

(No Model.)

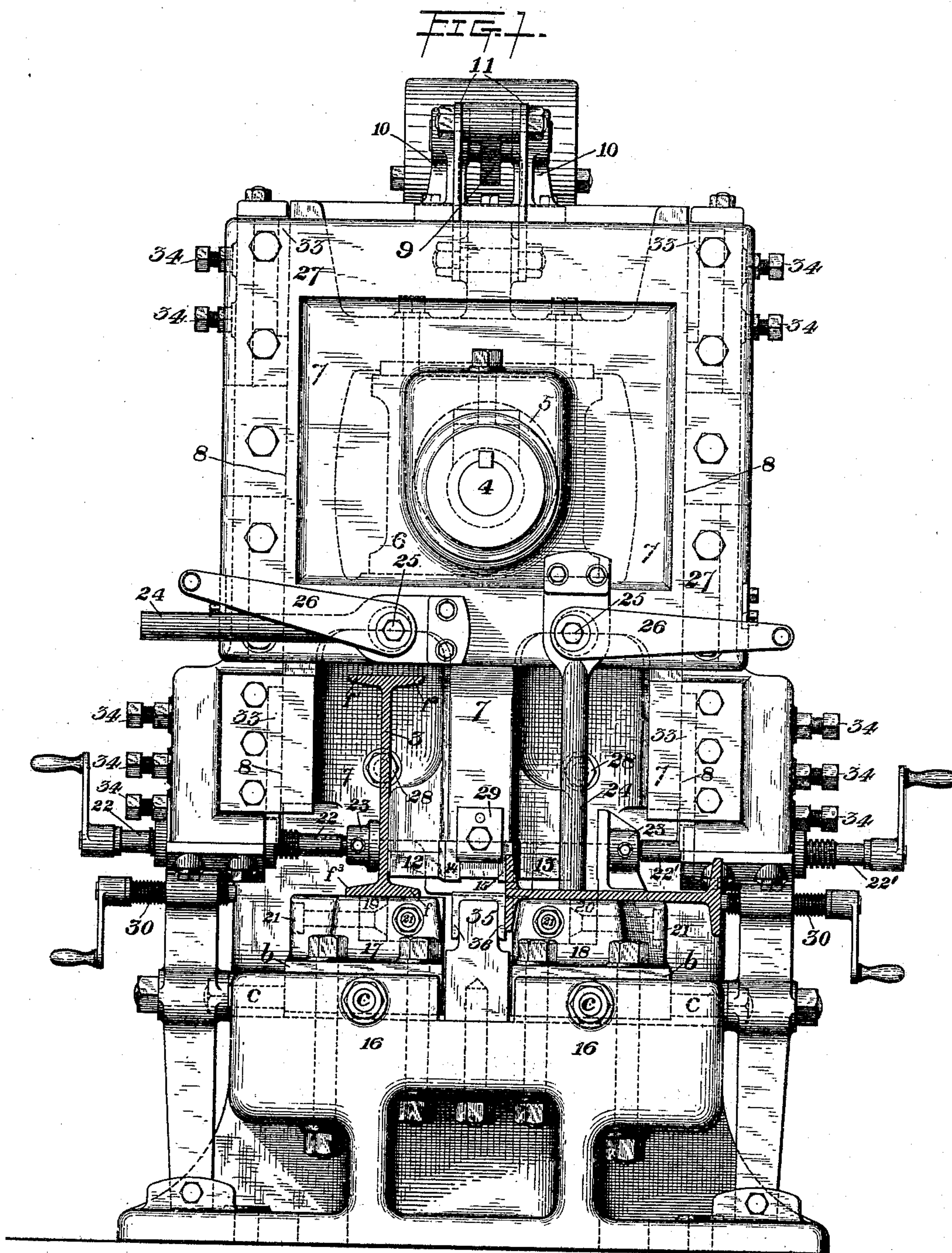
4 Sheets—Sheet 1.

J. KENNEDY.

MACHINE FOR CUTTING FLANGED BEAMS.

No. 395,569.

Patented Jan. 1, 1889.



WITNESSES.

*H. L. Gill.*  
*W. D. Corwin*

INVENTOR.

*Julian Kennedy*  
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(No Model.)

