

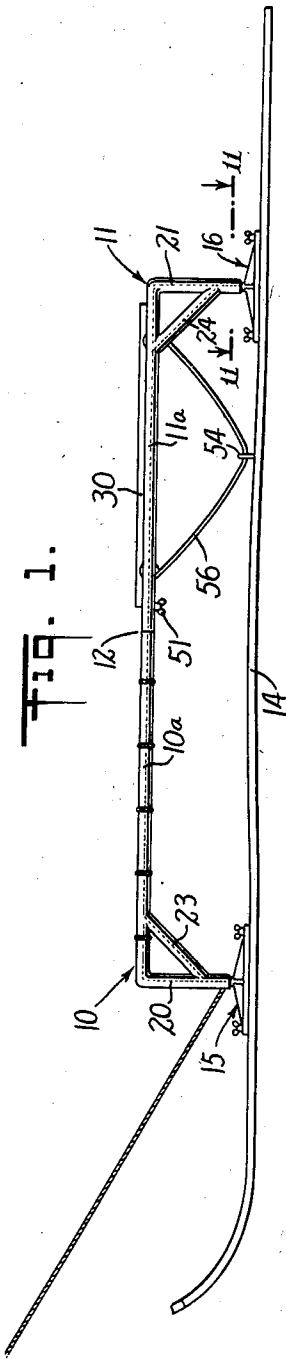
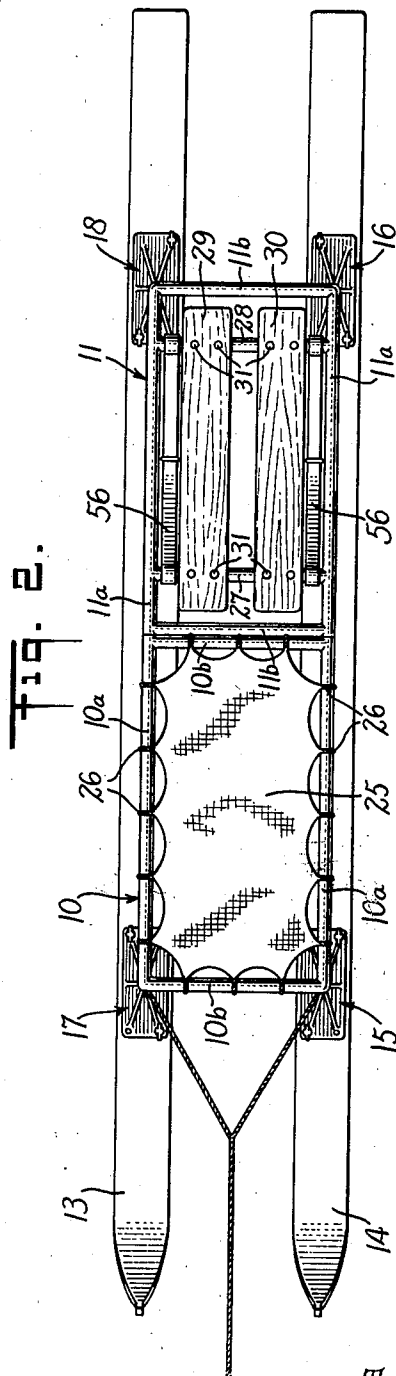
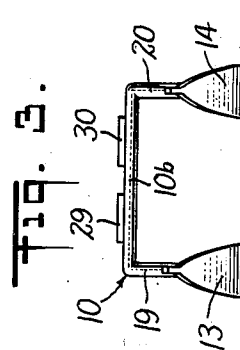
March 16, 1943.

T. N. TYNDALL
KNAPSACK CONSTRUCTION

Filed March 18, 1941

2,314,293

3 Sheets-Sheet 1



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March 16, 1943.

