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(54) **Snaphook, e.g. for rock climbing**

(57) To reduce the weight of a rock-climber's snaphook, without reducing its strength, the snaphook which is generally C-shaped, the upper and

lower arms defining an opening closed by a pivoting housing piece, is formed from a hollow tube or solid bar with an internal periphery of essentially semi-circular section whilst the external periphery is, at least along the upper and lower arms, in the form of a uniform sectioned rib.

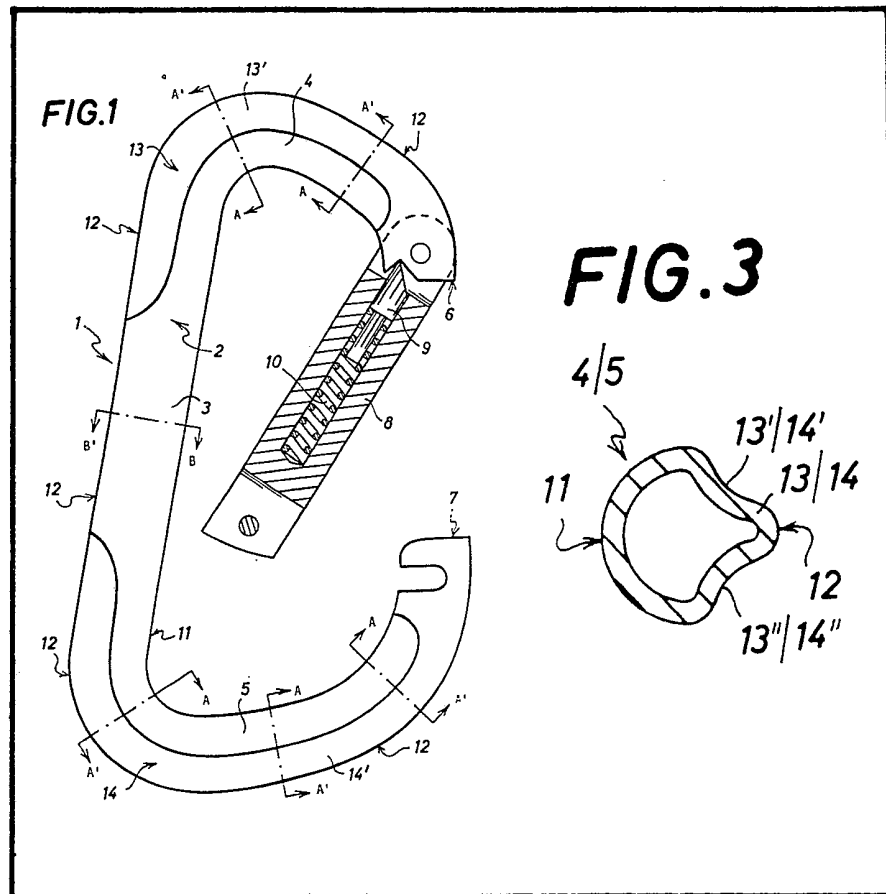


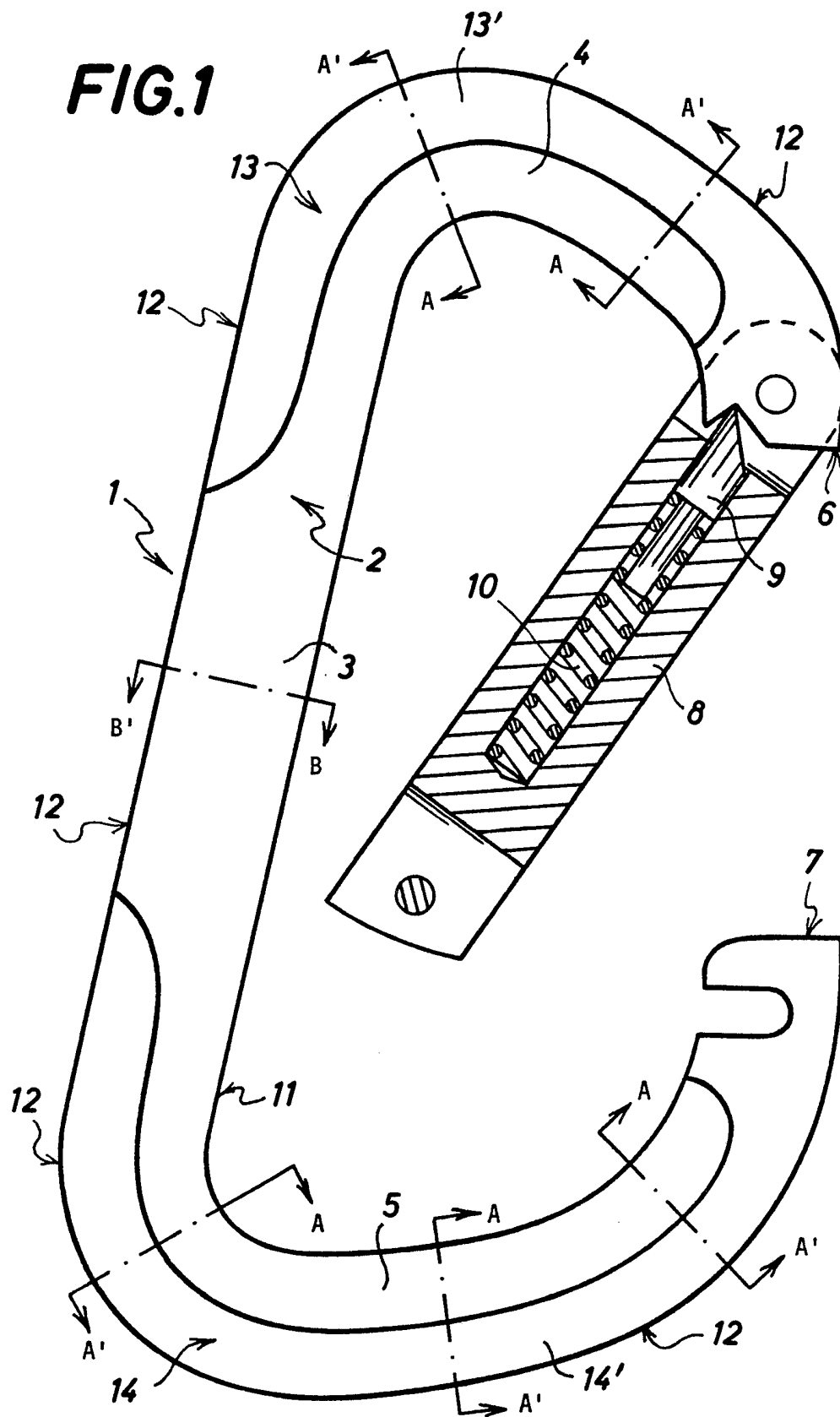
FIG. 1

FIG.2

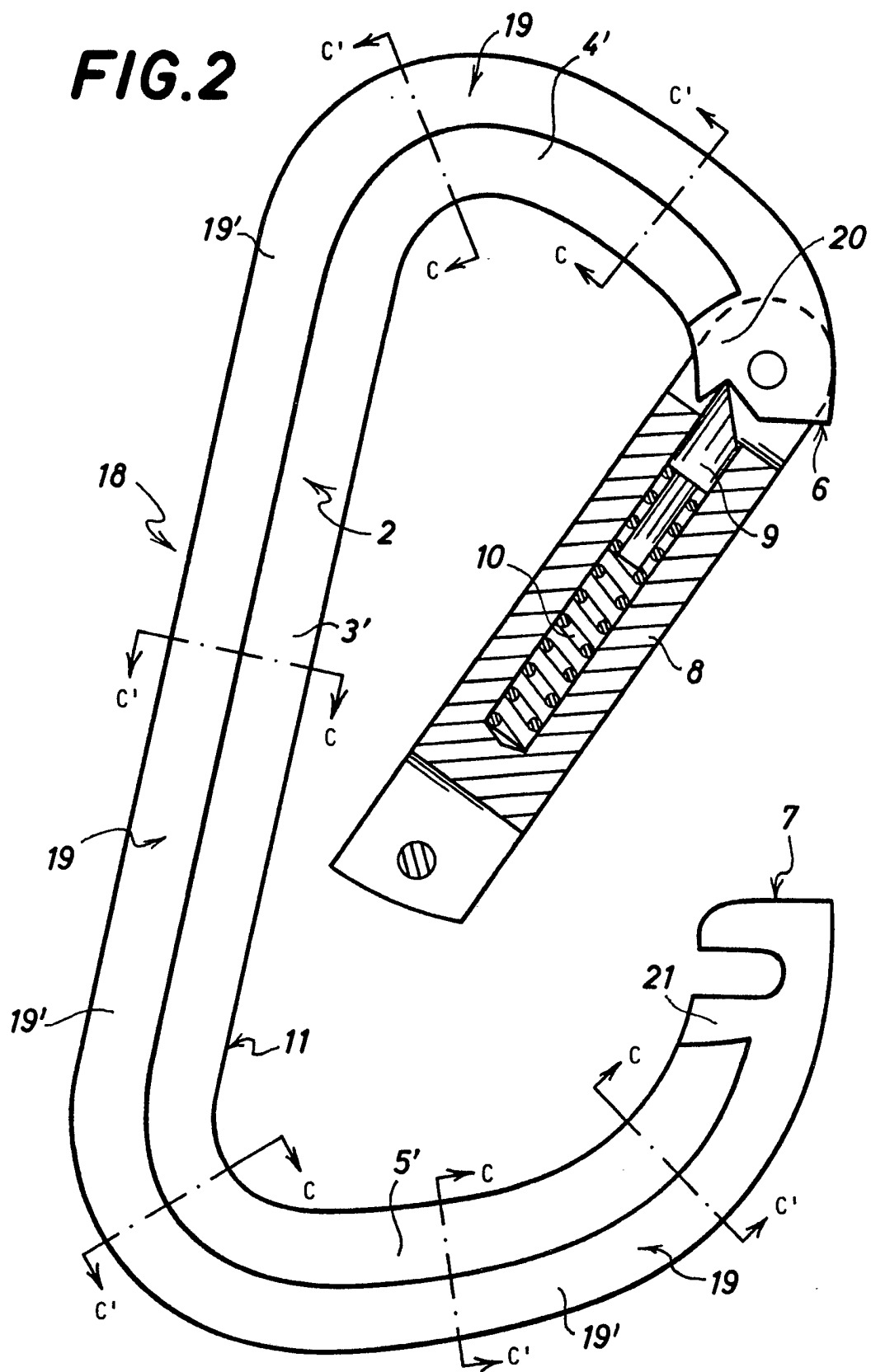
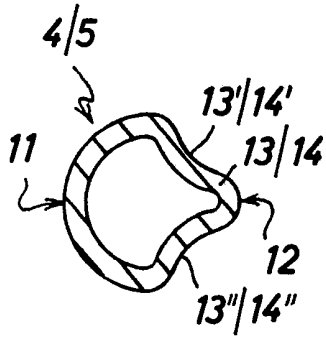
