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(71) Applicant: **Fernandez Iglesias, Francisco**
33211 Gijon (Asturias) (ES)

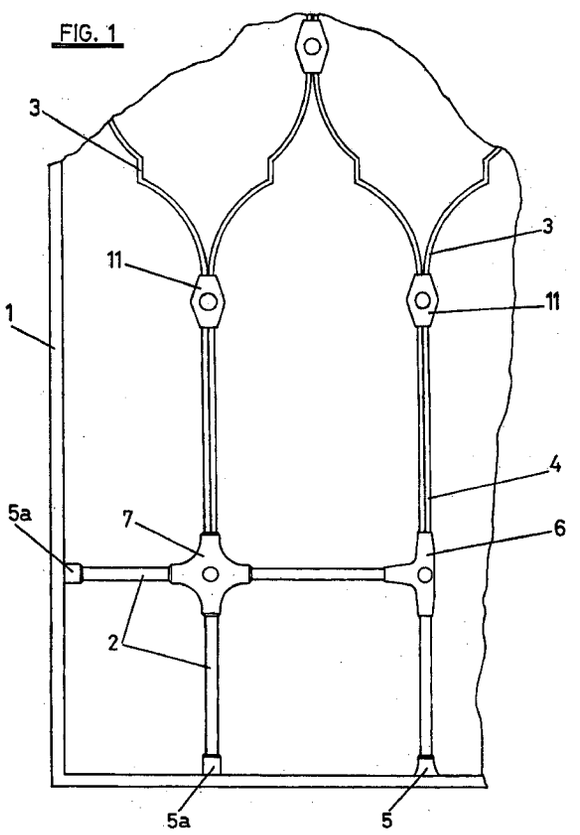
(72) Inventor: **Fernandez Iglesias, Francisco**
33211 Gijon (Asturias) (ES)

(74) Representative: **Hernandez Covarrubias, Arturo**
c/o Clarke, Modet & Co.,
Avda. de los Encuartes 21
28760 Tres Cantos (Madrid) (ES)

(54) System for the formation of lattice work

(57) System for the formation of lattice work formed by independent profiles (2,3) and connection means (5,6,7,11) featuring tubular passages aimed in the directions in which the profiles run and which size allow the previously mentioned profiles to be fittingly received, being such profiles made up of solid bars, and being such profiles capable of being coupled within the passages by pairs if required to achieve the design of the lattice work.

FIG. 1



EP 0 761 924 A1

Description

This invention refers to a system for the formation of lattice work, made up of a number of independent base parts or components that attach to each other so as to develop a flat structure with a surface matching that of the opening to be covered.

More specifically, the system of the invention is used to form lattice work of the type based on independent profiles and connecting joints fitted with one or more arms running on the direction in which the profiles meet.

This type of lattice work is particularly fitting for its inclusion between the double glazing panes of door and window panels, so that it is assembled upon said panel rims or frames, between the two glass panes, although they may also be used for the formation of independent lattice work for space partitions and other applications.

In the already known lattice work of the above described type, the independent profiles feature a tubular structure, whereas the arms of the joints are solid, and they adopt a stem shape with a cross section that matches the internal cross section of the tubular arms.

With the above arrangement, the assembly of the lattice work is effected by plugging at the end of the tubular profiles the arms or stems of the joints, so that only a profile may attach to an arm or stem. This condition constitutes a limitation in respect of the possible designs that may be achieved through the application of currently used systems.

Further, and due to the profiles having a tubular structure, they are generally used with a straight trajectory, due to the fact that its side forming is difficult and causes profile section deformation. This causes the lattice work to be formed almost exclusively by straight rods so that no irregular shape forming rods are normally found in the market.

On the other hand, due to the end of the profiles remaining outside the arms of the joints and being, therefore visible, profile cutting must then be effected with great accuracy and furthermore in many cases it will be necessary to touch up those cuts in order to achieve edges without any fettling or imperfections that may negatively affect the aspect of the lattice work.

The object of this invention is to eliminate the previously mentioned disadvantages by using a system that supplies a structure of the previously described type, arranged so that it allows the assembly of lattice work with any type of design, that can be made up of contours using straight and curved spans of any shape.

Using the system objet of this invention, may be achieved structures that are furthermore arranged so that the ends of the profiles that define the contours of the lattice work are concealed, so that the state of those ends will not influence the aspect or finish of the lattice work.

In accordance with this invention, the joints are made up of flat tubular parts limited by two larger opposed walls, largely flat and parallel, and two smaller opposed walls, being the above parts open at the other two smaller opposed surfaces. Between the greater walls run, from at least one of the free edges of the previously mentioned walls, intermediate partitions that define, between themselves and together with the smaller walls, passages which sections are sized so as to receive the end portion of the profiles that meet at the joint.

Due to the passages of the joint being arranged in accordance with the two opposed open surfaces of said joints, the profiles meet at two opposed sides, in almost the same ways, but in opposite directions.

The joints may form, as from their two opposed open sides, an equal or different number of passages, so that the number of profiles meeting at the joint may be different on either side.

The passages that start from an open side of the joints may form a certain angle in respect of each other, approximately in coincidence with the angle formed by the profiles that meet on this side of the joint.

The joints may furthermore include, as from each of their opposed open surfaces, two passages aligned and in extension, through which a profile may pass through the joint, extending from it on both sides so as to form lattice work bars or spans. This feature may also be found in the joints described in the main patent, fitted with tubular arms, as long as there are arms aimed in opposite directions.

The joints may be preferentially subdivided as per a median plane parallel to the larger walls, in two equal parts, fitted on their internal sides with mutual anchorage means, such as, for instance, pins and holes capable of being arranged across each other so that they may then couple upon each other, and mutually fitting ribs which purpose is to limit the passages.

The joints with the previously described characteristics may feature a relative positioning of the passages different to the one described above, so that they would then allow the reception of the profile ends running as per perpendicular directions and forming different angles in respect of each other.

The invention does also foresee that some of the spans between joints may be covered by pairs of bars or rods that will feature a thickness half of that of normal bars, so as to allow their coupling inside the tubular housing corresponding to the joint. These bars or rods may adopt any curve shape, preferentially symmetrical in respect to another one, finishing in the form of straight spans that are attached so as to be capable of being jointly housed into each joint.

The shape of the bars of each pair may be symmetrical, in which case the straight end spans of each bar will be aligned in respect of each other. Thus, upon attaching the two bars of each pair, the end spans of both bars will be supported upon each other, whereas their shapes will determine a symmetrical contour.

