Oct. 25, 1949. E. E. LONGFELLOW 2,486,303

SURGICAL APPLIANCE FOR BONE FRACTURES

Filed April 29, 1948

Fig. 1.

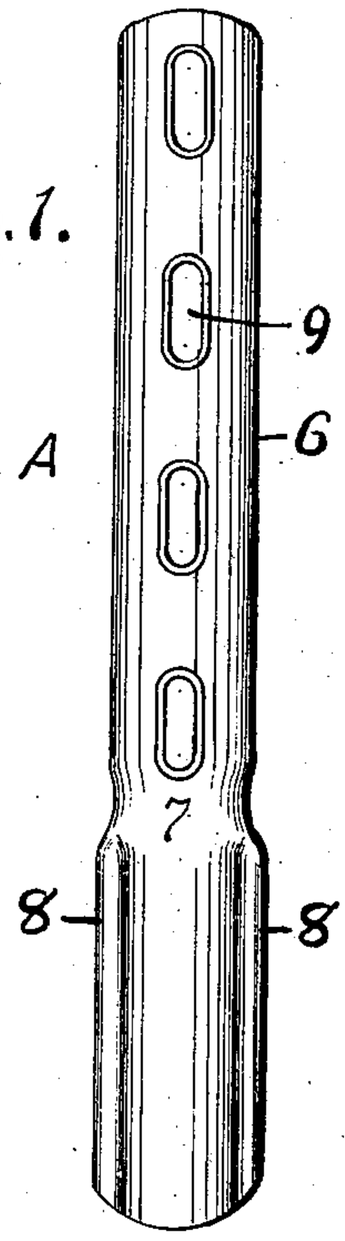


Fig. 2.

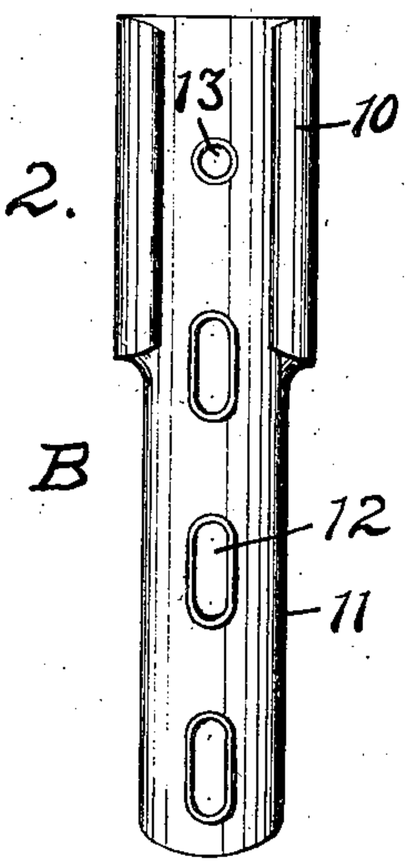


Fig. 3.

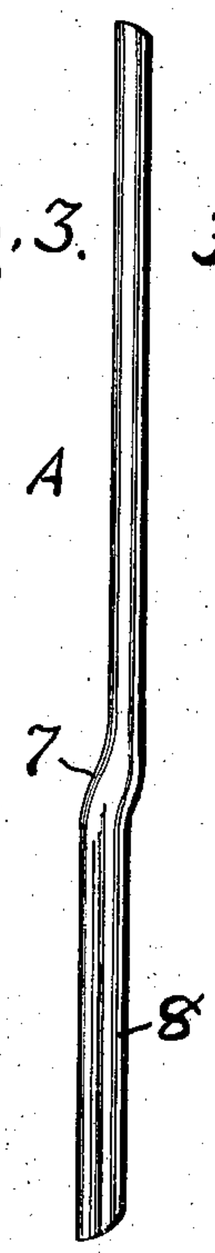


Fig. 4.

