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54 Frame for tightening fabric wound on it.

57 The present invention relates to a frame for tightening fabric wound on it, the said frame comprising a first bar (2, 32 or 62) the ends of which are fitted with two supporting elements (3, 33 or 63) with a number of arms (11, 42, 43 or 65) for supporting the said fabric.

The main feature of the present invention is that each of the said arms (11, 42, 43 or 65) carries a number of teeth (13, 23, 47 or 72) aligned in relation to one another and each having a cavity (14, 24, 48 or 73) and that, when in use, the selvedge of the said fabric is inserted between the said teeth (13, 23, 47 or 72) and the straight section (19, 51 or 74) of a body (15, 52 or 75), one for each of the said arms (11, 42, 43 or 65), is inserted into the said cavities (14, 25, 48 or 73) so as to pierce the said selvages and support them while, at the same time, being supported by the said teeth (13, 23, 47 or 72) so as to tighten the said fabric between the two said supporting elements (3, 33 or 63).

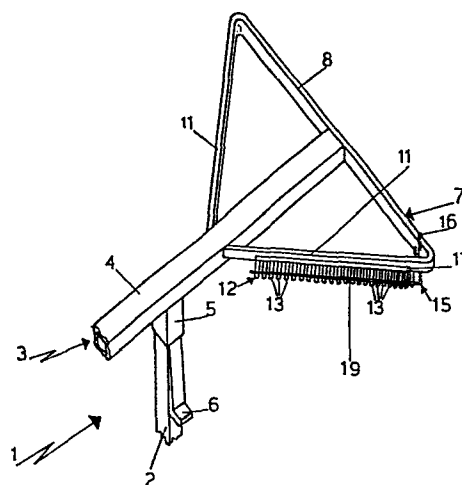


Fig.1

"FRAME FOR TIGHTENING FABRIC WOUND ON IT"

The present invention relates to a frame for tightening fabric wound on it.

Frames of the above type currently available on the market are mainly used for transporting fabric from the manufacturer to the user or for compact storage. The said frames are preferably made of metal and come essentially in two types.

10 Frames of the first type comprise a first bar the opposite longitudinal ends of which are fitted with two supporting elements each of which has a second bar with its longitudinal axis perpendicular to that of the first bar. From the centre section of the second bar, four arms branch out radially, each of which is fitted with a number of hooks along its entire length for hanging the fabric up by the selvages.

15 Frames of the second type also comprise a first bar fitted at the ends with two supporting elements, each of which, however, has a centre coupling for housing the corresponding end of the first bar and from which a number of radial

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arms branch out with the free end welded to an annular element coaxial with the said centre coupling. Each arm is fitted with a number of hooks on which to hang up the fabric. To wind and secure the fabric round the frames mentioned

5 above, the operators must pull the fabric both lengthwise and crosswise and, at the same time, hang it by the side selvages on to the innermost hooks on two opposite arms of the supporting elements. When the frame is turned, the fabric is brought up to another two corresponding opposite arms.

10 When the operators get back to the arms the fabric was first wound on to, the fabric is hung on to hooks spaced apart from the previous ones to prevent crushing the pile on the fabric. The distance between the hooks on any one arm depends on the length of the pile.

15 The frames currently available on the market present a number of serious drawbacks.

Firstly, as will be clear from the above description, the method by which the fabric is wound does not provide for securing the selvages firmly on to the hooks. Despite the

20 force exerted on the fabric when it is being wound, the folds in the fabric remain loose owing to the fact that the tip of the hook piercing the selvedge is higher than the part the selvedge is hung on to. This, combined with the weight of the fabric itself, may result in creasing of the

25 folds or even crushing of the pile. The force exerted on the fabric when it is wound, combined with the weight of the fabric itself, may increase the tear on the selvedge caused by the hook with the result that the fold is even more badly creased. The selvedge may even rip completely so that the

30 fold falls off altogether inside the frame. To overcome this

problem, a metal wire is currently inserted on each arm to strengthen the hold on the fabric. In time, however, the metal wire, which acts like the wires on an ordinary clothes line, inevitably bends so as to reduce tension on the fabric.

5 What is more, when the height of the fabric is even only slightly greater than the distance between the said supporting elements with the frame positioned vertically, i.e. with the axis of the first bar perpendicular to the supporting face, the selvedge, secured to the supporting element con-
10 tacting the supporting face, may slip off the hooks. When the frame is later positioned horizontally, on account of the selvedge coming loose, the folds in the fabric fall down. The selvedges may also be worked loose off the hooks as a result of normal oscillation on the supporting elements
15 around the first bar. All these drawbacks obviously occur more frequently when transporting or storing fabric wound on the frame. As already mentioned, the said drawbacks have a negative effect on the appearance of the fabric, particularly those with a thick pile, to the extent that they may
20 be rendered unusable, in addition to the transport and storage cost involved. Finally, the abovementioned types of frame also make unwinding equally complex.

The aim of the present invention is to provide a frame, for tightening fabric wound on it, which is free from the
25 above drawbacks, that is, one providing for winding and unwinding the fabric quickly and easily, and for keeping the folds tight so as to prevent creasing or crushing of the pile during transport or storage.