The shapes of the bars may be formed by curved and straight spans that may adopt any outline, enabling the achievement of a great number of different designs.

Joints of a single tubular arm will be used for the attachment of the elements making up the lattice work to the frame or contour upon which it is to be assembled. These joints will then be anchored to the frame or contour and will receive upon their tubular arm the attached ends of the pair of bars that initiate the lattice work, in the case of shaped bars, or the tubular element or bar, in the case of a straight span. Joints with two, three and four tubular arms may be used for the internal design or outline of the lattice work.

For the assembly of the lattice work are gradually introduced the attached straight end spans of each pair of shaped bars, or the bar, in the case of straight spans, into the tubular arms of the corresponding joint. In order to make bar pairs easier to handle, they may be secured to each other using holding clips that are fixed upon the end straight spans, particularly when those spans are long. In some cases those spans may also be joined together using spot welds. These clips may also join together the adjacent portions of shapes.

The joints are fitted at their central section with offsets that allow the assembly of elastic elements that ensure contact with the glass panes and the non movability of the lattice once it has been duly assembled.

The features and advantages of the structure object of the invention will be better understood with the aid of the following description, effected with reference to the attached drawings, showing a possible form of execution, rendered as a non limitative example.

In the drawings:

Figure 1 is a partial elevation view of a lattice work made up in accordance with the structure object of the invention.

Figure 2 is a detail view of the lattice work in figure 1, shown at a larger scale.

Figure 3 is an elevation view of a four arm joint.

Figure 4 is a cross section view of a four arm joint, taken as per the cut line IV-IV of figure 3.

Figure 5 is an elevation view of a three arm joint.

Figure 6 is a cross section view of a three arm joint, taken as per the cut line VI-VI of figure 5.

Figure 7 is a diametral cross section of a one arm joint.

Figure 8 is a cross section view similar to that of figure 7, showing an execution variant.

Figure 9 is an elevation view of a housing half of the structure bar holding clips.

Figure 10 is a cross section view taken as per the cut line X-X shown in figure 9.

Figure 11 is an upper plan view of the housing half shown in figure 9.

Figure 12 is a cross section view of a joint of the lattice work assembled between two glass panes.

Figure 13 is a frontal elevation view of a second lattice work built in accordance with the invention.

Figure 14 is a perspective view of a joint made up in accordance with the invention, that becomes part of the lattice work shown in figure 13.

Figure 15 is a perspective view of the joint shown in figure 14, in open position.

Figure 16 is a perspective view of another joint of those that form part of the lattice work shown in figure 13.

Figure 17 is a perspective view of the joint shown in figure 16, in open position.

Figure 18 is a perspective view of another joint, similar to that shown in figure 16, but with the same number of passages at both ends.

Figure 19 is a perspective view of one of the end joints that form part of the lattice work shown in figure 13.

Figure 20 is a cross section view of the joint shown on figure 19, as per a central plane parallel to its bigger walls.

Figure 21 is a perspective view of a variant of an end joint.

Figure 22 is a cross section view of the joint shown in figure 21, as per a median plane parallel to its bigger surfaces.

Figures 23 and 24 correspond to cross sections of different profiles that may become part of the lattice work shown in figure 13.

Figure 25 is a partial cross section of the lattice work shown in figure 13, taken as per cut line XXV-XXV of figure 13.

Figure 1 shows a lattice work made up as per the system object of this invention, assembled upon a rim or frame 1 and made up of a number of straight bars or tubes, marked with reference number 2, and pairs of shaped bars or rods marked with reference number 3.

The bars or rods 3 that feature intermediate outlines are topped at both straight end spans 4 that support each other through the coupling together of the two bars that make up each pair.

The lattice work is then completed using joints 5 that feature a single arm, joints 6 featuring three arms and joints 7 fitted with four arms. In all cases these arms are hollow, of tubular configuration, open at their end and internally sized so as to receive the end attached together portions 4 of the pairs of bars or rods 3 of the straight bars or tubes 2.

Figures 3 and 4 represent a joint 7 shown with greater detail, so that it may be observed how arms 8 of these joints feature a tubular configuration, open at their end and internally sized so as to be capable of receiving, with a tight fit, the joined end portion 4 of bars 3 or the end portions of bars 2.

Figures 5 and 6 represent a three arm joint, wherein it may be observed how each arm 9 adopts the same tubular configuration already described with reference to figure 4.

Finally, figures 7 and 8 represent a joint featuring a single arm 5, with a different external configuration but with its internal housing sized so as to receive the attached end portion of bar pairs 3 or of bars 2. These joints may have at their base a pin 10 capable of being introduced into a hole fittingly practised on frame 1, so

as to firmly secure the joint to the frame.

Bars 2 and 3 that become part of the structure formed as per the system object of this invention may be solid, thus allowing the performance of side outlines for the purpose of obtaining straight or curved spans using different designs, as may be observed in figure 1.

Figure 2 represents the joined end of two bars 3 being introduced into one of the tubular arms 8 of a four arm joint 7, as well as the assembly of a bar 2 into another arm 8. To enable the assembly of the pairs of arms into the joints, the straight spans of the bars 3 may be fastened using clips 11 that, as may be observed in figures 9 to 11, may be formed by two equal housings halves 12 fitted with a central longitudinal channel 13, at one side of which extends a pin 14, whereas on the opposite side it has a fittingly located hole 15. Using this arrangement, the clip is then formed joining together the two housing halves 12, rotated 180° in respect of each other, so that the pin 14 may then fit into hole 15 of the opposing housing half. The longitudinal passage 13 shall be sufficiently sized to hold the straight spans of bars 3, as shown in figures 1 and 2. The walls that limit the passage 13 of the housing halves 12 may be fitted with cross sectional ribs 16, figure 10, arranged so as to ensure their proper attachment to the joined straight spans of the bars.

Besides the use of clips 11 to keep fastened together the pairs of bars 3, mainly in the spans located away from the joints, spot welding may also be used to join bars 3.

The assembly of the lattice work shall then commence fixing the joints 5 and 5a to the frames and then will be introduced the joined straight end of the pairs of bars 3 or of the bars 2, using intermediate joints 6 or 7 fitted with two, three, four or even more arms and which may form equal or variable angles in respect of each other, all of the above so as to be capable of achieving, together with the different outlines or designs of bars 3, lattice work with highly attractive fancy shapes.

