

(No Model.)

2 Sheets—Sheet 1.

J. W. HUSSEY.
APPARATUS FOR MAKING HALF ROUNDS.

No. 578,877.

Patented Mar. 16, 1897.

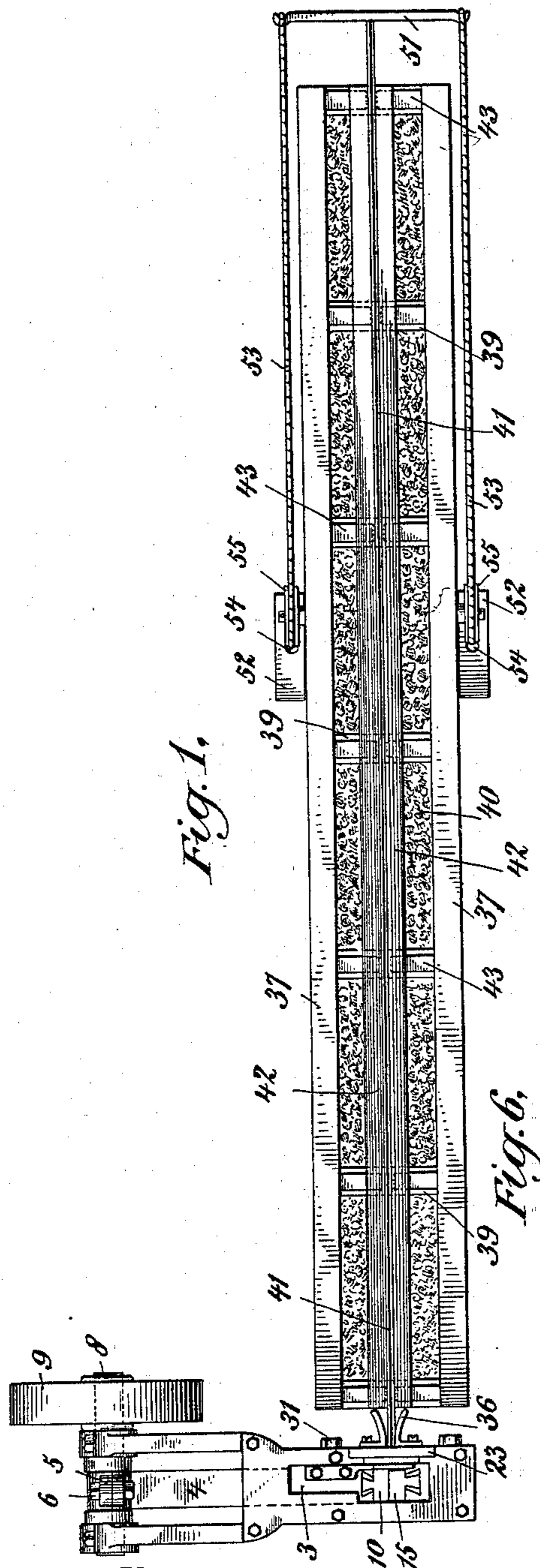


Fig. 1.