Further aims and advantages will be outlined in the following description.
30

With these aims in view, the present invention relates to a frame for tightening fabric wound on it, the said frame comprising a first bar the ends of which are fitted with two supporting elements having a hollow body fitted on to the
5 corresponding end of the said first bar and a number of arms for supporting the said fabric; the longitudinal axes of the said supporting elements being in a plane perpendicular to the longitudinal axis of the said first bar, characterised by the fact that each of the said arms carries a number of
10 teeth, aligned in relation to one another and each having a cavity; that, when in use, the selvedge of the said fabric is inserted between the said teeth and the straight section of a body, one for each of the said arms, is inserted into the said cavities so as to pierce the said selvedges and
15 support them while, at the same time, being supported by the said teeth, so as to tighten the said fabric between the said corresponding opposite arms of the two said supporting elements.

A number of preferred arrangements of the present invention
20 will now be described, by way of non-limiting examples, with reference to the attached drawings, in which :

- Fig.1 shows a part view in perspective of a first arrangement of a frame for tightening fabric wound on it;
- Fig.2 shows a side view of a comb element on the Fig.1
25 frame;
- Fig.3 shows a section of the Fig.2 element;
- Fig.4 shows a part view of part of the Fig.1 frame fitted with a different comb element from that shown in Fig.2;
- Fig.5 shows a section of the Fig.4 comb element;
- 30 - Fig.6 shows a view of an accessory for the Fig.1 frame;

- Fig.7 shows a part view in perspective of a second arrangement of a frame for tightening fabric wound on it;
- Fig.8 shows a part section of a first detail on the Fig.7 frame;
- 5 - Fig.9 shows a view of an accessory for the Fig.7 frame;
- Fig.10 shows a plan view of a portion of fabric arranged on the Fig.7 frame;
- Fig.11 shows a part view of a third arrangement of a frame for tightening fabric wound on it;
- 10 - Fig.s 12 and 13 show a side and front view respectively of a detail on the Fig.11 frame;
- Fig.14 shows a view of an accessory for the Fig.11 frame. Number 1 in Fig.1 indicates a metal frame for tightening fabric wound on it. Frame 1 comprises a main bar (2) the
- 15 ends of which are fitted with two elements (3) for supporting the wound fabric. Each supporting element (3) comprises a bar (4) with its longitudinal axis perpendicular to the longitudinal axis of bar 2 the end of which fits inside hollow elements 5 extending from the centre part of bar 4. The
- 20 ends of bar 2 are fitted into hollow elements 5 by means of wedges (6) forced into the said hollow elements (5) between the inside walls of the latter and the outside walls of bar 2. The ends of bar 4 are fitted with two essentially triangular elements (7), having a centre portion (8) fitted to
- 25 the end of bar 4 with its longitudinal axis perpendicular to the longitudinal axis of both bar 4 and bar 2, and two arms (11) with longitudinal axes converging in relation to the longitudinal axis of bar 4 and lying in the same plane as the longitudinal axes of portion 8 and bar 4. The ends
- 30 of arms 11 are welded close to the centre of bar 4.

In Fig.s 1, 2 and 3, each arm (11) carries a comb element (12) made from a plate, bent to form a U, from which, prior to bending, strips of material are removed so as to leave two solid top parts (17) and so, after bending, define a number of U-shaped teeth (13) with an internal cavity (14). As shown more clearly later on, the selvages on the fabric are held temporarily between teeth 13 until a straight section (19) of a metal wire (15) is inserted inside internal cavities 14 on teeth 13 so as to pierce and support the said selvages. The said metal wire (15 - Fig.6) has an open annular head designed to engage part of portion 8 when section 19 is inserted into comb element 12. In Fig.3, the top parts (17) on comb element 12 grip arm 11 to which they are either welded or screwed.

Number 21 in Fig.s 4 and 5 indicates a comb element with a different design from element 12. Element 21 is also made from a plate bent to form a U and therefore comprising two solid top parts (22) and a number of U-shaped teeth (23) with an internal cavity (24) into which portion 19 of wire 15 is inserted. Top parts 22 are shaped to form a downturned U so that one can accommodate the top part of arm 11 and the other the top part of rod 25 parallel to arm 11. The two ends (26) of rod 25 are bent to form an L by which it is either welded or screwed to arm 11. Between top parts 22, a spacer (27) is forced to clamp element 21 to arm 11 without welding or using assembly screws. Part 21 may sometimes consist of more than one piece, each comprising one or more teeth (23). The reason for this arrangement is to enable teeth 23, or sets of two or more teeth, to be spaced as required.

When in use, the fabric is wound in the same way as on presently sold frames with the difference that, when being wound, the selvages on the fabric are held temporarily tight between teeth 13 or 23 on frame 1 by means of a special device covered by another patent. Once the fabric has been wound, portion 19 of wire 15 on each arm 11 is inserted into cavities 14 or 24 so as to pierce the selvages on the fabric which, even when the said device is released, remain taut between the two supporting elements (3). Of course, depending on the length of the pile on the fabric, one or more teeth (13 or 23) will be skipped when winding the fabric so as not to crush the pile.

