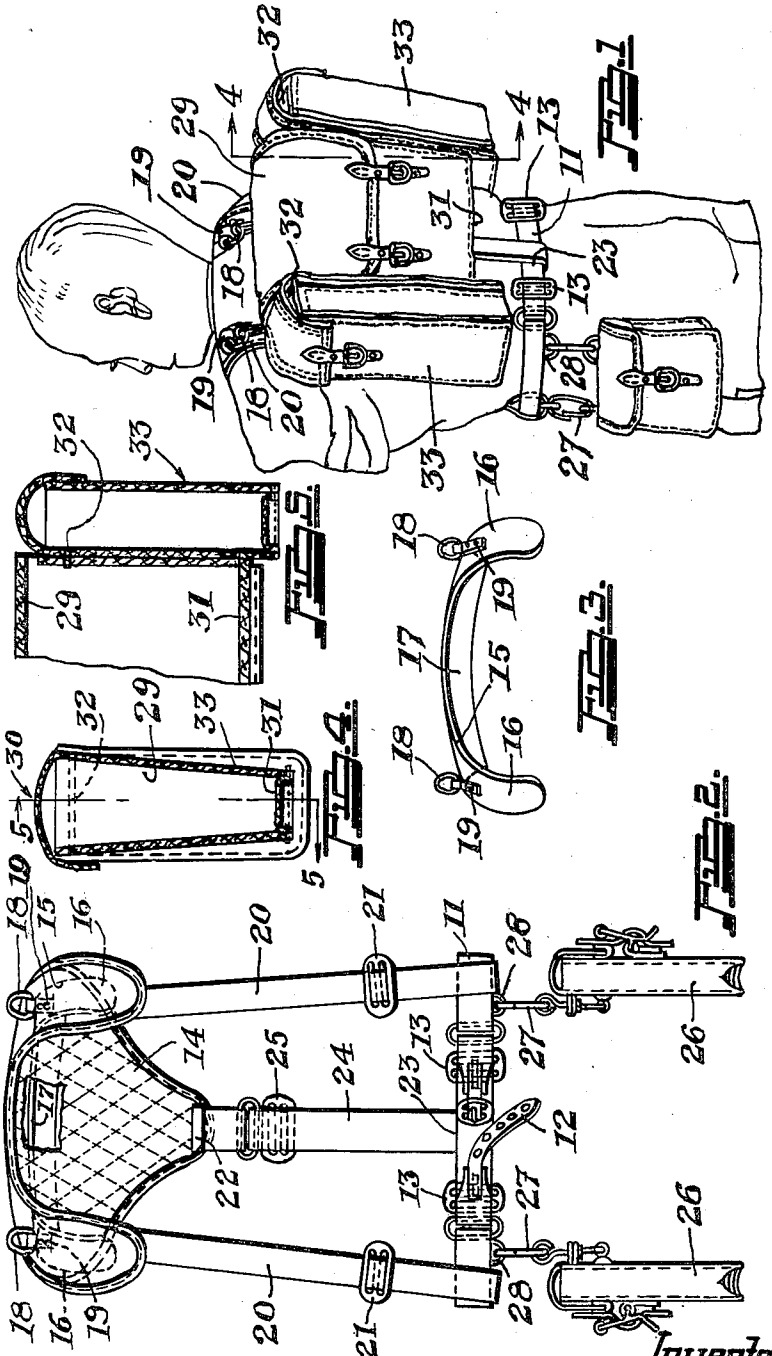
Aug. 28, 1956 E. R. RIVERS-MACPHERSON 2,760,699

