Dec. 9, 1958 L. O. SPENCER 2,863,449

SURGICAL SPLINT

Filed June 28, 1956 2 Sheets-Sheet 1

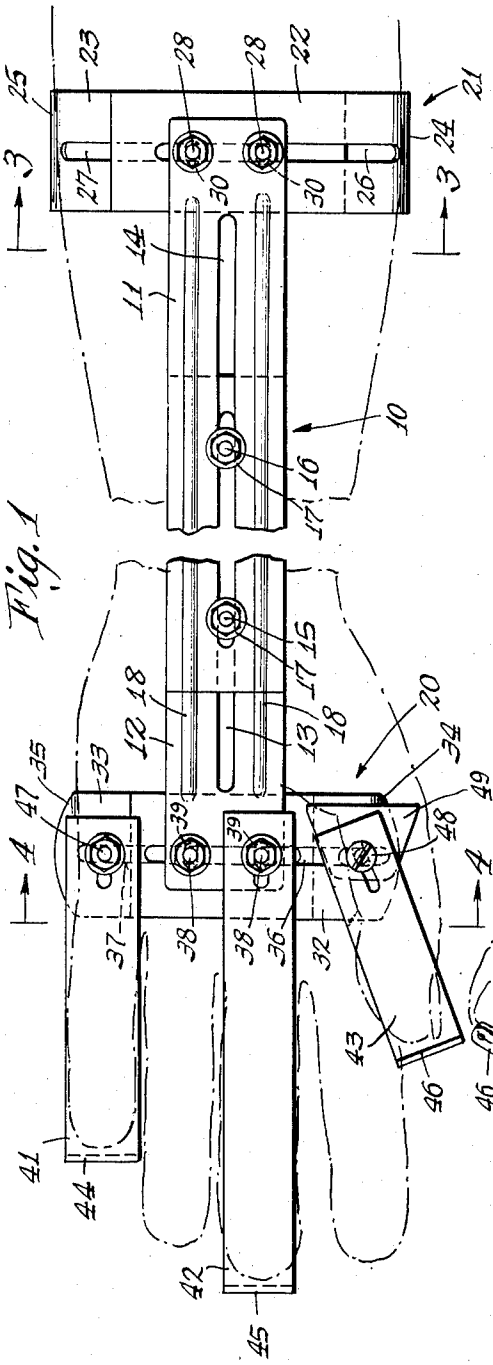

Fig. 1

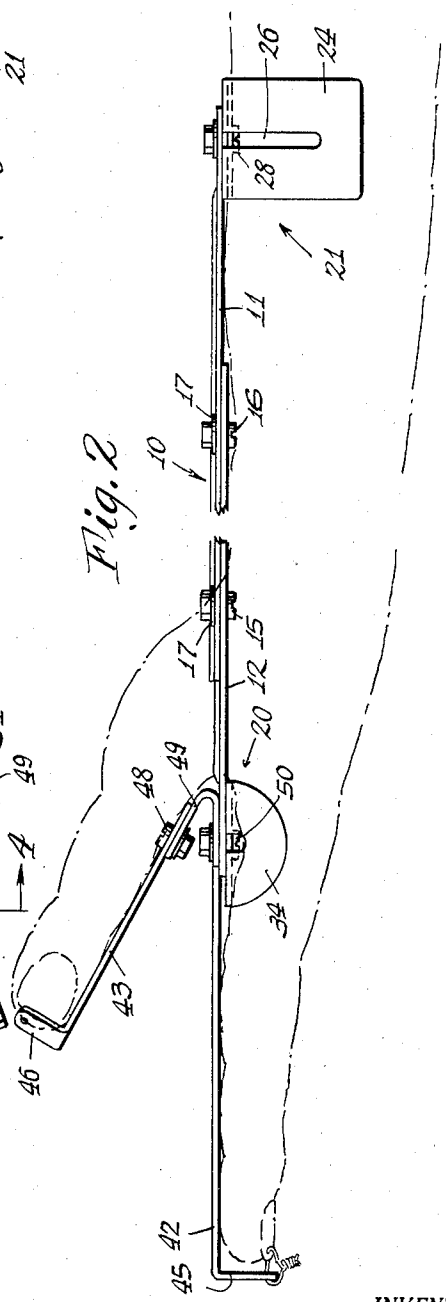

Fig. 2

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Fig. 3

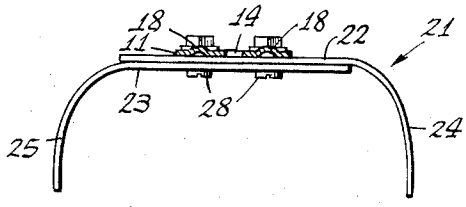


Fig. 4

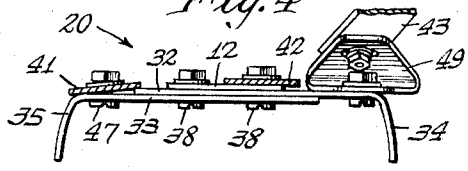


Fig. 5

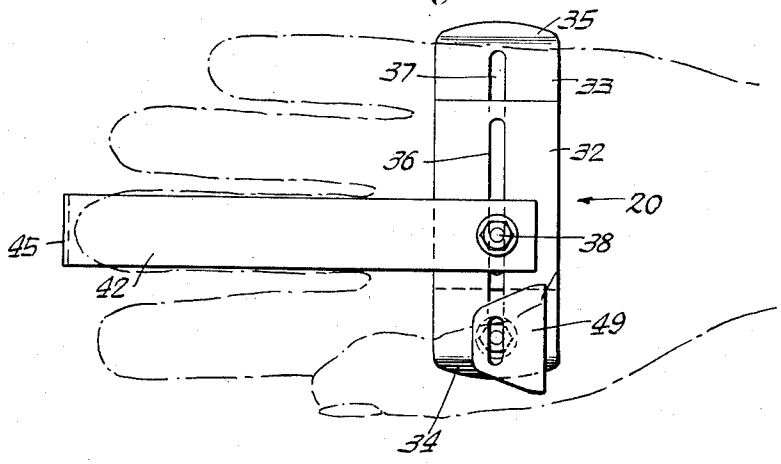
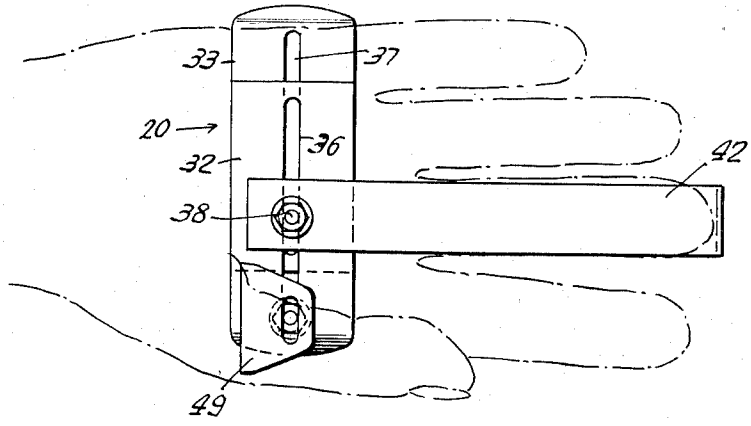


Fig. 6



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SURGICAL SPLINT

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12 Claims. (Cl. 128—87)

This invention relates to surgical splints, and more particularly to splints intended for application to the upper extremities of the body.

An object of the invention is to provide a novel and improved, surgical splint device which is adapted for use as a combined hand and forearm splint, or which may be easily and quickly converted to constitute either a traction finger splint or a forearm splint.

Another object of the invention is to provide an improved surgical splint as above characterized, which when converted for use as a finger splint may be readily adjusted or oriented for either right-hand or left-hand use.

Yet another object of the invention is to provide an improved finger splint in accordance with the above, wherein any one or all of the fingers of the hand may be readily immobilized or held inactive, or various combinations of fingers as required, and wherein traction may be applied optionally to such fingers as are considered to require the same.

A still further object of the invention is to provide an improved surgical splint of the above type, which is quickly and completely adjustable to conform it to various sizes and shapes of hands and/or forearms.

A feature of the invention resides in the provision of an improved surgical splint having all of the above features and which is also extremely easy to properly adjust and orient, is strong and sturdy, reliable in use, and of extremely light weight.

Another feature of the invention resides in the provision of an improved, adjustable and convertible surgical splint as above outlined, which is simple in construction and economical to fabricate.

Other features and advantages will hereinafter appear.

In the drawings accompanying this specification, similar characters of reference indicate corresponding parts wherever possible in the several views, in which:

Figure 1 is a top, plan view of an improved surgical splint made in accordance with the invention.

Fig. 2 is a side elevational view of the splint shown in Fig. 1.

Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is a transverse sectional view taken on line 4—4 of Fig. 1.