Number 31 in Fig.7 indicates a frame for tightening fabric wound on it, the said frame comprising a main bar (32) the two ends of which are fitted with two elements (33) for supporting the wound fabric. Each supporting element (33) comprises a bar (34) the longitudinal axis of which is perpendicular to the longitudinal axis of bar 32 the ends of which are forced into hollow elements 35 extending from a centre part of each bar (34). The ends of bar 32 are secured inside hollow elements 35 by means of two wedges (36) forced inside each of the said hollow elements (35) between the inside walls of the latter and the outside walls of bar 32. The latter has a rectangular section and each wedge (36) an essentially L-shaped section so that it can be inserted along one edge of bar 32 and grip parts of adjacent walls on it. Wedge 36 is tapered with a tailpiece (37), on the end outside hollow element 35, for engaging or releasing the said wedge 36 from hollow element 35 when knocked.

The longitudinal ends of bar 34 in Fig.7 are fitted with two

bars (38) bent into essentially triangular shape, each of the said bars having a centre portion (41) fitted to the end of bar 34 with its longitudinal axis perpendicular to the longitudinal axis of both bar 34 and bar 32, and two arms
5 (42) with their longitudinal axes converging from opposite sides with the longitudinal axis of bar 34 and lying in the same plane as the longitudinal axes of portion 41 and bar 34. The ends of arms 42 are welded to bar 34 close to its intermediate section. Each of bars 34 is also fitted with another
10 two straight arms (43) for each of bars 38. The said arms (43) are located inside the triangle formed by bar 38 and are parallel to arms 42. Each arm 43 has a first end welded to bar 34 and a second end welded to portion 41 on bar 38. As shown in Fig.s 7 and 8, each arm 42 and 43 is fitted with
15 a comb element (45) for tightening the fabric between the two opposite supporting elements (33). Each comb element 45 comprises a top part (46), bent in the shape of a U and gripping a portion of arms 42 or 43, and a bottom part with a number of teeth (47), each with the free end bent to form a
20 cavity (48). As shown more clearly later on, the selvages on the fabric are held temporarily between teeth 47 on each comb element (45) until a straight section (51) of a metal wire (52), bent in the shape of a U, is inserted into cavities 48, aligned with one another, on each comb element (45)
25 so as to pierce and support the said selvages. The said metal wire (52 - Fig.9) has a straight centre section (53) and two straight side sections (51) which fit into the cavities (48) of two adjacent comb elements (45) supported by parallel arms 42 and 43 respectively.
30 As shown in Fig.10, the fabric on each pair of parallel arms

42 and 43 is folded with an inside angle of 135° by one of arms 42 and 43 and subsequently with an inside angle of 135° by the other arm 43 or 42. Along the crosswise folds formed on arms 42 and 43 between the two opposite supporting elements (33), the pile on the fabric is turned towards the outside of frame 31 at an angle of 45° . In short, instead of winding the fabric by folding it on each comb element with an inside angle of 90° , the fold is halved by folding the fabric on each pair of parallel arms 42 and 43, at an inside angle of 135° on the first arm (42 or 43) and then at another 135° on the remaining arm (43 or 42).

The fabric is wound in the same way as on frame 1 in Fig.1. Once the fabric has been wound, for each pair of parallel, adjacent arms 42 and 43, portions 51 of metal wire 52 are inserted simultaneously into aligned cavities 48 on two comb elements (45) on the said parallel arms 42 and 43. When inserted, portions 51 pierce the selvages on the fabric inserted between teeth 47 so that, when the said temporary holding device is removed, the fabric remains taut between the two supporting elements (33). Of course, depending on the length of the pile, one or more teeth (47) will be skipped when winding the fabric to prevent crushing the pile. Number 61 in Fig.11 indicates a frame for tightening fabric wound on it, the said frame comprising a bar (62) the opposite ends of which are fitted with two wheel-like elements (63) for supporting the fabric. Each supporting element (63) has a centre coupling (64), which fits on to the corresponding end of bar 62, and a number of radial arms (65) each longitudinal axis of which defines, in the same plane, the same angle in relation to the longitudinal axis of arm

65 before and after it, and a right-angle in relation to the longitudinal axis of bar 62. A first end (66) of arms 65 is secured, e.g. welded, to centre coupling 64, while a second end (67) is secured, e.g. welded, to an annular element (68) coaxial with coupling 64. Though the number of arms (65) provided in Fig.11 is eight, this in no way limits the scope of the present invention in that the minimum number of arms (65) indispensable is three, naturally at the same angle in relation to one another. The end of bar 62 can be screwed, wedged or otherwise secured inside coupling 64.

Each arm 65 in Fig.s 12 and 13 is similar to a comb element. In fact, each arm 65 is made with a number of slots (71) to form a number of teeth (72) aligned to one another and each having a cavity (73) indicated by a dotted line in Fig.13. As shown in more detail later on, the selvages on the fabric are held temporarily in slots 71 until a straight portion (74) of metal wire 75 is inserted into cavities 73 on teeth 72 so as to pierce the said selvages and support the fabric. The said metal wire (75 - Fig.14) has an open annular head (76) for engaging part of annular element 68 when portion 74 is inserted into cavities 73. At each end (67) of arms 65, annular element 68 has a hole (77) coaxial with a hole in the said end 67. Through these holes, straight portion 74 of metal wire 75 fits through cavities 73 on teeth 72.