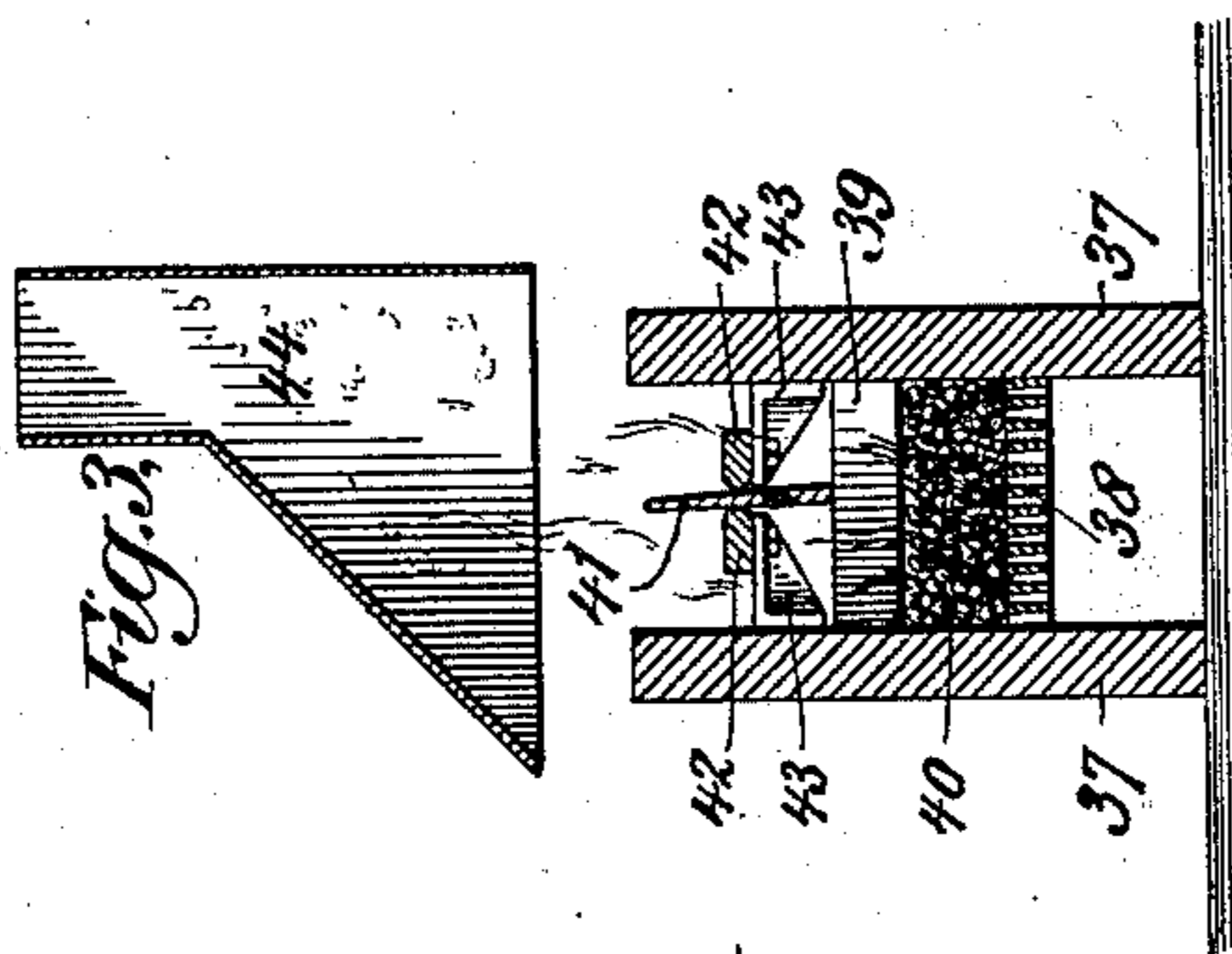


Fig. 2.

