Oct. 21, 1969 S. MISHKIN ET AL 3,473,528

STERNAL STABILIZER

Filed April 20, 1966

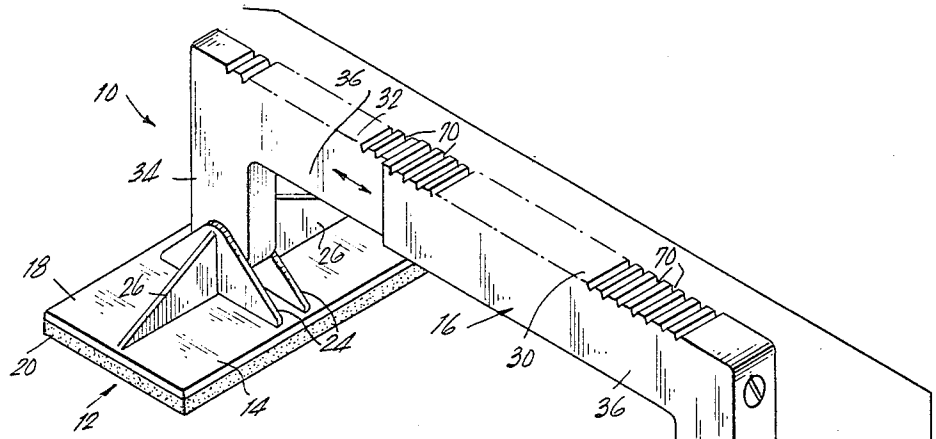

FIG. 1

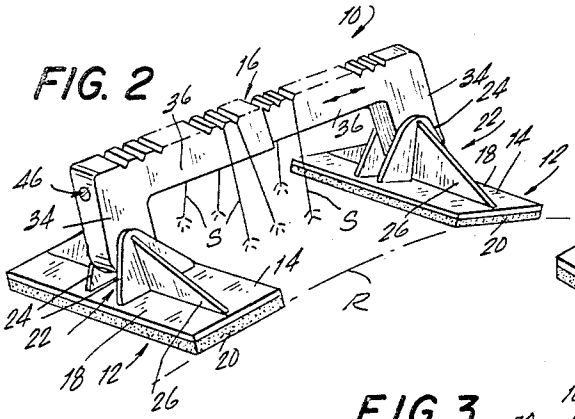

FIG. 2

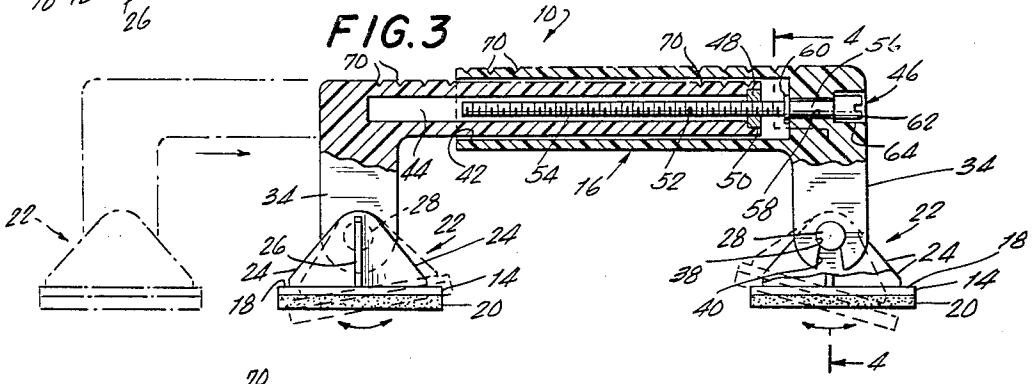

FIG. 3

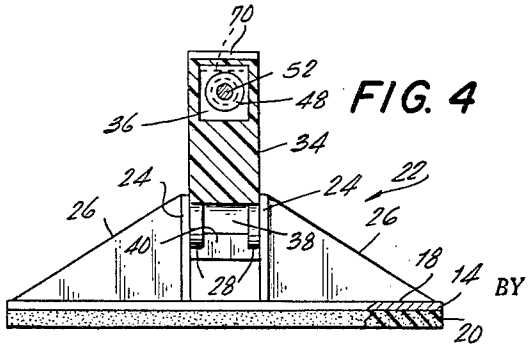

FIG. 4

INVENTORS
SIDNEY MISHKIN
ROBERT E. BIDWELL
BY
Amster & Rothstein
ATTORNEYS

United States Patent Office 3,473,528 Patented Oct. 21, 1969

3,473,528

STERNAL STABILIZER

Sidney Mishkin, 10 Wooley Lane, Great Neck, N.Y. 11023, and Robert E. Bidwell, 40 Florida St., Farmingdale, N.Y. 11735

Filed Apr. 20, 1966, Ser. No. 543,973
Int. Cl. A61f 5/04; A61b 17/08
U.S. Cl. 128—84 2 Claims

ABSTRACT OF THE DISCLOSURE

A traction device comprising a pair of base members with a bridge pivotally interconnected to the base members. The base members are placed on the patient with the bridge overlying the bone to be placed in traction. Sutures are passed over the bridge and into the bone to maintain the bone in traction. Means is provided for adjusting the length of the bridge.

