No. 839,839. PATENTED JAN. 1, 1907.

H. T. HALLOWELL.

APPARATUS FOR FORMING SHEET METAL HANGER LEGS.

APPLICATION FILED APR. 25, 1904.

5 SHEETS—SHEET 1.

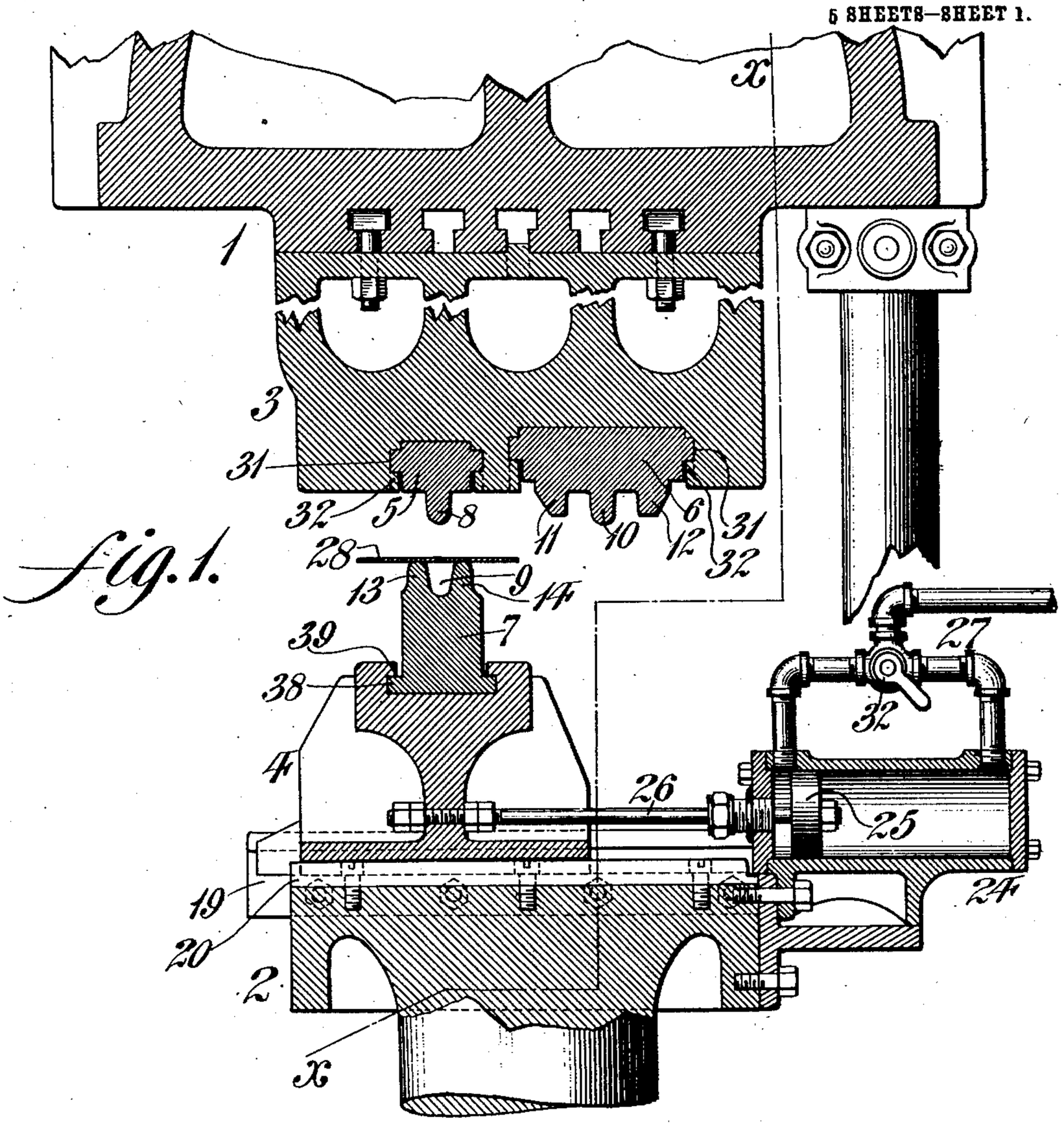


Fig. 1.

Fig. 6.

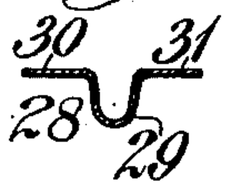


Fig. 4.

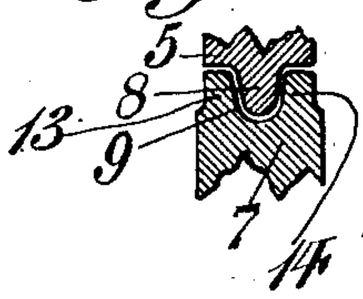
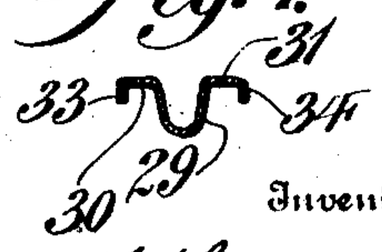


Fig. 5.

