

PATENT SPECIFICATION

(11) 1 339 551

DRAWINGS ATTACHED

- (21) Application No. 9815/70 (22) Filed 2 March 1970
 (23) Complete Specification filed 19 April 1971
 (44) Complete Specification published 5 Dec. 1973
 (51) International Classification A61G 1/00
 (52) Index at acceptance A5X 20
 (72) Inventor ROBERT WILLIAM JARDINE



(54) IMPROVEMENTS RELATING TO STRETCHERS

(71) We, N. V. PHILIPS GLOBILAMPENFABRIEKEN, of Emmasingel 29, Eindhoven, Holland, a limited liability company organised and established under the laws of the Kingdom of the Netherlands, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to stretchers particularly adapted for transferring persons suffering from physical injuries from one location to another.

The object of this invention is to provide a stretcher on to which an injured person can be moved without substantial change in body disposition so that the risk of complicating injuries such as spinal injuries is minimised.

The present invention provides a stretcher which comprises a belt connected at its ends to rotatable reels mounted on a frame, the part of the belt between the reels passing over upper guide means to define a body-supporting portion and under lower guide means to define a ground-engaging portion, the ground-engaging portion extending along the underside of the stretcher, and rotational means for driving at least one of said reels to wind the belt on to said one reel whilst unwinding it from the other reel so as to move the stretcher along the ground on the ground-engaging portion of the belt, the belt between said portions being conducted from upper guide means adjacent one edge of the stretcher to lower guide means adjacent the opposite edge of the stretcher so that when the belt is moved the said portions move in the same direction. The reels may be rotatable about axes which extend transversely to the stretcher.

Thus, with a stretcher in accordance with the invention, after placing one end under the injured person, the movement of the belt causes the injured person to be

automatically lifted on to the stretcher without any substantial movement of the body in a horizontal direction.

The invention will now be further explained with reference to the drawings (Figures 1 to 3) filed with the Provisional Specification and to the accompanying drawing (Figure 4) which shows two examples of stretcher construction in accordance with the present invention.

In the drawings:

Figure 1 shows a partly broken-away side view of the stretcher,

Figure 2 shows a section on the line II—II of Figure 1,

Figure 3 shows the actuating mechanism for winding up the belt of the stretcher, and

Figure 4 shows a partly broken-away side view of a second stretcher.

Figure 1 shows a first stretcher which comprises a belt connected at its ends to reels 2 and 3 which are rotatable about axes 4 and 5 respectively. The belt 1 extends from the reel 2 round a guide roller 6a and forms a body-supporting portion 7 between the guide roller 6a and a guide roller 6b adjacent the loading end of the stretcher. The body-supporting portion 7 slopes downwardly to the loading end of the stretcher. The belt passes round the guide roller 6b and a length 28 of the belt 1 passes under a backing plate 9 disposed beneath the body-supporting portion 7, the length 28 passing round guide rollers 6c and 6d, the belt 1 then forming a ground-engaging portion 8 between guide rollers 6d and 6e, the ground-engaging portion 8 passing under additional guide rollers 6 between guide rollers 6d and 6e. A portion 29 of the belt 1 extends from the guide roller 6e to the reel 3.

The backing plate 9 is attached at its edges to sheet metal side members 10 and 11 which also support shafts 12 (figure 2) of the guide rollers 6. At the rear end of the stretcher the side members form two box-sectioned uprights 13, one at either side of the stretcher and transverse channel

members 14 extend between the uprights 13 forming a rigid structure.

A shaft 15 is supported in the upper ends of the uprights 13 and a handle 16 (Figure 3) is attached to one end of the shaft 15. A chain-wheel 17 is fixed to the shaft 15 and a pair of parallel arms 18 and 19 are loosely mounted on the shaft 15. At their lower ends the parallel arms 18 and 19 support between them a shaft 20 on which are fixed a chain-wheel 21 and a gear-wheel 22. A chain 23 (Figure 1) drivingly connects chain-wheels 17 and 21. The gear-wheel 22 in its mid-position is just in mesh with gear-wheels 24 and 25 which are attached to shafts about which reels 2 and 3 rotate respectively.

When the handle 16 is rotated to rotate the gear-wheel 22 anti-clockwise as seen in Figure 1, the gear-wheel 22 climbs into mesh with gear-wheel 24 and leaves gear-wheel 25 and thus reel 3 free to rotate. Continued anti-clockwise rotation of gear-wheel 22 by handle 16 causes the belt 1 to be wound onto reel 2 and unwound from reel 3. Due to the course of the belt 1 over the guide rollers 6, the belt 1 is fed into the ground engaging portion 8 of the belt 1 from the right to the left as seen in Figure 1 and so convey the stretcher to the right, whilst the body supporting portion 7 of the belt 1 is moving from right to left. Hence the body supporting portion 7 of the belt 1 has substantially no horizontal component of movement relative to the ground. An injured person can therefore be automatically lifted on to the stretcher by this action of the belt 1 without any substantial horizontal movement of his body.

