Dec. 30, 1969 G. M. MORRISON 3,486,505

ORTHOPEDIC SURGICAL INSTRUMENT

Filed May 22, 1967

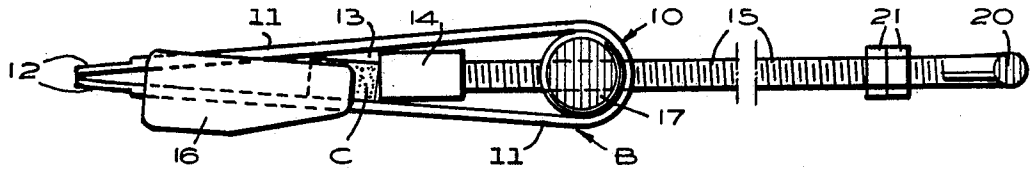



FIG. 1

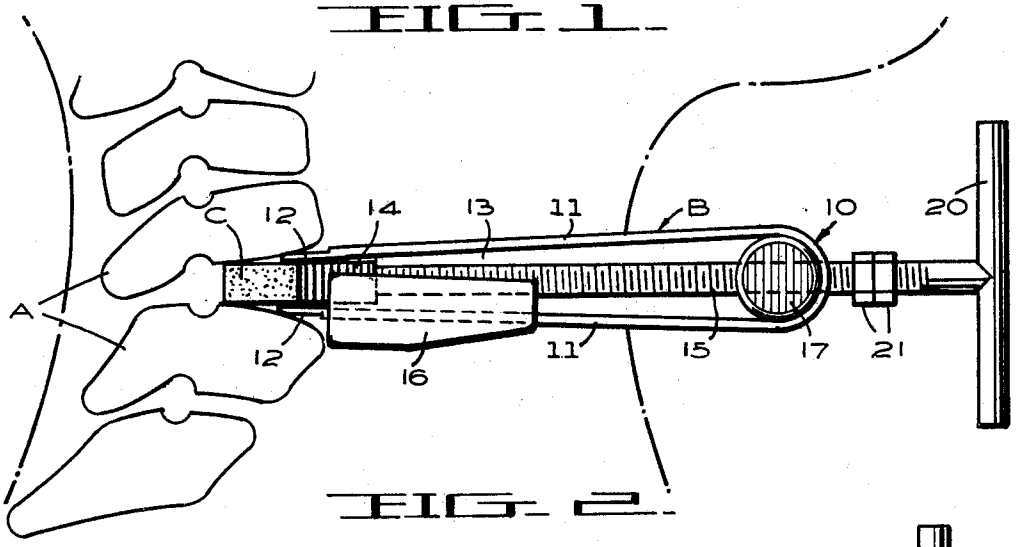



FIG. 2

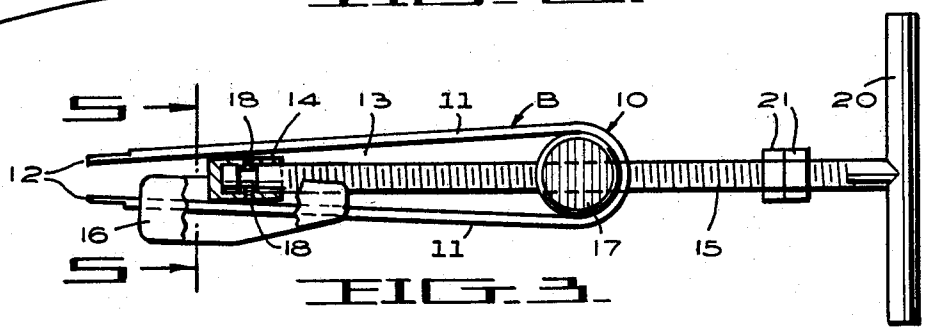



FIG. 3

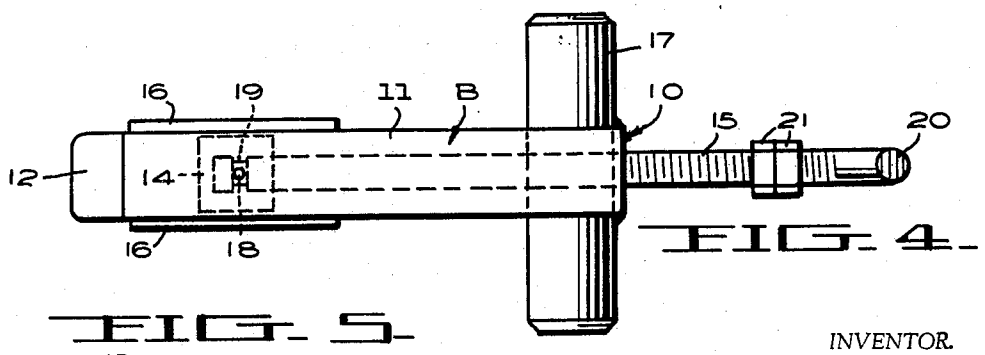
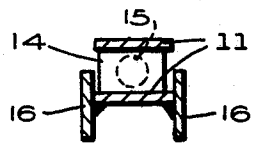



FIG. 4

FIG. 5




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# ORTHOPEDIC SURGICAL INSTRUMENT

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U.S. Cl. 128—303 4 Claims


## ABSTRACT OF THE DISCLOSURE

An instrument to distract (separate) two closely adjacent objects (as bodies of the vertebrae) and at the same time inserting an object (as a bone graft) between the distracted objects. The instrument acts as a protective guide and channel to the inserted object (as in inserting a bone graft between adjacent vertebral bodies) and at the same time acting as a protective retractor to adjacent soft tissues. The depth of insertion is controlled.


## BACKGROUND OF THE INVENTION

At the present time, it is common practice for orthopedic surgeons to apply a sling around a patient's neck and then draw the sling so as to distract or separate adjacent vertebral bodies; and while the patient is under such traction, a bone graft is actually hammered into a final position between the distracted vertebral bodies, and the implanted bone graft will unite the adjacent vertebral bodies.

## SUMMARY

An object of this invention is to provide an orthopedic surgical instrument that may be readily used to distract two closely adjacent vertebral bodies and at the same time inserting a bone graft therebetween, with the depth of insertion being controlled, and obviating the need of hammering the bone graft in place. Moreover, the instrument is so designed as to act as a protective guide and channel to the inserted bone graft and serving as a protective retractor to adjacent soft tissue of an incision that is made in the patient to expose the vertebral bodies to be repaired.

## BRIEF DESCRIPTION OF THE DRAWING

For a better understanding of the invention, reference should be had to the accompanying drawing, forming part of this specification, in which:

FIG. 1 is a side elevational view of my orthopedic surgical instrument with the tips thereof disposed in proximate relationship with respect to each other;

FIG. 2 is another elevational view disclosing the instrument being used to insert a bone graft between two distracted adjacent vertebral bodies;