4 Sheets—Sheet 2.

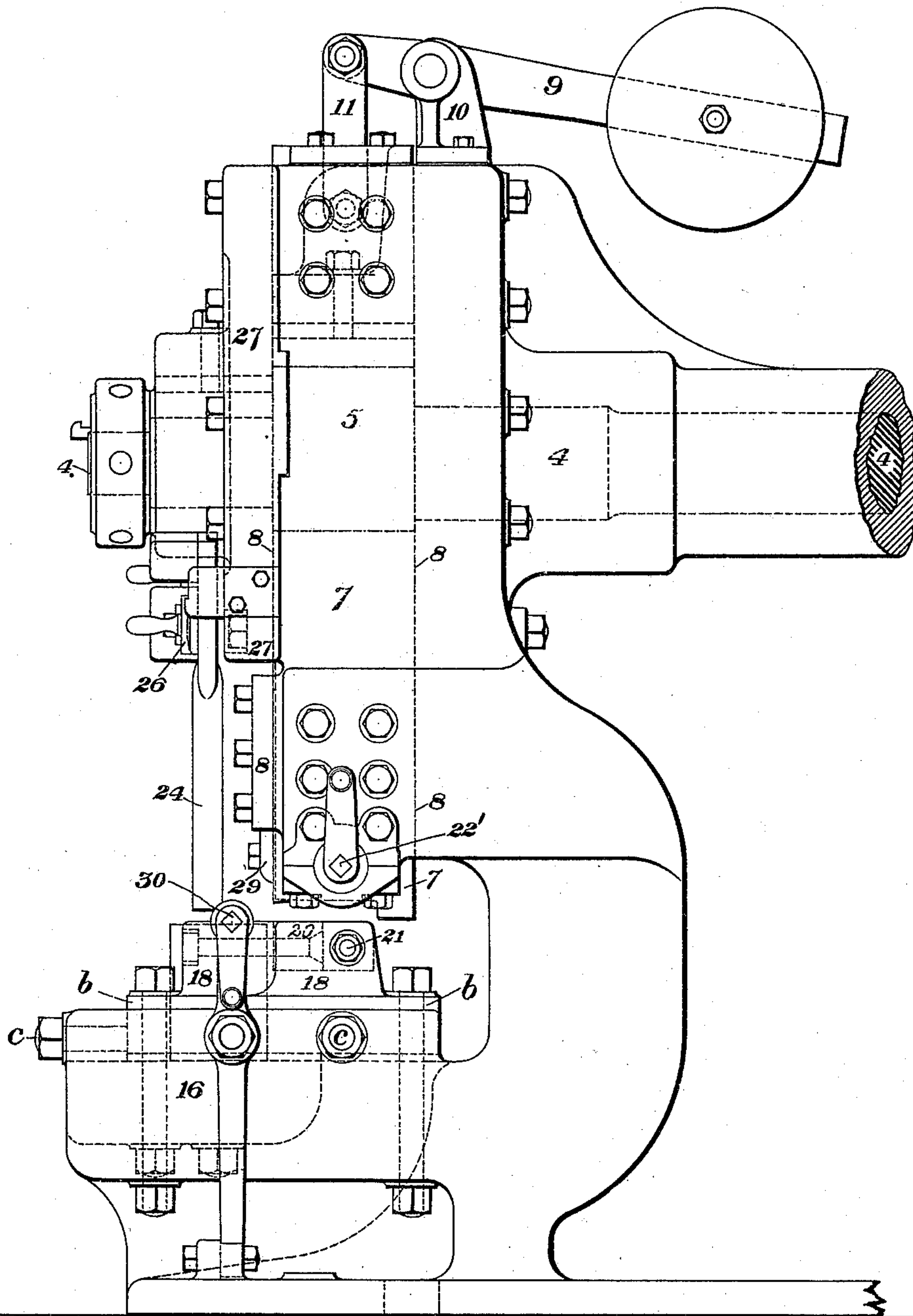
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FIG 2.



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(No Model.)

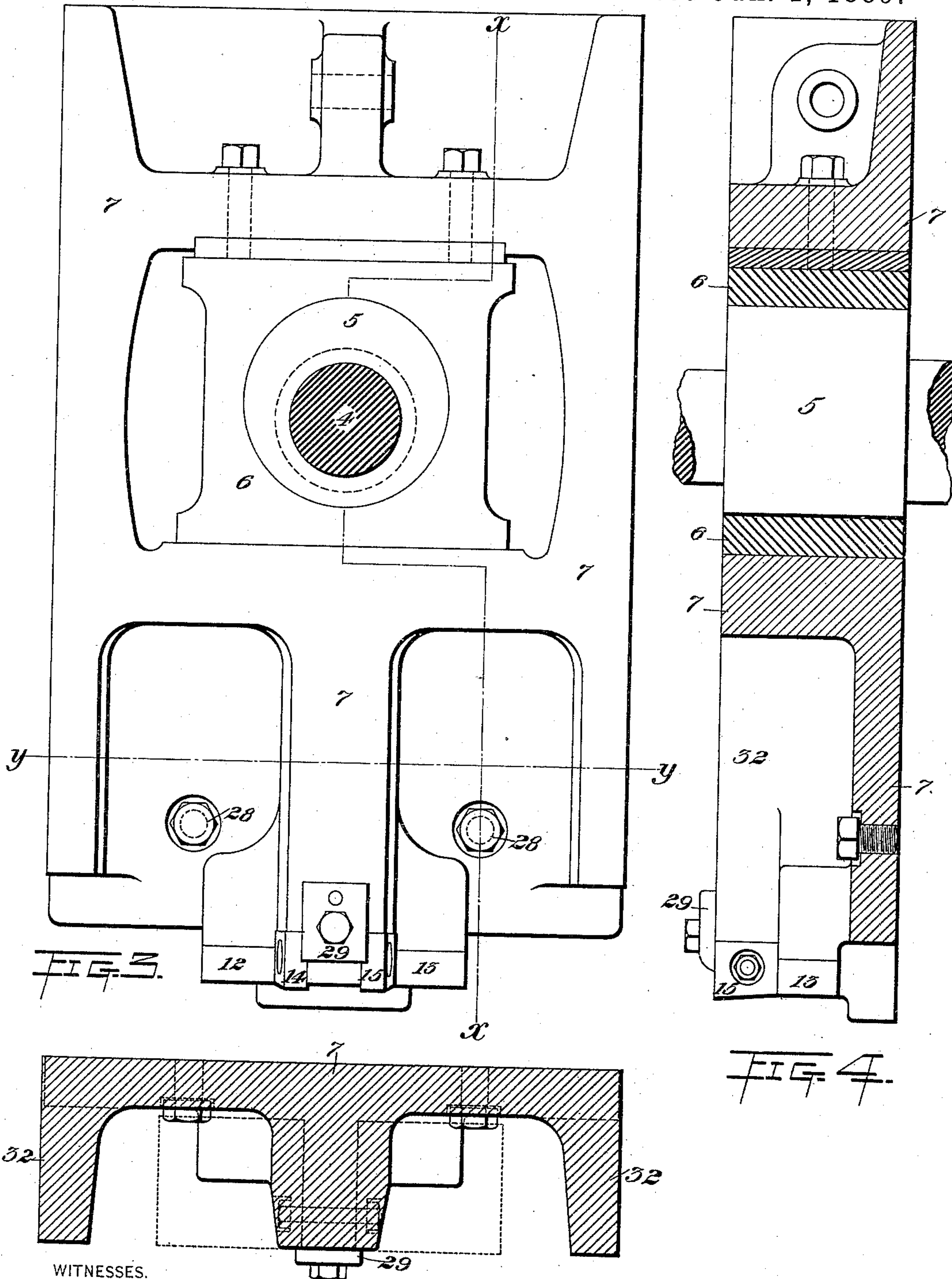
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WITNESSES.