As may be observed both joints 6 and 7 as fastening clips 11 are fitted, at the central area of both of their sides, with small offsets 17, which purpose is to enable the assembly of elastic elements 18, so as to secure the application of pressure upon glass panes 19 between which the lattice work is assembled, as may be observed in figure 12.

With the previously described constitution, the ends of bars 2 and 3 are furthermore concealed inside the tubular arms of the joints, thus enabling a better finish, given that all visible surfaces will then feature the finishes corresponding to the manufacturing processes of the various parts and components.

Although the new system allows the assembly of lattice work with solid bars, this fact does not prevent the use of tubular elements for straight spans and hollow rods for the curved spans, as long as it may be possible to give them the desired shape. Similarly, bars 2 are capable of featuring any polygonal, broadside, circular, square, octagonal, etc. cross section, whereas bars or rods 3 shall preferentially feature cross sections duly corresponding to the cross section selected for the corresponding bar or tube 2.

Although in the joints shown in the drawings, their tubular arms (8) form straight angles in respect of each other, it must be understood that these angles may be varied or they may even be all different, given that in any case the angle so formed in respect of each other shall depend upon the profiles meeting at a joint.

Furthermore the arms (8) of the joints may form a straight or slightly curve cage, so as to be capable of receiving the arched profile ends meeting at a joint.

Figure 13 represents a lattice work assembled within a frame of roughly semicircular shape and which is made up of a number of straight radial arms 21 running between the curved portion 22 of the frame and an internal bridge like structure approximately semicircular and concentric in respect of the semicircular curved portion 22 of the frame, being this bridge attached by its ends to the straight diametral span of the frame. There are external 25 and internal 26 arches running between radial arms 21.

The straight arms 21 are attached by their external end to the semicircular stretch 22 of the frame using joints 27 that include a tubular branch, whereas the joint to the central bridge may be effected using joints 28 that feature three tubular branches.

The joints between the external 25 and internal arch shaped bars and the intermediate straight radial bars is effected using joints 29, whereas the joint to the end radial bars is effected using joints 30.

The lattice work object of the invention, as previously commented, is particularly suited for assembly on door and window panes fitted with double glazing, as shown in figure 25, that represents the external stretch 22 of the frame shown in figure 13, to which are anchored the radial bars or arms 21, using joints 27, and which are then located between glass panes 31 and 32 that make up the double glazing, kept in place, for instance, through the use of beads 33 or any other traditional fixing system.

The various stretches that make up the lattice work shall be made up of profiles, preferentially made of metal, which may be either solid or tubular, and which may feature any required cross section.

Semicircular bridge like structure 23 may also be made up of stretches of arched profiles joined together using joints 28 which include three tubular arms into which are then plugged the profiles that meet at the joint. At their external end the radial arms or profiles 21 are fixed upon the semicircular stretch 22 of the frame using joints 27, which, as may be better observed in figures 18 and 20, are designed in the shape of sleeves which internal cavity 31 is sized so as to fittingly receive the end portion of radial arm 21. These parts are furthermore fitted with an external pin 32 for their attachment to the semicircular stretch 22 of the frame.

Should the radial profiles 21 meet at an angle of the frame, joints 27 may then adopt the configuration shown in figures 21 and 22., where the configuration of sleeve 31 is maintained but its enclosed base is limited by two surfaces 33 and 34 that form, in respect of each such surface, the same angle that the point of the frame where they are to be coupled, with pin 32 extending from one of the previously described surfaces, as in the case of figures 19 and 20.

Figures 14 and 15 represent joint 30 used to join arched arms or profiles 25 and 26 to the radial arms or profiles 21a. These joints are made up of flat configured tubular parts, limited by two opposite larger walls, marked with reference number 35 and by two opposite smaller walls, marked with reference number 36, being the two parts open at the remaining two opposite smaller surfaces. These joints shall be preferentially subdivided, as per a median plane parallel to the larger walls 35, in two approximately equal parts, marked with reference numbers 37 and 38 and shown in figure 15. These parts have, on their internal surface, holes 39 and pins 40 that can be arranged across each other and fittingly joined, so as to be used as fastening elements. The two parts are furthermore fitted upon their internal surface with ribs 41 located adjacent to their longitudinal edges, which upon joining the two parts together shall then define the smaller walls 36, and further fitted with intermediate ribs 42 that upon joining together the two parts 37 and 38 then form an intermediate wall that will then, together with the smaller walls 36 of the joint, define two passages, which passages are duly marked in the drawing with reference numbers 43 and 44. At the opposite end will be formed a single passage 45, enclosed by side walls.

In the execution shown in figures 14 and 15, passages 43 and 45 are aligned and extending from each other, so that through them may then pass a profile, as shown by the dotted lines of figure 15, marked with reference number 46 and which would correspond to straight radial arm la shown in figure 13. Through passage 44 would then be introduced the end portion of another profile that would end at this joint, as shown by way of dotted lines in figure 15 and marked with reference number 47, profile that would then coincide with arched arms 25 or 26 of figure 13, that end at joint 30.

Joints 29 are shown in figures 16 and 17 and are made up, similarly to joints 30 shown in figures 2 and 3, by flat configured tubular parts, limited by two opposite larger walls 35a and other two, also opposite, smaller walls 36a, being the tubular part open at the remaining two opposite surfaces.

Also in this case the tubular part is subdivided, as per a median plane parallel to the larger surfaces 35a, in two parts marked by reference numbers 37a and 38a and shown in figure 17 and which feature, upon their opposite surfaces, holes 39a and pins 40a arranged across each other and that can be joined together so as to define the joining elements of the two parts. On their internal surface these two parts are fitted with ribs 41a, adjacent to the longitudinal edges, which upon joining together the two portions shall then define longitudinal walls 36a. Extending from one of the free edges, the two parts are further fitted with ribs 42a which, upon joining the two parts together, shall then define an intermediate passage 48 in the space between them, and further passages 43a and 44a with side walls 36a. Passages 48 and 45a are aligned and in extension in respect of each other, being thus capable of receiving through them a single profile represented by dotted lines in figure 17 and marked with reference number 46a, and which shall correspond to any one of the straight radial arms 21 forming part of the lattice work shown in figure 13.

Passing through passages 43a and 44a will then run profiles shown by dotted lines in figure 17 and marked with reference numbers 47a and which may correspond to arched arms or profiles 25 and 26 forming part of the lattice work shown in figure 13.

