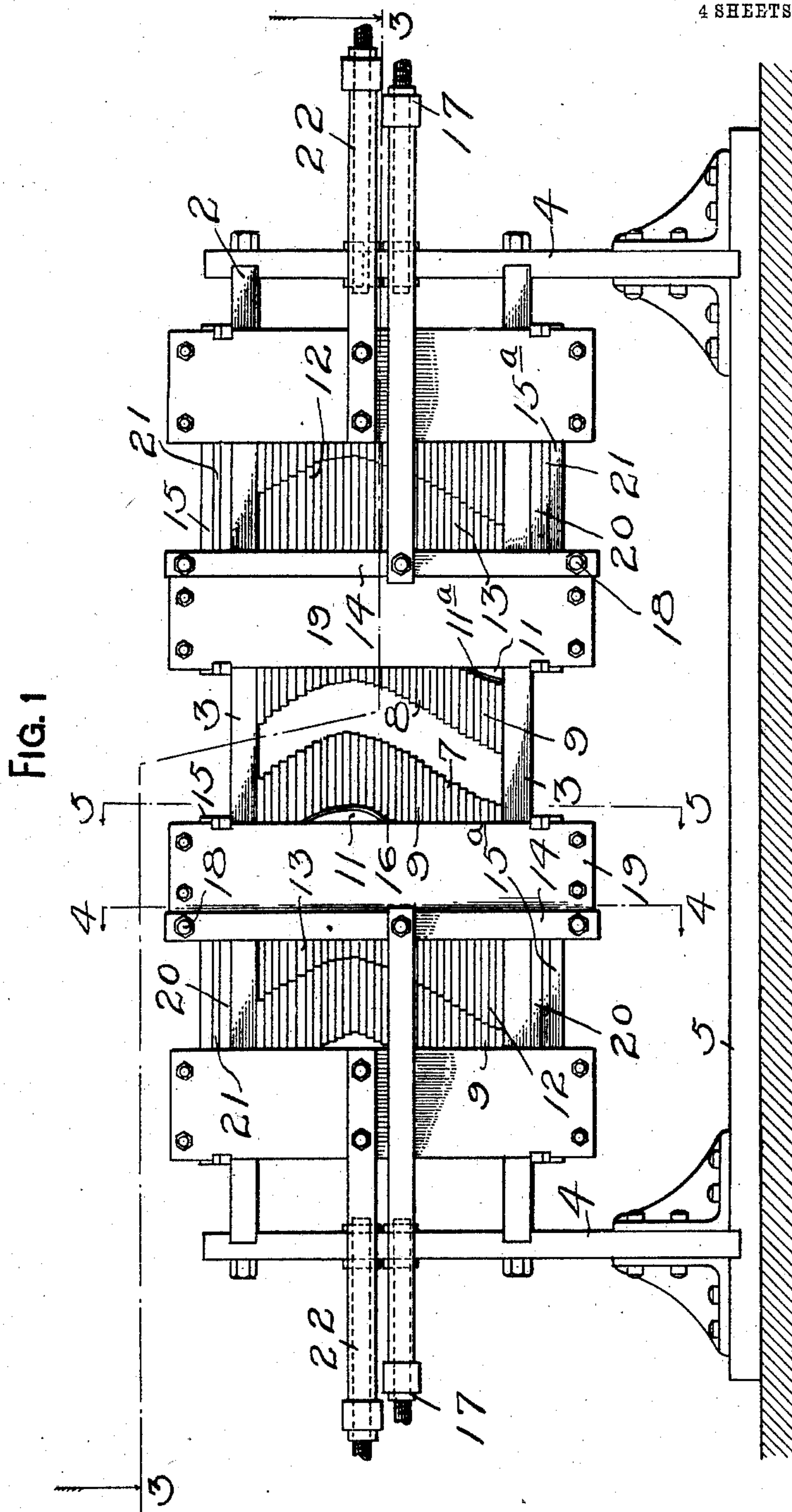


W. W. BISSELL.  
 APPARATUS FOR SHAPING METAL.  
 APPLICATION FILED DEC. 7, 1908.

928,353.

