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TENSIONING CLAMP

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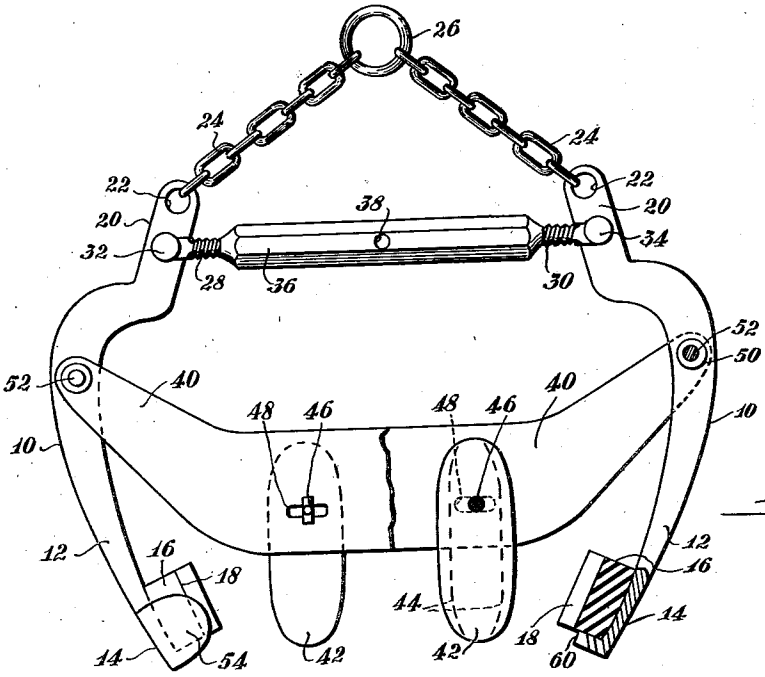


Fig. 1

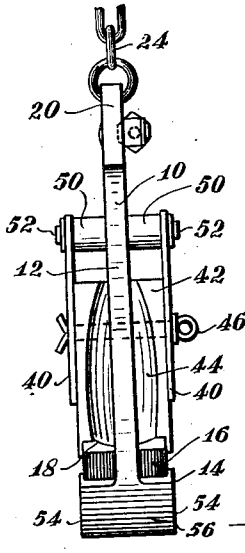


Fig. 2

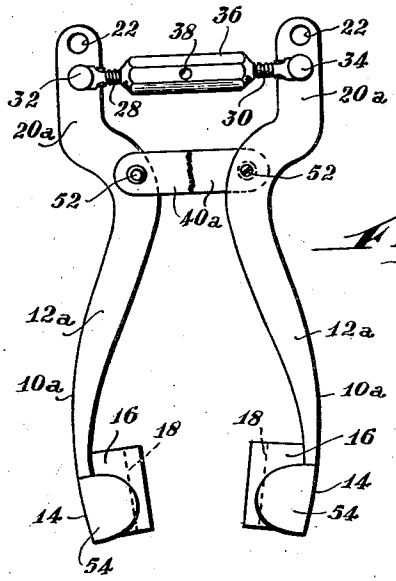


Fig. 3

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TENSIONING CLAMP

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6 Claims. (Cl. 128—84)

The present invention relates to clamps more particularly for orthopaedic and surgical purposes, of the kind adapted to be affixed to the limbs of patients for submitting the limbs to tension for varying periods.

Many different devices have been used for the purpose stated above, but hitherto, no entirely satisfactory means has been provided for tensioning the hand by traction applied to the fingers, or for applying traction to one or more fingers at a time.

The principal object of the present invention is to provide a clamp of simple and cheap construction and easy to manipulate, adapted to be applied to the fingers of the hand so as to permit of the attachment thereto of tensioning means properly so called.

Another object of the present invention is to provide a tensioning clamp comprising a pair of arms pivotally mounted between a pair of side plates and adjustably coupled together at one of their ends, the other ends of said arms being provided with cushioning means adapted yieldingly to grip the member to which the clamp is applied.

A further object of the present invention is to provide a multiple clamp of the kind described above, in which the arms are spaced apart out of clamping range and a plurality of elongated stops are adjustably mounted intermediate of said arms, whereby the clamp is adapted to be applied to a plurality of fingers at a time.

These and other objects and advantages of the present invention will become apparent in the course of the following description of certain embodiments thereof.

In the drawing:

Fig. 1 is a side elevation partly in section of a multiple clamp according to the present invention.

Fig. 2 is an end elevation of said multiple clamp, and

Fig. 3 is a side elevation of a simple clamp.

With reference to the figures, the novel clamp according to the present invention comprises a pair of arms 10 having a curved body portion 12 terminating in a housing 14 adapted to receive a resilient cushioning pad 16 preferably of rubber, said pad having a gripping face which is concavely curved in a direction transverse to the arm 10. The other end of said body portion merges in a head portion 20 perforated near its free end as shown at 22 to receive attached thereto a flexible attachment member here shown as a pair of lengths of chain 24 the ends remote from the head portion being joined together by a ring 26, whereby the clamp as a whole may be secured to tension applying means, as for example a cord passing over a pulley and having attached thereto a weight, which applies tension in the plane of pivotal movement of the arms.

At a point intermediate said perforation 22 and the body portion 12 said head portions are adjustably coupled together as by right and left hand screws 28, 30 pivotally secured to said head portions as by pins 32, 34, said screws being themselves adjustably coupled by the sleeve 36, which has a hole 38 for the insertion of a tommy bar to assist in tightening or slackening the screw connexion, the parts 28, 30, 36 forming a link of variable length.