With the previously described arrangement, a flat lattice work made up of straight profiles 21 and curved profiles 25 and 26 is then obtained, each such profile capable of being made up of either a single part or a number of independent sections, each of one would then extend between two consecutive joints.

As shown in figures 23 and 24, profiles 21, 25 and 26 may feature a rectangular cross section, with a small intermediate longitudinal channel or crevice 49 running along its larger surfaces or else with offsets 50 running along its corners. Its cross section may also adopt any other shape and may furthermore be either solid or tubular, adapting the configuration of the passages of the joints to the external shape of the profiles.

The above description has been effected with reference to the semicircular lattice work shown in figure 13, may be similarly applicable to rectangular lattice work, in which case joints 20, similar to that shown in figure 18, may also be used.

The joints described allow the assembly of lattice work with any design, forming contours based on straight stretches, curved stretches or upon a combination of both straight and curved stretches.

The previously described joints may be made using plastic material, being their thickness equal or slightly smaller than the separation between glass panes 31 and 32, figure 25, that make up the double glazing of the frame on which the lattice work is assembled.

Should the separation distance between glass panes 31 and 32 exceed the thickness of the joints, the resulting gap may then be closed up using plastic discs or drop shapes attached to the offsets of the joints, as shown in figures 14, 16 and 18.

As may be understood, the number of passages practised on the open faces or surfaces of the tubular parts shall depend upon the number of profiles running therein, being these parts capable of having a different number of passages on either side, as in the cases shown in figures 14 and 17, or else having the same

number of passages on both sides, as shown in figure 18.

Claims

1. System for the formation of lattice work, based on independent profiles and connecting joints, characterized in that the connecting joints are fitted with tubular passages aimed at the directions in which the profiles are running and sized so as to fittingly receive the end portions of the previously described profiles; which profiles are further made of straight or curved bars which may be solid.

2. System according with claim 1, characterized in that the joints are made up of flat configured parts limited by two opposite larger longitudinal walls and by two smaller longitudinal walls also opposite, which parts are internally fitted with intermediate partitions located between the previously mentioned greater walls, from the free edges of the walls and configuring smaller passages between themselves and between themselves and the smaller walls.

3. System according with claim 2, characterized in that the flat parts include, as from their outlet openings, two passages in alignment and extending from each other.

4. System according with the prior claims, characterized in that the parts that make up the joint are divided as per a median plane parallel to the larger walls of that part, in two approximately similar portions, fitted upon their internal surfaces with mutually acting anchorage means and opposite ribs that make up the partitions.

5. System according with claim 1, characterized in that the lattice work includes profiles with curved outline shapes.

6. System according with claim 1, characterized in that the bars that run between two joints may be replaced with pairs of bars that may adopt any curved configuration and which ends are attached so as to run to the corresponding joints.

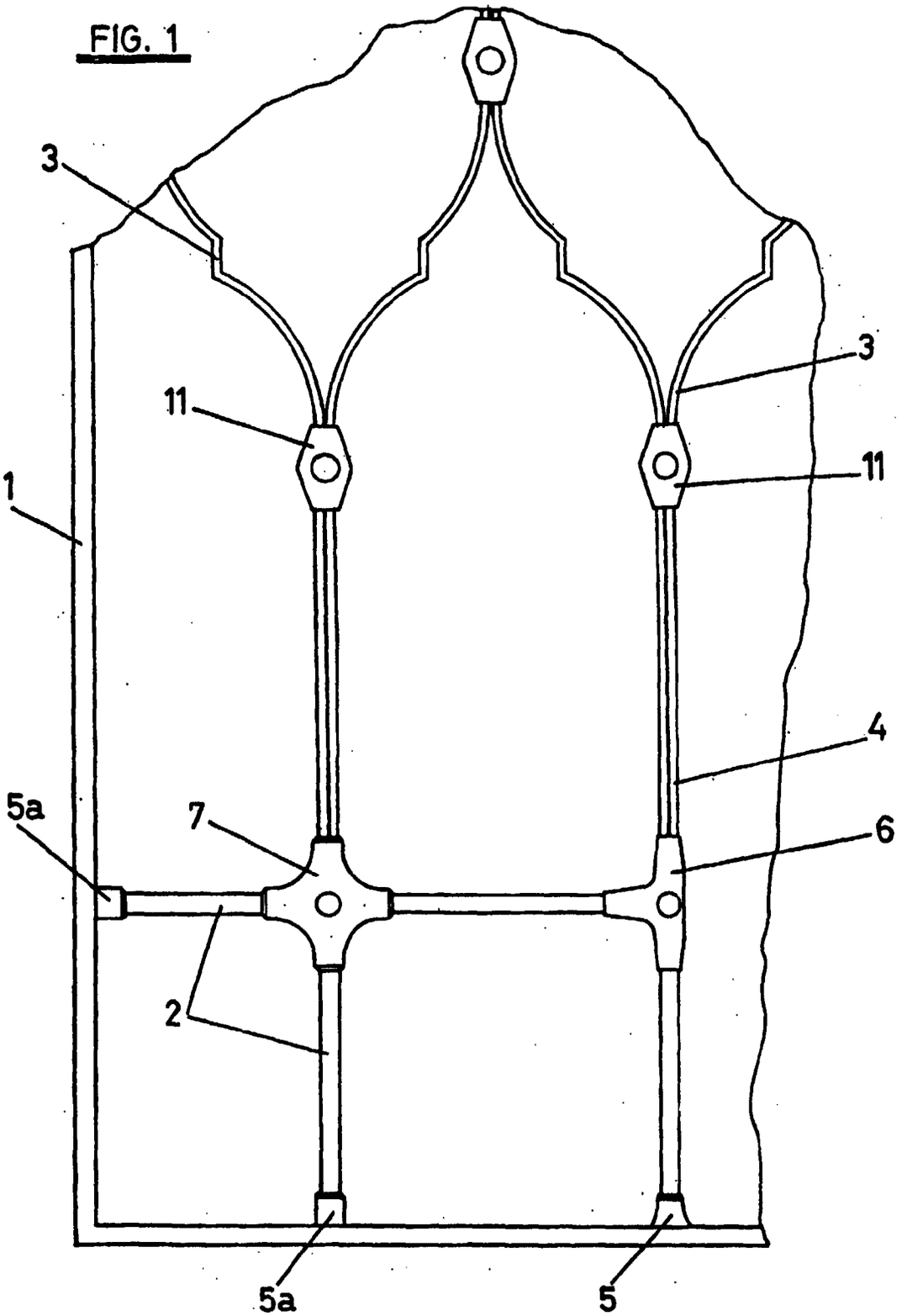
7. System according with claim 6, characterized in that the two bars (3) of each pair making up shapes are limited by straight end stretches; which straight stretches support each other by attaching the two bars, whereas the shapes determine a closed contour.