The present invention relates generally to medical accessories, and more particularly to an improved traction device.

Currently known traction devices generally include support structure mounted on the bed of a patient or adjacent thereto and tie means, such as cable, cord or the like which is supported from the support structure and appropriately connected to the part of the anatomy of the patient which is to be maintained in traction. Despite improvements in individual structural features of such traction devices, even the most advanced model thereof is wholly inadequate for the treatment of many anatomical conditions which could benefit from being treated by being placed in traction. A prime example is an indented chest wall or sternum which is difficult in the first instance, to elevate or restore to a proper position and which thereafter cannot readily be maintained in traction with available traction devices. Not only is an indented sternum difficult to restore to position, but even solving this problem, the patient must be thoroughly immobilized so as to eliminate the possibility of any movement of the patient relative to the stationary support structure of conventional traction devices. In addition to an indented sternum, cheek bone fractures, and fractures of the frontal part of the skull are further examples of bone structure which could benefically be treated by being maintained in traction, and which cannot be maintained in traction with conventional traction devices.

Broadly, it is an object of the present invention to provide a traction device overcoming the foregoing and other shortcomings of the prior art. Specifically, it is an object to provide a traction device which is specifically applicable for the treatment of an indented sternum and similar bone structure which is difficult to engage and maintain in traction.

In accordance with an illustrative embodiment demonstrating objects and features of the present invention, there is provided a traction device for maintaining bone structure in traction. The device comprises a support structure adapted to be mounted on a patient and includes a support member disposed in an elevated position overlying the bond structure. Thus, sutures are capable of being supported from the support member and in engagement with the bone structure to maintain the same in traction.

The above brief description, as well as further objects, features, and advantages of the present invention, will be more fully appreciated by reference to the following detailed description of a presently preferred, but nonetheless illustrative embodiment according to the present invention, when taken in conjunction with the accompanying drawings:

FIG. 1 is a perspective view of a traction device demonstrating features of the present invention, with one end of its bridge construction being removed from its base section;

FIG. 2 is a perspective view similar to FIG. 1 but on a smaller scale, showing the traction device completely assembled and in a straddling position over the rib cage with sutures being trained over the bridge construction;

FIG. 3 is a front elevational view with portions of the bridge construction being broken away and sectioned and with the base sections being shown in broken-line view to better illustrate the adjustable features of the instant invention; and

FIG. 4 is a side elevational view with portions of the bridge construction being broken away and sectioned.

It should be understood that the instant invention is used for placing bone structure in traction and is capable of setting the bones of various portions of the human and animal anatomy. However, for the sake of a more clear understanding of the instant invention, the traction device will be described in terms of a sternal stabilizing unit used for setting the bones of the chest.

Referring now specifically to the drawings, there is shown in FIGS. 1 and 2 a traction device generally designated by the reference numeral **10**. The traction device **10** includes base members **12** having two individual platforms **14** which are capable of being mounted on the rib cage R, of a patient being operated on, as shown in FIG. 2. A bridge construction **16** is mounted on the base **12** in a position spaced apart from and laterally straddling the rib cage R.

The platforms **14** include a rigid slab section **18** which is of a generally rectangular shape and attached to a relatively soft, padded footing section **20** that is coextensive with the slab **18**. The padded footing **20** serves to absorb the pressure imparted to the ribs of the patient when the traction device **10** is placed under traction. The platforms **14** are provided with a bearing support structure **22**, which includes a pair of upright trunnions **24** that are spaced apart from each other. The trunnions **24** are mounted on the slab **18** in a rigid position by means of a pair of support arms **26** that engage the upper surface of the slab **18** and the outer surface of the trunnions **24**. The platforms **14** are completed by the stub shafts **28** which are mounted on the inner surface of the trunnions **24** in a spaced apart and confronting position.

