United States Patent [19]

Frankel

[11] **3,857,388**

[45] **Dec. 31, 1974**

[54] **UNIVERSAL CLAVICLE SPLINT**

[75] Inventor: **Sylvan A. Frankel**, Billings, Mont.

[73] Assignee: **Richards Manufacturing Company**, Memphis, Tenn.

[22] Filed: **Oct. 18, 1973**

[21] Appl. No.: **407,428**

[52] **U.S. Cl.**. **128/87 R**, 128/DIG. 19, 128/DIG. 15, 2/45

[51] **Int. Cl.** **A61f 5/04**

[58] **Field of Search** ..... 128/87, 78, 133, DIG. 19, 128/DIG.15; 2/44, 45, DIG. 6

[56] **References Cited**

UNITED STATES PATENTS

531,372	12/1894	Gamble	2/45
556,424	3/1896	Lang	2/45
1,075,348	10/1913	Fritsch	128/DIG. 19
3,548,818	12/1970	Kaplan	128/78

Primary Examiner—Richard A. Gaudet
Assistant Examiner—J. Yasko
Attorney, Agent, or Firm—John R. Walker, III

[57] **ABSTRACT**

A clavicle splint including a backplate member which is intended to fit over the back of the user. Attached to the backplate member is a T-configured velcro element. The splint includes a pair of straps which have the upper ends thereof provided with elongated velcro sensitive material for grippingly engaging the remote portions of the transverse bar portion of the T-configuration. The lower ends of the straps may be adjustably attached one to the other with suitable velcro elements and the joined ends thereof may be adjustably attached to the vertical portion of the T-configuration at a point considerably below the transverse bar, i.e., the straps do not curve upwardly along the backside of the user, which enables the user to have more maneuverability of his arms without flexing his shoulders or aggravating the fractured clavicle.