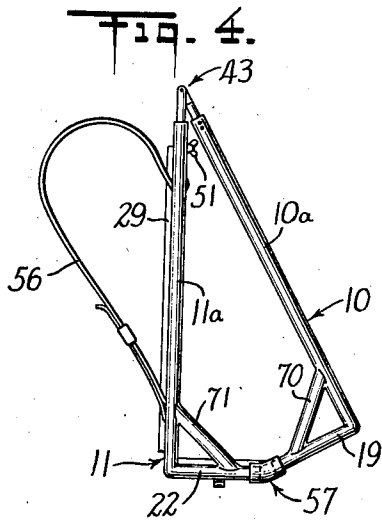
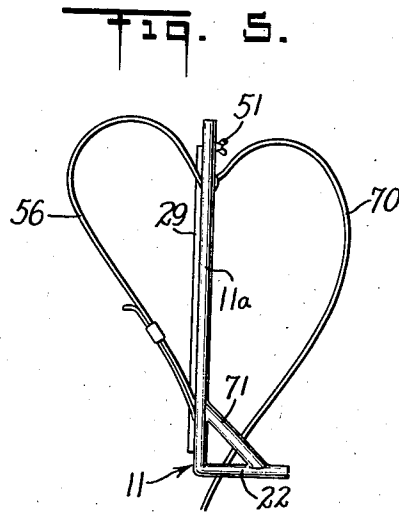
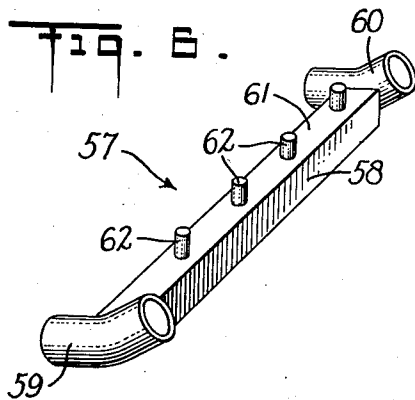
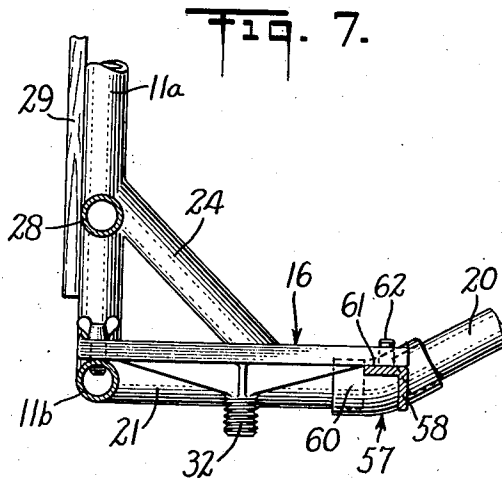
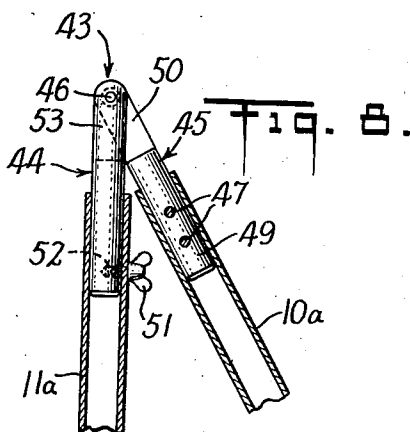
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KNAPSACK CONSTRUCTION

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3 Sheets-Sheet 2



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Fig. 9.

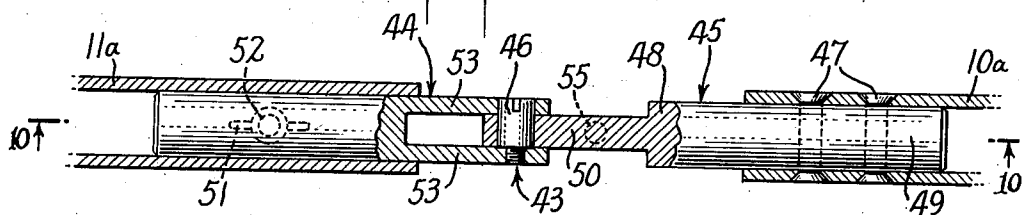


Fig. 10.

