March 13, 1951 G. K. BLANK 2,544,977

COLLAPSIBLE CARRIER

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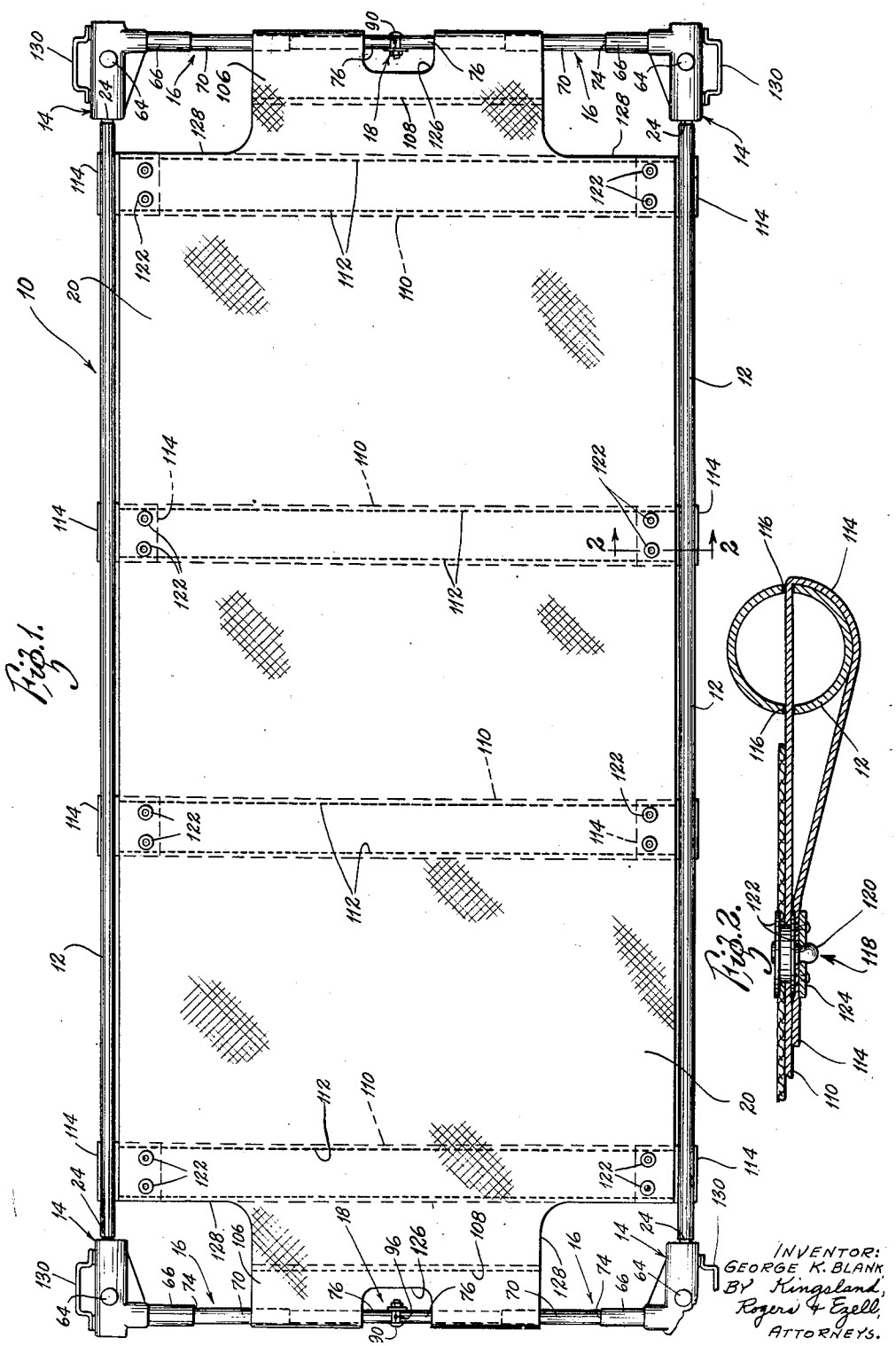


Fig. 1.