Fig. 7.



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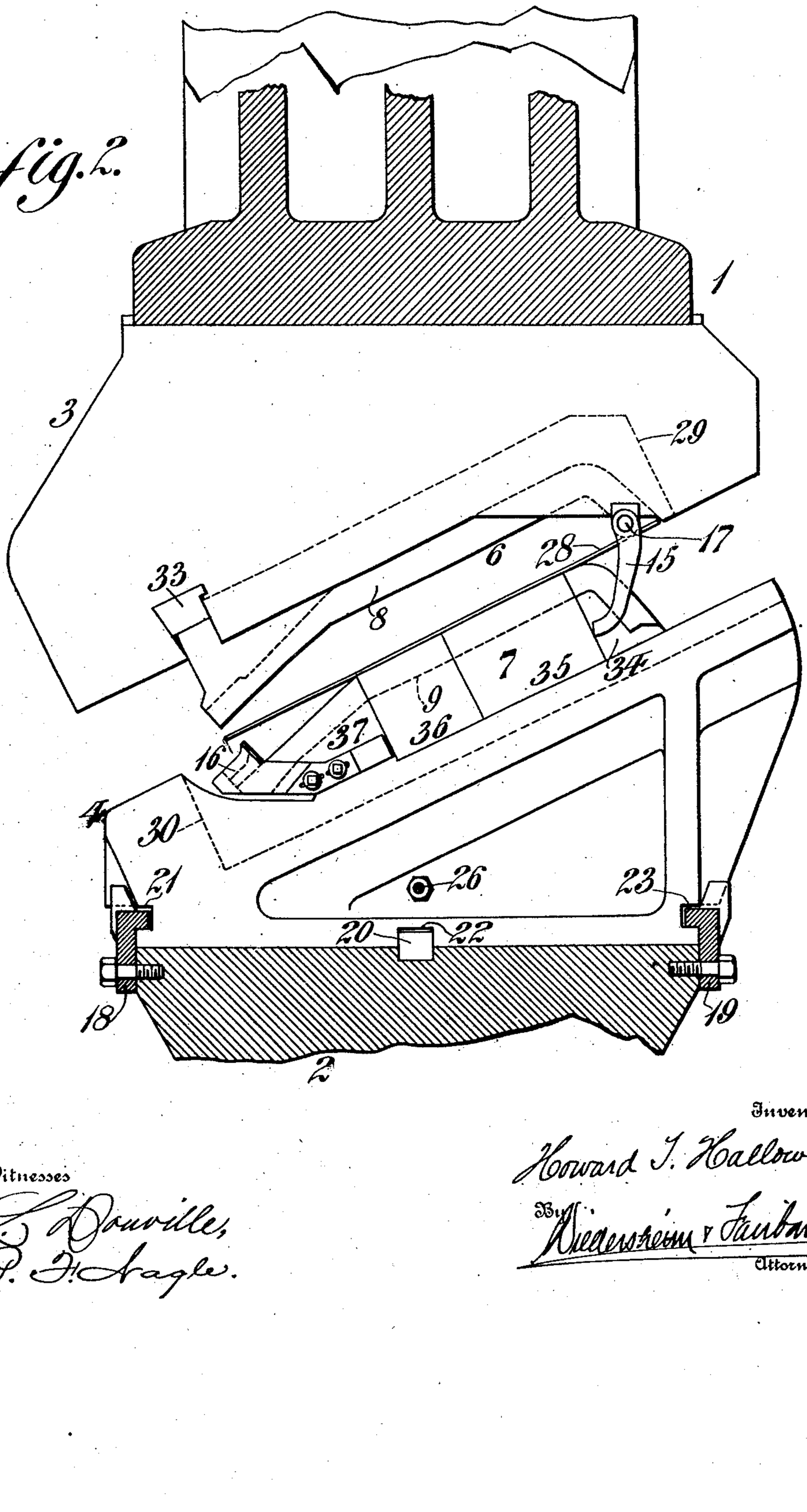
5 SHEETS—SHEET 2.

Fig. 2.



