Title: A PORTABLE EXPANDABLE LOWER LIMB EMERGENCY SPLINT

Abstract: The present invention relates to an emergency equipment for use in safely securing an injured limb of a person. The said emergency equipment is a portable and compact splint and wherein said emergency equipment (10) comprises of a top portion (12), a pair of spring wire and button (14), a pair of upper supporting members (16), a pair of locking means (18), a pair of lower supporting means (20), a pair of pins (22), a pair of bottom screws (24), a pair of fastening screws and nuts (26), a bottom portion (28) and a foot plate (30). The emergency equipment comprises of four main parts categorized as the length adjustment mechanism and locking means (18), the top portion (12), the bottom portion (28) and an attachment of the foot plate (30).


Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(H))
— of inventorship (Rule 4.17(iv))

Published:

— with international search report (Art. 21(3))
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))
A PORTABLE EXPENDABLE LOWER LIMB EMERGENCY SPLINT

FIELD OF THE INVENTION

The present invention relates to an emergency equipment and more particularly the present invention relates to a portable expandable lower limb emergency splint to be used during emergency situation.

BACKGROUND OF THE INVENTION

There are a few prior arts which describes the background of the present invention. These prior art would be described in brief in relation to the present invention.

US 3,756,227 describes a traction splint to maintain alignment by traction of a fractured leg of a patient for temporary therapy, the splint having upper and lower ends and including:

(i) telescoping upper and lower tubes, the tubes being extensible and retractable to permit change in length of the splint, and restricted against relative rotation, the tubes having a releasable locking means to lock the tubes axially,

(ii) a crotch piece at the upper end of the splint to locate the upper end of the splint relative to the crotch, the crotch piece having a strap to hold the
upper end of the splint against an upper portion of the leg so that the
crotch piece is held against the tuberosity of the ischium and the
perineum,

(iii) a flexible tension link having outer and inner ends, the outer end of the
link having a harness to fit around the ankle, the inner end of the link
having a resiliently extensible member having one end secured thereto,
an opposite end of the resiliently extensible member being secured
adjacent the lower end of the splint,

(iv) tension reversing means at the lower end of the splint, which means are
complementary to and engaged by the flexible tension link so that the
flexible tension link is located relative to the tension reversing means to
prevent slippage therebetween, the tension reversing means having
peripherally spaced graduations and an index adjacent the reversing
means for reading the graduations, so that when the crotch piece is held
against the upper end of the leg by the strap and is urged against the
perineum, tension in the flexible tension link arising from extension of
the resiliently extensible member is reversed by the tension reversing
means to apply traction to the leg tending to maintain the leg in
alignment, the tension in the flexible tension link being measured by
sighting the graduations in combination with the index.

US 4,350,153 describes a splint for use with a human leg comprising a frame
adapted to extend in a predetermined direction from the region of the crotch to a
location beyond the foot, means on one end of said frame for abutment with the ischial
uberosity, a base block on the other end of said frame, a sliding block, means interrelating said base block and said sliding block for relative movement in said predetermined direction, means adapted to engage the leg in the ankle region, a spring structure interposed between said means engaging the leg in said ankle region and said sliding block, and means interengaging said sliding block and said base block for moving said sliding block relative to said base block to vary the tension of said spring structure.

The frame includes a pair of rod portions adapted to lie in a transverse plane, and said base block has a first planar face and engages both of said rod portions to dispose said first planar face parallel to said transverse plane. The said sliding block has a second planar face, and means for holding said second planar face in substantial sliding abutment with said first planar face. The means for moving said sliding block relative to said base block includes a screw adapted to rotate relative to said base block and having a threaded engagement with said sliding block.

The threaded engagement includes threads of a non-overhauling pitch. The means for indicating the relative position of said sliding block and said leg engaging means. The said indicating means includes a calibrated slot in said sliding block and an indicator pin on said leg engaging means and movable in said slot. The sliding block has a channel therethrough, and said leg engaging means includes a cable extending through said channel and into engagement with said spring structure. A pair of spring coils is provided abutting said sliding block and disposed on opposite sides of said cable, and a yoke abutting said pair of spring coils and engaging said cable.
US 4,580,555 describes a portable pelvic and leg transport splint comprising an elongated narrow pad for positioning behind the patient's legs from pelvis to ankles and containing a series of narrow, elongated stiff staves in side-by-side arrangement, each adapted for independent parallel movement there between, said pad comprised of:

(i) a pelvic support area containing a first pair of flaps along the sides of said pad near one end thereof for wrapping up around the patient's pelvis;

(ii) a leg support area spaced apart from said pelvic support area containing a second pair of flaps along the sides of said pad for wrapping up around the outside of the patient's legs;

(iii) first and second strap means to fasten said first and second pairs of flaps around the patient's pelvis and legs respectively to immobilize the patient in said pad; and,

(iv) third strap means comprising a closed loop of strap under said pelvic support area attached to the underside of said pad terminating in free handles under said first pair of laps; and, a closed loop of strap under said leg support area attached to the underside of said pad terminating in free handles under said second pair of flaps for lifting said splint and transporting a patient immobilized therein.

Further to this, this prior art also teaches a portable pelvic and leg transport splint comprising:

(i) an elongated, narrow pad having opposed ends separated by elongated sides and containing a series of narrow, elongated parallel stiff slats, in
side-by-side arrangement, each adapted for independent parallel movement there between, spanning said opposed ends, said pad adapted to be placed along the back of a patient's legs from pelvis to ankles:

(ii) a first pair of flaps extending from opposite sides of said pad in the area from the patient's pelvis for folding up around the outside of the patient's pelvis;

(iii) a second pair of flaps extending from opposite sides of said pad in the area of the patient's thighs to ankles for folding up around the outside of the patient's legs;

(iv) a first and second strap means to fasten said first and second pairs of flaps around the patient's pelvis and legs respectively to immobilize the patient in said pad; and,

(v) a third means comprising a closed loop of webbing under said pelvic support area attached to the underside of said pad terminating in free handles under said second pair of flaps; and, a closed loop of webbing under said leg support area attached to the underside of said pad terminating in free handles under said second pair of flaps for lifting said splint and transporting a patient immobilized therein.

US 4,608,971 describes an emergency leg splint comprising a housing tube, means engaging one end portion of said housing tube for seating on the ischial tuberosity of a patient, an ankle tube movably projecting from the other end portion of said housing tube, a pulley rotatably mounted within said housing tube, a cable having two ends and trained around said pulley, a spring within said housing tube, means for
connecting one end of said spring to said housing tube, means for connecting the other end of said spring to one end of said cable, and means for connecting the other end of said cable to said ankle tube.

This prior art further describes a device especially for emergency use as a splint for a human patient's leg comprising a housing tube adapted to extend alongside the inner side of said leg, means connected to said housing tube to lie substantially in abutment with said patient's ischial tuberosity, an ankle tube telescopically engaging and movable relative to said housing tube and adapted to extend along the inner side of said leg in the vicinity of the ankle, means for use in strapping said housing tube to said leg, means for use in strapping said ankle tube to said patient's ankle, a tension spring within said housing tube, means for fastening one end of said tension spring to said housing tube, a pulley, means for mounting said pulley within said housing tube, a cable within said housing tube and trained around said pulley, and means for fastening one end of said cable to the other end of said spring and for fastening the other end of said cable to said ankle tube.

US 4,649,907 describes a traction splint including, a caliper frame having two laterally spaced arms each of which is adjustable to enable variation of the length thereof, locking means for releasably securing each said arm against said length variation. A retention means attached to said frame adjacent one end thereof and being attachable to a person's limb, an anchor member connected to the end of said frame opposite said one end thereof and being releasably securable around said limb, and releasable connecting means connecting said anchor member and said frame and being
perable to either allow or prevent separation of said anchor member from said frame. Said connecting means including locating means on said anchor member which is cooperable with said frame arms to position said anchor member relative to said arms, and retaining means on each said frame arm which is operable to releasably hold said anchor member against separation from said frame. The arrangement being such that adjustment of the length of said frame arms causes variation in the distance between said retention means and said anchor member.

This prior art also describes a traction splint including a caliper frame having two laterally spaced arms, each said arm including two interconnected parts which are relatively adjustable to enable variation of the length of said arm, retention means attached to one said part of each said arm and being attachable to a person's limb, an anchor member connected to the other said part of each said arm and being releasably securable around said limb, and pressure applying means which is operable to apply fluid pressure to at least one said part of each said arm so as to tend to cause extension of the length of said arms.