CARRYING HARNESS OR EQUIPMENT FOR HUMAN BEINGS

Filed May 3, 1954 3 Sheets-Sheet 1



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CARRYING HARNESS OR EQUIPMENT FOR HUMAN BEINGS

Filed May 3, 1954 3 Sheets-Sheet 2

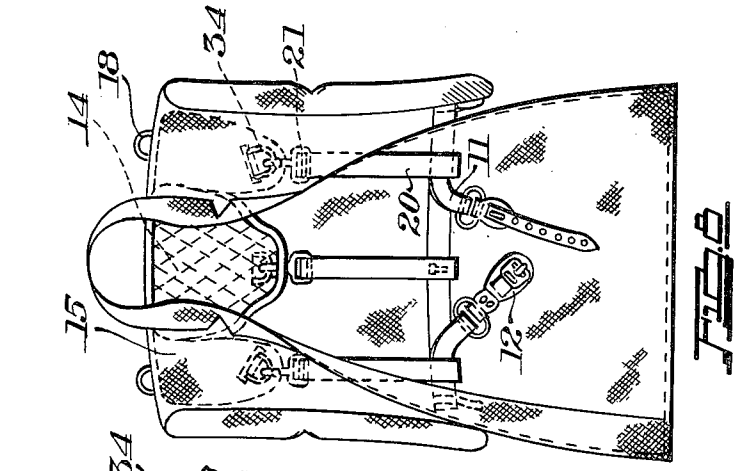


FIG. 8.

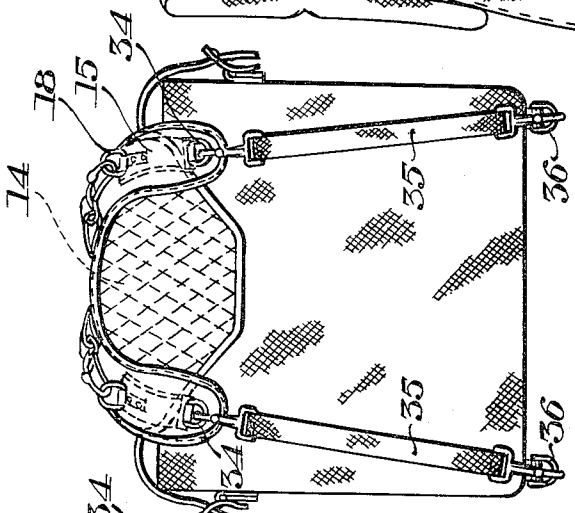


FIG. 7.

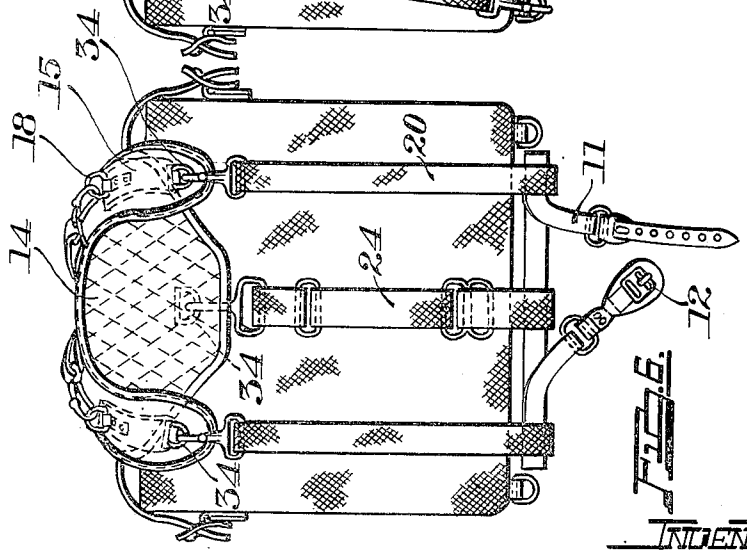


FIG. 6.

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Filed May 3, 1954 3 Sheets-Sheet 3