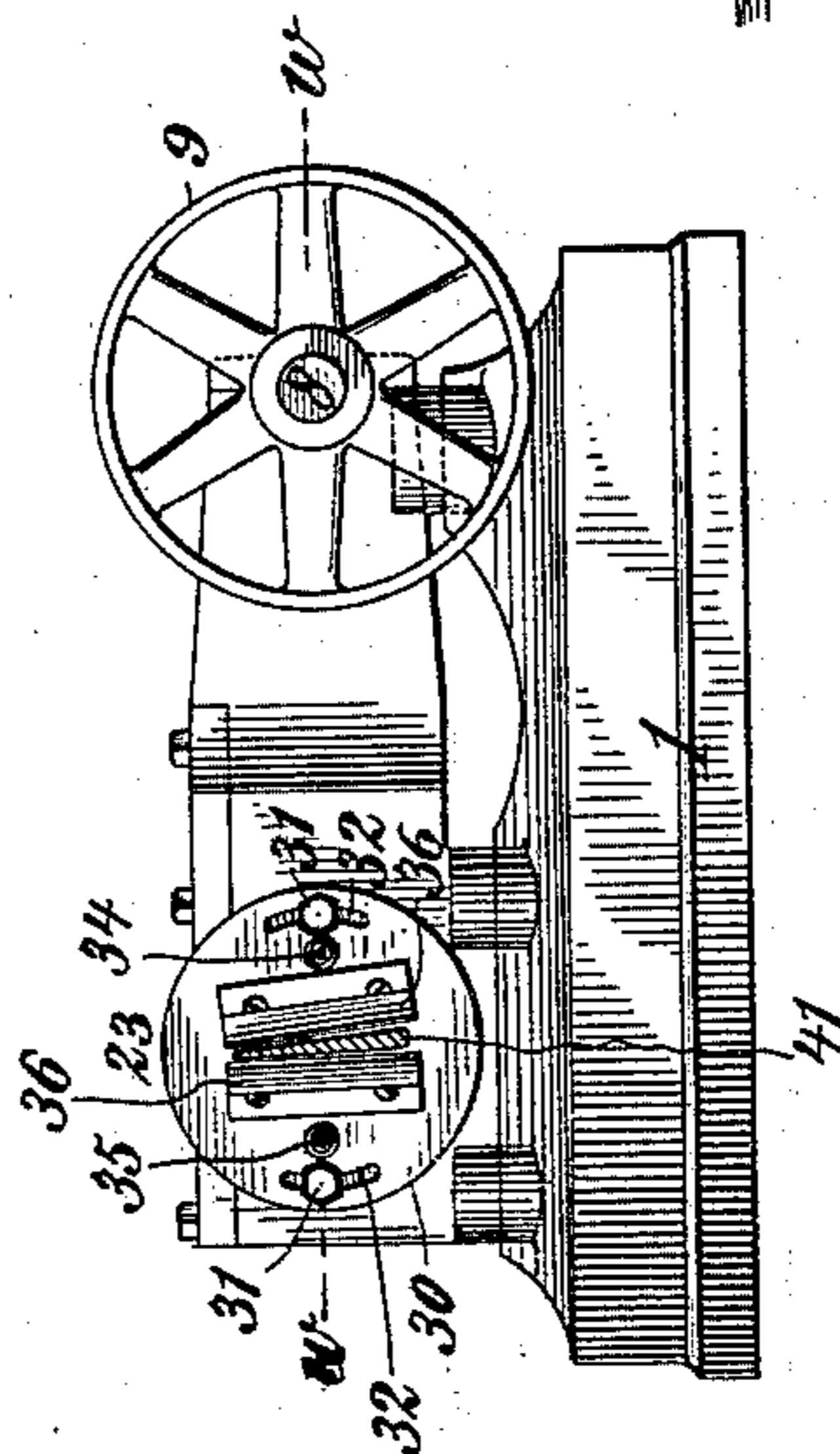


Fig. 3.

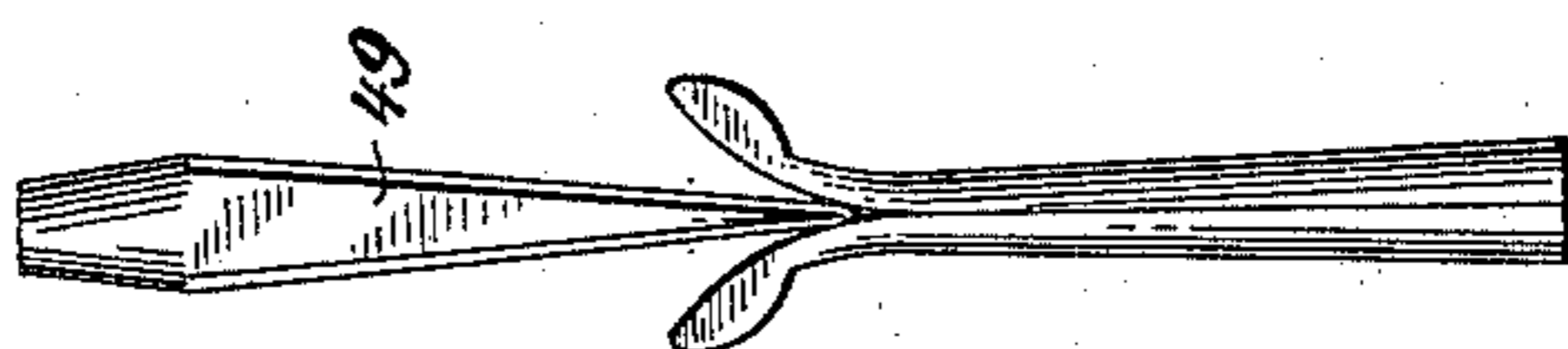


Fig. 4.