When the handle 16 is rotated to rotate the gear-wheel 22 clockwise as seen in Figure 1, the gear-wheel 22 climbs into mesh with gear-wheel 25 and leaves gear-wheel 24 free to rotate. The belt 1 is thus wound on to the reel 3 and unwound from reel 2. If desired, this action can be used to automatically move a person off the stretcher since the stretcher will be conveyed to the left as seen in Figure 1 by the ground-engaging portion 8 of the belt 1, whilst the body supporting portion 7 is moving to the right.

Lifting handles 26 are provided at the ends of the stretcher. Transverse straps 27 (Figure 2) are provided at intervals along the stretcher for securing an injured person to the stretcher. Stays 30 and 31 are provided for supporting strap-securing rings 32 and mounting strap reels (not shown) respectively.

In the stretcher shown in Figure 1, the driving mechanism with chain and chain wheels is shown by way of example. It will be obvious that other driving mechanisms for the reels are possible in which either only that reel is driven on to which the belt

is being wound, or in which both reels are driven simultaneously. When both reels are driven simultaneously, provision should be made for compensating for the variation of the reel diameter upon winding and unwinding the belt. The driving mechanism may be a worm which cooperates with worm wheels on the shafts of the reels.

In the stretcher shown in Figure 1, the belt runs from reel 2 first over the upper guide rollers 6a and 6b from the left to the right and then under the lower guide rollers 6d, 6 and 6e, also from the left to the right.

The second stretcher is shown in Figure 4, the belt 1 runs from reel 2 under the lower guide rollers 6d, 6 and 6e as a ground-engaging portion 8 from left to right, then round guide roller 6e, then guide roller 6c to upper guide roller 6b, then from guide roller 6b to guide roller 6a from left to right as a body-supporting portion 7. In this construction the rotational means are not shown but may be constructed as described above with reference to Figures 1 to 3. What is significant is that upon moving the belt — and this applies both to the construction shown in Figure 1 and to the construction shown in Figure 4 — the belt portions 7 and 8 move in the same direction and opposite to the movement of the frame.

A stretcher according to the present invention may be constructed so that a body can be loaded on to the stretcher from the side of the stretcher. In this arrangement the belt moves transversely to the length of the stretcher. The rotational means in this case may comprise a handle which drives a longitudinal shaft which extends over substantially the whole length of the stretcher. Gear wheels may be provided on the outside of each end of each reel, and the longitudinal shaft may be arranged to provide indirect drive to both gear wheels on one reel simultaneously. As described above, both reels may be driven at the same time.

WHAT WE CLAIM IS:—

1. A stretcher comprising a belt connected at its ends to rotatable reels mounted on a frame, the part of the belt between the reels passing over upper guide means to define a body-supporting portion and under lower guide means to define a ground-engaging portion, the ground-engaging portion extending along the underside of the stretcher, and rotational means for driving at least one of said reels to wind the belt on to said one reel whilst unwinding the belt from the other reel so as to move the stretcher along the ground on the ground-engaging portion of the belt, the belt between said portions being conducted from upper guide means adjacent one edge of the stretcher to lower guide means adjacent the opposite edge of the stretcher so that when

members 14 extend between the uprights 13 forming a rigid structure.

A shaft 15 is supported in the upper ends of the uprights 13 and a handle 16 (Figure 3) is attached to one end of the shaft 15. A chain-wheel 17 is fixed to the shaft 15 and a pair of parallel arms 18 and 19 are loosely mounted on the shaft 15. At their lower ends the parallel arms 18 and 19 support between them a shaft 20 on which are fixed a chain-wheel 21 and a gear-wheel 22. A chain 23 (Figure 1) drivingly connects chain-wheels 17 and 21. The gear-wheel 22 in its mid-position is just in mesh with gear-wheels 24 and 25 which are attached to shafts about which reels 2 and 3 rotate respectively.

When the handle 16 is rotated to rotate the gear-wheel 22 anti-clockwise as seen in Figure 1, the gear-wheel 22 climbs into mesh with gear-wheel 24 and leaves gear-wheel 25 and thus reel 3 free to rotate. Continued anti-clockwise rotation of gear-wheel 22 by handle 16 causes the belt 1 to be wound onto reel 2 and unwound from reel 3. Due to the course of the belt 1 over the guide rollers 6, the belt 1 is fed into the ground engaging portion 8 of the belt 1 from the right to the left as seen in Figure 1 and so convey the stretcher to the right, whilst the body supporting portion 7 of the belt 1 is moving from right to left. Hence the body supporting portion 7 of the belt 1 has substantially no horizontal component of movement relative to the ground. An injured person can therefore be automatically lifted on to the stretcher by this action of the belt 1 without any substantial horizontal movement of his body.

