

No. 667,187.

Patented Feb. 5, 1901.

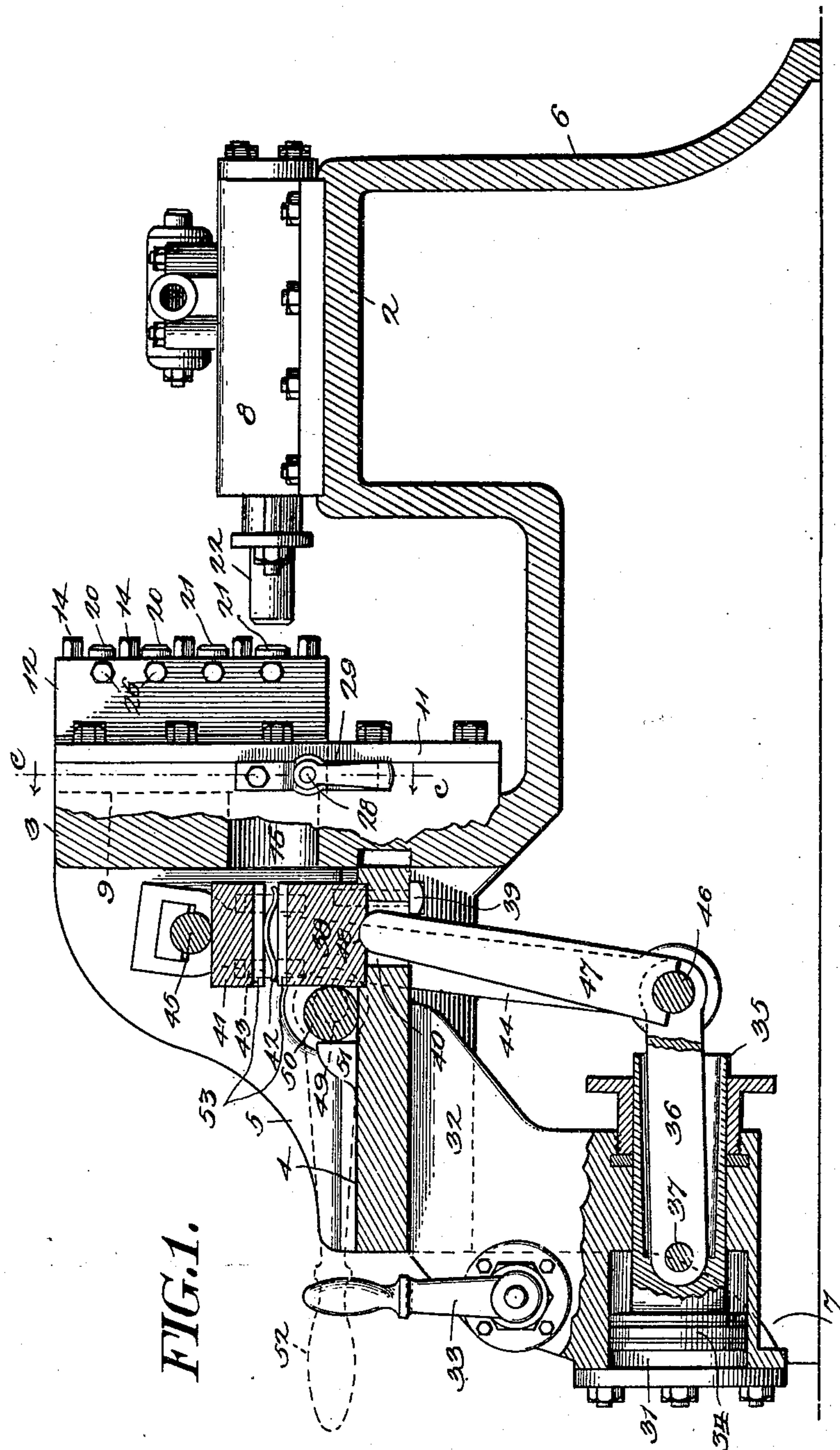
A. CARSTENS.

MACHINE FOR SHARPENING OR SHAPING DRILLS.

(Application filed Aug. 25, 1900.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses

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4 Sheets—Sheet 2.

FIG. 2.

