construction, association and relative arrangement of parts, members and features, all as shown in the accompanying drawing, described generally, and more particularly pointed out in the claims.

An advantage of the present invention consists in particular in the fact that number of working steps can be decreased to a great extent as the side frames A, B1, B2, C1, C2, and C3 can be fabricated at factory and should be only linked together on site.

Another advantage of the present invention consists in that the side frames A, B1, B2, C1, C2, and C3 are more sturdy than the conventional ones bound on site as their lateral and longitudinal bars are welded at the cross points. This can reduce binding material.

Brief Description of the Drawings

Other objects and advantages of the present

invention will further become apparent thereafter and in the drawings in which:

Fig. 1 is cross-sectioned side views of side frames of an embodiment of the ferroconcrete constructing frame of the present invention as looked in a direction of the longitudinal bars. Fig. 1a is across-sectioned side view of a side frame A. Fig. 1b is across-sectioned side view of a side frame B1. Fig. 1c is across-sectioned side view of a side frame B2. Fig. 1d is across-sectioned side view of a side frame C1. Fig. 1e is across-sectioned side view of a side frame C2. Fig. 1f is across-sectioned side view of a side frame C3.

Fig. 2 is examples of combination of the side frames of the ferroconcrete constructing frame of the present invention. Fig. 2a is combination of three side frames A and one side frame B1. Fig. 2b is combination of three side frames A and one side frame B2. Fig. 2c is combination of three side frames A and one separate side frame C1. Fig. 2d is combination of three side frames A and one separate side frame C2. Fig. 2e is combination of three side frames A and one separate side frame C2.

Fig. 3 is cross-sectioned views of an example of applications of the ferroconcrete constructing frame of the present invention to a beam or the like. Fig. 3a is a cross-sectioned view of an application in which the assembly shown in Fig. 2a is used. Fig. 3b is a cross-sectioned view of the completed ferroconcrete constructing frame. Fig. 4 is a cross-sectioned view of another embodiment of the ferroconcrete constructing frame of the present invention with it assembled. Fig. 5 is side views of lateral bars of the side frames exploded in Fig. 4.

Fig. 6 is a side view of a part of the embodiment in Fig. 4.

Fig. 7 is a cross-sectioned view of still another embodiment of the ferroconcrete constructing frame of the present invention.

Fig. 8 is a cross-sectioned view of still another embodiment of the ferroconcrete constructing frame of the present invention.

Fig. 9a is an expanded view of coupling parts of the embodiments shown in Figs. 4, 7, and 8.

Fig. 9b is an expanded view of the end of the lateral bar in Fig. 9a.

Detailed Description of the Preferred Embodiments

The present invention is illustrated in further detail by reference to the accompanying drawings.

Embodiment 1

In Fig. 3, a ferroconcrete constructing frame 12

surrounding a beam 11 forming a pillar or similar structural parts, comprises four side frames independent from one another, each of which has a plurality of lateral bars a 2 to c3 7 and a plurality of longitudinal bars 1 crossing them at right angles. All the crossing points is fixed by welding. Appropriate four of the completed side frames A, B1, B2, C1, C2, and C3 are selected to form the ferroconcrete constructing frame 12.

Fig. 1a shows the side frame A lateral bars a 2 of which have a ring 8 formed on a plane perpendicular to the longitudinal bars 1 at each of ends thereof.

Fig. 1b shows the side frame B1 lateral bars b1 3 of which have a ring 8 formed on a plane perpendicular to the longitudinal bars 1 at one end thereof and a hook a 9 formed on the plane at the other end.

Fig. 1c shows the side frame B2 lateral bars b2 4 of which have a ring 8 formed on a plane perpendicular to the longitudinal bars 1 at one end thereof and a hook b 10 bent from the longitudinal bars 1 on a plane parallel with the lateral bars b2 4 at the other end.

Fig. 1d shows the side frame C1 lateral bars c1 5 of which have a hook a 9 formed on a plane perpendicular to the longitudinal bars 1 at each of ends thereof.

Fig. 1e shows the side frame C2 lateral bars c2 6 of which have one hook 10 at each of ends thereof, which are bent reversely from each other on a plane parallel with the lateral bars c2 6.

Fig. 1f shows the side frame C3 lateral bars c3 7 of which have a hook a 9 formed on a plane perpendicular to the longitudinal bars 1 at one of ends thereof and a hook b 10 bent from the longitudinal bars 1 on a plane parallel with the lateral bars c3 7 at the other end.

In turn, the following describes how to assemble the four of the side frames A through C3 on site.

Example 1

Fig. 2a is an example of ferroconcrete constructing frame 12 of the present invention having three side frames A and one side frame B1 assembled together. The ferroconcrete constructing frame 12 should be assembled in the way that first, the adjoining side frames A and B1 should be made to align at their rings 8 and have a stick bar 13 passed through every couple of the rings 8 to link them. The end side frame A should have the stick bar 12 passed through each couple of the end rings 8 thereof. The ferroconcrete constructing frame 12 developed as such should be wound around the beam 11 forming the pillar or similar structural parts. The hooks a 9 of the side frame

B1 should be made to hook the stick bar 13 passed through the rings 8 at a free (no coupling) end of the side frame A opposite to the side frame B1.