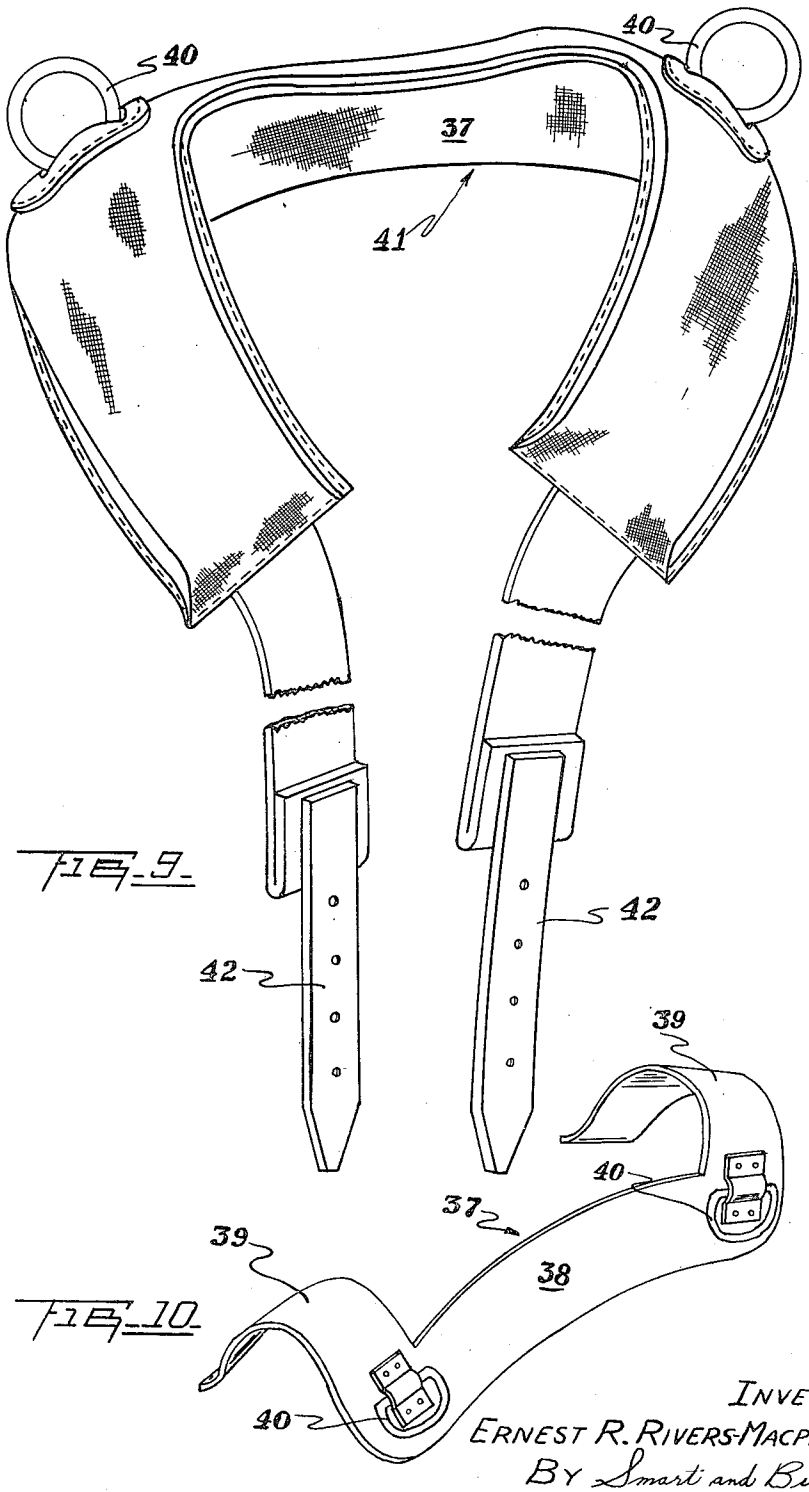


FIG. 9.

FIG. 10.

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CARRYING HARNESS OR EQUIPMENT FOR HUMAN BEINGS

Ernest Ronald Rivers-Macpherson, Eastview, Ontario, Canada

Application May 3, 1954, Serial No. 426,967

2 Claims. (Cl. 224—5)

This invention relates to new and useful improvements in carrying harness, equipments or devices for human beings for use by land fighting forces, for mountaineering purposes or for skiing, hiking, cycling, horseback riding or other types of sport where it is necessary or convenient to carry loads on the human body.

This is a continuation-in-part of application Serial No. 267,436, filed January 21, 1952, and now abandoned.

