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STRETCHER AND COT COMBINATION

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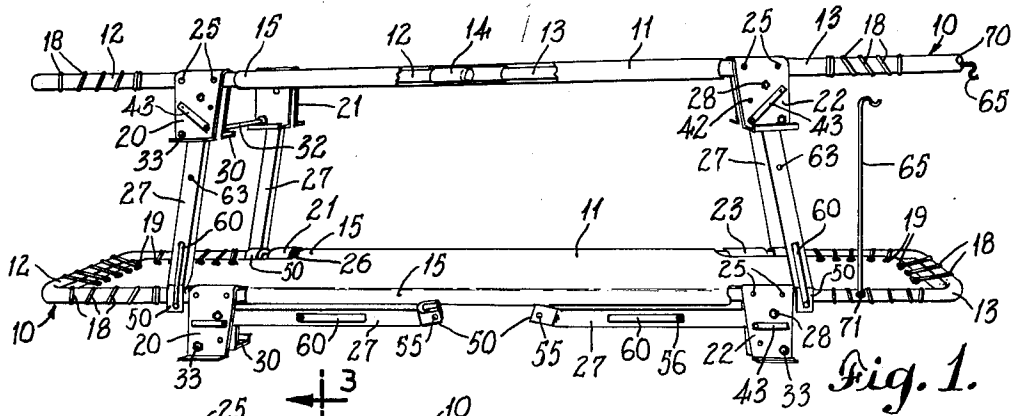


Fig. 1.

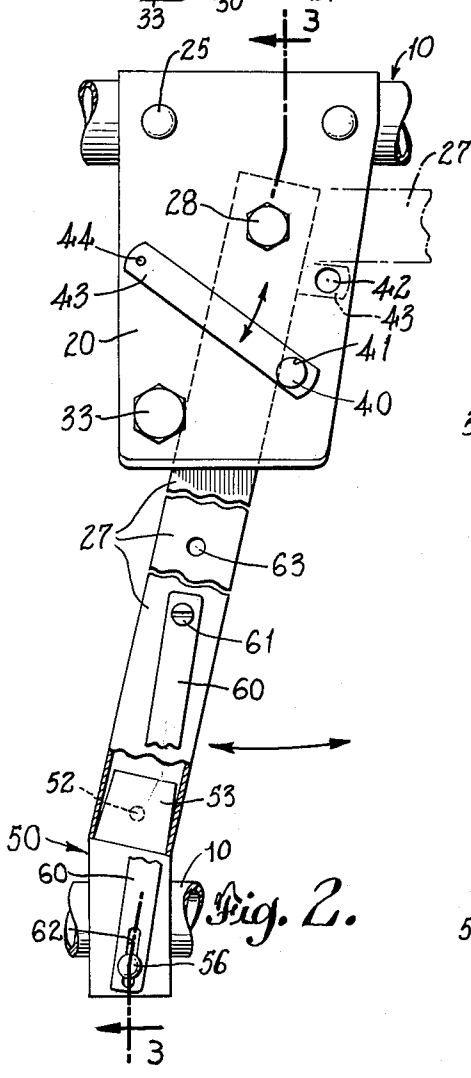


Fig. 2.

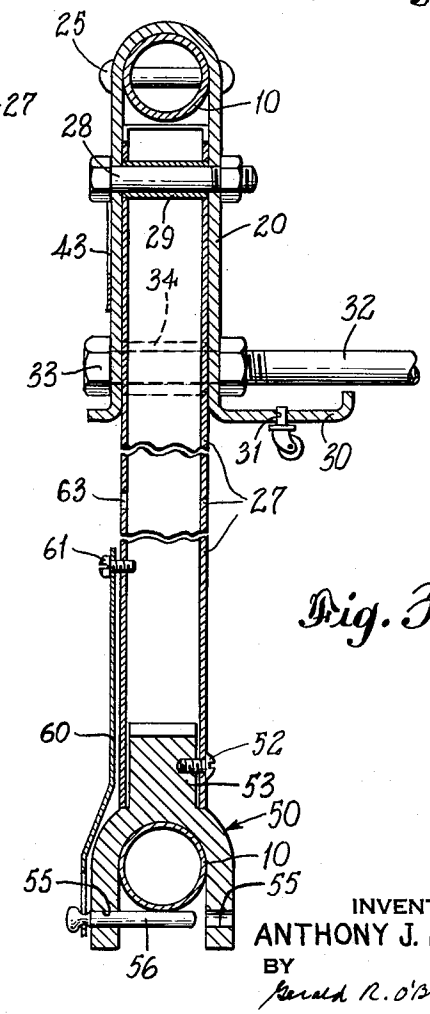


Fig. 3.

