(No Model.) 2 Sheets—Sheet 1.

# A. H. MILLER.

## MACHINE FOR CUTTING OVAL HOLES IN MARBLE SLABS.

No. 459,787. Patented Sept. 22, 1891.

Fig. 1.

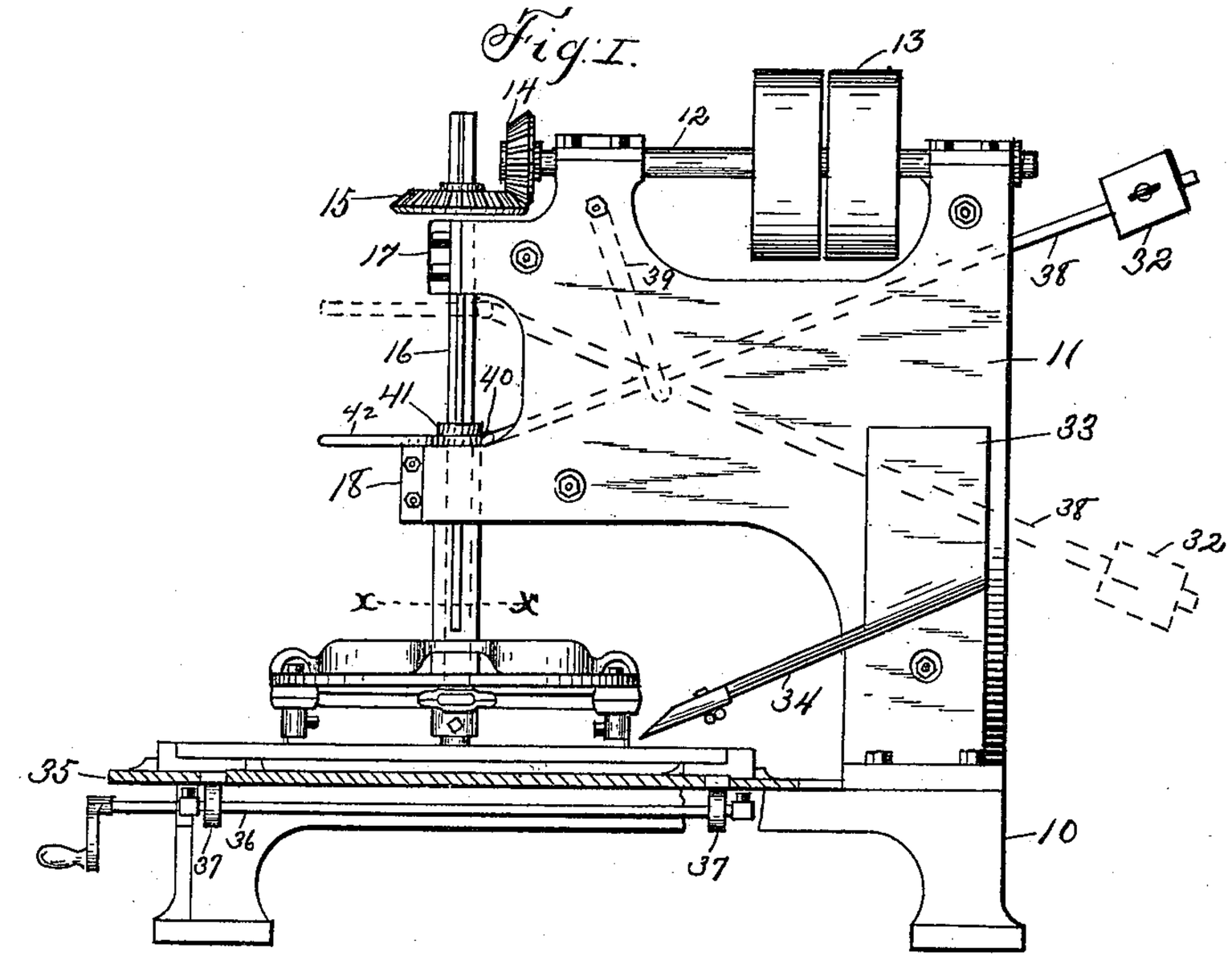



Fig. 3.