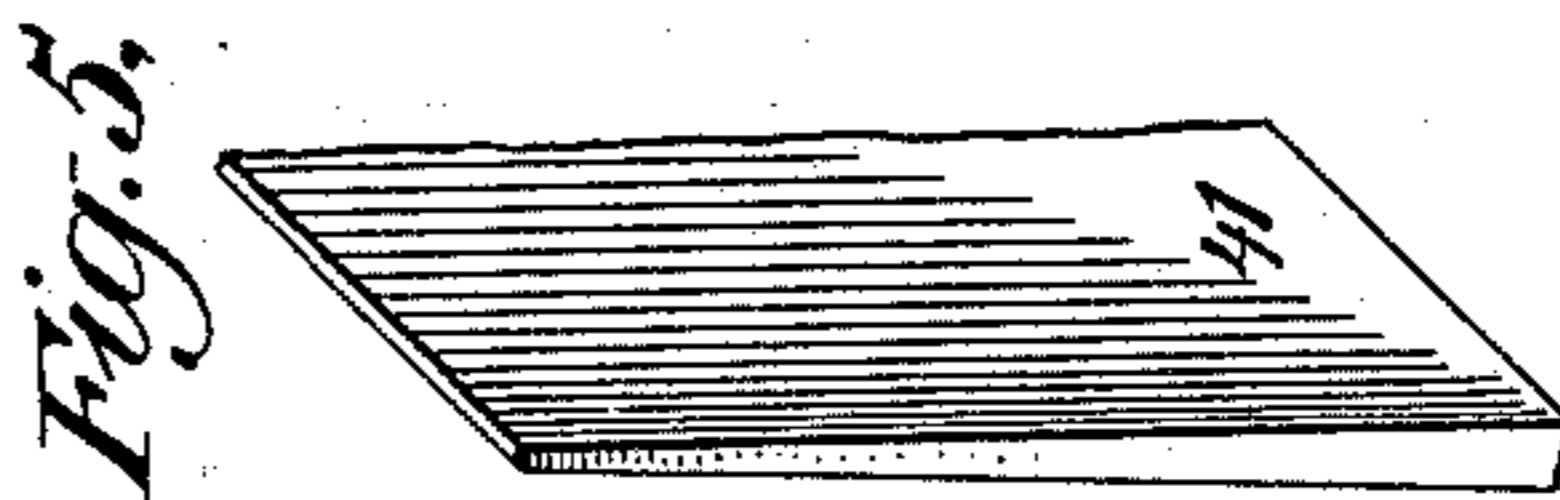


Fig. 5.

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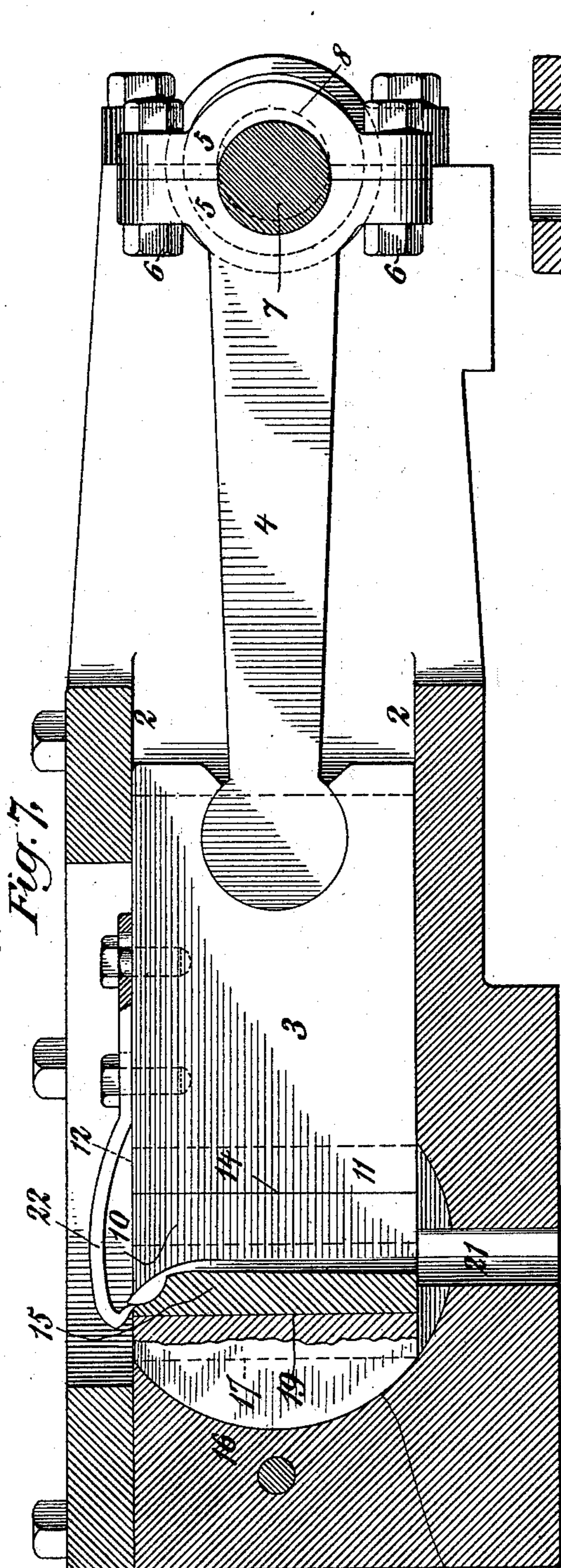


Fig. 7.