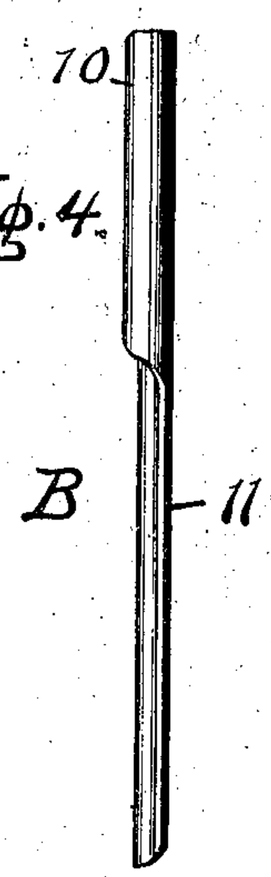
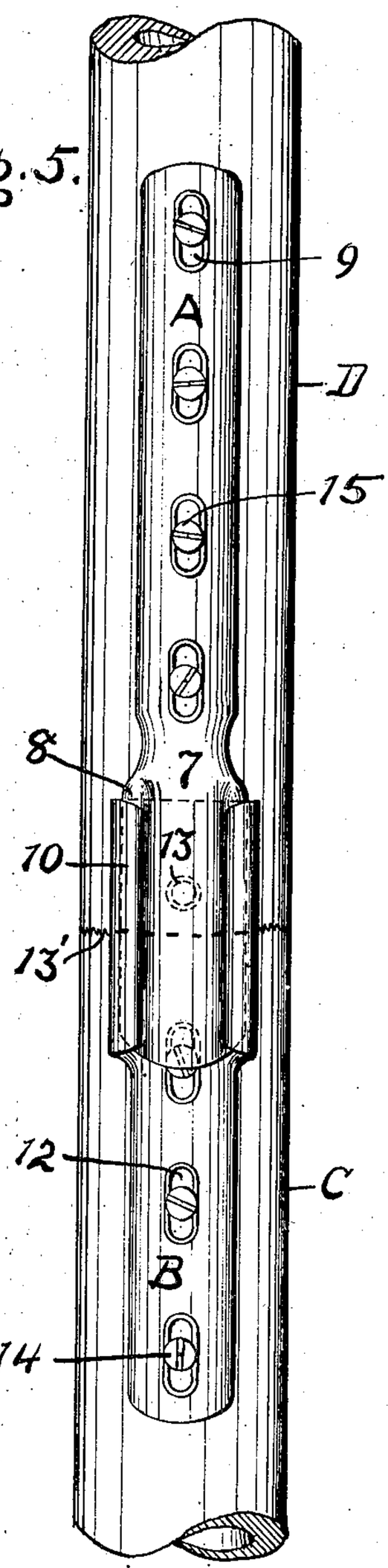


Fig. 5.



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SURGICAL APPLIANCE FOR BONE FRACTURES

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3 Claims. (Cl. 128—92)

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This invention relates to improvements in a surgical appliance for bone fractures, such as those of the femur shaft or humerus.

Ordinarily, in the treatment of a fractured bone a continuous plate is secured to the abutting bone fragments after apposition of the fragments has been established by manipulation, screws being inserted through openings in the plate into the underlying bone, thus holding the fragments relatively in definite fixed positions, which forestalls more or less natural movement of one fragment from the other necessary to accommodate growth of callous as it forms between the fragments during the knitting process that usually follows.

An object of the instant invention is to afford an appliance by which abutting fragments of a fractured bone are coupled together after apposition is established, secured against relative rotation, and sustained in axial alinement while permitting relative axial movement therebetween to compensate for growth of the callous formation between the opposing fragments of the bone, the purpose being to relieve the fragments of stress during the knitting process.

Another object of the invention is to afford facility in establishing alinement of and apposition of the bone fragments and in securing the appliance in place without occasioning stress as between the fragments during or subsequent to the operation.

Other objects and advantages of the invention appear in the following description.

An illustrative embodiment of the invention is shown in the accompanying drawings, in which:

Fig. 1 is a top plan view of one member of the appliance;

Fig. 2 is a similar view of a mating member for that shown in Fig. 1;

Fig. 3 is a side view projected from Fig. 1;

Fig. 4 is a side view projected from Fig. 2; and

Fig. 5 is a composite top plan view showing an assemblage of the members and fragments of a fractured bone.