8 Claims, 5 Drawing Figures

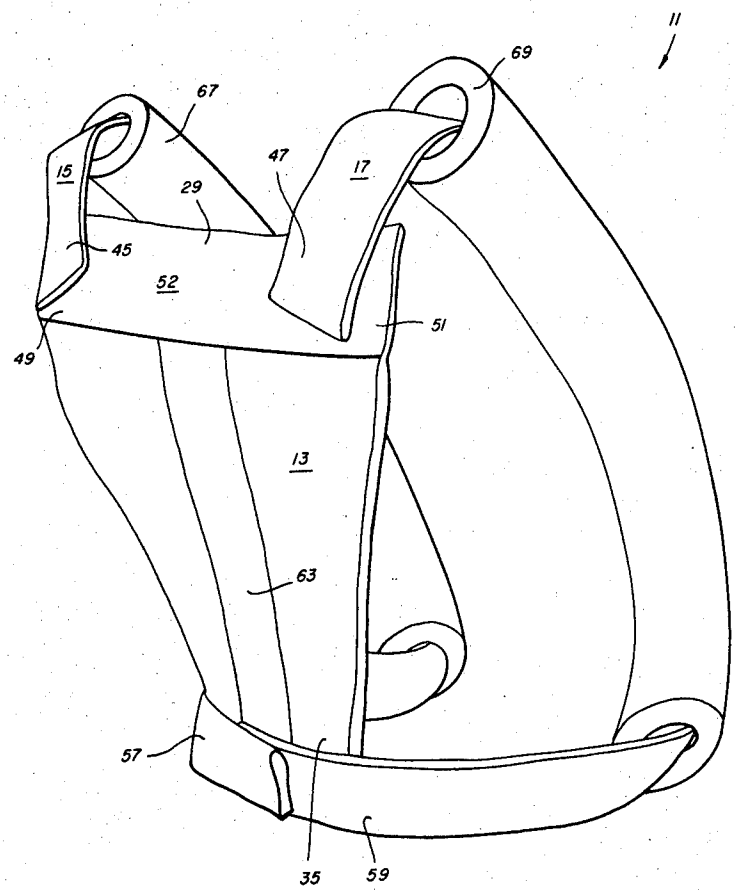


FIG. 1

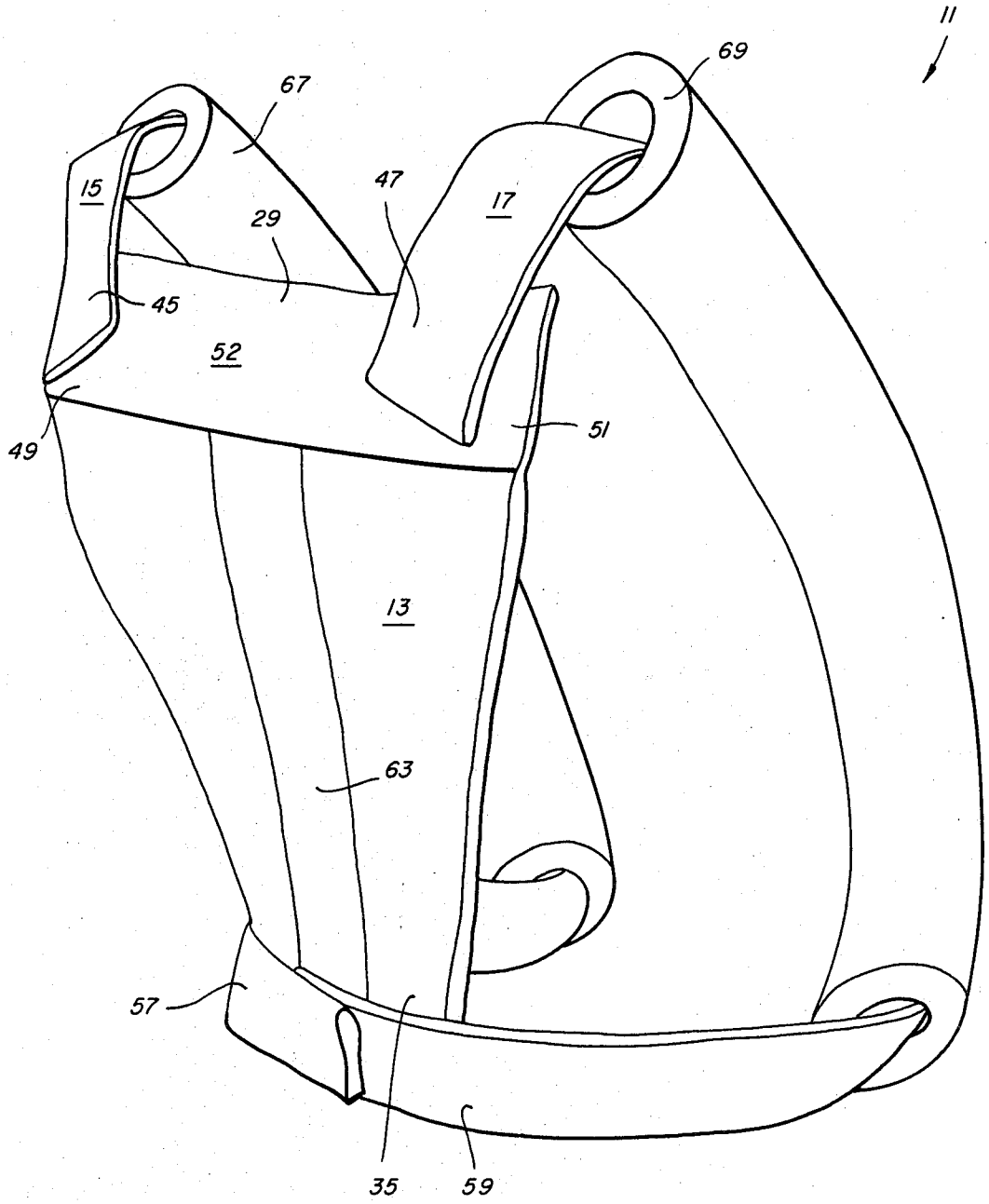


FIG. 2

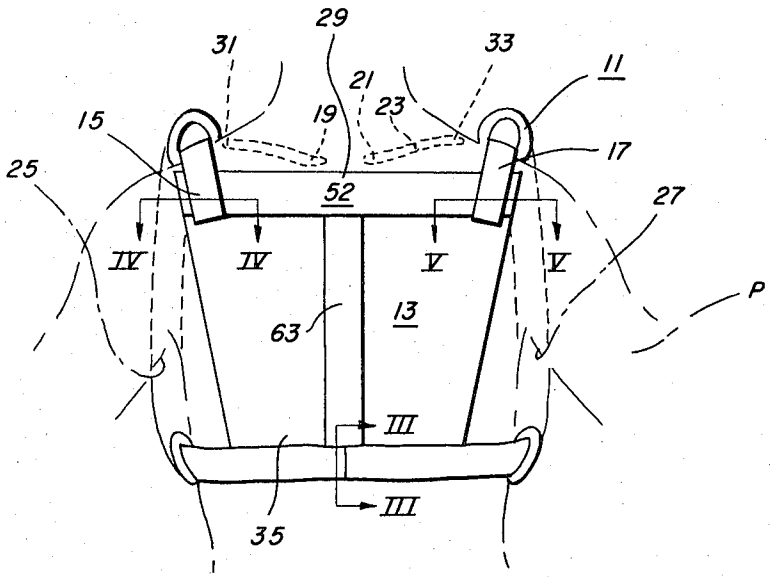


FIG. 3

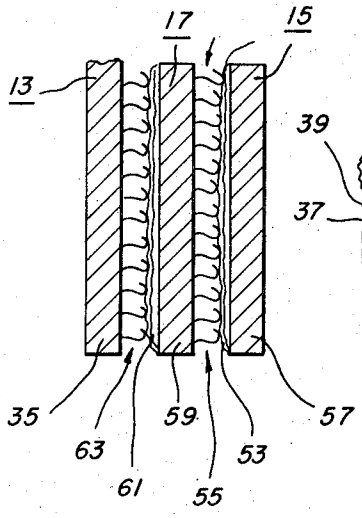


FIG. 4

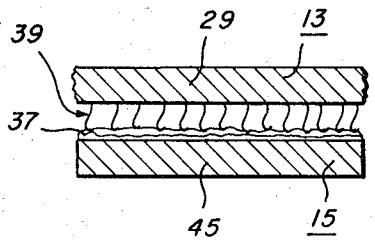
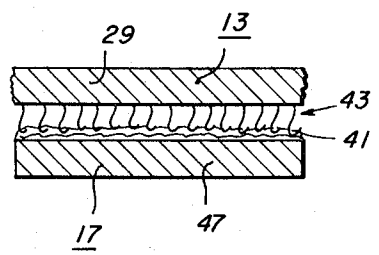


FIG. 5



UNIVERSAL CLAVICLE SPLINT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to the field of clavicle braces or splints.

2. Description of the Prior Art

A preliminary patentability search revealed the following U.S. Pats.: The Meek No. 3,141,456; the McLeod Jr. No. 3,338,236; the Stiefel No. 3,382,868; the Benjamin No. 2,735,426; the Roberson No. 2,859,746; the Phillips No. 3,469,268; the Hall No. 3,499,441; the Kaplan No. 3,548,818; and the Gaylord Jr. No. 3,718,137. None of the above patents disclose or suggest applicant's device.

A fracture of the clavicle is usually a result of a fall on the outstretched hand or on the side of the shoulder. Additionally, fractures of the clavicle usually occur in the middle third of the clavicle. A cursory observation of the above patents will reveal that they have, almost without exception, two common characteristics, i.e., the shoulder straps are joined at the midline posterior of the user from whence they come across the top of the shoulder obliquely, to enter the axilla. Also, the straps (when adjustable) are adjustable at the lower ends only. This characteristic is typical of the straps currently in use which admittedly hold the shoulders back quite firmly if pulled tightly enough. However, these types of straps are objectionable for several reasons, a few of which are: Since the straps come from the midline posterior across the top of the shoulder obliquely to enter the axilla, its course is such that it exerts most of its pressure on the lateral one half of the clavicle. Since the great majority of clavicle fractures occur in the middle one third, the objection has been made by medical practitioners that the deformity is increased quite often with the use of these straps. Unfortunately, this is not something about which the patient is usually aware. Accordingly, the clavicle is allowed to heal in this deformed position.

On the other hand, the great majority of patients are quite aware of another problem, that is, the fact that the standard strap is quite uncomfortable under the arm, in the axilla, frequently causing paresthesias (numbness, tingling) in the hand. This constriction of the axillary contents is made worse by the fact that the strap curves upwardly after leaving the axillary area to return to its point of origin, like that taught by the '236 patent.

Further, certain of these prior clavicle splints tend to shift from an optimum position or ride up which requires constant readjustment. More specifically, when the upper ends of the straps taper downwardly to the midline posterior, e.g., like that taught by the Meek '456 patent, and the lower ends of the straps are joined at a point below the junction of the upper ends, the natural tendency is for the junction of the straps to move upwardly along the midline posterior toward the head or neck of the user. Obviously, this shifting of the splint aggravates the healing process of the clavicle, thus deformity is increased quite often with the use of these prior straps.