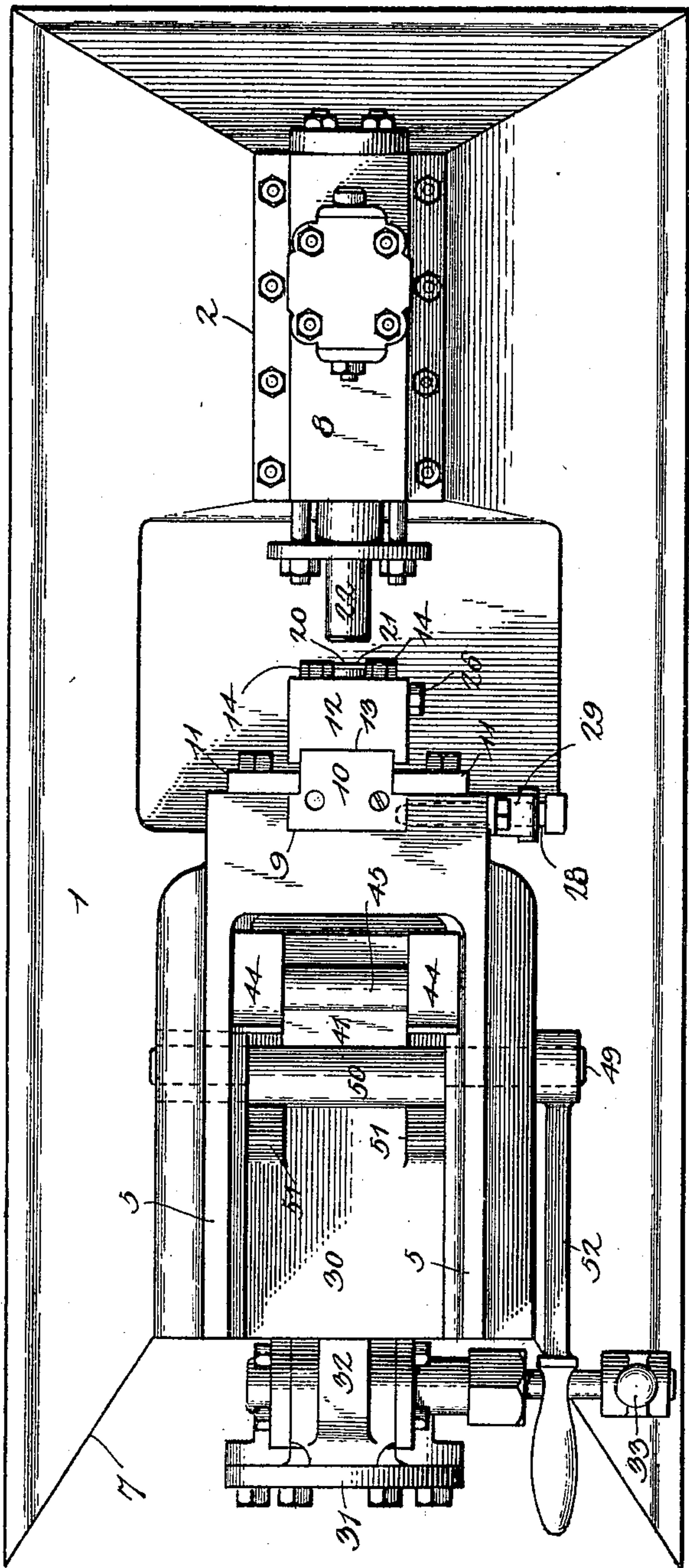
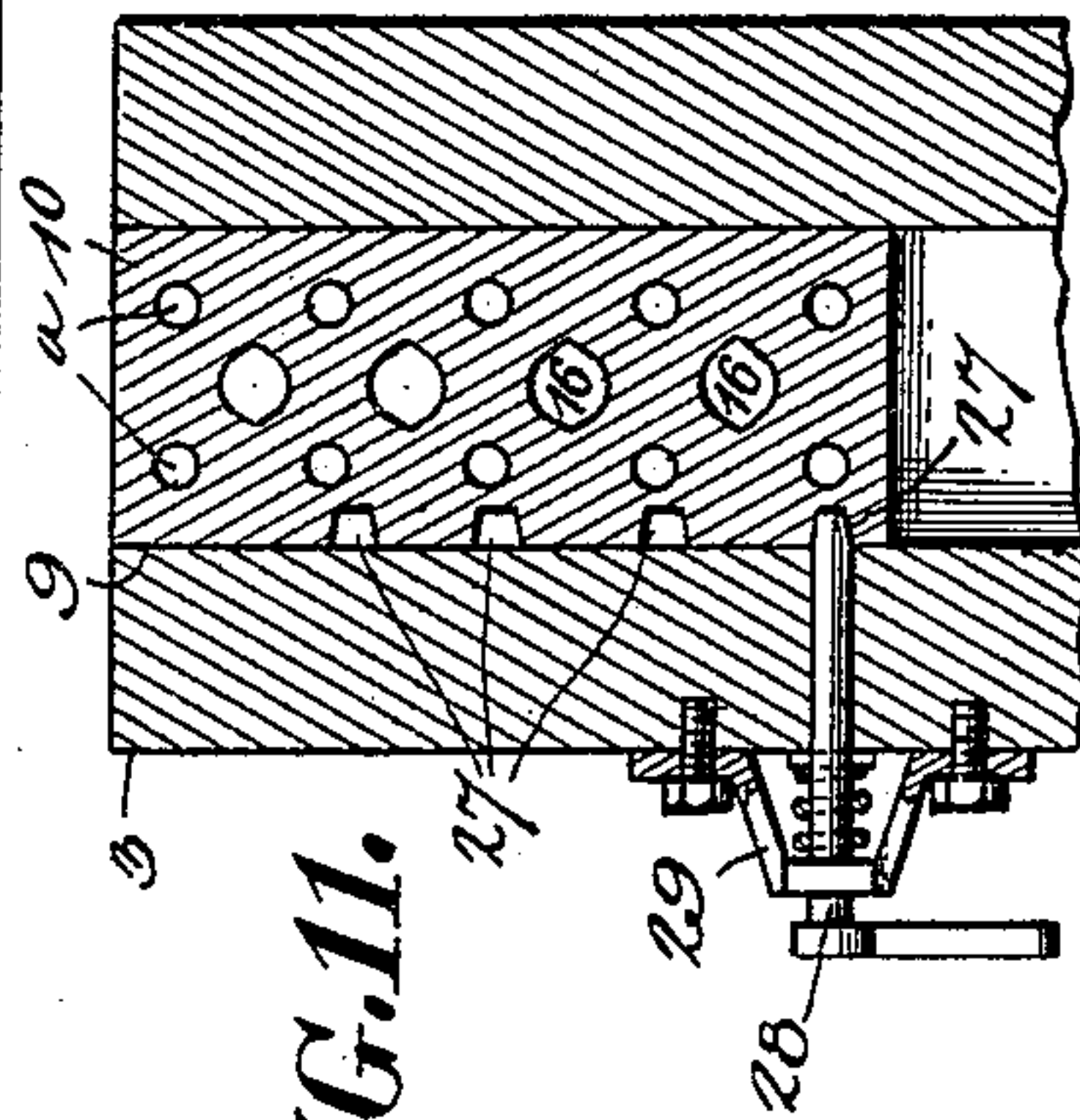


FIG. 11.



Witnesses

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4 Sheets—Sheet 3.

FIG. 4.