Patented July 20, 1909.

4 SHEETS—SHEET 1.



WITNESSES

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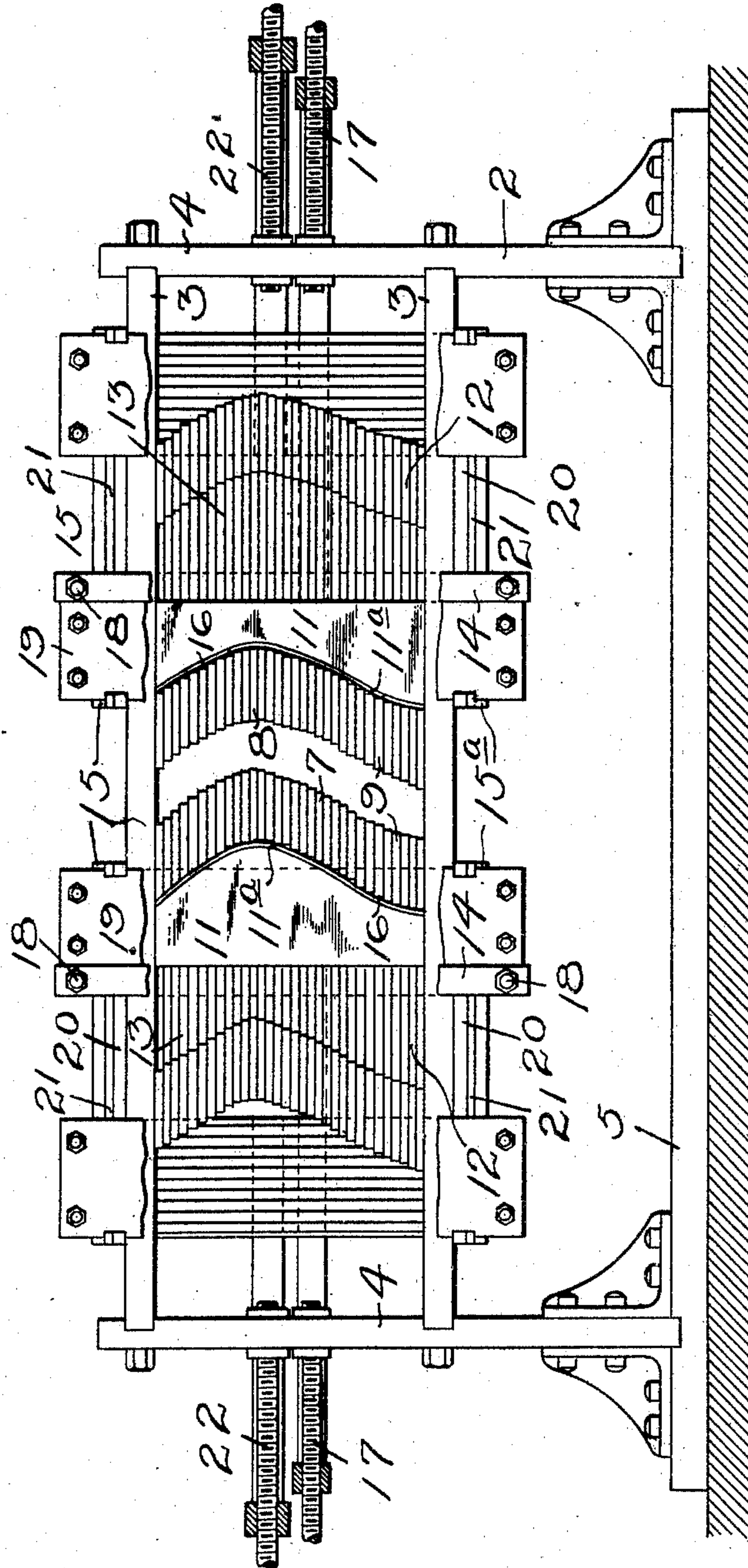
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4 SHEETS—SHEET 2.

