

12 **EUROPEAN PATENT APPLICATION**

21 Application number: 88201360.0

51 Int. Cl.4: **A61G 1/00**

22 Date of filing: 30.06.88

30 Priority: 30.06.87 NL 8701529

43 Date of publication of application:
01.02.89 Bulletin 89/05

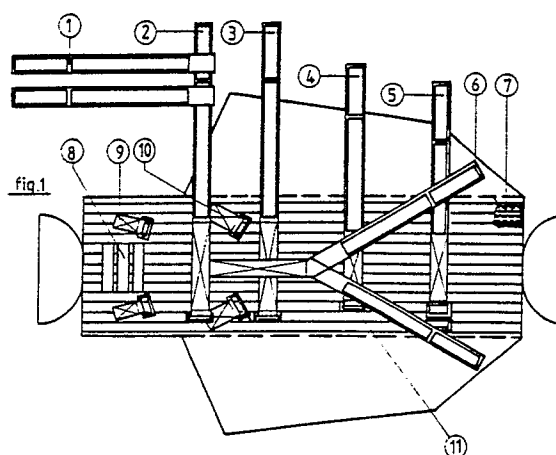
84 Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

71 Applicant: **FELIX-HOOGENDIJK B.V.**
Mississippidreef 20
NL-3565 CG Utrecht(NL)

72 Inventor: **Waling, Jacob Cornelis**
Mississippidreef 20
NL-3565 CG Utrecht(NL)

54 **Rescue stretcher.**

57 The invention concerns a stretcher for rescue operations where horizontal as well as vertical transport may be expected. The patient supporting part of the stretcher contains rigid bar-like parts (7) which are connected axially, and which fold transversely along the body of the casualty when the immobilization and binding straps (1-5) are tightened and fastened. In this way the stretcher functions as a body splint. It also becomes more manoeuvrable, thanks to the resulting width-reduction. Floating capacity, in a vertical position, is obtained by attaching floating devices to special attachment rings, or by inflating the inflatable parts of the stretcher. A system of side covers and immobilization straps (1-5) and devices (12-14, 21) enables complete immobilization, regardless of the length, or other features of the stature of the wounded person, thanks to the fact that they can be tightened and fastened in a continuously variable way. The stretcher is designed in order to function as a single, but multi-purpose splint-evacuation device for situations where hitherto one was obliged to combine various types of stretchers and bound to loose time because the complexity of the hitherto existing systems.



Rescue stretcher.

The invention relates to a stretcher for rescue purposes that has the following characteristic technical aspects:

a) Rigid bar-like parts that are connected axially to each other. These parts make the stretcher flexible and manoeuvrable, because it is folded around the body of a wounded person according to his stature. This occurs when the immobilization straps are tightened and fastened, followed by the covering of the casualty with the left and right side-covers, and, subsequently, the tightening and fastening of the outer binding straps. The immobilization straps, together with the outer binding straps and the side covers, serve to fold the stretcher around the body of the casualty; this makes the stretcher more manoeuvrable, because of the reduction of its width when it is used.

b) A system of side-covers, immobilization straps for legs, body, arms, and head of a wounded person that enables the stretcher to serve as a body splint which totally immobilizes a casualty, regardless of his stature or the horizontal or vertical position in which the stretcher is transported.

c) Attachment devices which enable to attach floating devices to the stretcher, so that it may float upon the water in an upright position.

d) Inflatable parts that, thanks to their floating capacity, enable the stretcher to float upon the water in an upright position.

The present state of the art shows several models of stretchers for rescue purposes that have each one or more of the characteristic elements of flexibility, manoeuvrability, rigidity and immobilizational facilities. The applicant points in this context to the following existing patents:

- patent nr. GB-A 600.232
- patent nr. BG-A 2.157.574
- patent nr. US-A 4.601.075

However, none of the hitherto known stretcher types combines the features mentioned above in such a way that it makes them useful as well as efficient in emergency situations where one can expect to be transported horizontally as well as vertically, to pass narrow man-holes and other narrow places, to be transported through the air, or to stay floating upon the water in an upright position, with a wounded person completely immobilized, regardless of his stature. The stretcher types of the patents referred to above here have these features only partially. This makes that in emergency situations rescue squads have to combine various stretcher types, or they have to make use of stretchers that are so complicated that they are not efficient when they are being used.