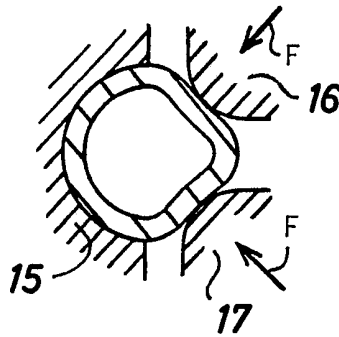
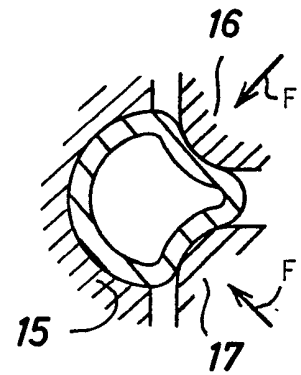
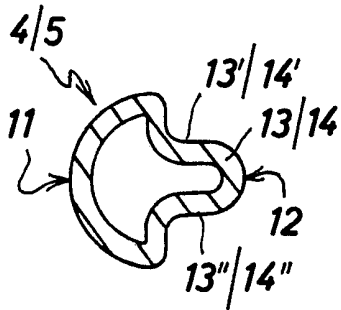
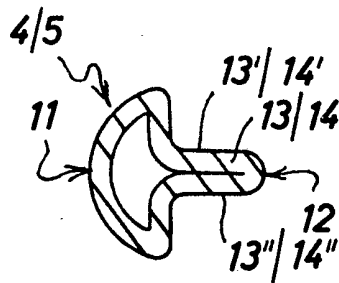
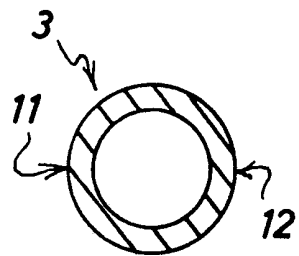
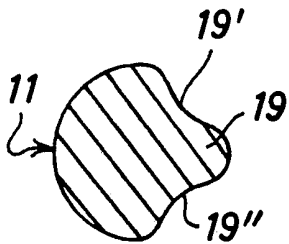
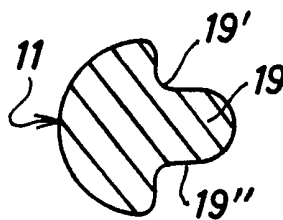
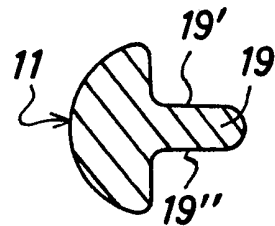