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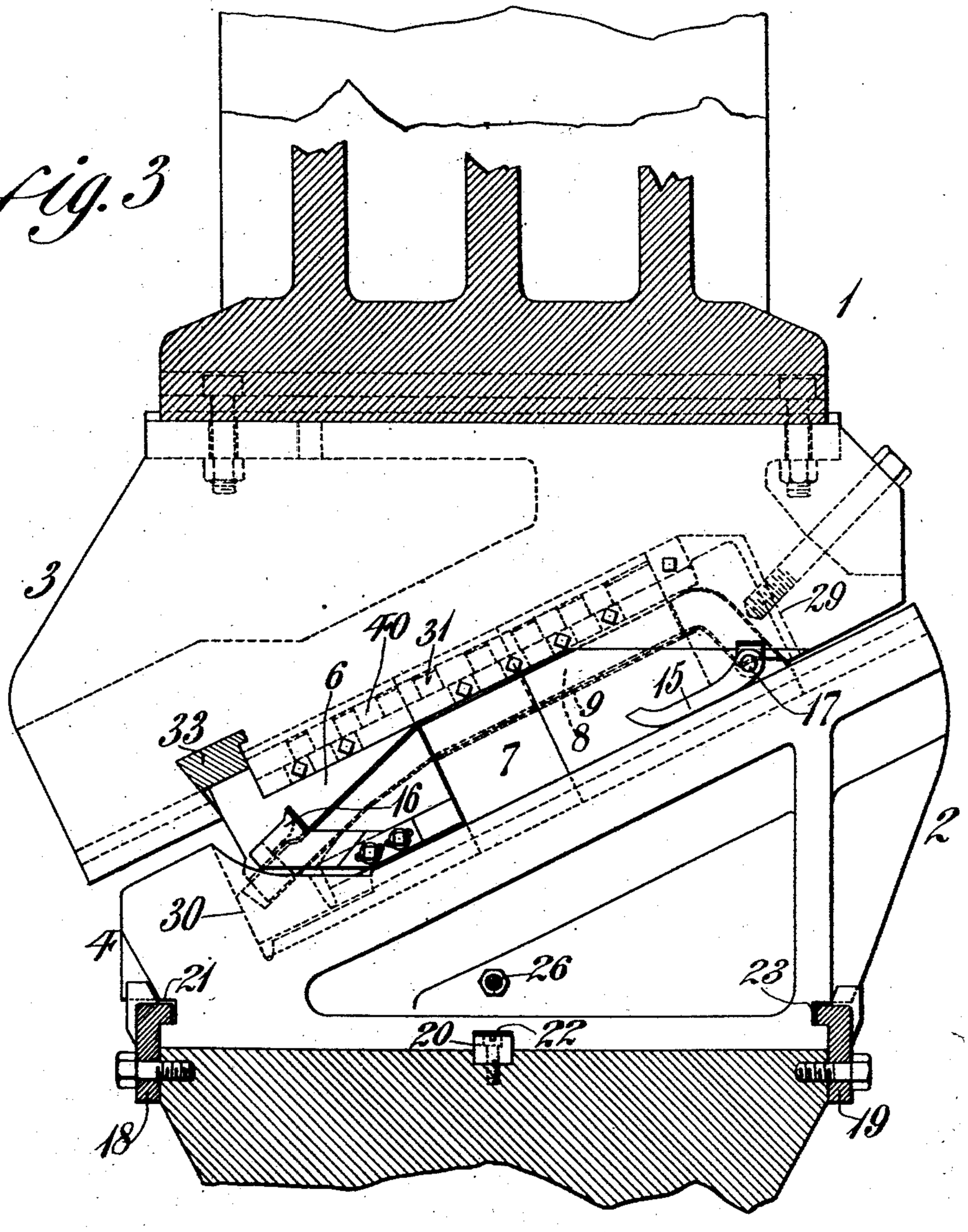
5 SHEETS—SHEET 3.

Fig. 3



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5 SHEETS—SHEET 4.

Fig. 8.

