

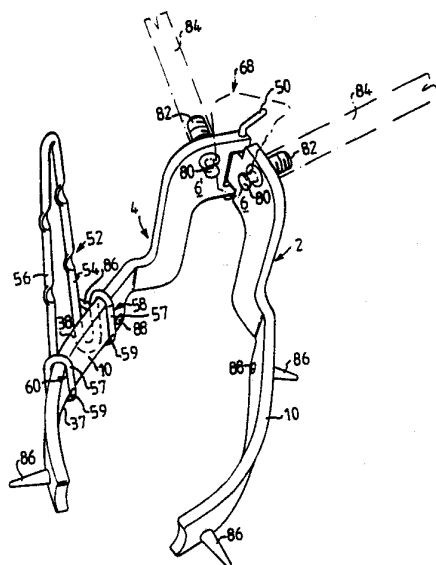


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(21) International Application Number: PCT/SE92/00163 (22) International Filing Date: 17 March 1992 (17.03.92) (30) Priority data: 9100845-8 20 March 1991 (20.03.91) SE (71) Applicant (for all designated States except US): JETTMAN, Per [SE/SE]; Iversongatan 6, S-114 30 Stockholm (SE). (71)(72) Applicant and Inventor: GADELIUS, Gustaf [SE/SE]; Swedenborgsgatan 43, S-118 27 Stockholm (SE). (74) Agents: BERG, Sven, Anders et al.; H. Albihns Patentbyrå AB, Box 3137, S-103 62 Stockholm (SE).		(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, LU (European patent), MC (European patent), NL (European patent), SE (European patent), US. Published <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>

(54) Title: A SURGICAL RETRACTOR**(57) Abstract**

An openable retractor for use in an operation wound/surgical incision in the region of a patient's spine. The retractor includes two mutually-hinged halves (2, 4), each of which comprises an upper hinge part (6, 6') which, on the side thereof remote from the hinge, merges with a downwardly-extending shaft (8) at a radial distance from the hinge axis or its extension, a wound widening and restraining part (10) which projects laterally from the lower part of the shaft in a direction away from the hinge axis and which is intended for engagement with muscle tissue on one side of the operation wound, and a latching means (68) which is intended to be applied in the region of the hinge formed by the hinge parts (6, 6') of respective retractor halves and which functions to lock the retractor halves in an outwardly angled active position (functional position).



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A Surgical Retractor

Technical Field

5 The present invention relates to a widenable surgical retractor, and particularly, but not exclusively, to a retractor which is intended for use in holding tissue, etc., away from the field of operation in operation wounds/surgical incisions in the region of a patient's
10 spine, said retractor including two mutually-connected retractor halves.

The invention thus relates to a widenable, more particularly an angularly extendable retractor by means of
15 which tissue, etc., can be held away from the field of operation, and then particularly from the field of an operation wound in the region of a patient's spine.

In certain types of spine operations, for instance
20 operations for prolapsed discs or fractures of the vertebrae, it is necessary for the surgeon to be able to reach particular vertebrae and intermediate cartilage discs with the surgical instruments needed to carry out the operation. In order to make this possible, both the
25 subcutaneous fascia and the muscular tissue which lies beneath or inwardly of the fascia must be held to one side in the region of the operation wound, so that the wound can be held open and thereby provide access to the vertebrae.

30

Background Art

The type of retractor normally used at present includes a pair of mutually separable tissue-retraining plates or wings. The retractor is first inserted into the operation wound, often in the form of an incision, with the
35 restraining plates lying contiguous with one another,

such that the outer surfaces of the plates are in abutment with the mutually-opposing "walls" of the incision, whereafter the plates are forced apart sufficient for the field of operation to be at least slightly accessible to the surgeon.

However, the restraining wings or plates of the known retractor, which bear against the walls of an operation wound and function to hold the wound open have a vertical extension such that the plates extend from the bottom of the wound up to the surface of the surrounding skin, even when the operation wound/incision is relatively deep. Thus, the vertical extension of the retractor plates covers the walls of the operation wound over the whole of their depth, including the uppermost layer of skin and associated fascia.

One problem in this regard, however, is that the fascia is far less elastic than the inwardly-lying muscular tissue, and consequently the separating force which the retractor needs to exert between the walls of the operation wound (when the retractor is adjusted to its wound widening and restraining state is determined primarily by the smaller elastic resistance of the fascia. It has also been found that a retractor whose restraining plates have the aforesaid vertical dimensions has a pronounced tendency to slide upwards and out of the operation wound as a result of tension in the fascia. This tendency is, of course, particularly problematic during the course of an operation, since it necessitates repeated adjustment of the position of the retractor. Furthermore, due to the structural design of this known retractor, with mutually parallel and mutually separable wound-opening and wound-restraining plates, this known retractor causes muscular atrophy as a result of the high surface abutment pressure which prevails between

muscle and the respective vertical front and rear edges of the restraining plates, this abutment being essentially a line contact between said edge and said muscle.