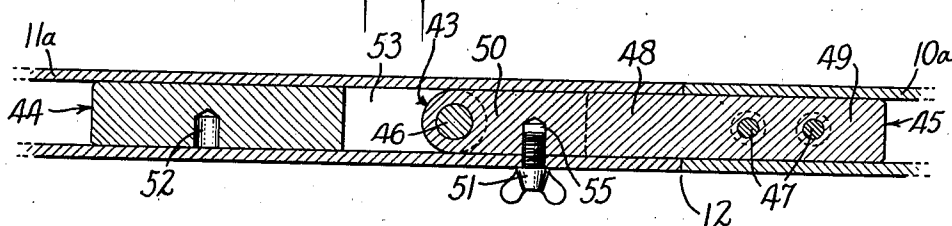
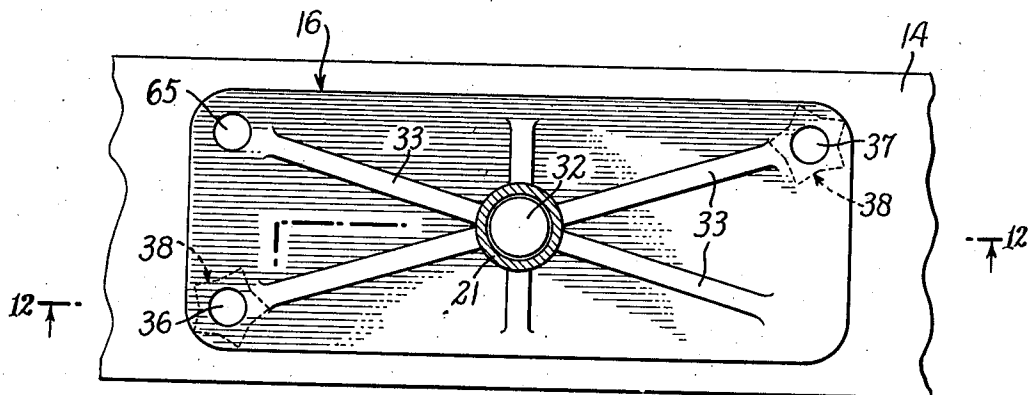
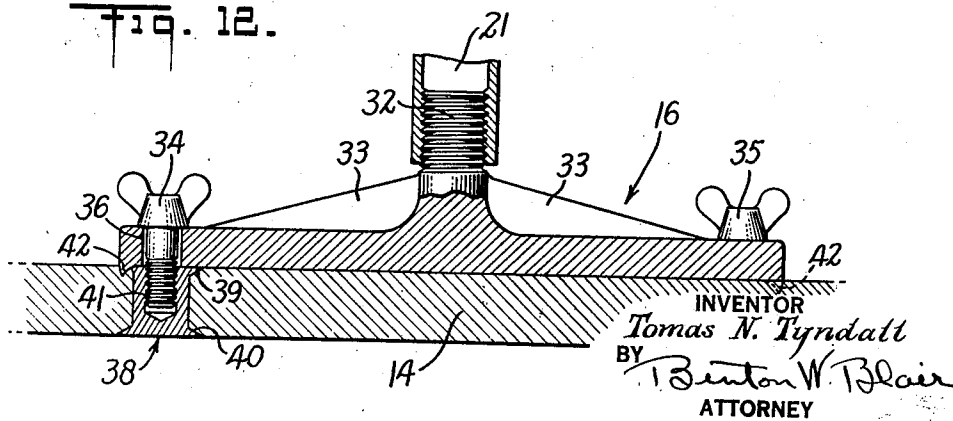


Fig. 11.



719. 12.



UNITED STATES PATENT OFFICE

2,314,293

KNAPSACK CONSTRUCTION

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11 Claims. (Cl. 280—11.37)

This invention relates to a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge.

One of the objects of this invention is to provide a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge which is simple, thoroughly practical, and durable in use. Another object is to provide a construction of the above character which may be easily and quickly assembled by the user. Another object is to provide a construction of the above character which has a minimum of individual parts, thus facilitating the manufacture thereof. Another object is to provide a construction of the above character the manufacture of which will be economical, both from the standpoint of labor and materials used. A further object is to provide a construction of the above character which will be sturdy and well able to withstand hard usage. A still further object is to provide a construction of the above character in which the materials are so disposed as to attain a high degree of strength without heavy construction. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts as will be exemplified in the structure to be hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings in which is shown one of the various possible embodiments of my invention,

Figure 1 is a side elevation of the assembled emergency ski-sledge;

Figure 2 is a top plan view of the sledge shown in Figure 1;

Figure 3 is a front elevation of the sledge shown in Figure 1;

Figure 4 is a side elevation of the knapsack which is adapted to be connected to a pair of skis to form the sledge shown in Figure 1;

Figure 5 is a side elevation of a portion of the knapsack shown in Figure 4 used to form a carrier frame;