Fig. 5 is a top, plan view of the splint converted for hand use only and adapted to the left hand.

Fig. 6 is a plan view of the splint shown in Fig. 5, but adapted for use with the right hand.

Referring to Figs. 1 and 2, the improved surgical splint shown therein comprises an elongate body or main portion indicated generally by the numeral **10**, said main portion being in itself extendible or retractible and constituted of a pair of substantially flat, elongate members **11** and **12** adjustably connected with each other.

To provide for adjustable, extending and retracting movement, the members **11** and **12** are formed with substantially centrally-disposed, elongate, longitudinally-extending slots **13** and **14** through which bolts **15** and **16** pass, said bolts being preferably provided with lock washers **17** and being arranged when tightened to secure the members **11** and **12** in various adjusted positions, by which the main portion **10** of the splint may be either lengthened or shortened.

The body members **11** and **12** may be consituted of any suitable material, being preferably formed of sheet or strip aluminum alloy of relatively high tensile strength and stiffness. Preferably also, the members **11** and **12** are provided with elongate, longitudinally-extending embossed ribs or beads **18** adapted to nest with each other whereby an interlocking of the members is effected while at the same time the stiffness or rigidity is greatly increased. By such construction I am enabled to obtain in a surgical splint a very appreciable, desirable rigidity together with lightness of weight.

The improved splint shown in Figs. 1 and 2 further comprises adjustable, transverse portions indicated generally by the numerals **20** and **21**, the portion **21** being adapted for engagement with the thicker part of the forearm adjacent the elbow and comprising a pair of members **22**, **23** having curved extremities **24** and **25** respectively, and having elongate slots **26** and **27** through which bolts **28** may be passed to adjustably secure the members **22** and **23** together. The bolts **28** also pass through relatively-short, longitudinally-extended slots **30** in the main member **11**, thereby to fasten the transverse portion **21** of the splint to the main portion **10**.

It will be understood that, by the provision of the slots **30** in the member **11**, the transverse portion **21** may be disposed at a number of different angles with respect to the main portion **10**, all such angles however being not greatly different from a right angle. Also, the members **22** and **23** may be adjustably positioned with respect to each other as well as with respect to the main portion **10** of the splint, thereby to fit the transverse portion **21** to the forearm in a comfortable and effective position.

The transverse portion **20** of the splint comprises members **32** and **33** having curved extremities **34** and **35** respectively for engagement with opposite side edges of the hand at the palm thereof. The members **32** and **33** have elongate slots **36** and **37** through which bolts **38** pass, said bolts also extending through relatively-short, longitudinally-extended slots **39** in the main member **12** by which the transverse portion **20** of the splint is secured to the main portion **10**. It will be understood that adjustment of the members **32** and **33** may be effected to enable the portion **20** to be fitted to the width of the palm of the particular hand on which the splint is being used, and that the transverse portion **20** may be also angularly disposed with respect to the main portion **10**, as permitted by the slots **39**.

In order to provide splints for any of the fingers, I employ flat, elongate members or strips **41**, **42** and **43**, said strips being arranged to extend along the fingers at the inner sides thereof, and having angularly extended extremities **44**, **45** and **46** respectively. The strips **41—43** may be formed of metal, as for example aluminum alloy, and may be adjustably secured to the transverse portion **20** of the splint by bolts as shown. The strip **41** may be held by a bolt **47** passing through the slot **37** of the member **33**. The strip **42** may be held by one of the bolts **38** passing through both of the slots **36** and **37** of the members **32** and **33**. The strip **43** is held by means of a bolt **48** which passes through a thumb rest in the form of an angle bracket **49** secured to the member **32** by a bolt **50** passing through the slot **36** of the member.

It will be understood that the finger splints **41**, **42** and **43** may be angularly disposed, as required by the specific

conditions, and may also be extended more or less longitudinally by virtue of the slots therein. After the entire splint has initially been set up, the various bolts may be securely tightened to hold the different components in their adjusted positions, thereby enabling the splint to constitute a rigid, unitary device.

While only three finger splints have been illustrated, it will be readily understood that more or less may be utilized, depending on the requirements. The finger splints for the four fingers of the hand excepting the thumb will be carried by bolts passing through the slots of the members **32** and/or **33**. The thumb splint, of course, is carried by the angle bracket **49**.

The angularly bent extremities of the finger splints are perforated or apertures to admit a wire by which traction may be effected, such wire being passed through small holes drilled through the projecting portions of the fingernail, as indicated in Fig. 2.