5

Another problem, which is closely relates to the conditions which prevail in an operation in which the surgical section or wound area lies in the region of the patient's spine is that the spine vertebrae have projections (spinous and transverse spinelike processes) which are seated on the vertebrae arch, which in turn is seated on the body of vertebrae.

10

The retractor shall therefore be constructed so as to provide sufficient space for the spine-vertebrae and not least for the spinal vertebrae arches with the spinous and transverse spinelike processes of the vertebrae.

15

The Object of the Invention

The object of the present invention is to provide a novel type of openable, hinged retractor which is capable of solving the aforesaid problems.

20

Disclosure of the Invention

This object is mainly achieved in that each of the retractor halves, which are pivotally connected together for relative movement in a scissor-like fashion, comprises a hinge part which on the side thereof which faces away from the hinge merges with a downwardly-extending shaft at a radial distance from the hinge axis or from the extension of said axis, a wound widening and wound-restraining part which projects laterally away from the hinge axis and which is intended to be placed against the muscle tissue on one side of the operation wound, a latching means which is intended to be placed in the region of the hinge formed by the hinge-parts of

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30

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respective retractor halves such as to mutually latch said halves in an outwardly angled active position (functional position).

5 A retractor of this construction enables the wound widening and wound-restraining parts of the retractor to be placed in the operation wound so as to act primarily on the muscular tissue beneath (inwardly of) the overlying fascia. Thus, the problem caused by the retractor
10 sliding up out of the operation wound is avoided, because the wound-restraining parts of the retractor are located beneath the fascia.

15 Further developments and preferred embodiments of the invention are defined in the depending Claims 2-16.

According to one practical embodiment of the invention, the wound widening and restraining parts of the retractor have a generally constant vertical extension within
20 the greater part of their longitudinal extension and are curved in mutually opposite directions, with the concave inner surfaces facing towards each other, wherein the centres of curvature of respective curves preferably form lines which extend generally parallel with the
25 hinge axis.

According to another preferred embodiment of the invention, the free outer edges of the wound widening and restraining parts of the retractor remote from the shaft
30 are inwardly concave so as to increase the functional pressure on the muscle tissue against which said parts engage in their angularly-extended positions.

35 Since the inventive retractor is intended to be used so that the aforesaid retractor parts will normally engage muscle tissue with the fascia and associated skin layer

lying above the upper defining edge of said parts, it may be necessary to provide separate means for supporting the fascia and the fat layers of the skin, these means being removably insertable into the upper part of the wound widening and restraining retractor parts.

In addition, each said part may suitably be provided with mutually spaced and mutually parallel attachment holes for accommodating insertable support elements which function to form an edge support (for skin layers and fascia) in the region above the upper defining edge of the wound widening and restraining part, said attachment holes extending generally parallel with the shaft of the retractor halves and/or the hinge axis.

This support element may, for instance, have the form of a U-shaped metal device whose legs preferably parallel legs can be inserted into the attachment holes in respective wound widening and restraining parts of the retractor.

Brief Description of the Drawings

The invention will now be described in more detail with reference to a number of exemplifying embodiments of the structural components of an inventive retractor, and with reference to the accompanying drawings, in which Figure 1 and Figure 2 are side views of a respective retractor half which when hingedly-connected are able to angle outwardly, in a scissor-like fashion, and which form the inventive retractor; Figure 3 illustrates the retractor half shown in Figure 1, seen in the direction of the arrow A; Figure 4 illustrates the same retractor half seen in the direction of the arrow B; Figure 5 is a side view of a latching device for an inventive retractor; Figure 5a is an end view of the latching device; Figure 6 illustrates a retractor from above,

with the retractor halves swung outwards (mutually separated); Figure 7 is a perspective view of a slightly different embodiment of a complete retractor according to the invention, in which the latching means is different to that of the Figure 5 embodiment and in which the support element is different to that of the Figure 2 embodiment; Figure 8a is a front view and Figure 8b a sectional view (taken on the line VIII-VIII in Figure 8a) of a third type of support element; and Figure 9 is a perspective view of the latching means used in the Figure 7 embodiment.

Embodiments of the invention

Reference is first made to Figure 1 and Figure 2, which each illustrate a respective half 2 and 4 of the inventive retractor whose active parts can be angled outwardly relative to one another, in a scissor-like fashion. Each retractor half includes three main parts, i.e. respective hinge parts 6 and 6' which merge downwardly with a depending shaft 8. A wound widening and restraining part 10 extends outwardly from the lower part of the shaft 8 in a direction opposite to respective hinge parts 6, 6', said wound widening and restraining part 10 hereinafter being simply referred to as restraining part. As shown in Figure 1, the hinge part 6 has an outwardly-projecting shoulder 12, which is provided with penetrating holes 14, whereas the hinge part 6', shown in Figure 2, has a fork-like structure which includes two legs 16, 18, with mutually coaxial penetrating holes 20, 22. In the assembled state of the inventive retractor, the two hinge parts 6, 6' are positioned so that the three holes 20, 14, 22 are mutually in register and can receive a common hinge pin (not shown).

