

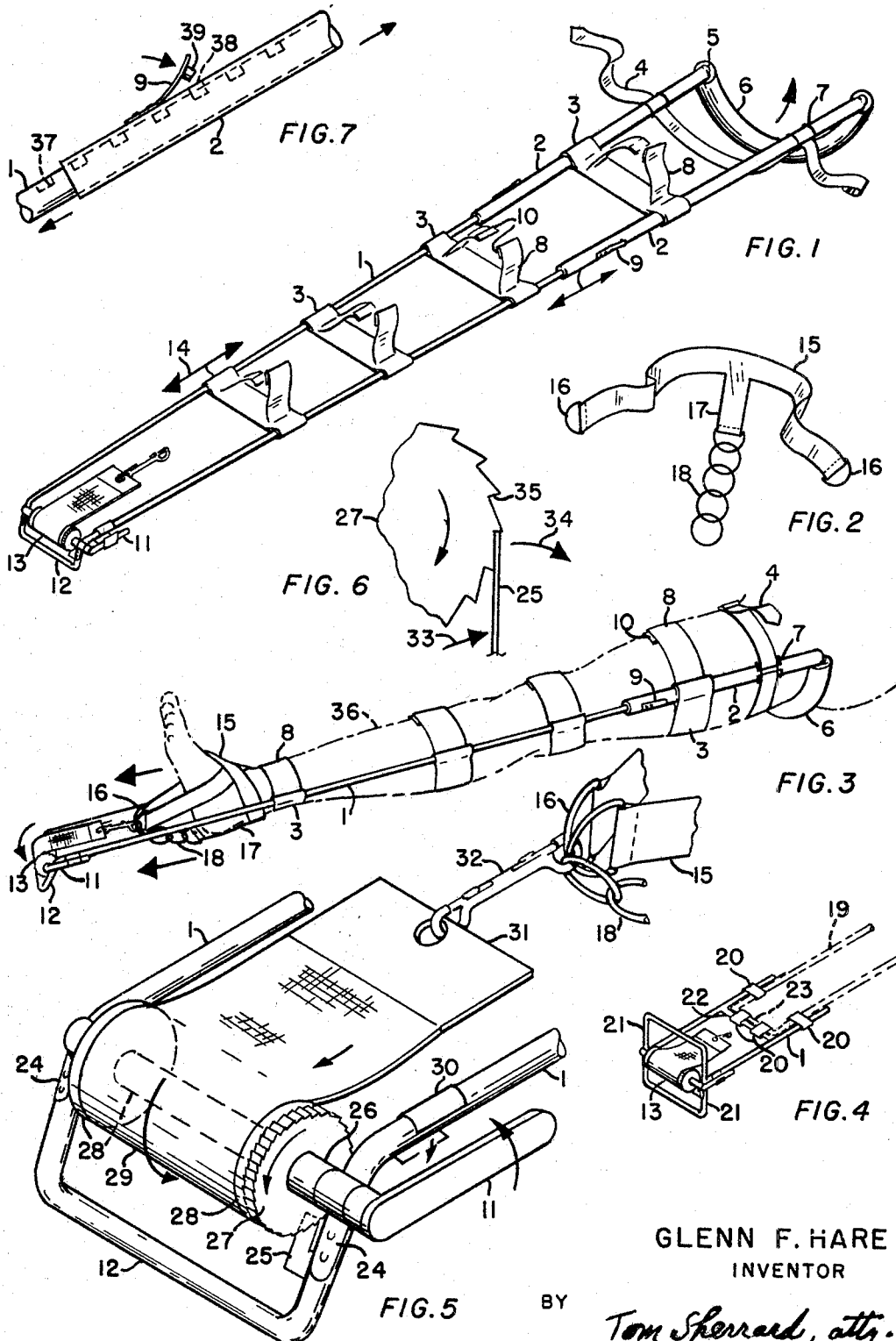
Nov. 11, 1969

G. F. HARE

3,477,428

COMBINED SPLINT AND TRACTION DEVICE

Filed June 29, 1967



GLENN F. HARE
INVENTOR

BY

Tom Sherrard, atty.