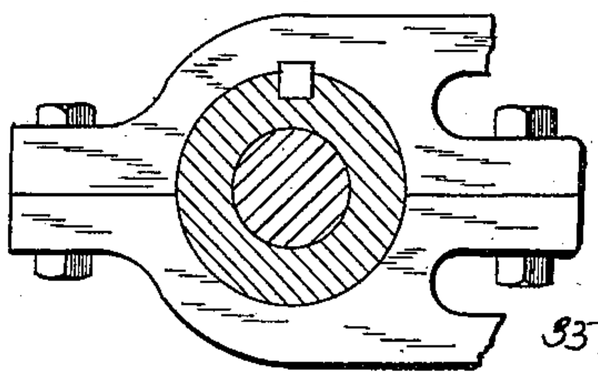


Fig. 2.




Fig. 10.

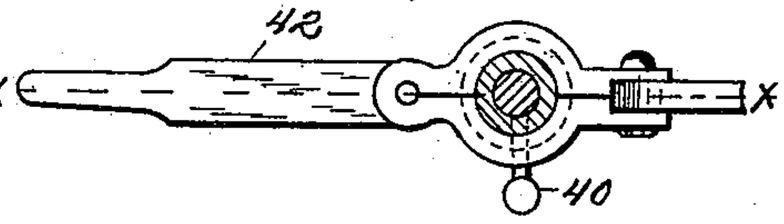
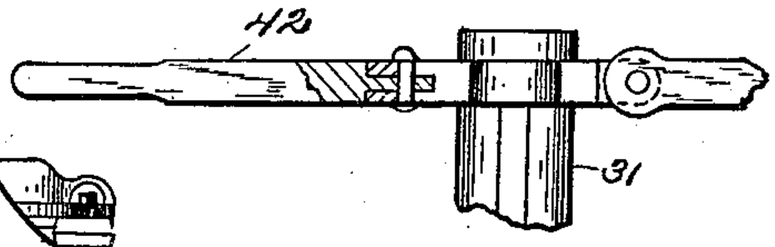



Fig. 11.

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(No Model.) 2 Sheets—Sheet 2.

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## MACHINE FOR CUTTING OVAL HOLES IN MARBLE SLABS.

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Fig. 4.