As illustrated in Figures 1-4, the retractor halves 2, 4

have a generally constant thickness in the hinge part, the shaft and restraining part. The retractor halves are preferably made of metal, for instance stainless steel, although the retractor halves may, alternatively,
5 be made of a suitable plastic material, such as a reinforced fibre plastic. As will be seen from the drawings, the two restraining retractor parts 10 have a substantially constant height or vertical extension.

10 As illustrated in Figures 1-4, in the initial stages of manufacture, the retractor halves have a flat shape, and the restraining parts are subsequently curved in mutually opposite directions prior to joining the retractor halves together, through the medium of their respective
15 hinge parts 6, 6'. The curvature of said restraining parts is indicated by the chain line K in Figure 4, where the radius of curvature is referenced R. The two restraining retractor parts are curved so that their respective concave inner surfaces 24, 26 (see Figure 6)
20 face towards one another. In practice, the radius of curvature R of said wound restraining parts will preferably lie in the range of 50-70 mm, and may suitably be about 60 mm.

25 Formed in the lower part of the shaft 8 are concave recesses 28, 30, whose radius of curvature is suitably in the order of 15-35 mm, preferably about 25 mm.

The free outer edges of the restraining parts 10 remote
30 from the shaft are provided with inwardly concave recesses, as illustrated by the outer contour line 32 in Figure 1. The radius of curvature of this concave recess 32 is in the order of 15-35 mm, preferably about 25 mm.

35 Each restraining part 10 has provided therein a number

of mutually-spaced and mutually-parallel attachment holes 34 into which support elements 36 can be inserted. These support elements are intended to form edge supports (primarily for skin layers and fascia) in the region above the upper-defining edge 38 of a respective
5 restraining part.

In accordance with one preferred, particularly simple embodiment, the support element 36 may suitably have the
10 shape of an inverse-U, as shown in Figure 2. In this case, the support element has the form of a metal wire that has been bent to a U-shape. The two legs of the U-shaped support are inserted into a pair of attachment holes 34, in the manner shown. Disc-like hooks or barbs
15 39 which project out from the convex side of the part 10 of the retractor may be provided on the underside 37 of said restraining part 10 and there form additional muscle engaging means which assist in preventing the retractor from sliding up out of the operation wound.

20 Figures 5 and 5a illustrates an exemplifying embodiment of latching means whereby the retractor halves 2, 4 can be locked mutually in an outwardly angled, active position or functional position. In this case, the latching
25 means 40 is a latching element which is intended to straddle the hinge formed by the pivotally-connected hinge parts 6, 6'. In the case of the illustrated embodiment, this latching element is a U-shaped metallic element 42 whose legs 44, 46 define therebetween a V-
30 shaped space 48 which enables the latching element 40 to be placed lockingly over the hinge from above. Naturally, the latching means may have many other alternative forms. The one essential feature of the latching means
35 is that it can be placed easily in position in the region of the hinge, and that it will positively lock the two retractor halves 2, 4 in relation to one another

when the latching means is brought to its locking position.

5 The wound-restraining parts 10 may be provided conveniently with engagement slots or grooves 49 on their respective concave inner surfaces, as shown in Figures 1 and 4. These slots or grooves are intended to form anti-slipping engagement locations for, e.g., the legs
10 of an instrument used to open (angle outwardly) the wound widening and restraining parts of the inventive retractor to the desired extent, wherein the retractor is then locked in position by applying the aforesaid latching means 40, i.e. the latching element or stirrup 42 in the case of the illustrated embodiment.

15 The two halves 2, 4 of the embodiment of the inventive retractor illustrated in Figure 7 are hingedly connected at the hinge parts 6, 6' by means of an L-shaped hinge pin 50, through the holes 20, 14, 22. The illustrated
20 retractor half 4 is provided with a support element 52 which is detachably fitted to the restraining part 10 by means of attachment parts 58, 60 each of which is located at the lower part of a respective leg 54, 56 of the support element, these attachment parts being fitted
25 over the restraining part from above, so as to straddle said part. In the illustrated embodiment, the support element 52 has the form of a U-shaped wire element, or wire stirrup, wherein that part of the stirrup-like element which lies above the defining edge 38 has gener-
30 ally the form of an inverse V. The downwardly directed end parts 57 of the attachment parts 58, 60 have inwardly directed abutment portions 59 which hook firmly against the edge of the underside 37.

35 Figures 8a and 8b are respectively front and side views of an alternative form of a support element 62, which

includes a U-shaped wire stirrup-like element 62, which has two legs 64. Provided on the lower parts of the legs 64 are saddle-like attachment parts 66. The support element 62 is fitted onto the relevant restraining part 10, by placing the two attachment parts 66 of the support element over the edge 38 of the restraining part 10 so as to straddle said edge.

In the embodiment illustrated in Figure 7, the latching means is a disk shaped latching element 68 which has mutually converging side edges 70 and 72 on the active locking-wedge part 74. As will be seen from Figure 9, this locking-wedge part 74 is provided at the top thereof with an angled gripping part 76. The latching element is shown in Figure 7 solely in chain contour. Formed in the side edge 72 is a series of arcuate recesses or notches 78 which give the edge a sawtooth-like configuration. When in its functional position, the latching element 68 coacts with an outwardly widened projection 80 on the inside of the upper hinge parts 6, 6' of the retractor halves 2, 4. When in its downwardly inserted latching position between the projections 80, the latching element 68 is fixed wedgedly by virtue of the engagement of one of its edge recesses 78 with the adjacent projection 80.