Example 2

Fig. 2b is another example of ferroconcrete constructing frame 12 of the present invention having three side frames A and one side frame B2 assembled together. The ferroconcrete constructing frame 12 should be assembled in the way that first, the adjoining side frames A and B2 should be made to align at their rings 8 with the stick bar 13 passed through each couple of the rings 8 to link them. The ferroconcrete constructing frame 12 developed as such should be wound around the beam 11 forming the pillar or similar structural parts. The hooks b 10 of the side frame B2 should be made to directly hook the rings 8 at a free (no coupling) end of the side frame A opposite to the side frame B1.

Example 3

Fig. 2c is still another example of ferroconcrete constructing frame 12 of the present invention having three side frames A assembled together and one separate side frame C1. The ferroconcrete constructing frame 12 should be assembled in the way that first, the adjoining side frames A should be made to align at their rings 8 with the stick bar 13 passed through each couple of the rings 8 to link them. The semi-assembled ferroconcrete constructing frame of the three side frames should be wound around the beam 11 and have the stick bar 13 passed through each couple of the end rings 8. After this, the hooks a 9 of the last side frame C1 should be made to hook the respective stick bars 13 passed through the rings 8.

Example 4

Fig. 2d is still another example of ferroconcrete constructing frame 12 of the present invention having three side frames A assembled together and one separate side frame C2. The ferroconcrete constructing frame 12 should be assembled in the way that first, the adjoining side frames A should be made to align at their rings 8 with the stick bar 13 passed through each couple of the rings 8 to link them. The semi-assembled ferroconcrete constructing frame of the three side frames should be wound around the beam 11. The hooks b 10 of the side frame C2 should be made to directly hook the respective rings 8 of the semi-assembled ferroconcrete constructing frame.

Example 5

Fig. 2e is still another example of ferroconcrete constructing frame 12 of the present invention having three side frames A assembled together and one separate side frame C2. The ferroconcrete constructing frame 12 should be assembled in the way that first, the adjoining side frames A should be made to align at their rings 8 with the stick bar 13 passed through each couple of the rings 8 to link them. The semi-assembled ferroconcrete constructing frame of the three side frames should be wound around the beam 11 and have the stick bar 13 passed through couples of the rings 8 on either of the free ends. The hooks a 9 of the side frame C3 should be made to hook the stick bar 13 passed through the rings 8 on the one free end and be made to directly hook the rings 8 of the other free end.

While the principles of the present invention have been described above in connection with specific embodiments, and particular modifications thereof, it is to be clearly understood that this description is made only by way of example and not as limitation on the scope of the present invention. That is, the side frames A, B1, B2, C1, C2, and C3 can be combined in a way other than the examples described above.

Fig. 3 is a cross-sectioned view of an example of applications of the ferroconcrete constructing frame 12 to the beam 11 or the like. Fig. 3a is an application in which the assembly shown in Fig. 2a is used. In the example, a crane is used to lift the assembled side frames A linked with the side frame B1 to put on the beam 11 or the like. Fig. 3b shows the completed ferroconcrete constructing frame 12 that the free end of the lowest side frame A is pulled up with the hook a 9 made to hook the stick bar 13 passed through the rings 8 thereof to thoroughly surround the beam 11.

If the side frames shown in Fig. 2b are used, the stick bar 13 is not passed through the rings 8 on the free end of the lowest side frame A as the side frame B2 is used. Instead, the hooks b 10 should be made to directly hook the rings 8 to complete the ferroconcrete constructing frame 12 that thoroughly surrounds the beam 11.

The side frames A, B1, B2, C1, C2, and C3 should not always be plane, but may be, for example, curved.

Embodiment 2

In Fig. 4 is shown four side frames E, F, G, and H for surrounding a beam 21 forming a pillar or similar structural parts. Each of the side frames has longitudinal bars e1, e2 and so forth and lateral bars f1, f2 and so forth combined to form a grill

along a side of the beam 21. Each of cross points 21 of the longitudinal bars and lateral bars is welded. The side frames E and G have five longitudinal bars e1, e2 through en each. An end fy of each of the lateral bars f1, f2 and so forth is bent obliquely inward to hook and be welded with the respective longitudinal bars e1 and e2 on the both ends. Each of the side frames F and H has three longitudinal bars e1 and e2 and e3 and has no longitudinal bars on the both ends.

The lateral bars f1, f2 and so forth of the side frame F and G extend perpendicular to the longitudinal direction of the beam 21. Ends fx of the lateral bars are bent obliquely inward so as to hook the longitudinal bars e1 and en at ends of the adjoining side frame E and G.