In accordance with the present invention, the combined forearm and hand splint shown in Figs. 1 and 2 may be converted into a splint only for the forearm, or only for the fingers. In the first mentioned case, the finger splints **41–43** together with the thumb rest or angle bracket **49** would not be employed, the transverse portion **20** of the splint being, however, still made to engage the palm as shown. With this form of the invention, the forearm splint is completely adjustable as to length and as to the angularity of the transverse portions **20** and **21**.

Also, in accordance with this invention, the splint shown in Figs. 1 and 2 may be converted to a universal finger splint, by not employing the forearm portion. For this purpose, the body or main portion **10** and transverse portion **21** are omitted, and only the finger splints **41–43** used in conjunction with the transverse splint portion **20**.

Such an organization is illustrated in Fig. 5, for example, where the transverse portion **20** mounts the central finger splint **42** and has also the thumb rest or angle bracket **49**.

By this invention, the hand splint shown in Fig. 5 may be easily and quickly reversed and converted for right-hand use as illustrated in Fig. 6, it being shown for left-hand use in Fig. 5. To accomplish this, the finger splints **42** (or other finger splints, as many as are used) is or are reversed to the position shown in Fig. 6, and also the angle bracket **49** is reversed about its mounting bolt, as shown.

It will be readily understood from the above description that I have provided a very simple, sturdy and advantageous surgical splint device for use with either the right or left hand and/or forearm. My improved surgical splint is fully adjustable as for length and width of the hand and arm engaging portions, and also for angularity. Finger splints as required are readily provided for, such splints being fully adjustable as for length and angularity, and being capable of applying traction where this is considered desirable. The improved splint of this invention is of extremely light weight while at the same time being strong, sturdy and durable. Moreover, it may be inexpensively fabricated, and will serve to replace more expensive splints having a more limited application.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. A surgical splint having an elongate main portion adapted to extend along the forearm, said main portion comprising a pair of elongate parts and releasable means for adjustably securing said parts in extended and retracted positions, said splint having a pair of transverse portions for engagement with the arm and hand respectively, each of said transverse portions comprising a pair of elongate, slotted relatively-movable parts; and a pair of means for adjustably securing the said parts of the transverse portions to each other in different adjusted relation and for adjustably securing said transverse portions to the ends of the said main portion, said means each comprising releasable fasteners passing through the slots of the said parts and through said main portion.

2. A surgical splint having an elongate main portion adapted to extend along the forearm, said main portion comprising a pair of elongate parts and releasable means for adjustably securing said parts in extended and retracted positions, said splint having a pair of transverse portions for engagement with the arm and hand respectively, each of said transverse portions comprising a pair of elongate, slotted relatively-movable parts; and a pair of means for adjustably securing the said parts of the transverse portions to each other in different adjusted relation and for adjustably securing said transverse portions to the ends of the said main portion, said means each comprising releasable fasteners passing through the slots of the said parts and through said main portion; an elongate finger splint strip; and means passing through a slot in one of said parts, for adjustably securing said finger splint strip to one of said transverse portions.

3. A surgical splint having an elongate main portion adapted to extend along the forearm, said main portion comprising a pair of elongate parts and releasable means for adjustably securing said parts in extended and retracted positions, said splint having a pair of transverse portions for engagement with the arm and hand respectively, each of said transverse portions comprising a pair of elongate, slotted relatively-movable parts; and a pair of means for adjustably securing the said parts of the transverse portions to each other in different adjusted relation and for adjustably securing said transverse portions to the ends of the said main portion, said means each comprising releasable fasteners passing through the slots of the said parts and through said main portion; an elongate finger splint strip; and means passing through a slot in one of said parts, for adjustably securing said finger splint strip to one of said transverse portions, said means for adjustably securing the finger splint strip comprising an angle bracket connecting said strip and transverse portion.

4. A surgical splint having an elongate main portion adapted to extend along the forearm, said main portion comprising a pair of elongate parts and releasable means for adjustably securing said parts in extended and retracted positions, said splint having a pair of transverse portions for engagement with the arm and hand respectively, each of said transverse portions comprising a pair of elongate, slotted relatively-movable parts; and a pair of means for adjustably securing the said parts of the transverse portions to each other in different adjusted relation and for adjustably securing said transverse portions to the ends of the said main portion, said means each comprising releasable fasteners passing through the slots of the said parts and through said main portion; an elongate finger splint strip; and means passing through a slot in one of said parts, for adjustably securing said finger splint strip to one of said transverse portions, said means for adjustably securing the finger splint strip comprising an angle bracket connecting said strip and transverse portion, said finger splint strip having an angularly-extended extremity and opening therethrough by which a traction wire may be secured thereto.