Although the projections 80 may be attached to the inner surfaces of the hinge parts 6, 6' in any desired manner, it is preferred that each projection 80 is comprised of the end part of an externally threaded fastener pin which has threaded portion 82 that is screwed into a penetrating threaded hole in a respective hinge part 6, 6', this latter alternative affording a particularly rational solution. The threaded portion 82 of the fastener pin projects out from the hinge part on the outer side thereof and therewith forms a screw-threaded

pin attachment for coaction with the internally screw-threaded end of a tubular shaft 84, which is shown in chain contour in Figure 7.

- 5 The other hinge part also has a fastener pin which is provided with a similar projection 80 and with a similar screw-threaded part 82 which coacts with a corresponding tubular shaft 84. The two tubular shafts 84, 84 together
10 form a practical device for manually separating, or manually swinging apart, the two retractor halves 2, 4 to a desired angular position, said halves then being fixed in this position by inserting the latching element 68 down between the projections 80.
- 15 There is suitably provided close to the lower edge of the restraining parts 10 of the retractor halves 2, 4 one or more outstanding pins 86, on the curved, convex outer surfaces of said parts 10. These pins, or points, 86 form muscle engaging means which assist in preventing
20 the retractor from sliding up out of the operation wound. The pins 86 thus form an alternative to the hooked barbs 39 of the embodiment illustrated in Figures 1 and 4. Although the pins 86 may be attached to the restraining parts 10 in any appropriate manner, in
25 practice said pins will preferably be comprised of the outwardly directed point of a pin means which has a rear, externally screw-threaded attachment part 88 which is screwed into a screw-threaded penetrating hole located in the near vicinity of the lower edge of respective
30 restraining parts 10.

Claims

1. An openable surgical retractor, intended particularly, but not exclusively, for use with operation wounds/surgical incisions in the region of a patient's spine, said retractor comprising two mutually-connected retractor halves (2, 4), c h a r a c t e r i z e d in
5 ' that the retractor halves (2, 4) are mutually hinged so as to be openable in a scissor-like fashion; in that each said half comprises an upper hinge part (6, 6') which merges on the side remote from said hinge with a
10 downwardly-extending shaft (8) at a radial distance from the hinge axis or the extension of said hinge axis, a wound widening and restraining part (10) which projects laterally from the lower part of the shaft in a direction away from said hinge axis and which is intended for
15 engagement with muscle tissue on one side of the operation wound; and in that there is provided a latching means (40; 68) intended to be applied in the region or the vicinity of the hinge formed by the hinge parts (6, 6') of said two retractor halves in a manner to lock
20 said halves in an outwardly angled active position (functional position).

2. A retractor according to Claim 1, c h a r a c -
t e r i z e d in that the thickness of the retractor
25 halves (2, 4) is generally constant in the hinge parts (6, 6'), the shaft (8) and the wound widening and restraining parts (10).

3. A retractor according to Claim 1 or 2, c h a r -
a c t e r i z e d in that the wound widening and re-
30 straining parts (10) have a generally constant vertical extension at least within a greater part of their longitudinal extension; in that said wound widening and

restraining parts (10) are curved in mutually opposite directions with the concave inner surfaces (24, 26) of said parts facing towards each other; and in that the centre of curvature of respective concave surfaces are able to form lines which extend generally parallel with the hinge axis.

4. A retractor according to Claim 3, characterized in that the radius of curvature (R) of the wound widening and restraining parts (10) lies in the range of 50-70 mm, and preferably up to about 60 mm.

5. A retractor according to any one of the preceding Claims, characterized in that the lower part of the shaft (8) is provided with arcuate recesses (28, 30), both on the edge remote from the wound widening and restraining part (10) and on the lower edge adjoining the bottom edge of said part; and in that the arcuate recesses (28, 30) suitably have a radius of curvature in the order of 15-35 mm, preferably the order of about 25 mm.

6. A retractor according to any one of the preceding Claims, characterized in that the free outer edges of the wound widening and restraining parts (10) remote from the shaft (8) are inwardly concave (32); and in that the radius of curvature of said concave edges is suitably in the range of 15-35 mm, preferably 25 mm.

7. A retractor according to any one of the preceding Claims, characterized in that each wound widening and restraining part (10) is provided with mutually-spaced and mutually-parallel attachment holes (34) for the insertion of support elements (36) which function to form an edge support for, e.g., skin layers

and fascia in the region above the upper defining edge (38) of a wound-opening part (10); and in that the insertion holes (34) extend generally parallel with the shaft of respective retractor halves and/or the hinge axis.

8. A retractor according to Claim 7, c h a r a c -
t e r i z e d in that the support elements (36) have
the form of inverse U-shaped metal elements whose legs
can be inserted into the insertion holes (34).