The fabric is wound in the same way as on frames 1 and 31. Once the fabric has been wound, on each arm 65, portion 74 of the corresponding wire (75) is inserted into cavities 73 of teeth 72 so as to pierce the selvages on the fabric held in slots 71. The said device is then released, the same be-

ing no more than an element with a number of arms, each with a number of grips for gripping the selvages on the fabric which, even when the device is released, remains taut between the two supporting elements (63) in that portions 74 on wires 75 are supported by teeth 72 to prevent them from bending. Of course, depending on the length of the pile on the fabric, one or more teeth will be skipped when winding the fabric, so as not to crush the pile.

The advantages of the present invention will be clear from the description given.

Firstly, the winding systems described in connection with frames 1, 31 and 61 overcome all the drawbacks posed by support and hook frames, e.g. tearing or unhooking of the selvages or falling folds resulting in creasing or crushing of the pile. As compared with frame 1, frames 31 and 61 provide for a softer fold on the fabric (Fig.10). Obviously, the crosswise folds will be less evident so that the fabric falls easily back into place when unwound or used. Another point worth noting is the negligible effect on the pile which, along the crosswise folds, no longer opens 90° but by half that angle on frame 31 and by an angle depending on the number of arms (65) on frame 61. Furthermore, between adjacent arms 42 and 43 on frame 31 or adjacent arms 65 on frame 61, the fabric may be arranged parabolically so as to reduce the effect on the pile or fabric even further.

To those skilled in the art it will be clear that changes can be made to frames 1, 31 and 61 described and illustrated herein, without departing from the scope of the present invention.

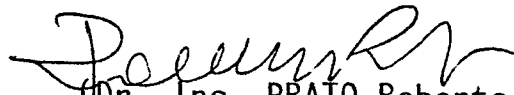
In particular, the comb element on frame 1 may be secured to

arm 11 in any number of ways and the comb element itself be designed differently from the ones described providing it comprises a number of U-shaped teeth or teeth comprising an annular portion for accommodating portion 19 of wire 15. .
5 The said design variations depend on production time and cost. For example, the teeth may be annular or made of one piece with a hole for accommodating the said portion 19. The comb element may even be made by winding a helical metal wire round arm 11, or by bending an undulated metal wire in the
10 form of a U or in more than one piece fitted with one or more teeth. Finally, arms 11 may be made in the same way as arms 65 on frame 61, that is, with built-in teeth with cavities aligned to one another.

What has been said in connection with the comb elements on
15 frame 1 also applies to comb elements 45 on frame 31. Arm 42 or 43 on frame 31 may be made from a bar bent in the shape of a U and either screwed or welded to the other arm (43 or 42). Another arrangement of arms 42 and 43 could comprise a bar bent to form a quadrilateral with two parallel sides fitted with two comb elements (45) and the other two sides connected to bar 34 and the end of portion 41. In this arrangement, though portions 51 form part of a single U-shaped
20 piece, this in no way means that portions 51 may not be disconnected from each other or each have a head designed for
25 connecting it to frame 31.

On frame 61, the number of arms (65) may differ, as may the way in which the ends of bar 62 are secured to the two supporting elements (63). Teeth 72 may be designed differently providing they comprise an annular portion for accommodat-
30 ing portion 74 of wire 75. Furthermore, arms 65 may be de-

signed differently with a comb element similar to the one described on frame 1 or one of its variations already mentioned. Teeth 72 and, in particular, cavities 73 may protrude from the space formed by element 68. Finally, though
5 frames 1, 31 and 61 are preferably made of metal, they may be made, even only partly, of plastic and suitably strong board.


(Dr. Ing. PRATO Roberto)

CLAIMS

- 1) - Frame for tightening fabric wound on it, the said frame comprising a first bar (2, 32 or 62) the ends of which are
5 fitted with two supporting elements (3, 33 or 63) having a hollow body (5, 35 or 64) fitted on to the corresponding end of the said first bar (2, 32 or 62) and a number of arms (11, 42, 43 or 65) for supporting the said fabric; the longitudinal axes of the said supporting elements being in a plane
10 perpendicular to the longitudinal axis of the said first bar (2, 32 or 62), characterised by the fact that each of the said arms (11, 42, 43 or 65) carries a number of teeth (13, 23, 47 or 72), aligned in relation to one another and each having a cavity (14, 24, 48 or 73); that, when in use, the
15 selvedge of the said fabric is inserted between the said teeth (13, 23, 47 or 72) and the straight section (19, 51 or 74) of a body (15, 52 or 75), one for each of the said arms (11, 42, 43 or 65), is inserted into the said cavities (14, 24, 48 or 73) so as to pierce the said selvedges and support
20 them while, at the same time, being supported by the said teeth (13, 23, 47 or 72), so as to tighten the said fabric between the said corresponding opposite arms (11, 42, 43 or 65) of the two said supporting elements (3, 33 or 63).
- 2) - Frame according to Claim 1, characterised by the fact
25 that each of the said arms (65) has a number of slots (71) to form the said number of teeth (72).
- 3) - Frame according to Claim 2, characterised by the fact that the portion of the said teeth (72) in which the said cavity (73) is made projects towards the inside of the space
30 formed by the said arms (65).