8. System according with claim 7, characterized in that fastening clips (11) are fitted upon the straight stretches of the attached bar pairs, separated by the joints.

9. System according with claim 7, characterized in that the shapes of the bars (3) of each pair are symmetrical and the straight end stretches of each bar are aligned in respect of each other.

10. System according with claims 6 and 8, characterized in that the joints and the clips feature on both sides offset portions (17) that allow the assembly of elastic elements (18) that ensure the non movability of the lattice work when assembled between glass panes (19).

FIG. 1



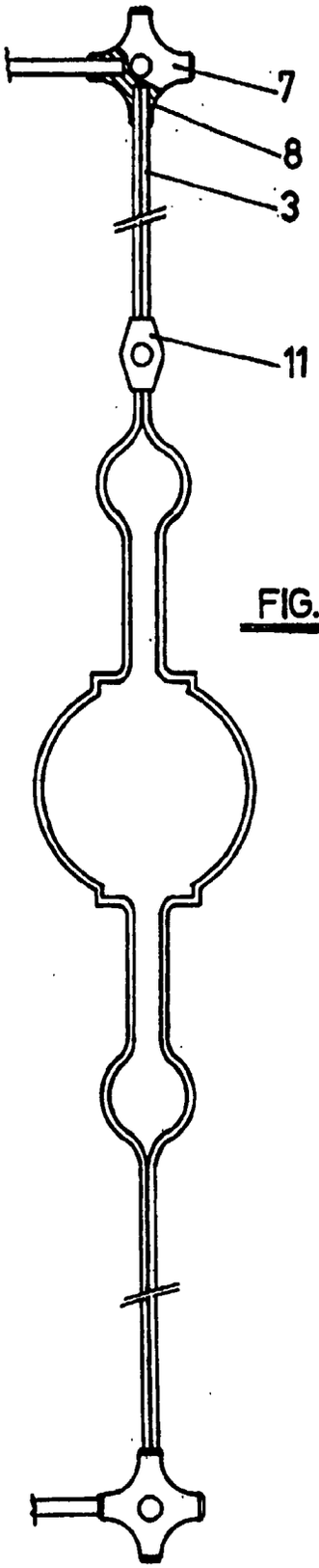


FIG. 2

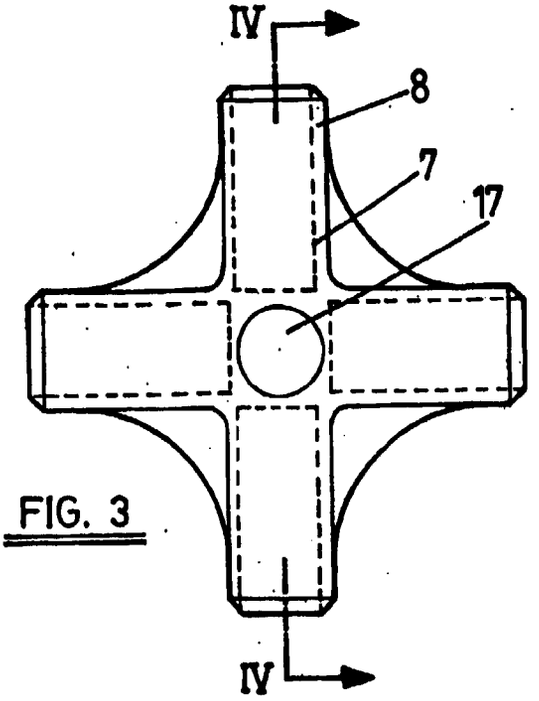


FIG. 3

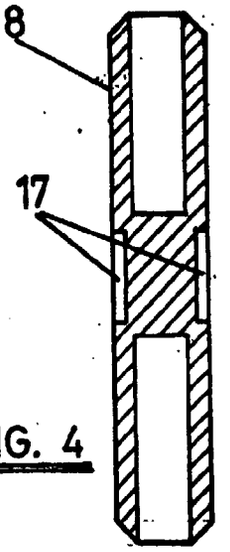


FIG. 4

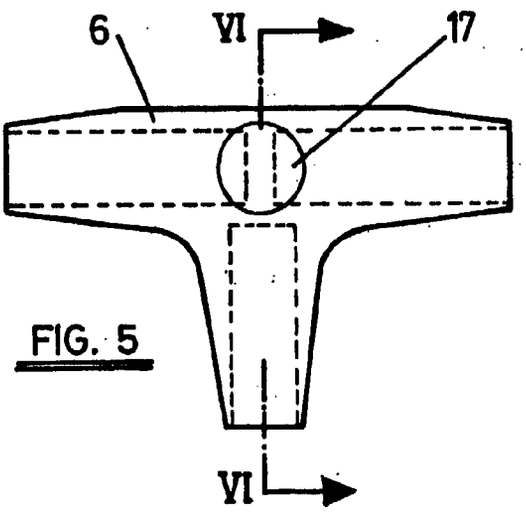


FIG. 5

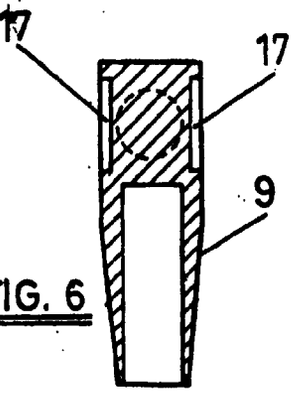


FIG. 6

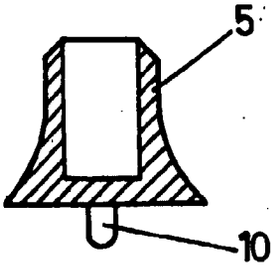


FIG 7

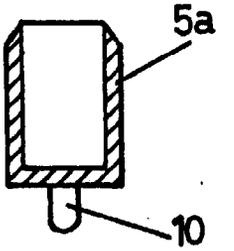


FIG 8

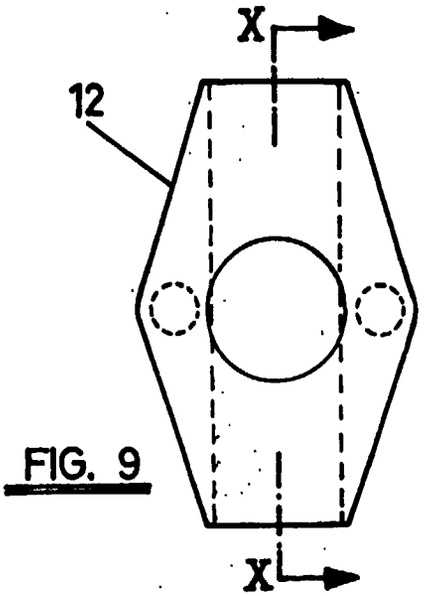


FIG. 9