9. A retractor according to any one of Claims 1-6,
c h a r a c t e r i z e d in that each restraining part
(10) carries one or more upwardly directed support
elements (52, 62) which function as tissue edge supports
to hold to one side skin layers and fascia for instance
in the region above the upper defining edge (38) of said
restraining part (10), and each said support element
(52; 62) having at its lower part at least one attach-
ment part (58, 60; 66) which is placed over the
restraining part from above so as to straddle said part,
thereby enabling the support element to be detachably
fitted to the restraining part.

10. A retractor according to Claim 9, c h a r a c -
t e r i z e d in that the support element (52; 62) is a
wire stirrup-like structure that has the form of an
inverted U or V; and in that at least one of the two
legs of the stirrup-like structure supports at its lower
part the attachment part (58, 60; 66) of said support
element.

11. A retractor according to Claim 10, c h a r a c -
t e r i z e d in that each of the two legs of the wire
stirrup-like structure (64) is provided with an attach-
ment part (66) which is mounted on the lower part of

respective legs on that side thereof which is opposite to the other leg.

12. A retractor according to Claim 11, c h a r a c-
5 t e r i z e d in that the attachment part (66) is com-
prised of a strip element which has been bent to a U-
shaped cross-section and which is firmly attached along
an edge region thereof to the lower part of the leg
(64).

10

13. A retractor according to Claim 10, c h a r a c-
t e r i z e d in that the bottom part of each of said
two legs (54, 56) of the wire stirrup-like structure is
formed as an attachment part (58, 60) which includes an
15 upwardly directed, curved wire section extending from
the lowermost part of the leg, said wire section being
curved downwards at the top thereof and terminating in a
downwardly directed end part which has at its lower free
end a hooked abutment part (59) for engagement with the
20 lower defining edge (37) of the restraining part.

14. A retractor according to any one of the preceding
Claims, c h a r a c t e r i z e d in that the latching
means comprises a disc element (68) having a pair of
25 mutually converging side edges (70, 72), of which at
least one (72) is provided with a series of arcuate
recesses or notches (78) which give said edge a saw-
tooth-like configuration; in that each of the retractor
halves (2, 4) has provided on the inside of its upper
30 hinge part an outwardly widened projection (80); and in
that the latching element (68) can be inserted down
between said two projections to a latching position in
which the latching element is fixed wedgingly between
the projections, with one of the edge recesses or
35 notches (78) in engagement with the contacting projec-
tion (80).

15. A retractor according to Claim 14, c h a r a c-
t e r i z e d in that each projection (80) is formed by
one end part of an externally screw-threaded fastener
pin (82) which is screwed into a screw-threaded hole on
5 the hinge part, wherein said fastener pin projects out
from the hinge part on that side of the hinge part which
is opposite to said projection; and in that the screw-
threaded fastener pin (82) forms a screw attachment for
a tubular shaft (84) which has an internal screw-thread
10 at one end thereof and which together with a
corresponding tubular shaft (84) on the other retractor
half can be used to separate or swing apart the
retractor halves to their desired active (functional)
position.

15 16. A retractor according to anyone of the preceding
Claims, c h a r a c t e r i z e d in that close to the
lower edge of the restraining parts (10) of the retrac-
tor halves (2, 4) there is provided on the outside of
20 each restraining part on or more outstanding points or
pins (86) which function as anchoring means in the
muscle tissue in the outwardly lying part of the opera-
tion wound in which the retractor is used.

25 17. A retractor according to any one of Claims 1 to 8,
c h a r a c t e r i z e d in that the latching means
(40) has the form of a latching element which is intend-
ed to be straddled over the hinge; and in that said
element is suitably in the form of a U-shaped or
30 V-shaped metallic element (42); and in that the legs
(44, 46) of said metallic element define a space (48)
whose width increases in a direction out towards the
free extremities of the legs.

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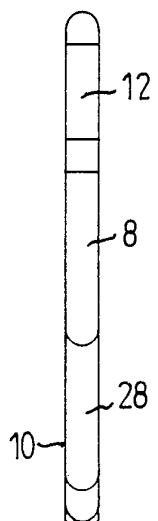