The end fx is as long as four or more times diameter of the longitudinal bar e1 and extends, or is twisted, in the same oblique direction as the end fy mentioned above, or is twisted, not to interfere the ends fy of the side frames E and G as shown in Fig. 9. Since the end fx extends, or is twisted, obliquely inward, it will not obstruct spot points when it is welded on the longitudinal bars e1 and en.

As shown in Figs. 9a and 9b, each of the ends fy, like the ends fx, extends, or is twisted, obliquely inward. It is made long enough to spirally entangle around the longitudinal bar e1 or en by an angle of 180 to 360 degrees, preferably 270 degrees. Distance between the adjoining lateral bars f1 of the side frames E and F combined together are made uniform. This allows the ends fy contact each other between the welded ends fx. The ends fy cannot move in axial directions of the longitudinal bars e1 and en. Note that the adjoining ends fy and fx are symmetrical.

In turn, the following describes how to assemble the four side frames on site. The side frames E, F, G, and H should be put along the beam 21 to surround. The ends fx of the lateral bars f1, f2 and so forth of the side frames F and G should be made to hook the end longitudinal bars e1 and en of the adjoining side frames A and C. This completes the ferroconcrete constructing frame. In turn, a form (not shown) should be placed outside the completed ferroconcrete constructing frame. Concrete should be poured in the form to erect concrete block 23 as indicated by a dot-dash-line in Fig. 4.

If the present invention is applied to reinforced concrete having no beam, the ferroconcrete constructing frame may be placed outside an iron bar bundle, support, or similar structural parts instead of the beam.

Embodiment 3

Fig. 7 shows still another embodiment of the present invention. The four side frames E, F, G, and, H mentioned above are hinged to two pairs of E and F and G and H. The lateral bars f1, f2 and so forth of the two opposing side frames F and H are turnably coupled with the end longitudinal bars e1 of the other two opposing side frames E and F.

In this embodiment, the side frame pairs E and F and G and H can be folded plain as they are hinged. They can be easily transported to site and assembled as they should be simply coupled together there.

The two side frame pairs E and F and G and H may be formed L shape by integrating their lateral bars f1, f2 and so forth. In this case, the pairs cannot be folded, but can be assembled further easily as they are formed L shape.

Embodiment 4

Fig. 8 shows still another embodiment of the present invention. Three adjoining side frames E, F, and H of the above-mentioned four are formed U shape by integrating their lateral bars f1, f2 and so forth. Assembling the U-shaped frame and plain side frame can be made further more easily without the beam 21.

As explained in the embodiments 2, 3, and 4, still another advantage of the present invention consists in particular in the fact that the side frames E, F, G, and H of the present invention can be assembled in the simple way that they should be placed around the beam or bar bundle and the ends fx of the lateral bars f1, f2 and so forth should be made to hook the end longitudinal bars. This makes on-site work simple and easy as it eliminates bar cutting and binding works.

Still another advantage of the present invention consists in particular in the fact that the side frames are stronger than the conventional ones bound on site. This can save binding material.

Claims

1. A ferroconcrete constructing frame comprising a constructing frame having four side frames linked together to surround a beam forming a pillar or similar structural parts, each of the side frames being independent from the other and comprising a plurality of lateral bars and a plurality of longitudinal bars perpendicular to the lateral bars, cross points of the lateral bars and longitudinal bars being welded to fix.
2. A ferroconcrete constructing frame as set forth in claim 1, wherein the constructing frame is formed on site in a way that the lateral bars have a ring formed on a plane perpendicular to

the longitudinal bars at each of ends thereof, and that rings of one side frame are made to align the ones of an adjoining side frame, and that a stick bar is passed through the aligned rings to link the side frames.

3. A ferroconcrete constructing frame as set forth in claim 1, wherein lateral bars of the side frame have a ring formed on a plane perpendicular to the longitudinal bars at one end thereof and a hook formed on the plane at the other end, and the constructing frame is formed on site in a way that the lateral bars have a ring formed on a plane perpendicular to the longitudinal bars at each of ends thereof, and that the rings of one side frame are made to align the ones of an adjoining side frame, and that a stick bar is passed through the aligned rings to link the side frames, and that the hooks are made to hook the stick bar passed through the rings of the adjoining side frame.
4. A ferroconcrete constructing frame as set forth in claim 1, wherein lateral bars of the side frame have a ring formed on a plane perpendicular to the longitudinal bars at one end thereof and a hook bent from the longitudinal bars on a plane parallel with the lateral bars at the other end, and the constructing frame is formed on site in a way that the lateral bars have a ring 8 formed on a plane perpendicular to the longitudinal bars at each of ends thereof, and that the rings of one side frame are made to align the ones of an adjoining side frame, and that a stick bar is passed through the aligned rings to link the side frames, and that the hooks are made to hook the rings of the adjoining side frame.
5. A ferroconcrete constructing frame as set forth in claim 1, wherein lateral bars of the side frame have a hook formed on a plane perpendicular to the longitudinal bars at each of ends thereof, and the constructing frame is formed on site in a way that the hook on each end of the side frame is made to hook the respective stick bars passed through the rings of the adjoining side frames on both sides thereof.
6. A ferroconcrete constructing frame as set forth in claim 1, wherein lateral bars of the side frame have one hook at each of ends thereof, which are bent reversely from each other on a plane parallel with the lateral bars, and the constructing frame is formed on site in a way that the hook on each end of the side frame is

