June 9, 1959 R. BASSO 2,889,827

CORRECTIVE SPLINTS

Filed Oct. 11, 1957 2 Sheets-Sheet 1

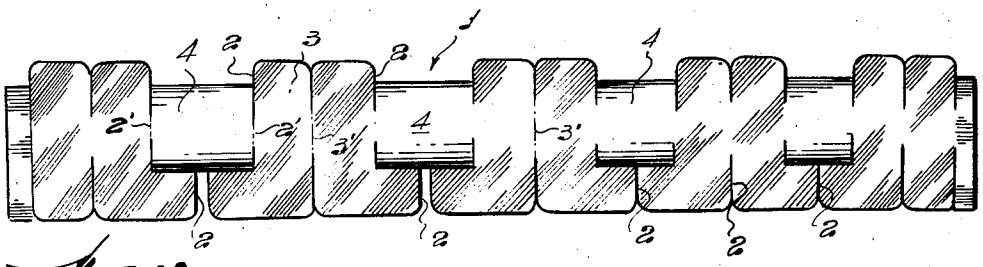


Fig. 1

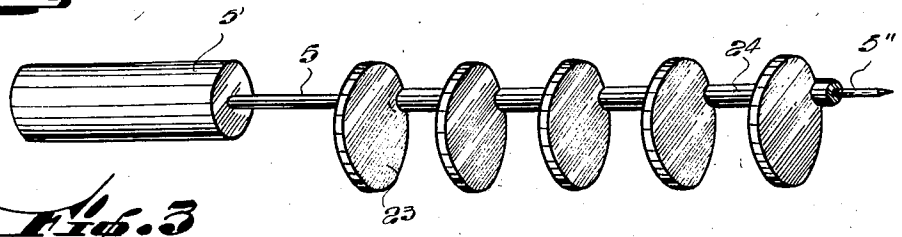


Fig. 3

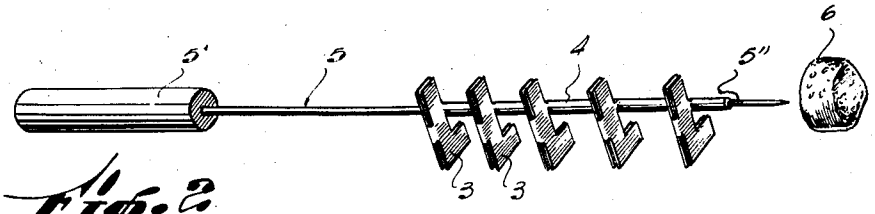


Fig. 2

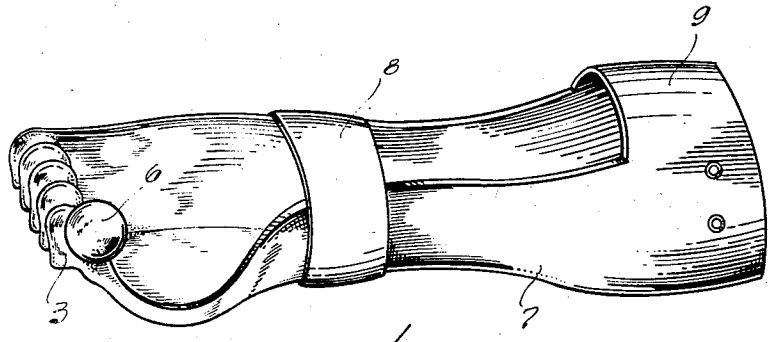


Fig. 4

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CORRECTIVE SPLINTS

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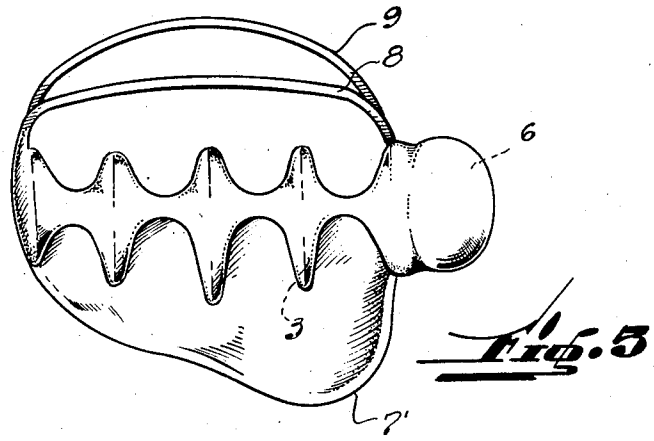