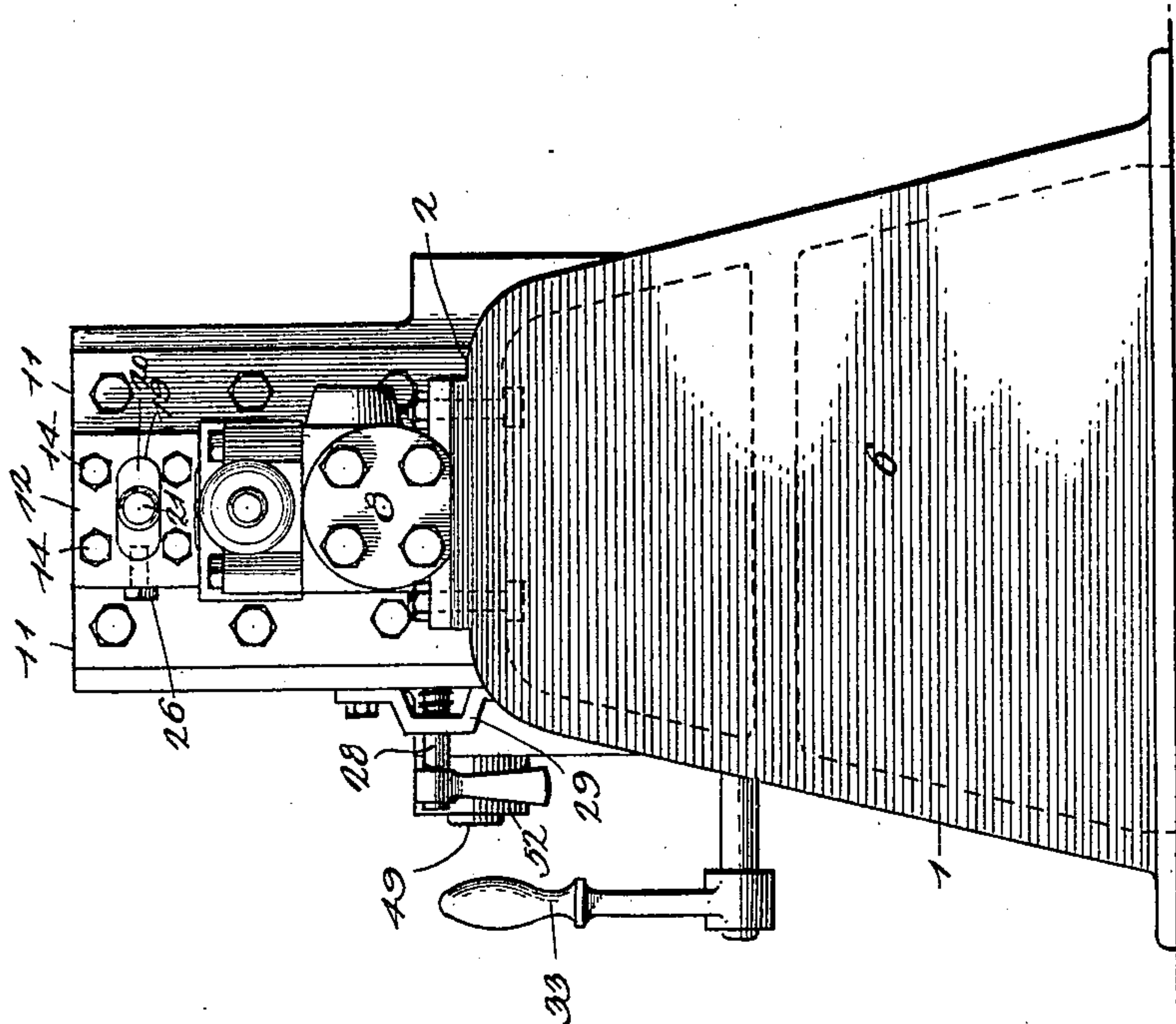
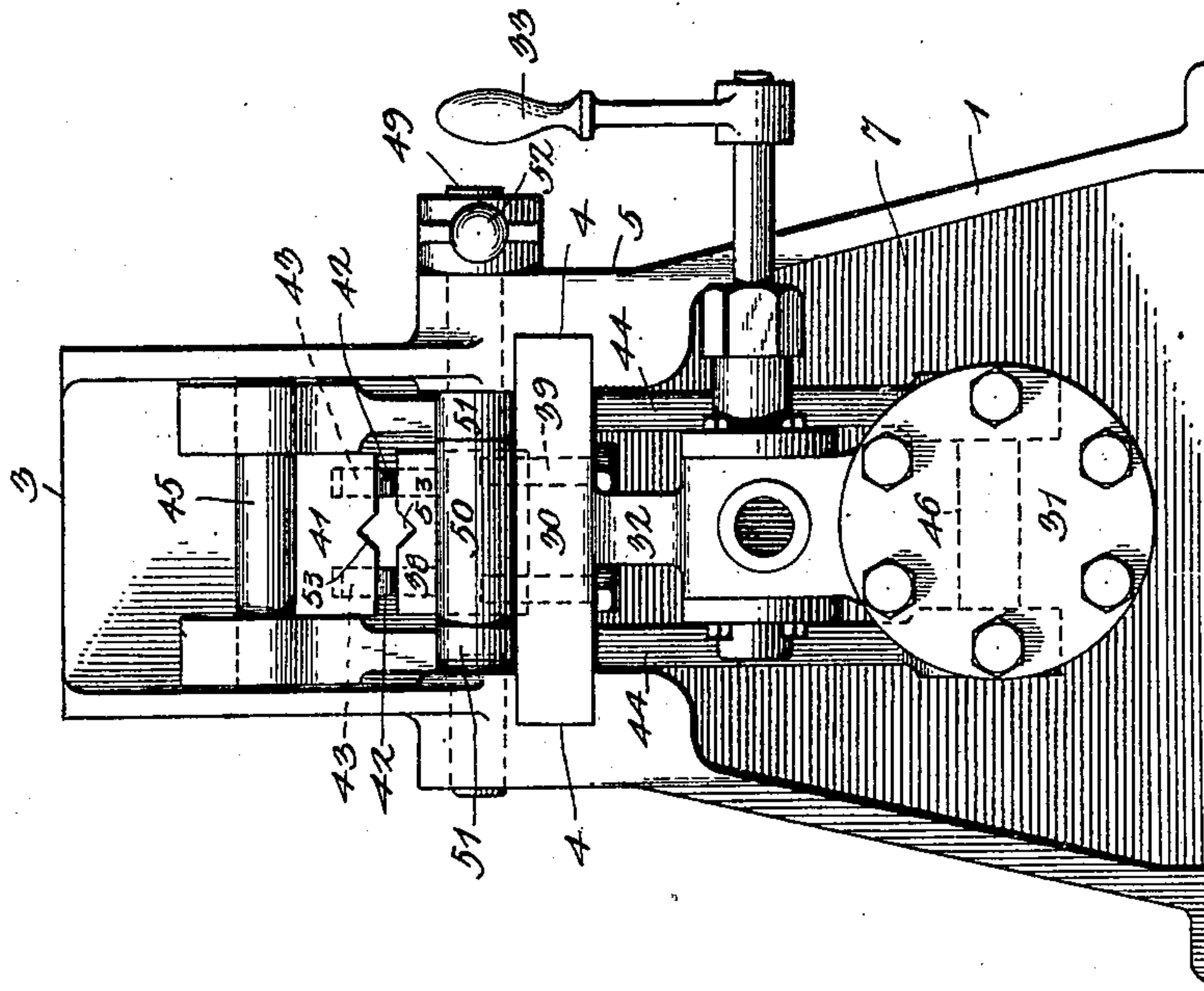


FIG. 3.