The aim of the applicant is to bring a solution

to the often expressed need for a stretcher that embodies a combination of all the above-stated functional aspects, and that is, nevertheless, easy and efficient in its use when it is needed in emergency situations.

The combined aims flexibility, manoeuvrability, complete immobilization, floating capacity and simplicity, and efficiency in use are obtained by the following means:

a) The patient supporting part of the stretcher is rigid axially, but flexible transversely. This is obtained by means of rigid bar-like parts which are connected to each other axially.

The left and right side-covers, and the outer binding straps, that are placed opposite of the patient-supporting part at the side upon which the wounded person is supposed to be laid down, make that the bar-like parts fold themselves axially around the casualty's body when the casualty is immobilized and the side-covers are closed, and when, subsequently, the outer binding straps are tightened and fastened. In this way the stretcher is folded along the body of the casualty as tightly as possible. This makes the stretcher narrow and more manoeuvrable, and, together with this effect, the immobilization of the casualty is made more complete.

b) A system of immobilization straps serves to obtain complete immobilization of the casualty. With immobilization straps the crotch and hip area of the casualty's body are to be completely immobilized. These straps are the essential immobilizing device in this system, and they make it possible that the casualty can be immobilized completely, regardless of his stature: the crotch area is always fixed at this central part of the stretcher, and, depending on the stature of the casualty, the other immobilization devices are used, tightened, and fastened.

The immobilization straps of the crotch area are also determining in preventing a person from slipping from the stretcher, with the shoulder immobilization straps as complementary, though equally indispensable protecting devices from letting the casualty slip from the stretcher at the head end.

c) The application of a system that enables the various immobilization devices to be tightened and fastened in a continuously variable way, makes that this stretcher is to be used considerably faster and simpler than the hitherto known types of stretchers for rescue purposes.

d) The floating capacity is obtained by attaching floating devices to the stretcher, or, alternatively, to make use of the inflatable parts, so that the stretcher floats upon the water in a vertical

position.

In the following paragraph the meaning of the drawings is to be explained.

(1) shows the rescue stretcher from above, with the left and right side-covers and the immobilization straps unfolded.

(2) shows the stretcher from beneath, with the side-covers and the outer binding straps unfolded.

(3) shows the immobilization device for the head of the wounded person, unfolded, from above.

(4) shows the immobilization device for the head of the wounded person, unfolded, from beneath.

(5) shows the rigid bar-like parts of the patient-supporting part, from besides.

(6) shows, together with (7), a transverse section of some of the bar-like parts of the patient-supporting part of the stretcher.

(8) and (9) show the stretcher operationally, with a wounded person upon it.

With the help of the illustrations mentioned above the specific technical and operational aspects of the rescue stretcher can be explained:

a) The complete immobilization. When a wounded person is to be immobilized, one starts with tightening and fastening of the immobilization straps for the crotch area of the casualty's body. With these restraints this part of the body is totally immobilized.

The immobilization of this very part of the body of the casualty decides how the person is to be positioned upon the stretcher, so that the other parts of his body can be properly immobilized. Once the crotch-restraints are tightened and fastened, length or other features of a casualty's stature do not influence the measure of immobilization that can be obtained.

The further immobilization of the wounded person is obtained by tightening and fastening the other immobilization straps (nrs. 1, 2, 3, 4, and 5), and by tightening and fastening the head restraints, and by positioning the head immobilization device according to the stature of the casualty. Illustration (3) shows the head restraint and immobilization device from above, with (12) as the part upon which the casualty is supposed to lay down his head. Illustration (4) shows the head immobilization device from below. The velcro stripes of the head immobilization device are to be placed upon the velcro of the patient supporting part of the stretcher, at the head end. The immobilization of the head is made complete with the side-parts (21), the forehead-strap (13), and the chin-strap (14).

The restraining and immobilization that are applied on this rescue stretcher have the feature that the combined application of velcro, and, when necessary, open buckles, makes it possible to immobilize

a wounded person quicker, in a more simple way, and in a way that allows a continuously variable tightening and fastening of the straps, according to the stature of the casualty.

b) The rigid patient supporting part of the stretcher folds around the person to be transported when he is being immobilized by the tightening of the immobilization straps, and by the closing of the left and right side covers, together with the tightening and fastening of the outer binding straps.

