Aug. 1, 1950 H. M. SHAW 2,516,925

PATIENT SUPPORTING MEANS

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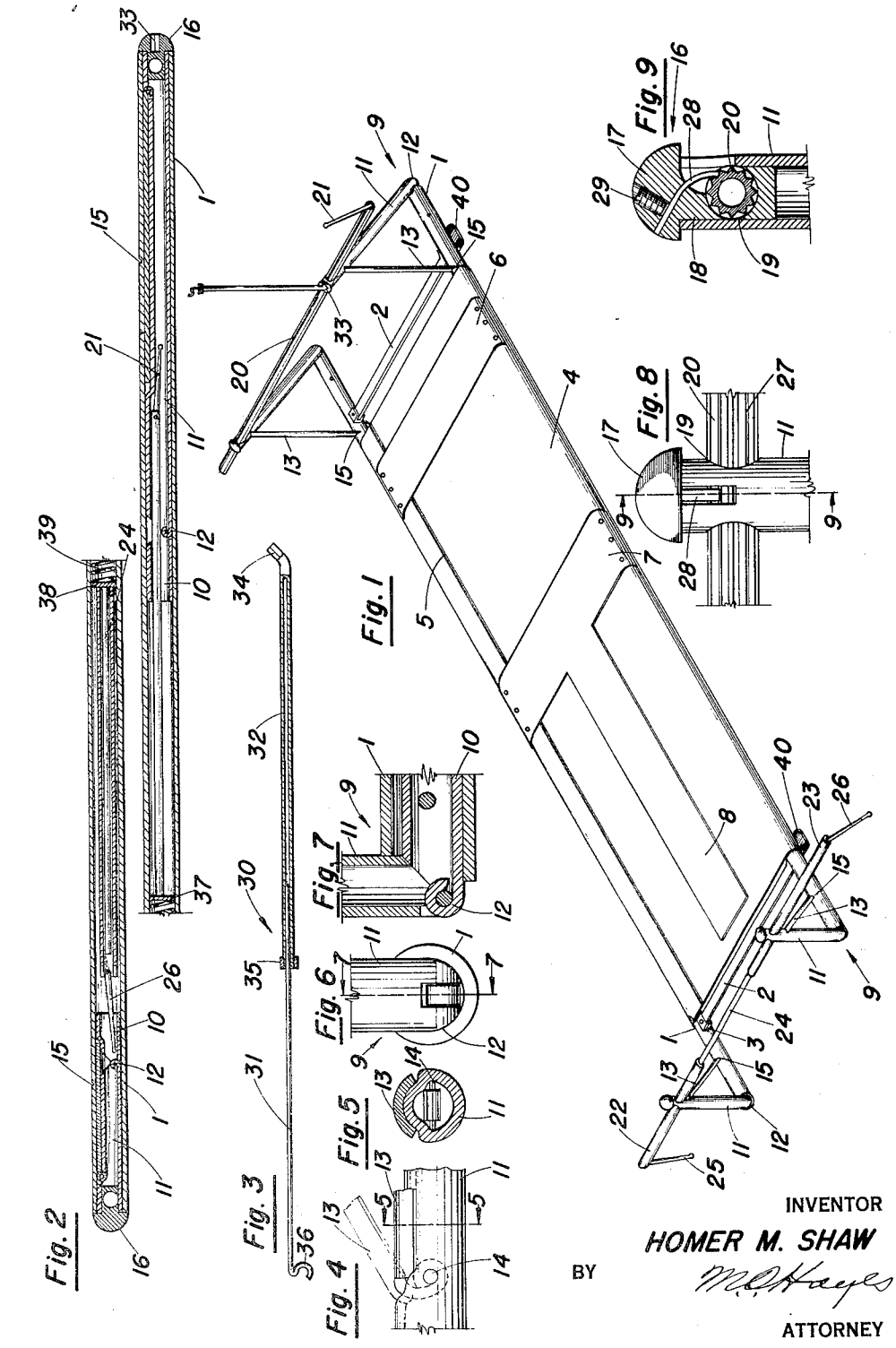


Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8

Fig. 9

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Fig. 1a

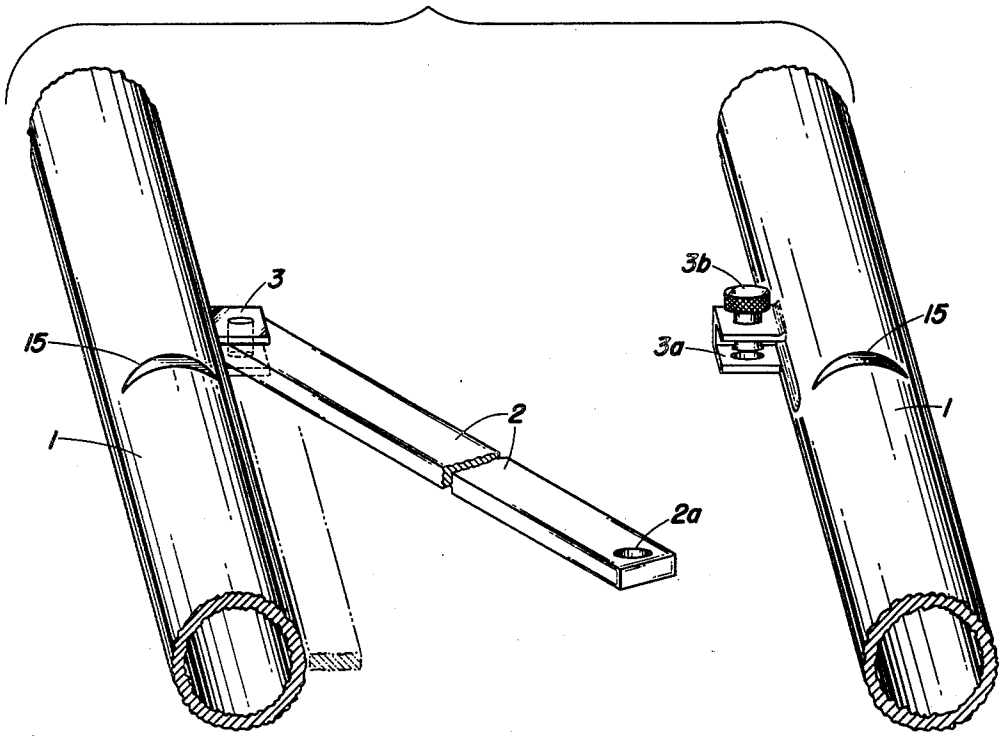
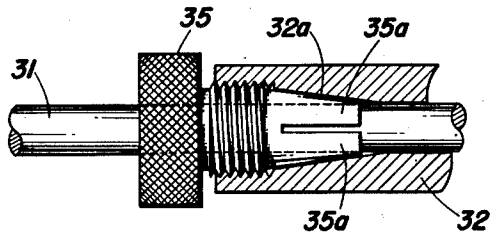


Fig. 3a



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PATIENT SUPPORTING MEANS

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This invention relates to patient supporting means and more particularly to pole litters permitting complete access to, and treatment of, a patient without removing him from the litter.

Objects of the present invention are to provide an improved pole litter; to provide an improved self-contained simply assembled, readily portable traction table; to enhance the patient's comfort during treatment; to reduce shock; to reduce time of treatment of casualties; to provide a pole litter adapted to provide traction and counter-traction; to provide a pole litter permitting the administration of first aid and treatment of a patient without removing him from the litter; to provide complete access to a litter supported patient; to provide support for the patient while casts are applied and permitted to set; to provide a pole litter having support means combined therewith for holding intravenous and other fluids employed in patient treatment; and to provide improved elements and arrangements thereof in a litter of the character and for the purposes set forth.