Summary of the Invention

The present invention is directed towards overcoming the disadvantages and problems relative to previous clavicle splints; particularly the problem of the splint shifting, the problem associated with the splint exerting most of its pressure on the lateral one half of the clavicle, and the problem which frequently causes paresthesias in the hand. The concept of the present invention is to provide a clavicle splint which is not intended to hold any more firmly than those presently available in the state of the art. However, the instant splint holds in a different manner, and is considerably more comfortable when properly adjusted.

In other words, the clavicle splint of the present invention provides lateral hold, i.e., more on the shoulder than the clavicle, but does not directly immobilize the fracture. It will be appreciated by those skilled in the art that coming across the clavicle like certain prior straps serves no purpose. However, I have discovered that placing the holding straps laterally of the clavicle tends to effectively restrict the movement of the fracture. Previous attempts to restrict the movement of the fracture have resulted in the clavicle healing in a deformed disposition. An important feature of the present invention is that the upper ends of the straps may be properly adjusted to the user, not only along the length of the straps but laterally as well or along a line that extends substantially parallel with the clavicle. Another feature of the present invention is that the splint does not enter the area under the arm, i.e., in the axilla, thus the probability of paresthesias developing in the hand is obviated.

The splint is characterized by a backplate member which is intended to fit over the back of the user. Attached to the backplate member is a T-configured velcro element. The splint includes a pair of padded straps which have the upper ends thereof provided with elongated velcro sensitive material for grippingly engaging the remote portion of the transverse bar portion of the T-configuration. The lower ends of the straps may be adjustably attached one to the other with suitable velcro elements and the joined ends thereof may be adjustably attached to the vertical portion of the T-configuration at a point considerably below the transverse bar, i.e., the straps do not curve upwardly along the backside of the user like the well-known figure 8 splint or that disclosed by the McLeod '236 patent. This very important feature enables the user to have more maneuverability of his arms without flexing his shoulders or aggravating the fractured clavicle and more importantly, the splint does not shift or ride up to allow deformity of the clavicle during the healing process.

In donning or applying the device, the transverse bar of the velcro element should be placed across the top of the shoulders, the shoulder straps are then applied by adjusting the velcro at the top so the bulk of the pad lies in front of the shoulder, but does not enter the area under the arm. The strap is then tightened inferiorly and fastened firmly to the lower part of the vertical bar of the velcro element. The final adjustment, and the one which produces effective correction, is to release the top of each strap, pull it tight, and fasten it again as far laterally as possible. Either strap can be tightened or loosened above or below to produce a final tight fit. One of the straps has velcro on both sides inferiorly to allow one strap to be applied directly over the other at the bottom of the vertical bar of the velcro element. A certain portion of the straps is padded to promote comfort to the user.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the three-piece universal clavicle splint of the present invention with the view taken from the rear portion thereof.

FIG. 2 depicts the splint of the present invention being worn by a patient, the clavicle bone structure of the patient being shown to illustrate the optimum position of the splint.

FIG. 3 is a sectional view taken as on the line III—III of FIG. 2.

FIG. 4 is a sectional view taken as on the line IV—IV of FIG. 2.

FIG. 5 is a sectional view taken as on the line V—V of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The clavicle splint **11** of the present invention generally includes a backplate member **13** and a pair of shoulder straps **15, 17** which have the remote ends thereof removably and adjustably attached to the backplate member **13** in such a manner as to provide a totally new concept in supporting the shoulders of a patient having a broken clavicle.

The appropriate posterior portions of a patient are depicted in phantom in FIG. **2** of the drawings and character referenced therein by the capital letter P. Further, the left clavicle of the patient P is shown by the numeral **19** and his right clavicle is shown by the numeral **21.** The right clavicle **21** is depicted as having a fracture, as at **23,** in order to better describe the splint **11** and the advantages thereof. Further, the left axilla and the right axilla or armpits are characterized by the respective numerals **25, 27** in FIG. **2** of the drawings.

The backplate member **13** preferably is constructed from a flexible nonstretchable material, e.g., soft felt padding or the like, and is intended to contiguously engage the back of the user or patient P. The backplate member **13** includes an uppermost transverse edge portion, as at **29,** which extends at least from the lateral end, as at **31,** of the left clavicle **19** of the patient P to the lateral end, as at **33** of his right clavicle **21.** The backplate member **13** also includes a lower portion, as at **35,** which is disposed a considerable distance below the transverse edge portion **29** with the lower portion **35** being lower than is the axilla **25** or **27** of the user or patient P, as clearly shown in FIG. **2** of the drawings.