FIG. 1

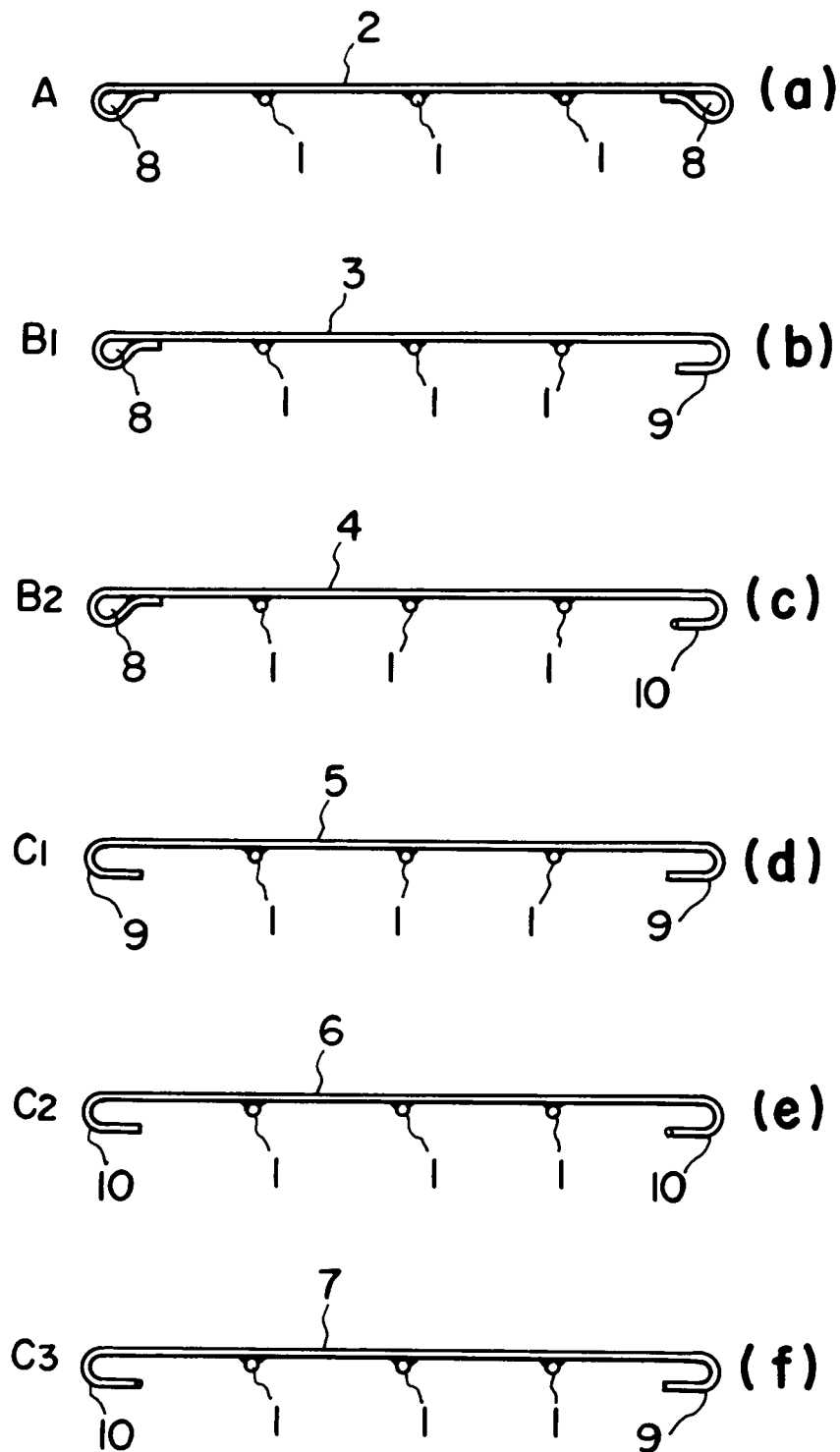


FIG. 2

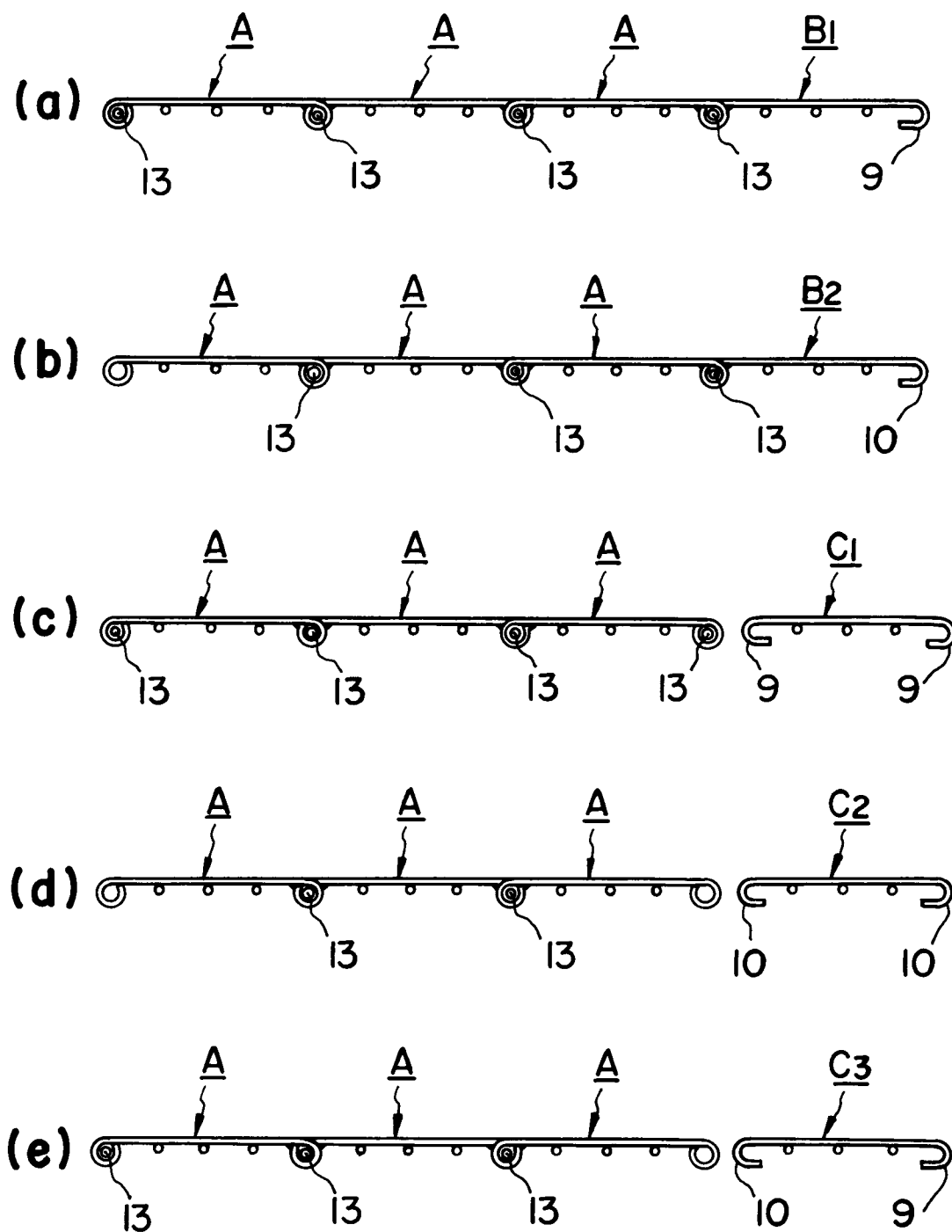