FIG. 3

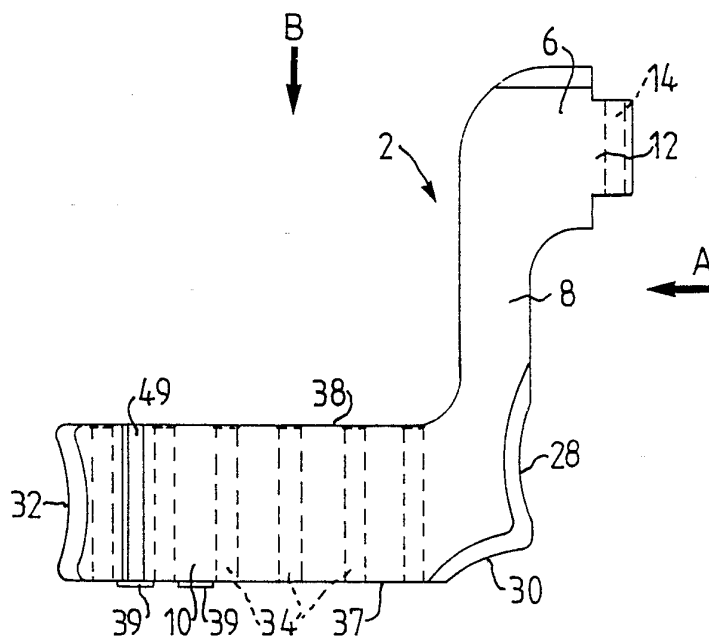


FIG. 1

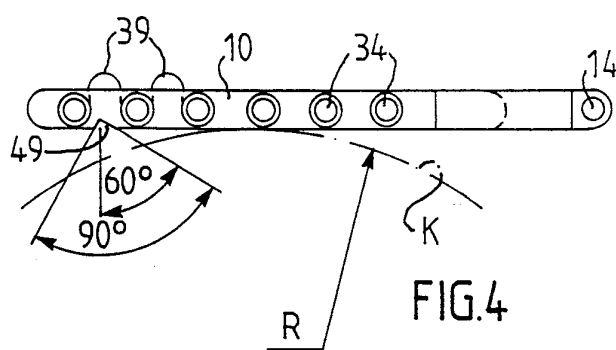
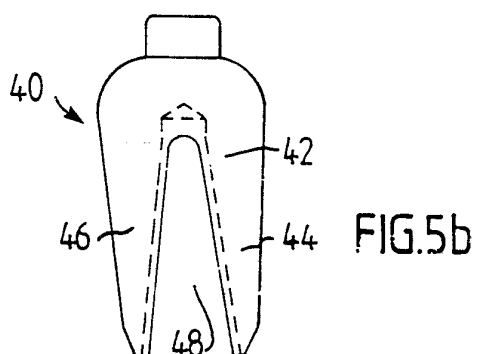
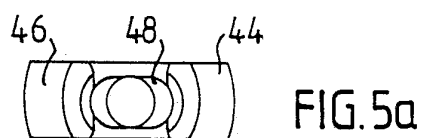
