

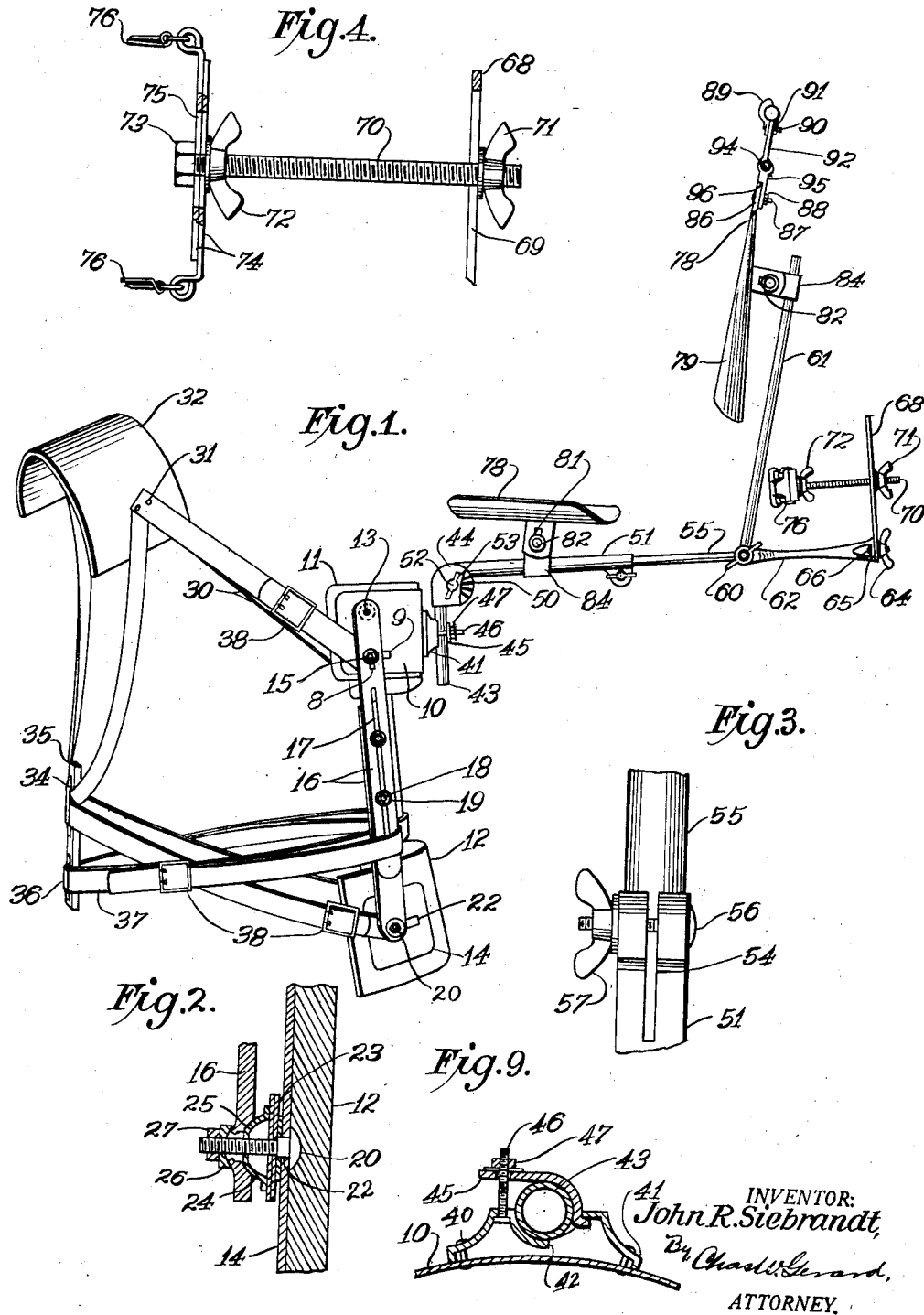
Aug. 6, 1935.

J. R. SIEBRANDT
SURGICAL SPLINT APPLIANCE

Filed Dec. 14, 1929

2,010,328

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

Fig. 5.

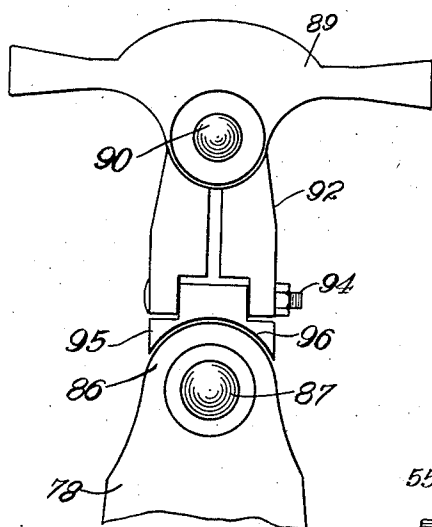


Fig. 6.