The invention consists of mating metallic plates indicated generally by A and B respectively. The shank 6 of the plate A is made transversely arcuate to conform approximately with the curvature of the bone when attached thereto, as hereinafter described. The plate A has an offset medial portion 7 and laterally extending flanges 8 that extend longitudinally from said offset portion to the lower end of the plate. The shank 6 has made therein a series of screw slots 9 disposed midway between the

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sides of the shank and are preferably elongated lengthwise with respect to the shank.

The plate B is made transversely arcuate uniformly throughout its length to snugly fit the bone, and along the sides of its upper end portion are inturned flanges 10 that overlap the flanges 8 of the plate A when the two plates are telescopically interrelated. In the shank 11 of the plate B are made a series of elongated screw slots 12 disposed midway between the sides thereof, and preferably a sight opening 13 is made in the plate B between the inturned flanges 10 thereon, which serves as an aid in adjusting the plate relative to the fracture line, and in establishing apposition of the fragments.

When the plates are positioned into engagement with each other the flanged end of the plate A overlaps the opposing flanged end of the plate B, and due to the offset portion 7 of the plate A the inner face of the shank 6 thereof and that of the plate B lie in a common plane parallel with those of the apposed bone fragments when the assemblage is completed.

In applying the plates to a fractured bone after the bone is exposed, as in customary open surgery, the plate B is preferably first positioned on the bone with its flanged end bridging the fracture line 13' after apposition of the bone fragments has been established. Screws 14 then are inserted through the slots 12 and driven into the bone fragment C, whereby to firmly secure the plate B thereon. The plate A is applied to the bone fragment D by placing it thereon and sliding it lengthwise into telescopic connection with the flanged end of the plate B, and thereafter are inserted screws 15 through the slots 9 and driven into the bone fragment D, whereby the plate A is firmly secured in place. After the plates have thus been secured in place, the incision is then treated and sutured as in usual surgical practice.

By this structure and arrangement of the plates, the bone fragments are held in alinement with each other, relative rotation thereof is circumvented and the fragments are permitted to be drawn together by contraction of the surrounding muscles of the limb by which said fragments are continuously urged toward each other during callousing of the joint. And, coincidentally, relative axial movement of the apposed fragments, under the urge of the growth of callous between their abutting ends, is permitted. In this manner is facilitated the knitting process by which the fragments of the broken bone are reunited without the hindrance that occurs where an ordinary con-

tinuous bar connection between the fragments is employed, in which instance the fragments are either definitely held a fixed distance apart from each other or detrimentally cramped.

Variations from the particular construction above disclosed may be resorted to by the exercise of skill in the art, without departure from the spirit or scope of the invention.

What I claim is:

1. A surgical appliance for bone fractures consisting of mating plates, one of which has lateral outwardly extending flanges along one end portion thereof, and having an offset between said end portion and the shank of said plate, said shank being transversely arcuate throughout its length, the other plate being transversely arcuate throughout its length, one end portion thereof having lateral inturned flanges that have telescopic engagement with the flanged end portion of its mating plate.

2. A surgical appliance for coupling fragments of a fractured bone together, said appliance consisting of two separate plates, the opposing end portions of which have telescopic engagement with each other, one of said plates having adjacent its telescoping portion an offset, and the adjacent end portion of the other plate having made therein a sight opening, said plates having screw slots made in their shanks for the reception of screws to secure the plates to said bone fragments.

3. A surgical appliance for holding fragments of a fractured bone in alinement, said appliance consisting of two separate plates, one of said plates having an end portion provided with an offset and outwardly extending lateral flanges, the opposing end portion of the other plate having inwardly extending side flanges, the flanged portions of said plates having telescopic free longitudinal movement relative to each other, and means securing said plates separately to the corresponding bone fragments.

EARL E. LONGFELLOW.

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The following references are of record in the file of this patent:

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