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STRETCHER AND COT COMBINATION

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9 Claims. (Cl. 5—8)

The present invention relates to a novel stretcher and cot combination which is foldable and stackable.

During periods of disaster such as those caused by large scale bombings, floods, fires, tornadoes, etc., hospital beds are never available in sufficient numbers to properly handle the large number of victims. Additionally, ambulances are never available in sufficient numbers to efficiently and speedily transport a large number of victims to hospitals or neighboring cities where medical care can be administered. This problem of mass movement of disaster victims from the scene of disaster to either emergency medical stations or to hospitals of neighboring cities is a serious one which heretofore has remained unsolved due to the absence of suitable means for accomplishing such a movement.

It is, therefore, the main object of the present invention to provide a stretcher and cot combination which in periods of disaster can be employed to remove a victim from the scene, can be used to transport the victim to an emergency medical station or hospital, and if the need arises can be employed to serve as a cot at the emergency medical station or hospital.

Another object is to provide such a combination stretcher and cot which is rugged and simple in construction, economic in cost, light in weight, easily cleaned, easily handled by stretcher bearers, and easily stored when not needed.

Other aims and advantages of the present invention will be apparent from the following description and appended claims.

In the drawing:

Fig. 1 is a perspective view of two stretcher and cot combinations embodying the invention, showing the stacked position;

Fig. 2 is an elevational view of the hinge and adjacent leg construction of the stretcher and cot combination of Fig. 1, legs in the down position and parts having been broken away to show the internal construction; and

Fig. 3 is a sectional view of the stretcher and cot combination taken along the line 3—3 of Fig. 2.

In accordance with the present invention, a stacking combination stretcher and cot is provided having a rectangular frame preferably of light weight tubular metal, a flexible generally rectangular supporting layer preferably of fabric such as canvas, four hinge members arranged in two opposed pairs and positioned near opposite ends of the longitudinal sides of the frame, and four leg members each pivotally mounted at one end to one of the hinge members and provided at the other end with gripping means adapted to engage and be supported by the top of the rectangular frame of another stretcher and cot combination. In this manner a number of the stretcher and cot combinations of the present invention can be vertically stacked, one above the other, and so positioned or transported in a minimum of space.

The leg members are secured to the rectangular frame so that they are capable of being pivoted between a downwardly extended position and an upwardly folded position.

Means are provided for firmly securing the leg members in either of these two positions. With the leg members in the upwardly folded position, the combination serves as a stretcher or litter capable of bearing a victim from the scene of a disaster. With the leg members lowered to the downwardly extended position, the combination serves as a cot capable of transporting victims from the disaster scene and capable of serving as an emergency cot in a medical station or hospital.

The lower ends of the leg members are provided with gripping means so that when functioning as cots, i. e. with leg members downwardly extended, they can be vertically stacked with ease to as many as three or four in height. Thus, a disaster victim can be picked up on the combination when functioning as a stretcher, be carried thereon to a transporting vehicle at which point the legs can be lowered and the combination, then functioning as a cot, can be stacked with other victim-bearing cots and transported to any locality where medical care is available. At that point the cots may be brought from the vehicle individually and restacked within the medical station.

Consequently, the victim need never be removed from his stretcher and cot combination from the time he is put aboard at the disaster scene to the time he enters the medical station.

It has been found that stretcher and cot combinations of the invention are easily handled as a stretcher by two bearers without discomfort to the victim borne thereon. It has additionally been found that the stretcher and cot combinations can easily be stacked vertically by two or three bearers to three or four cots in height without discomfort to any of the victims borne thereon.