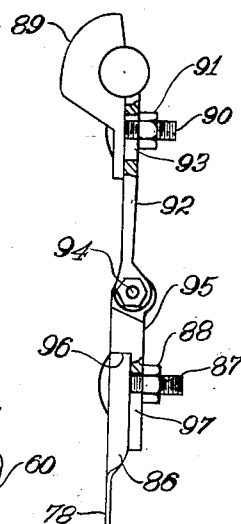


Fig. 10.

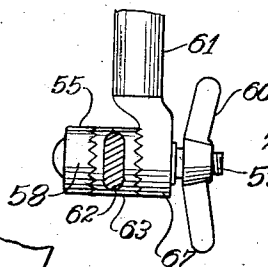


Fig. 8.

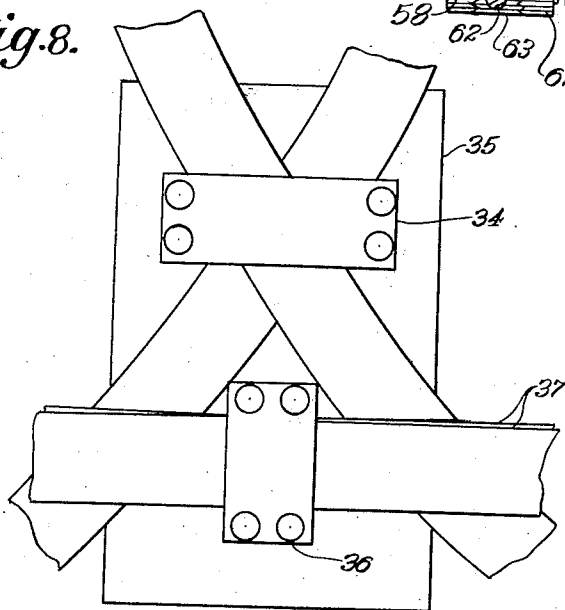
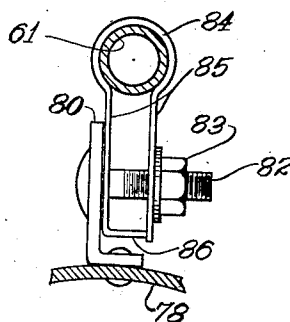


Fig. 7.



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3 Sheets-Sheet 3

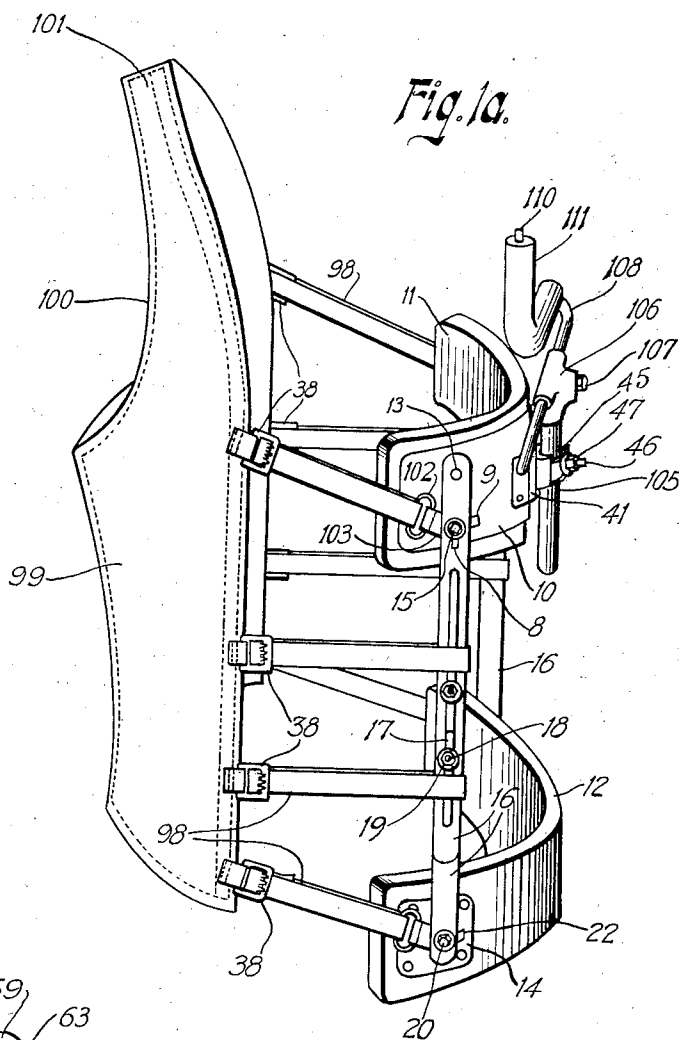
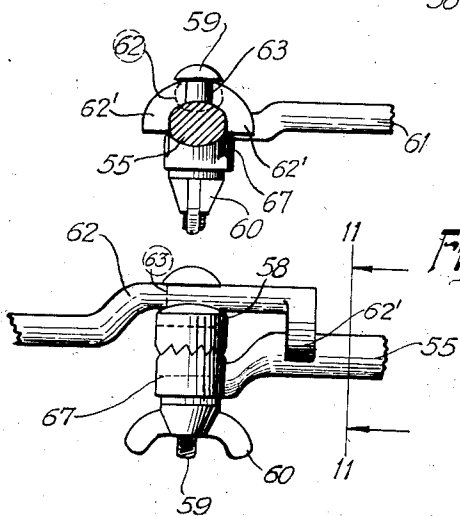