Fig. 2.

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Fig. 3.

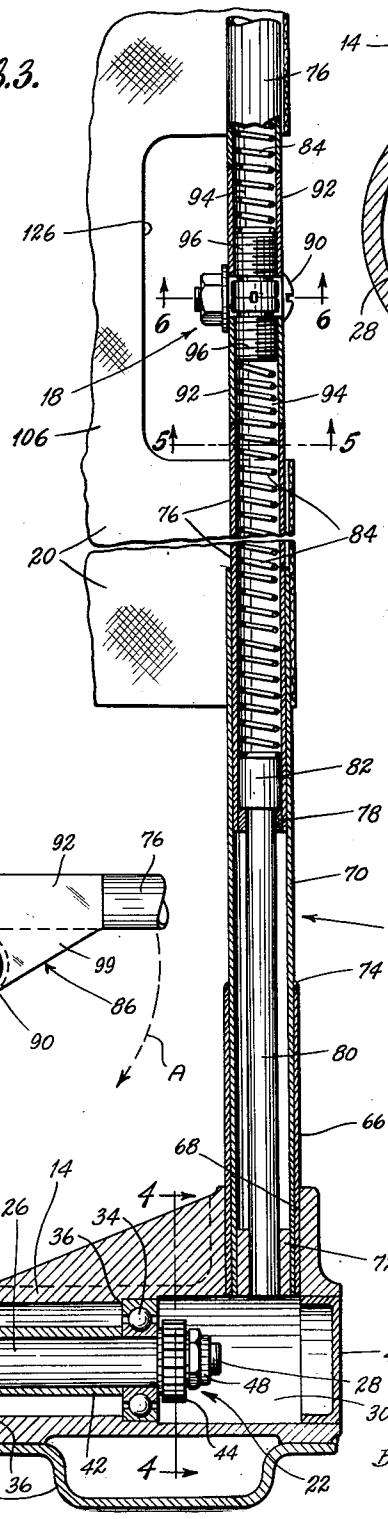


Fig. 4.

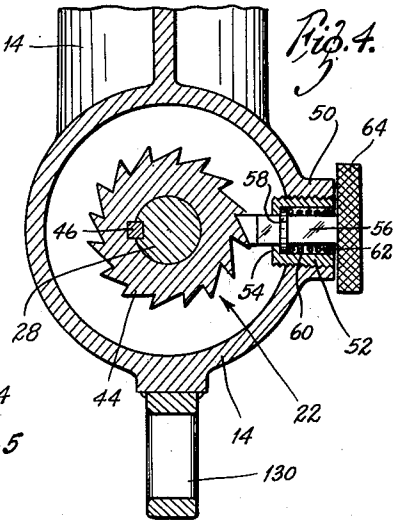


Fig. 5.

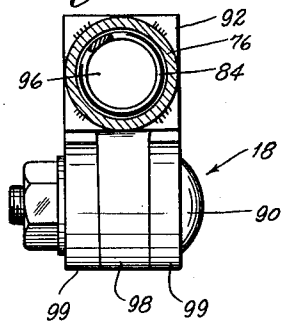


Fig. 7.

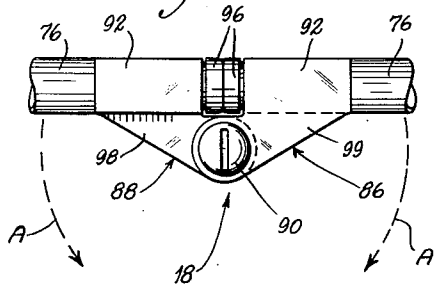
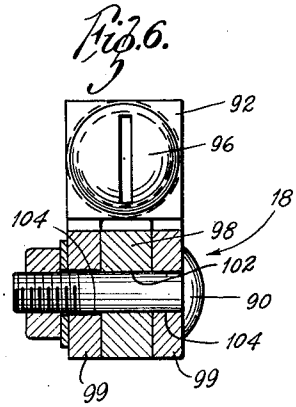


Fig. 6.