In accomplishing these and other objects of the present invention, I have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawing wherein:

Fig. 1 is a perspective view of a pole litter embodying the principles of the present invention;

Fig. 1a is a broken, fragmentary view of certain enlarged parts of the litter of Fig. 1 having the webs removed for clarity;

Fig. 2 is a longitudinal cross sectional view of the poles of the pole litter of this invention showing the component parts thereof in retracted position;

Fig. 3 is a cross sectional view of a telescopic support arm of the present invention;

Fig. 3a is an enlarged, fragmentary view, partially in section, of the support arm of Fig. 3;

Fig. 4 illustrates in full lines a bracing means in folded position and in broken lines the bracing means in operating position;

Fig. 5 is a cross sectional view of the elements shown in Fig. 4 taken on line 5—5 thereof;

Fig. 6 is an elevational view of an articulated portion of a mounting element employed in traction means of the present invention;

Fig. 7 is a cross sectional view of the said articulated portion taken on line 7—7 of Fig. 6;

Fig. 8 is an elevational view of traction shaft mounting and racheting means of the present invention;

Fig. 9 is a cross sectional view of the elements

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of the present invention shown in Fig. 8 taken on line 9—9.

Referring more in detail to the drawing:

In Fig. 1, a pair of substantially tubular pole elements are shown. The pole elements are preferably arranged in fixed parallel relationship during operation of the pole litter. To this end, space bars 2 are articulately mounted as at 3 in an inwardly disposed position. Associated with the pole elements opposite to the articulated mountings there are provided receptacle elements having any suitable conventional disengageable fastening arrangement, such as (Fig. 1a) the socket 3a and pin 3b. During operation, the space bars maintain the pole elements in proper relative position by engaging within the receptacles. To collapse the pole litter as for storing purposes, the space bars are disengaged from their respective receptacles, after withdrawing the pin 3b from the hole 2a, and folded down against the pole elements on which they are mounted. The solid line position of bar 2 in Fig. 1a shows the bar soon after disengagement from the socket 3a and the phantom line position shows it completely folded against its pole element.

A patient support member 4, of canvas or other suitable material, is secured to the pole elements 1 and is stretched therebetween. To permit the severing and removal of the support member 4, the said member is interrupted longitudinally by an automatic fastener 5, such as a zipper.

To provide alternate support means for the patient, contacting limited areas of the said patient, a shoulder piece 6 and a hip piece 7 are preferably secured to the pole elements 1 transversely thereto and stretched therebetween. A flexible counter-traction band 8 is preferably secured at one end to the hip piece near its mid point so as to extend substantially at right angles therefrom away from the shoulder piece, or toward the foot of the stretcher.

Substantially tubular mounting elements 9 are slidably engaged within the pole elements 1 in telescopic relation thereto. The mounting elements have an inner portion 10 and an outer portion 11 articulately connected as at 12 in Figures 1, 2, 6, and 7. The inner and outer portions may be aligned and retracted into the pole elements as shown in Fig. 2 or positioned in angular relation, the outer portion extending upwardly, as shown in Fig. 1. The articulated connections of the outer and inner portions are accomplished so that the said portions abut on each other when folded to a predetermined position. This abut-

ment may serve, as in the case of the outer supports at the foot end of the litter, Fig. 1, to determine the position which the outer portion assumes when unfolded into operating condition. The area of abutment appears in Fig. 7 as the line of contact between elements 10 and 11 bisecting the right angle between their longitudinal axes. The members 11 at the foot end of the litter are thus illustrated as extending, when in operating condition, at right angles to the axes of the poles. This position is further maintained by inserting the respective inner elements 10 sufficiently into the poles 1, so that the erect elements 11 abut the end of the poles 1, as shown by the vertical line in Fig. 7 constituting the right hand limit of portion 11, and by the engagement of the braces 13 in the receptacles 15. On the other hand, when it is more convenient, the portions 11 may be inclined at an acute angle to the poles, as in the case of those at the head end of the litter shown in Fig. 1. In such construction the poles 1 may be notched to present a greater area of abutment against the portions 11, as also illustrated in Fig. 1.

Inasmuch as further bending from this predetermined position is undesirable, braces 13 are foldably mounted on the outer portions of the mounting elements by means of mounting pins 14 (Fig. 4). Receptacles 15, which may be simply notches as shown in Fig. 2, are provided in the pole elements to engage the free ends of the braces when the said braces are employed to resist said further bending of the mounting elements. In Fig. 4, a brace is shown in light lines as it is outwardly positioned in functioning attitude. In full lines the said brace is indicated in retracted position. In Fig. 5, a cross sectional view of a mounting element and attached brace in retracted position are indicated. The braces are preferably arcuate in cross section and the mounting elements are preferably formed to have a complementary indented portion for receiving the braces when retracted.