*H. L. Gill.* *FIG. 5.*  
*W. A. Corvill*

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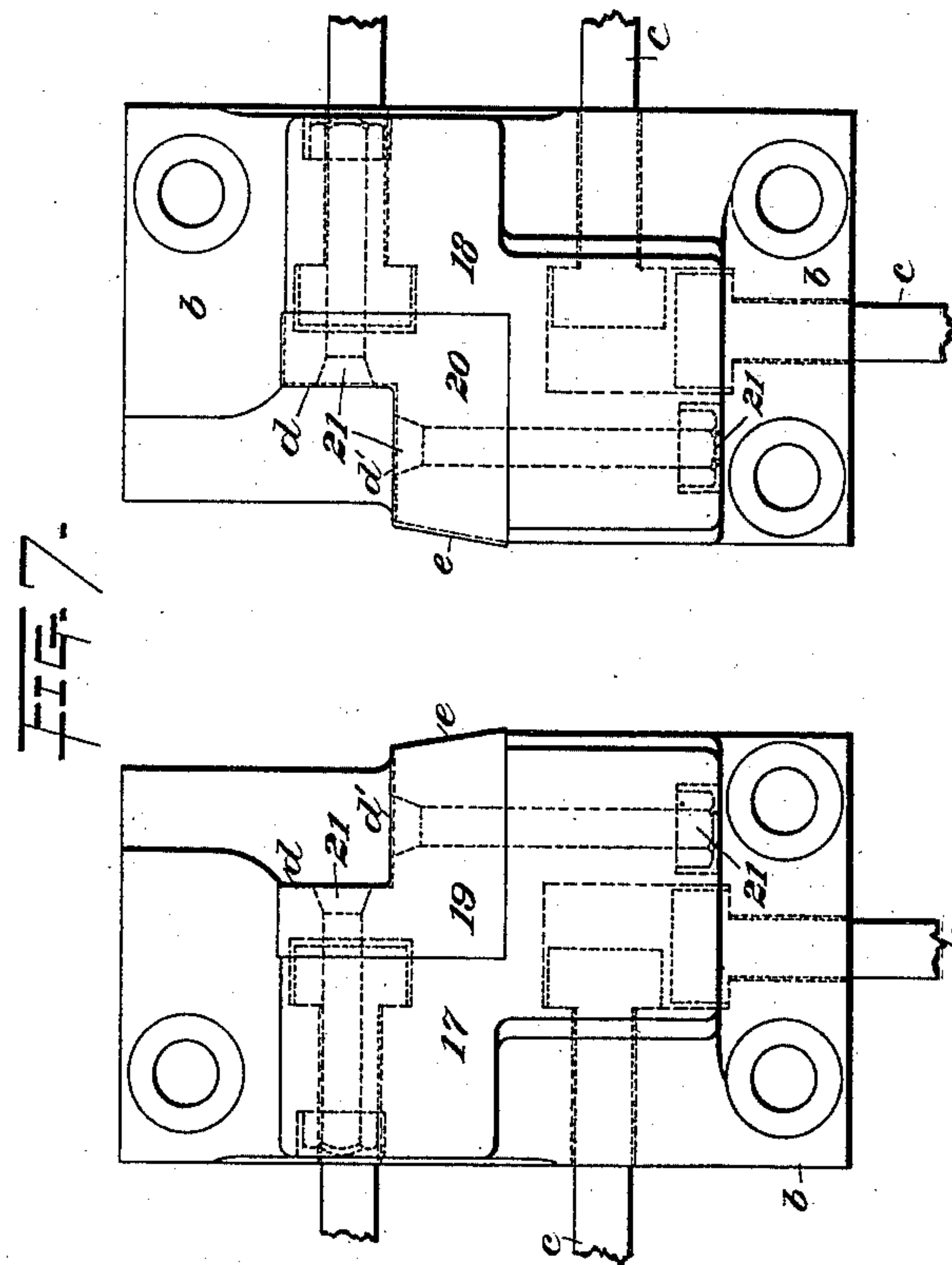
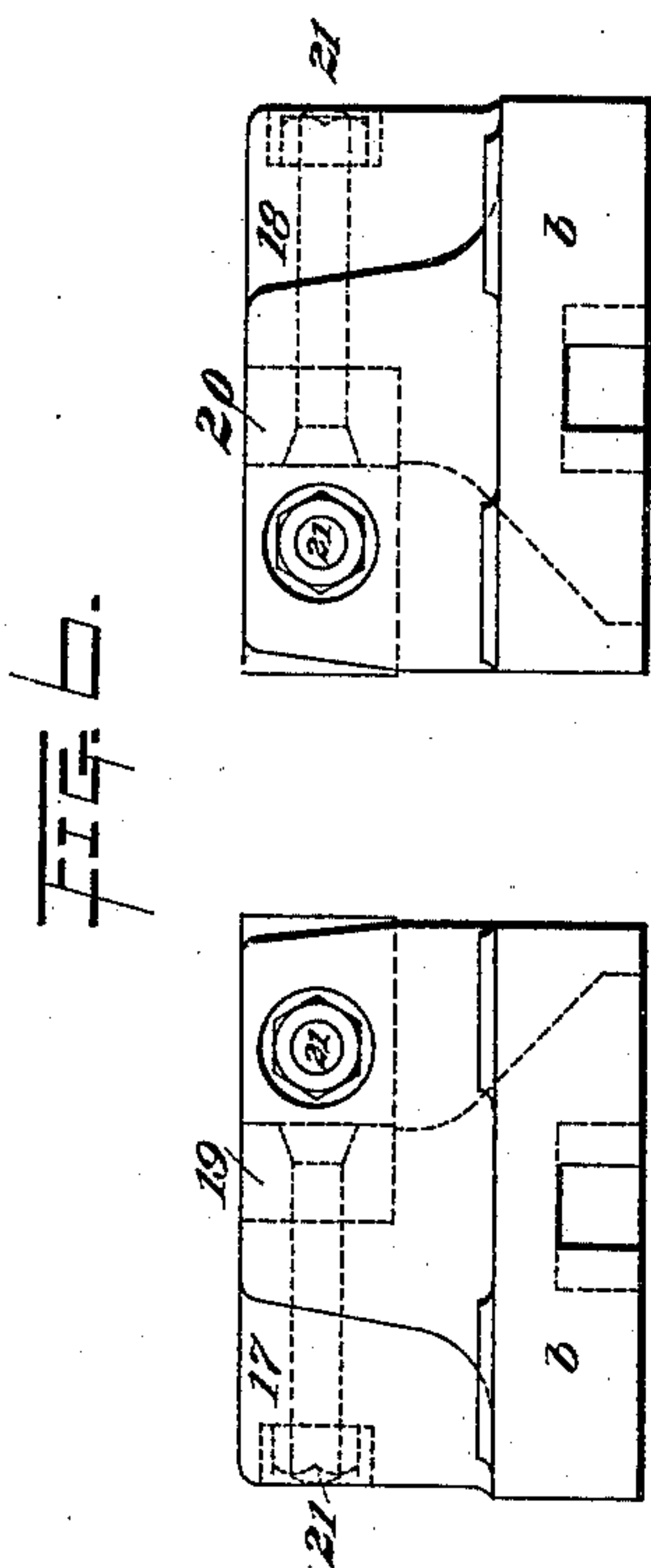
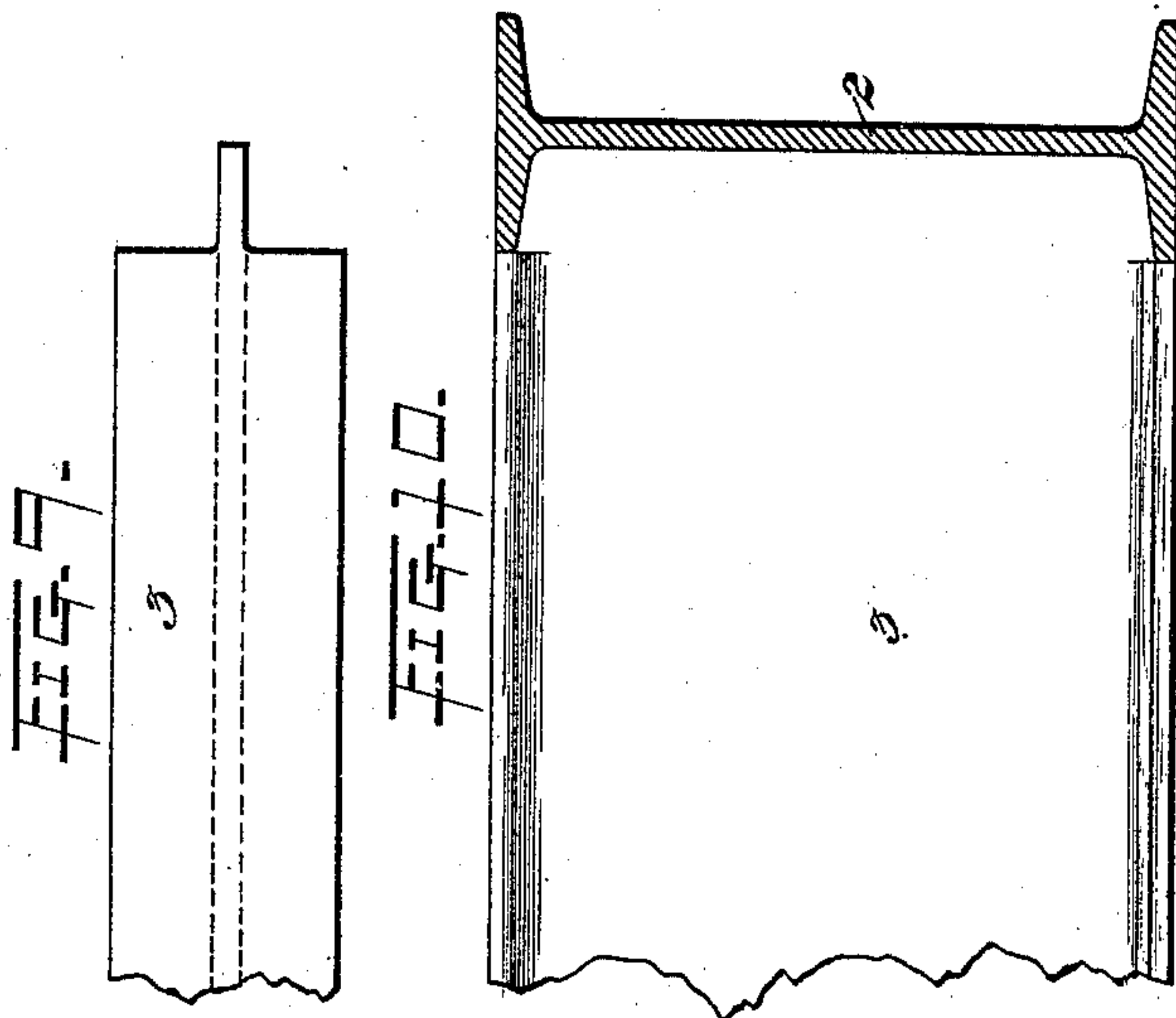