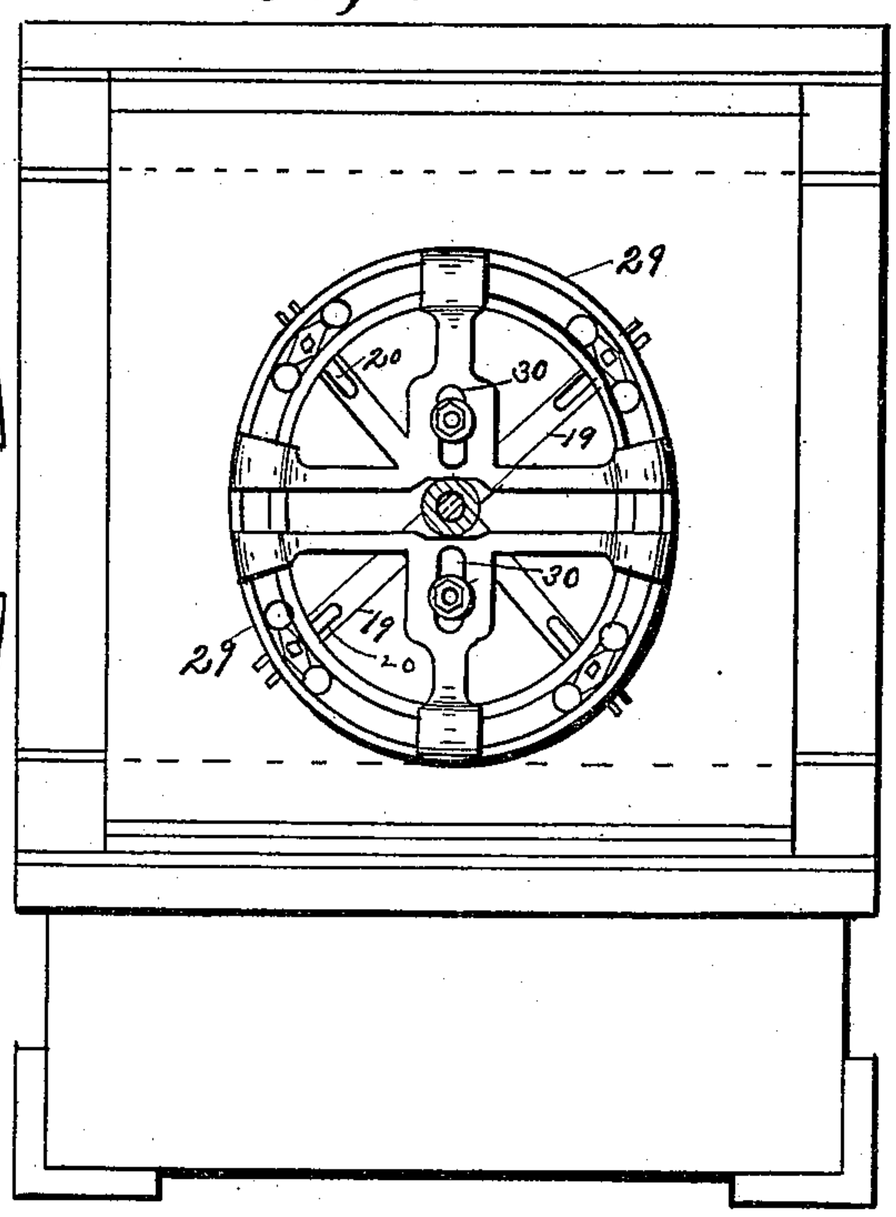


Fig. 5.

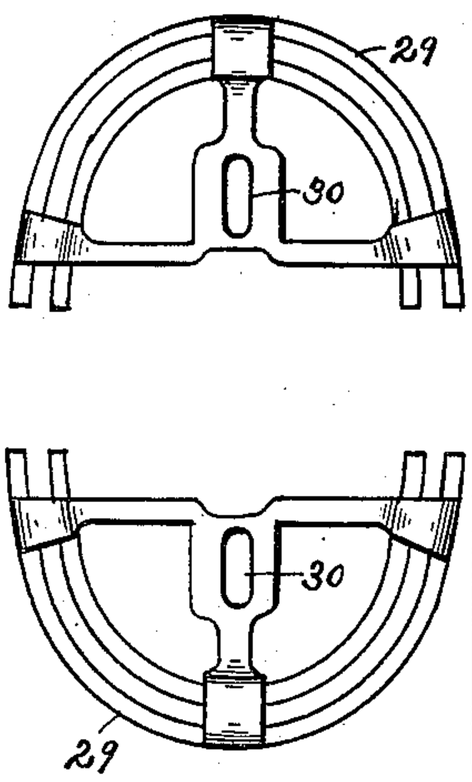


Fig. 7.

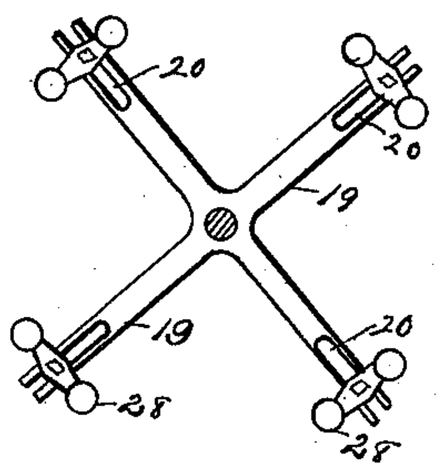


Fig. 6.

