

Garnett

[15] **3,706,310**

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[54] **HANGING SLING FOR ARM CAST**
[72] Inventor: **Robert E. Garnett**, Memphis, Tenn.
[73] Assignee: **Richards Manufacturing Company**,
Memphis, Tenn.
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Primary Examiner—Richard A. Gaudet

Assistant Examiner—J. Yasko

Attorney—John R. Walker, III

[52] **U.S. Cl.**.....128/94, 128/DIG. 15
[51] **Int. Cl.**.....A61f 5/40
[58] **Field of Search**.....128/94, 90, 87, 83, DIG. 15;
224/5, 11, 12, 22

[57] **ABSTRACT**

A hanging sling for arm casts. The sling has a neck portion including polyurethane open cell foam material padding attached to a flexible web that extends around the patient's neck. An arm portion of the sling is detachably connected to the neck portion and includes a loop which is adjustable in size to fit either imbeddedly in the cast or around the outside thereof.

9 Claims, 6 Drawing Figures

[56] **References Cited**

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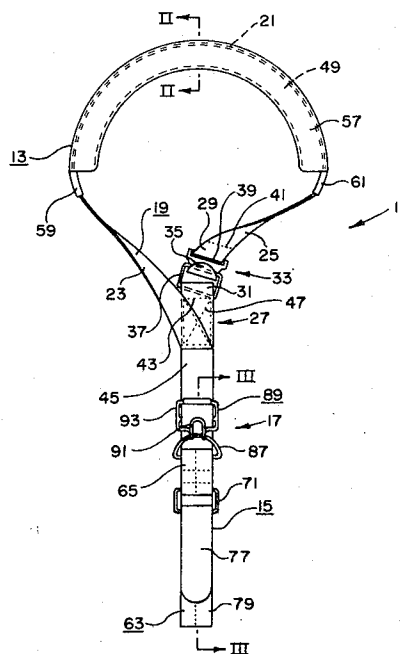