FIG. 2



WITNESSES

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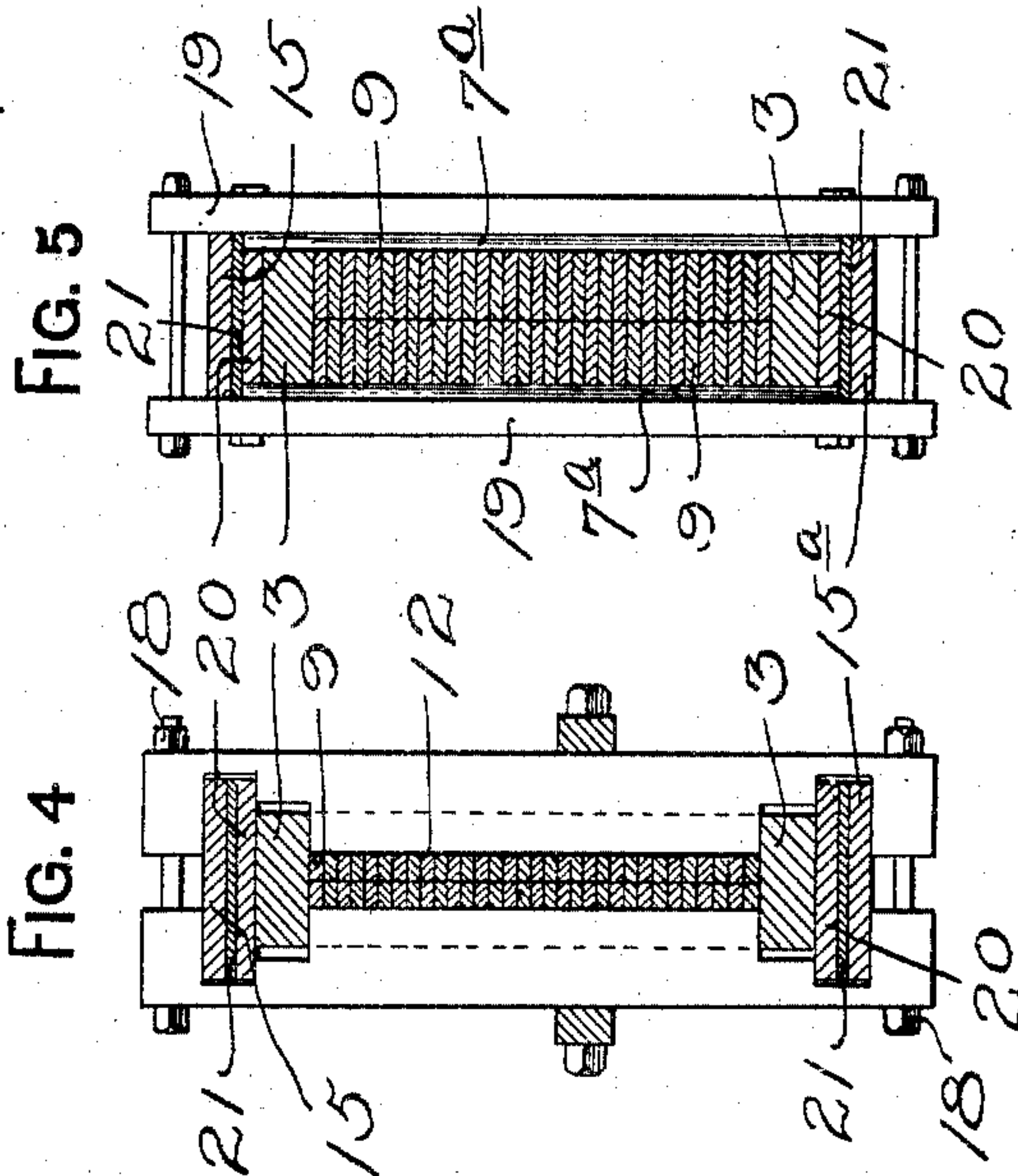