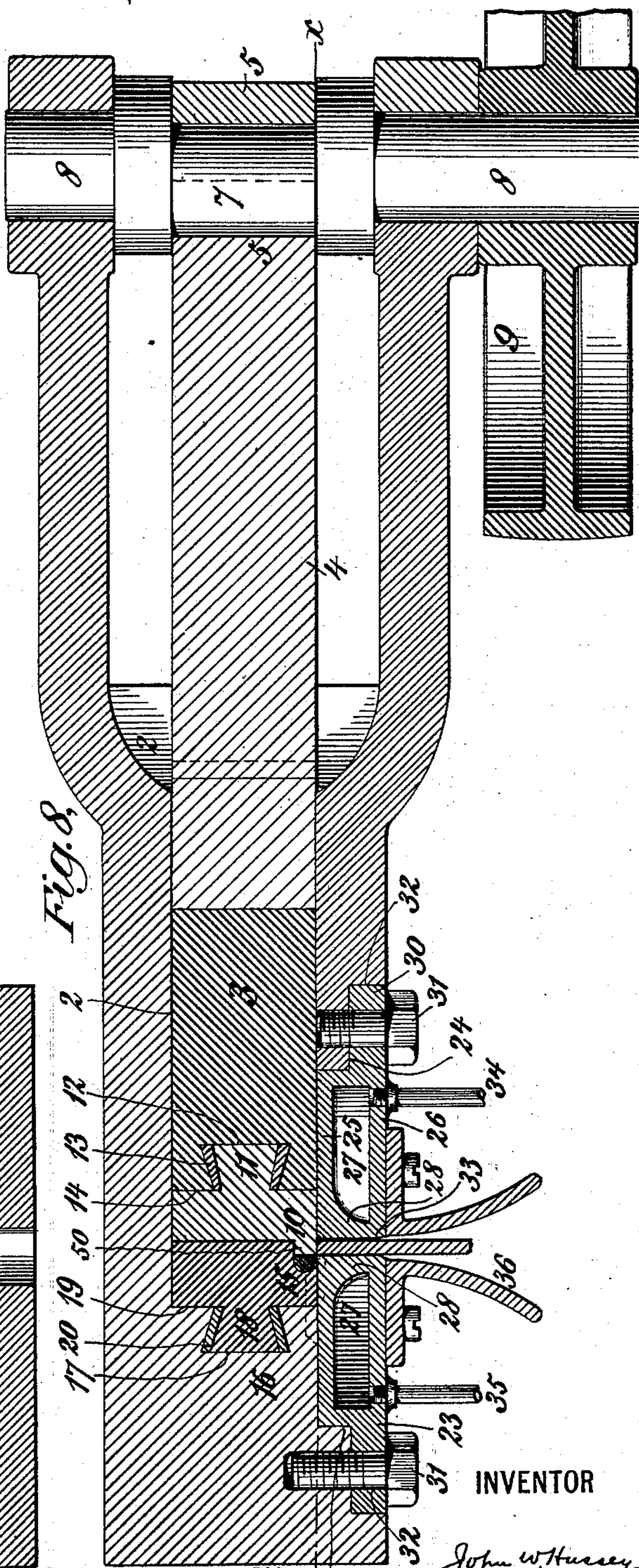


Fig. 8.

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UNITED STATES PATENT OFFICE.

JOHN W. HUSSEY, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO
CLARENCE W. SEAMANS, OF SAME PLACE.

APPARATUS FOR MAKING HALF-ROUNDS.

SPECIFICATION forming part of Letters Patent No. 578,877, dated March 16, 1897.

Application filed April 1, 1895. Serial No. 544,037. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HUSSEY, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Apparatus for Making Half-Rounds, &c., of which the following is a specification.

My invention has for its main object to provide a machine for manufacturing what is known in the art as "half-rounds," which are implements made of iron or steel employed in the quarrying of stone.

In getting out slabs or blocks of stone from the rock round holes are drilled a few inches apart along a line about equal in length to the slab to be taken or produced, and a pair of half-rounds is inserted in each of said holes. Wedges are then driven in between the pairs of half-rounds, and by forcing the wedges down farther and farther and causing the half-rounds to spread more and more the stone slab is finally separated from the body of rock or granite. The half-rounds are tapering from top to bottom, being smaller at the upper end, so that when two are put together in the drilled hole they do not fill the upper end of the hole, and hence may be forced apart by the entering wedge without practically disturbing the lower ends of the half-rounds, which remain together and substantially fill the bottom portion of the circular hole. The half-rounds are provided with shoulders or flanges at their upper ends, which overhang or catch upon the rock and slab after separation of the slab or cut, and thus prevent the half-rounds from falling down between the cut and the body of the rock and facilitate the picking off or removal of the half-rounds after the slicing operation. The half-rounds are also bent outwardly at their upper ends to form a V-shaped opening for the introduction of the wedge.