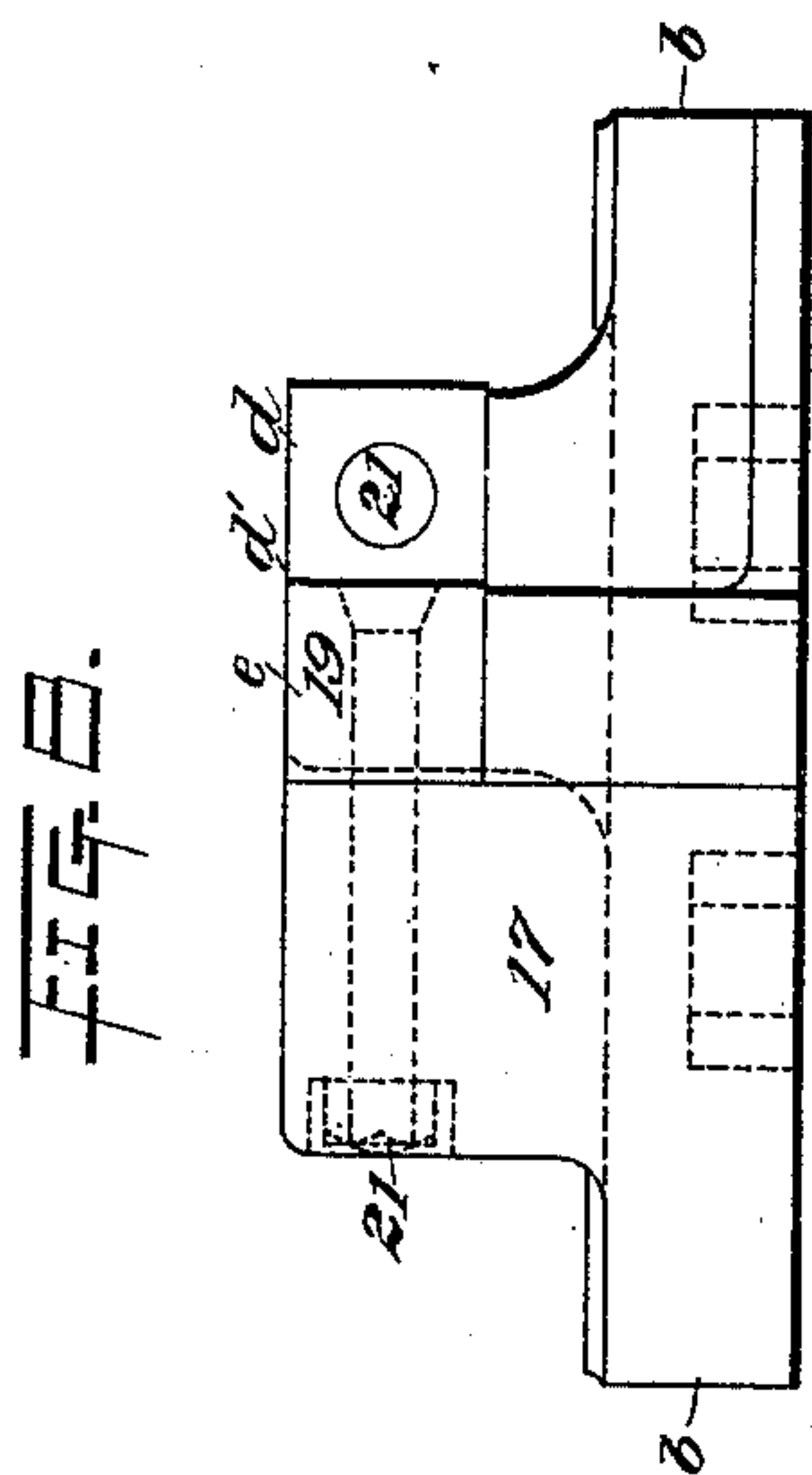
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# UNITED STATES PATENT OFFICE.