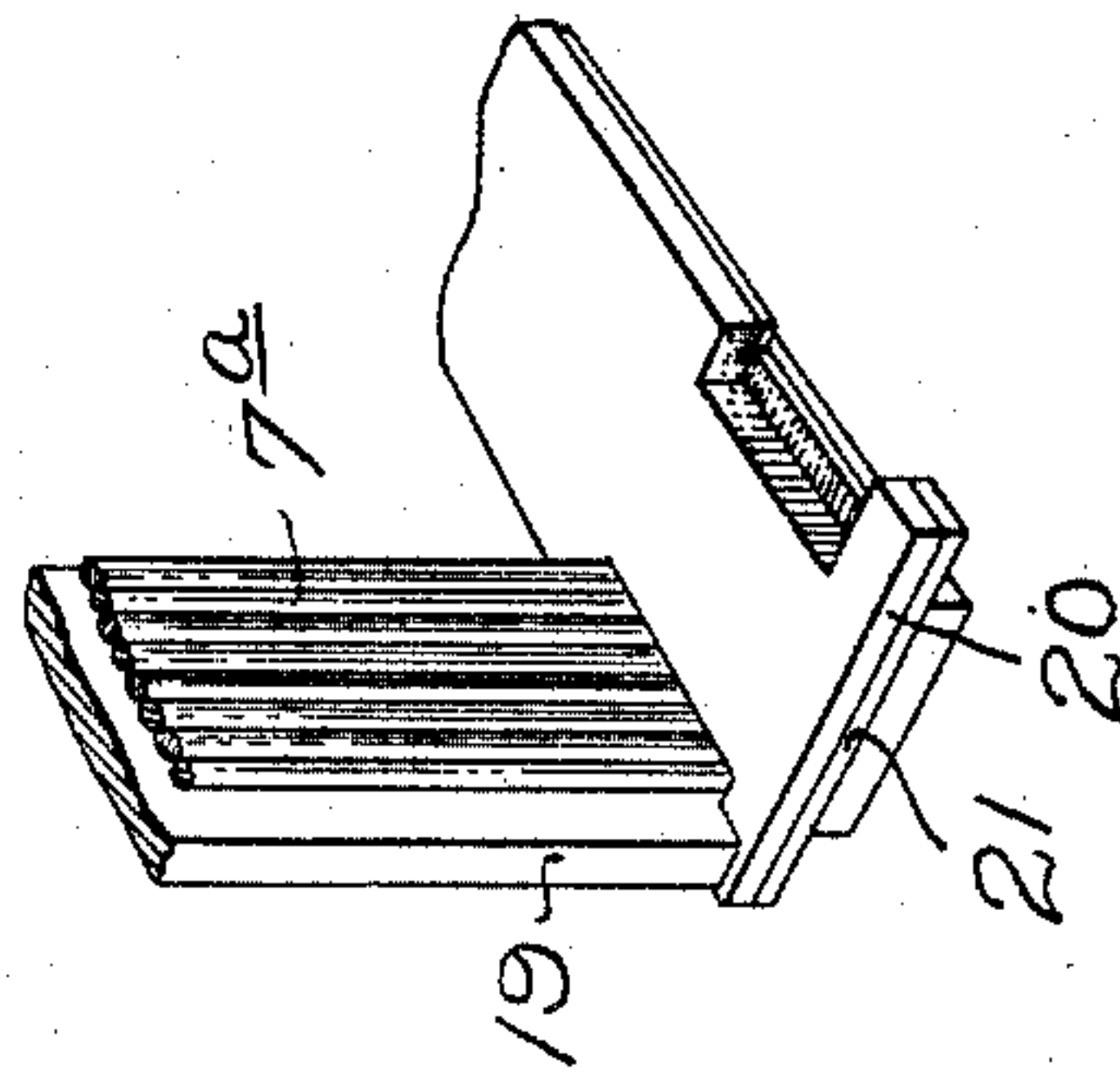
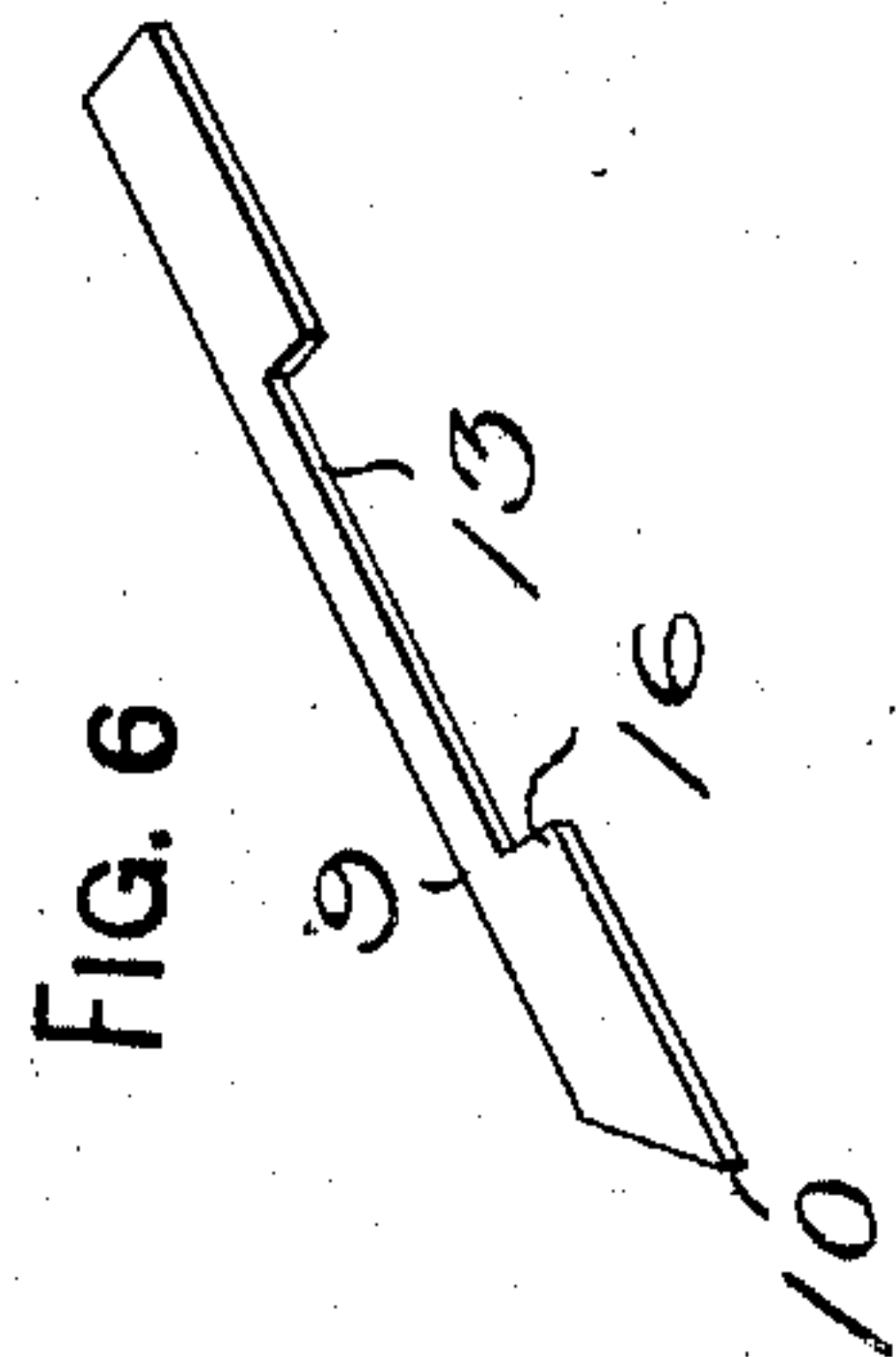