Figure 6 is a perspective view, on an enlarged scale, of a part of the knapsack shown in Figure 4;

Figure 7 is a fragmentary vertical section, on an enlarged scale, of a portion of the knapsack shown in Figure 4;

Figure 8 is a fragmentary vertical elevation, partly in section and on an enlarged scale, of the hinge of the knapsack shown in Figure 4;

Figure 9 is a horizontal section of the hinge shown in Figure 8 when the parts thereof are positioned in alignment with each other;

Figure 10 is a vertical section of the hinge shown in Figure 9 taken on the line 10—10 of Figure 9;

Figure 11 is a horizontal fragmentary sectional view, on an enlarged scale, taken on the line 11—11 of Figure 1; and,

Figure 12 is a vertical section taken on the line 12—12 of Figure 11.

Similar reference characters refer to similar parts throughout the several views of the drawings.

As conducive to a clearer understanding of certain features of this invention, it might here be pointed out that in mountain warfare there are many times when a ski-sledge is an article of vital importance. For example, in mountain fighting a sledge is used to move mortars, howitzers, machine guns and similar equipment because they are both inefficient and difficult in extreme cold to disassemble. Also, when men are incapacitated either through enemy action or by other means, such as frost bite and fractures, a sledge is used to move them. In both of these cases an emergency sledge that is always readily available is highly important, as the need for a sledge in such cases cannot possibly be forecast. In the past, many different types of emergency sledges have been used, but difficulty has been experienced with them because they require a soldier to carry extra equipment useful only in the construction of an emergency sledge. As the weight carried by each soldier engaged in mountain warfare is of major importance, and as there are many articles which such soldiers must carry, it has not been practical to have each soldier carry the dead weight of emergency sledge equipment. Thus, there is no assurance that a sledge will always be available when needed. Also, in the past, because the equipment for an emergency sledge has not been needed in every day use, the possibility always has existed that necessary parts will be lost or discarded, preventing the assembly of a sledge when the need arises. It is another object of this invention to provide a construction which will overcome the above-mentioned difficulties as well as many others.

Referring now to the drawings, and to Figures 1, 2 and 3 in particular, a ski-sledge is shown which is constructed from a knapsack and a pair of ordinary skis. The knapsack, which forms the body of the sledge, comprises two sections, generally indicated at 10 and 11, rigidly joined

together at their inner ends at the point marked 12 (Figure 1). The outer ends of these sections are connected by legs to a pair of skis 13 and 14 by a series of base plates generally indicated at 15, 16, 17 and 18. Sections 10 and 11 when detached from the skis and folded form the knapsack shown in Figure 4, all as will be fully described hereinafter.

As best seen in Figures 1 and 2, the framework of each section of the body is substantially similar in construction. Each has a pair of side rails 10a and 11a, a pair of end rails 10b and 11b, and a pair of legs which extend downwardly from the outer corners thereof to base plates 15, 16, 17 and 18 at substantially right angles to the rails of their respective sections. Thus, section 10 has legs 19 and 20 (Figures 1 and 3) and section 11 has legs 21 and 22 (Figures 1 and 4). Each leg is preferably braced by a support which extends between the central portion of each leg and the adjacent side rail. Thus, legs 20 and 21 (Figure 1) are braced by supports 23 and 24 and legs 19 and 22 (Figure 4) by supports 70 and 71. The rails, legs, and leg supports are all preferably tubular and made of a light strong metal such as Duralumin.

Referring now to Figure 2, the space between rails 10a and 10b is preferably closed by a member 25 made of strong canvas. This may be secured to the rails in any suitable manner, such as by bindings 26 secured to its edges around the rails. The center portion of section 11 between rails 11a and 11b is preferably bridged by a pair of metal tubular cross members 27 and 28 which extend between and are secured to side rails 11a. A pair of flat wood slats 29 and 30 are riveted to cross members 27 and 28 by rivets 31 and cover a substantial portion of the space between the rails of this section. Thus, the central portions of sections 10 and 11 are substantially closed so that when these sections form the body of a sledge, as in Figures 1, 2 and 3, they are well adapted to carry either equipment or the body of an injured soldier.

As pointed out hereinabove, the lower ends of legs 19, 20, 21 and 22 are connected to skis 13 and 14 by base plates 15, 16, 17 and 18 (Figures 1, 3 and 4). As all of the legs are connected to the base plates and by them to the skis in substantially a similar manner, the description will be limited to the connection of leg 21 to ski 14 by base plate 16.