Witnesses

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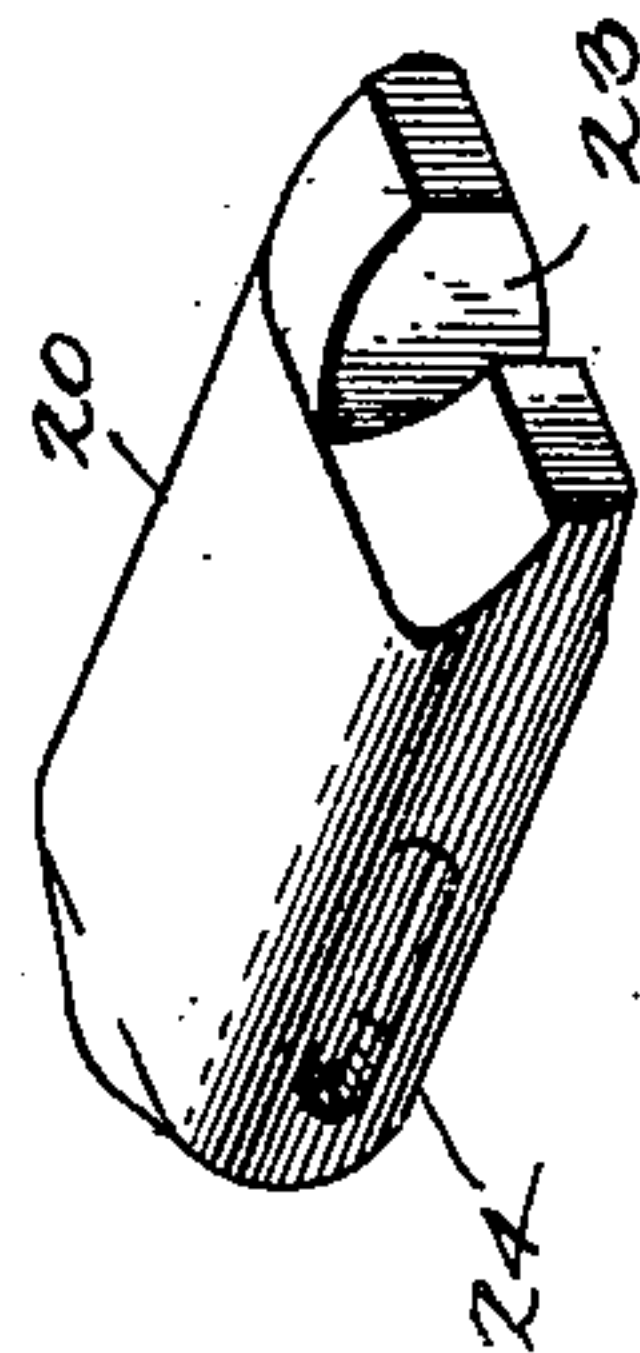
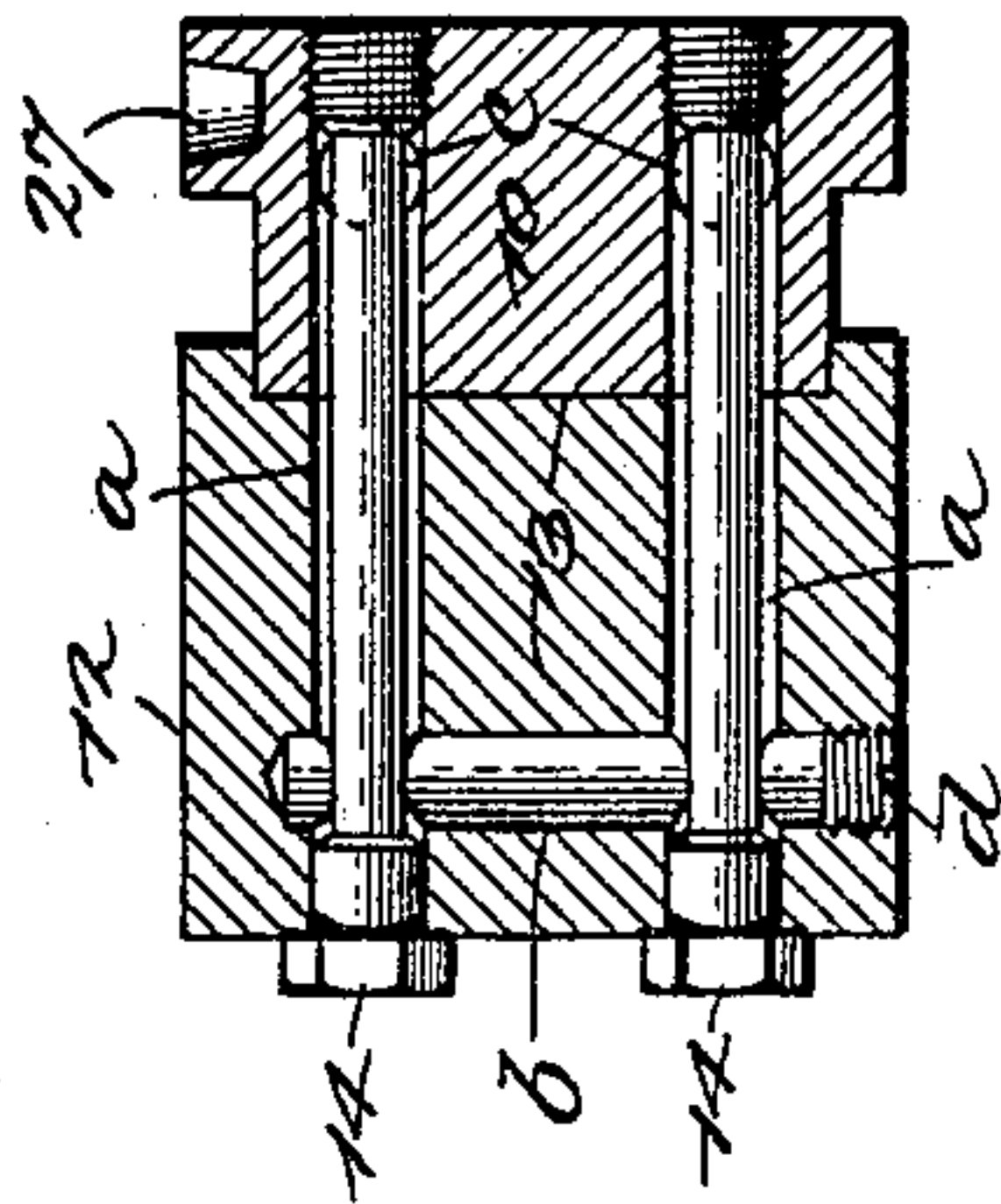