FIG. 3(a)

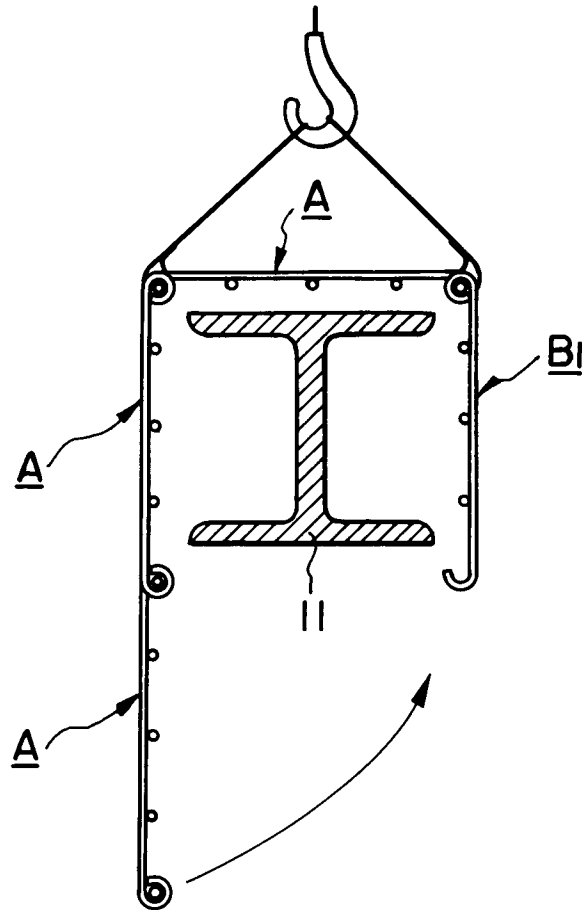


FIG. 3(b)