5. A surgical splint having an elongate main portion adapted to extend along the forearm, said main portion comprising a pair of elongate parts and releasable means for adjustably securing said parts in extended and retracted positions, said splint having a pair of transverse portions for engagement with the arm and hand respectively, each of said transverse portions comprising a pair of elongate, slotted relatively-movable parts; and a pair of means for adjustably securing the said parts of the transverse portions to each other in different adjusted relation and for adjustably securing said transverse portions to the ends of the said main portion, said means each comprising releasable fasteners passing through the slots of the said parts and through said main portion,

said means for securing the transverse portions to the main portion permitting limited angular adjustment of the transverse portions.

6. A surgical splint having an elongate main portion adapted to extend along the forearm, said main portion comprising a pair of elongate parts and releasable means for adjustably securing said parts in extended and retracted positions, said splint having a pair of transverse portions for engagement with the arm and hand respectively, each of said transverse portions comprising a pair of elongate, slotted relatively-movable parts; and a pair of means for adjustably securing the said parts of the transverse portions to each other in different adjusted relation and for adjustably securing said transverse portions to the ends of the said main portion, said means each comprising releasable fasteners passing through the slots of the said parts and through said main portion, said transverse portions having angularly-extended ends adapted to be fitted to the arm and hand.

7. A surgical splint having an elongate main portion adapted to extend along the forearm, said main portion comprising a pair of elongate parts and releasable means for adjustably securing said parts in extended and retracted positions, said splint having a pair of transverse portions for engagement with the arm and hand respectively, each of said transverse portions comprising a pair of elongate, slotted relatively-movable parts; and a pair of means for adjustably securing the said parts of the transverse portions to each other in different adjusted relation and for adjustably securing said transverse portions to the ends of the said main portion, said means each comprising releasable fasteners passing through the slots of the said parts and through said main portion, one of said transverse portions having an angle bracket constituting a thumb rest, and means passing through a slot in one of said parts for adjustably positioning said angle bracket on the portion.

8. A surgical splint having an elongate main portion adapted to extend along the forearm, said main portion comprising a pair of elongate parts and releasable means for adjustably securing said parts in extended and retracted positions, said splint having a pair of transverse portions for engagement with the arm and hand respectively, each of said transverse portions comprising a pair of elongate, slotted relatively-movable parts; and a pair of means for adjustably securing the said parts of the transverse portions to each other in different adjusted relation and for adjustably securing said transverse portions to the ends of the said main portion, said means each comprising releasable fasteners passing through the slots of the said parts and through said main portion, said elongate parts comprising sheet metal strips, said strips having embossed ribs nesting with each other for strengthening them and preventing relative angular movement thereof.

9. A surgical splint having a transverse portion adapted

to extend across the hand, said portion comprising two, elongate, relatively-movable slotted parts and means for adjustably securing said parts together in different relative positions; a finger splint strip; and means for adjustably securing said strip to said transverse portion, both said means passing through the slots of the said parts.

10. A surgical splint having a transverse portion adapted to extend across the hand, said portion comprising two, elongate, relatively-movable slotted parts and means for adjustably securing said parts together in different relative positions; a finger splint strip; and means for adjustably securing said strip to said transverse portion, both said means passing through the slots of the said parts, said means for adjustably securing the finger splint strip also including the means for adjustably securing to each other the relatively-movable parts of the transverse portion.

11. A surgical splint having a transverse portion adapted to extend across the hand, said portion comprising two, elongate, relatively-movable slotted parts and means for adjustably securing said parts together in different relative positions; a finger splint strip; and means for adjustably securing said strip to said transverse portion, both said means passing through the slots of the said parts; a thumb rest comprising an angle bracket, and means passing through a slot in one of said parts for adjustably mounting said angle bracket on the said portion.

12. A surgical splint having a transverse portion adapted to extend across the hand, said portion comprising two, elongate, relatively-movable slotted parts and means for adjustably securing said parts together in different relative positions; a finger splint strip; and means for adjustably securing said strip to said transverse portion, both said means passing through the slots of the said parts, said finger splint strip being swingable through an arc of 180 degrees to reverse its position on the portion; a thumb rest comprising an angle bracket and means for adjustably positioning the angle bracket on said portion, said means enabling the angle bracket to be swung through a 180 degree arc, thereby to adapt the splint for both left and right hand use.

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