US 4,649,907 describes a traction splint including, a caliper frame having two laterally spaced arms each of which is adjustable to enable variation of the length thereof, locking means for releasably securing each said arm against said length variation, retention means attached to said frame adjacent one end thereof and being attachable to a person's limb, an anchor member connected to the end of said frame opposite said one end thereof and being releasably securable around said limb, and releasable connecting means connecting said anchor member and said frame and being
perable to either allow or prevent separation of said anchor member from said frame, said connecting means including locating means on said anchor member which is cooperatorable with said frame arms to position said anchor member relative to said arms, and retaining means on each said frame arm which is operable to releasably hold said anchor member against separation from said frame, the arrangement being such that adjustment of the length of said frame arms causes variation in the distance between said retention means and said anchor member.

This prior art also describes a traction splint including a caliper frame having two laterally spaced arms, each said arm including two interconnected parts which are relatively adjustable to enable variation of the length of said arm, retention means attached to one said part of each said arm and being attachable to a person's limb, an anchor member connected to the other said part of each said arm and being releasably securable around said limb, and pressure applying means which is operable to apply fluid pressure to at least one said part of each said arm so as to tend to cause extension of the length of said arms.

According to the present invention there are four main parts; length adjustment mechanism and locking system, top part, bottom part and attachment of foot plate. The locking system is composed by two components. The mechanism allows the adjustment of length at any length. At both the angled and straight sides, set of spring wire and buttons is used. This brings convenience while attaching and detaching the top part. A lot of times is saved during the process as no additional tool is needed. An attaching of foot plate is also provided on bottom part.
Therefore, it is an objective of the present invention to provide an easy to use splint for lower limb (which can also be extended to other limbs of a human body).

**SUMMARY OF THE INVENTION**

The present invention relates to an emergency equipment for use in safely securing an injured limb of a person. The said emergency equipment is a portable and compact splint and wherein said emergency equipment comprises of a top portion, a pair of spring wire and button, a pair of upper supporting members, a pair of locking means, a pair of lower supporting means, a pair of pins, a pair of bottom screws, a pair of fastening screws and nuts, a bottom portion and a foot plate. The emergency equipment comprises of four main parts categorized as the length adjustment mechanism and locking means, the top portion, the bottom portion and an attachment of the foot plate.

The locking means comprises of two components, an upper lock and a nylon lower lock. The upper lock and nylon lower lock are screwed together, the internal portion of the nylon lower lock will tighten the supporting members internally restricting it from repositioning itself when in use. The locking means is designed to allow extending the supporting members at any length.

The set of spring wire and buttons are provided that at both angled and straight sides of the top portion. The set of spring wire and buttons allows easy attaching and detaching the top portion. The foot plate is attached to the bottom portion by the
-astening the screws and a nuts. The foot plate can be used for both left and right leg by changing the orientation of foot plate.

**BRIEF DESCRIPTION OF THE PRESENT INVENTION**

Figure 1 shows a perspective view of the present invention.

Figure 2 shows another perspective view of the present invention in a non assembled manner.

Figure 3 shows a diagram of the locking means according to the present invention.

Figure 4 shows a diagram of the top portion and the upper supporting member according to the present invention.

Figure 5 shows a diagram illustrating the bottom portion and its configuration according to the present invention.

Figure 6 shows a perspective view of the bottom plate and its configuration according to the present invention.

Figure 7 shows an image of the present invention when fully assembled and with straps ready for use.
DETAILED DESCRIPTION OF THE PRESENT INVENTION

The present invention will now be described in detail with reference made to the accompanied drawings. However, it shall be noted that the scope of the invention is not limited thereto by making references to the said accompanied drawings.

Reference is made to Figure 1 wherein is shown there a perspective view of the present invention (10) in an assembled view. On the other hand, Figure 2 shows a perspective view of the present invention (10) in a non assembled view. According to Figure 2, the present invention (10) comprises of a top portion (12), a pair of spring wire and button (14), a pair of upper supporting members (16), a pair of locking means (18), a pair of lower supporting means (20), a pair of pins (22), a pair of bottom screws (24), a pair of fastening screws and nuts (26), a bottom portion (28) and a foot plate (30).