In illustration (1) shows nr. 7 how the rigid bar-like parts are put into the cover of the patient supporting part of the stretcher. Illustrations (6) and (7) show how these parts fold themselves around the body of a person and make the stretcher flexible and more manoeuvrable.

c) It is possible to put carrying poles through the straps of (18).

d) At the place where the straps for the carrying poles are located, four rings are positioned that serve as attachment points for hoisting purposes.

e) At the lower side of the stretcher there are two sliding devices (16), that prevent the stretcher from being damaged when the stretcher passes sharp edges of hatches and man-holes.

f) Two hand-grips at the top and bottom ends of the stretcher serve to make the stretcher more easily manoeuvrable during transport.

g) Floating capability is obtained by either attaching floating parts to the rings that serve for hoisting purposes, or by using the inflatable parts of the stretcher.

h) Two velcro straps (17) serve to keep the stretcher rolled up when it is not in use.

Claims

1) Rescue stretcher, with a patient supporting part that is axially rigid and transversely flexible, and with a system of devices for complete immobilization of wounded people regardless of their stature, with the special feature that the patient supporting part is formed by rigid bar-like parts which are connected to each other in order to have a folding capacity in the axial direction. This folding capacity becomes effective when the inner and outer straps for the immobilization and binding are tightened. The left and right side covers and the straps are positioned in such a way that the rigid bar-like parts of the patient-supporting part fold transversely along the body of the person to be transported, with the effect of enclosing him tightly, in order to add to the complete immobilization of the wounded person, and to the manoeuvrability of the stretcher. The immobilization straps for the crotch area and the shoulders of the casualty serve

also as restraints in order to prevent the casualty from sliding from the stretcher when it is transported in a vertical position.

2) Rescue stretcher, as claimed in claim (1),
with the special feature that the immobilization
straps, which are positioned transversely over the
patient-supporting part, make possible a complete
and continuously adaptable immobilization of the
wounded person, over the full length of his body,
included his head and legs. 5 10