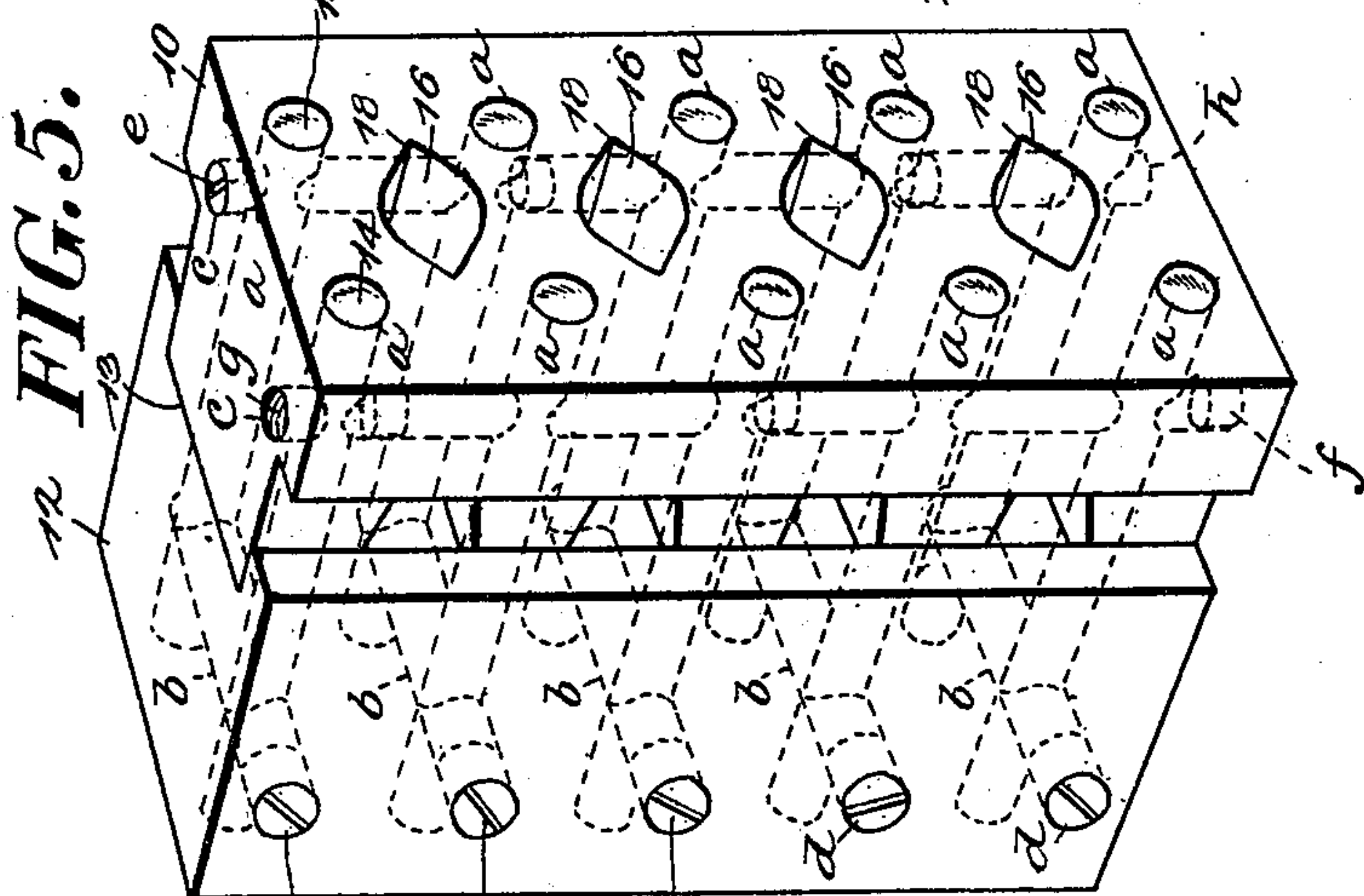
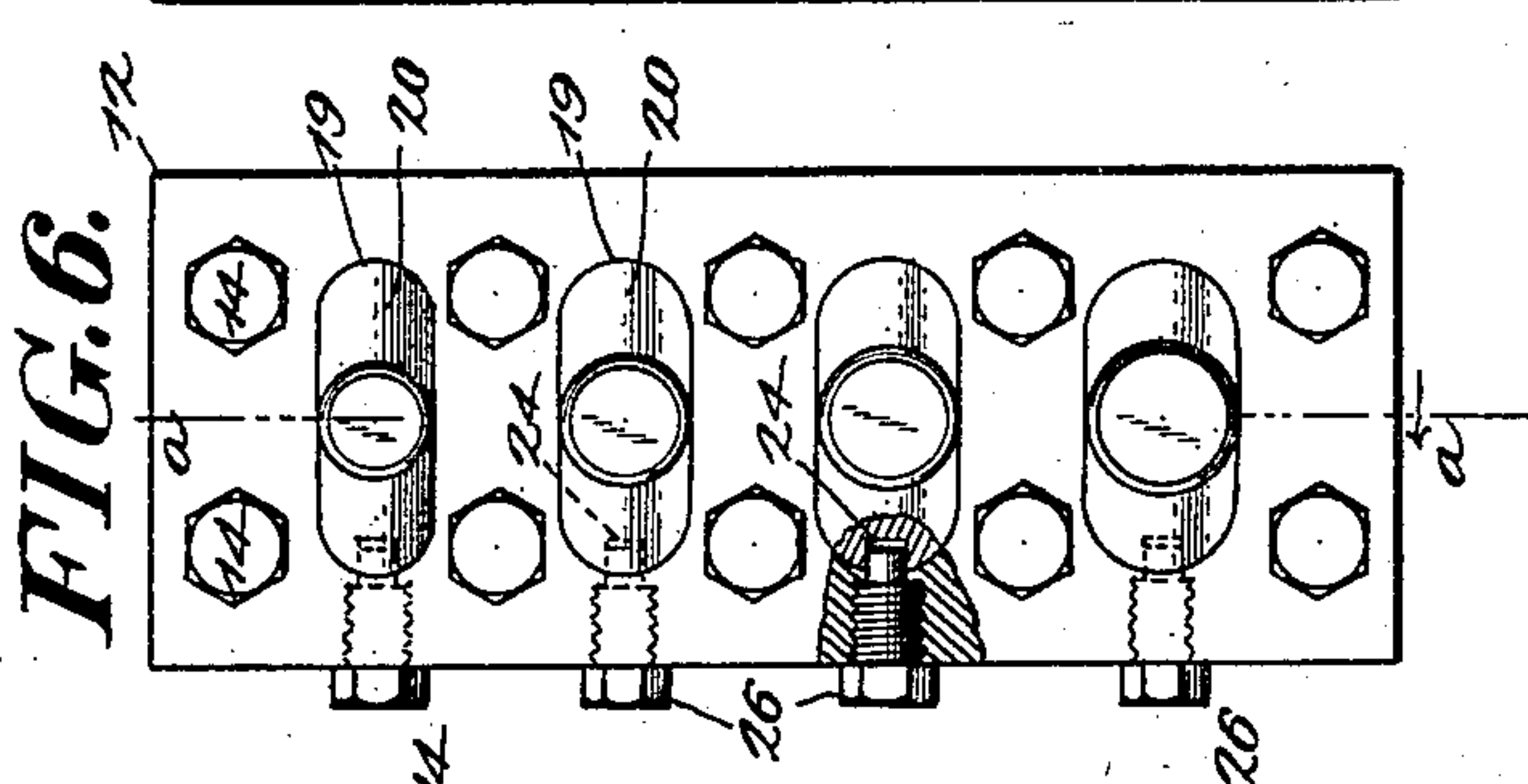
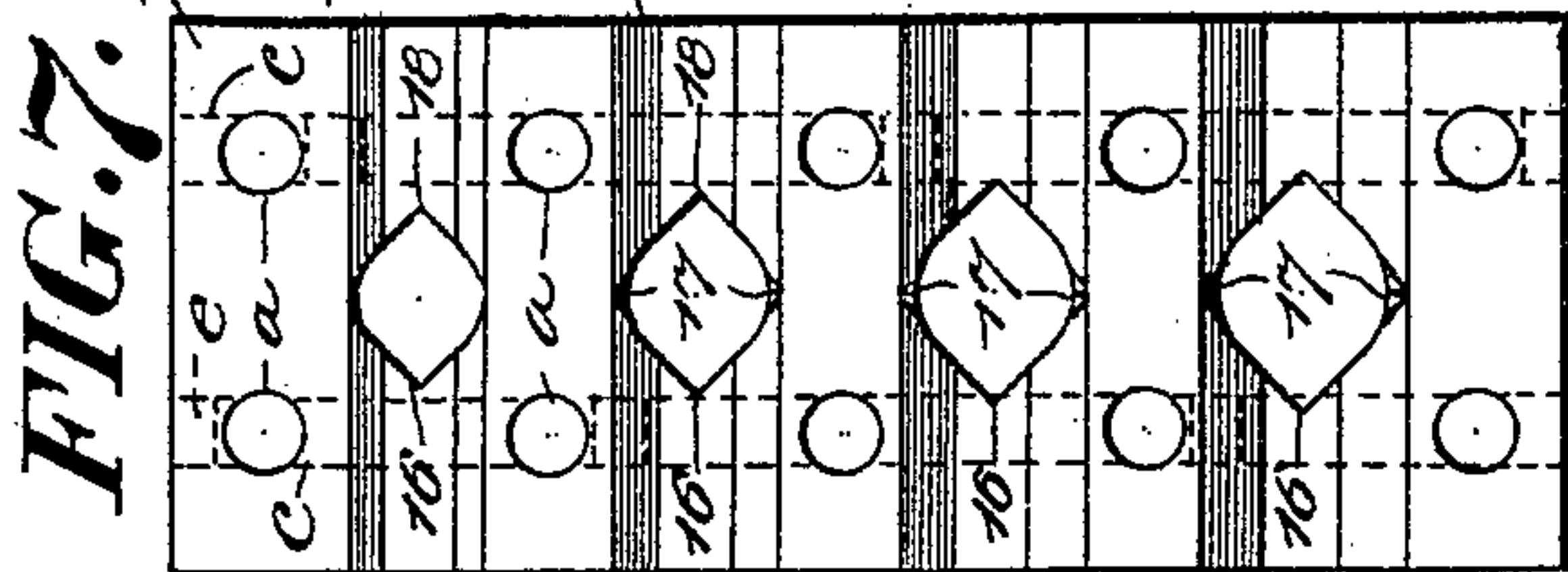