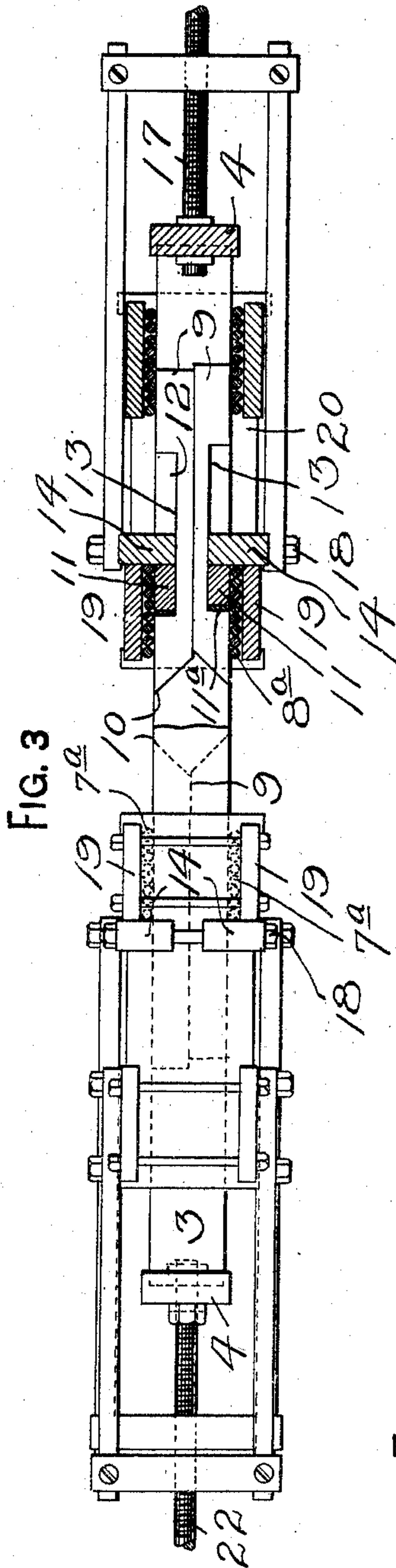
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4 SHEETS—SHEET 3.