Further to this, according to the present invention, there are four main parts categorized as the length adjustment mechanism and locking means (18), the top portion (12), the bottom portion (28) and an attachment of the foot plate (30).

Reference is made to Figure 3 wherein, the locking means comprises of two components, an upper lock (32) and a nylon lower lock (34). The locking means (18) is configured and designed in such a manner that when the upper lock (32) and nylon lower lock (34) are screwed together, the internal portion of the nylon lower lock (34) will tend to tighten the supporting members (16, 20) inside, restricting it from
repositioning itself when in use. The locking means (18) is designed to allow extending the present invention (10) at any length.

Reference is made to Figure 4 wherein is shown that at both angled and straight sides of the top portion (12), a set of spring wire and buttons (14) are used. Such configuration allows the convenience while attaching and detaching the top portion (12). Further to this, with such configuration, much time is saved while assembling and disassembling the present invention (10) and no additional or external tool is needed to do so.

Reference is made to Figure 5 wherein is shown therein the configuration of the bottom portion (28). Two holes (36) are provided and spaced apart from one another on the bottom portion (28). The holes (36) are provided to receive the supporting members (20) and the said holes (36) are milled strictly at a certain angle. This angle of 10° is enough for the supporting tube to move as needed.

Reference is made to Figure 6 wherein is shown therein an exploded view of the foot plate (30). The foot plate (30) is attached to the bottom portion by the fastening the screws and a nuts (26). The foot plate (30) can be used for both left and right leg by changing the orientation of foot plate (30).

The top portion (12) is used as a thigh supporting piece in which said top portion (12) is curved so that a patient's thigh could be comfortably place thereof. The higher side is placed at the outer side of the patient's leg while the lower side is placed at the
inner side of the patient's leg or under the Ischia. However, from an un-detachable top portion (12), it is designed to be detachable from the upper supporting members (16). The reason for this is that there are two different top portions for the same set of splint equipment, one for left leg and another one for right leg. There is a set of spring wire and buttons (14) to ease the process of detaching and attaching the top portion (12) to the upper supporting members (16). It works as a clip means. By pressing the spring wire and buttons (14), the top portion (12) can be easily removed from the upper supporting members (18). In the end, the top portion (12) is wrapped with leather to provide comfort to the patient because it has direct contact with the patient's thigh.

The upper supporting members (16) are designed as elongated, round and hollow members. In the present invention (10), there are two upper supporting members (16), one is straight from the bottom and another one is angled. The straight member is placed at the inner side of leg while the angled member is placed at the outer side of leg. Outer side member is longer than the inner side member due to the higher side of the top portion (12).

The lower supporting members (20) are also designed to be elongated, round and hollow members as the upper supporting members (16) but the diameter of the lower supporting members (20) are smaller than the upper supporting members (16). It is because the lower supporting members (20) are slotted into the upper supporting members (16) while adjusting the length. These two lower supporting members (20) are of the same length.
Reference is made to Figure 7 wherein, is shown therein a plurality of straps (38) provided to ensure that when the patient's limb are placed in the present invention (10), the limbs can be securely held in place. When in use, the present invention is placed under the injured limb with the patient's foot securely resting on the foot plate (30). Then, the straps (38) are fastened using conventional means to secure the said injured limb.

The advantage of the present invention is that it is mobile and compact in which when not in use it can be easily stored in a small area such as a emergency bag, bags and the like. Further to this, another advantage of the present invention is that the present invention can be quickly deployed and assembled and use as a splint for a patient in need.

Another advantage of the present invention is that, it can also be used for other parts of the human body, and not only the legs of a patient. The foot plate can be replaced by other resting means for different type of limbs.
1. An emergency equipment for use in safely securing an injured limb of a person in which the said emergency equipment is an emergency splint and wherein two support members are provided to support the injured limb to securely hold the injured limb in position characterized in that wherein the said emergency equipment is a portable and compact splint and wherein said emergency equipment (10) comprises of a top portion (12), a pair of spring wire and button (14), a pair of upper supporting members (16), a pair of locking means (18), a pair of lower supporting means (20), a pair of pins (22), a pair of bottom screws (24), a pair of fastening screws and nuts (26), a bottom portion (28) and a foot plate (30) and wherein further to this, the emergency equipment comprises of four main parts categorized as the length adjustment mechanism and locking means (18), the top portion (12), the bottom portion (28) and an attachment of the foot plate (30).