JULIAN KENNEDY, OF LATROBE, PENNSYLVANIA.

## MACHINE FOR CUTTING FLANGED BEAMS.

SPECIFICATION forming part of Letters Patent No. 395,569, dated January 1, 1889.

Application filed October 29, 1888. Serial No. 289,406. (No model.)

*To all whom it may concern:*

Be it known that I, JULIAN KENNEDY, of Latrobe, in the county of Westmoreland and State of Pennsylvania, have invented a new and useful Improvement in Machines for Cutting Flanged Beams; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

10 Figure 1 is a front elevation of my improved machine. Fig. 2 is a side elevation thereof. Fig. 3 is an enlarged front elevation of the plunger and moving cutters. Fig. 4 is a vertical section on the line  $xx$  of Fig. 3. Fig. 5  
15 is a horizontal cross-section on the line  $yy$  of Fig. 3, the position of the bed-knives being indicated by dotted lines. Fig. 6 is an enlarged front elevation of the knife-holders for the bed-knives. Fig. 7 is a plan view of the parts  
20 shown in Fig. 6. Fig. 8 is an end view of one of the knife-holders of the bed-knives. Fig. 9 is an edge view showing the flange of an I-beam which has been cut in my improved machine. Fig. 10 is a view showing such an  
25 I-beam fitted into place against the web and flanges of a second beam.

Like symbols of reference indicate like parts in each.

The object of my invention is to provide a  
30 machine for cutting the ends of I-beams, so that they may be fitted against the sides of other I-beams when used in the formation of structural frame-work and for similar purposes. The shape of the I-beam when thus  
35 cut is shown in Figs. 9 and 10. In these figures 2 represents in cross-section an I-beam, against the side of which it is desired to fit a second I-beam, 3, of the same size and shape. For this purpose it is necessary to cut away  
40 the flanges of the beam 3 for a short distance from the end, so as to leave a projecting portion of the web which shall fit against the side of the web of the beam 2, while the uncut portions at the ends of the flanges of the beam 3  
45 fit against the lateral edges of the flanges of the beam 2. In order to accommodate for the slight inclination of the inner sides of the flanges of the beam 2, it is necessary to bevel the lateral edges of the web of the cut portion  
50 of the beam 3. The shape into which the beam 3 is reduced by cutting the flanges is

shown in Fig. 9, and the beveled cut which is given to the lateral edges of the web at the end of the beam is shown in Fig. 10. Heretofore no machinery has been devised which  
55 has been suitable for cutting the ends of I-beams of different sizes without change of the dies, and I have devised the present machine for the purpose of supplying this want and of affording means for doing the cutting  
60 of the beam rapidly and with a minimum of labor.

Referring now to the drawings, 4 represents the rotary main shaft of the machine.

5 is an eccentric which is fixed thereto and  
65 is provided with an inclosing-box, 6, which is arranged in an opening in a plunger, 7. This plunger is set in upright guideways 8 in the frame of the machine, and is reciprocated  
70 vertically between said guides by the action of the eccentric and its box. The construction of the guides 8 and of the frame of the machine and the bolts by which it is held together is clearly shown in Figs. 1 and 2, and  
75 needs no detailed description. The plunger 7 is counterweighted in the usual manner by a counter-weight lever, 9, which has its fulcrum between standards 10 at the top of the machine, and is provided at its front end with  
80 links 11, which are connected with the plunger. At the lower end of the plunger 7 are fixed the moving knives. These are preferably four in number, two knives for cutting the flanges of the beam and two for cutting the web. They  
85 are arranged in pairs at the sides of the plunger, on each side being a web-knife and a flange-knife.

12 and 13 are the flange-knives, each of which is made with two cutting-edges substantially at right angles to each other. These knives  
90 are set at the outer sides of the plunger and are secured thereto by suitable bolts. In front of and at the inner sides of the flange-knives are the web-knives 14 and 15. The cutting-edges of these knives are inclined to  
95 the section-plane of Fig. 4, so as to give the necessary-bevel to the edges of the end of the web of the beam. They are placed in recesses in the plunger by means of a cap-plate, 29, which is fixed to the plunger by bolts.  
100 The bed-knives are set in holders which are fixed to the bed-piece 16 of the machine.



These knives and their holders are clearly illustrated on the fourth sheet of the drawings.