Fig. 5

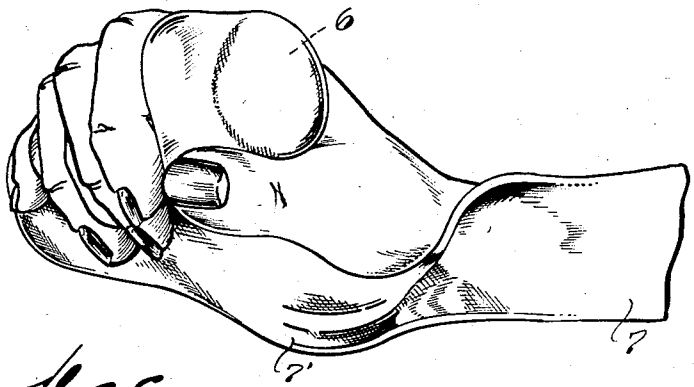
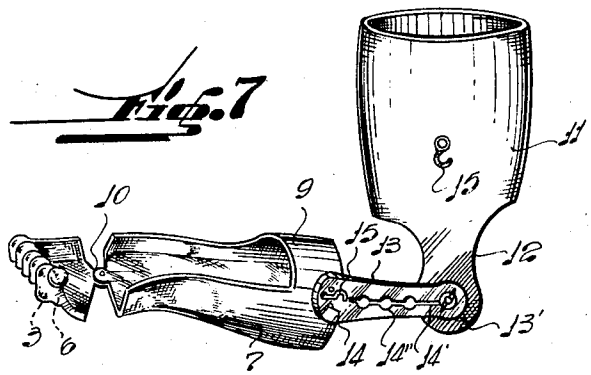


Fig. 6

Fig. 7



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CORRECTIVE SPLINTS

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9 Claims. (Cl. 128—87)

This invention relates to a corrective splint for preventing deviations of the hand and fingers axes, caused by the generically called "deforming or misshaping diseases," and is particularly indicated for completing the post-operative process.

The pathological processes, both of general and local order, attacking the anatomical structure of the joints, may produce weldings or ankylosis between the ends thereof, and partial or total destructions, which modify the direction of the axis and disable the affected member.

Besides chronical diseases attacking the locomotive apparatus and particularly the hand joints, there are other diseases and eventualities in modern life, such as accidents in industry, domestic life and sports. In addition, the neurological diseases such as poliomyelitis and others having a not yet determined cause (congenital deformations and misshapings) may also alter the structure and function of the hands, which can be successfully treated with the splint of the present invention.

Modern skillfulness in surgical techniques enables the recovery of many cripples, but the corrective surgery does not deal itself with the post-operative step, which requires the assistance of an expert in the manufacture of corrective splints, a difficult task demanding special skill when dealing with hands.

Bearing in mind the above, it is an object of this invention to provide a corrective splint capable of preventing deformations and/or ankylosis which is effective in the two fundamental steps of the orthopedic treatment, since the splint provides simultaneously the benefits of the correct position of the hand during resting static periods and functional or dynamic periods in a single device.

Another object of the invention is to provide a corrective splint having a digital guide which allows the maximum or necessary movement of each interphalangical and metacarpophalangical joint, which movements necessarily have to follow a corrective guiding axis in view of the special arrangement of the integrating parts of the splint. As to the thumb, having complex movements and a plurality of different positions, it is possible to pass from its resting position (intermediate between flexion, opposition and abduction) to any position which is favorable for recovering a particular movement.

A further object of the invention is to provide a corrective splint, the digital guide of which may be manufactured in several sizes so that the proper size may be selected for each patient in accordance to the size of his hands. Therefore, the splint of the invention is specially indicated for places in which it is not possible to find a specialist capable of manufacturing a complex splint.

A still further object of the invention, is to provide a corrective splint which may be as strong as the case demands yet very light and hygienic.

These objects and advantages of the invention will become more apparent in the course of the following description in which reference will be made to preferred embodiments by way of example in relationship with the accompanying drawings.

In the drawings:

Figure 1 is a blank in plan view of the means for manufacturing the digital guide in accordance with one of the preferred embodiments of this invention.

Figure 2 is a perspective view of the finished digital guide made of the blank shown in Figure 1, with additional accessories.

Figure 3 is a perspective view of another embodiment of the digital guide.

Figure 4 is a perspective view of the finished splint.

Figure 5 is a front view of the splint of Figure 4.

Figure 6 is a perspective view of the front portion of the splint showing a hand placed therein.

Figure 7 is a perspective view of another embodiment of the invention having adapted thereto an arm sleeve for treating the elbow joint. The corrective splint of the invention comprises a fore-arm support and a digital guide fixed thereto.

As may be seen in Figure 1, the digital guide blank shown therein consists in an elongated metal plate **1**, having cuttings **2** to define T-shaped portions **3** and linking core portions **4**.

In order to shape the blank shown in Figure 1 to its final form, as shown in Figure 2, the blank is first folded through 180°, along the longitudinal axis **3'** of each of said T-shaped portions so as to define L-shaped partitions, and then through 90° along lines **2'**. Finally core portions **4** are bent to define a tubular supporting portion.

Another digital guide is shown in Figure 3 and comprises a tubular supporting portion **24** to which partitions **23** are substantially perpendicularly connected by means of welding or the like.

Partitions **3** or **23** define the spaces for the fingers.

In order to prepare the splint, a rod **5**, having a holder **5'**, integral with one end thereof, and a sharpened free end **5''**, is passed through the tubular supporting portion **4** or **24**. The holder **5'** is mounted in a supporting device (not shown) and a rounded member **6**, made of cork, paper or the like is pinned on the free end **5''**, which projects out of the tubular supporting portion of the digital guide. Said rounded member **6** constitutes the thumb guide, as will be later seen.