When the handle 16 is rotated to rotate the gear-wheel 22 clockwise as seen in Figure 1, the gear-wheel 22 climbs into mesh with gear-wheel 25 and leaves gear-wheel 24 free to rotate. The belt 1 is thus wound on to the reel 3 and unwound from reel 2. If desired, this action can be used to automatically move a person off the stretcher since the stretcher will be conveyed to the left as seen in Figure 1 by the ground-engaging portion 8 of the belt 1, whilst the body supporting portion 7 is moving to the right.

Lifting handles 26 are provided at the ends of the stretcher. Transverse straps 27 (Figure 2) are provided at intervals along the stretcher for securing an injured person to the stretcher. Stays 30 and 31 are provided for supporting strap-securing rings 32 and mounting strap reels (not shown) respectively.

In the stretcher shown in Figure 1, the driving mechanism with chain and chain wheels is shown by way of example. It will be obvious that other driving mechanisms for the reels are possible in which either only that reel is driven on to which the belt

is being wound, or in which both reels are driven simultaneously. When both reels are driven simultaneously, provision should be made for compensating for the variation of the reel diameter upon winding and unwinding the belt. The driving mechanism may be a worm which cooperates with worm wheels on the shafts of the reels.

In the stretcher shown in Figure 1, the belt runs from reel 2 first over the upper guide rollers 6a and 6b from the left to the right and then under the lower guide rollers 6d, 6 and 6e, also from the left to the right.

The second stretcher is shown in Figure 4, the belt 1 runs from reel 2 under the lower guide rollers 6d, 6 and 6e as a ground-engaging portion 8 from left to right, then round guide roller 6e, then guide roller 6c to upper guide roller 6b, then from guide roller 6b to guide roller 6a from left to right as a body-supporting portion 7. In this construction the rotational means are not shown but may be constructed as described above with reference to Figures 1 to 3. What is significant is that upon moving the belt — and this applies both to the construction shown in Figure 1 and to the construction shown in Figure 4 — the belt portions 7 and 8 move in the same direction and opposite to the movement of the frame.

A stretcher according to the present invention may be constructed so that a body can be loaded on to the stretcher from the side of the stretcher. In this arrangement the belt moves transversely to the length of the stretcher. The rotational means in this case may comprise a handle which drives a longitudinal shaft which extends over substantially the whole length of the stretcher. Gear wheels may be provided on the outside of each end of each reel, and the longitudinal shaft may be arranged to provide indirect drive to both gear wheels on one reel simultaneously. As described above, both reels may be driven at the same time.

WHAT WE CLAIM IS:—

1. A stretcher comprising a belt connected at its ends to rotatable reels mounted on a frame, the part of the belt between the reels passing over upper guide means to define a body-supporting portion and under lower guide means to define a ground-engaging portion, the ground-engaging portion extending along the underside of the stretcher, and rotational means for driving at least one of said reels to wind the belt on to said one reel whilst unwinding the belt from the other reel so as to move the stretcher along the ground on the ground-engaging portion of the belt, the belt between said portions being conducted from upper guide means adjacent one edge of the stretcher to lower guide means adjacent the opposite edge of the stretcher so that when



the belt is moved the said portions move in the same direction.

5 2. A stretcher as claimed in Claim 1, wherein the frame includes a backing plate which supports the body-supporting portion of the belt.

10 3. A stretcher as claimed in Claim 1 or Claim 2, wherein the one reel is rotatable to wind the belt on to said one reel so as to be able to load a body on to the body-supporting portion.

15 4. A stretcher as claimed in any preceding Claim, wherein the other reel is rotatable to wind the belt on to the said other reel so as to be able to unload a body from the body-supporting portion.

5. A stretcher as claimed in any preceding Claim, wherein the rotational means are

adapted to drive both reels simultaneously.

6. A stretcher as claimed in any preceding Claim, wherein the rotational axes of the reels extend transversely to the stretcher. 20

7. A stretcher as claimed in any of Claims 1 to 5, wherein the belt moves transversely to the length of the stretcher. 25

8. A stretcher substantially as herein described to Figures 1 to 3 of the drawings filed with the Provisional Specification or to Figure 4 of the accompanying drawing.

C. A. CLARK,
Chartered Patent Agent,
Century House,
Shaftesbury Avenue,
London, W.C.2.
Agent for the Applicant.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1973.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.



* C L N S *