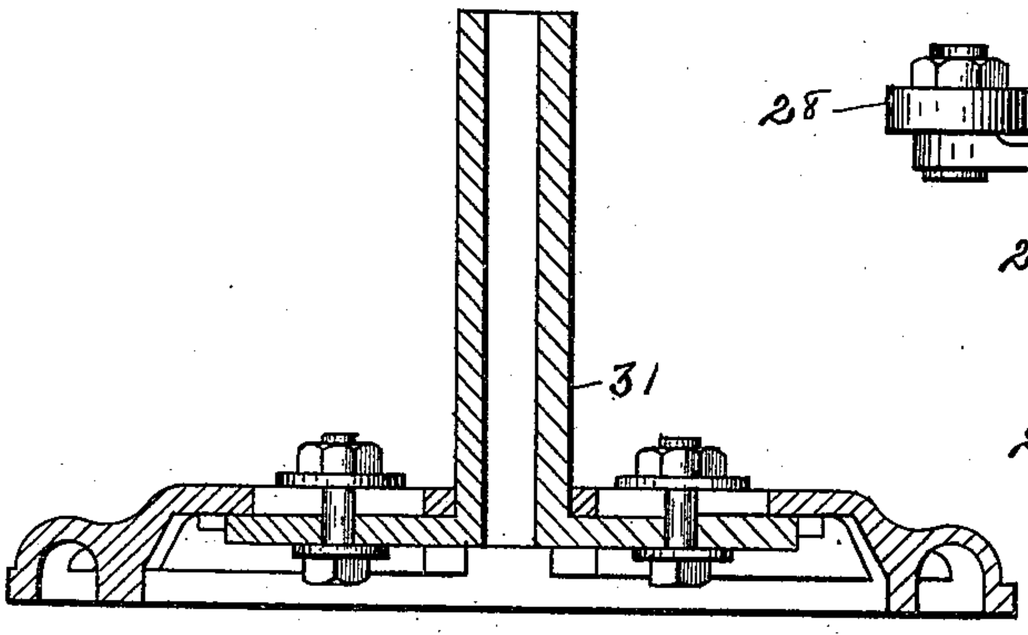


Fig. 8.