FIG.3**FIG.4****FIG.5****FIG.6****FIG.7****FIG.8****FIG.9****FIG.10****FIG.11**

SPECIFICATION

Snaphook, in particular for rock climbing, and its manufacturing processes

The invention described is a snaphook,
5 primarily for rock-climbing, and its process of manufacture.

Such snaphooks are, as is well known, made up of a body or hook in the form of a "C" of which the rear, straight, centre portion is extended by
10 two curved loops, one at the top and one at the bottom, the free ends of which are connected, to close the snaphook, by a pivoting finger moving on one of the two ends.

It is necessary for it to be both sufficiently
15 strong and as light as possible. Its strength guarantees the safety of the climber. Its longitudinal tensile strength (breaking load along the direction of the abovementioned rear central portion) can reach about three tonnes, whilst its transverse tensile strength (breaking load of the ring formed by the snaphook, in a direction perpendicular to the rear central portion) is about one tonne. This strength must be balanced
20 against the lightness of the snaphook so as not to over-weight the climber's equipment. Also, the ropes passed through the snaphook must not, when under tension, be damaged by the snaphook. It follows that the internal rim of the snaphook must offer to the tautened ropes a
25 semi-circular cross-section of adequate radius.

Attempts have been made to lighten the weight of the snaphook in various ways. Whilst retaining a solid body, some snaphooks have been made, not in steel, but in light aluminium alloys,
35 some cast, some obtained by bending of circular section bar. On the other hand, some snaphooks, in steel or other metals of comparable rigidity but of higher density than that of aluminium alloys, have been made from hollow tube. This is so in
40 the case of snaphooks, whose external section is uniformly circular, described in French patents Nos. 975.004, 70.30809 (2.060.668) and 77.04399 (2.342.423).

The snaphook described herein is of a different
45 design, and whether its body is solid or hollow, it offers against the previously described types of snaphook the advantage of considerably increased rigidity/weight ratio and therefore also strength/weight ratio.

It is characterised by the fact that, whilst its internal periphery presents an essentially semi-circular section, the external periphery is in the form of, on at least the length of the upper and lower arms, a uniform section rib, designed to
55 increase the rigidity of the said upper and lower arms, without increasing, and even reducing, the weight of the snaphook.