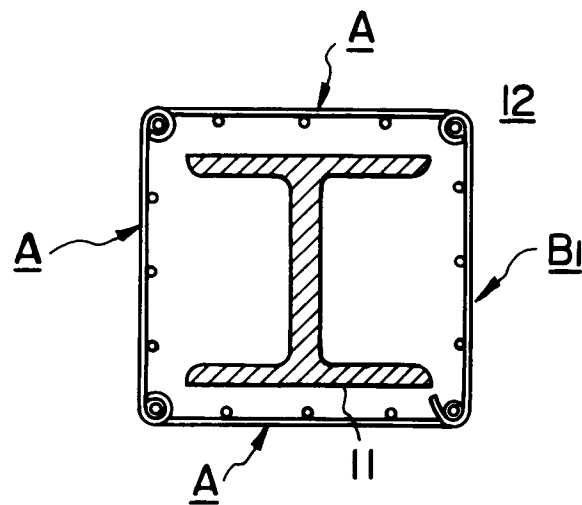


FIG. 4

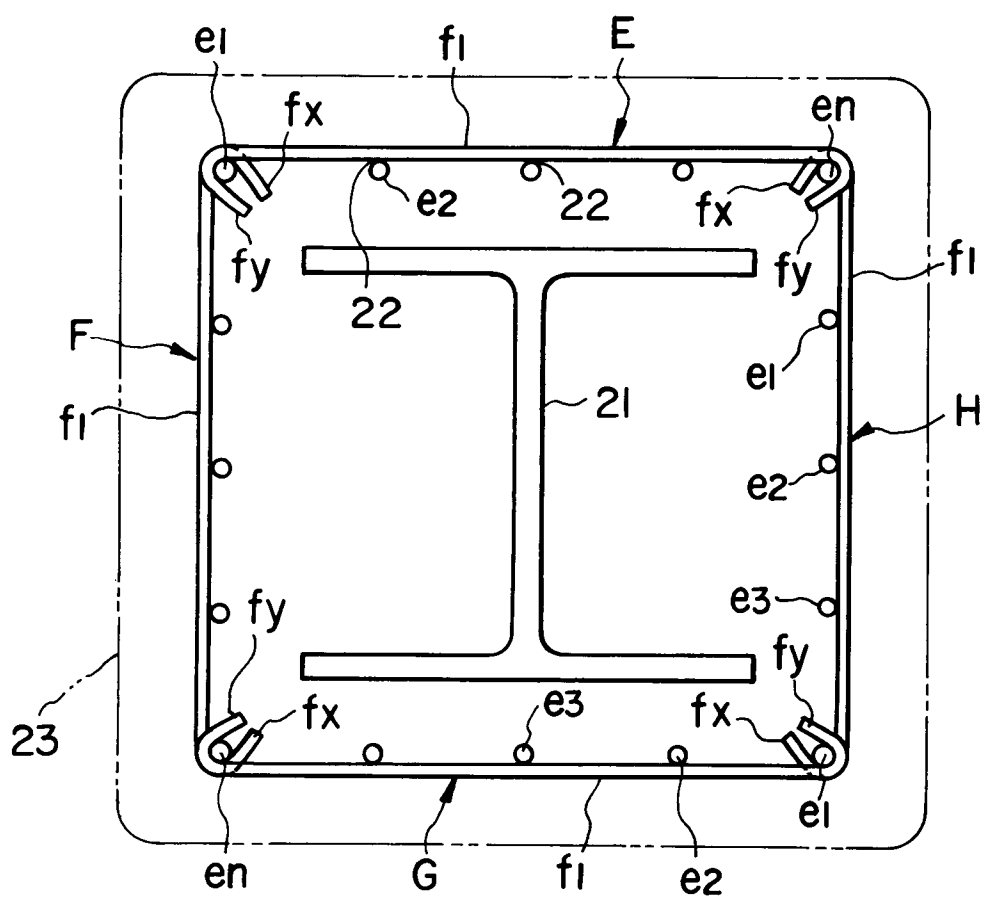


FIG. 5(a)

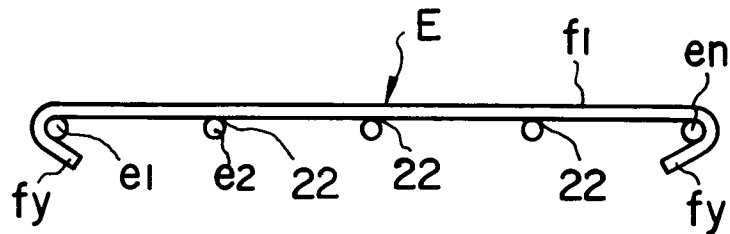


FIG. 5(b)

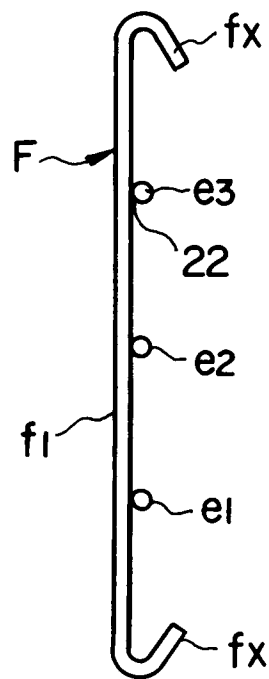


FIG. 5(d)