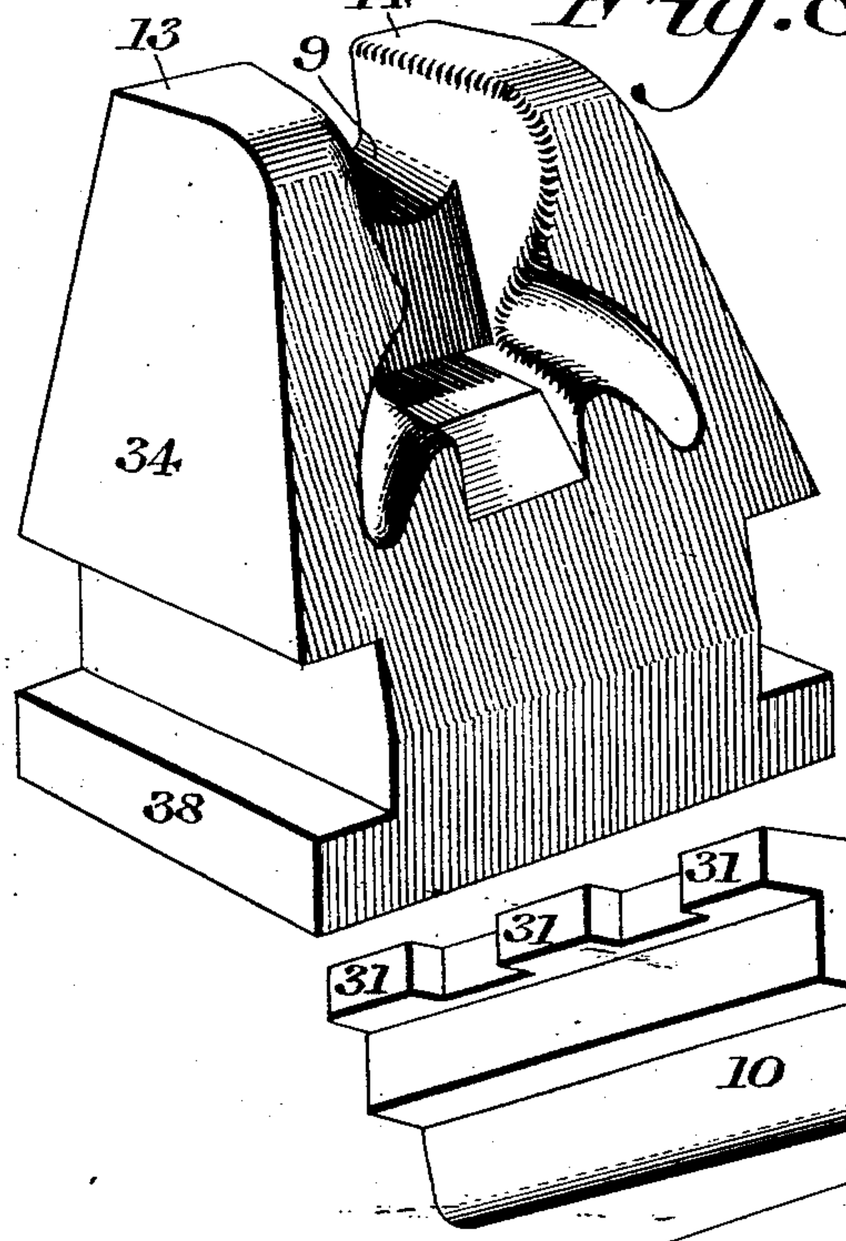


Fig. 9.