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COLLAPSIBLE CARRIER

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11 Claims. (Cl. 5—82)

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The present invention relates generally to stretchers, and more particularly to a collapsible stretcher which may be reduced to a fraction of its in-use size for storage, carry and the like.

An object of the present invention is to provide a novel collapsible stretcher which is adapted to be reduced to substantially one-quarter of its in-use size in order to facilitate transportation thereof in an ambulance to reduce the space required for storage, and the like.

Another object is to provide a novel collapsible stretcher which may be readily collapsed and quickly enlarged to in-use size.

Another object is to provide a novel collapsible stretcher which incorporates telescoping and hinged members whereby the stretcher may be reduced to three-quarters and one-half its width through telescoping action and reduced to a quarter of its original width by hinging action so that it may be employed to carry an individual when extended to full size or when reduced to three-quarters, one-half or one-quarter size, or to sizes in between full and one-quarter size, which renders the present device extremely useful for carrying persons through narrow passages, and the like.

Other objects are to provide a novel collapsible stretcher which is sturdy in construction so that it is capable of standing rugged use for a long period of time without breakdown, which is relatively economical to produce, which is readily fabricated, and which may be used by individuals to obtain maximum benefit from its manifold novel features after a minimum amount of instruction.

The foregoing and other objects and advantages are apparent from the following description taken with the accompanying drawings, in which:

Fig. 1 is a plan view of a collapsible stretcher constructed in accordance with the teachings of the present invention;

Fig. 2 is a vertical cross-sectional view on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged horizontal cross-sectional view through one corner casting together with its enclosed elements and through one telescoping assembly including the center hinge assembly;

Fig. 4 is a vertical cross-sectional view on the line 4—4 of Fig. 3 showing the locking means for maintaining the canvas in a rolled position;

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Fig. 5 is a vertical cross-sectional view on the line 5—5 of Fig. 3 through one tube and its enclosed compression spring and showing the center hinge assembly in end elevation;

Fig. 6 is a vertical cross-sectional view through the center hinge assembly on the line 6—6 of Fig. 3; and

Fig. 7 is a side elevational view of the center hinge assembly.

Referring to the drawings more particularly by reference numerals, 10 indicates generally a collapsible stretcher embodying the concepts of the present invention. Broadly, the stretcher 10 includes two side rollers 12, four corner castings 14 which rotatably support the side rollers 12, four telescoping assemblies 16, each being connected to a corner casting 14, two hinge assemblies 18 each of which joins two telescoping assemblies 16, a canvas 20 supported by the side rollers 12 and the telescoping assemblies 16, and four roller-latching mechanisms 22, one being disposed in each corner casting 14.

Each side roller 12 has bearing support in a corner casting 14 at each end thereof, details of which are clearly shown in Fig. 3. Each end of the rollers 12 includes stepped reduced portions 24, 26 and 28, the last-named being threaded at its extremity. Each corner casting 14 includes a main longitudinally extending cylindrical chamber 30 which receives ball bearing assemblies 32 and 34 which are snugly fitted against annular shoulders 36. The reduced portion 26 of the roller 12 snugly receives the inner race of each of the ball bearing assemblies 32 and 34. A cap member 38 abuts the outer side of the outer race of the ball bearing assembly 32 and surrounds the reduced portion 24 of the roller 12, being held in such relationship by screws 40 extending through suitable openings in the corner casting 14 and threaded apertures in the cap 38. A spacer member 42 surrounds the reduced portion 26 between the roller bearing assemblies 32 and 34. A cap 43 closes the other end of the chamber 30 which may be removed for access thereto