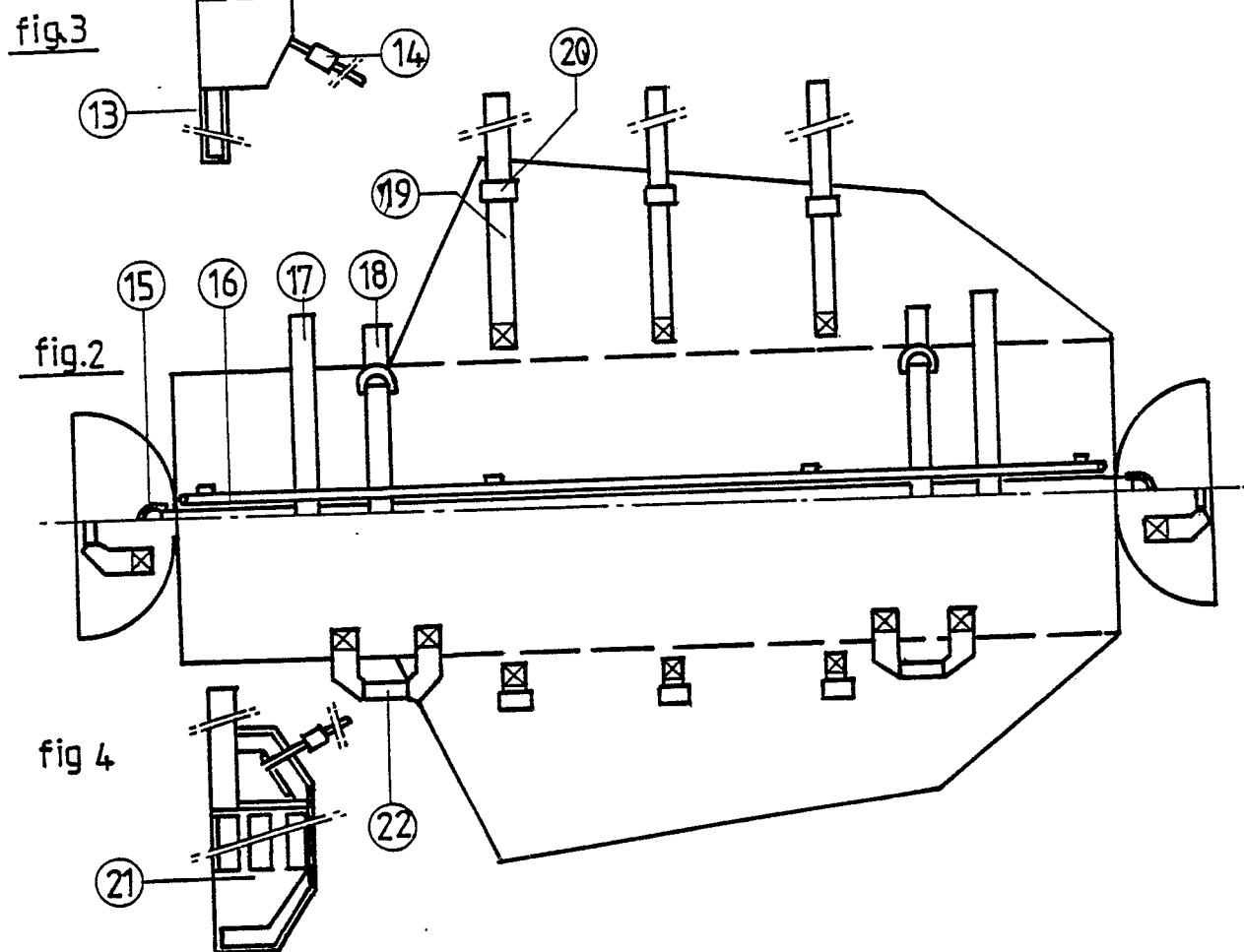
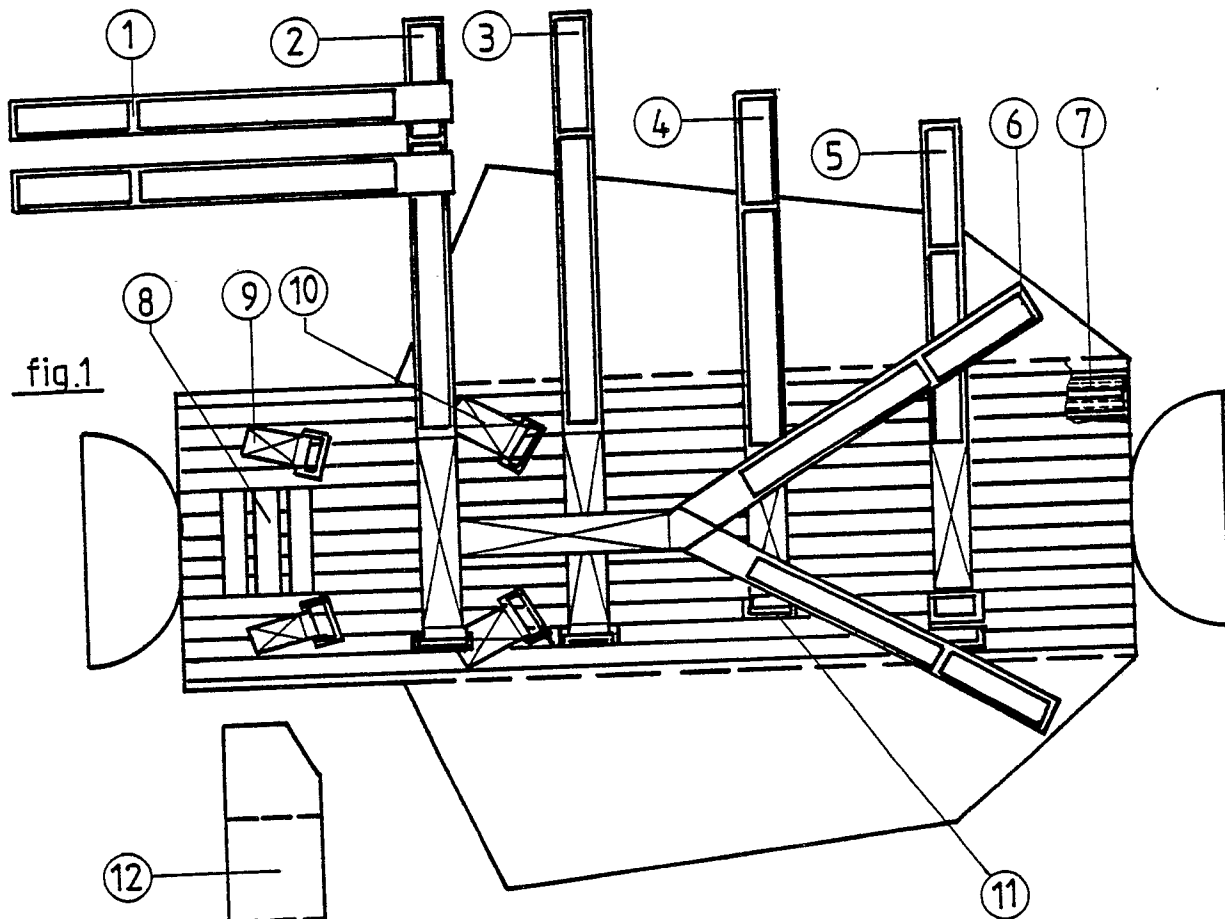
3) Rescue stretcher, as claimed in claims (1),
and (2),
with the special feature that the straps for the
immobilization of the shoulders are to be tightened
and fastened in a continuously variable way. In this
way patients, regardless of their stature, are to be
protected from sliding out of the stretcher at the
head end. 15