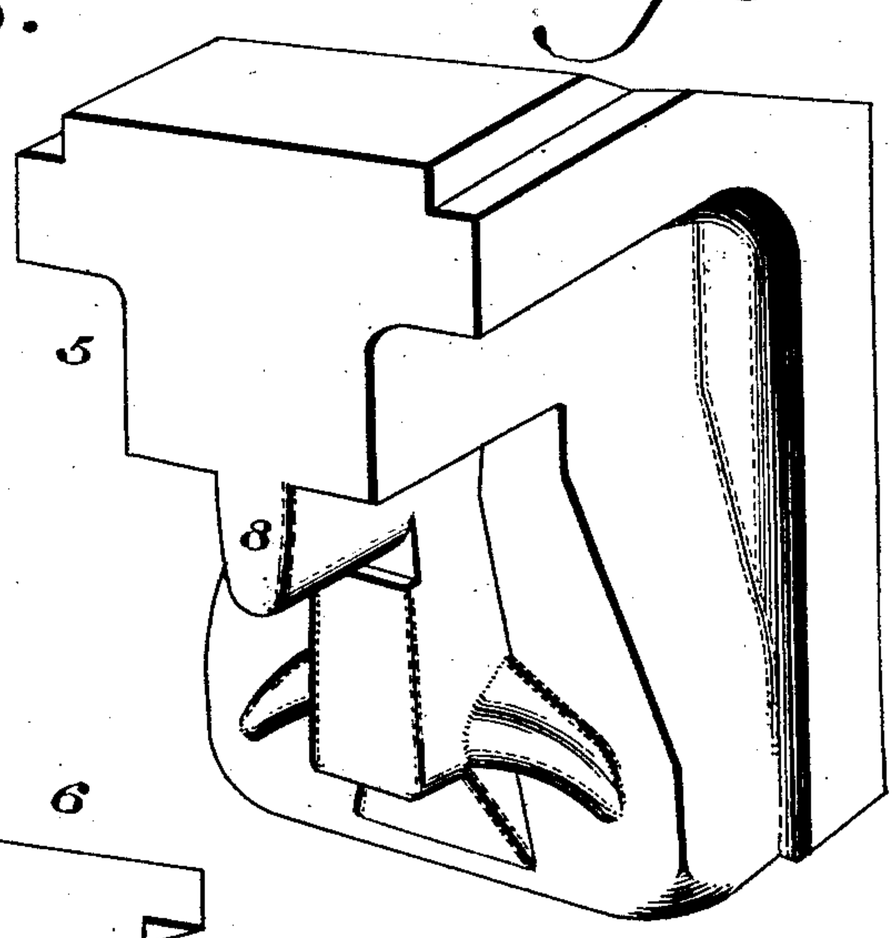
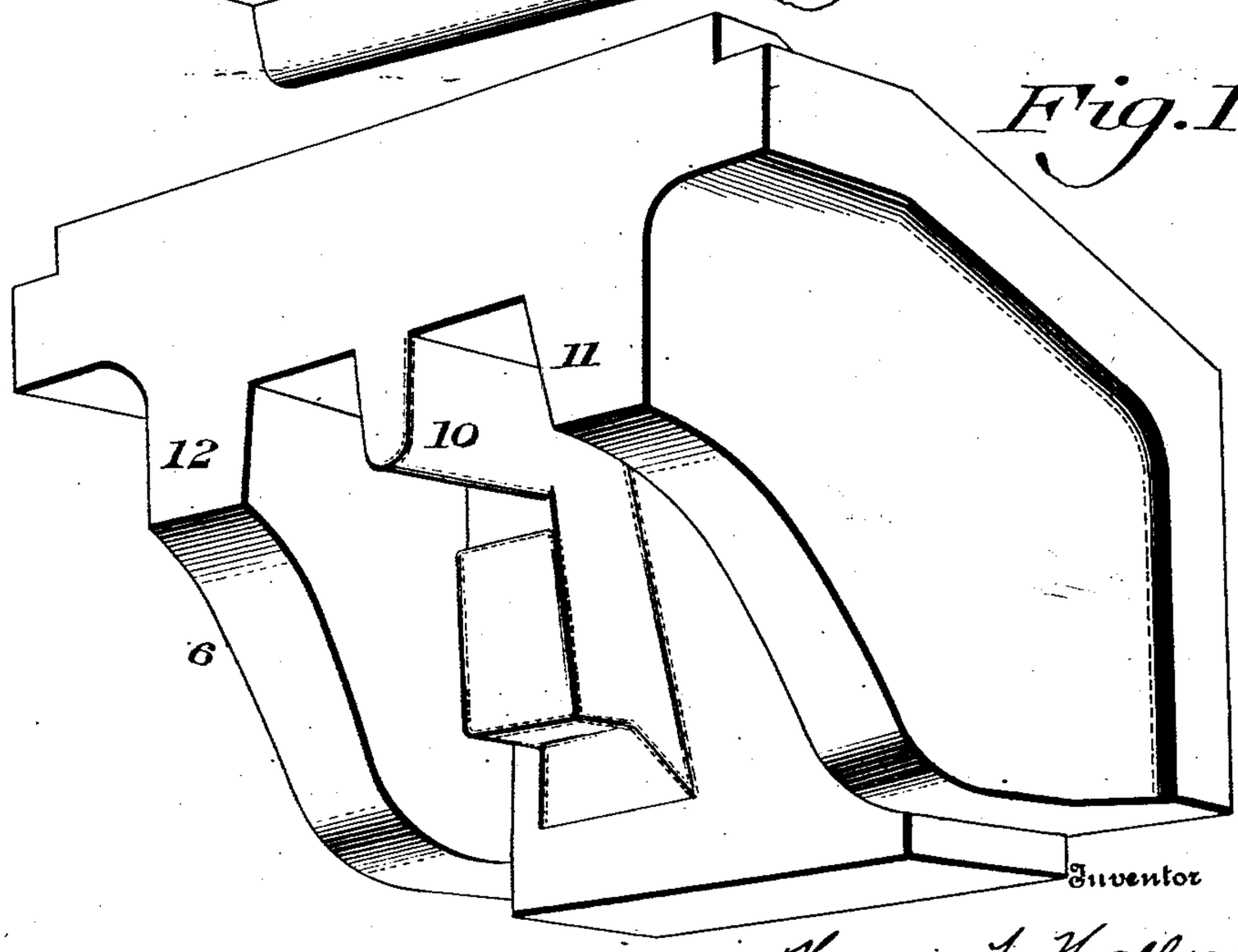


Fig. 13.

Fig. 10.



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5 SHEETS—SHEET 5.

Fig. 11.