FIG. 1

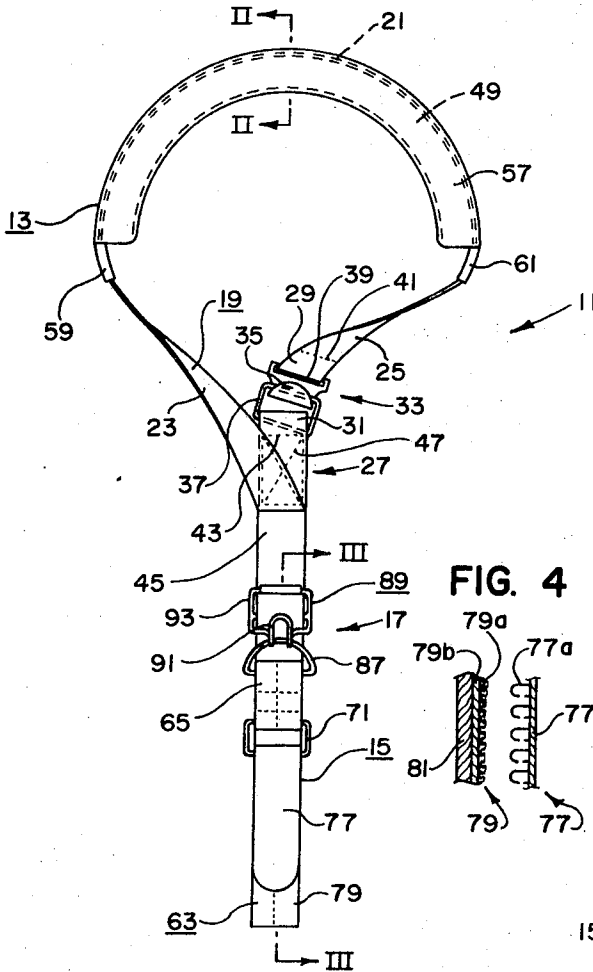


FIG. 2

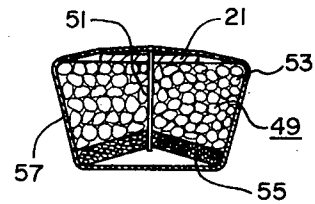


FIG. 3

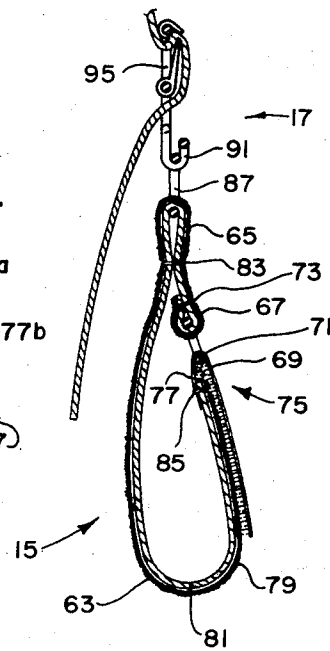


FIG. 4

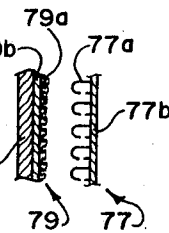


FIG. 5

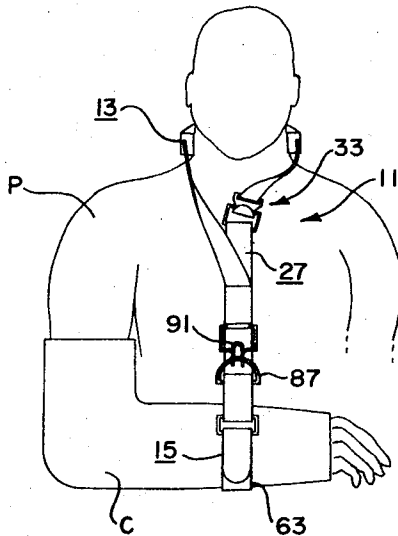
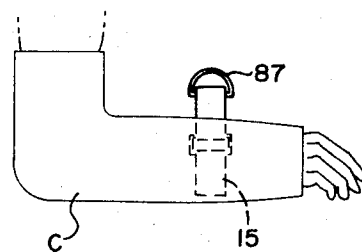


FIG. 6



INVENTOR.
ROBERT E. GARNETT

BY *John R. Walker, III*
Attorney

HANGING SLING FOR ARM CAST

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a hanging sling for arm casts, particularly adapted for treatment of fractures of the humerus.

2. Description of the Prior Art

There are in general two different types of hanging slings for arm casts. First, there is a type which comprises a halter and a wishbone-shaped hook. The halter includes a felt-lined leather neck strap, a cord attached to the neck strap, and a slide that adjusts the stress on the patient's neck. The hook is attached to the lower end of the sling and is adapted to straddle the wrist of the patient and to be embedded in the cast which is formed therearound. The hook is not adapted for use on the outside of the cast since it is not a complete loop and could not support the cast without the hook being embedded in the material of the cast.

The other type comprises a neck halter that has a foam rubber padding attached to flexible web material. The lower end of the web material is disposed in an adjustable loop which also has a foam pad thereon. This type is not suitable for embedding in the cast due to the bulkiness of the pad, but is adapted to hold the cast on the outside thereof with the cast resting in the pad. The weblike member that extends around the patient's neck does not lie flat but rather has the edges thereof disposed towards the patient's chest where it may cause discomfort to the patient.

SUMMARY OF THE INVENTION

The present invention is directed towards providing a hanging sling for arm casts which can be used, at the option of the physician, either with the arm portion embedded in the cast or disposed around the outside thereof. In addition, an object of the present invention is to provide such a sling, particularly adapted for treatment of fractures of the humerus, which is adjustable to fit any patient and can be easily adjusted for the 90° flexion position of the arm characteristic of hanging arm casts.

Also, it is a concept of the present invention to provide an improved construction of the neck portion wherein it lies flat against the chest of the wearer, thereby obviating any discomfort to the patient and presenting neatness in appearance.

Additionally, means is provided in the hanging sling of the present invention so that the arm portion may be readily detached from the neck portion to permit ease in applying the sling to the cast and to permit removal and placement of clothing over the cast.