When the stretcher and cot combinations are stacked in vehicles, such as trucks, trains and the like, it will be found desirable to tie the stacked assembly with supporting lines to insure against side capsizing due to possible rapid turning of the vehicle.

Referring specifically to the embodiment of the invention shown in the drawing, a rectangular rigid frame member **10** of light weight tubular metal is provided, to which a flexible generally rectangular supporting layer **11** of fabric is secured on all four sides. The rectangular frame member **10** comprises two U-shaped sections **12** and **13** which are joined at their corresponding abutting edges by two tubular splices **14**. The longitudinal sides of supporting layer of fabric **11** are stitched to form two sleeves **15** through which sections **12** and **13** of frame member **10** and splices **14** fit, thereby securing supporting layer **11** to the longitudinal sides of rectangular frame member **10**. The horizontal ends of supporting layer **11** are secured to frame member **10** by means of lashing thongs **18**, and grommets **19** are provided to prevent tearing of supporting layer **11** by the lashing thongs **18**. By unlashing thongs **18** at one end of rectangular frame member **10** the U-shaped section (**12** or **13**) at that end of the rectangular frame member can be slipped out of tubular splice **14**, thereby permitting folding of the cot so that it can be more easily stored when not in use.

Four hinge members **20**, **21**, **22**, and **23** are arranged in two opposed pairs, **20—21** and **22—23**, and secured near opposite ends of the longitudinal sides of frame member **10** by means of rivets or bolts **25**. Portions of supporting layer **11** are cut back from rectangular frame member **10** as at **26** in the areas where the hinge members are secured to the frame members. The hinge members are constructed of metal and pass over and bear on the top surface of frame member **10** and project below the tubular frame member on both sides forming a space therebetween in which the leg members **27** are pivotally mounted by bolts **28**. Bushings **29** surround bolts **28** and pass through leg members **27** thereby preventing crimping and shearing of the leg members. The lower end of

each hinge member is bent to form a base plate or bracket **30**. When leg members **27** are pivoted to the upwardly folded position the stretcher will rest on the four base plates **30** of hinge members **20, 21, 22** and **23**. The base plates also provide stiffness to the hinge member in the horizontal plane when spreader bars **32** are bolted in place by nuts **33**. Borings **31** are provided to receive casters or shock absorbers which may be mounted in base plate **30** when found desirable. When casters are placed on a stretched with leg members in the upwardly folded position, the stretcher may be employed as a dolly to convey at least two other stretchers with leg members in the downwardly extended position stacked thereon. A stretcher carrying casters for use as a dolly may easily be converted to a cot by lowering the leg members since there is no interference with the casters when the legs are moved from the upwardly folded to the downwardly extended positions .

Spreader bars **32** of metal are secured between each pair of opposed hinge members by nuts **33**, thereby strengthening tubular frame member **10** against lateral displacement. Bushings **34** are provided where spreader bars **32** pass through hinge members **20, 21, 22** and **23** to prevent crimping. Thus, the entire assembly of the main frame member, hinge plates, and spreader bar form a fixed and rigid combination offering great resistance to torsion and deformation of the stretcher foot and leg assembly.

Leg members **27** in the downwardly extended position, as shown in the upper cot of Fig. 1 and in Fig. 2 of the drawing, bear on spreader bars **32**, and are restrained from pivotal movement in the other direction by pins **40** inserted through holes **41** of the hinge members. The leg members are secured in the upwardly retracted position, as shown in the lower cot of Fig. 1 and in dotted lines in Fig. 2 of the drawing, by pins **40** inserted through holes **42** in the hinge members. Leaf springs **43**, rotatably mounted on the hinge members by pins **44**, are secured to pins **40** and permit rotation of pins **40** from holes **41** to holes **42**. By placing the leg members in opposed pairs and at a slight angle from the vertical, greater stability is provided than would be if the leg members were exactly vertical. In addition, the leg members are positioned inwardly from the ends of the frame member to obtain the benefits of cantilever loading of the frame member and permit the use of a lighter frame member by reducing bending moments and deflections.