FIG. 3 is a further elevational view of the instrument with part of a lateral guide broken away and a sliding block being shown in section;

FIG. 4 is a top plan view of the orthopedic surgical instrument; and

FIG. 5 is a transverse sectional view taken along the vertical plane 5—5 of FIG. 3.

While I have shown only the preferred embodiment of my invention, it should be understood that various changes, or modifications, may be made within the scope of the appended claims without departing from the spirit of the invention.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing in detail, it will be noted that a fragmentary portion of a patient's spinal column has been shown in FIG. 2. It is well known that such a



spinal column is composed of an articulated series of vertebrae connected by ligaments and separated by elastic intervertebral fibrocartilages. In this view of the drawing, two adjacent vertebral bodies A that are normally disposed in closely adjacent relation have been distracted (separated) by my orthopedic surgical instrument B, with a bone graft C being inserted between these distracted vertebral bodies so that the latter may be fused or united together.

The orthopedic surgical instrument B is provided with a supporting frame **10** having a pair of arms **11** mounted for movement toward and away from one another, the arms extending generally lengthwise with respect to each other, each arm being provided with a tip **12** at its forward end, the tips being movable into proximate (close) relationship relative to one another (see FIG. 1) so that they may be inserted between closely adjacent vertebral bodies A. The arms **11** define a channel **13** into which the bone graft C may be placed, with the tips **12** in contact with one another, as in FIG. 1.

A sliding block **14** is disposed between the arms **11** and is anchored to the forward end of a threaded rod **15** in a position to engage with and advance the bone graft C between and forwardly of the tips **12**. As this block is advanced from the position disclosed in FIG. 1 to the position shown in FIG. 2, the arms **11** and their tips **12** will be spread apart by the advancing block, resulting in distracting the adjacent vertebral bodies A to provide sufficient space therebetween for reception of the bone graft C, and at the same time advancing the bone graft into a final position between the distracted vertebral bodies A. The arms **11** and tips **12** are located to engage with and guide the bone graft C forwardly to its final position.