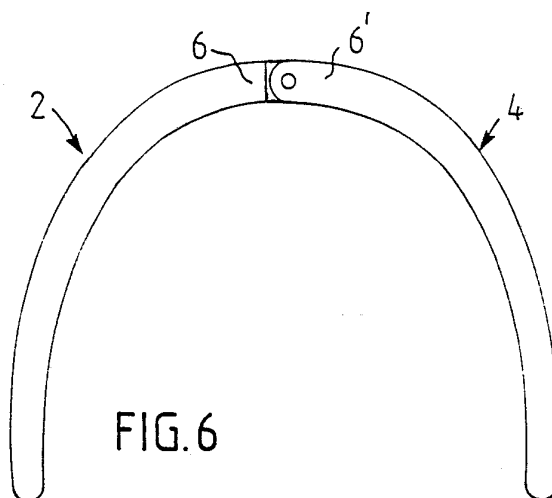
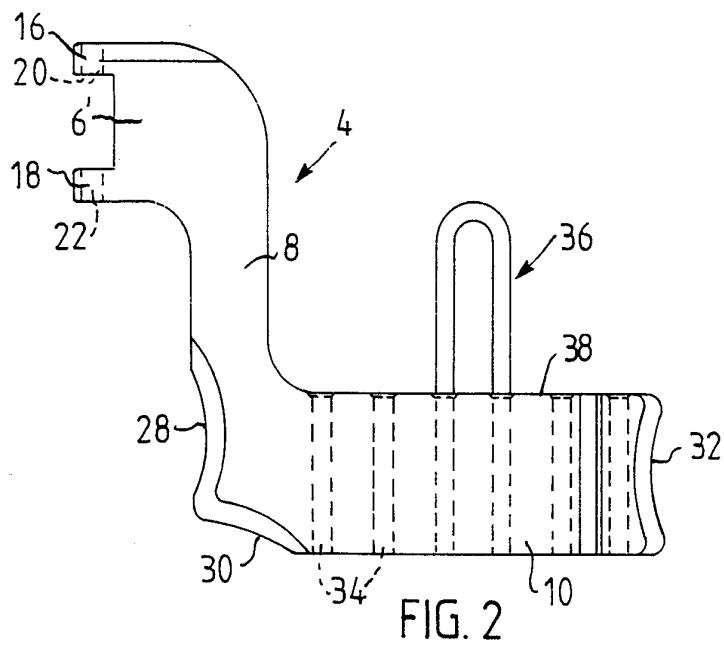
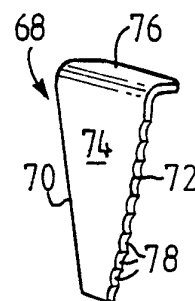
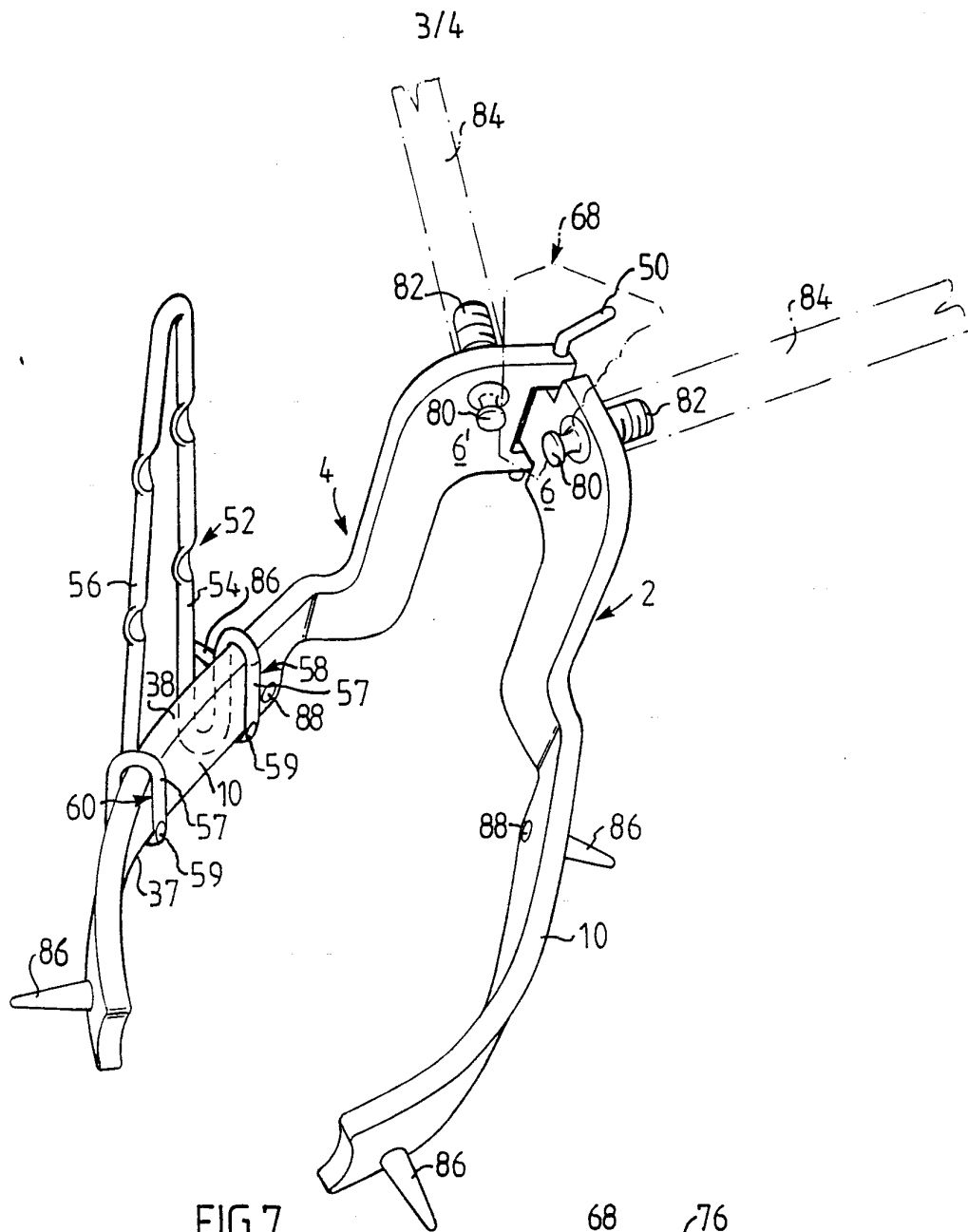