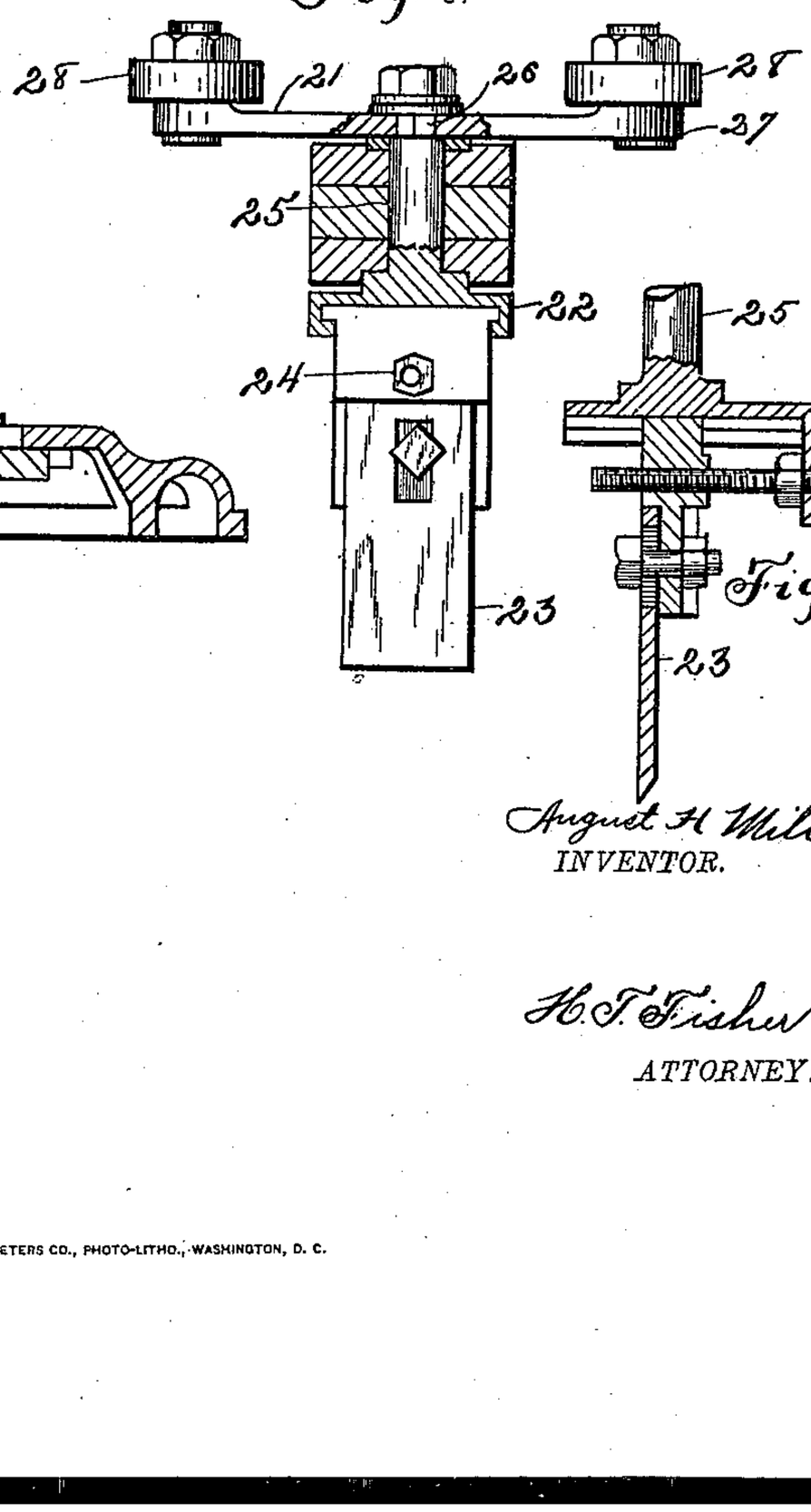


Fig. 9.




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# UNITED STATES PATENT OFFICE.

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## MACHINE FOR CUTTING OVAL HOLES IN MARBLE SLABS.

SPECIFICATION forming part of Letters Patent No. 459,787, dated September 22, 1891.

Application filed March 28, 1891. Serial No. 386,786. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUST H. MILLER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Machines for Cutting Oval Holes in Marble Slabs; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in machines for cutting oval holes in marble slabs; and the invention consists in the construction and combination of parts, substantially as shown and described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my improved machine. Fig. 2 is a view looking from the right of Fig. 1. Fig. 3 is an enlarged bottom view of one of the bearings for the vertical shaft to which the cutter-head frame is attached. Fig. 4 is a plan view of the cutter-head guide-frame and the parts beneath, looking down from line *x x*, Fig. 1. Fig. 5 is a view of the sections of the guide-frame for the cutters shown supported. Fig. 6 is a view of the T-shaped bearing for the cutter-shaft, which extends through the tubular portion thereon and upon the arms of which shaft the sections of the guide-frame are laterally adjustable. Fig. 7 is a plan view of the revolving cutter-frame; and Fig. 8 is an enlarged vertical section of one of the cutter-heads, showing the cutter as viewed laterally upon its side. Fig. 9 is a view of the cutter and its immediate supports and adjusting mechanism at right angles to Fig. 8. Figs. 10 and 11 are views showing the the manner of connecting the counter-weight to the vertical shaft and the handle for operating the said parts.

The object of the invention is to provide a machine which is adapted to automatically cut elliptical or oval openings in marble slabs designed for use in wash-stands or lavatories. Hitherto the methods employed to accomplish this work have been slow and unsatisfactory, and my machine is designed to both facilitate, simplify, and cheapen the work. To this end I have provided the machine with a supporting-base 10 and an upright frame 11, to which respective parts the operating machinery is attached. Thus upon the upper portion of the frame 11 is a main shaft 12, having pulleys 13 for the power-belt, and upon the shaft 12 is a gear 14, meshing with a horizontal gear 15, which works on the vertical shaft 16. The gear 15 and the shaft 16 are splined together, so that the shaft is free to work up and down at the same time that it is revolved by the said gear, which of course does not change its position horizontally. The shaft 16 has suitable bearings 17 and 18 upon the inner portion of the upright frame 11, and upon its lower end is rigidly fastened a horizontally-revolving carrying-frame 19. (Shown clearly in Fig. 7.)