1

3,477,428

COMBINED SPLINT AND TRACTION DEVICE
Glenn F. Hare, San Diego, Calif., assignor, by mesne assignments, to Dyna-Med, Inc., San Diego, Calif., a corporation of California

Filed June 29, 1967, Ser. No. 649,907

Int. Cl. A61f 5/04; A61h 1/02

U.S. Cl. 128—85

6 Claims

ABSTRACT OF THE DISCLOSURE

An improved splint and leg traction means with a ratchet arrangement for applying and maintaining traction on a fractured leg including a member for retaining the foot in a supported position and novel transverse splint straps.

BACKGROUND OF INVENTION

Fractures of the extremities require appropriate splinting. It is epitomized in the aphorism "Splint 'em where they lie." It is generally recognized that splints should be applied at the scene of injury before the patient is moved.

For thigh and leg fractures the application of a slow, steady pull to relax the muscles and not produce irritation is recommended therapy. A gentle and steady pull should be in the long axis of the extremity. This brings the fragment which can be controlled into alignment with the fragment which cannot. Chance for injury to soft tissue, and blood vessels are reduced and relief from pain is accomplished in this manner. A small fracture might otherwise mean a large disability.

Prior first aid art includes the Thomas ring splint. Tongue depressors for a Spanish windlass action to increase and maintain traction is advised. The use of a foot support, "if available" is suggested. Thereafter the patient should be transported with extreme care and gentleness. See "The Management of Fractures and Soft Tissue Injuries," 2nd edition, American College of Surgeons, p. 78.

Upon hospitalization, the prior art leaves something to be desired. Skeletal traction has the advantage that it is more efficient than adhesives and glue applied to the skin; more weight can be used and is more comfortable, if applied correctly. But according to Management of Fractures, etc., Conwell and Reynolds, 7th edition, p. 100, "In many clinics skeletal traction has become a lost art." Also, "even under the best of conditions, the bone will become infected from the pin wound."

SUMMARY

My device has a heel support tape as a part of the sling and traction combination. This, coupled with a U-shaped member under the heel permits easy and safe handling of patients. A ratchet arrangement is adapted to sensitive control of the amount of force applied to the leg. Even though the force is critical and should be varied, the continuous use of my device is acceptable at all stages of therapy.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawing:

FIGURE 1 is a perspective view of the device, complete except the foot tape support.

FIGURE 2 is a perspective view of the foot tape support with the heel portion.

FIGURE 3 is a perspective view of the device showing it in use.

FIGURE 4 is a perspective view of a modification of my device suitable for adapting to the existing Thomas splint.

FIGURE 5 is a close-up perspective of the foot end of

2

the device with arrows to illustrate the direction of force.

FIGURE 6 is a brake detail part of the ratchet assembly, and

FIGURE 7 is a detail of an adjustable portion of the parallel splint rods.

In the drawing, wherein like numerals represent like parts throughout, the numeral 1 is one of two identical parallel rod members characteristic of the well known Thomas splint. The rods telescope into tubular sections 2 to accommodate patients with legs of various lengths. As shown in FIGURE 7, a locking arrangement may be formed of pin 39 on spring-steel arm 9. It fits into a plurality of recesses 37 through orifice 38 of item 2.

Elements transverse to the parallel members include the half ring cradle 6 for patients' leg 36. It is swively mounted at the ends of 2 for movement in the direction of the arrow by dual universal joints 5. Also traversing the space between the rods are a plurality of supports 3, preferably three in number, at regular intervals, free to slide in the direction of arrows 14 of FIGURE 1. With each support are elastic bands 8 and 10 two sections which lock over the leg in a bandage fashion. For this I prefer to use modern cohesive materials which grip without tying, buckling or snapping. Completing the transverse elements is non-elastic strap 4 with a buckle and wire brackets 7. It also may slide along tubular frame 2.

At the foot end of the device I have provided novel U-shaped support member 12 secured to rods 1 by brackets 24 on each side. This obviates the necessity of a separate foot mount and keeps the foot from bumping a hard surface.

Much of my invention resides in a ratchet pulling means or system 13. It comprises a spool 28 with spacers 26 which revolves in the direction of arrows of FIGURE 5 by manual operation of handle 11. This pulls the foot and leg of the patient in the direction of the arrows of FIGURE 3. When desired tension is acquired spring steel brake 25 engages teeth 35 of cog 27, see FIGURE 6. Finger pressure at the place indicated by arrow 33 moves item 25 in direction of arrow 34 releasing the ratchet for a new position. A spring metal handle retainer 30 may lock onto handle 11 and swing out of the way when the handle is operated. Nylon belt 29 with metal strip 31 wraps onto spool 28 as illustrated.

