

[54] FINGER SUPPORT

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634,069 3/1950 Great Britain 128/87 A

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[58] Field of Search 128/77, 87 R, 87 A, 89, 83

[56] **References Cited**

UNITED STATES PATENTS

2,357,323	9/1944	Goldberg	128/77 X
2,237,251	4/1941	Longfellow	128/87 A
1,389,741	9/1921	Cotton	128/87 A

FOREIGN PATENTS OR APPLICATIONS

1,529,910	6/1968	France	128/77
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[57] **ABSTRACT**

A finger support for finger joint contractures and finger straightening. A one-piece sheet metal finger support includes a base member, an extension member and a strap member applied to the joint to be straightened and an adjustable screw engageable with the base for applying a vernierly adjustable force to the finger joint.

7 Claims, 4 Drawing Figures

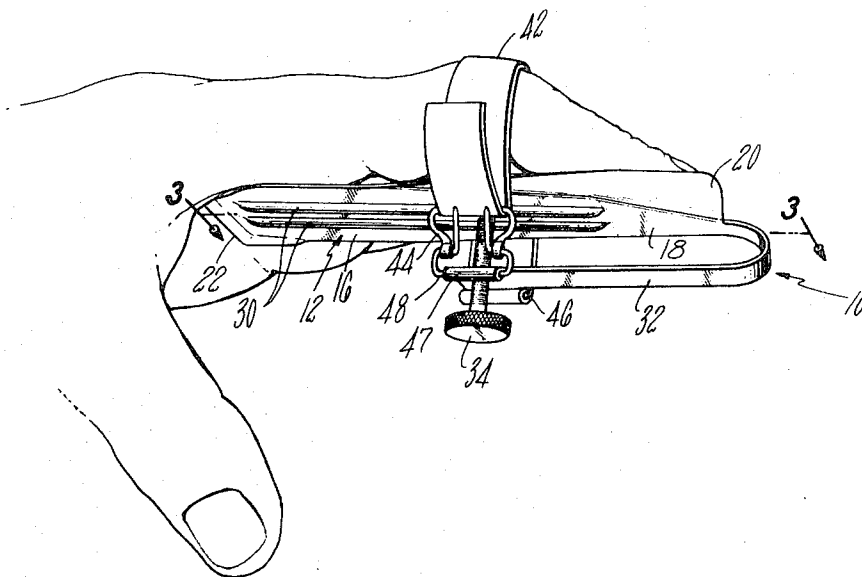


FIG. 1

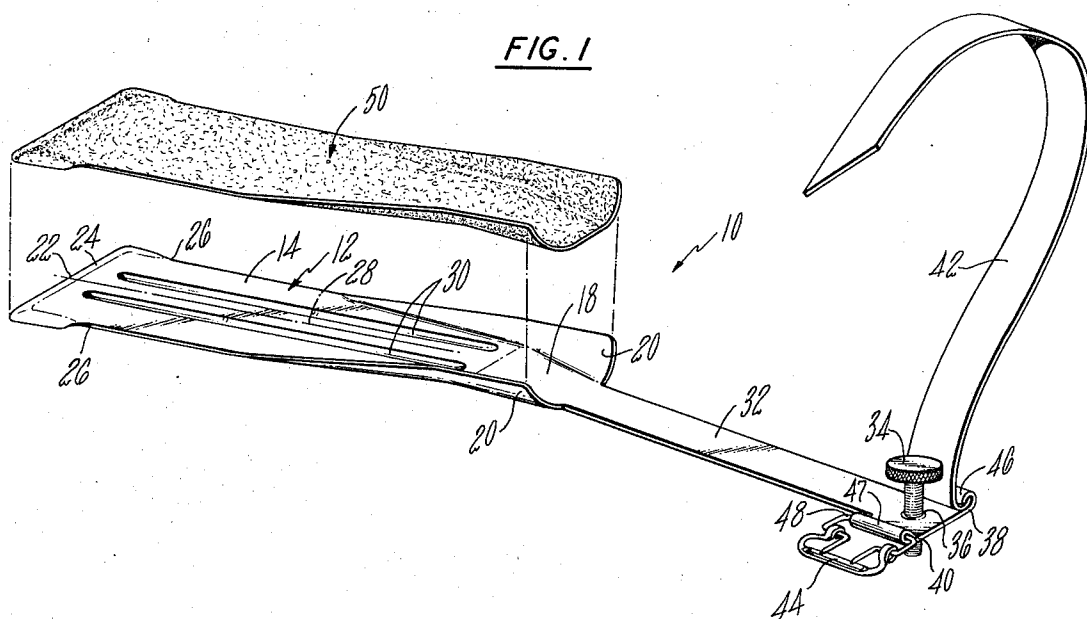


FIG. 2

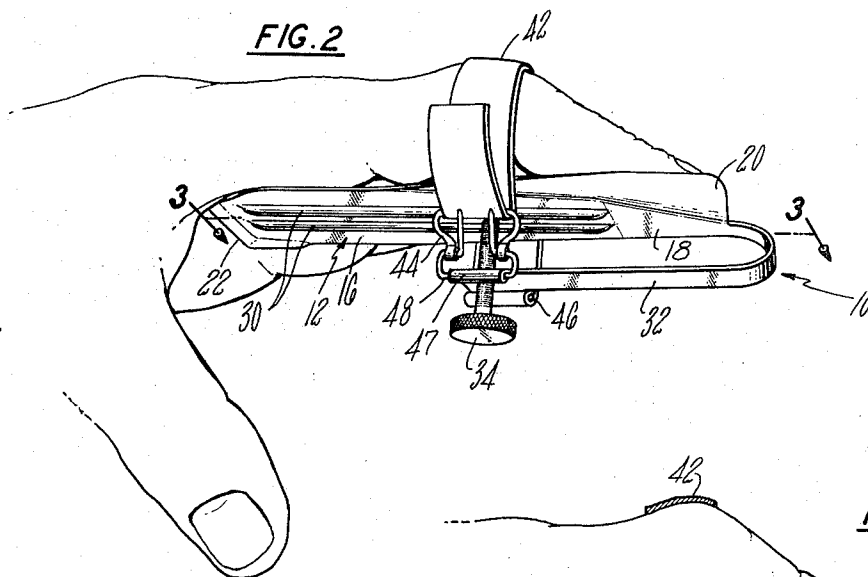


FIG. 3

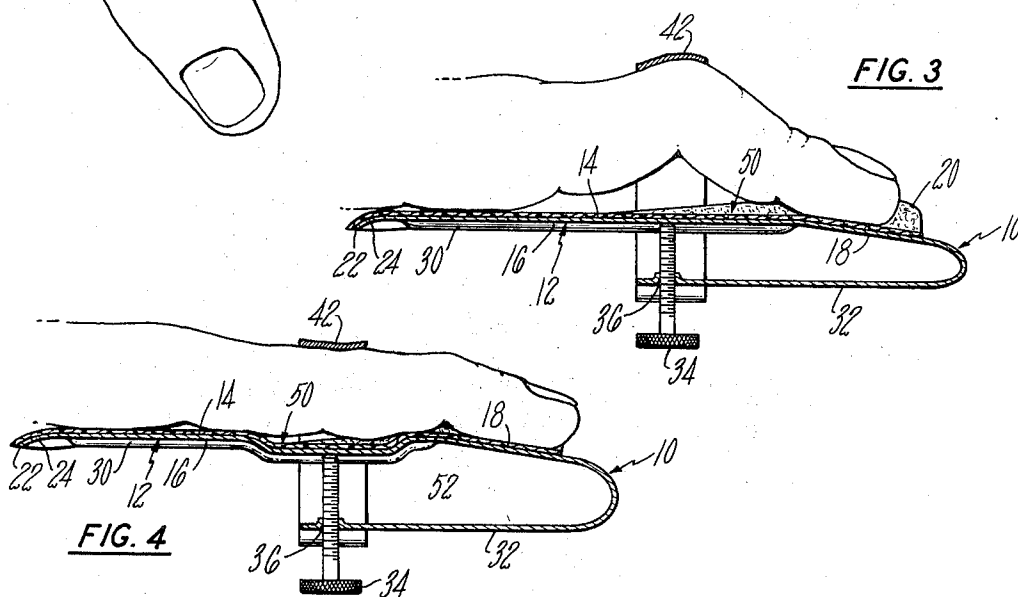
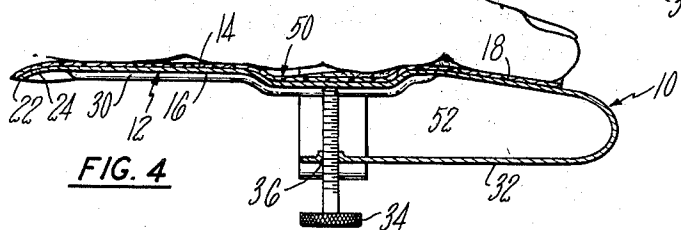


FIG. 4



FINGER SUPPORT

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates generally to surgical supports of the type used to overcome deformities, and more specifically to a finger straightening device for finger joint contractures and the like.