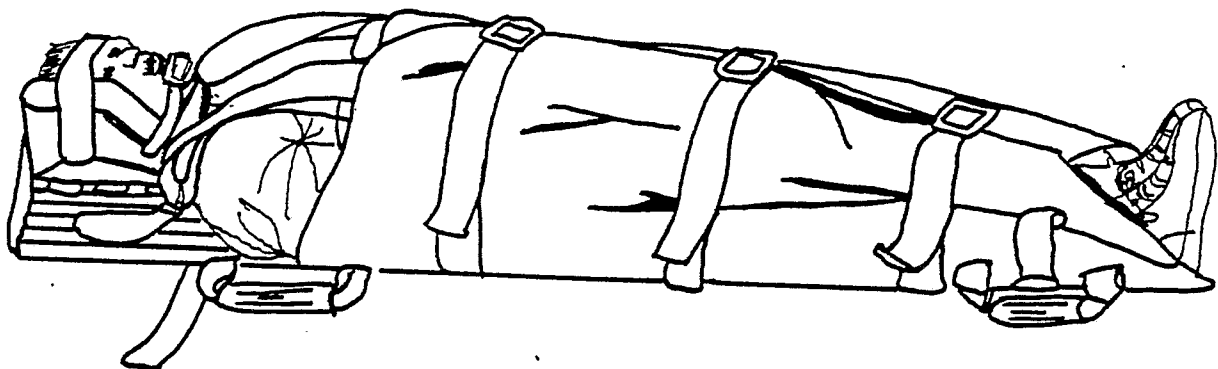
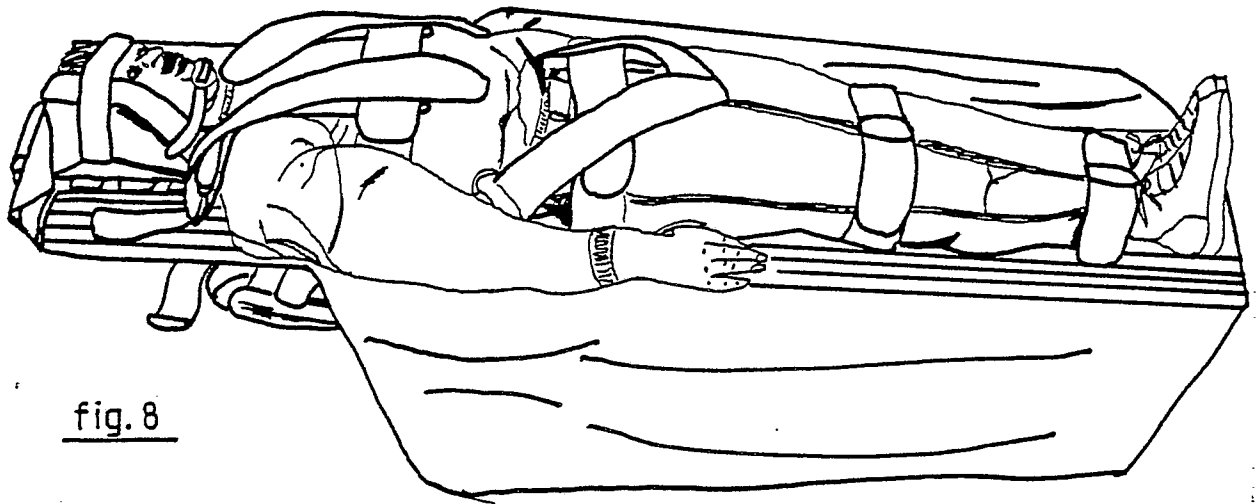
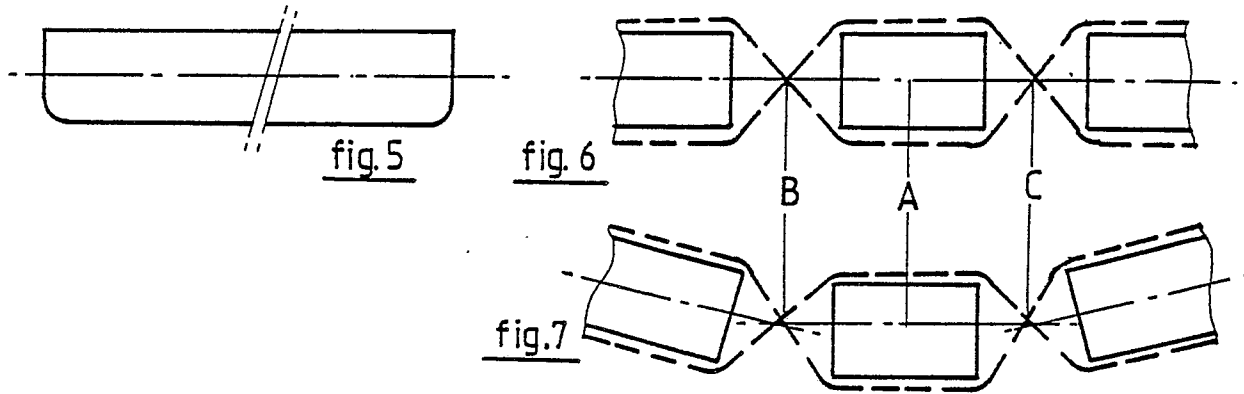
4) Rescue stretcher, as claimed in claims (1),
(2), and (3), 20
with the special feature that the immobilization of
the head is achieved by a device which can be put
into various positions, according to the stature of
the patient, so that complete immobilization is pos-
sible, regardless of the stature of the wounded
person. 25