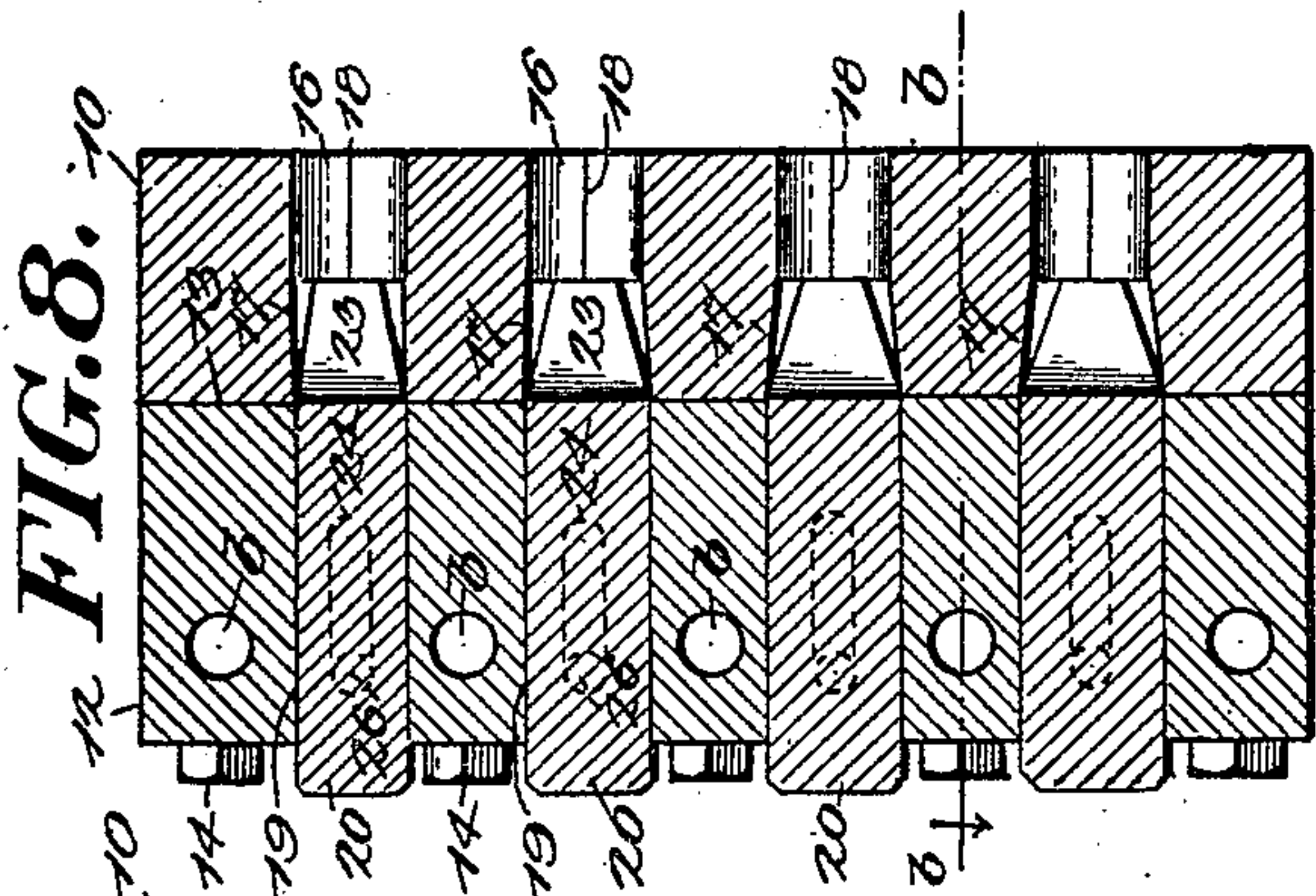
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4 Sheets—Sheet 4.