To the lower end of each leg member **27** is secured a U-shaped gripping member **50** adapted to engage and rest on the rectangular frame **10** of another stretcher and cot combination in the manner shown in Fig. 1 of the drawing. Gripping member **50** may be of forged metal and is inserted into tubular leg members **27** of rectangular cross-section and firmly secured thereto by screws **52** in the rear shoulder **53** of gripping members **50**. Borings **55** are provided through the projections of U-shaped gripping members **50** and adapted to receive pins **56** thereby firmly securing griping members **50** to the rectangular frame **10** of the lower supporting cot. Leaf springs **60** are rotatably mounted on leg members **27** by means of screws or rivets **61** and are provided with slots **62** in which pins **56** are held.

When it is desired to remove a cot from the supporting cot below, pins **56** are removed and rotated with leaf springs **60** about pivot screws or bolts **61** and inserted in borings **63** of leg members **27**. In this position pins **56** are firmly held by leaf springs **60**, cannot be lost, and will be available when the cot is again to be stacked.

An irrigating rod **65** for suspending blood plasma containers and the like, may be provided with each stretcher and cot combination. A suitable boring **70** may be provided in frame member **10** in which the rod may be kept when not in use, and a further boring **71** adapted to receive rod **65** for use may be provided in the frame member **10**. In Fig. 1 of the drawing, irrigating rods **65** are shown in both the stored and the use positions.

It has been found preferable to construct the stretcher and cot combination of the invention of extruded aluminum tubing and forged aluminum. Such cots have proven to be strong, light in weight, and highly resistant to moisture, salt in the atmosphere, and extreme temperature changes.

A stacked assembly of stretcher and cot combinations of the invention exhibits remarkable stability to racking and slipping. Due to the construction of the hinge members, a lateral bending (side overturning) load is not transmitted to a single hinged or pivoted point but is absorbed by the entire length of the hinge members which enclose a considerable length of the leg members acting somewhat like a vise. Longitudinal slipping of stacked cots is not possible due to the fact that the leg members are secured against motion in both longitudinal directions by bearing against the hinge members of the cot below. Overturning of the entire stacked assembly of cots at the ends is not a problem because of the end-supported manner in which the cots are suspended by the leg members.

It has been found that a stretcher and cot combination in accordance with the present invention can be constructed having an overall weight of less than about 16 pounds and folded storage dimensions of about 7" x 26" x 43". One such combination had frame members constructed of round drawn aluminum alloy tubing, leg members of square aluminum alloy tubing, spreader bars of aluminum alloy, gripping members of forged aluminum alloy having shanks for insertion into the leg members, a supporting layer of hard texture, vat dried, water-repellent, mildew-resistant treated cotton duck or plastic coated duck, and other parts of either hard aluminum alloy, cadmium plated steel, or other suitable corrosion-resistant material. This combination had overall dimensions of 5⅝" x 26" x 74½" when used as a stretcher, 20" x 26" x 74½" when used as a cot, and allowed a clearance of 18" between stacked cots. Stacked assemblies of these cots were tested under normal load conditions and found to perform satisfactorily when stacked up to three in height, or the normal reach of the bearers engaged in the stacking operation.

What is claimed is:

1. A stackable stretcher and cot combination comprising a rigid rectangular frame member; a flexible generally rectangular supporting member secured to said frame member; four U-shaped hinge members arranged in two opposed pairs and secured near opposite ends of the longitudinal sides of said rectangular frame member, each forming two spaced downward projections from said frame member; four leg members having first and second ends, each of said leg members pivotably mounted to one of said hinge members between said spaced projections of said hinge members and adapted to rotate with a fixed radius about a fixed point near said first end between upwardly folded and downwardly extended positions, each of said leg members provided at said second end with gripping means adapted to be secured to and supported by the frame member of a second stretcher and cot combination at points on the outer sides of the opposed pairs of hinge members of said second stretcher and cot combination; and rigid spreader bar means secured through said projections of each pair of opposed hinge members and positioned to support at least a portion of the weight of said stretcher and cot combination when said leg members are in said downwardly extended position.