Caps 16, having rounded end portions 17 and inwardly extended portions 18, are preferably secured in the ends of the outer portions 11 of the mounting elements 9. As shown in Figures 8 and 9, bearing openings 19 are formed through the outer portions 11 of the mounting elements and the inwardly extended portions 18 of the caps 16. The bearing opening in each mounting element 9 is aligned with the bearing opening in the mounting element correspondingly positioned on the opposite pole element 1.

Referring again to Fig. 1, a counter-traction element 20 is rotatably mounted in the aligned bearing openings 19 in the mounting elements 9 borne by the litter at its end near which the shoulder piece 6 is mounted. A crank 21 is provided as a convenient means for rotating the counter-traction element. The crank is pivotally mounted so as to fold down out of the way when not in use and to permit the crank to be housed within the pole elements, as shown in the lower part of Fig. 2.

It is desirable to be able to apply independent traction forces to each leg of a patient. To this end, separate tubular traction elements 22 and 23 are rotatably mounted in the aligned bearing openings 19 in the mounting elements 9 borne by the litter at its end opposite the counter-traction element. An aligning rod 24 is engaged within the bores of the tubular elements 22 and 23 to maintain said tubular elements in proper position during operation. Cranks 25 and 26, similar to crank 21, are preferably provided to rotate the traction elements.

The counter-traction element 20 and the traction elements 22 and 23 are provided with longitudinal peripheral gear teeth 27. As the traction and counter-traction elements are operated, it is desirable to be able to maintain forces applied by means of the cranks. To this end, ratchet pawls 28, in Fig. 9, are mounted in the caps so as to cooperably engage the teeth 27. Set screws 29 are screw-threadedly mounted in the caps 16 to secure the ratchet pawls in adjusted position.

In the treating of patients, it is frequently necessary to provide elevated support for containers of fluids, such as blood plasma, in order to achieve gravitational flow of the fluids therefrom. Further, it is highly desirable to be able to move the patient without altering the flow of the fluids. To the end of furnishing such support, telescopic support arm 30 is provided (Fig. 3). The support arm has an inner portion 31 and an outer portion 32. A receptacle is formed in a convenient cap 16 as at 33 in Fig. 1. The outer portion 32 of the support arm has a mounting stud portion 34 formed on its lower end portion shaped to fit within the receptacle 33 and thus mount the support arm. The receptacle 33 may be a polygonal socket as shown in Fig. 1, with the stud portion 34 being of a corresponding polygonal shape but obviously other joints may be used such as, for example, a threaded connection. In the end of the outer portion 32, opposite the mounting stud, a split taper bushing 35 (Fig. 3*a*) is screw-threadedly engaged, circumscribing the inner portion 31. The split taper bushing permits the relative positioning and securing of the inner and outer portions of the support arm. To fix the rod portion 31 relative to the tube portion 32, the bushing is screwed further into the tube from the position shown in Fig. 3*a* until the jaws 35*a* are forced by the tapered portion 32*a* of the tube into tight engagement with the rod 31. For convenience, the inner, extensible portion of the support arm is formed into a hook 36 at its extended end.

In Fig. 2, stop elements 37 and 38 slidably supported in the pole elements 1 are shown. A substantially helical spring 39 is positioned between the stop elements. When the mounting elements 9 and parts borne thereby are retracted within the pole elements, the stop elements are engaged and cooperatively compress the spring. The energy absorbed by the spring during compression is stored therein and serves to maintain tightly the several retracted parts and preclude their rattling within the tube elements during movement thereof. Conventional litter rests 40 (Fig. 1) provide sufficient elevation for the pole elements of the litter when it is rested on the ground, deck, or other such surface that the extended end portions of the pole elements may be grasped conveniently.

Operation

The operation of a pole litter constructed and described is as follows:

When the litter is not in operation, it is conveniently collapsed. That is, all of the retractable parts are retracted as shown in Fig. 2, the space bars 2 are disengaged from their sockets and folded against their respective pole elements 1, and the pole elements and attached parts are rolled up in the support member 4.