As is well known, finger joints do not always assume a normal position and range of motion after an accident which has caused damage to the tendons of the finger. The tendons and joint capsule structures in many cases are damaged or altered for a variety of reasons causing a contracture of the joint. Other reasons for contractures can be attributed to scar tissue from burns or surgical intervention to the joint itself. Heretofore the practice has been to apply an elastic force longitudinally on the finger to straighten it, but as the finger becomes more nearly straight, this type of force becomes less effective.

This elastic, high pressure load type force additionally tends to irritate the skin where it is attached to the finger, and since the force is applied by wire springs or rubber bands, the patient cannot precisely adjust the force to his tolerance.

Accordingly, it is an object of the present invention to provide a finger contracture support which applies an easily changeable, vernier adjustable, and precisely controllable non-elastic force to the joint to set the joint in a gradually increasing extended position at a rate which the patient can select.

Another object of this invention is to provide a finger contracture support which applies a force to the joint with the contracture without constantly loading the skin under high pressure to cause irritation to the skin.

Another object of this invention is to provide a finger contracture support whose force opposite to the corrective force will be transmitted to the pulp portion of the finger tip and the volar portion of the hand to provide a comfortable support which can be worn over long periods of time while still using the hand for light use.

It is a further object of this invention to provide a finger contracture support with an integral adjustable clamp portion which can be used on fingers or thumbs of varying sizes.

Another object of this invention is to provide a relatively inexpensive, expendible, simple-to-use finger contracture support for joint contractures and the like which can be initially applied and adjusted by a physician as he instructs the patient of its use, and simple enough for the patient to use until the contracture is corrected.

Other object will be in part obvious and in part pointed out more in detail hereinafter.

A better understanding of the invention will be obtained from the following detailed description and the accompanying drawings of the illustrative application of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is an exploded top perspective view partly broken away of the finger contracture support of the present invention.

FIG. 2 is a bottom perspective view of the finger contracture support of the present invention shown positioned for use on a finger having a contracture.

FIG. 3 is a sectional view taken generally along the lines 3—3 of FIG. 2.

FIG. 4 is a view similar to FIG. 3 showing a modified form of the finger contracture support of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing in greater detail wherein like reference numerals indicate like parts throughout the FIGS., the finger contracture support 10 of the present invention is shown in FIG. 1 prior to being fitted to a finger which has a contracture. The support 10 has a generally flat rectangular base portion 12 having upper and lower surfaces 14 and 16, respectively. The base portion 12 is formed of a malleable metal such as steel to allow for bending to fit the specific requirements of an application while providing the necessary strength while in use. One end of the base portion 12 has an inclined portion 18 having a deflection of about 8° to 15° and integral arcuate side walls or wings 20. The side walls 20 have their maximum height in the area of the incline portion 18 and gradually diminish approximately midway of the base portion 12. The outer periphery of the opposite end 22 of the base 12 is shown having a curved or coined end 24 in the opposite direction of the side walls or wing 20 which extends as shown along sides 26 of base 12 for a short distance.

To aid in making the base 12 a substantially rigid member, there are, spaced on each side of the longitudinal center line 28 of the flat base portion 12 and between the incline portion 18 and the coined end 22, two strengthening ribs 30 downwardly depressed from the upper surface 14. These ribs also serve to locate the adjustment screw 34 and prevent it from slipping sideways when pressure is applied.

Formed as an integral part of the base 12 adjacent the slant or inclined portion 18 is a T-shaped extension 32 which carries on its free end a finely threaded adjustment screw 34 threadably received in a tapped extruded hole 36. This screw has a large diameter knurled head to allow convenient tightening by hand.

Legs 38, 40 located on opposite sides of the knurled adjustment screw 34 of the T-shaped extension 32 have, mounted on their free ends, a non-stretching webbed strap 42 and associated buckle 44, respectively. Strap 42 is shown secured by crimping as at 46 to leg 38, and buckle 44 is pivotally connected by forming a rolled barrel or knuckle 47 around one bar 48 of the buckle.

A flannel-like material pad 50 with an adhesive backing is shown in FIG. 1 as being suitably contoured for covering the entire upper surface 14 of the base portion 12 including the slant portion 18, wings 20, and coined end 24. Pad 50 will serve to prevent maceration of the skin in the area where the finger and palm come in contact with the support 10 and to increase friction of the skin with the device so it will not slip.