Preferably symmetrical about the plane of the snaphook, the sides of this rib provide a concave section which can be curved, in the arc of a circle, or angled in an "L", the sides of the rib thus being flat and parallel, more or less distant one from the other.

By means of the manufacturing process of this

65 snaphook, the said rib is obtained by forming, either before, during or after bending of a solid metal bar or metal tube, a uniform section, of the same cross-section as this rib, on the external periphery and at least along the whole length of the two ends of the bar or tube which, after
70 bending, form the two arms of the snaphook.

By means of a preferred method of implementing this process for making a hollow snaphook, in accordance with the invention, said
75 section is obtained, the entire length of the two arms, at the same time as the bending, by deformation of the said ends by means of formers, profiled to the sides of the rib, which approach simultaneously, obliquely in relation to the plane
80 of the snaphook, working the metal and impressing the shape of the two sides of the rib.

By means of a preferred method of implementing this process for making a solid snaphook, in accordance with the invention, said
85 section is, prior to the bending of the bar, obtained along the entire length of this bar, by casting, extrusion or longitudinal working of it, the said rib, which extends around the entire external periphery of the snaphook, thus being formed
90 before the bending of the arms.

The invention will be better understood, and the other characteristics and advantages of it will appear more clearly, by referring to the following description and the attached drawings, which
95 show two preferred versions of the snaphook (hollow or solid), several variations in cross-section for them, as well as a preferred method of implementing the process for the manufacture of a hollow snaphook, cited by way of non-restricting examples.
100

In the drawings:

Fig. 1 represents a hollow snaphook, of the first preferred form.

Fig. 2 represents a solid snaphook, of the
105 second preferred form.

Fig. 3 is a section along lines A—A' of Fig. 1.

Figs. 4 and 5 show two successive phases in the forming of the section Fig. 3, by the operating procedures of this invention.

110 Figs. 6 and 7 show two variants of the section along lines A—A' of Fig. 1.

Fig. 8 is the section along B—B' in Fig. 1.

Fig. 9 is the section along lines C—C' in Fig. 2.

Figs. 10 and 11 represent two variants of this
115 section along the same lines C—C' in Fig. 2.

Referring to Figs. 1, 3 and 8, the hollow snaphook 1 is, as described, made of a body or hook 2, in the form of a "C" with straight rear central portion 3, extended to two curved arms, one, 4, at the top, the other, 5, at the bottom, with the free ends, 6 and 7 respectively, joined on closing the snaphook, by a pivoting finger 8, hinged to the upper arm 4 and locked in the closed position by a catch 9 with spring 10; finger
120 8 being shown, in longitudinal section, in the open position.

The internal periphery 11 of the snaphook 1 has an essentially semi-circular cross-section (Figs. 3 and 8).

Following the essential characteristics of this invention, the external periphery 12 of the snaphook 1 is made up, over the length of the upper arm 4 and lower arm 5, of ribs 13 and 14 respectively, with sides 13' and 13'', 14' and 14'' respectively, symmetrically about the plane of the snaphook (plane of Fig. 1). In the example shown, these sides have a curved concave section, in the arc of a circle, and, in the rear central portion 3, tail off to conserve, in the central part of this portion, a circular cross-section along line B—B' (Figs. 1 and 8).

The hollow snaphook 1 is made from a cylindrical tube of steel or similar metal, of the same uniform circular section as that of the said central section (Fig. 8) by using the following process, described with reference to Figs. 4 and 5:

The tube being supported on counter former 15, formed with a supporting peripheral groove, of semi-circular section with radius equal to the external radius of the tube, the two ends are bent to form the two arms 4 and 5, upper and lower, at the same time deforming these ends by means of formers 16 and 17, profiled to the sides 13' and 13'', 14' and 14'' of ribs 13 and 14 respectively, the said formers 16 and 17 both approaching obliquely in relation to the plane of the snaphook (in the direction of arrows "F"), pressing progressively (from Fig. 4 to Fig. 5) the metal of these ends and forming in them the sides 13', 13'', 14', 14'' of the ribs 13 and 14 respectively (Fig. 5).