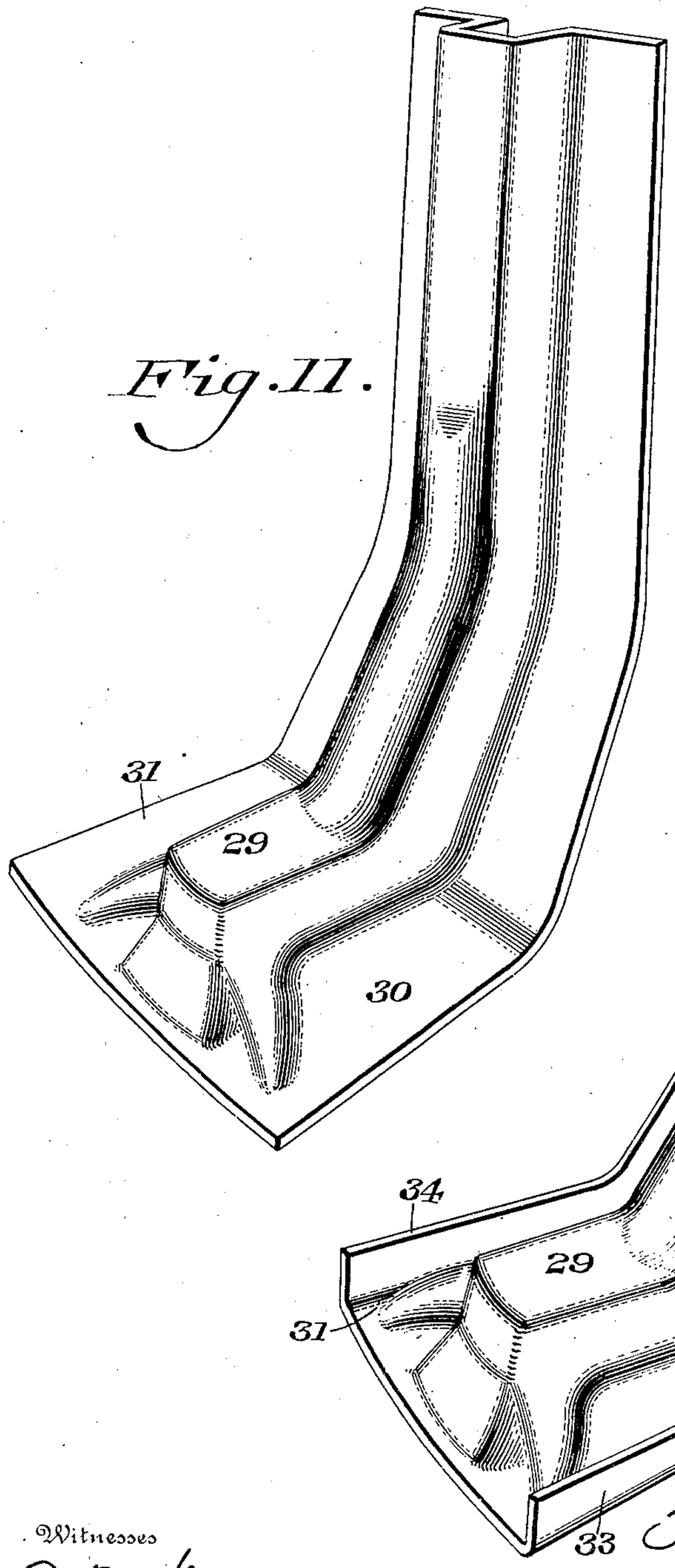
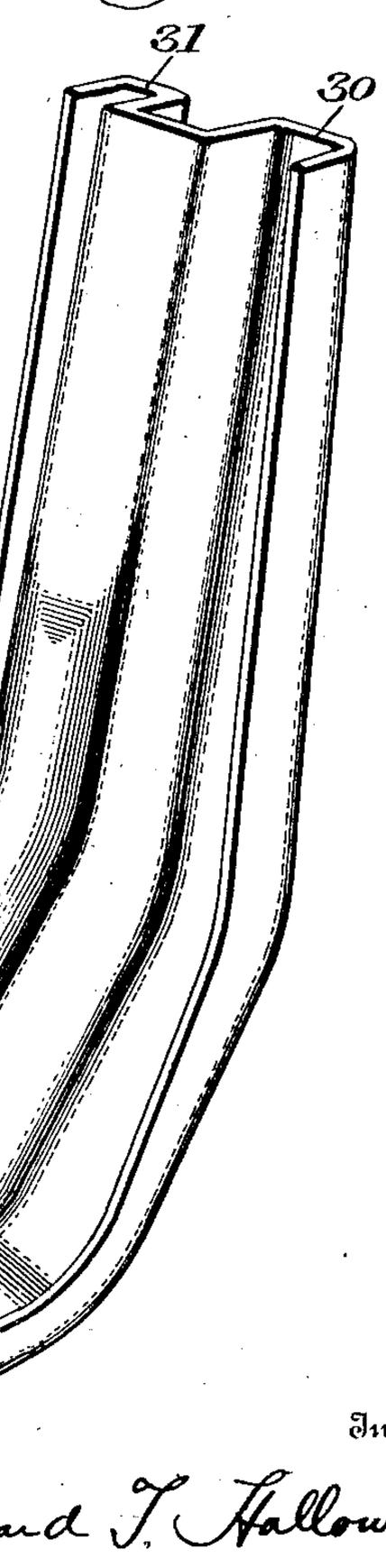


Fig. 12.



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APPARATUS FOR FORMING SHEET-METAL HANGER-LEGS.

No. 839,839. Specification of Letters Patent. Patented Jan. 1, 1907.

Application filed April 25, 1904. Serial No. 204,733.

To all whom it may concern:

Be it known that I, HOWARD T. HALLOWELL, a citizen of the United States, residing at Hallowell, Montgomery county, State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Forming Sheet-Metal Hanger-Legs, of which the following is a specification.

My invention relates to a device for forming sheet metal or the like.

It provides a plurality of dies adapted to coact with one or more dies to produce a plurality of successive operations upon a blank of metal or the like.

It further consists of means for shifting the blank-holding die from the path of one of the coöperating dies to that of the other for successive engagement therewith.

It further consists in providing die-blocks the adjacent faces of which are inclined at an angle with the horizontal.

It further consists of means for supporting and securing the dies in said blocks.