In addition, it is contemplated that the padding on the neck portion be formed from open cell polyurethane foam material which allows air to circulate therethrough to the patient's neck, thereby providing comfort to the patient. Also, it is contemplated that the means for adjusting the size of the arm portion be formed from so-called "Velcro" fastening means, which is infinitely adjustable, and which with the web of the arm portion provides a very thin member that can readily be embedded in the cast or placed around the outside thereof, which dual use is not possible with previous hanging cast slings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of the hanging sling of the present invention.

FIG. 2 is an enlarged sectional view taken as on the line II—II of FIG. 1.

FIG. 3 is an enlarged sectional view taken as on the line III—III of FIG. 1.

FIG. 4 is an enlarged view of a portion of that shown in FIG. 3, but with the "Velcro" fastening elements being shown in a detached disposition.

FIG. 5 is a view showing the hanging sling of the present invention in use with the arm portion shown disposed around the outside of the cast.

FIG. 6 is a similar view of a portion of that shown in FIG. 5 with the arm portion shown embedded in the cast.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The hanging sling 11 of the present invention comprises in general a neck portion 13, an arm portion 15, and an attachment 17 for removably attaching arm portion 15 to neck portion 13.

Neck portion 13 includes a flexible web 19, preferably formed from cotton webbing. Web 19 is arranged so that it has a bight portion 21 and a pair of bridle portions 23, 25 integrally formed at the ends of bight portion 21. The lower ends of the bridle portions are overlapped at an angle and in flat face to face engagement to provide a flat V-shaped joint 27 adapted to lie flat against the chest of the wearer, as shown in FIG. 5. One of the bridle portions, namely, portion 25, is divided to provide separable ends 29, 31. The end 31 extends upwardly from joint 27 and is removably attached to end 29 by the detachable fastener 33, which is preferably a truss hook-type including a hook member 35 and a ringlike member 37. Hook member 35 is preferably attached to end 25 as by extending the end through a slot 39 in hook member 35, doubling the end back upon itself and securing it by stitching as at 41. The ringlike member 37 is secured to end 31 by a doubled portion of the end and by the stitching 43.

Neck portion 13 also includes a depending portion 45 which is preferably integrally attached to joint 27 and depends therefrom. In manufacturing neck portion 13, bight portion 21, bridle portions 23, 25, joint 27, and depending portion 45 are preferably all made from one continuous piece of the webbing, the end of which starts at end 29 of bridle portion 25, extends around bight portion 21, bridle portion 23, with the portion adjacent the lower end of bridle portion 23 being doubled back upon itself at an angle to establish the joint 27 with the stitching being made as at 47 to hold the joint together, and with the depending portion 45 extending downwardly from the joint 27.

Neck portion 13 additionally includes an elongated blocklike padding 49 which is attached to the inside surface of bight portion 21 as by stitching 51. Padding 49 is light and flexible and is formed of a porous material for permitting air to flow therethrough, with the porous material preferably being open cell material of the type known to those skilled in the art as reticulated polyurethane foam and having two different degrees of porosity. An open cell material found suitable for this

purpose is that produced by the Foam Division of Scott Paper Co. of 1500 East Second Street, Chester, Pa., and known as "Scott Foam." One of the two above mentioned degrees of porosity of this foam material provides a soft or fine pore characteristic which will be hereinafter referred to as the "fine foam." A fine foam which has been found to be satisfactory for this purpose is Scott's reticulated polyurethane foam having approximately 90 pores per square inch as designated by Scott Paper Co. The other one of the two above mentioned degrees of porosity of this foam material provides a coarse pore foam which will be hereinafter referred to as the "coarse foam." The coarse foam which has been found to be satisfactory for this purpose has been Scott's reticulated polyurethane foam having approximately 30 pores per square inch. The major or outer portion 53 of padding 49 is formed of said coarse foam, and the minor or inner portion 55 of the padding 49 is preferably formed of said fine foam so as to be comfortable and soft to the neck of the user. The two portions 53, 55 are preferably heat-laminated together in a manner well known to those skilled in the art. After padding 49 has been attached to bight portion 21 as heretofore-described, flexible and loosely woven material, which is preferably in the form of so-called stockinette material and which is tubular in form is passed over padding 49 and secured at the opposite ends thereof to bridle portions 23, 25 as by gathering the ends of the tubular member 57, encircling the gathered ends by the pieces of cotton webbing 59, 61 which are then stitched to the bridle portions 23, 25 by stitching, not shown.