In the manufacture of half-rounds in accordance with my invention a blank or sheet of rolled steel of suitable length, say, for example, eight or ten feet, and of a width equal to the length of the half-round to be formed, is passed through a suitable furnace to a press or forming-machine arranged in proximity thereto. At about the middle of the furnace

are arranged cross-bars for supporting the blank edgewise in a vertical position as it passes through the furnace to the press. The furnace may be of any suitable length, as, for example, six feet, and of any suitable width and height, as, for example, eight inches. The blank is held upright and is guided by lateral guide-bars arranged above the series of cross-bars above referred to. The coal is preferably piled up to the said cross-bars and the flames extend up to near the top of the furnace or trough. The smoke and products of combustion are caught by an overlying hood leading to a chimney. Between the furnace and the cast-iron press or forming-machine is a suitable space, as, for example, three inches, for the circulation of air in order that the press may not become too hot. The blank is passed to the press red-hot, being put cold into the furnace at one end and shoved along therethrough, either by a tool or automatically, one blank preferably following another and abutting thereagainst. As the blank leaves the furnace it passes through a guide-opening on the side of the press, which opening is preferably shaped to correspond with the cross-section of the blank, which is wedge-shaped or tapered, being thicker at one edge than at the other. Preferably the blank is fed with the thinner edge uppermost. From the guide-plate at the side of the press, which is also a shearing-die, the forward end of the blank passes in front of a fixed female die, which is so made as to form also a gage for the feed of the blank.

On a guided bar or slide is fixed a male forming and shearing die, and said slide is connected to a pitman which is worked by an eccentric or crank shaft. Both forming-dies are detachably connected, so that other dies for making other forms or other lengths or sizes may take their places in the same machine. The die and guide at the side of the machine is made adjustable to bring its central slot or passage-way to any desired angle relatively to the reciprocating male die, whereby a tapering or gradual cut may be made. The side die is also removable for the purpose of substituting other dies for other shapes or sizes. The blank is fed across

the face of the female die while the male die is separated therefrom, and as the male die advances it operates to cut off a suitable quantity of the hot metal to make a half-round and to force it into the female die and produce by pressure a device of the desired shape. On the slide is provided a means for automatically pulling the half-round out of the female die on the back stroke of the male die.

The side die is made hollow and a continuous stream of cold water is circulated there-through to keep said die and the forming-dies cool, particularly the male die, which is made of hardened steel, to facilitate the cutting or shearing operation.

Other features and further details of construction and modes of operation will be more fully described hereinafter.

My invention consists in certain features of construction and combinations of devices, all as will be hereinafter more fully described, and particularly set forth in the appended claims.

In the accompanying drawings, Figure 1 is a plan view, reduced scale, of the press or forming-machine and the furnace with a blank or plate therein and shown as having entered the press. Fig. 2 is a side view of the press on a larger scale with the blank in section. Fig. 3 is a cross-section of the furnace with the blank in feeding position. Fig. 4 is a perspective view of one of the half-rounds when finished. Fig. 5 is a partial perspective view of the blank or plate from which said half-round is made. Fig. 6 is an elevation of two half-rounds placed together in operative position and with the wedge inserted in the opening formed at the upper ends of said half-rounds. Fig. 7 is a vertical section on a still larger scale, taken at the line X X of Fig. 8; and Fig. 8 is a horizontal section of the press, taken at the line W W of Fig. 2.

In the several views the same parts will be found designated by the same numerals of reference.

I shall first describe the construction of the press or machine, which is mounted upon a suitable bed-plate or foundation 1. In suitable ways or guides 2, formed in the body of the press, reciprocates a vertically-arranged slide 3, to the rear end of which is pivotally connected one end of a pitman 4, whose opposite end is attached by collars 5 and bolts 6 to a crank or eccentric 7 on a shaft 8, mounted in bearings in the sides of the press, and provided at one end with a band-pulley 9 for application of the motive power.

To the front end of the slide 3 is attached the male die 10, the working face of which is shaped to correspond with the inner side or face of the half-round, as shown more particularly at Figs. 7 and 8, having a plane vertical face for the major portion of its length and a curved forwardly-projecting face at its upper end. This die is extended laterally the full width of the slide and is formed centrally at its rear with a vertical dovetailed

rib 11, which enters a corresponding groove 12 in the slide and is secured firmly therein by side wedges 14, which also act to draw the shoulders 13 of the die tight against the face of the slide.

The female die 15 is attached to the solid end 16 of the body of the press, which has a vertical dovetailed groove 17 to receive the central dovetailed rib 18 on the die. The die 15 is extended laterally to equal the width of the male die, and, like the latter, its shoulders 19 are held firmly against the solid end of the press by means of wedges 20.