By using formers of different profiles to those of formers 16 and 17 shown in Figs. 4 and 5, one may obviously obtain different profiles for sides 13', 13'', 14', 14'' of ribs 13 and 14 respectively, for example an "L" profile (Figs. 6 and 7), these sides being flat and parallel. The section shown in Fig. 6 is obtained by maintaining a gap between the parallel sides, which gives the rib itself a "U" section, whereas that in Fig. 7 is obtained by nipping the metal, the two parallel sides being pressed face to face.

Referring now to Figs. 2, 9, 10 and 11, the solid snaphook 18 shows the known layout of the same elements 2, 6, 7, 8, 9 and 11 as the hollow snaphook 1 in Fig. 1.

Its rear central portion 3', together with the upper and lower arms 4' and 5', show the same section, along lines C—C' in Fig. 2, shown in Fig. 9, and, in variants, Figs. 10 and 11' sections which have the same profiles as those shown in Figs. 3, 6 and 7 respectively. Its rib 19, with sides 19' and 19'', extends around the entire external periphery.

The solid snaphook 18 is, in the simplest way, formed by bending a bar initially profiled along its length into the uniform section shown on lines C—C' of Fig. 2. This profile may be formed by casting or extrusion, or else by machining (milling) of a bar of larger section.

Before or after bending, the arm ends 20 and 21 are formed by milling, so as to allow the fitting, free rotation, and locking of finger 8 to join the ends 6 and 7 of arms 4' and 5'.

Finally, the versions of the invention which have just been described by referring to the drawings having only been given by way of non-restricting examples, the specialist will be able to make any modifications of form or detail he may care to, or to replace all or part of the constituent elements with equivalents, without, in so doing, going outside the compass of the invention.

75 Claims

1. Snaphook, made up of a body or hook in the shape of a "C" of which the straight rear central portion is extended by two curved arms, one upper, the other lower, of which the free ends are joined, on closing the snaphook, by a pivoting finger moving on one of these two ends, characterised by the fact that, its internal periphery has an essentially semi-circular cross-section and its external periphery is formed, on at least the whole length of the upper and lower arms, of a rib of uniform section.

2. Snaphook according to Claim 1, characterised by the fact that the sides of the said rib present a concave section.

3. Snaphook according to Claim 1, characterised by the fact that the sides of the said rib present an angled section.

4. Snaphook according to Claim 2 or Claim 3, wherein the section of the rib is symmetrical about the plane of the snaphook.

5. Process of manufacture of the snaphook as under Claim 1, characterised by the fact that the said rib is obtained by forming, either before, during or after bending of a solid metal bar or metal tube, a uniform section, of the same cross-section as this rib on the external periphery and at least along the whole length of the two extremities of the bar or tube which, after bending, form the two arms of the snaphook.

6. Process of manufacture according to Claim 5, of a hollow snaphook, characterised by the fact that the said section is obtained, along the whole length of the two arms, at the same time as the bending, by deformation of the said extremities by means of formers, to the profiles of the sides of the rib, which, approaching together, obliquely in relation to the plane of the snaphook, press the metal and form in it the shape of the two sides of the rib.

7. Process of manufacture according to Claim 5, of a solid snaphook, characterised by the fact that the said section is, prior to the bending of the bar, obtained, along the entire length of the bar, by casting, extrusion or longitudinal machining of it, the said rib, which thus extends along the entire external periphery of the snaphook, being thus formed before the bending of the arms.

8. Snaphook, made up of a body or hook in the shape of a "C" of which the straight rear central portion is extended by two curved arms, one upper, the other lower, of which the free ends are
5 joined, on closing the snaphook, by a pivoting

finger moving on one of the said two ends, substantially as described with reference to the drawings.

9. Method of manufacturing a snaphook
10 according to Claim 8, substantially as described.