Fig. 11.



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2,010,328

SURGICAL SPLINT APPLIANCE

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Application December 14, 1929, Serial No. 414,176

3 Claims. (Cl. 128—88)

The present invention relates to surgical appliances, and aims to provide an improved appliance of this character for use in the treatment of fractures, with particular reference to fractures of the upper limbs.

Accordingly, one of the primary objects of the invention is to devise an appliance including appropriate splint elements for the affected parts, and a superior type of body attachment adapted to conform more efficiently to the body of the patient as well as to afford all desirable adjustments of the supporting structure.

It is a further object to provide a supporting structure for the splint devices which will afford improved means for adjustment of the various elements thereof and adapt the same for varied new uses or functions not heretofore facilitated by appliances of this character.

With these various general objects in view, as well as minor objects which will appear in the course of the detailed specification, the invention will now be described by reference to the accompanying drawings illustrating one form of embodiment of my proposed improvements, after which those features and combinations deemed to be novel will be set forth and claimed.

In the drawings—

Figure 1 is a general view of the complete appliance with the upper arm support shown in horizontal position and the fore-arm support in raised vertical position;

Figure 1a illustrates a modified form;

Figure 2 is a sectional detail of the joint between the lower body pad and one of the rigid bracing bars;

Figure 3 is a detail of the adjustable extension joint in the upper arm support;

Figure 4 is a detail of the tractor hitch members carried by said upper arm support;

Figures 5 and 6 are enlarged details of the hand and wrist supporting elements;

Figure 7 is a detail of one of the adjustable bracket elements for the shelf members;

Figure 8 is an enlarged outer face view of one of the lower pads showing the arrangement of the strap loops and straps connected therewith;

Figure 10 is a detail of the joint between the upper and fore-arm supporting members;

Figure 9 is a sectional detail of the joint between the upper arm supporting member and the body pad; and

Figures 11 and 12 are details of another form of joint.

Referring now to the drawings in detail, these illustrate the improved construction as comprising

an upper or chest pad plate 10 of light metal, such as aluminum, provided with the pad lining 11, and a lower hip pad 12 having the light metal plates 14 secured to the opposite ends thereof, as shown in Figure 1. To each end of the plate 10 is secured, as by a pin 13 and a bolt 15, one of a pair of adjustable side plates 16, each of said pair of plates 16 being capable of extensible adjustment by means of a slot 17, bolts 18 and clamp nuts 19, as well as angular adjustment relative to the plate 10 by virtue of the slots 8 and 9 in upper plate 16 and said plate 10, respectively, for slidable adjusting engagement with the bolt 15. Each of the lower side plates 16 is attached to the corresponding hip plate 14 by means of a bolt 20, the head of which engages the inner face of the plate 14 beneath the pad 12.

The headed end of each bolt 20 is formed with a squared shank portion which is adjustable along a slot 22 in the plate 14, the remaining shank portion of the bolt extending through a washer 23 faced against said slot, and through a universal bearing collar 24 having its convex surface projecting within a cup bearing recess 25 formed around the bolt opening in the plate 14, which is retained in place by a washer 26 and clamp nut 27, said washer also having a cup-shaped recess engaging the projecting convex margin formed around said bolt opening in the plate 14, as illustrated in Figure 2. This construction permits all necessary adjustment of the hip pad as to distance between the pairs of side plates 16, as well as angularity of adjustment to conform to the particular physique of the subject.