From FIG. **2** of the drawings it may also be seen that the shoulder straps **15, 17** engage the shoulders of the patient P laterally of his left and right clavicles **19, 21** to restrict his movement during the healing process of the fracture **23.** The splint **11** includes means, e.g., coacting velcro elements **37, 39** (FIG. **4**) and cooperating velcro elements **41, 43** (FIG. **5**), for removably and adjustably attaching the upper ends, **45, 47** respectively, of the pair of straps **15, 17** to the backplate member **13** at selected ones of a plurality of laterally displaced locations, each of which being adjacent the lateral ends, **49, 51,** of the transverse edge portion **29.** In this regard, it should be understood that the velcro elements **39, 43** extend laterally a predetermined distance along the transverse edge portion **29.** In fact, the velcro elements **39, 43** may optionally be one horizontal bar of velcro hook fabric, as at **52,** which is fixedly attached to the backplate member as with stitching (not shown) or the like.

The splint **11** also includes means, e.g., velcro elements **53, 55** (FIG. **3**), for removably and adjustably attaching the lower ends, **57, 59** respectively, of the pair of straps **15, 17** one to the other.

The splint **11** also includes means, e.g., cooperating velcro elements **61, 63** (FIG. **3**) for removably and adjustably attaching the joined lower ends **57, 59** to the backplate member **13** adjacent the lower portion **35** with the pair of straps **15, 17** extending across the top of the shoulders of the patient P, thence downwardly as they pass over the forward lateral portions of his shoulders, thence turning rearwardly and extending under his arms but well below his armpits **25, 27** whereby the pair of shoulder straps **15, 17** may have tension applied thereto for restricting the movement of the user's shoulders to hold the lateral end of the fractured clavicle **21** in an optimum position during the healing process of the fracture **23** thereof.

It should be understood that the velcro element **63** may be in the form of a vertical bar of velcro hook fabric which is fixedly attached to the backplate member **13** in any suitable well-known manner, such as stitching (not shown) or the like, so as to extend substantially along the midline posterior of the user or the patient P. Further, the velcro elements **37, 41** alluded to above preferably are well-known velcro hook sensitive fabric means for grippingly engaging the horizontal bar of velcro hook fabric **52** at infinite locations along the length thereof. The velcro elements **37, 41** are fixedly attached as by stitching (not shown) or the like to the respective upper ends **45, 47** of the straps **15, 17.** Further, the velcro element **55** being formed from velcro hook fabric is fixedly attached as by stitching (not shown) or the like to the lower end **59** of the strap **17** and the element **53** being formed from velcro sensitive material is fixedly attached as by stitching (not shown) or the like to the lower end **57** of the strap **15.** Further yet, the velcro element **61** being formed from velcro sensitive material is fixedly attached as by stitching (not shown) or the like to the lower end **59** of the strap **17,** i.e., the element **61** being attached to one side of the strap **17** while the element **55** is attached to the opposite side thereof. The straps **15, 17** preferably are made of a type of nonstretchable fabric well known to those skilled in the art.

The splint **11** also includes a pair of tubular shaped pad means, e.g., foam padding members **67, 69** or the like, for promoting comfort to the patient P. The tubular foam pads **67, 69** have predetermined lengths thereto so as to cushion the appropriate portions of the shoulder straps **15, 17** against biting into the patient P. The tubular foam pads **67, 69** are disposed circumferentially about the shoulder straps **15, 17** along the respective midportions thereof as clearly shown in FIG. **1** of the drawings.

Although the invention has been described and illustrated with respect to a preferred embodiment thereof, it is to be understood that it is not to be so limited since changes and modifications may be made therein which are within the full intended scope of the invention.