Witnesses

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UNITED STATES PATENT OFFICE.

ALEXANDER CARSTENS, OF LEADVILLE, COLORADO.

MACHINE FOR SHARPENING OR SHAPING DRILLS.

SPECIFICATION forming part of Letters Patent No. 667,187, dated February 5, 1901.

Application filed August 25, 1900. Serial No. 28,071. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER CARSTENS, a citizen of the United States, residing at Leadville, in the county of Lake and State of Colorado, have invented a new and useful Machine for Sharpening or Shaping Rock-Drills and other Tools, of which the following is a specification.

My invention is an improved machine for sharpening and shaping rock-drills and other tools—such as moils, gads, tools for channeling-machines, gadders, stone-cutters' tools, bits for certain forms of coal-mining machines, and the like.

One object of my invention is to provide a machine which is adapted to first form and sharpen the edge of the tool and then shape and size the head or bit thereof without removing the tool from the machine, so that the operations of forming and sharpening the edge of the tool and shaping or sizing the head or bit thereof may be performed one after the other without removing the tool from the machine during the process and so that the tool is entirely finished by the machine.

A further object of my invention is to effect improvements whereby the machine is adapted for entirely forming and sharpening the tool without cutting off and wasting any of the metal of which the tool is composed.

A further object of my invention is to effect improvements in the construction of the die-block and dolly-holder, whereby the same are prevented from becoming unduly heated while the machine is in operation.

A further object of my invention is to effect improvements in the machine and in the die-block and dolly-holder whereby the die-block and dolly-holder are provided with a plurality of dies and dollies which may be of different forms and sizes, adapted for sharpening and shaping tools of various kinds and sizes, and which may be readily adjusted on the machine to fit the same for performing any desired variety of work.

A further object of my invention is to effect improvements in the construction of the vise for clamping the tool while the same is being shaped and sharpened and in the mechanism for operating the vise.

A further object of my invention is to effect

improvements in the means for feeding the tool alternately to the dolly and to the matrix in the shaping and sizing die, so that the operations of forming and sharpening the edge and of sizing and shaping the tool may be successively performed by the machine.

A further object of my invention is to effect improvements in the construction of the frame of the machine.

A further object of my invention is to effect improvements in the construction of the slide and the fluid-pressure cylinder.

With these and other ends in view my invention consists in the peculiar construction and combination of devices hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is partly a side elevation and partly a vertical longitudinal sectional view of a machine for sharpening and shaping rock-drills and other tools constructed in accordance with my invention. Fig. 2 is a top plan view of the same. Fig. 3 is a front elevation of the same. Fig. 4 is a rear elevation of the same. Fig. 5 is a detail perspective view of the die-block and dolly-holder. Fig. 6 is a rear or exterior elevation of the dolly-holder, showing the dollies disposed therein. Fig. 7 is a detail elevation of the die-block. Fig. 8 is a detail sectional view through the die-block and dolly-holder, taken on the plane indicated by the line *a a* of Fig. 6. Fig. 9 is a horizontal sectional view of the same, taken on the plane indicated by the line *b b* of Fig. 8. Fig. 10 is a detail perspective view of one of the dollies. Fig. 11 is a detail sectional view taken on the line *c c* of Fig. 1.

The frame 1 of the machine in the embodiment of my invention here shown is formed of a single casting. A horizontally-disposed bed 2 is formed on one end of the frame, and the latter is further provided with a vertically-disposed bed 3 and with guideways 4, which are disposed horizontally and are formed in the sides 5 of the frame. The sides 5 are preferably inclined and converge upwardly, as shown, and are closed together at the outer end of the frame, as at 6, the end of the frame under the guideways 4 being open, as at 7.

A power-hammer 8 of suitable construc-

tion which may be operated by steam, compressed air, or other suitable fluid pressure is bolted on the bed 2, as shown.

The bed 3 is provided with a vertical guideway 9, in which is fitted a vertically-adjustable die-block 10, which is of the form here shown. A guide-plate 11, which is bolted on the base of the bed 3, secures the vertically-adjustable die-plate in its containing guideway 9. A dolly-holder 12, which corresponds in height and width with the die-block, is provided with a rabbet 13 on its inner side and is fitted on the outer side of the die-block and is secured thereto by bolts 14. The bed 3 is provided with a feed-opening 15 and the die-block is provided with a series of openings 16, which are adapted to successively register with the said opening 15 when the die-block is adjusted in the bed 3. Any suitable number of the openings 16 may be provided, and at the inner end of each of the said openings is formed a matrix 17 of a die for shaping and gaging or sizing the bits on the ends of the drills or other tools. It will be observed by reference to the drawings, more particularly by reference to Fig. 7, that the matrices of the dies are vertically disposed or disposed in a vertical line. The openings 16 are widened in their centers to form clearance-grooves 18, which are disposed in horizontal lines or at right angles to the plane in which the matrices are disposed. The dolly-holder is provided with a series of guide-openings 19, which register with the openings 16 in the die-block and form the guides for the dollies 20. The length of each dolly exceeds the thickness of the dolly-holder, and each dolly is provided at its outer end with a head 21, adapted to be struck by the head 22 of the hammer, and has at its inner end a sharpening matrix or die 23, in which the edge of the tool is formed and sharpened. In one side of each of the dollies is a groove 24, and the said grooves are engaged by the inner ends of screws 26. Said screws and said grooves, as will be understood, coact to limit the horizontal longitudinal movements of the dollies in the openings 19. It will be understood that the dollies and the dies in the die-block may be of any required style and size and adapted to sharpen and shape the bits of such tools as rock-drills, moils, gads, channeling-tools, gadders, stone-cutters' tools, and the like.

It is desirable to prevent the die-block and dolly-holder from becoming injured when the machine is in operation, and to effect this I provide the die-block and dolly-holder with series of communicating channels *a b c*. The channels *a* are the openings for the bolts 14, which secure the die-block and dolly-holder together, the shanks of the said bolts 14 intermediate of the headed and threaded ends thereof being reduced, so that spaces are formed around them in the said channels. The channels *b* are drilled transversely in the dolly-holder from one side thereof and serve to connect the respective pairs of the chan-

nels *a*, the outer ends of said channels *b* being closed by screw-plugs *d*. The channels *c* are vertically drilled in the die-block and connect the channels *a* together in vertical series. The upper end of one of the channels *c* is closed by a suitable screw-plug, as at *e*, and the lower end of the other channel *c* is closed by suitable screw-plugs *f*. Hence water introduced to the upper end of one of the channels *c* at the point *g* by means of a suitable flexible tube leading from a source of water will be caused to circulate throughout the connected series of channels *a b c* in the die-block and dolly-holder and to be discharged at the point *h*. It will be understood that the circulating water will serve to keep the die-block and dolly-holder from becoming unduly heated.