Referring now to FIG. 2 and 3 of the drawing, the brace 10 is shown as being applied to a finger having a contracture. It can be seen that the finger tip is located on the slanted or inclined portion 18 to accommodate the slight flexion position of the finger tip and the

side walls or wings 20 tend to cradle the finger tip in a protective manner and to stabilize the devices on the finger. The opposite coined end 24 is dimensioned to be received in the volar portion of the hand. The coined rounded edges present no sharp or uncomfortable edge to the palm.

With the support 10 in this position the middle joint is located, and the T-shaped extension 32 is bent in a clockwise direction, as viewed in the drawings, to align the knurled adjustment screw 34 with the joint of the finger to be straightened. With the adjustment screw 34 backed all the way out, the nonstretching webbed strap 42 is positioned over the middle joint of the finger and firmly secured to the associated buckle 44. Corrective pressure is then precisely applied by turning the knurled head of the adjustment screw 34 in a clockwise direction. It will be noted that the threaded end of the adjustment screw 34 is located between the strengthening ribs 30 to aid in positioning the T-shaped extension in alignment with the longitudinal center line 28 of the base 12.

From the above it can be seen that by clockwise rotation of the adjustment screw 34 with its threaded end abutting the lower surface 16 of the base 12 it will tend to jack the T-shaped extension 32 away from the lower surface 16 of the base applying a finely adjusted non-elastic force through the non-stretching strap 42 to the joint of the finger. After the tendons have been stretched by a given adjustment, additional pressure can be carefully and accurately applied at regular intervals via the vernier adjustment screw 34 to set the joint to lengthen the tendons and joint capsule structures in a positive accurate and gradually increased manner.

Referring now to FIG. 4 there is shown a modified finger contracture brace or support 10 altered as by bending at 52 of the base portion 12 in the opposite direction to the flexion of the finger joint so as to allow the finger joint to be held in an over-center position by the support. This arrangement is especially useful in some cases to stretch the tissue a small amount past the normally flat position to overcome springback tendencies of the tissue. This relief bridge 52 in the base portion is flat on the bottom to present a stable flat surface to the adjustment screw.

As will be apparent to persons skilled in the art, various modifications, adaptations and variations of the foregoing specific disclosure can be made without departing from the teachings of the present invention.

We claim:

1. A finger support of the type used to overcome deformities, comprising; a base for supporting a finger having a contracture, and an extension member connected at the forward portion of said base and adapted to be bent backward to underlie said base, a strap secured to said extension member adapted to form an ad-

justable non-stretching band around the joint to be straightened and to apply a fixed perpendicular force to said finger at the joint affected by the contracture, and an adjustment screw threadably received in said extension member and said adjustment screw engageable with said base when said extension member is bent backward in alignment with said joint for applying a vernierly adjustable force to said finger joint.

2. A finger support as defined in claim 1 wherein said base includes an inclined portion on one end thereof, said inclined portion having integral side walls to laterally position the end of the finger.

3. A finger support as defined in claim 1 wherein a buckle secured to said extension member is provided to adjust the length of said non-stretching band.

4. A finger support as defined in claim 2 wherein said side walls begin midway of said base and gradually increase to maximum height at said inclined portion.

5. The finger support of claim 1 wherein a portion of the base is displaced downwardly from the plane of the base at the point along its length aligned with the joint to be straightened to allow slight over straightening of the joint.

6. A finger support of the type used to overcome deformities, comprising; a base for supporting a finger having a contracture, said base having an inclined portion at one end thereof, side walls integral with said base and adjacent said inclined portion, a coined end on the opposite end of said base, said inclined portion and said side walls adapted to cradle the tip of said finger and said coined end adapted to receive the volar part of the hand, an extension member integral with said base and extending from the end of said inclined portion, said extension member adapted to be bent backward and positioned in underlying relationship with said base with its free end in vertical alignment with the joint of said finger affected by the contracture, a non-stretching strap secured to one side of the free end of said extension member, a buckle pivotally secured to the opposite side of the free end of said extension member, said strap adapted to encircle said finger joint and to be fastened to said buckle to form a non-stretching band for applying an inelastic perpendicular force to said finger joint, an adjustment screw threadably received in said extension member on the free end thereof between said strap and said buckle, said adjustment screw adapted to engage the underside of said base when said extension member is bent backward to apply a vernierly adjustable force to said joint through said non-stretching strap.

7. A finger support as defined in claim 6 wherein the forces opposing the perpendicular force are directed to the pulp portion of the finger tip and the volar part of the hand.

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