As best seen in FIG. 3 the bridge construction **16** includes a first support unit **30** and a second support unit **32** which are capable of being joined together and have a generally L-shaped outer configuration. Since the support units **30** and **32** have an identical outer configuration, for the sake of clarity, it will suffice to describe the major components of only one such support unit in detail. Specifically, the first support unit **30** includes an upright strut **34** which is integrally formed with a cantilever arm **36** that laterally extends from the strut **34** at an angle which is substantially perpendicular thereto. The strut **34** is provided with a bearing opening **38** that communicates with a keyway slot **40** for mounting the bridge construction onto the support platforms **14**. The keyway slot **40** is sized to easily slip over the stub shafts **28** to facilitate the positioning of the struts **34** on the stub shafts **28**. The outer diameter of stub shafts **28** are slightly smaller than the inner diameter of bearing opening **38** for journalling the struts **34** on the stub shafts **28**. Accordingly, by referring to FIG. 3, it can be appreciated that the provision of the stub shafts **28** and bearing opening **38** enable the support platforms **14** to be rotated into the desired position in order to obtain proper position on either side of the rib cage R of the patient.

The cantilever arm **36** of the first support unit **30** is formed with an inner housing **42** which is sized to slid-

ably receive the cantilever arm **36** of second support unit **32**. A slot chamber **44** is also formed in the second support unit **32** for housing part of the adjustment mechanism for varying the length of span of bridge construction **16**. An adjustment mechanism generally designated **46**, is provided for varying the span length of bridge construction **16** in accordance with the physical size of the individual patient. The adjustment mechanism **46** includes an internally threaded nut **48** which is force-fitted on a recessed shoulder **50** which is formed on the end of the second support unit **32**. For threadably engaging the nut **48**, an externally threaded, elongated shaft **52** is journalled on the upper end of the strut **34** of first support unit **30**. The shaft **52** is provided with an externally threaded section **54** which extends substantially along the entire length of cantilever arm **36**, and smooth shaft section **56** which is journalled in a lateral through bore **58** that is formed in strut **34** of the first support unit **30**. The lateral bore **58** is provided with a reduced inner diameter section slightly larger than the outer diameter of shaft section **56** to obtain the free rotation necessary for adjustment. Lateral movement of the shaft **56** in through bore **58** is prevented by providing a snap ring **60** which is force-fitted onto the threaded shaft section **54** against the end of lateral bore **58** proximate inner chamber **42**, and by a set screw head **62** which is seated against the other end of lateral bore **58**. An enlarged recess **64** which communicates with lateral bore **58** is formed to house the set screw head **62** in a concealed position so as not to interfere with the surgeon. Thus, it can be appreciated that by providing a handle or screw driver device it is possible to rotate the adjustment shaft **52** in either direction to threadably engage the nut **48**, thereby laterally moving the second support unit **32** in and out of the inner housing **42**. In this manner, it is possible to adjust the lateral span of the bridge construction **16**, as desired.

A series of substantially parallel troughs **70** are formed on the upper surfaces of the support units **30** and **32**. By referring to FIG. 3 it can be appreciated that individual sutures, designated S, can be positioned in the troughs **70** such that the sutures S can be trained over the bridge construction **16** for applying traction and properly positioning the bones which are being set by the surgeon.

From the foregoing description it will be appreciated that there has been provided in accordance with the present invention an exceptionally simple and highly reliable device for applying traction to the bones of the chest after they have been set by a surgeon. After all of the bones have been set, it is relatively easy to position the traction device **10** over the rib cage R of the patient as shown in FIG. 3. This is accomplished by first adjusting the overall span of the bridge construction **16** to conform to the lateral chest width of the individual patient, by rotating the adjustment mechanism **46**. After the proper width of the span has been obtained, the support platforms **14** can then be placed on either side of the indented portion of the chest and the bridge construction can then be mounted on the stub shafts **28**. With the bridge construction **16** laterally straddling the chest, it is then possible for the surgeon to attach one end of an individual length of suture S to a bone which has been set and then train the other loose end of the suture S over the support units **30** and **32** so as to be located in one of the troughs **70** and then attach the loose end of the suture S to the bone on the other side of bridge construction **16**.

A latitude of modification, change and substitution is intended in the foregoing disclosure and in some instances some features of the invention will be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

What we claim is:

1. A traction device for maintaining bone structure in traction comprising a pair of base members and an interconnecting bridge including a pair of telescopic elements, means pivotally mounting said pair of telescopic elements on said base members, said base members adapted to be placed on a patient in spaced relation with the interconnecting bridge overlying bone structure to be placed in traction, and parallel troughs on each of said telescopic elements for receiving sutures to be attached to bone structure.

2. A tracton device according to claim **1** and further including an elongated screw interconnecting said telescopic elements for varying the length of span between said base members.

References Cited

UNITED STATES PATENTS

1,101,954	6/1914	Petry	128—85
1,852,098	4/1932	Anderson	128—335

RICHARD A. GAUDET, Primary Examiner

JOHN D. YASKO, Assistant Examiner

U.S. Cl. X.R.

128—335