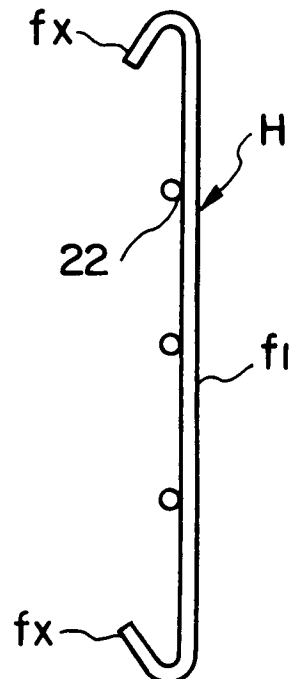


FIG. 5(c)

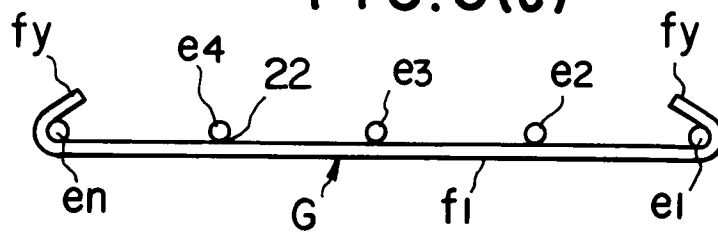


FIG. 6

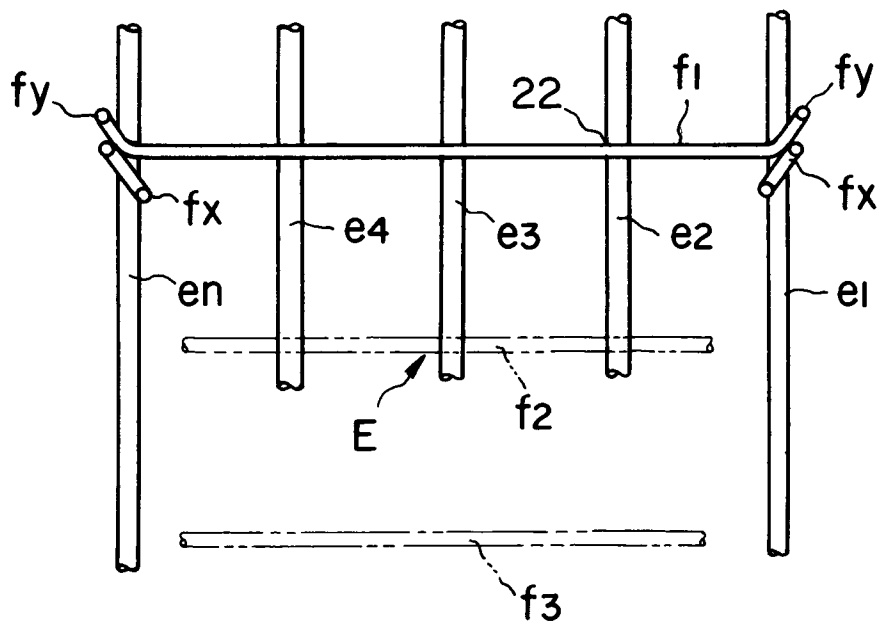


FIG. 7

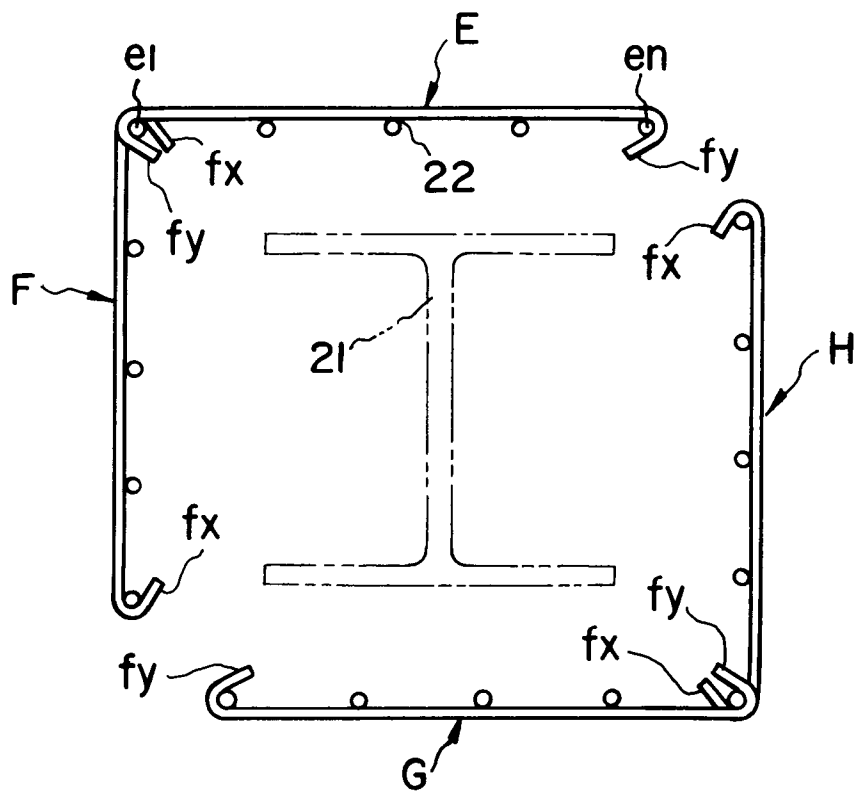


FIG. 8

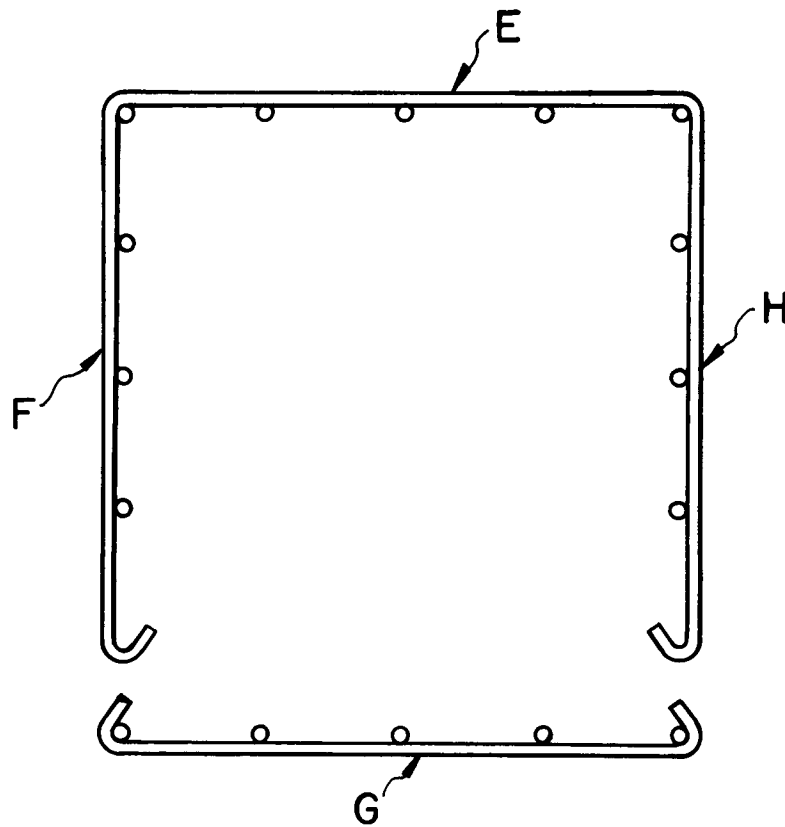


FIG. 9(a)

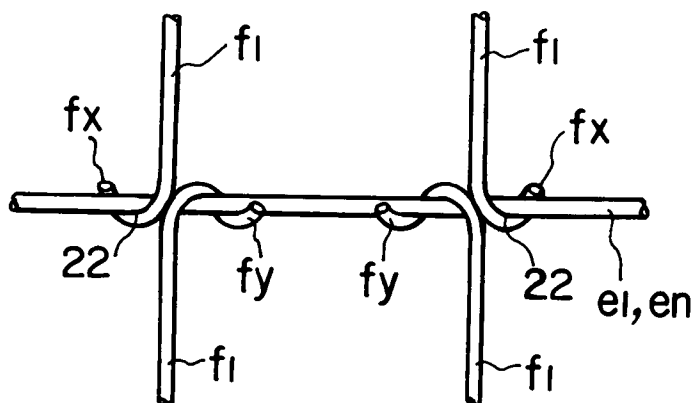
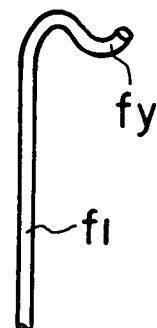


FIG. 9(b)





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 10 9027

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.5)
X	US-A-4 280 310 (TOLLIVER)	1	E04C5/06
Y	* the whole document *	2,8,9,12	E04B1/30

Y	EP-A-0 136 283 (OROSCHAKOFF)	2	
A	* page 6, line 4 - page 6, line 15 *	3,5,6	
	* page 7, line 20 - page 8, line 10 *		
	* page 10, line 17 - page 11, line 18 *		
	* page 14, line 25 - page 15, line 14; figures 1-28,44-52 *		

Y	FR-A-2 526 465 (STANDARM)	8,9,12	
	* the whole document *		

A	FR-A-2 088 529 (OROSCHAKOFF)	3,11	
	* figures 1-7,29-32,63 *		

A	US-A-3 938 294 (GABURRI)	1	
	* column 3, line 55 - column 4, line 22; figure 5 *		

			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E04C
			E04B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 AUGUST 1992	Examiner HENDRICKX X.
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