The die-block is provided in one side with a series of adjusting-openings 27, which correspond in number with the openings 15 and are appropriately located with reference to said openings. A lock-pin 28, which operates in an opening in one side of the bed 3 and in an opening in a suitable supporting-bracket 29, which is bolted to said bed, by engaging an appropriate opening 27 supports the die-block and dolly-holder at any required adjustment. A horizontally-disposed slide 30 operates in the guideways 4. A steam or other fluid-pressure cylinder 31 depends from the lower side of and is carried by the said slide. As here shown, the slide is a casting with which a depending hanger 32 and the cylinder 31 are integrally formed; but this construction may be varied without departing from the spirit of my invention. A suitable operating-valve to admit steam or other fluid to and exhaust the same from said cylinder is provided with an operating-lever 33, by means of which the movement of the piston 34 in the cylinder may be controlled. In the form of my invention here shown the piston is a casting, and a short rod 35 is formed integrally therewith and chambered out at its outer end for a suitable distance and adapted to contain and form a seat for a link 36, which is pivoted at its inner end, as at 37, and thereby connected to the piston. On the slide 30, near the inner end thereof, is seated a block 38, which forms the lower jaw of a vise. The said block is bolted to the said slide, as at 39, and an opening 40 is made in the said slide under the said block. A block 41, which is vertically movable and forms the upper jaw of the vise, is supported above the block 38 by springs 42 and is guided by vertical pins 43, which connect the said blocks 38 41 together. A pair of link-levers 44 have their upper ends connected together by a shaft or pin 45, which bears on the upper block or jaw 41 of the vise. The link-levers operate in recesses or rabbets formed in the sides of the slide 30, and their lower ends are connected together and to the outer ends of the link 36 by a pin or shaft 46. The lower end of a toggle-lever 47 is seated

on said pin or shaft and the upper end of said toggle-lever is seated and fulcrumed in a recess 48 in the lower side of the lower block or jaw 38 of the vise. A shaft 49 is journaled in bearings in the sides of the frame 1, passes over the slide 30, and is provided with an eccentric-cam 50, which coacts with the block 42 and with stops 51, formed on the upper side of said slide, to move the latter toward and from the die-block in the bed 3. Said shaft 49 has at one end an operating-lever 52.

The operation of my invention is as follows: Initially the slide 30 is moved outward from the bed 3 and the piston is in the outer end of the cylinder, thereby disposing the link-levers 44 at an inclination and the toggle-lever 47 at a somewhat greater angle from the perpendicular. This initial position of the machine is shown in Fig. 1. Assuming that the die-block has been appropriately adjusted, the heated tool which is to be shaped and sharpened is inserted through the grooves 50 in the coacting faces of the blocks or jaws of the vise through the opening 15 and through the drill-die opening 16 that registers therewith, with its bit disposed horizontally in the clearance-grooves 18, which admit of the passage thereof, and as the shoulders at the inner or upper side of the bit or head of the tool clear the face of the die-block the tool is turned through a quarter of a circle to dispose the shoulders of the head or bit thereof vertically and in line with the matrices of the die. Steam or other fluid pressure is then admitted to the outer end of the cylinder and the piston is forced inward in the cylinder, the link 36 serving to swing the link-levers 44 to a vertical position and also move the toggle-lever 47 to a vertical position, said toggle-lever and said links coacting to move the upper block or jaw 41 of the vise downward against the tension of the springs 42 and to close the same upon the shank or other tool, thereby firmly holding the same in place. The feeding-lever 52 is now taken in hand, the hammer is started into operation, and the tool is fed against the dolly, which is hammered until it forms the required shape on the cutting edge of the bit or head of the tool. The motion of the feed-lever 52 is then reversed, causing the slide 30 and the vise which holds the tool to move backward and bring the head of the tool into the matrices of the die, into which it is hammered to size and shape the head of the tool. The hammer is then thrown out of operation and the finished drill or tool removed from the die-block and vise.

Having thus described my invention, I claim—

1. In a machine of the class described, the frame having the horizontally-disposed bed for the power-hammer, the vertically-disposed bed, and the die-block and dolly-holder having a plurality of dies and dollies and adjustable in said vertically-disposed bed, substantially as described.

2. In a machine of the class described, the combination of a power-hammer and a die-block, the one adjustable with relation to the other, said die-block having a plurality of dies, substantially as described.

3. In a machine of the class described, the combination of a power-hammer, a die, a dolly in advance of the die, and a feeding mechanism to feed the work forward to the dolly and thereafter rearward to the die, substantially as described.

4. In a machine of the class described, the combination of a power-hammer, a die, a dolly in advance of the die, a movable vise to grip the work, and a feed mechanism for said vise whereby the work may be fed forward to the dolly and thereafter rearward to the die, substantially as described.

5. In a machine of the class described, the combination of a power-hammer, a die, a dolly in advance of the die, a vise to grip the work, a slide carrying said vise, and means to move said slide, and thereby feed the work forward to the dolly and rearward to the die, substantially as described.

6. In a machine of the class described, the combination of a die-block having an opening therethrough and a die formed at the outer end of said opening, a dolly in advance of said die, and means to feed the work through said opening forward to said dolly and rearward to said die, substantially as described.

7. In a machine of the class described, the die-block having a die on one side, an opening leading through said block to said die, said opening having clearance-grooves disposed at an angle to the matrix of the die, substantially as described.

8. The combination of a slide, feed mechanism therefor, a vise carried by said slide and having a movable jaw, a fluid-pressure-operated mechanism, movable with said slide, a link connected to a movable element thereof, a link-lever connecting said link and said movable jaw, and a toggle-lever connecting said link and a relatively-fixed point, substantially as described.

9. The combination of a relatively-fixed die, a slide, feed mechanism therefor; a vise carried by said slide and having a vertically-movable jaw, springs to support said jaw, a link-lever carried by said jaw and a toggle-lever bearing at one end against a relatively-fixed point and connected to said link-lever, substantially as described.

10. The combination of a power-hammer, a bed having a feed-opening in line with the head of the hammer, a die-block having an opening in line with said feed-opening and hammer-head, a die being formed at the outer end of said opening, a dolly-holder, a dolly therein, between said die and hammer-head, and means to feed the work forward to the dolly and then rearward to the die, substantially as described.

11. A die-block, a dolly-holder bolted thereto, said block and holder having water-chan-

nels formed around their connecting-bolts, substantially as described.

12. A die-block and dolly-holder having registering bolt-openings, connecting-bolts
5 therein having their shanks intermediate of their heads and threaded ends reduced, and water-channels communicating with said bolt-openings, whereby the latter also form water-channels, substantially as described.

10 13. A die-block of the class described, having a feed-opening extending therethrough, which opening is wider in one direction than in another, and a matrix at one end of said opening, said matrix being wider in one direction than another, the respective widened
15 portions of said opening and said matrix being disposed in planes at an angle to each other, substantially as described.

14. In a machine of the class described, the

combination of a power-hammer, a bed having a feed-opening in line with the head of the hammer, a feed-slide having a workholder, means to operate said feed-slide, an adjustable die-block on the bed and having
20 a plurality of dies and feed-openings, and a dolly-holder movable with said die-block and having a plurality of dollies registering with the respective dies, and a holder to secure the die-block and dolly-holder when adjusted,
25 substantially as described.

30 In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

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Witnesses:

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