Jan. 24, 1967 L. CZAP 3,299,887

ULNAR DRIFT SPLINT

Filed Dec. 9, 1963 2 Sheets-Sheet 1

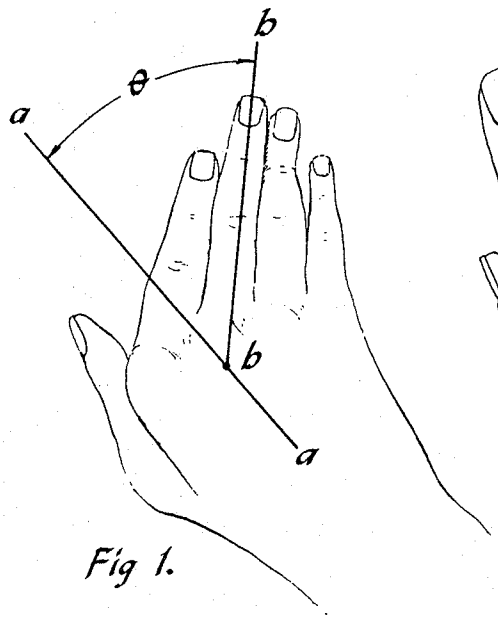


Fig 1.

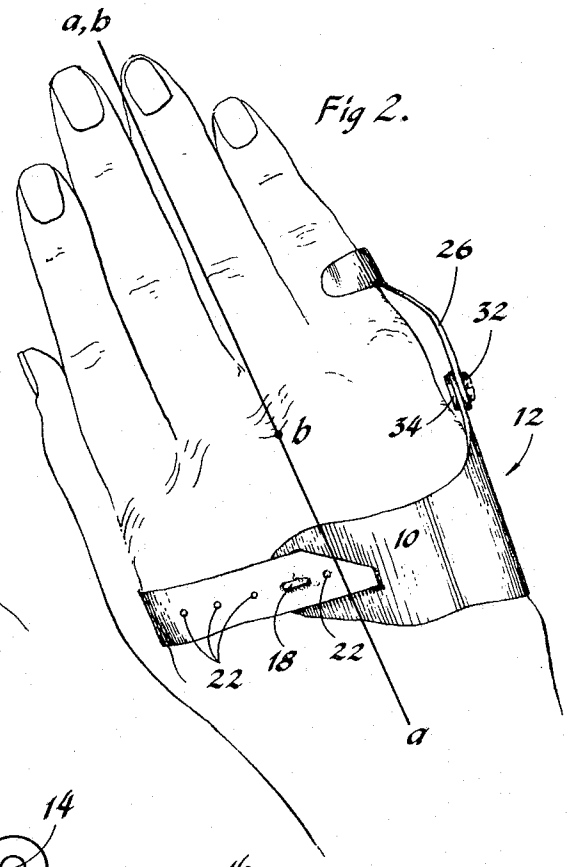


Fig 2.

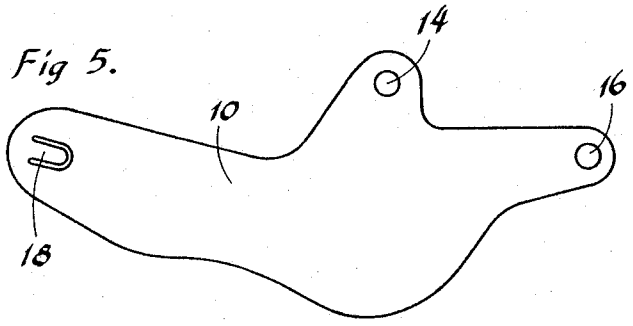


Fig 5.

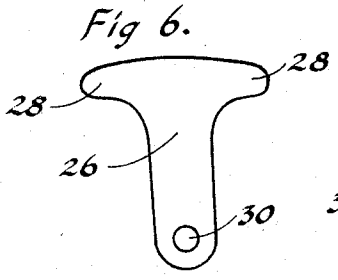


Fig 6.

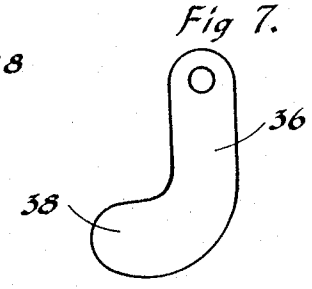


Fig 7.