WITNESSES

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 M. A. Barth

INVENTOR

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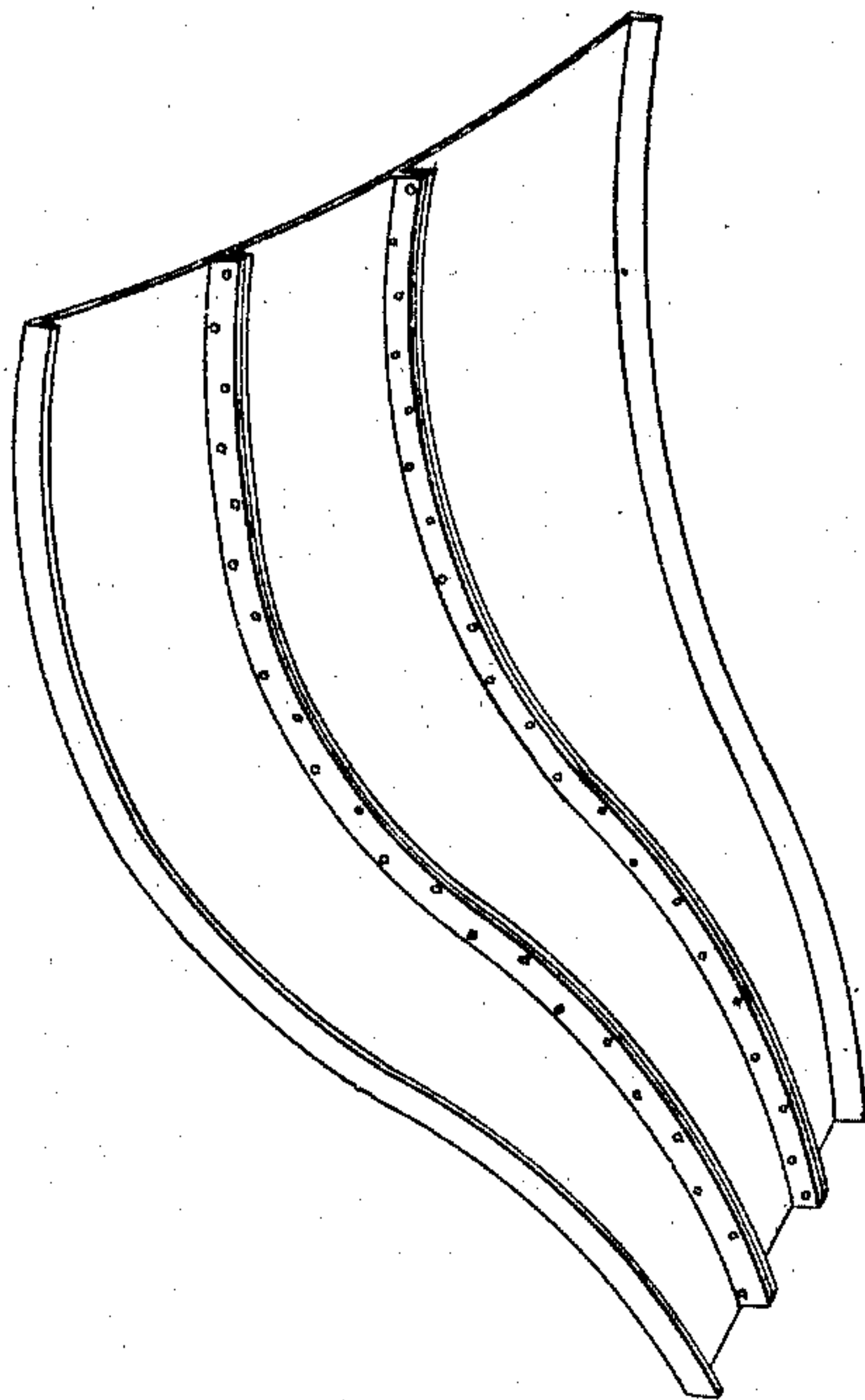
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4 SHEETS—SHEET 4.