The known types of carrying harnesses, devices or equipment have many disadvantages, principal among which are that there is an improper distribution of the weight of the load carried, which causes the wearer to become tired and sometimes chafed, and the fact that many of them are awkward to assemble and to put on. For example, the web equipment normally in use by the armed forces is relatively heavy and cumbersome. When the pockets and pouches, side arms, water bottle, haversack, pack and entrenching tool are put in position on the web harness the whole load to be carried by the serviceman is an awkward one, and the correct adjustment assembly of the harness and of the various items to be attached to it requires expenditure of some considerable time and skill. There is a tendency for the harness to move on the wearer after it has been in position for some time, the principal tendency being for the waistbelt to slide up and the load or pack to slide down the back of the wearer into a position which is most uncomfortable. There is no proper distribution of the load over the trapezius muscle, the part of the human body intended by nature to carry loads. Moreover, in the web equipment now known, because of the fact that many of the component parts of it are designed for use in interchangeable positions, a relatively large number of loops, buckles or slides and additional tags or straps are necessarily included, all of which are apt to catch in the undergrowth and produce noise and add to the weight which has to be carried by the man. With this type of harness or equipment, no matter how the loads are distributed, the shoulders are always subject to strain and pressure, thus prematurely inducing fatigue in the man.

In my Canadian Patent No. 428,921, dated July 24, 1945, I have described and claimed a pack for military or mountaineering purposes, which, broadly speaking, is a sleeveless coatlike foundation of woven fabric or the like with an integral waistbelt and integral pockets and a carrier for an entrenching tool, the whole resembling somewhat a skeleton jerkin. Also disclosed and claimed in that patent is an adaptation of the sleeveless coatlike foundation which has been termed a light pack, and this in effect is a sleeveless coatlike foundation with portions of it cut away which can be used for a number of purposes, included among which is use by stretcher-bearers.

While the pack disclosed in the said Canadian patent represents a vast improvement over the web equipment above described it has been found that it does not give the required amount of distribution across the trapezius muscle of the weight of the load to be carried.

The present invention overcomes the disadvantages of

both the web equipment and of the sleeveless coatlike pack and of other load-carrying devices by the provision of a yoke of a spring material adapted to fit across the back and over the shoulder of the wearer. The invention comprises generally a harness having a yoke, a waistbelt, means connecting the yoke and the waistbelt and a spring member within the yoke in such a position that it will fit across the back and over the shoulders of the wearer in such manner that the maximum distribution of the weight of the load to be carried is across the trapezius muscle, thus providing a carrying means which will cause the least amount of fatigue to anyone carrying a load. The spring member is of flexible spring steel, spring band leather, plastic, aluminum, split cane or bamboo, or any other suitable material, and is in the form of a yoke. Of these materials spring band leather adapts itself best to the human body and is preferred. The transverse cross-member or part extending across the back is curved and the end portions, or shoulder pieces, which extend over the shoulders are splayed. In consequence, when the weight to be carried is applied to the yoke, a proper fit of the spring on and across the back and shoulders of the wearer is obtained. A suitable spring steel is one, the gauge of which is from 19–21. The overall length of it can be varied to suit the size of the wearer, but it is contemplated that a maximum of three different sizes will be sufficient for all needs. The yoke proper of the harness may be suitably padded and the spring member is incorporated in the yoke. The portion of the spring member extending across the back of the wearer is preferably curved upwardly. This upward curvature causes the spring when under load to fit into the back across the shoulders in the region of the trapezius muscle, in the most advantageous manner to keep the load high and prevent undue fatigue.

When a spring band leather spring member is used, which is preferred, it is approximately 2¼ inches to 2½ inches wide and approximately ⅛ inch thick. D's or the like are provided for the attachment of snaps, straps or the like, and the distance between the D's is approximately 9½ inches. It has been found that best results are obtained if the D's are positioned at approximately the point of union between the cross-member and the shoulder piece of the spring member. This ensures quicker positioning of the yoke in the proper and most comfortable position for carrying the load. The weight of the load causes the transverse curved cross-member, because of its curvature, to press into the back in the region of the trapezius muscles and the shoulder pieces to splay outwardly for the proper, comfortable and efficient positioning thereof.