Snap fasteners 32 connect the described ratchet system to tape support 15. It is preferably made of non-elastic nylon material. At each end thereof are two rings 16 for engagement with fastener 32. A tape heel portion 17 is integral therewith by T-shaped connection at one end and a plurality of chain-linked rings 18 at the opposite end. FIGURE 2 shows the support in an open position and FIGURE 3 shows the support in position for use.

Lastly, a modification of the existing Thomas splint 19 is within the scope of my invention. This is shown in FIGURE 4. The Thomas splint is made for either leg by simply turning it over. In such instances I have a rectangular support member 21 for use on either leg. My modification is an adapter for splint 19. It has cross bar 22 to align with and abut splint cross piece 23 and it is secured thereto by a plurality of clamps 20, as illustrated. With the modification, conventional Thomas splints may be converted into my novel combination.

I claim:

1. In a leg splint and traction device,
 - a splint having at least two aligned and spaced elongated members that are connected at each end with spaced cross members, one of said cross members being shaped to abut against the body of the user,
 - a pulling strap for being attached to the foot of the user including a first tape member that is adapted to be looped around the ankle of the user and crossed over the upper portion of the foot with the ends ex-

3

tending laterally on each side of the mid portion of the foot,

a second tape member connected at one end to said first tape member at a point intermediate the ends of said first tape member so as to lie in the back of the ankle of the user, which second tape member is adapted to extend down the back of the heel of the user with its other end extending away from the foot adjacent the free ends of said first tape member, and

means connected to the ends of said first and said second tape members and to the other cross member of said splint for exerting a pulling force on said pulling strap that exerts a tension force on the leg of a user positioned in said splint, which tension force is exerted through said first and second tape members to not substantially bend the forward portion of the foot downwardly.

2. In a leg splint and traction device as claimed in claim 1 in which,

said second strap has means for varying the length thereof between its connection with said first tape member and said connector means, whereby the connection to said connector means is at the center line of the leg and the pulling force exerted on said pulling strap is on the center line of the leg of the user.

3. In a leg splint and traction device as claimed in claim 2 in which,

said length varying means of said second strap comprises a plurality of rings connected in a string, in which selective ones of said rings are connected to said connector means.

4. In a leg splint and traction device as claimed in claim 2 in which,

said connection means comprises a ratchet means connected at said other end of connection of said splint for exerting said tension force.

5. In a leg splint and traction device,

a splint having at least two aligned and spaced elongated members that are connected at each end with spaced cross members and with one cross member shaped to abut against the body of the user,

a spool that has an axle with a belt for being wound on said spool,

a pair of spaced aligned longitudinal members with adjacent ends secured to opposite sides of said spool axle allowing rotation of said spool thereon,

4

said longitudinal members extending radially away from said spool, said longitudinal members having a connecting member extending therebetween spaced from said adjacent spool ends,

means releasably securing said longitudinal members to said two aligned elongated members with said connecting member abutting against the other cross member,

means for rotating said spool on said longitudinal members and exerting tension through said belt on the limb of a user that is adapted to be positioned in said splint, when the user's limb is connected to the end of said belt, and

locking means for locking said spool in given rotational positions.

6. In a leg splint and traction device as claimed in claim 5 including,

a rectangular shaped member secured at substantially the mid points of a pair of its adjacent sides to the ends of said longitudinal members at the connection to said spool axle.

References Cited

UNITED STATES PATENTS

590,625	9/1897	Paquette	128—85
799,664	9/1905	Norwood	128—75 XR
819,607	5/1906	Shafer	128—85
2,007,127	7/1935	Longfellow	128—85
2,282,653	5/1942	Herzmark	128—84.4
2,394,653	2/1946	Auerhaan	128—85
2,865,367	12/1958	Sorenson	128—71

FOREIGN PATENTS

483,785	4/1938	Great Britain.
---------	--------	----------------

OTHER REFERENCES

Fracture Appliances, DePuy Catalog, DePuy Manufacturing Co. Inc., Warsaw, Ind. (1954), p. 52, relied upon.

RICHARD A. GAUDET, Primary Examiner
R. L. FRINKS, Assistant Examiner

U.S. Cl. X.R.

128—75