FIG. 8



WITNESSES

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# UNITED STATES PATENT OFFICE.

WILLIAM W. BISSELL, OF BEAVER, PENNSYLVANIA.

## APPARATUS FOR SHAPING METAL.

No. 928,353.

Specification of Letters Patent.

Patented July 20, 1909.

Application filed December 7, 1908. Serial No. 466,284.

*To all whom it may concern:*

Be it known that I, WILLIAM W. BISSELL, of Beaver, in the county of Beaver, State of Pennsylvania, have invented a certain new and useful Improvement in Apparatus for Shaping Metal, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to apparatus for shaping metal, more particularly the shaping of sheet metal sections to be used in the manufacture of boats, tanks, and other articles; and it consists in providing a series of separable dies adapted to be built up to the desired shape to be given the sheet metal section by means of suitable patterns, as will be hereinafter more fully described.

I will now describe my invention so that others skilled in the art to which it appertains may understand and construct the same, referring to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved apparatus; Fig. 2 is a similar view partly in section; Fig. 3 is a horizontal sectional view on the line 3—3 of Fig. 1; Fig. 4 is a transverse sectional view on the line 4—4 of Fig. 1; Fig. 5 is a similar view on the line 5—5 of Fig. 1; Fig. 6 is a perspective view of one of the separable bars used in building up the dies; Fig. 7 is a fragmentary perspective view to be hereafter referred to; and Fig. 8 is a perspective view showing a number of boat sections which have been formed in the dies and then riveted together.

In describing my invention, the reference numeral 2 indicates the main frame of the apparatus. This frame comprises the top and bottom horizontal bars 3 secured to the vertical end bars 4, which end bars extend upwardly from a suitable base 5. Carried in the frame 2 are the dies 7 and 8, each die being formed of two tiers of separable steel bars 9 beveled at the end to form bending faces 10. The bars 9 may be shifted so as to give to the dies 7 and 8 any desired shape. This shaping of the dies may be accomplished by the use of suitable patterns 11 which are adapted to be inserted in the recesses 12 formed by the cutaway portions 13 of each of the bars 9. These recesses 12 are arranged preferably on the outer side of the dies 7 and 8, so as to allow of the ready insertion and withdrawal of the patterns.