To each of the lower bolts or rivets 15 of the chest plate 10 is secured a supporting strap 30 which is riveted or otherwise secured intermediate its ends, as indicated at 31, to a shoulder pad 32, whence these straps 30 extend downwardly and cross each other diagonally within a keeper loop 34 on the outer face of another hip pad 35. From this point the straps 30 extend to the opposite hip pad and are secured to the corresponding bolts 20, as shown in Figures 1 and 2. The pad 35 is also provided with a second keeper loop 36 through which is doubled and slidingly passed an abdominal strap 37 which is looped around the plates 16 above the pad 12 for further security of attachment of the body support. All the aforesaid straps are provided with the necessary buckle elements 38.

To the outer face of the chest pad plate 10, mid-way between its ends, is secured, as by rivets 40, a bracket 41 formed with a socket 42 for the

adjustable mounting of a post 43 having a rosetted hinge head 44.

One side of the socket 42 is undercut for the angular portion of a clamp plate 45 which engages and clamps said post 43, the other end of the plate 45 being slotted for engagement with a screw 46 carried by the bracket 41 and provided with a clamp nut 47 for securing the post 43, whereby the latter is adjustable both vertically and also angularly about a vertical axis.

The rosetted hinge head 44 co-operates with a similar hinge head element 50 formed on the end of a tubular arm 51, the elements 44 and 50 having a hinge bolt 52 and clamp nut 53. The other end of the arm is slotted, as indicated at 54 in Figure 3, and telescopically fitted with a rod 55 and clamped thereto by a bolt 56 and nut 57. The rod 55 is formed with a terminal hinge element 58 fitted with a hinge bolt 59 and clamp nut 60 for securing said element 58 in engagement either with the rosetted head 67 of a rod 61 constituting the fore-arm support or with the double rosetted head 63 of a tractor hitch extension arm 62 which is insertable between said elements 58 and 67, as illustrated in Figures 1 and 10. This arrangement permits the extension arm 62 to be swung angularly and secured in practically any desired operative position, as for example, in alignment with either the arm 51 or with the arms 51-55, thus acting as an adjustable adhesive hitch device in conjunction with either the fore-arm or upper arm, respectively.

The end of the arm 62 is formed with a laterally turned lug 65 carrying a hinge clamping bolt 66 and nut 64 for the attachment of a bar or plate 68 to said arm at right angles thereto. The bar or plate 68 is formed with a longitudinal slot 69 for the passage of a traction rod 70 carrying an adjusting nut 71 for engagement with the bar 68, and also a pair of clamp nuts 72-73 for adjustably securing a pair of plates 74 for adhesive attachment, both of the plates 74 being slotted, as indicated at 75 (see Figure 4), for transverse adjustment with reference to the rod 70, and having suitable buckle elements 76 or the like for attachment of the adhesive bands or tape (not shown).

Each of the arms 51-55 and 61 is designed to support a limb rest or shelf member of any desired type, such as the shelf member 78 in the case of the upper arm and the member 79 in the case of the fore-arm. Each shelf member is provided with an attaching lug or bracket element 80, slotted, as indicated at 81, for adjustable engagement with the bolts 82 having the clamp nut 83, which clamping means is also utilized for securing the self to the supporting arm by means of a spring metal clip having the cylindrical portion 84 for arm or rod-engaging and clamping purposes, and the resilient legs 85 engaged by the bolts 82, one of which legs is formed with the terminal spacing lug 86 engaging the end of the other lug 85, as shown in Figure 7.

The fore-arm shelf 78 is provided with a rounded forward terminal 86 carrying the hinge bolt 87 and nut 88 adapted for the attachment of a hand splint device comprising a hand grip element 89 having a clamping bolt 89 and nut 91 for securing the element 89 to a hinge plate 92 having a slot 93 for the adjustment of said bolt. A bolt 94 provides a hinge connection between the plate 92 and attaching plate 95 which is formed with a curved socket 96 for fitting the terminal 86 and an open ended slot 97 for engagement with the bolt 87. As shown in Figures

5 and 6, the bolt 94 provides an axis of adjustment at right angles to the bolts 87 and 90, so that the splint device provides for all adjustments in answer to all the requirements for accommodating the various positions of the wrist and hand, either right or left.