- 4) - Frame according to Claim 1, characterised by the fact that each of the said arms (11, 42, 43 or 65) is fitted with a comb-shaped element (12, 21 or 45) with the said number of teeth (13, 23 or 47).
- 5 5) - Frame according to Claim 4, characterised by the fact that the said comb-shaped element (12, 21 or 45) is made from a metal plate bent in the shape of a U but from which, prior to bending, strips of material are removed so as to form the said number of teeth (13, 23 or 47).
- 10 6) - Frame according to Claim 5, characterised by the fact that the said comb-shaped element (12, 21 or 45) has a solid portion (17, 22 or 46) secured to the said arm (11, 42, 43 or 65) by screws, welding or the U bend on the same, so as to accommodate a portion of the said arm (11, 42, 43 or 65).
- 15 7) - Frame according to Claim 4, characterised by the fact that the said comb-shaped element (12, 21 or 45) is made by winding a helical metal wire round each of the said arms (11, 42, 43 or 65) so as to form the said number of teeth (13, 23, 47 or 72).
- 20 8) - Frame according to Claim 4, characterised by the fact that the said comb-shaped element (12, 21 or 45) is made of more than one piece, not necessarily integral with one another, but each of which has one or more of the said teeth (13, 23, 47 or 72).
- 25 9) - Frame according to Claim 4, characterised by the fact that the said comb-shaped element (12, 21 or 45) is made by bending an undulated metal wire in the shape of a U.
- 10) - Frame according to any one of the previous Claims, characterised by the fact that the said arms (65) are at
30 least three in number and extend radially from the said

hollow body (64) to connect with an annular element (68) coaxial with the said hollow body (64); the longitudinal axis of each of the said arms (65) defining the same angle in relation to the longitudinal axis of the said arm (65) before it and the said arm (65) after it.

11). - Frame according to any of Claims 1 to 9, characterised by the fact that each of the said supporting elements (3 or 33) has a second bar (4 or 34), the longitudinal axis of which lies in the same plane as the longitudinal axes of the said arms (11, 42 or 43), and an intermediate portion from which the said hollow body (5 or 35) extends, and that, from the said second bar (4 or 34), four of the said arms (11, 42 or 43) extend with their longitudinal axes converging in relation to the longitudinal axis of the said second bar (4 or 34).

12) - Frame according to Claim 11, characterised by the fact that the ends of the said second bar (4 or 34) are fitted with two essentially triangular components (7 or 38) comprising a centre portion (8 or 41) with its longitudinal axis perpendicular to and in the same plane as that of the said second bar (4 or 34); the said centre portion (8 or 41) being secured in the centre region to the end of the said second bar (4 or 34) and two of the said arms (11, 42 or 43) extending from the ends of the said centre portion (8 or 41), the ends of the said arms (11, 42 or 43) being secured specularly to the centre region of the said second bar (4 or 34).

13) - Frame according to Claim 11 and/or 12, characterised by the fact that each of the said supporting elements (33) comprises four straight elements (43) each parallel and adjacent to one of the said arms (42); each of the said

straight elements (43) supporting a number of teeth (47) comprising cavities (48) aligned in relation to one another and functioning in the same way as the said arms (42).


(Dr. Ing. PRATO Roberto)