On the reduced portion 28 at each end of each roller 12 is the roller-latching assembly 22 (Figs. 3 and 4), which includes a sprocket 44 secured to the reduced portion 28 by a spline or key 46. A nut 48 threadedly engages the threaded portion of the reduced portion 28 to secure the

sprocket 44 against longitudinal movement. An internally threaded cylindrical boss 50 is formed in the corner casting 14 with the axis thereof radially disposed in respect to the sprocket 44. An externally threaded tubular insert member 52 is threaded into the boss 50 and includes an inwardly extending annular integral flange 54 at the inner end. A plunger 56 having an annular flange 58 is disposed in the insert member 52 with the flange 58 abutting the flange 54. A compression spring 60 is disposed about the plunger 56 outwardly of the flange 58, being retained in the insert member 52 by a ring 62 which may be welded or otherwise secured to the insert 52 after the spring 60 and plunger 56 are disposed therein. A knurled head 64 is secured to the outer end of the plunger 56.

It is to be observed that the inner end of the plunger 56 is bevelled to snugly engage a tooth of the sprocket 44, as is shown in Fig. 4, which is the rest position thereof due to the bias of the compression spring 60.

Each telescoping assembly 16 includes a doubler or base tube 66 which snugly fits a cylindrical opening 68 formed in the corner casting 14 at right angles to the chamber 30. A tube 70 having an insert ring 72 secured in one end is disposed in and supported by the base tube 66, being secured thereto by welding 74, or the like. The tube 70 telescopically receives therein a tube 76, one end of which has an insert ring 78. A rod 80 is disposed within the tube 70, having one end secured to the insert 72 and having the other end formed as an enlargement 82 which is disposed within the tube 76 and which is of a diameter to be engaged as a stop by the insert ring 78 when the telescoping assembly 16 is in the extended position shown in Fig. 3. Within the tube 76 is a compression spring 84, one end of which abuts the enlargement 82, the other end of which abuts an element of the hinge assembly 18, as is pointed out below.

Each center hinge assembly 18 includes a female hinge element 86 and a male hinge element 88 which are connected by a suitable bolt assembly 90 extending through aligned apertures in the elements 86 and 88. The male hinge element 88 includes a rectangular base portion 92 which is butt welded or otherwise secured to the end of one tube 76 and which includes a bore 94 of substantially the same diameter as the bore of the tube 76. The bore 94 is threaded and threadedly receives a stop member 96. The above-mentioned spring 84 extends into the bore 94 and abuts the inner end of the stop member 96. Extending radially from one side of the base portion 92 is a single wing portion 98 through the free end of which extends an aperture 102, aforementioned generally, which receives the bolt assembly 90 (Fig. 6).

The female hinge element 86 is identical with the male hinge element 88 except for the inclusion of two parallel wing portions 99 extending at right angles from one surface of the rectangular base portion 92 instead of a single wing portion 98. An aperture 104 extends through each of the wing portions 99 in aligned relation and is adapted to receive the bolt assembly 90 along with the aperture 102. The female hinge element 86 is butt welded or otherwise secured to the end of the tube 76 of the telescoping assembly 16 which is disposed in opposed relation to the telescoping assembly 16 to which the male hinge element 88 is secured.

The relationship of the hinge elements 86 and 88 when the stretcher 20 is in open position is shown in Fig. 7. It is to be observed that the stop members 96 are in abutting relation. The stop members 96 are adjustable axially so that the opposed telescoping assemblies 16 will be disposed in the same plane when the stretcher is in open position. As is indicated by the dotted arrow lines A, the hinge elements 86 and 88 fold downwardly about the bolt assembly 90 as a pivot.