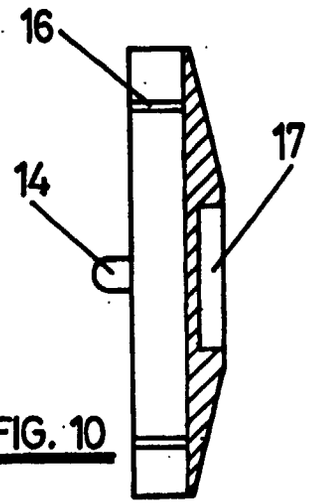


FIG. 10

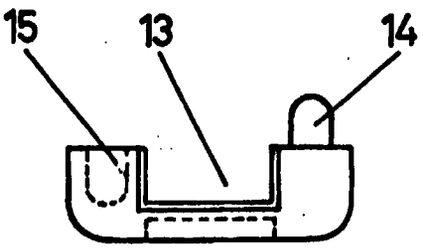


FIG. 11

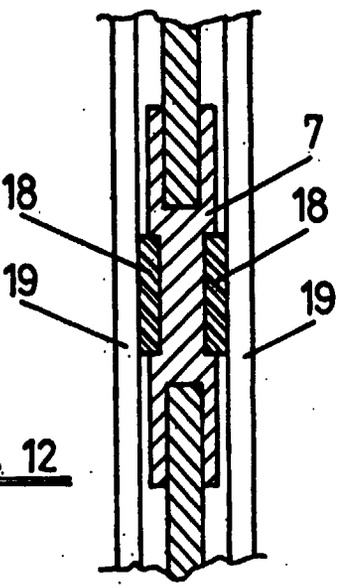


FIG. 12

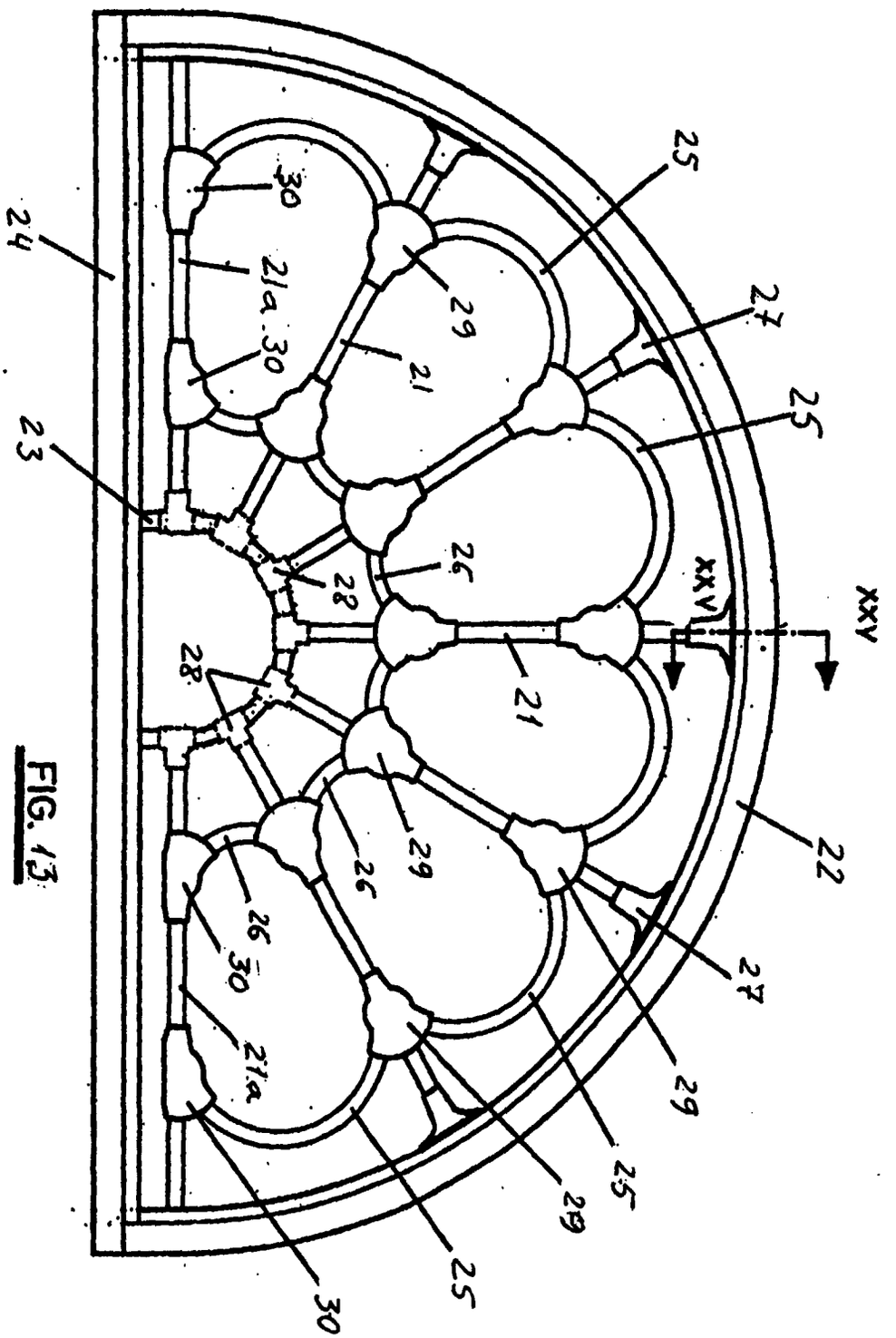

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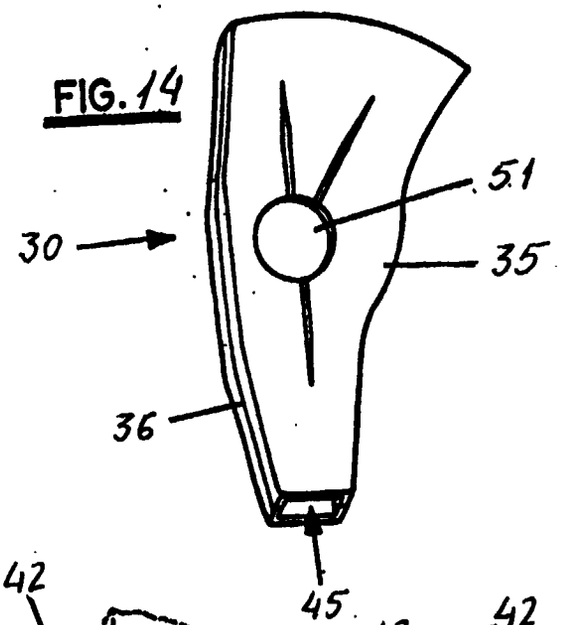
FIG. 13

FIG. 14



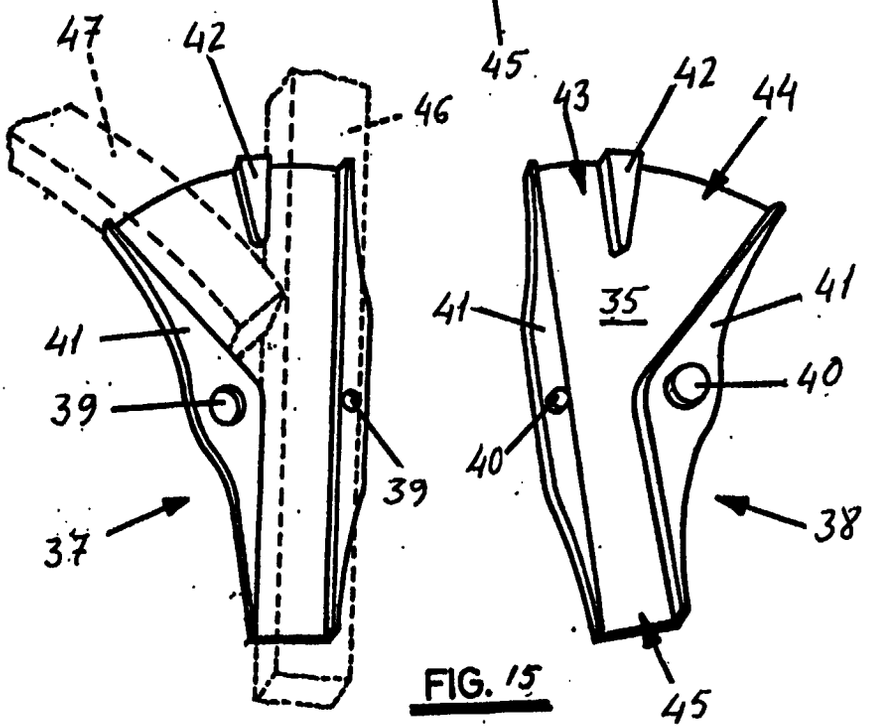
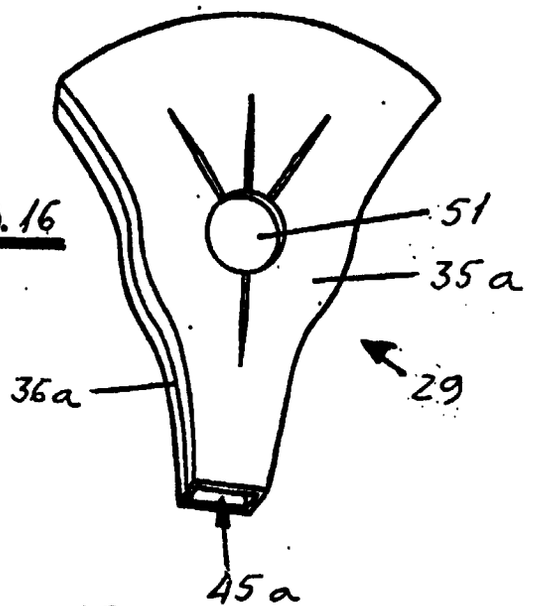


FIG. 15

FIG. 16


51
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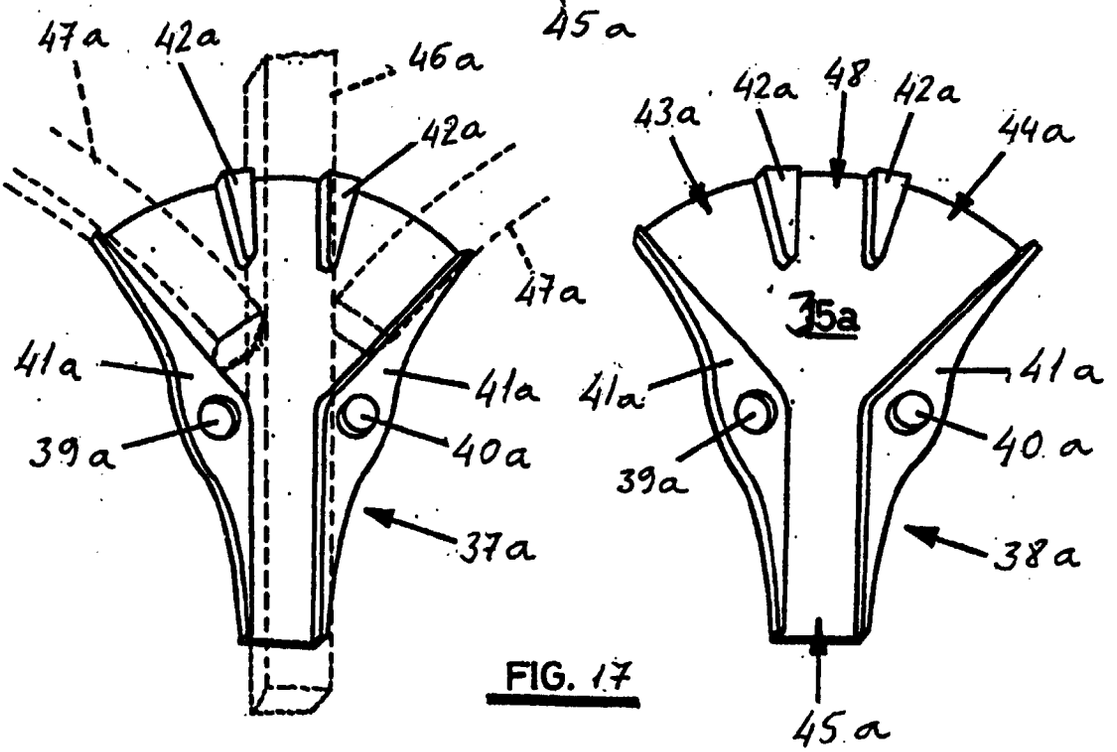
29
36a
45a