The working face of the female die is hollow or grooved and shaped to correspond with the outer side of the half-round.

Below and in line with the face of the female die is an opening 21 for the escape of the finished half-round on the return movement of the male die.

To obviate the liability of the half-round sticking in the female die, I have provided a spring-hook 22, which is screwed onto the top of the slide and which on the backward stroke of the same is adapted to catch upon the point of the half-round and positively pull it away from the die and permit it to fall out of the machine through the opening 21.

On that side of the press contiguous to the working faces of the dies is arranged a device 23, which performs several functions. It is made circular in contour, preferably, and fits into a like depression 24 in the side of the press. The said device comprises a back plate 25, a front plate 26, connected at the perimeters, an intermediate space or chamber 27, a pair of vertical walls or webs 28, connecting the front and back plates centrally, and a circular flange 30, by which the device is attached to the side of the press by means of screws or bolts 31, passing through segmental slots 32, as shown at Figs. 2 and 8.

A vertical opening 33 extends through the device from the front to the back plate, which opening forms a passage-way and guide for the blank to be operated upon and in contour matches the cross-section of the blank.

The back plate 25 constitutes also a cutting-die, the edge of the opening 33 therein cooperating with the outer vertical contiguous edge of the male die to effect a cutting or shearing of the projected end of the blank to be converted into a half-round. These cutting-dies and the female die are of hardened steel.

To prevent loss of temper in the dies and also to prevent expansion and distortion thereof and of adjacent parts, due to the presence of the red-hot blanks, I pass cold water through the space or chamber 27 and thereby maintain the parts in a comparatively cool condition. The cold-water-inlet pipe 34 may be screwed into the front plate 26 on one side of the guide-opening and the outlet-pipe 35 into said plate on the opposite side of said opening, the water coming from any suitable source of supply and circulating or passing

through said chamber, the portions thereof on the sides of the guide-opening communicating with each other above said opening.

On the front plate 26 is bolted a flaring or funnel-shaped guide 36 to direct the incoming blank properly into the guide-opening leading to the dies.

I shall now describe the furnace, which is arranged at right angles to the press and preferably distant therefrom a few inches, so as to avoid unduly heating the press.

37 37 represent the side walls of the furnace, which may be of brick or other fire-proof material.

At a suitable height from the base of the furnace is arranged a grate 38, extending the entire length of the structure. Cross-bars 39 extend from wall to wall at a suitable elevation above the grate, which is preferably covered with coal 40 up to the under sides of the cross-bars. These cross-bars, of which any desired number may be used, are employed to support the blank or plate 41 while being heated in and during its passage through the furnace. The blank is maintained in an upright position by a pair of parallel guide-bars 42, running the entire length of the furnace and centrally thereof. The guide-bars are bolted to angular brackets 43, which in turn are attached to the walls of the furnace. The space between the guide-bars is arranged substantially in line with the opening 33, leading to the dies.

As will be seen, the blank is tapering or wedge-shaped in cross-section, and in feeding it through the furnace and into the press I prefer to place or arrange its thicker edge downward nearer the fire in consequence of this portion of the blank requiring more heat than the thinner, and also because the handling and feeding of the blank are somewhat facilitated thereby.

Above the furnace is a hood 44 to carry off the products of combustion to a flue or chimney.

The finished half-round consists of a shank, half-round on one side, as at 45, flat or plane on the other, as at 46, and of an outwardly-curved top 47, having a shoulder or notch 48. The female die corresponds in shape with the half-round side and the male die with the flat or plane side of the tool, which is tapering, as shown. When two such devices are placed together, as shown at Fig. 6, a circular tapering two-part implement is formed, with a flaring mouth for the introduction of the wedge 49, which spreads the parts in the rock and finally rends the same.

The mode of making the half-rounds is as follows: The plate or blank 41, preferably of rolled steel and of the form shown, is slid into the furnace between the guide-bars 42 and with one edge resting upon the supporting cross-bars. When said blank has received a sufficient amount of heat, it is moved forward, so that its inner end passes into the flaring guide or mouth 36 and thence through the

guide-opening 33. The male die having been retreated by the slide, pitman, and crank-shaft the forward end of the heated blank is pushed across the face of the female die until it abuts against the projecting portion 50 of said die, which forms a stop for the feed movement of the blank and serves to regulate the quantity of metal supplied for each action of the forming-dies, the said stop being in alinement with the guide-opening 33. The male die now advances, and its outer vertical edge, acting in conjunction with the inner vertical edge of the guide-opening, cuts or shears off the projected end of the blank, while at the same time the said male die carries the said projected or measured portion of the blank onward and crowds or presses it into the female die with considerable pressure or force, thereby causing the metal to conform to the contour of said die and to the face of the male die. Immediately the half-round is thus pressed into shape or forged the male die recedes, and in this movement the spring-hook catches upon the point or upper end of the half-round and pulls it away from the stationary female die, thus insuring its escape through the outlet 21. On the retrograde movement of the male die the blank is again shoved forward against the stop and enough metal measured off for the next device. Then the male die advances, cuts it off, and, together with the female die, forms another half-round as before.