It further consists of novel features of construction, all as will be hereinafter fully set forth.

Figure 1 represents, chiefly in vertical section, drawing or stamping press blocks and dies embodying my invention. Figs. 2 and 3 represent sections on the line *x x*, Fig. 1, showing the device in different positions. Figs. 4 and 5 represent the coacting portions of the dies shown in Fig. 1 detached from the device. Figs. 6 and 7 represent in transverse sections the blank at two stages of the operation thereon. Fig. 8 represents a perspective view of a portion of the foot or end die 34. Fig. 9 represents a perspective view of a portion of the end of the upper die 5. Fig. 10 represents a perspective view of a portion of the end of the upper die 6. Fig. 11 represents a perspective view of a blank after the first forming operation. Fig. 12 represents a perspective view of a blank after the second forming operation. Fig. 13 represents a perspective view of one of the upper die-sections.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 and 2 designate, respectively, the upper and lower die-beds of a drawing or stamping press. As the means for reciprocating one of such beds toward the other is well known in the metal-working art and forms no part of my present invention, I have not deemed it necessary to illustrate the same.

Bolted onto the beds 1 and 2 are die-blocks 3 and 4, respectively. In the block 3 are supported two dies 5 and 6 with their longitudinal axes in parallel relation. Similarly supported in the block 4 is a die 7. As shown, the die 5 has a single downward projection 8, adapted to pass into a recess 9 in the die 7. The die 6 has a downward projection 10 corresponding in shape and position with the projection 8 and has at each side thereof additional downward projecting portions 11 and 12, adapted to pass outside of the upwardly-projecting portion of the die 7.

As clearly shown in Figs. 2 and 3, the die-blocks 3 and 4 have their adjacent faces inclined at an angle with the horizontal and are provided with gages 15 and 16 on the blocks 3 and 4, respectively. As shown, the gage 15 is pivoted at 17 to the block 3, so as not to prevent the movement of the blocks toward each other.

As shown in Fig. 1 of the drawings, the face of the lower die-bed 2 is considerably larger than the lower face of the die-block 4 supported thereon. Guides 18, 19, and 20 are provided, engaging in recesses 21, 22, and 23 in the block 4 for guiding the block 4 in lateral movement across the face of the bed 2. As shown, the block 4 is moved on the bed 2 by mechanism comprising a cylinder 24, piston 25, and rod 26. The cylinder is provided with suitable connections 27 for the admission to both ends thereof of an expansive fluid, as steam or compressed air, or of hydraulic pressure. Proper outlets for the fluid (not shown) are of course provided.

I have described the faces of the die-blocks 3 and 4 as being downwardly inclined. The upper block 3 has at its rear end the shoulder 29, against which the rear end of the die 6 abuts. A similar shoulder 30 is provided on the lower block 4, against which the forward end of the die 7 abuts. The shoulders 29 and 30 act to take the longitudinal thrust of the dies on the faces of the blocks 3 and 4, respectively. As shown in Fig. 1, the die-blocks 5 and 6 are provided at their rear faces with flanges 31, adapted to engage with the upper sides of the shoulders 32 on the die-block 3, a key 33 (shown in Figs. 2 and 3 of the drawings) securing the die in place. I have shown the lower die 7 as comprised of four

pieces 34, 35, 36, and 37. It is obvious that one of these—as, for instance, the piece 34, which is subjected to the greatest wear—may be replaced when worn out or injured without the necessity of replacing the entire die, or by substituting for one of the sections 9 or 7 and section of different length a longer or shorter leg or similar article may be produced. It will thus be seen that a relatively small number of blocks or sections may be united to form several different dies of varying patterns and sizes. I have shown the blocks 34 to 37, forming the lower die 7, as held in the block 4 by flanges 38 engaging under shoulders 39 in the block and being held together by the action of gravity on the inclined faces of the block 4. It is evident, however, that any positive means for securing the blocks together may be used as desired and that a similar sectional block, the sections being properly secured together, may be used in the case of the upper dies 5 or 6.

In Fig. 3 of the drawings I have shown the upper die 6 as provided with a dentated or broken flange 31, the block 3 having a similar dentated shoulder 40. In this construction by removing the key 20 the entire die 6 or the pieces of which it is composed, if it be made of sectional form, may be allowed to slip forward, so as to permit their removal.

In Fig. 13 I have shown one form of a blank after the first forming operation has been completed by the coaction of the dies 5 and 7. In Fig. 14 I have clearly shown the flange which is formed on this same blank after the dies 6 and 7 have operated thereon.