As best seen in Figures 11 and 12, base plate 16 is rectangular in shape and has a boss 32 extending upwardly therefrom at its center. This boss is preferably braced by a series of webs 33 formed on plate 16, which extends outwardly radially from the lower portion of the boss. The upper portion of boss 32 is threaded and is adapted to thread into the lower portion of leg 21 which carries complementary threads.

A pair of wing bolts 34 and 35 (Figure 12), which extend through holes 36 and 37 (Figure 11) positioned in diagonal corners of the base plate, secure the plate to ski 14. Preferably these bolts thread into metal plugs of the type generally indicated at 38 (Figure 12). Plug 38 extends through a hole in ski 14 and its upper and lower edges are spun outwardly into countersunk portions 39 and 40 of the hole. A threaded hole 41 extends downwardly into the plug a substantial distance and is adapted to receive the threaded portion of wing bolt 34. A series of sharp points 42 are preferably formed on the lower surface of plate 16, and thus, when wing bolts 34 and 35 are

tightened to connect the base plate 16 to the ski, these points will aid in forming a rigid connection between the ski and the plate. It should be noted that plug 38 is of a type which does not interfere with the smooth under-surface of ski 14, while at the same time a pair of these plugs forms an efficient and durable manner of connecting a base plate to a ski.

Thus, after sections 10 and 11 are rigidly joined, the bosses of the base plates are threaded into the ends of legs 19, 20, 21 and 22. Next, the wing bolts are set into their respective plugs, which are properly positioned upon the skis to receive them. After the base plates are secured to the skis, they cannot turn with respect to the legs, and thus, a secure connection between the plates and the legs is assured. Thus, a practical and efficient manner is disclosed for connecting the knapsack to a pair of skis to form an emergency sledge.

The means which rigidly connects sections 10 and 11 when the knapsack forms the body of the sledge preferably consists of two joints connecting side rails 10a and 11a (Figure 1). These joints are adjustable so that they also form the hinges (Figures 4 and 8) of the knapsack (Figure 4). As both of these joints are substantially similar in construction, the description will be limited to the joint generally indicated at 43 (Figures 4, 8, 9 and 10) joining rails 10a and 11a.

Joint 43 preferably comprises two parts generally indicated at 44 and 45 and pivotally connected by a pin 46. These parts are round in cross section and preferably made of solid metal. The outer end 49 of part 45 extends into the end of rail 10a and is secured therein in any suitable manner, such as by rivets 47. The inner section 48 of this part preferably is of substantial length (Figure 9) and has the male portion 50 of a hinge formed on its end. The inner end of part 44 has the female portions 53 of the hinge formed thereon which are adapted to receive portion 50 and be connected thereto by pin 46, which has its ends flush with the outer surfaces of part 44. The outer portion of part 44 is held within side rail 11a by a wing bolt 51 (Figures 8 and 9) which threads through rail 11a and extends into a hole 52 in part 44. When parts 44 and 45 are thus connected to side rails 10a and 11a, as shown in Figures 8 and 9, they form an efficient hinge connecting sections 10 and 11.

Both the inner section of part 45 and part 44 are of a diameter slightly smaller than the inner diameter of side rail 11a. Thus, when it is desired to rigidly connect sections of the knapsack together to form the body of an emergency sledge, wing bolt 51 is withdrawn from hole 52 (Figures 8 and 9), the sections are positioned so that side rails 10a and 11a are in alignment with each other, as shown in Figure 9, and then the sections may be moved toward each other. This causes the whole of part 44 and the inner section 48 of part 45 to move into rail 11a, movement in this direction being limited by the ends of rails 10a and 11a abutting against each other. To hold the parts in this relationship, a second hole 55 is positioned in the male portion 50 of joint 43, and wing bolt 51 may be set into this hole when the ends of side rails 10a and 11a meet.

As pointed out hereinabove, joints of this type connect both pairs of side rails. Thus, an efficient and practical manner of joining the sections is disclosed which is well adapted to withstand the pressure placed thereon when the sec-

tions are in use as the body of the sledge. Furthermore, the connection is one which may be quickly changed, either from the rigid connection of the sledge body to a hinge connection of the knapsack or from a hinge to a rigid sledge body joint.