The die-plate or guide-plate 23 is preferably so adjusted to the press as that the guide-opening 33 stands at a slight angle to the vertical and to the male die, in order that the latter may make a gradual shearing cut instead of striking or contacting with the blank at once along the whole line of severance. To facilitate said adjustment, the segmental slots 32 and bolts 31 are provided. The die or guide plate by reason of this construction may also be readily removed for substitution by other die or guide plates when blanks of other sizes or shapes are to be operated upon, at which time the male and female dies may also be changed.

The blanks may be fed through the furnace, either by hand-tools or automatically, by the cross-bar 51, pulled by weights 52, attached to chains 53, running through guides 54 and over pulleys 55.

It will be seen from the drawings and from the foregoing description of the construction and mode of operation of the apparatus that I am enabled to rapidly and cheaply manufacture the half-rounds and produce them with great accuracy and uniformity, something not hitherto accomplished, all such devices having been previously made by hand, not only slowly and expensively, but with considerable lack of regularity as to size and shape.

While my improvements relate more especially to the manufacture of half-rounds, they may be employed, with a change of dies,

to make other articles, and hence I do not wish to be restricted altogether to the making of half-rounds.

Various changes in details of construction and arrangement may be made without departing from the spirit of my improvements.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a stationary forming-die, a combined reciprocatory shearing and forming die, arranged in alinement therewith, and a laterally-arranged independent stationary guiding and shearing die contiguous to and with its guide-opening in advance of the stationary forming-die and cooperating with the reciprocatory forming and shearing die; the construction and arrangement being such that the reciprocatory die in connection with the lateral die first cuts off the forward end of the blank, fed transversely through the lateral die, and then forces the detached portion of the blank into the stationary forming-die, and in cooperation therewith presses the blank into the desired shape, as set forth.

2. The combination with a stationary forming-die, and a reciprocatory shearing and forming die, of a laterally-arranged independent, stationary shearing-plate having a guide-opening through its body contiguous to the forming-die, as set forth.

3. The combination with a stationary forming-die provided with an integral stop, of a reciprocating forming-die having a shearing edge, and a lateral independent, stationary die cooperating with the shearing edge of the reciprocating die, and having formed in its body a lateral passage-way for the blank arranged in line with said stop; substantially as described.

4. The combination with a stationary forming-die and a reciprocating forming-die having a shearing edge, of an independent lateral adjustable shearing-die cooperating with the latter and having a guide-opening for the passage of the blank; substantially as described.

5. The combination with a stationary forming-die and a reciprocating forming-die hav-

ing a shearing edge, of an independent lateral shearing-die having a guide-opening arranged at an inclination to the shearing edge of the reciprocating forming-die and cooperating therewith in the feeding, guiding and severing of the blank; substantially as described.

6. The combination with a stationary forming-die and a reciprocating forming-die having a shearing edge, of an independent lateral die having a guide-opening through its body and a cold-water chamber surrounding said guide-opening; substantially as described.

7. The combination with a stationary forming-die and a reciprocating forming-die having a shearing edge, of an independent lateral hollow die having a shearing edge and a guide-opening, and ingress and egress pipes communicating with the interior of said die for the passage therethrough of cold water; substantially as described.

8. The combination with the forming-dies, of a lateral circular die-plate, having slots and securing means, also an elongated guide-opening, a water-chamber, and means for supplying the same; substantially as described.

9. The combination with the forming-dies, and the shearing-die having a guide-opening, of the lateral furnace provided interiorly with means for supporting the blanks in upright positions and for guiding the blanks therethrough, and feeding them into the guide-opening in the shearing-die; substantially as described.

10. The combination with the forming-dies and the shearing-die having a guide-opening and a cold-water chamber, of a deflector, and a lateral adjacent furnace having a guide-slot for the blanks arranged substantially coincident with the guide-opening, substantially as described.

Signed at New York city, in the county of New York and State of New York, this 27th day of March, A. D. 1895.

JOHN W. HUSSEY.

Witnesses:

JACOB FELBEL,
K. V. DONOVAN.