The operation is as follows: As shown in Figs. 1 and 2 of the drawings, a blank 28 is laid upon the face of the die 7 and held against lateral motion by the gages 15 and 16. The press is then operated to bring the dies toward each other, as shown in Figs. 3 and 4 of the drawings. The effect of this operation is to produce in the blank 28 the rib or depression 29, (shown in Fig. 6 of the drawings,) leaving laterally-extending flanges 30 31 at each side of said rib. By means of the three-way cock 32 steam or other fluid is admitted to the left end of the cylinder, as shown in Fig. 1, whereby the block 4, die 7, and partially-completed blank 28 are moved to the right of the drawing Fig. 1, and so that the dies 6 and 7 are in vertical alinement. The dies are then brought together as shown in Fig. 5 of the drawings, the projection 10 of the die 6 entering into the rib 29 of the blank 28, while the projecting ribs 11 and 12 coöperate with the ribs 13 and 14 on the die 7 to depress the outer edges of the flanges 30 31 to form depending flanges 33 34, as shown in Fig. 7 of the drawings. At the same time the effect of the second drawing operation is to "iron out" the wrinkles in the blank 28.

I have necessarily shown the dies of my device as coöperating to form a particular article, as seen in Figs. 13 and 14; but it is obvious that the shape of the article to be formed before, during, and after the successive operations thereon may vary within wide limits. An essential feature of my device is the shifting of one of the pair of coacting dies with the partly-formed blank supported thereon to engage with another die or other dies, whereby further drawing or stamping operations are performed on said blank.

Another especially advantageous feature of my device is the blocks and dies secured therein at an angle with the horizontal. This is especially advantageous in the production of articles one end of which is bent at a greater angle than the other or at any considerable angle with the body of the blank.

A third advantage is in the method of securing the dies in the blocks by which they are readily detachable therefrom.

It is evident that various changes may be made by those skilled in the art which may come within the scope of my invention, and I do not, therefore, desire to be limited in every instance to the exact construction herein shown and described.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A forming device comprising a plurality of die-holding portions, gages on the adjacent faces thereof, means for moving one of said portions toward the other, a plurality of dissimilar dies in one of said portions, a die in the other of said portions and means for moving one of said portions transversely of the line of movement of one of said portions toward the other, whereby one of said dies and the blank supported thereon is successively engaged with the dies in the other of said portions.

2. A forming device comprising a die-block, a plurality of dissimilar dies in said block, a second die-block, a bed on which said second block is movable transversely of the line of movement of one of said blocks toward the other, gages on the adjacent faces of said blocks, a die in said second block adapted to support a blank and means for moving said second block so as to bring its die and the blank supported thereon successively in engagement with the dies in said first-named block.

3. A forming device comprising an upper die-block, a plurality of dissimilar dies in said block, a lower die-block, a bed on which said lower block is supported, means common to said lower block and said bed for guiding said block in transverse movement on said bed, a die in said lower block adapted to support a blank and means for moving said lower block to bring said die succes-

sively beneath the dies in said upper block, gages on the adjacent faces of said blocks, one of which gages is pivotally mounted.

4. A forming device comprising an upper die-block, a plurality of dissimilar dies in said block, a lower die-block, said die-blocks being arranged with their adjacent faces inclined from the horizontal, a bed on which said lower block is supported, means common to said lower block and said bed for guiding said block in transverse movement on said bed, a die in said lower block adapted to support a blank, a cylinder mounted adjacent said bed, a piston in said cylinder connected with said lower block and means for the application of a force whereby said lower block may be moved on said bed to bring said die and the blank supported thereon successively in engagement with the dies in said upper block.

5. In a forming device, a die-block and a die having coacting dentated flanges and detachable means engaging said block and one end of said die for preventing the relative movement of said block and said die, whereby they are retained in operative relation to each other.

6. In a forming device, an upper die-block having its lower face inclined with the horizontal and a die detachably engaged in said block, said die and said block having common flanges and shoulders longitudinally interrupted so as to permit their engagement and disengagement by their relative motion and a detachable key for preventing such relative motion.

7. In a forming device, a die-block having its outer face inclined to the horizontal, a die composed of a plurality of sections thereon, the upper and lower of said sections having their working face inclined to the horizontal, a coacting die-block, and means on said die-blocks for taking the end thrust of the dies.

8. In a forming device, a die-block having its outer face inclined to the horizontal, a die composed of a plurality of sections thereon, the upper and lower of said sections having their working face inclined to the horizontal, a coacting die-block, means on said die-blocks for taking the end thrust of the dies, and a gage carried by said lower section.

9. In a forming device, a die-block, a die thereon composed of a plurality of sections having their working face inclined to the horizontal, said sections being held in operative relation to each other by gravity, and a gage carried by one of said sections.

10. In a forming device, a sectional die having interrupted flanges and a die-holder having reverse interrupted flanges whereby said flanges may be interlocked.

11. In a forming device, a sectional die having interrupted flanges, and a die-holder having reverse interrupted flanges, whereby said flanges may be interlocked, the interrupted flanges of the die being seated on the interrupted flanges of the die-holder when in assembled position.

12. In a forming device, a die-block, a sectional die carried thereby and having its working faces inclined to the horizontal and means for preventing relative movement of said die and die-block.

13. In a forming device, upper and lower die-blocks, dies carried by said blocks, the lower end of said dies being substantially wedge-shaped and having their working faces inclined to the horizontal.

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