As is clear from Figs. 1 and 2, the canvas 20 is secured to the telescoping assemblies 16 by extensions 106 which loop around the inner end of the tube 70 and around the tube 76, being secured by stitching 108. Since the bolt assemblies 90 are readily removed for separation of the opposed telescoping assemblies 16, it is apparent that an old canvas 20 may be readily removed from and a new one disposed on the telescoping assemblies 16. The canvas 20 is supported from the side rollers 12 by a plurality of straps 110 which are sewed thereto against the underside by stitching 112. Each strap 110 includes free extremities 114 which pass through opposed slits 116 in the roller 12 (Fig. 2) and are returned underneath the roller 12, the end being engaged by a pair of snaps 118 which may be of any well-known type and which are shown as including a stud 120 carried by a pair of opposed washers 122 clamping the main portion of the strap 110 therebetween and a washer 124 secured to the end 114 of the strap 110 adapted to snugly engage the stud 120. The canvas 20 has a recess 126 in its extensions 106 at each hinge assembly 18 to facilitate folding, and a recess 128 at each corner to facilitate rolling on side rollers 12.

For carrying purposes, each of the corner castings 14 is provided with a hand grip 130 which is U-shaped in form.

In Fig. 1 the present collapsible stretcher 10 is shown in fully extended position, which is the standard position for carrying an adult person of average build. Should it be desired or necessary to reduce the width of the stretcher 10, a reduction of as much as one-quarter may be attained by telescoping the two telescoping assemblies 16 at one side of the center hinge assemblies 18. In this telescoping action, the canvas 20 is rolled on the particular side roller 12 by rotation of the roller 112 by hand at either end thereof. The latching mechanisms 22, which resist unrolling of the canvas 20, will rotate freely in this rolling of the canvas 20, the plunger 56 riding up the inclined slope of the teeth of the sprocket 44 in this counterclockwise movement of the sprocket 44 (Fig. 4). The stretcher 10 may be reduced to substantially one-half of its width by similarly telescoping the other two telescoping assembies 16 and rolling the canvas 20 on the roller 12. It is clear from the drawings that the engagement of the ring 78 with the enlargement 82 limits separation movement of the tubes 70 and 76, and that abutment of the ring 78 against the ring 72 limits telescoping movement of the tubes 70 and 76.

In order to reduce the stretcher 10 to its minimum width for transportation and storage and for use as a narrow stretcher in places where the passageway is restricted, the telescoping assemblies 16 and the roller 12 are actuated as above described, and thereafterwards the two halves of the stretcher 10 are pivoted around the center hinge assemblies 18 which disposes the rollers 12 with their rolled canvas in contiguous relation, thereby reducing the stretcher to a width of sub-

stantially one-quarter of the total expanded width. To place the stretcher in carry form and to provide maximum width, the foregoing procedure is reversed. It is manifest, of course, that the stretcher 10 may be folded about the assemblies 18 and then telescoped, if such is considered more convenient than the preceding procedure. The recess 126 in the edge extension 106 obviates tearing and bulking of the canvas 20 at the hinge assemblies 18 when the stretcher 10 is folded. The recess 128 at each corner of the canvas 20 makes it possible to roll the canvas 20 on the rollers 12 as the telescope assemblies 16 are actuated.

The roller-latching mechanisms 22 are positive in action to prevent fortuitous unrolling of the canvas 20 and spreading action of the telescoping assemblies 16. The compression springs 84 strongly bias the telescoping assemblies 16 to extended positions, and may be strong enough to extend the telescoping assemblies 16 and unroll the canvas 20 from side rollers 12 upon release of latching mechanisms 22.

It is apparent from the foregoing description taken with the accompanying drawings that there has been provided a novel collapsible stretcher which fulfills all the objects and advantages sought therefor.

It is to be understood that the foregoing description and the accompanying drawings have been given by way of illustration and example.

It is also to be understood that changes in form of the elements, rearrangement of parts, and substitution of equivalent elements, which will be obvious to those skilled in the art, are contemplated as within the scope of the present invention which is limited only by the claims which follow.