To transport a patient in the conventional manner, the litter is unrolled, the space bars 2

engaged within their respective receptacles, the patient placed on the support member 4 and the elements 6, 7 and 8, and the litter is manually transported and positioned by the end portions of the pole members 1, extending beyond the patient support member 4. The extended end portions of the pole members also may be rested upon support means, such as trestles, when it is desired to position the litter and supported patient for convenience in treating the patient.

To support the patient by means other than the support member 4, the counter-traction band 8 is passed between the legs of the patient, thence upwardly and fastened on the counter-traction element 20. The crank 21 is employed to rotate the counter-traction member 20, and by rolling the counter-traction band 8 thereon, to apply the desired counter-traction fixation. When such force has been applied, the ratchet control 28 maintains the counter-traction element in adjusted position. Traction means, such as traction harness, not shown, is secured to a portion of a leg of the patient supported on the litter and to a traction element 22, or 23. By securing each leg of the patient to a separate traction element, traction forces may be individually exerted upon selected portions of either, or both legs of the patient. Ratchet controls 28 maintain the traction elements 22 and 23 in adjusted position.

When the patient is extended by the traction and counter-traction elements as described, the support means 4 may be removed by disconnecting it at 5, as previously described, and the said support means positioned so as not to interfere with access to the patient. So conveniently supported, fractures may be reduced, casts applied and permitted to harden, and the proper controlled and maintained traction and counter-traction forces applied. The stretcher and patient may be conveniently moved for fluoroscopic or X-ray examination without removing the patient from the stretcher or releasing the traction. Treatment of the patient is accomplished without the shock of movement to an operating room table, and such operating room table is released for other use.

The telescopic support arm 30 is placed in its desired position by engaging stud portion 34 thereof in its receptacle 33. The height of the hook 36 is adjusted and maintained by means of the split bushing 35. Containers of intravenous solutions are maintained on the hook 36 as desired.

Thus it is seen that I have provided an improved pole litter having the attributes of a simple, self-contained, simply assembled and readily portable traction table, enhancing the patient's comfort during treatment; reducing shock by obviating frequent moving of the patient; reducing the time required to treat casualties; providing traction and counter-traction means; permitting the examination and treatment of the patient without removing him from the litter; permitting movement of the patient without interrupting the flow of intravenous solution; providing a litter adapted for free access to the supported patient; and providing improved elements and arrangements thereof in a litter of the character and for the purposes set forth.

While I have shown but one embodiment of my invention, it is susceptible to modification without departing from the spirit of the invention. I do not wish, therefore, to be limited by the disclosures set forth, but only by the scope of the appended claims.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

I claim:

1. A pole litter comprising generally hollow pole members; articulately mounted space bars positioning the pole members relative to each other; a patient support member detachably connected between the pole members; a shoulder piece secured to the pole members; articulated mounting elements slidably engaged within the pole members; traction elements and counter-traction elements rotatably supported in the mounting elements; ratchet controls for the traction and counter-traction elements; a telescopic support arm providing elevational support for treating devices; the mounting elements, traction and counter-traction elements and the telescopic support arm being so proportioned relative to each other and to said pole members as to fit telescopically substantially entirely within the pole elements; caps for maintaining the telescopically assembled elements within the pole members, and resilient means within the pole members precluding rattling of the elements during movement of the pole litter.

2. In a pole litter of the character described, pole members having hollow spaces therein, hinged space bars positioning the pole members relative to each other; a detachable patient support; a shoulder piece and a hip piece for alternate patient support; articulated mounting elements slidably engaged within the pole members; traction and counter-traction elements rotatably supported in the mounting elements, said mounting, traction, and counter-traction elements being so proportioned and articulated as to fit telescopically within the pole members, and means for retaining the said elements within the pole members when telescopically positioned therein.

3. In combination with a pole litter, mounting means slidably engaged within pole members of the litter, and having upwardly extended articulated end portions, traction and counter-traction means rotatably mounted by the said articulated portions, and means for adjusting traction and counter-traction forces applied to a patient, said mounting, traction, counter-traction, and adjusting means being so constructed and proportioned as to fit substantially entirely within the pole members.

HOMER MERRILL SHAW.

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