The harness or equipment is essentially a skeleton equipment which is light in weight and the use of which causes the minimum amount of heating of the body of the user. The base or chassis of the waistbelt, the yoke and the connecting straps are preferably made of artificial silk, plastic or nylon, either multi-filament or mono-filament, spun or extruded. The mono-filament is preferred, as a stringing effect is not obtained with the use of the mono-filament material. The harness is so designed that the belt rides about the hipline of the wearer to give support to the abdomen and in a position such as will not interfere with the action of the respiratory organs.

D's are fastened to the spring member, preferably by riveting, and they project through the yoke. If desired, means such as D's can be attached to the belt for carrying small purses or haversacks. The belt and the straps connecting the yoke and belt are made adjustable so that they can be fitted to the form of the wearer.

The haversack or pack adapted to cooperate with the skeleton harness is one which is slightly wedge-shaped, the widest portion of it being at the top and the narrowest

portion at the bottom, and rests comfortably across the back of the shoulders of the wearer. The purpose of making the haversack or pack wedge-shaped is so that the load may be carried as high as possible, which is material in the prevention of fatigue. On each side of the wedge-shaped haversack or pack are provided wings or pouches which are articulated to the haversack at or near their upper ends only, thus leaving them free to move with the movements of the wearer and at the same time getting the weight of the load carried by them as high as possible. If desired, a tump-line may be attached to the pack in the normal way.

The skeleton harness above described can be incorporated within any loose-fitting jacket, smock, parka, tunic or the like, thus making it unnecessary to have separate equipment for the carrying of loads. Where the harness is incorporated into a garment it is done in such a way that the attachments for fastening load-carrying articles project through the fabric of the garment.

The essential feature of the invention is the spring member shaped as herein described, for the reasons stated. The transverse curved cross-member is preferably curved upwardly, and the shoulder pieces are preferably splayed inwardly in such manner that they would meet if prolonged. If so curved, the transverse cross-member will fit into the back when the load is applied, and, if so splayed, when the load is attached, the shoulder pieces straighten out and assume a straight up-and-down position rather than a splayed position, thus providing for the proper and most comfortable distribution of the load across the trapezius muscle. These two features combine to prevent substantial dislodgment of the load from the optimum position during movement of the body. The preferred radius of curvature of the upper edge of the cross-member when it is curved upwardly is approximately 10½ inches, and of the lower edge approximately 9 inches. If a straight, as against a curved, cross-member were used, it would have a tendency to bulge under load, thus taking the loaf off the trapezius muscle, whereas with the curved cross-member the load causes it to "sink into" the trapezius muscle. The positioning of the D's at the approximate unions of the cross-member and the shoulder pieces also is of importance in obtaining the optimum results from the use of the invention.

In the drawings:

Figure 1 is an elevation showing the harness and a haversack or pack on the body of a man;

Figure 2 is a front elevation of the harness;

Figure 3 is a perspective plan view of the spring insert for the yoke of the harness;

Figure 4 is an end section of the haversack, showing the wedge-shape of the haversack or pack;

Figure 5 is a section taken through an end of the haversack to show how a pouch is articulated to it;

Figure 6 shows a construction similar to that shown in Figure 2, wherein the straps are detachable;

Figure 7 shows an alternative form of construction, wherein detachable straps for attachment to the yoke and the haversack are used;

Figure 8 shows the harness of Figure 6 incorporated in a jacket;

Figure 9 shows a simplified embodiment of the invention wherein the device is limited in its construction to a covered spring member and means for fastening a load thereto, and

Figure 10 shows the spring member per se of Fig. 9 in its preferred embodiment.

Referring to Figures 1–8, the harness comprises a belt **11** having fastening means **12** which are of any suitable design, and adjusting means **13** to provide for a suitable fit and adjustment to the waistline of the wearer. A suitable padded yoke **14** is provided with the spring insert **15** having the shoulder pieces **16** adapted to fit over the shoulders of the wearer and the curved transverse part **17** adapted to extend across the back of the wearer. Fastening means, or D's, **18** are secured to the spring member or insert in any suitable manner, as by riveting, as at **19**. The D's project through the cloth of the yoke so that suitable cooperating means on the pack or haversack can be attached thereto. The shoulder pieces are shown in Figures 2 and 3 as being splayed outwardly, and the cross-member is shown as curved downwardly.