What is claimed is:

1. In a device of the kind described, in combination, a frame, flexible supporting means connected to and supported by said frame, said frame including telescoping members adapted to be telescoped to reduce the frame width and to be extended to increase the frame width, each telescopic member being collapsible to substantially one-half length, and means for pivoting said frame about a longitudinal center line to place in contiguous relation the two halves thereof.

2. A collapsible carrier comprising a frame including four corner members, side members rotatably mounted in said corner members, a telescopic end assembly anchored in each corner member, said two assemblies at each end being pivotally connected providing a longitudinal center line folding axis for the frame, each telescopic end assembly being collapsible to substantially one-half length, and a flexible support connected to said side members and end assemblies adapted to fold with said frame and to be rolled on the side members.

3. In a device of the kind described, a frame including rotatable side members and telescoping end assemblies, a flexible support connected to and carried by said members and assemblies, said flexible support being adapted to be rolled about said rotatable side members as said end assemblies are telescoped, and releasable locking means at each end of said rotatable member resisting rotation of said member in one direction and permitting rotation in the other.

4. In a device of the kind described, a frame including side members and telescoping end assemblies lying in substantially the same plane, a flexible support connected to and supported by said frame, said end assemblies including telescoping members and means biasing said telescoping members towards extended position.

5. A collapsible carrier comprising a frame including four corner members, side members rotatably mounted in said corner members, a telescopic end assembly anchored in each corner member, said two assemblies at each end being pivotally connected providing a longitudinal center line folding axis for the frame, each telescopic end assembly being collapsible to substantially one-half length, means biasing said end assemblies towards extended position, and a flexible support connected to said side members and end assemblies adapted to fold with said frame and to be rolled on the side members.

6. A collapsible stretcher comprising, in combination, a frame including end members and side members rotatably secured to said end members, and a flexible support member connected to and supported by said side members, said end members being composite and being reducible and extensible between maximum and minimum overall lengths thereby providing means for changing the effective width of said frame.

7. A collapsible stretcher comprising, in combination, a frame including end members and side members rotatably secured to said end members, a flexible support member connected to and supported by said side members, said end members being composite and being reducible and extensible between maximum and minimum overall lengths thereby providing means for changing the effective width of the frame, said support member being connected to said side members for rolling thereon or therefrom as the effective width of said frame is changed, and releasable means for securing the frame and support member at the selected width.

8. A collapsible carrier comprising a frame including four corner members, side members rotatably mounted in said corner members, a telescopic end assembly anchored in each corner member, said two assemblies at each end being pivotally connected providing a longitudinal center line folding axis for the frame, and a flexible support connected to said side members and end assemblies adapted to fold with said frame and to be rolled on the side members.

9. A collapsible carrier comprising a frame including four corner members, side members rotatably mounted in said corner members, a telescopic end assembly anchored in each corner member, said two assemblies at each end being pivotally connected providing a longitudinal center line folding axis for the frame, a flexible support connected to said side members and end assemblies adapted to fold with said frame and to be rolled on the side members, and means to maintain the end assemblies in a selected position against further extension.

10. A collapsible carrier comprising a frame including four corner members, side members rotatably mounted in said corner members, a telescopic end assembly anchored in each corner member, said two assemblies at each end being pivotally connected providing a longitudinal center line folding axis for the frame, means biasing said end assemblies towards extended position, and a flexible support connected to said side members and end assemblies adapted to fold with said frame and to be rolled on the side members.

11. A collapsible carrier comprising a frame including four corner members, side members rotatably mounted in said corner members, a telescopic end assembly anchored in each corner

member, said two assemblies at each end being pivotally connected providing a longitudinal centerline folding axis for the frame, each telescopic end assembly being collapsible to substantially one-half length, a flexible support connected to said side members and end assemblies adapted to fold with said frame and to be rolled on the side members, and means to maintain the end assemblies in a selected position against further extension.

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