2. A stackable stretcher and cot combination comprising a rigid rectangular frame member; a flexible generally rectangular supporting member secured to said frame member; four hinge members arranged in two opposed pairs and secured near opposite ends of the longitudinal sides of said rectangular frame member; and four leg members having first and second ends, each of said leg

members pivotably mounted to one of said hinge members and adapted to rotate with a constant radius about a fixed point near said first end, and provided at said second end with gripping means adapted to be secured to and supported by the rectangular frame of another stretcher and cot combination whereby a plurality of said stretcher and cot combinations can be stacked vertically; said gripping means including a U-shaped projection having at least one boring passing through the ends thereof, and a removable pin in each of said borings for securing said gripping means to the rectangular frame of said other stretcher and cot combination.

3. A stretcher and cot combination in accordance with claim 2 also comprising leaf springs having first and second ends, one of said leaf springs rotatably mounted at said first end on each of said leg members and positioned to engage at the second end thereof said removable pin in said boring of said U-shaped projection and adapted to rotate with said pin when removed from said boring of said U-shaped projection and hold said pin firmly in another boring of said leg member away from said gripping means.

4. A stackable stretcher and cot combination comprising a rigid rectangular frame member; a flexible generally rectangular supporting member secured within said frame member on the four sides thereof; four hinge members arranged in two opposed pairs and secured near opposite ends of the longitudinal sides of said rectangular frame member; a bracket provided at the lower end of each of said hinge members and perpendicular thereto; rigid spreader bar means secured between each pair of hinge members; four leg members having first and second ends, each of said leg members pivotally mounted to one of said hinge members and pivotable with a constant radius about a fixed point near said first end between a downwardly extended first position and an upwardly folded second position; gripping means secured to said second end of said leg members adapted to be secured to and supported by the rectangular frame of another stretcher and cot combination whereby a plurality of said stretcher and cot combinations can be stacked vertically; and means associated with said hinge members for firmly securing said leg members against pivotal movement in both said downwardly extended first position and said upwardly folded second position.

5. A stretcher and cot combination in accordance with claim 4, wherein said gripping means includes a U-shaped projection having at least one boring passing through the ends thereof, and a removable pin in each of said borings for securing said gripping means to the rectangular frame of said other stretcher and cot combination.

6. A stretcher and cot combination in accordance with claim 4, wherein said brackets are provided with drillings in which casters are mounted for supporting and transporting said stretcher and cot combinations.

7. A stretcher and cot combination in accordance with claim 5, also comprising leaf springs having first and second ends, one of said leaf springs rotatably mounted at said first end on each of said leg members and positioned to engage at the second end thereof said removable pin in said boring of said U-shaped projection and adapted to rotate with said pin when removed from said boring of said U-shaped projection and hold said pin firmly in another boring of said leg member away from said gripping means.

8. A stackable stretcher and cot combination comprising a rigid rectangular frame member; a flexible generally rectangular supporting member secured to said frame member; four U-shaped hinge members arranged in two opposed pairs and secured near opposite ends of the longitudinal sides of said rectangular frame member, each forming two spaced downward projections from said frame member; four leg members having first and second ends, each of said leg members pivotably mounted to one of said hinge members between said spaced projections of said hinge member and adapted to rotate with a fixed radius about a fixed point near said first end between upwardly folded and downwardly extended positions, each of said leg members provided at said second end with gripping means adapted to be secured to and supported by the frame member of a second stretcher and cot combination at points on the outer sides of the opposed pairs of hinge members of said second stretcher and cot combination; rigid spreader bar means secured through said projections of each pair of opposed hinge members and positioned to support at least a portion of the weight of said stretcher and cot combination when said leg members are in said downwardly extended position; and locking means associated with said projections of said hinge members for holding said leg members against said spreader bar means in said downwardly extended position.

9. A stretcher and cot combination in accordance with claim 8, wherein said gripping means includes a U-shaped projection having at least one boring passing through the ends thereof, and a removable pin in each of said borings for securing said gripping means to the rectangular frame of said second stretcher and cot combination.

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