In normal use side rails 10a and 11a are hingedly connected to form a knapsack (Figure 4). When used for this purpose, the wood slats 30 on section 11 spread the weight of the knapsack and its load evenly against the back of the user. Shoulder straps 56 are connected to section 11 at any suitable points, such as on cross members 27 and 28, and are preferably provided with buckles so that they may be suitably adjusted by the user. When the knapsack is used to form the body of a sledge, these straps are preferably looped through eyes on the skis, such as eye 54 on ski 14 (Figure 1), which secures sections 10 and 11 to the skis.

To aid in carrying base plates 15, 16, 17 and 18 (Figure 2) on the knapsack and to help hold the legs of sections 10 and 11 in proper alignment when the knapsack is closed, as shown in Figure 4, a closing bar, generally indicated at 57 (Figure 6), is provided. This bar preferably consists of a body member 58 (Figures 6 and 7) which extends between and is secured to a pair of knuckles 59 and 60. These knuckles are preferably tubular and have an inner diameter slightly greater than the outer diameter of the legs of sections 10 and 11. Thus, as the angle bar 58 is substantially equal in length to the distance between the legs of the sections, knuckle 59 is adapted to receive the ends of legs 19 and 22 and knuckle 60 is adapted to receive the ends of legs 20 and 21.

The base plates are carried between legs 21 and 22 of section 11 (Figures 1 and 7) and are connected to end rail 11b (Figure 7) and the body member of the closing bar. As the mounting of all the base plates is substantially similar, the description will be limited to the mounting of base plate 16. Referring first to Figures 11 and 12, plate 16 has two holes 36 and 37 through which wing bolts 34 and 35 pass to secure the plate to skis 14 and an extra hole 65. Referring next to Figures 6 and 7, the body member 58 of the closing bar has a flat top surface 61 from which a pin 62 of a diameter slightly smaller than the diameter of the hole 37 in base plate 16 extends upwardly. The distance between this pin and the center of the upper surface of rail 11b, as viewed in Figure 7, is equal to the distance between the holes 37 and 65 in the base plate 16 (Figure 11). Threaded holes are formed in end rail 11b which are in alignment with holes 36 and 65 of plate 16 when pin 62 extends through hole 37 (Figure 7) and which carry threads complementary to the wing bolts 34 and 35 (Figure 12). Thus, when closing bar 57 is in position on legs 21 and 22, the base plate 16 may be placed so that pin 62 passes through the hole 37. Then the wing bolts of plate 16 are threaded into the end rail 11b through holes 36 and 65, and when these wing bolts are set, they exert a downward pressure on the plate and thus hold the outer end of plate 16 on pin 62, locking the closing bar to section 11.

All four base plates are mounted side by side on member 58 and end rail 11b in the same manner as plate 16, and their bosses preferably extend downwardly between legs 21 and 22. Thus, their flat lower surfaces form a bottom to section 11 when it forms a part of the knap-

sack. After the knapsack has been loaded, section 11 is preferably folded downwardly until the ends of its legs extend into knuckles 59 and 63 (Figure 6). The sections are then secured together in any suitable manner, such as by a strap (not shown) connecting cross bar 58 and the end rail of section 10.

Referring now to Figure 8, it may be seen that the wing bolts holding the joints to section 11 may be loosened, permitting the withdrawal of parts 44 from side rails 11a. Thus, section 11 may be readily disconnected from section 10, and when in this form, it may be used as the carrier frame shown in Figure 5. When section 11 is used as a carrier frame, the closing bar 57 and base plates are preferably removed and a packing strap 70 is used to hold articles on the frame.

Thus, the knapsack shown in Figure 4 may be used in either of three forms—namely, as a knapsack, as the body of an emergency sledge, or as a carrier frame. Thus, in normal use, sections 10 and 11 form an efficient and practical knapsack which may be easily and quickly loaded on a carrier frame (Figure 5). From a knapsack, the construction may be readily converted into an emergency sledge by connecting the parts of the knapsack to the user's skis as described hereinabove. It will be noted that the knapsack is so constructed that the change from a knapsack to an emergency sledge may be made in a minimum of time with a maximum of ease. Furthermore, the emergency sledge so constructed is efficient and durable, being well adapted to move heavy loads, such as machine guns and mortars or to carry incapacitated soldiers. Also, the knapsack sections 10 and 11 when rigidly connected may be used either in conjunction with or without the skis to form an efficient bed or rest to support the user above a rough or cold surface. Thus, an efficient and practical construction is shown in which the objects hereinabove mentioned, as well as many others, are efficiently and practically achieved.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge, in combination, a framework, said framework comprising a pair of hingedly connected sections, said sections when folded on said hinges forming a knapsack, and means for detachably connecting said framework when unfolded to said skis to form a ski-sledge.