FIG. 4

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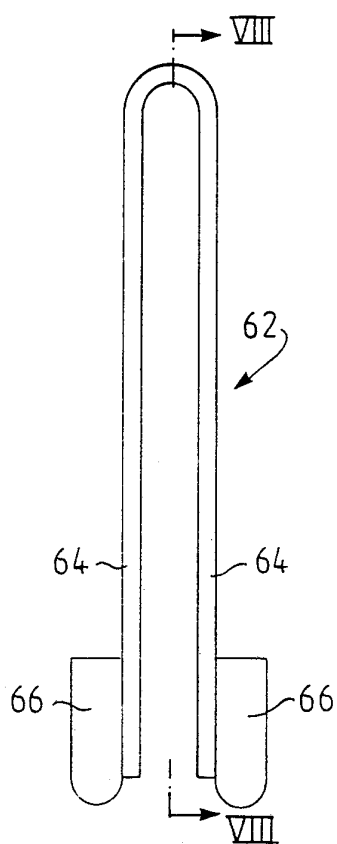


FIG. 8a

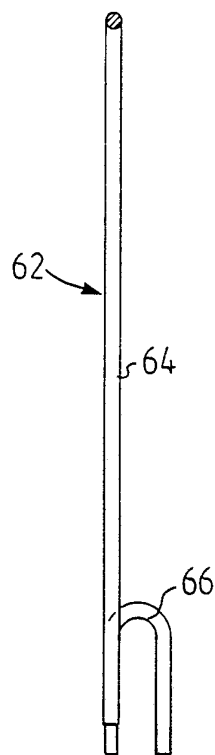
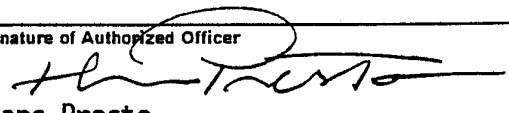
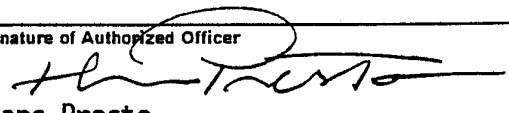
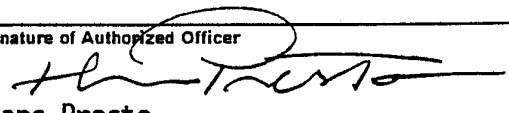


FIG. 8b

INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 92/00163

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: A 61 B 17/02																	
II. FIELDS SEARCHED Minimum Documentation Searched⁷ <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; border: 1px solid black; padding: 2px;">Classification System</th> <th style="width: 75%; border: 1px solid black; padding: 2px;">Classification Symbols</th> </tr> <tr> <td style="border: 1px solid black; padding: 5px; vertical-align: top;">IPC5</td> <td style="border: 1px solid black; padding: 5px; vertical-align: top;">A 61 B</td> </tr> </table> Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched⁸ SE,DK,FI,NO classes as above			Classification System	Classification Symbols	IPC5	A 61 B											
Classification System	Classification Symbols																
IPC5	A 61 B																
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹ <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; padding: 2px;">Category *</th> <th style="width: 60%; padding: 2px;">Citation of Document,¹¹ with indication, where appropriate, of the relevant passages¹²</th> <th style="width: 30%; padding: 2px;">Relevant to Claim No.¹³</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">GB, A, 2218912 (TAHA ROUDAN LAZIM) 29 November 1989, see the whole document ---</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1-6</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">KOCHER Goitre Retractor, No. A 12-0430, KIFA, SURGICAL INSTRUMENT CATALOG, The Lewton Company, New Jersey 1970, p. 117; see figure A ---</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1-6</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">US, A, 1947649 (G.J. KADAVY) 20 February 1934, see figure 2 ---</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">WO, A1, 8905131 (GROUNAUER, P.-A.) 15 June 1989, see abstract; figures 1-2 ---</td> <td style="text-align: center; vertical-align: top; padding: 5px;">3-6</td> </tr> </tbody> </table>			Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	Y	GB, A, 2218912 (TAHA ROUDAN LAZIM) 29 November 1989, see the whole document ---	1-6	Y	KOCHER Goitre Retractor, No. A 12-0430, KIFA, SURGICAL INSTRUMENT CATALOG, The Lewton Company, New Jersey 1970, p. 117; see figure A ---	1-6	A	US, A, 1947649 (G.J. KADAVY) 20 February 1934, see figure 2 ---	1	A	WO, A1, 8905131 (GROUNAUER, P.-A.) 15 June 1989, see abstract; figures 1-2 ---	3-6
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A	WO, A1, 8905131 (GROUNAUER, P.-A.) 15 June 1989, see abstract; figures 1-2 ---	3-6															
* Special categories of cited documents:¹⁰ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family																	
IV. CERTIFICATION <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border: 1px solid black; padding: 5px; vertical-align: top;"> Date of the Actual Completion of the International Search 22nd June 1992 </td> <td style="width: 50%; border: 1px solid black; padding: 5px; vertical-align: top;"> Date of Mailing of this International Search Report 1992 -06- 2 6 </td> </tr> <tr> <td style="border: 1px solid black; padding: 5px; vertical-align: top;"> International Searching Authority SWEDISH PATENT OFFICE </td> <td style="border: 1px solid black; padding: 5px; vertical-align: top;"> Signature of Authorized Officer  Hans Presto </td> </tr> </table>			Date of the Actual Completion of the International Search 22nd June 1992	Date of Mailing of this International Search Report 1992 -06- 2 6	International Searching Authority SWEDISH PATENT OFFICE	Signature of Authorized Officer  Hans Presto											
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International Searching Authority SWEDISH PATENT OFFICE	Signature of Authorized Officer  Hans Presto																

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	US, A, 3840014 (R.S.M. LING ET AL) 8 October 1974, see abstract; figure 1 -----	14

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 92/00163**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the Swedish Patent Office EDP file on 29/05/92
The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB-A- 2218912	89-11-29	NONE	
US-A- 1947649	34-02-20	NONE	
WO-A1- 8905131	89-06-15	CH-A- 673938	90-04-30
		DE-A- 3868403	92-03-26
		EP-A-B- 0345310	89-12-13
		JP-T- 2502435	90-08-09
		US-A- 5070860	91-12-10
US-A- 3840014	74-10-08	CH-A- 549995	74-06-14
		GB-A- 1409052	75-10-08
		CH-A- 559544	75-03-14
		CH-A- 561056	75-04-30
		DE-A-C- 2246940	73-03-29
		FR-A- 2154246	73-05-04
		GB-A- 1409051	75-10-08
		US-A- 3793650	74-02-26
		US-A- 3829904	74-08-20