Obviously the supporting portion **24** of the digitial guide shown in Figure 3, may consist in a rod having a sharpened projection at one end thereof and means for detachably connecting a holder at the other.

The digital guide is then covered with plaster or any other suitable hardenable material, and the patient's hand is fit around the covered guide which is thereby shaped to the contour of the patient's fingers whilst he grasps it.

The fore-arm support, is then cast with the same plaster employed in covering the digital guide.

Said fore-arm support consists of a channel-like member **7** adapted to support the inside face of the fore-arm, and comprises a first band **8** adapted to surround the forearm support at the height of the patient's wrist, the rear end of the forearm support **7** being defined by a cylindrical portion **9**.

Band **8** is preferably an elastic band in order to facilitate the donning and removal of the support **7** and the upper part of the cylindrical portion **9** may be detachable (not shown) or integral with the fore-arm support.

The front portion **7'** of the fore-arm support **7**, that is to say that portion which is connected to the digital guide, is preferably upwardly inclined with regard to the rest of the fore-arm support to form therewith an angle of approximately 45° (see Fig. 6).

Obviously the entire arrangement is lined interiorly with felt or flannel in order to keep the temperature of the arm and to fit it comfortably.

Once the plaster has set, rod **5** is removed.

As may be seen in Figure 6, the rounded member **6**, once covered with plaster, defines the guide for the thumb, which may thus adopt a resting position, as shown, and perform all the movements of which a healthy joint is capable, about said rounded member **6**.

In the embodiment shown in Figure 7, which is particularly adapted to correct inveterate deformations, the fore-arm support has an articulation **10** in the base of the wrist portion so that the patient's hand may oscillate in the plane defined by the fingers when in extended position.

In the cases in which the elbow joint must be treated, the splint is attached to an arm sleeve **11**.

Said arm sleeve **11**, has a projection **12** to which is pivoted the end portion **13'** of a connecting member **13**, the other end of which is secured to the fore-arm support by means of any suitable means such as screws **14** or the like.

The connecting member **13**, has preferably a longitudinal slots **14'** provided with recess **14''** so as to adapt the assembly to the length of the patient's arm.

The arm sleeve **11** and the fore-arm support **7**, may also be provided with means **15** for connecting a spring or any other elastic member therebetween in order to assist the patient in the flexion of the elbow.

I claim:

1. A corrective splint for preventing deviations of the hand and fingers axes, comprising a fore-arm support and a digital guide secured thereto, said digital guide having a pair of spaced apart lateral guiding partitions for each of the fingers and a rounded end member, fixed to said digital guide at an end thereof, for guiding the thumb.

2. A corrective splint for preventing deviations of the hand and fingers axes, comprising a fore-arm support and a digital guide secured thereto, said digital guide having a pair of spaced apart lateral guiding partitions for each of the fingers and a rounded end member, fixed to said digital guide at an end thereof, for guiding the thumb, said fore-arm support comprising a channel-like member having a band adapted to surround the patient's wrist and a cylindrical end portion adapted to surround the fore-arm in the adjacence of the elbow.

3. A corrective splint for preventing deviations of the hand and fingers axes, comprising a fore-arm support and a digital guide secured thereto, said digital guide having a pair of spaced apart lateral guiding partitions for each of the fingers and a rounded end member, fixed to said digital guide at an end thereof, for guiding the thumb, said fore-arm support comprising a channel-like member having a wrist portion including a base and a pivotal connection in said base for enabling lateral movements of the patient's hand.

4. A corrective splint according to claim 3, which comprises an arm-sleeve pivotally connected to the end portion of said fore-arm support in order to treat the elbow joint.

5. A corrective splint for preventing deviation of the hand and finger axes, comprising a fore-arm support and a digitial guide secured thereto, said digital guide comprising a supporting portion, partitions substantially perpendicular to said supporting portion defining spaces for the four fingers and a rounded member secured to one of the ends of said supporting member for guiding the thumb, said digital guide being covered with plaster and shaped to the contour of the patient's fingers, said fore-arm support comprising a channel-like member having a first band adapted to surround the patient's wrist and a cylindrical end portion adapted to surround the fore-arm in the adjacence of the patient's elbow.

6. A corrective splint according to claim 5, in which said band is an elastic band.

7. A corrective splint according to claim 5, wherein said fore-arm support, in the adjacence of said first band, is upwardly inclined with regard to the rest of the fore-arm support, to form therewith an angle of approximately 45°.

8. A corrective splint according to claim 5, which comprises an arm-sleeve pivotally connected to the end portion of said fore-arm support in order to treat the elbow joint.

9. A method for manufacturing a splint comprising the steps of producing a digital guide blank consisting in an elongated plate having cuttings to define T-shaped portion and linking core portions, folding said blank through 180° along the longitudinal axis of said T-shaped portions in order to define L-shaped partitions and through 90° along the linking line between said T-shaped portion and said core portions, bending said core to define a substantially tubular supporting portion, securing a rounded member to one end of the digital guide, covering the digital guide with plaster, shaping said covered digital guide to the contour of the patient's fingers, forming a fore-arm support and fixing said digital guide thereto.

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