The shape of the inserted patterns is caused to be imparted to the dies 7 and 8 by means of the vertical bars 14 which extend downwardly from the sliding blocks 15 to similar blocks 15<sup>a</sup> beneath the lower bar 3. These vertical bars 14 are adapted to lie in the recesses 12 of the dies 7 and 8 and are adapted to force the pattern 11 against the end shoulders 16 formed by the recesses 13 of the bars 9, causing the separable bars 9 to assume the shape of the pattern as the said bars 9 are caused to be moved longitudinally in the frame 2. It will, of course, be understood that in shaping up the dies 7 and 8, a concave portion of the face of one die should conform to the opposite convex surface of the other die.

The horizontal shifting of the separable bars 14 and the consequent shifting of the bars 9 may be effected by means of a suitable screw arrangement 17. Any suitable mechanism, however, may be employed to accomplish this movement. After the dies have been formed to the desired shape, the bars 9 are locked in this position by means of the binding screws 18 which serve to compress the vertical bars 14 binding them against the bars 9. The locking of the bars 9 after the dies have been shaped serves to hold the bars 9 against displacement when the dies 7 and 8 are caused to be separated after the formation of a sheet-metal section. In pressing the dies together during the operation of shaping the metal, the force exerted on the bars 9 is taken up by the patterns 11 which are held against displacement by means of the vertical bars 14 which serve to bring the dies together during the said forming operation in the manner above described. If a wooden pattern be used, a metallic strip 11<sup>a</sup> may be inserted between the pattern and the separable bars so as to preserve the pattern outline against the destructive pressure of the separable bars.

To form flanges on the side edges of the curved sheet-metal plate, already formed by the dies 7 and 8, I provide the side dies 7<sup>a</sup> and 8<sup>a</sup> (see Fig. 3) which are caused to be advanced to press the flanges on the curved form. The dies 7<sup>a</sup> and 8<sup>a</sup> shown are in the form of vertical rollers 7<sup>a</sup> mounted in front of the bearing plates 19 carried by the slidable blocks 20 mounted between the horizontal bars 3 and the blocks 15 and 15<sup>a</sup>. The rollers 18 are journaled in the blocks 20 as shown in Fig. 7, the intermediate plate 21



serving to prevent vertical displacement of the said rollers when the two sets of slidable blocks are caused to be shifted one over the other. The dies 7<sup>a</sup> and 8<sup>a</sup> are caused to be  
5 advanced and retracted by means of the screw arrangement 22 which is similar to the screw arrangement 17.

The operation of my invention will be readily understood. The dies 7 and 8 being  
10 brought to the desired shape, as shown in the drawings, being of the desired curved form of a boat section, the sheet of metal to be formed is placed between the dies 7 and 8, which dies are caused to be brought to-  
15 gether in the manner described above, pressing the metal to the curved form. Either one of the side dies 7<sup>a</sup> and 8<sup>a</sup> may then be advanced to press a flange on each edge of the curved form. In the building of boats,  
20 the forming of the flange *b* integral with the metallic section *c*, the flanges may be riveted together in the manner shown in Fig. 8 of the drawings, thus forming strengthening ribs and doing away with rivet-heads on the  
25 outer surface of the boat.

Although I have mentioned my invention

as especially adapted to the building of boats, I do not desire to limit myself thereto.

Having thus described my invention, what I claim and desire to secure by Letters Pat- 30 ent is:—

1. In apparatus for shaping metal, the combination of separable dies having cut-away portions, patterns adapted to be in- 35 serted in said cut away portions, and die-connecting bars adapted to lie in said cut-away portions and bear against the patterns.

2. In apparatus for shaping metal, the combination of separable inner dies having cutaway portions, patterns for shaping the 40 said inner dies and adapted to occupy a portion of the said cutaway portions, means for holding the patterns in the cutaway portions against displacement, outer dies, and means 45 for imparting a reciprocatory movement to the said inner and outer dies.

In testimony whereof, I have hereunto set my hand.

WILLIAM W. BISSELL.

Witnesses:

M. A. BARTH,

M. ARTHUR KELLER.