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ULNAR DRIFT SPLINT

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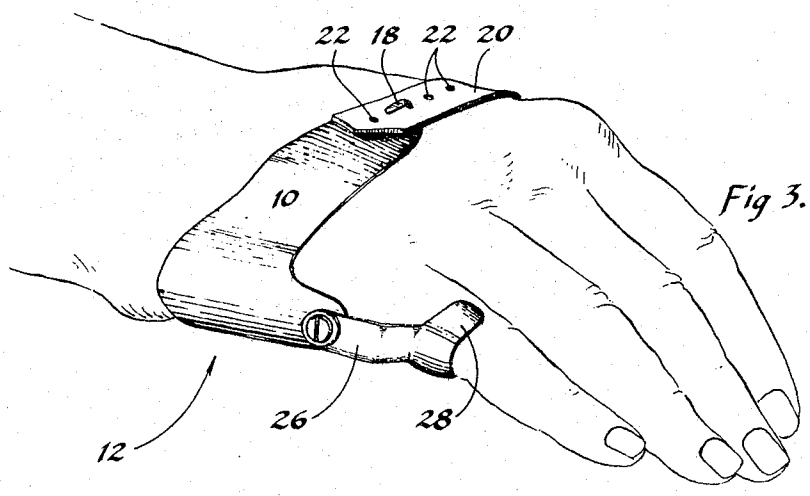


Fig 3.

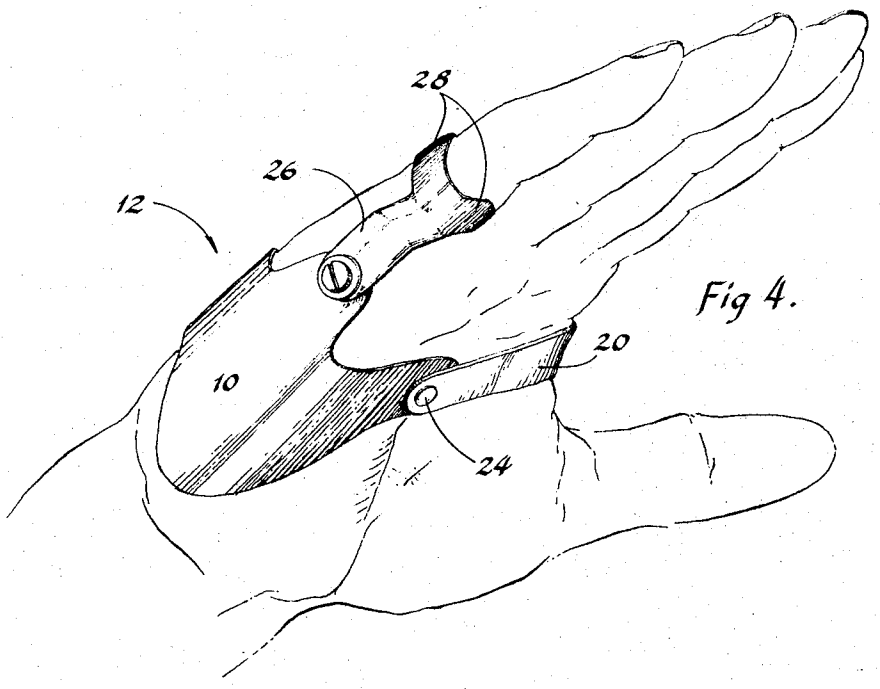


Fig 4.

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ULNAR DRIFT SPLINT

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3 Claims. (Cl. 128—77)

The present invention relates to orthopedic methods and appliances and more particularly to methods and means for retarding ulnar drift in arthritics.

The severely involved rheumatoid arthritic hand characteristically exhibits ulnar deviation deformity in the finger structures of such extent as to disturb the normal functions of grasp and release. Physical examination of the fingers at the metacarpophalangeal joints frequently reveals a definite lateral ulnar displacement of the long tendons of the flexor digitorum profundus, flexor digitorum sublimus and extensor digitorum communis. Further examination quite often indicates that the tendons of these muscles have been displaced laterally in an ulnar direction and are no longer anchored directly over the central axis of the metacarpophalangeal joints.

The magnitude of these ulnar-directed forces is necessarily large in order to produce the distortion and malalignment of the fingers of the hand. The ulnar displacement of these tendons creates a lateral torque about the metacarpophalangeal joints in an ulnar direction, especially during grasp and release during which attempted functions the finger flexors and extensors exert a maximum force for pretension of an object. The displacement results from deterioration of the tendon anchors, which act as constraints and support normal joint, tendon and muscle alignment, and the basic cause of such deterioration has been medically described as the so-called rheumatoid process.