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Fig. 1

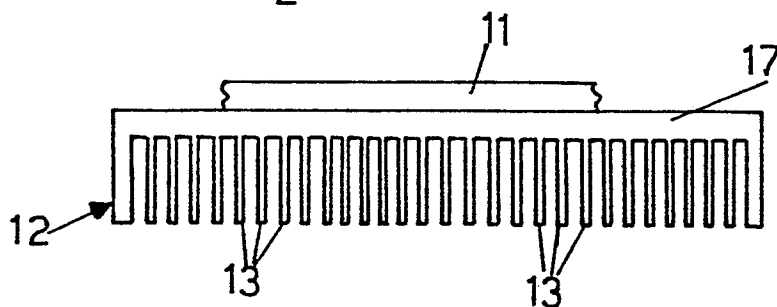
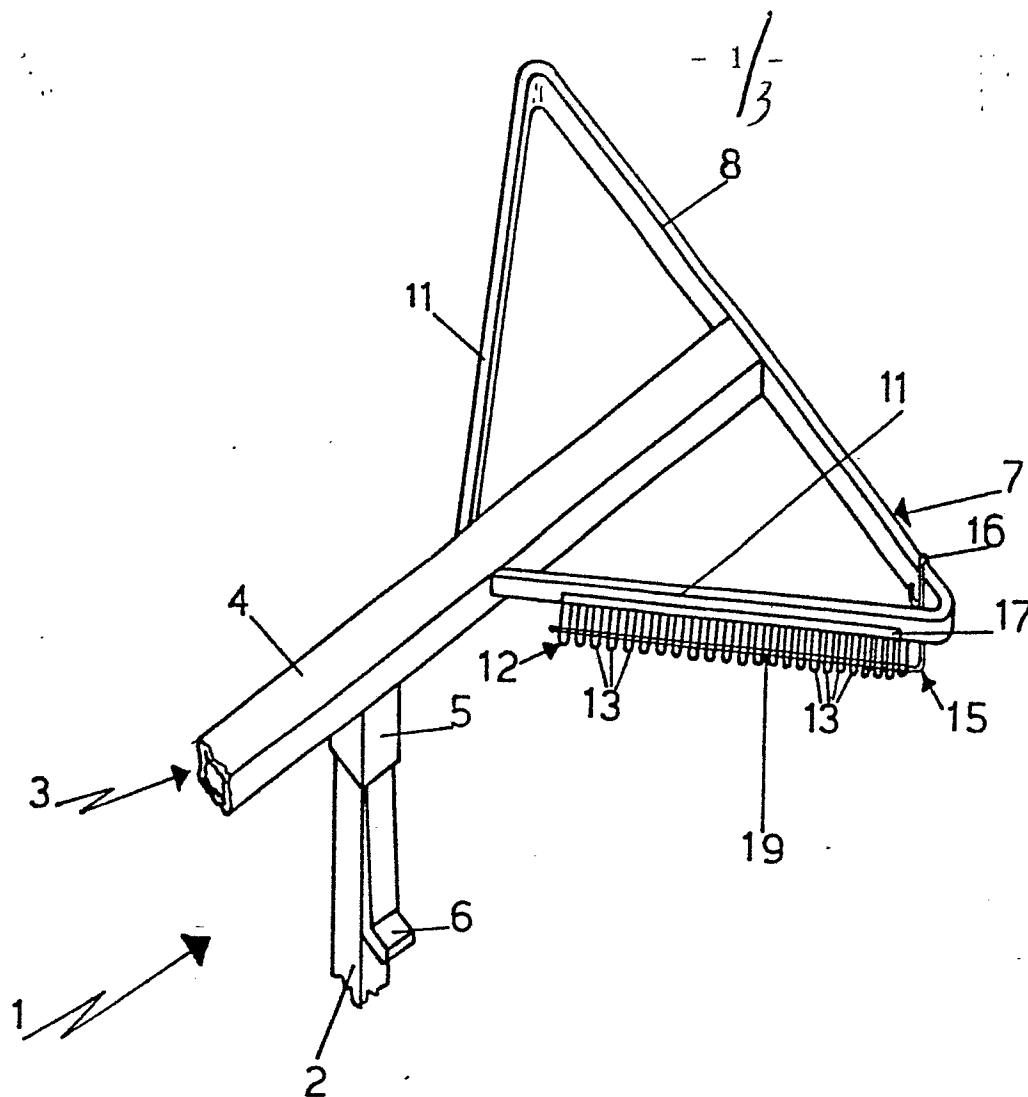


Fig. 2

Fig. 3

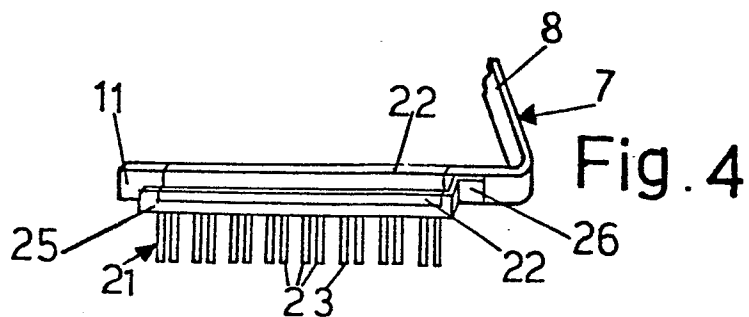
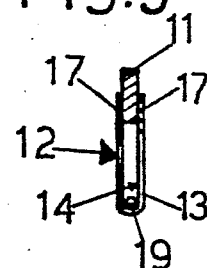