17 and 18 are the holders, which are set opposite to each other in recesses in the bed-piece, as shown in Figs. 1, 6, and 7, being bolted thereto by vertical bolts which pass through flanges *b*, and by horizontal bolts *c*. At the inner sides of the holders at the rear thereof are L-shaped recesses, in which the bed-knives 19 and 20 are set and fixed by bolts 21. These knives are L-shaped, and each has three cutting-edges—viz., cutting-edges *d d'* at right angles to each other, so as to conform to the cutting-edges of the knives 12 and 13, and a cutting-edge, *e*, Figs. 7 and 8, at the inner side of and in front of the cutting-edge *d'*, which conforms to the cutting-edge of the web-knives 14 and 15, being beveled correspondingly therewith.

The operation of the machine in cutting the I-beams is as follows: In order to cut the flanges of the beam, the I-beam 3 is fed in edgewise from the front of the machine, as shown at the left side of Fig. 1, so that the flange to be cut shall rest on the knife-holder 17, with that portion of the flange (at one side of the web) intended to be cut directly over the cutting-edges *d d'*. To permit the insertion of the beam in this way, the face of the plunger 7 is recessed, as shown in Figs. 3, 4, and 5, and to determine the proper distance of feed of the I-beam into the machine I provide adjustable stop-bolts 28, set on the face of the plunger at the back of the recesses. These bolts are properly adjusted and the beam is fed in until its end strikes against the bolt. The flange-cutting knives and wing portions of the plunger project laterally from the inner sides of the recesses, so that while the recessed plunger shall in its motions clear the upper flange of the beam the knife shall work between the upper and lower flanges, so that it may cut close up to the web. The body of the plunger extends down nearly to the level of the knives, being recessed for this purpose, as shown in Figs. 3 and 4, and at the outer sides of these recesses there are vertical flanges 32, Fig. 5, which work in the slide-ways 8 of the machine. In these slideways are vertical brasses 33, which are adjustable by set-bolts 34. This construction of the plunger imparts great strength and rigidity to the machine and enables it to perform its work with uniformity and without liability of getting out of order.

When the beam has been placed in proper position, it is clamped against the side of the plunger by means of a screw, 22, which works in a transverse screw-hole in the side of the machine, the head 23 of the screw being for this purpose swiveled and adapted to bear against the web of the beam. The function of this screw is to hold the beam firmly in place during the cutting process. If, now, the main shaft of the machine be rotated, so as to depress the plunger 7, the knife 12, acting

in conjunction with the blades *d* and *d'*, cuts out from flange of the beam, which I have marked *f*, a rectangular piece bounded at one side by the web and at the other side extending to the outside edges of the flange at the end and side of the beam. The screw 22 is then loosened, so as to release the I-beam, and the latter is lifted from the knife-holder 17 and reversed so as to bring the flange *f'* into the same position as shown in Fig. 1, and just, described. The next descent of the plunger then cuts out this flange in the same way. To cut the other two flanges, *f*<sup>2</sup> and *f*<sup>3</sup>, the I-beam is transferred to the other side of the machine, and after being placed on the bed-knife holder 18 is held in place over the blades *d d'* of the knife 20 by the screw 22'. The flange *f*<sup>2</sup> is thus cut off at the end by the knife 13, and by reversing the beam the flange *f*<sup>3</sup> may be cut in like manner. In order now to cut the web of the beam with beveled cuts, as described in the first part of the specification, the beam is turned over on its side and placed with the web resting on either of the holders 17 or 18, with the projecting part of the web from which the flanges have been cut resting on the knife 19 or 20, with the edge directly over the blade *e*, Fig. 7. The beam is adjusted and held in proper position by means of a set-screw, 30, there being one such set-screw at each side of the machine. The end of this set-screw bears against the outer flange of the beam and forces the inner flange against the side of an upright block or stop, 35, at the middle of the machine, thus clamping the beam tightly in place. When the beam has been thus adjusted, the descent of the knife 15 cuts the projecting end of the web with an inclined or beveled cut—such as is shown in Fig. 10—at the end of the I-beam 3. In order to hold the beam in position during this cutting operation, I employ a swinging post, 24, pivotally mounted at its upper end on a short eccentric-shaft, 25, which is journaled in the cover-plate 27 of the machine. The post is thus adapted to swing from a horizontal to a vertical position, so that its lower end shall rest on the web of the I-beam. When the post is thus placed, it is caused to bear with pressure upon the I-beam web by moving down a lever 26, which is fixed to the eccentric-shaft 25. I prefer to have a post, 24, and lever 26 at each side of the machine, as shown in Fig. 1, one set for each pair of knives. In this figure I show one of the posts in a horizontal position and the other post in a vertical position in the act of clamping the I-beam.

In order now to cut the web at the other side of the I-beam, the beam is either upturned from the position last described and the opposite side of the web laid upon the knife 20, or it is preferably shifted laterally to the knife 19 at the other side of the machine without upturning. The I-beam is then clamped to position by the screw 30 and post 24, and the next descent of the plunger cuts



the web in the manner last described. When these four cuts have been made, the end of the I-beam is in proper shape to be fitted against the side of another beam. In order to properly cut the four flanges of the beam, two sets of flange-knives should be employed; but for the purpose of cutting the web on both edges only one set of web-knives need be used. It is more convenient, however, to employ two sets of knives, as shown in the drawings.