The yoke and belt are connected together by suitable straps **20** which are adjustable for length, the adjusting means being shown at **21**. The rear and central portion of the yoke is shown at **22** as extending downwardly so that it fits over a substantial portion of the upper part of the back of the wearer to give good distribution of the weight of a load. It is connected to the belt at **23** by an adjustable strap **24**, the adjusting means being shown at **25**.

The whole harness, apart from the spring member and yoke, may be adjusted to the length of the back and the girth of the wearer. The spring member and the yoke may be made in different sizes such as small, medium and large, to fit different sizes of men or women and children, but where spring band leather is used as the spring member, the size above recited will be suitable for most purposes.

On either side of the belt, and depending from it, are shown pouches **26** which are affixed to the belt by suitable fastening means **27** through D's **28** in the belt. Such pouches might be used for the carrying of first aid kits, money, food or anything which the wearer desires to carry which is of a size to fit. In any event, by reason of the design of the spring member, the harness will transmit the weight of the load to the trapezius muscle, thereby creating the minimum amount of fatigue.

In Figure 1, a haversack or pack **29** is shown attached to the harness on the body of a man. Such haversack is made wider across its top portion than it is across its bottom portion in order to get as much as possible of the weight of the load high up on the back of the wearer. The wedge shape of the pack is shown in Figure 4 where the top portion **30** is shown as being relatively wider than the bottom portion **31**.

Articulated to the pack or haversack **29**, at **32** are pouches **33**. The articulation of these pouches high up on the sides of the haversack or pack serves also to get the weight of the load high up on the back of the wearer, which is essential in the prevention of undue fatigue.

In Figure 6, the straps **20** and **24** are shown as being detachable from the yoke. Suitable fastening means may be employed for this purpose, such as snaps. D's **34** are shown as being provided on the spring member and in the padded yoke. In this way it is possible to use only the yoke when a comparatively light load is being carried.

In Figure 7 detachable straps **35** are shown fastened to the D's **34** and to D's **36** on the bottom of the haversack. This provides an alternative means of holding the yoke in place on the wearer, and is satisfactory for light loads.

Referring now to Figures 9 and 10, which show the preferred embodiment of the invention and the essential features of it, the spring member **37** is shown with its transverse cross-member **38** curved upwardly as defined previously and its shoulder pieces **39** splayed inwardly. The D's or other suitable fastening means are shown at **40** centrally disposed at the approximate unions of the cross-member and the shoulder pieces. The spring member is enclosed in a yoke **41** from the shoulder pieces of which, at the front, extend fastening straps **42** adapted to be fastened to the lower part of a pack in which a load is to be carried on the back, the upper part of the pack, of course, being fastened to the yoke and spring member through the D's **40**. The fastening straps **42** are secured to the yoke **41** by riveting, sewing or in any other suitable manner.

It will be seen from the foregoing description that a carrying harness with cooperating carriers has been provided which will give to the wearer of it, when engaged

in any activities necessitating the wearing of a load carrying harness or device, the maximum amount of comfort and the minimum amount of fatigue.

What I claim is:

1. In a device for the carrying of loads by humans, a spring collar member comprising an elongated transversely curved cross-member, adapted to span the base of the neck of the wearer, and shoulder pieces, adapted to fit over the shoulder of the wearer, said shoulder pieces extending forwardly and downwardly from said cross-member at the extremities thereof to points below the level of said cross-member, said shoulder pieces being splayed inwardly with relation to one another when not under load, load attaching means located adjacent the junctions of said cross-member and said shoulder pieces for uniformly distributing applied load to each

of the wearer's trapezius muscles approximately in the region where said muscles are of maximum breadth, whereby the load may be carried with a minimum of fatigue; a padded yoke member associated with said spring collar member; and anchoring straps depending from the extremities of said padded yoke member.

2. A device as defined in claim 1, wherein the said transverse cross-member is curved upwardly.

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