Fig. 4

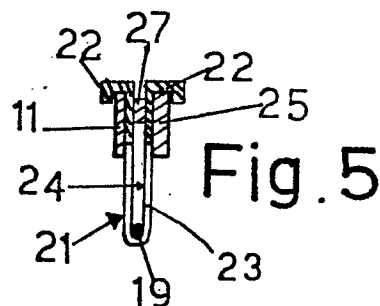


Fig. 5

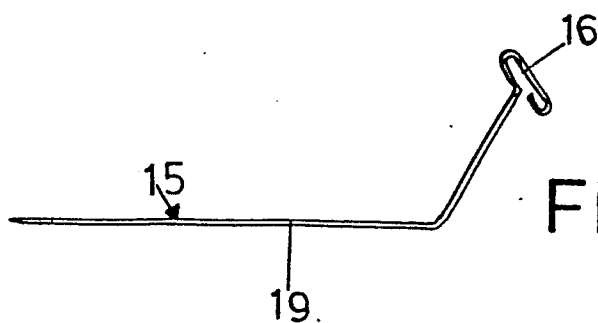
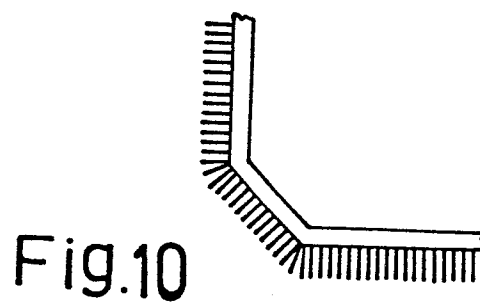
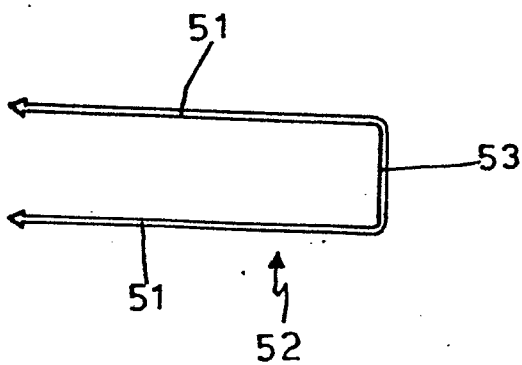
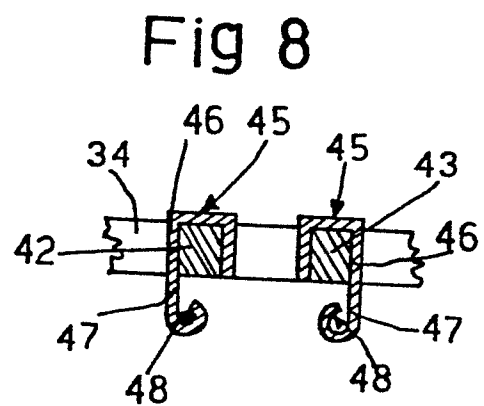
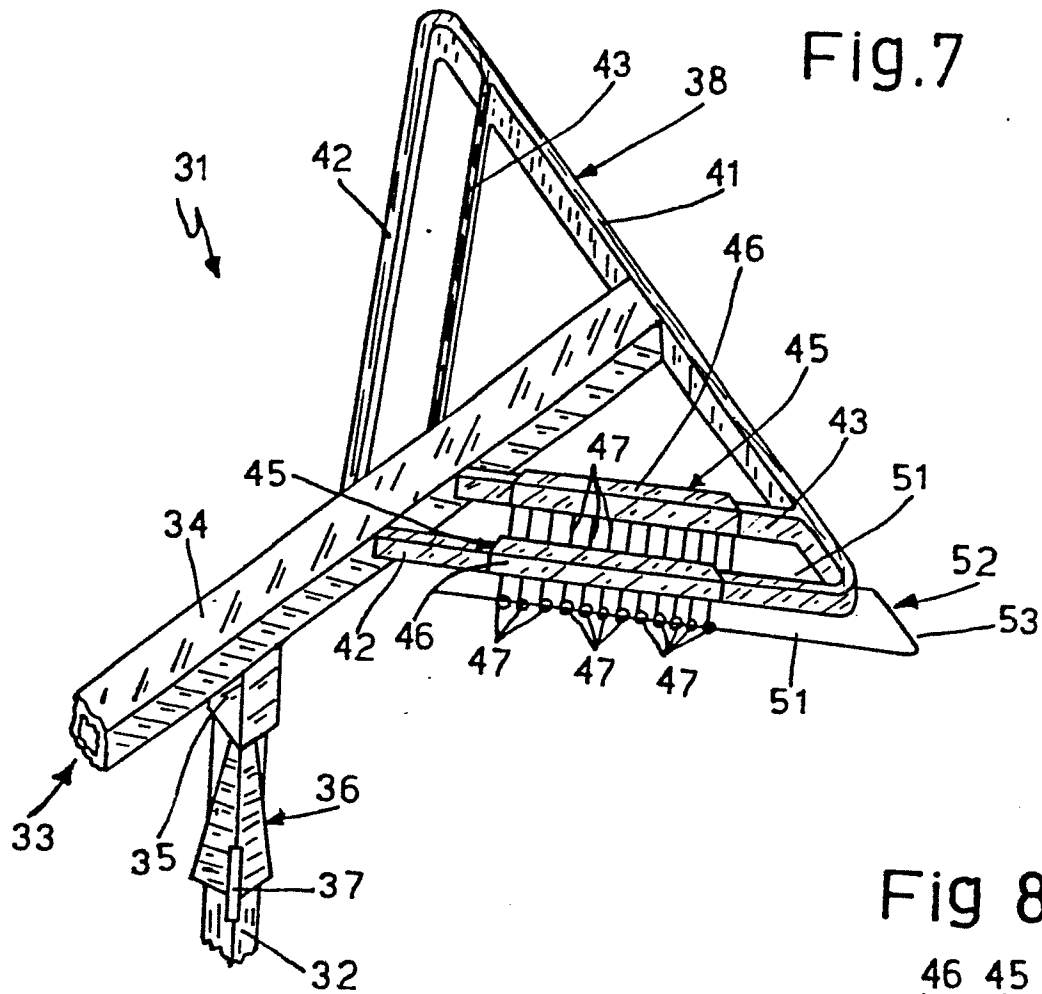
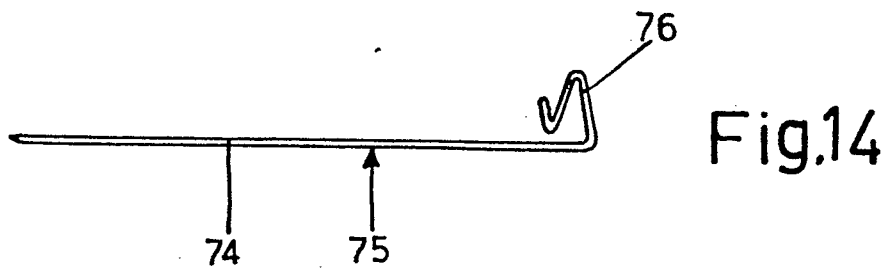
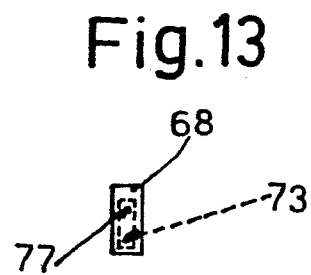
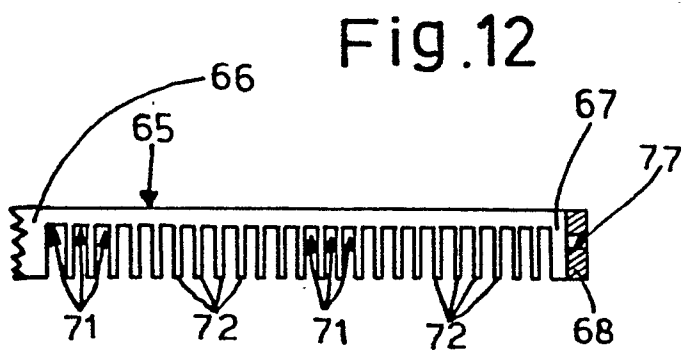
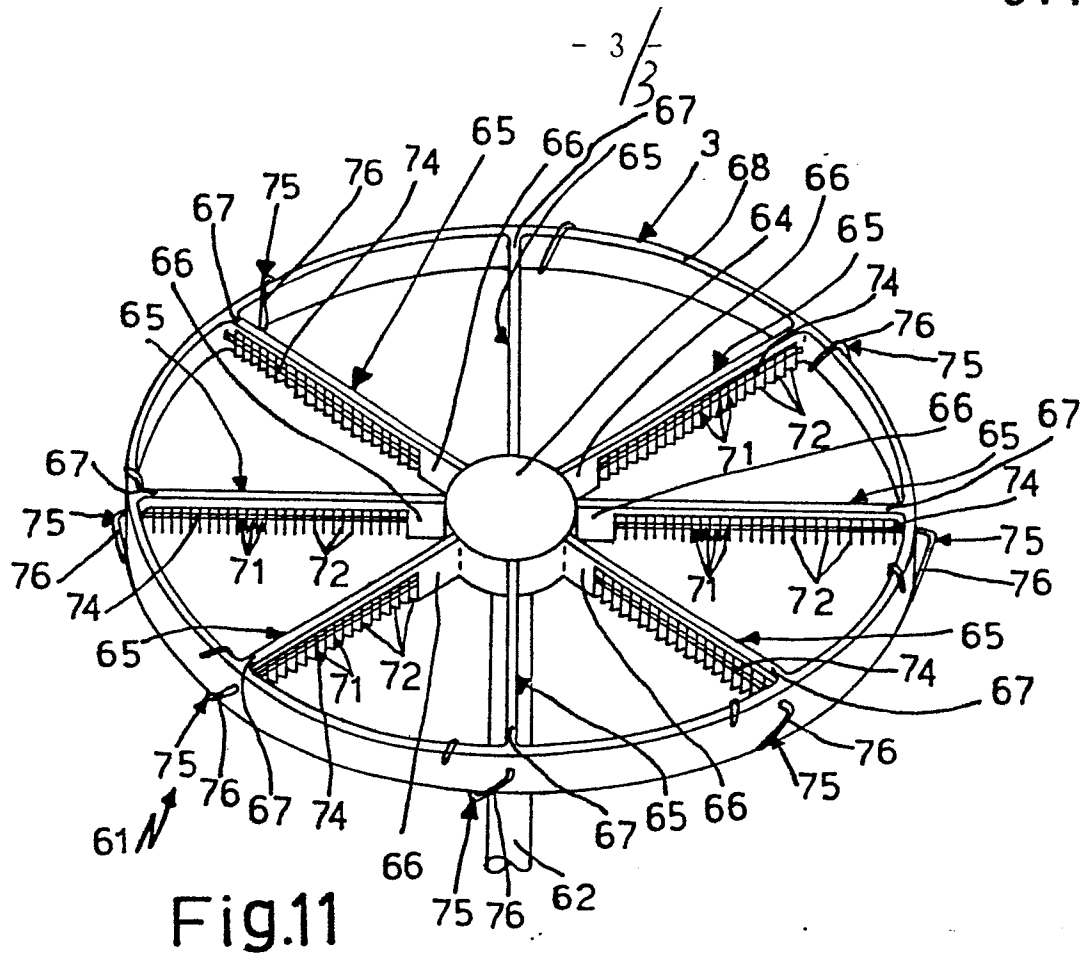


Fig. 6

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European Patent
Office

EUROPEAN SEARCH REPORT

0111127

Application number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 83110656.2
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
X	US - A - 2 944 751 (SCHWARTZ) * Totality *	1,2,4, 5,6,11 12	B 65 H 75/02 B 65 H 17/00
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A	US - A - 4 089 484 (A. SCHNEIDER) * Abstract; fig. 1 *	1,12	
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A	DE - A1 - 2 408 590 (SCHEIBLER, PELTZER & CO) * Fig. 1 *	1	
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A	AT - B - 287 632 (D. DUPUIS & CO)		
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A	US - A - 2 936 882 (J. KREUTH-MEIER) -----		
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 25-01-1984	Examiner HABART
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