2. In a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge, in combination, a framework, said framework comprising a pair of hingedly connected sections, a pair of legs connected to the free ends of each of said sections, said sections when folded with the ends of said legs positioned in abutting relationship forming a knapsack, and means for detachably connecting said legs to said skis when said sections are unfolded.

3. In a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge, in combination, a framework, said framework comprising a pair of hingedly connected sections, and a pair of legs formed on the free ends of each of said sections, said legs forming means which sep-

arates said sections when they are folded to form a container suitable for use as a knapsack and also forming means for connecting said sections to said skis to form a sledge.

4. In a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge, in combination, a framework, said framework comprising a pair of hingedly connected sections, a pair of legs formed on the free ends of each of said sections, said legs forming means separating said sections when said sections are folded to form a container suitable for use as a knapsack and also when said sections are unfolded forming means for connecting said sections to said skis, and strap means adapted to both connect said framework to the back of a person when said framework is used as a knapsack and also adapted to secure said framework to said skis when said framework is used as the body of a ski-sledge.

5. In a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge, in combination, a framework, said framework comprising a pair of sections, a pair of joints connecting said sections, said joints being adjustable to either rigidly or hingedly connect said sections, a pair of legs formed on each of said sections, said sections and said legs forming a container suitable for use as a knapsack when said sections are hingedly connected and in folded relationship to each other, and said legs forming means for connecting said framework to said skis when said sections are in unfolded relationship and rigidly connected to each other.

6. In a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge, in combination, a framework, said framework including a pair of substantially flat sections, joint means connecting said sections, said joint means being adjustable to either rigidly or pivotally connect said sections, leg means formed on each of said sections, said sections and said leg means forming a container suitable for use as a knapsack when said sections are pivotally connected and in folded relationship to each other, and means for connecting said leg means to said skis when said sections are in unfolded relationship and rigidly connected to each other.

7. In a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge, in combination, a framework, said framework including a pair of substantially flat sections, joint means connecting said sections, leg means formed on each of said sections, said joint means being adjustable either to hold said sections in angular relationship to each other to form a knapsack or to rigidly connect said sections in substantially a flat plane, and means for connecting said leg

means to said skis when said sections are rigidly connected together to form a ski-sledge.

8. In a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge, in combination, a framework, said framework including a pair of substantially flat sections, joint means connecting said substantially flat sections, said joint means being adjustable either to pivotally connect said sections for movement with respect to each other or to rigidly join them in substantially a flat plane, leg means formed adjacent the free ends of each of said sections, said leg means forming means separating said sections when they are folded together to form a container suitable for use as a knapsack, and means for connecting said leg means to said skis to form a sledge.

9. In a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge, in combination, a framework, said framework including a pair of flat sections of substantially rectangular shape, joint means connecting said sections, said joint means being adjustable to either rigidly or pivotally connect said sections, a pair of legs formed on the free ends of each of said sections, said sections and said legs forming a container suitable for use as a knapsack when said sections are pivotally connected and in folded relationship to each other, plate means secured to said skis, and means for connecting said plate means to the ends of said legs when said joint means is adjusted so that it rigidly connects said sections.

10. In a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge, in combination, a framework, said framework including a pair of pivotally connected sections, said sections when folded together about their pivotal connection forming a container suitable for use as a knapsack, means to rigidly connect said sections together in substantially a flat plane, and means for connecting said framework to said skis when said sections are rigidly connected together to form a ski-sledge.

11. In a knapsack adapted to be connected to a pair of skis to form an emergency ski-sledge, in combination, a framework, said framework including a plurality of sections, adjustable joint means for either pivotally connecting said sections together for pivotal movement with respect to each other or rigidly connecting said sections together in substantially flat plane, said sections when folded at said joint means forming a container suitable for use as a knapsack, and means for connecting said framework to said skis when said sections are rigidly connected together to form a ski-sledge.

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