5) Rescue stretcher, as claimed in claims (1),
(2), (3), and (4),
with the special feature that the immobilization
straps of the crotch area of the wounded person 30
are the determining device in this system of im-
mobilization regardless of the casualty's stature, as
well as for protecting the casualty to slide down
from the stretcher when this is transported in a
vertical position. These immobilization straps start 35
at a central point on the patient-supporting part of
the stretcher, at the side upon which the wounded
person is supposed to be laid down and positioned
there where an average adult will lie with his crotch
area. From that point the left and right straps can 40
be attached to the fastening buckles that are posi-
tioned at the hip level. The straps can be fastened
continuously variably, according to the stature of
the wounded person, so that any person, regard-
less of his stature, can be immobilized completely. 45

6) Rescue stretcher, as claimed in claims (1),
(2), (3), (4), and (5),
with the special feature that special attachment
rings for attachment to floating devices provide for
floating capability in vertical position. 50

7) Rescue stretcher, as claimed in claims (1),
(2), (3), (4), (5), and (6),
with the special feature that inflatable parts provide
for floating capacity in vertical position. 55







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. 4)
X	US-A-3 158 875 (FLETCHER) * Column 3, line 22 - column 5, line 60; figures 1-5 * ---	1-5	A 61 G 1/00
X	US-A-2 309 464 (LUCCI) * Page 2, left-hand column, line 1 - right-hand column, line 32; figures * ---	1-5	
A	GB-A-2 157 957 (SHICKLE) * Abstract; figure * ---	1	
A	US-A-2 489 828 (SPRINGER) * Whole document * ---	1	
A	US-A-2 361 328 (SPRINGER) * Page 1, left-hand column, lines 1-15; figures 1-4 * ---	4	
A	US-A-2 410 181 (PETERS) * Column 5, lines 20-47; figures 1,6 * ---	6-7	
A,D	GB-A-2 157 574 (SHICKLE) * Abstract; figures * ---	1	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A,D	US-A-4 601 075 (SMITH) * Abstract; figures * ---	1	A 61 G
A,D	GB-A- 600 232 (CULLINAN) * Claims; figures * -----	1	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19-10-1988	Examiner BAERT F.G.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	