It is accordingly an object of the invention to provide a method for retarding ulnar drift resulting from the rheumatoid process.

Another object of the invention is to provide means for retarding ulnar drift resulting from the rheumatoid process.

The above and other objects of the invention which will later become apparent as the following description proceeds, are attained by the present invention, preferred embodiments of which have been illustrated, by way of example only, in the accompanying drawings, forming a part of this specification in which like characters are employed to designate like parts throughout the same, and wherein:

FIGURE 1 is a plan view of a right hand severely deformed by rheumatoid arthitis.

FIGURE 2 is an enlarged plan view of the same hand with an ulnar drift splint applied thereto.

FIGURE 3 is a perspective view of the same hand with an ulnar drift splint applied thereto.

FIGURE 4 is another perspective view of the same hand with an ulnar drift splint applied thereto.

FIGURE 5 is a plan view of a blank for an ulnar drift splint base.

FIGURE 6 is a plan view of a blank for an ulnar drift splint extension member.

FIGURE 7 is a plan view of a blank for a modified form of an ulnar drift splint extension member.

Referring now more particularly to the drawings, the axis *a—a* of the fingers of a right hand afflicted with rheumatoid arthritis is deviated in an ulnar direction at an angle θ from the axis *b—b* of the metacarpal bones of the hand, as best shown in FIGURE 1. I have discovered that mechanical stabilization of the fifth finger of the hand to provide a counterforce on the fingers in a radial direction will retard such ulnar deviation deformity

in the finger structure characteristic of such an arthritic hand and will prolong its useful life. I have also invented an ulnar drift splint which provides a discriminately placed counterforce on the finger in such radial direction and which allows function and ulnar stability during flexion and extension of the fingers.

I form from a sheet of stainless steel or aluminum material approximately 0.037 inch in thickness a blank having a configuration and of a size approximately that shown in FIGURE 6 to form a base **10** for an ulnar drift splint generally indicated at **12**. A pair of circular apertures **14** and **16** and a tongue **18** defined by a generally U-shaped perforation are punched in base **10**. The edges of base **10** are then smoothed and polished. Base **10** is then bent along its transverse axis into a generally U-shaped configuration adapted to snugly but comfortably fit the lateral edge of the human hand. The end of base **10** which bears tongue **18** extends across the back of the hand and the opposite end, containing aperture **16**, extends across the palm of the hand generally midway between the base of the little finger and the base of the hand, as best shown in FIGURES 2, 3, and 4. The shank of tongue **18** is then slightly offset upwardly so as to dispose the tongue into a generally hook-shaped configuration with the forward portion thereof generally parallel to the plane of the portion of base **10** immediately therebelow and directed toward the center of the base along its longitudinal axis.

A strap **20**, preferably formed of flesh-colored plastisol material, bearing a plurality of longitudinally arranged, equally spaced apertures **22** therein, is then attached at its opposite end to base **10** by a rivet **24** extending through aperture **16** and through the strap. Each of the apertures **22** in strap **20** are adapted to receive and retain tongue **18** therein, whereby splint **12** may be firmly but releasably attached to a hand.

I further form from material similar to that from which base **10** was formed, a blank for an extension member **26**, having a shape and size approximately that shown in FIGURE 6, bearing a pair of wings **28**, **28** at one end thereof and a circular aperture **30**, of a slightly larger diameter than aperture **14**, near the other end thereof. The edges of extension member **26** are then smoothed and polished. Ends **28**, **28** are then bent into a generally U-shaped configuration adapted to fit snugly but comfortably about the lateral edge of the little finger of the hand near the joint between the first and second phalanges, and the extension member is offset so as to press radially inward against the little finger, as best shown in FIGURES 2, 3, and 4. Extension member **26** is then pivotally connected to base member **10** by a stainless steel screw **32** extending inwardly through apertures **30** and **14** and threadably engaged with an internally threaded annular boss **34** soldered or screwed to the inside of base member **10** surrounding aperture **14** and which is filed and polished to smoothness. If desired, a pair of washers (not shown) preferably formed of Teflon, may be inserted between extension member **26** and, respectively, base member **10** and the head of screw **32**, to minimize friction.