The body portion 12 is pivotally mounted in a frame member between two side plates 40 thereof, so that when the link connexion between the head portions is extended by turning the sleeve 38 in one direction, the cushion carrying ends of the arms are brought closer together, and when said link connexion is shortened by turning the sleeve 38 in the reverse direction, said ends of the arms are caused to separate.

In the embodiment shown in Figs. 1 and 2, the arms 10 are relatively widely spaced apart to permit the inclusion of intermediate stops 42, whereby the clamp is adapted to grip a plurality of fingers in spaced relationship at a time. Said stops 42 are of elongated lozenge shape and their side faces 44 are concavely curved in a transverse direction so as to enable them in cooperation with said pads 16 to embrace the major portion of a round member such as a finger. The stops 42 are adjustably mounted between the side plates 40 by cotters 46 passing through slots 48 formed lengthwise of said plates 40. Preferably said cotters pass excentrically through said stops so that by turning said stops on the cotters, the extent to which the stops project beyond the side plates on the same side thereof as the cushions or pads 16, may be changed. When in the position shown in the drawing, the stops act to exert pressure on fingers located therebetween, substantially on the curve passing through the several knuckles of corresponding joints, whereas in the inverted position, in which a negligible amount of the stops projects beyond the side plates on the same side thereof as the pads 16, the line of pressure defined by the stops lies well above that defined by the pads.

The single clamp shown in Fig. 3 is of substantially the same general construction as the multiple pad of Figs. 1 and 2. Since the single clamp is intended to be applied to only one finger

at a time, the side plates 42a may be much shorter and appear as links. Consequently to accommodate the screw coupling between the arms 10a the body portion 12a thereof is curved outwardly just before it merges into the head portions 20a. In the single clamp the side plates 40a may be in direct contact with the side faces of the arms 12a, as owing to the outward curvature of the pad carrying extremities of said arms, there is plenty of room therebetween to accommodate a finger. In the multiple clamp, however, certain fingers have to pass between the side plates 40 and these are therefore spaced apart by bosses 50 integral with arms 10 and serving as bearings for the pivot pins 52 passing through said body portions 12.

The housing for the pads 16 conveniently comprises a pair of parallel cheeks 54, a back 56 and a floor. Said floor is narrower than the thickness of the pad to be inserted in the housing, and the free edge 60 thereof is concave and preferably rounded as shown to prevent damage to the pads when these are being inserted. By the provision of the housings for the pads, as well as by the use of cotters for securing the stops to the side plates, the resilient parts may readily be removed from the clamps for cleaning and/or sterilising purposes or to replace existing pads or stops with others of greater or lesser hardness. Since the remainder of the clamps is wholly of metal or some similar strong material which will readily withstand high temperatures, and may be boiled or heated in an oven without damage.

It will be readily understood that in practice, the multiple clamp will be made as shown in Fig. 1 with two intermediate stops 42 so that it is more particularly adapted to grip the middle three fingers of the hand, since a separate single clamp as shown in Fig. 3 may readily be applied to the thumb and little finger if necessary. This however is not intended as limiting the present invention in any way except as in the appended claims, as clamps adapted to take all five fingers may also be constructed in accordance with the principles hereinbefore explained, as may clamps for two fingers at a time.

I claim:

1. A finger tensioning clamp for orthopaedic and surgical purposes comprising a frame member, a pair of clamp arms pivoted intermediately of their length at spaced points on said frame member, an adjustable link operative between adjacent ends of said clamp arms to vary the distance between the other ends, finger gripping pads on said other ends, and at least one intermediate stop adjustably attached to said frame member and extending into the space between said pads, said pads and stop having complementary curved surfaces for gripping a plurality of fingers.

2. A finger tensioning clamp for orthopaedic and surgical purposes comprising a frame member, a pair of clamp arms pivoted intermediately of their length at spaced points on said frame member, an adjustable link operative between adjacent ends of said clamp arms to vary the distance between the other ends, finger gripping pads on said other ends, at least one intermediate stop attached to said frame member and extending into the space between said pads, said pads and stop having complementary curved surfaces for gripping a plurality of fingers, and means providing adjustment of said stop on said frame in any direction in the plane of movement of said arms.

3. A finger tensioning clamp according to claim 1 in which the frame member includes two parallel plates between which the arms and stop are mounted, the spacing of said plates being wide enough to receive the ends of the fingers clamped by the pads and stops.

4. A finger tensioning clamp for orthopaedic and surgical purposes comprising a frame member, a pair of clamp arms pivoted intermediately of their length at spaced points on said frame member, an adjustable link operative between adjacent ends of said clamp arms to vary the distance between the other ends, finger gripping pads on said other ends, at least one intermediate stop adjustably attached to said frame member and extending into the space between said pads, said pads and stop having complementary curved surfaces for gripping a plurality of fingers, and means for applying tension to the link connected ends of said arms in the plane of pivoting thereof.

5. A finger tensioning clamp according to claim 1 in which the frame members is bowed towards to the space between the pads and carries the intermediate stop in its bowed portion.

6. A finger tensioning clamp for orthopaedic and surgical purposes comprising a frame member, a pair of clamp arms pivoted intermediately of their length at spaced points on said frame member, an adjustable link operative between adjacent ends of said clamp arms to vary the distance between the other ends, finger gripping pads on said other ends, at least one intermediate stop attached to said frame member and extending into the space between said pads, said pads and stop having complementary curved surfaces for gripping a plurality of fingers, and means for adjusting the position of the line of clamping pressure between the pads and the stop.

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