47a
42a
46a
42a
47a
41a
41a
39a
40a
37a
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48
42a
44a
35a
41a
41a
39a
40a
38a
45a

FIG. 17

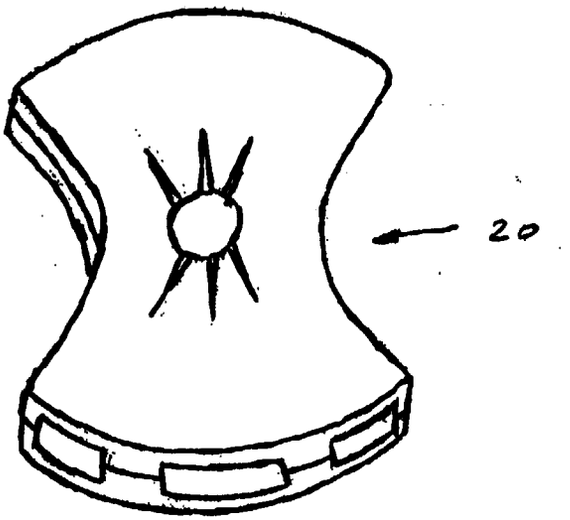

FIG. 18

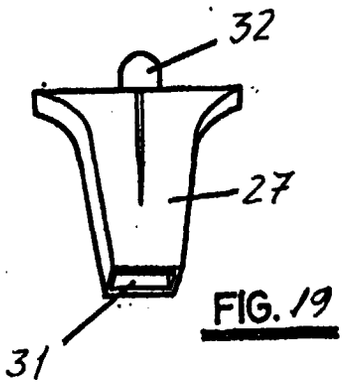

FIG. 19

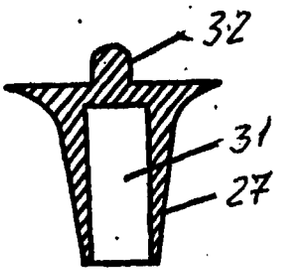

FIG. 20

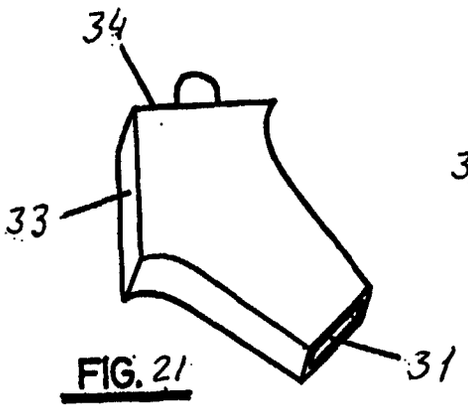

FIG. 21

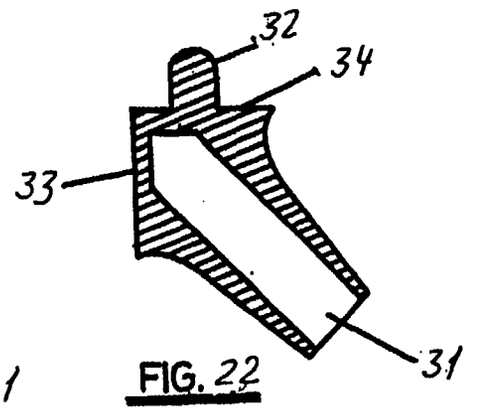

FIG. 22

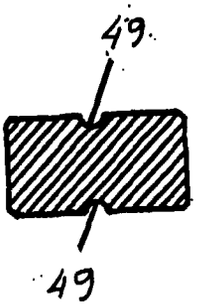

FIG. 23

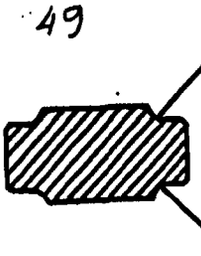

FIG. 24

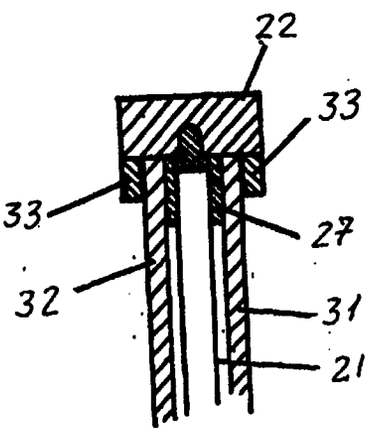

FIG. 25

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 50 0101

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.6)
X Y	EP-A-0 296 755 (PITT) * column 5, line 38 - column 8, line 16 * * column 8, line 36 - line 58 * * figures *	1-3 4,10	E06B9/01 E06B3/66 E06B3/964
X Y	FR-A-1 352 640 (STEINMETZ) * page 2, left-hand column, paragraph 2 - page 3, left-hand column, paragraph 1; figures 1-7 *	1-3,5 4,6,7,9	
Y A	US-A-3 039 574 (MILLER) * column 5, line 70 - column 8, line 19; figures *	6,7,9 1-5	
Y	DE-A-32 21 117 (KNACK) * page 6, paragraph 3 - page 13, paragraph 2; figures *	10	
A	AT-B-394 617 (PROGLAS) * the whole document *	1,10	
A	GB-A-2 106 580 (HEPWORTH PLASTICS) * page 1, line 100 - page 2, line 61; figures *	4,10	TECHNICAL FIELDS SEARCHED (Int.Cl.6) E06B
A	DE-A-35 04 717 (DREXLER) * the whole document *	6-9	
A	FR-A-2 343 873 (CLEMENT ET AL) * page 5, line 37 - page 6, line 32; figures 3-8 *	6-9	
A	US-A-4 783 938 (PALMER) * column 5, paragraph 2 * * column 6, line 39 - column 7, line 19 * * figures *	10	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	9 January 1997	Depoorter, F

CATEGORY OF CITED DOCUMENTS

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