To use splint **12**, base member **10** is strapped snugly to the affected hand by engagement of tongue **18** with an appropriate hole **22**, and extension member **26** is disposed so as to snugly embrace the outer portion of the little finger of the affected hand, as best shown in FIGURES 2, 3, and 4. Due to the ulnar deviation of the hand, as best shown in FIGURE 1, extension member **26** presses radially inward against the little finger, thereby causing the finger and, in turn, each of the fingers of the hand, to assume a position parallel to the longitudinal axis of the metacarpal bones of the hand, as best shown in FIGURE 2. Screw **32**, forming the pivot intermediate exten-

sion member **26** and base member **10**, is generally coaxial with the hinge axis formed by the joints between the metacarpal bones and the phalanges of the hand. The fingers are thus free to close, grasp and release in a normal manner, while being maintained against ulnar drift.

A modified form of an extension member **36** is shown in FIGURE 7, and is adapted to replace extension member **26** in cases where the little finger has been so severely deformed by the rheumatoid process that it remains curled downward by and cannot be straightened out to the position shown in FIGURE 2. Extension member **36** is offset so that the downwardly curved projection **38** presses radially inward against the little finger. The downwardly curved projection **38** of the modified form of extension member **36** then generally follows the configuration of the crippled little finger and provides lateral stability at all points therealong despite the extreme deformity. If desired, a thin liner (not shown), preferably formed of Teflon, may be glued to the inner surface of projection **38** to minimize any friction between the projection and the little finger.

While the preferred embodiments of the ulnar drift splint shown in the drawings are illustrated and described for use with the right hand, it is to be specifically understood that by reversing the curvature of base member **10** and extension members **26** and **36**, the direction of offset of tongue **18**, the side of base **10** to which boss **34** is affixed, and the side to which strap **20** and extension member **26** are connected, together with other appropriate adaptations of the structural elements and mode of assembly, splint **12** may be constructed to fit, and for operative employment with, the left hand. Further, while I have shown and described extension members **26** and **36** as being pivotally connected to base member **10**, it is to, be expressly understood that they may be rigidly and non-pivotally attached to base member **10**, or formed integrally therewith by extension of the portion of the base member which is shown in FIGURE 6 as bearing aperture **14**, within the spirit and scope of my invention, in which case aperture **14** may be eliminated.

It is to be understood that the forms of the invention herewith shown and described are to be taken as preferred embodiments of the same and that resort may be had to various changes in construction without departing from the scope of the subjoined claims.

What is claimed is:

1. An ulnar drift splint for a human hand comprising;
a generally U-shaped base member formed to fit snugly around the lateral edge of said hand,
strap means for releasably securing said base member to said hand,
an extension member pivotally attached to said base member by a screw extending inwardly through apertures in said extension member and base member,

respectively, and threadably engaged with an internally threaded annular boss mounted upon the inner surface of said base member,
and a pair of wings at the forward end of said extension member, said wings being bent into a generally U-shaped configuration arranged to contact, to fit snugly around, and to press radially inward against the lateral edge of the little finger of said hand.

2. An ulnar drift splint for a human hand comprising;
a generally U-shaped base member formed to fit snugly around the lateral edge of said hand and having a tongue upwardy offset near one end thereof,
a strap connected at one end to the other end of said base member and adapted for engagement by said tongue at its other end, to releasably secure said base member to said hand,
an extension member pivotally attached to said base member,
and a pair of wings at the forward end of said extension member, said wings being bent into a generally U-shaped configuration arranged to contact, to fit snugly around, and to press radially inward against the lateral edge of the little finger of said hand.

3. An ulnar drift splint for a human hand comprising;
a generally U-shaped base member formed to fit snugly around the lateral edge of said hand,
strap means for releasably securing said base member to said hand,
an L-shaped extension member having an inverted foot, pivotally attached to said base member at a point near the end opposite said foot by a screw extending inwardly through apertures in said extension member and base member, respectively, and threadably engaged with an internally threaded annular boss mounted upon the inner surface of said base member, and arranged to contact and to press inwardly against the little finger of said hand.

References Cited by the Examiner

UNITED STATES PATENTS

1,174,887	3/1916	Meriwether	128—157
1,635,798	7/1927	Morris	128—80
2,237,251	4/1941	Longfellow	128—87

FOREIGN PATENTS

313,177	7/1919	Germany.

OTHER REFERENCES

"Purposeful Splinting Following Injuries of the Hand," by Koch et al. in Surgery, Gynecology and Obstetrics 128–87.1, vol. 68, No. 1, January 1939. Page 15 relied upon structurally. (Copy in Sci. Lib.)

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J. W. HINEY, *Assistant Examiner.*