Arm portion 15 includes a substantially think loop means 63 and an upwardly extending portion 65. Loop means 63 includes a first end 67 and a second end 69. A ringlike member 71, as for example, a so-called "Zytel Dee" ring, is attached to end 67 as by extending the end through the ringlike member and doubling the end back upon itself where it is secured by the stitching 73.

Fastening means 75 is provided for holding end 69 in a selected position relative to ringlike member 71 so that the size of loop means 63 can be selectively varied. Fastening means 75 preferably is of the so-called "velcro"-type. It should be pointed out that when the term "Velcro" is used herein, it refers to that type of well known fastening means known as "Velcro," for example, like that shown in U.S. Pat. Nos. 2,717,437 and 3,154,837. "Velcro"-type fastening means 75 includes first and second relatively operative contact surface elements 77, 79.

First, "Velcro" contact element 77 is generally bristle textured and defined substantially by a multiplicity of short barbed bristles 77a, secured on a fabric backing 77b.

Second "Velcro" contact element 79 is generally velvet textured and formed substantially of micro-filament matted pile 79a, firmly secured on fabric backing 79b. Fabric backing 79b is preferably stitched onto the outward side of a flexible web 81 preferably formed of cotton webbing. The flexible web 81 preferably extends substantially the entire length of fabric backing 79b and there are preferably continuous adjacent pieces of flexible web 81 and fabric backing 79b to establish the upwardly extending portion 69 by being doubled back

upon themselves and provided with stitching 83. Flexible web 81 and backing 79b establish substantially all of loop means 63 except for an end portion of end 69 which is established by first contact surface element 77 that is sewn onto the end of flexible web 81 and fabric backing 79b as by the stitching 85 to provide an extension of web 81 and backing 79b. It will be understood that the bristles 77a should face outwardly in the same direction as the pile 79a so that when the end 69 is passed through ringlike member 71, it can be doubled back on itself and the bristles 77a engaged with the pile 79a to provide the desired size of the loop portion of the loop means 63. Since the first contact surface element 77 closely adheres to second contact surface element 79, as best seen in FIG. 3, it will be seen that the combined thickness is thin so that it can be embedded into the cast, in a manner to be described later in the specification.

Attachment 17 includes a substantially D-shaped ring 87 which is attached to upward extending portion 65 by a portion of the ring 87 extending through the double backed material of the upwardly extending portion as best seen in FIG. 3. In addition, attachment 17 includes a member 89 having a hook portion 91 adapted to engage ring 87 and a bucklelike member 93 attached to the hook portion 91 and adjustably mounted on depending portion 45 to adjust the length of the sling 11. The buckle portion 93 includes prongs 95 which removably extend into the depending portion 45 to hold it at a selected position, as shown in FIG. 3.

To use the sling 11 in a manner shown in FIG. 5, the loop means 63 is passed around the outside of the cast C adjacent the wrist of the patient P, the detachable fastener 33 is unlatched, the bight portion 21 is placed around the neck of the patient P, the fastener 33 is relatched, and the hook portion 91 is engaged in ring 87. Then, if the cast C is not disposed at a correct 90° angle, the buckle portion 93 is moved on depending portion 45 until the correct angle is obtained. It will be understood that if it is necessary for clothing or the like to be passed over the cast C, the patient only has to unhook the hook portion 91 for the passage of the clothing and then re-engage same after it has been passed over the cast.

For the use of the sling 11 in the second manner, that is, with the arm portion 15 embedded in the material of the cast C, the following procedure is followed:

First, a light cast is formed on the patient's arm by wrapping gauze therearound which has a very light plaster thereon. Then, the loop means 63 is adjusted in a manner heretofore described to fit around the light cast, and subsequently more plaster is applied as by wrapping with the wet soluble plaster wraps well known to those skilled in the art and having a heavier plaster therein. Finally, the neck portion 13 is placed around the patient's neck as heretofore described relative to FIG. 5 and the hook portion 91 is hooked into the ring 87. Then, the buckle 93 may be adjusted to give the proper 90° flexion position of the arm.