2. The emergency equipment as claimed in Claim 1 wherein the locking means comprises of two components, an upper lock (32) and a nylon lower lock (34).

3. The emergency equipment as claimed in Claims 1 and 2 wherein when the upper lock (32) and nylon lower lock (34) are screwed together, the internal portion of the nylon lower lock (34) will tighten the supporting members (16, 20) internally restricting it from repositioning itself when in use.
4. The emergency equipment as claimed in Claim 1 wherein the locking means (18) is designed to allow extending the supporting members (16,20) at any length.

5. The emergency equipment as claimed in Claim 1 wherein the set of spring wire and buttons (14) are provided that at both angled and straight sides of the top portion (12).

6. The emergency equipment as claimed in Claim 1 wherein the set of spring wire and buttons (14) allows easy attaching and detaching the top portion (12).

7. The emergency equipment as claimed in Claim 1 wherein the bottom portion (28) includes two holes (36) for receiving the supporting members (20) and the said holes (36) are milled straightly at an angle of 10°.

8. The emergency equipment as claimed in Claim 1 wherein the foot plate (30) is attached to the bottom portion (28) by the fastening the screws and a nuts (26).

9. The emergency equipment as claimed in Claim 1 wherein the foot plate (30) can be used for both left and right leg by changing the orientation of foot plate (30).

10. The emergency equipment as claimed in Claim 1 wherein the top portion (12) is used as a thigh supporting piece in which said top portion (12) is curved securely hold a patient's thigh thereof and wherein a higher side is placed at the outer
side of the patient's leg while a lower side is placed at the inner side of the patient's leg or under the Ischia.

11. The emergency equipment as claimed in Claim 1 wherein the spring wire and buttons (14) works as a clip means.

12. The emergency equipment as claimed in Claim 1 wherein a plurality of straps (38) provided to ensure that when the patient's limb are placed the limbs can be securely held in place.

13. The emergency equipment as claimed in Claim 1 wherein the patient's foot is securely rested on the foot plate (30).

14. The emergency equipment as claimed in Claim 1 wherein when not in use it the said emergency equipment can be easily stored in a small area such as an emergency bag, bags and the like.

15. The emergency equipment as claimed in Claim 1 wherein the emergency equipment can also be used for other parts of the human body.

16. The emergency equipment as claimed in Claim 1 wherein the foot plate (30) can be replaced by other resting means for different type of limbs.
INTERNATIONAL SEARCH REPORT

PCT/MY2012/000042

A. CLASSIFICATION OF SUBJECT MATTER

A61F 5/04 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of database and, where practicable, search terms used)

EPODOC, WPI; IPC, ECLA: A61F5/04 & keywords: splint, support, limb, leg, foot, length, height, adjust, change, telescope, extension, portable, compact, dismantle, foot-rest, foot-plate, pedal and like terms

---

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
</table>

Documents are listed in the continuation of Box C

[X] Further documents are listed in the continuation of Box C  
[X] See patent family annex

* Special categories of cited documents:
  "A" document defining the general state of the art which is not considered to be of particular relevance
  "E" earlier application or patent 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 when the document is taken alone.
  "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

Date of the actual completion of the international search  
10 August 2012

Date of mailing of the international search report  
20 August 2012

Name and mailing address of the ISA/AU

AUSTRALIAN PATENT OFFICE  
PO BOX 200, WODEN ACT 2606, AUSTRALIA
Email address: pct@ipaaustralia.gov.au
Facsimile No.: +61 2 6283 7999

Authorized officer

Rashmi Basu  
AUSTRALIAN PATENT OFFICE  
(ISO 9001 Quality Certified Service)
Telephone No. 0262832 173

Form PCT/ISA/210 (fifth sheet) (July 2009)
**INTERNATIONAL SEARCH REPORT**

**DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 3942521 A (Klippel) 09 March 1976 column 2, line 46 - column 5, line 9; figures 1 - 3</td>
<td>1 - 16</td>
</tr>
<tr>
<td>X</td>
<td>US 5058574 A (Anderson et al.) 22 October 1991 figure 1; column 4, description</td>
<td>1 - 16</td>
</tr>
</tbody>
</table>

International application No. **PCT/MY2012/000042**
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Publication Number</td>
<td>Publication Date</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

End of Annex