It is evident that an appliance embodying the foregoing construction affords all necessary provision for securely supporting the splint devices from the body and for taking care of all requirements and objects of the invention as regards greater flexibility of adjustment for both length and angularity in the splint structure, and also for conformity to the body of the subject.

In Figure 1^a I illustrate a modified form of supporting means in lieu of the shoulder and hip pads 32 and 35 of Figure 1. In this modified form I employ a set of separate straps 98 connected with the front and rear margins of a half-vest or jacket member 99 having the arm hole 100 and the shoulder strap portion 101. The intermediate straps 98 are looped around the side supporting plates 16, while the upper and lower straps are connected by means of loops 102 and swivel elements 103 with the bolts 15 and 20 respectively, the straps being adjustable by means of the buckles 32, as before.

This construction simplifies the application of the supporting structure to the body by obviating any likelihood of confusion due to the cross straps and loosely connected pads, and at the same time all the security and firmness of the supporting means is retained. In either construction the provision of the slots 93 and 22 in the plates 10, 13 and 14, respectively, enables all necessary adjustments to be effected as between the pads 11 and 12 and the side supporting plates 16, as already referred to.

Figure 1^a also illustrates a modified form of attachment for the bracket 41, comprising a rod 105 carrying a socket head 106 in which is adjustably clamped (by means of a screw 107) the stem 108 of a supporting device which comprises a curved supporting arm 110 cushioned with suitable sponge rubber material 111 for engagement underneath the arm pit as in the treatment of a clavicle fracture or the like. Such a method of treatment obviates the usual pressure or stricture employed, as in binding from shoulder to shoulder across the back, and thus relieves the nerves and blood vessels practically entirely of any unnatural pressure.

A modified form of connection between the upper and forearm supporting members and the tractor hitch element is illustrated in Figures 11 and 12, where the arms 53 and 61 are shown as directly connected in coplanar relation by means of the rosetted heads 58 and 67 and bolt 59, and the tractor hitch device provided with an open ended slot 63 enabling the same to be slid into engagement with the head of the bolt 59 without removing the latter. The tractor hitch arm 62 is bent or curved so as to bring it also into coplanar relation with the arms 53 and 61, and the forked end is formed with terminal lugs 52' and 61' according to which of these arms the arm 62 is to be aligned with.

By the described construction a body-attaching means is provided of a lighter and more comfortable form-fitting character, the chest plate and pad engaging the body snugly beneath the shoulder and the hip pads being adjustable to afford a wide comfortable support by distributing the pressure to each side of the hip and insuring

against any shifting of the splint structure due to any displacement of the supporting means. Moreover, the provision of the shoulder pad and arrangement of supporting straps as shown, not only serves to hold the supporting structure securely to the body but also leaves the opposite shoulder and the affected arm entirely free and comfortable, and without stricture of any kind. The construction of the various splint elements themselves and their connections, is extremely simple and without any unduly complex or heavy parts and yet provide all means of adjustment necessary for complete flexibility. In this connection, it will be noted that the tractor hitch device is adaptable for application of the adhesive hitch either to the upper arm in the position illustrated in Figure 1, or by swinging into alinement with the arm 61 the parts are adjustable for applying said adhesive hitch to the forearm; and an independent means of varying the degree of traction is afforded by the adjustable nut 71 on the traction screw 70, as will be readily understood. While the parts are of light construction, they are strong and durable, and extremely simple in their manipulation.

It will thus be seen that I have devised a practical and efficient appliance for fulfilling all the desired objects of the invention, and while I have illustrated what I now regard as the preferred and most practical form of construction I desire to reserve the right to make all such changes or modifications as may fairly fall within the scope of the following claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. An appliance of the character described comprising a chest pad, a hip pad, securing means for attaching said pads in spaced relation to one side of the body, rigid stay devices having combination pivotal and sliding connections with said chest pad and also separate universal joint connections with said hip pad at the front and rear of the body, respectively, and a splint structure supported by said chest pad.

2. An appliance of the character described comprising a chest pad, a hip pad, straps attaching said pads in spaced relation to one side of the body, extensible stay devices having combination pivotal and sliding connections with said chest pad and also separate universal joint connections with said hip pad at the front and rear of the body, respectively, and splint devices supported by said pad structure.

3. In an appliance of the character described, a chest pad comprising a backing plate of light metal construction lined with padding material for embracing the front, rear and intervening side portions of the chest, a hip pad, adjustable bracing means connecting the corresponding end portions of said pads for leaving said intervening portion of the chest pad free for yielding movement at the side of the chest, and a splint structure carried by said chest pad at a point approximately midway between the ends thereof.

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