In the present specification sling 11 of the present invention has been shown in connection with a so-called "sugar tongs" type of cast, but it will be understood that it may be used with other types of casts without departing from the spirit and scope of the present invention.

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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 this invention.

I claim:

1. A hanging sling for arm casts comprising neck portion means for engagement around the neck of a user, an arm portion, attachment means attaching said arm portion to said neck portion, said arm portion including substantially thin loop means for extending around an arm of a user, and means for varying the size of said loop means for selectively fitting into an arm cast or around the exterior of an arm cast; said neck portion means including a flexible web having a bight portion and a pair of bridle portions provided at the opposite ends of said bight portion, and which bridle portions are overlapped at an angle and in flat face-to-face engagement to provide a flat V-shaped joint adapted to lie flat against the chest of the wearer, and said neck portion including a depending portion attached to said joint and depending therefrom.

2. The hanging sling of claim 1 in which said neck portion means includes an elongated pad consisting of a reticulated polyurethane open cell foam material, and stitching means attaching said pad to said bight portion of said web.

3. The hanging sling of claim 1 in which one of said bridle portions is divided to provide separable ends, and in which is included detachable fastening means detachably coupling said separable ends together.

4. A hanging sling for arm casts comprising neck portion means for engagement around the neck of a user, an arm portion, attachment means for removably attaching said arm portion to said neck portion, said arm portion including substantially thin loop means for extending around an arm of a user, and means for varying the size of said loop means for selectively fitting into an arm cast or around the exterior of an arm cast in which said loop means includes a first end and a second end, and in which said means for varying the size of said loop means includes a ring-like member attached to one of said ends, the other of said ends extending through said ring-like member and being doubled back upon itself, and "Velcro"-type fastening means including first and second relatively operative contact surface elements arranged on opposing surfaces of said other of said ends for holding said other of said ends in a selected position relative to said ring-like member.

5. A hanging sling for an arm cast comprising neck portion means for engagement around the neck of a user, an arm portion, attachment means attaching said

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arm portion to said neck portion means, said arm portion including an upwardly extending portion and substantially thin loop means attached adjacent the lower end of said upwardly extending portion and means for varying the size of said loop means for selectively fitting into an arm cast or around the exterior of an arm cast, said neck portion means including a flexible web having a bight portion and a pair of bridle portions provided at the opposite ends of said bight portion, said bridle portions being overlapped at an angle and in flat face to face engagement to provide a flat V-shaped joint adapted to lie flat against the chest of the user, said neck portion including a depending portion attached to said joint and depending therefrom, said neck portion additionally including an elongated pad consisting of a reticulated polyurethane open cell foam material, stitching means attaching said pad to said bight portion of said web, one of said bridle portions being divided to provide separable ends, detachable fastening means detachably coupling said separable ends together, said loop means including a first end and a second end, said means for varying the size of said loop means including a ringlike member attached to one of said ends, the other of said ends extending through said ringlike member and being doubled back upon itself, "Velcro"-type fastening means including first and second relatively operative contact surface elements arranged on opposing surfaces of said other of said ends for holding said other of said ends in a selected position relative to said ringlike member, said attachment means comprising ring means attached to said upwardly extending portion of said arm portion and hook means adjustably attached to said depending portion of said neck portion, and said hook means being detachably engaged with said ring means whereby said portions of said sling may be detached one from another.

6. The combination with a cast of a sling comprising a neck portion for engagement around the neck of a user, an arm portion, attachment means attaching said arm portion to said neck portion, said arm portion including substantially thin loop means of at least a size for encircling the arm of a user, and means for varying the size of said loop means, said loop means engaging said cast for the support thereof.

7. The combination of claim 6 in which said loop means is embedded in said cast.

8. The combination of claim 6 in which said loop means encircles the outside of said cast.

9. The combination of claim 6 in which said attachment means includes means for disengaging said portions of said sling from one another.

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