Moreover, the supporting frame is U-shaped and is made from resilient material, with the arms **11** and their tips **12** being biased toward one another so as to yieldingly maintain contact with the bone graft C as the latter is advanced between and projects beyond the tips.

A pair of spaced lateral guides **16** are provided on opposite sides of the supporting frame, and have been shown as being welded to the lowermost arm. These guides are located to hold the bone graft C between the arms **11** as the bone graft is advanced, the lateral guides and arms acting as a protective retractor to adjacent soft tissues of an incision made in the patient to reach and expose the vertebral bodies A. These lateral guides define forward ends that are located to engage with one of the vertebral bodies A to limit or control insertion of the tips **12** between the vertebral bodies (see FIG. 2), thereby preventing damage to the spinal cord.

It will be seen that a handle **17** is provided on the supporting frame **10** that may be grasped by a surgeon to hold the instrument in place.

The rod **15** previously mentioned is threaded through the handle **17** and has its forward section projecting into the channel **13** between the arms **11**, the rod being advanced toward the tips **12** when the rod is turned in one direction and retracted relative to the tips when the rod is turned in the opposite direction. The sliding block **14** may be anchored to the forward end of the rod **15** by set-screws **18** that extend into an annular groove **19** formed in the rod (see FIGS. 3 and 4), with the rod being free to rotate relative to the block **14**. Cross-bar **20** may be used to rotate the rod **15** and forward movement of the rod is limited by adjustable nuts **21** on the rod, thereby limiting insertion of the bone graft between the distracted vertebral bodies.

It will be apparent from FIGS. 4 and 5 that the lateral guides **16** are welded to the lower arm **11** (or otherwise secured thereto), and that the upper arm **11** will pass be-

tween these guides as the tips **12** are moved into proximate relationship (see FIG. 1). Also, the lateral guides act as a gauge to the width of the implanted objected (as a bone graft).

Although I have described my instrument in detail with respect to orthopedic surgery, it may be used in other applications where it is desired to distract (separate) closely adjacent objects and move an insertable object into a final position between the distracted objects.

I claim:

**1.** In an orthopedic surgical instrument:

(a) a supporting frame having a pair of arms mounted for movement toward and away from one another, the arms extending generally lengthwise with respect to each other, each arm being provided with a tip at its forward end, the tips being movable into proximate relationship relative to one another so that they may be inserted between closely adjacent vertebral bodies;

(b) the arms defining a channel therebetween into which a bone graft may be inserted;

(c) operating means actuatable to spread the tips apart so as to distract said adjacent vertebral bodies to provide sufficient space therebetween for reception of the bone graft, and at the same time advancing the bone graft into a final position between the distracted vertebral bodies, the arms and tips being located to engage with and guide the bone graft forwardly to its final position;

(d) a pair of spaced lateral guides provided on opposite sides of the supporting frame and located to hold the bone graft between the arms as the bone graft is advanced, the lateral guides and arms acting as a protective retractor to adjacent soft tissues of an incision made in the patient to reach said vertebral bodies;

(e) the lateral guides defining forward ends that are located to engage with one of said vertebral bodies to limit insertion of the tips between the vertebral bodies;

(f) and the lateral guides being secured to one of the arms and disposed so that the other arm will pass between these guides as the tips are moved into proximate relationship.

**2.** The orthopedic surgical instrument, as set forth in claim **1**;



(g) and in which the supporting frame is made from resilient material, with the arms and their tips being biased toward one another so as to yieldingly maintain contact with the bone graft as the latter is advanced between and projects beyond the tips.

**3.** The othopedic surgical instrument, as set forth in claim **1**;

(g) and in which adjustable means are provided to limit the depth of insertion of the bone graft between said distracted vertebral bodies.

**4.** The orthopedic surgical instrument, as set forth in claim **1**;

(g) and in which a handle is provided on the supporting frame that may be grasped by a surgeon to hold the instrument in place;

(h) the operating means comprising:

(1) a rod threaded through the handle and having a forwarded section projecting into the space between the arms, the rod being advanced toward the tips when the rod is turned in one direction and retracted relative to the tips when the rod is turned in the opposite direction;

(2) and a sliding block disposed between the arms and being anchored to the forward end of the rod in a position to engage with and advance the bone graft between and forwardly of the tips with sufficient force to insert the bone graft into its final position between the distracted vertebral bodies.

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U.S. Cl. X.R.

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