The machine may be used for cutting beams of any size within certain limits. Obviously the construction of the flange-knives is such as to cut the flanges of any beam without special adjustment, because the web of the beam is held by the screws 22 or 22' against the side of the moving knife and the laterally-projecting wing of the plunger, irrespective of the dimensions of the beam. In cutting the web, however, adjustment is necessary when the beams vary in thickness of flange, for the position of the beam on the machine is determined by the stop block or post 35, and if the position of the stop-block be constant a beam with a thin flange would be differently situated relatively to the web-knife from a beam having a thick flange. To compensate for this I adjust the position of the stop preferably by using a number of cap-pieces or liners, 36, of different thickness of sides. In working the machine I place on the block a cap-piece or liner of sufficient thickness of side to hold the beam up to the web-knife in proper position. The knife-holders 17 18, which serve as anvils for the beam, are made sufficiently narrow to permit beams having webs of different width to be placed thereon. It is this property of adaptability of the machine to varying work which forms one of the distinguishing features of the machine.

The machine may also be employed for cutting the ends of T-iron channel-bars and other sorts of flanged beams. The advantages of the machine will be apparent to those skilled in the art. It is strong in its construction, performs the work of cutting the I-beam rapidly and with great accuracy, and is a means of saving considerable time and labor.

I do not limit myself strictly to the construction and arrangement of the parts which I have herein shown and described, since they may be modified by the skilled mechanic; but

What I claim is—

1. In a machine for cutting the flanges of flanged beams, a plunger or knife-head having oppositely-directed right and left knives for separately cutting the right and left flanges of the beam, substantially as and for the purposes described.

2. In a machine for cutting the flanges of flanged beams, a plunger or knife-head having knives on opposite sides thereof for separately cutting the right and left flanges of the beam, in combination with bed-knives adapted to act in conjunction therewith, substantially as and for the purposes described.

3. In a machine for cutting the ends of flanged beams, a moving knife and a bed-knife, each of angular shape, having a blade which cuts the flange of the beam transversely, and a blade which cuts the flange longitudinally in proximity to the web, substantially as and for the purposes described.

4. In a machine for cutting the flanges of flanged beams, a plunger having a laterally-projecting knife, and adjusting mechanism by which the web of the beam is held against the side of the knife, substantially as and for the purposes described.

5. In a machine for cutting the flanges of flanged beams, a plunger having a laterally-projecting knife, and adjusting mechanism by which the web of the beam is held against the side of the knife, said plunger being recessed to permit insertion of the beam beneath the knife within the limits of the plunger, substantially as and for the purposes described.

6. In a machine for cutting the ends of flanged beams, a plunger or knife-head having a knife on each side thereof for separately cutting the right and left flanges of the beam, in combination with one or more knives on the plunger adapted to cut the web, and a supporting block or anvil adapted to support the beam vertically during cutting of the flanges and to support the same horizontally during the cutting of the web, substantially as and for the purposes described.

7. In a machine for cutting the ends of flanged beams, the combination of a bed-knife having cutting-edges  $d$   $d'$ , formed at an angle to each other, and an outer cutting-edge,  $e$ , and moving-knives set on a single plunger, one of which knives acts in conjunction with the cutting-edges  $d$  and  $d'$ , while the other works in conjunction with the cutting-edge  $e$ , substantially as and for the purposes described.

8. In a machine for cutting the ends of flanged beams, the combination of right and left bed-knives oppositely placed, each having cutting-edges  $d$  and  $d'$ , formed at an angle to each other, and an outer cutting-edge,  $e$ , and right and left moving knives set on a single plunger and adapted to work in conjunction with the bed-knives, substantially as and for the purposes described.

9. In a machine for cutting the ends of flanged beams, the combination of a supporting-anvil adapted to receive the web of the beam and made of narrow surface, so as to be capable of receiving beams of different widths, knives for cutting the said web, and a stop adjacent to the supporting-anvil, against which the lateral edge of the beam abuts, substantially as and for the purposes described.

10. In a machine for cutting the ends of flanged beams, the combination of a supporting-anvil adapted to receive the web of the beam and made of narrow surface, so as to be capable of receiving beams of different widths, knives for cutting the said web, a stop adja-



cent to the supporting-anvil, against which the lateral edge of the beam abuts, and an adjusting-screw by which the beam is held against the stop, substantially as and for the purposes described.

11. In a machine for cutting the ends of flanged beams, the combination of a supporting-anvil adapted to receive the web of the beam and made of narrow surface, so as to be capable of receiving beams of different widths, knives for cutting the said web, a stop adjacent to the supporting-anvil, against which the lateral edge of the beam abuts, and adjusting mechanism—such as liners—by which the distance between the stop and the anvil is variable, substantially as and for the purposes described.

12. In a machine for cutting the ends of flanged beams, the combination, with a supporting block or anvil for receiving the web of the beam, of knives for cutting the web, and a clamping-post which bears upon the web, substantially as and for the purposes described.

13. In a machine for cutting the flanges of flanged beams, a plunger or knife-head having on each side thereof a laterally-projecting portion, and a knife for separately cutting the right and left flanges of the beam, said laterally-projecting portions fitting in suitable slideways and extending to or nearly to the bases of the knives, substantially as and for the purposes described.

14. In a machine for cutting the ends of flanged beams, the combination, with right and left supporting blocks or anvils for receiving the web of the beam, of knives for cutting said web, and a stop between the said anvils, against which the lateral edge of the beam on either anvil abuts, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 24th day of October, A. D. 1888.

JULIAN KENNEDY.

Witnesses:

W. B. CORWIN,  
H. L. GILL.