I claim:

1. A clavicle splint comprising a flexible nonstretchable backplate member for contiguously engaging the back of the user, said backplate member having an uppermost transverse edge portion which extends at least

from the lateral end of the left clavicle of the user to the lateral end of his right clavicle, said backplate member also having a lower portion which is disposed a considerable distance below said uppermost transverse edge portion with said lower portion being lower than is the axilla of the user, a pair of shoulder straps for engaging the shoulders of the user laterally of his left and right clavicles to restrict his movement thereof, means for removably and adjustably attaching the upper ends of said pair of straps to said transverse edge portion of said backplate member at a plurality of laterally displaced locations each of which being substantially adjacent the lateral ends of said transverse side of said backplate member to allow the upper ends of said pair of straps to be properly adjusted to the user both along the length thereof and along the transverse edge portion of said backplate member that extends substantially parallel with the user's clavicles, means for removably and adjustably attaching the lower ends of said pair of straps one to the other, and means for removably and adjustably attaching the joined lower ends of said pair of straps to said backplate member adjacent said lower portion thereof with said pair of straps extending across the top of the shoulders of the user, thence downwardly as they pass over the forward lateral portions of his shoulders, thence turning rearwardly and extending under his arms but well below his axilla whereby said pair of shoulder straps may have tension applied thereto for restricting the movement of the user's shoulders.

2. A clavicle splint comprising a backplate member for contiguously engaging the back of the user, a horizontal bar of velcro hook fabric fixedly attached to said backplate member so as to extend substantially parallel with and along the lengths of the clavicle bones of the user, a vertical bar of velcro hook fabric fixedly attached to said backplate member so as to extend substantially along the midline posterior of the user, first and second flexible shoulder strap means for engaging the shoulders of the user to restrict his movement thereof, the upper ends of said first and second strap means respectively including upper predetermined lengths of velcro hook sensitive fabric means for grippingly engaging said horizontal bar of velcro hook fabric selectively along the lengths of said upper velcro sensitive fabric means and selectively along the length of said horizontal bar of velcro hook fabric means, means for adjustably attaching the lower ends of said first and second strap means one to the other, and lower velcro hook sensitive fabric means attached to the lower ends of one of said strap means for grippingly engaging said vertical bar of velcro hook fabric selectively along the length thereof whereby tension may be applied to said first and second strap means.

3. The splint of claim **2** in which is included first and second tubular shaped pad means for promoting comfort to the user, said first and second pad means having predetermined lengths thereto and being disposed circumferentially about said first and second strap means along the respective mid portions thereof.

4. The splint of claim **2** in which said backplate member is constructed from a flexible nonstretchable material.

5. The splint of claim **2** in which said backplate member is constructed from soft felt padding.

6. A clavicle splint comprising a flexible nonstretchable backplate member for contiguously engaging the back of the user, a horizontal bar of velcro hook fabric fixedly attached to said backplate member so as to extend substantially parallel with the clavicle bones of the user, a vertical bar of velcro hook fabric depending from the mid portion of said horizontal bar of velcro hook fabric and being fixedly attached to said backplate member so as to extend substantially along the midline posterior of the user, a pair of flexible elongated nonstretchable straps for engaging the shoulders of the user and extending downwardly and rearwardly with respective portions thereof being adjacent the lateral ends of his clavicle bones and other respective portions thereof passing adjacent to but not contacting his axilla, a pair of upper elongated velcro sensitive fabric means respectively attached to the upper ends of said pair of straps for grippingly engaging said horizontal bar of velcro hook fabric selectively along the lengths of said pair of upper velcro sensitive fabric means and selectively along the length of said horizontal bar of velcro hook fabric means with the upper ends of each of said straps being laterally displaced from the midline posterior of the user, means for adjustably attaching the lower ends of said pair of straps one to the other, and lower velcro hook sensitive fabric means attached to the lower end of one of said straps for grippingly engaging said vertical bar of velcro hook fabric selectively along the length thereof with the lower ends of said pair of straps being a considerable spaced distance below the upper ends thereof and with tension being applied to said shoulder straps to restrict the movement of the user's shoulders.

7. The clavicle splint of claim **6** in which said means for adjustably attaching the lower ends of said pair of straps one to the other includes velcro hook fabric and velcro hook sensitive material.

8. A clavicle splint comprising a backplate member for contiguously engaging the back of the user, horizontal means fixedly attached to said backplate member and extending in a direction along the width thereof so as to extend substantially parallel with and along the lengths of the clavicle bones of the user, vertical means fixedly attached to said backplate member and extending in a direction along the length thereof so as to extend substantially along the midline posterior of the user, first and second flexible shoulder strap means for engaging the shoulders of the user to restrict his movement thereof, the upper ends of said first and second strap means respectively including means for grippingly engaging said horizontal means selectively along the length thereof, means for adjustably attaching the lower ends of said first and second strap means one to the other and means attached to the lower ends of one of said strap means for grippingly engaging said vertical means selectively along the length thereof whereby tension may be applied to said first and second strap means.

* * * * *