The arms of the carrying-frame 19 are provided with open longitudinal slots 20 at their ends, and in these slots and upon the arms are supported the movable cutter-heads 21. These heads are formed in two sections adapted to be clamped together at their ends upon the sides of the said arms and have a space centrally between them in which the arms rest, so that the said head may slide back and forth upon the arm which forms its support as well as guide. The immediate head 22, which supports the cutter 23, has a spindle which extends centrally through the cutter-guide 21 and through the slot 20 in the carrying-frame, and it has laterally inside grooves upon its under side, in which the cutter 23 is hung and adjustable by means of set-screw 24. The head 22, as stated, has a spindle 25, which projects through the carrier and the frame, and has a square or shouldered portion 26 at its upper end outside of the carrier, upon which is secured the double arm guide-piece 27, having anti-friction rolls or rollers 28 upon the ends of the arms. These rollers have their path or track provided in the guide-frame 29, which is elliptical in outline, and is provided with slots 30 upon its opposite sections adapting the sections to be laterally adjustable within certain limits on the T-shaped bearing 31, so that the size of the elliptical opening may be increased or diminished in that direction by such adjust-

ment. The bearing-sleeve 31 is secured by any suitable means at its upper portion in the projecting lower arm of the frame 11, and the arms of this part 31 are provided with adjusting-screws for holding and adjusting the sections of the guide-frame 29, the guide-frame 29 being adjusted in one direction, so as to enlarge the ellipse (more or less) within the limits of said adjustment. The opening may be enlarged in the opposite direction by adjusting the cutters outward by means of the set-screw 24. (Shown clearly in Fig. 9.) These two adjustments enable me to make larger or smaller holes in the mable slab, according as may be desired, and are supposed to have all the range of adjustment that work of this character requires. In operation the revolving frame 19 will be carried around by the power mechanism, while the guide-frame 29 of course will remain stationary. This causes the cutter-head and all its attachments which are secured to the revolving frame to travel around with said frame, subject, however, to the guiding control of the guide-frame. Because this guide-frame is elliptical in outline, of course the line of travel of the respective cutters must be elliptical, so that all the cutters having a corresponding position in the frame and arranged to travel one immediately behind the other in the same track will cut through the marble upon a given line.

The head 21 has simply a back-and-forth movement upon the arm 19; but the cutter, secured as it is to the pivotal head 22, will somewhat change its position, as it is the side or end of the ellipse, according as it may be thrown into one position or another by the guide-arm 27 and its traveling wheels 28—that is, the cutter 23 has a sliding plate upon its pivotal support, subject to the portion of the ellipse in which it is working. The heads 21 are designed to work freely upon the arms 19, so as to avoid undue friction. The cutters 23 also have a vertical adjustment to compensate for wear, and are made of such length that they will cut through the slab before striking the carrier part of the head.

A counter-weight 32 is employed to counterbalance the revolving carrier-frame and its attachments. This weight is adjustable, so that more or less downward pressure may be permitted on the cutters 23, as the nature of the work may require.

Sand and water are supplied to the cutters from the receptacle 33 and the spout 34, (seen in Fig. 1,) and the table 35, upon which the marble is laid for cutting, is laterally adjustable by means of a crank-shaft 36 and pinions 37, arranged to work beneath the table 35 and move it with the marble slab, whereby said slab may be carried forward for any purpose, such as cutting a second hole therein or the like.

Any kind of cutters other than those shown may be used—such, for example, as black diamond. So may any kind of stone be cut therewith other than marble if worked in this way. It will be seen that the guide-arms 27, with their anti-friction-wheels, have a defined path in which they travel and by which all the cutters are held alike to work edgewise and to follow each other exactly at all points. The blades should be slightly curved in cross-sections, as seen below in Fig. 8. The guideway for the anti-friction wheels 28 is of such depth that said wheels may fall sufficiently therein to accommodate them to the depth of cut and yet have a proper bearing in the frame. The counter-weight 32 is adjustable upon a bar 38, pivoted upon a pivoted hanger 39, attached at its inner end to a sleeve 40, adapted to turn on a ferrule or ring 41, fixed rigidly upon the shaft 16 by set-screw, wedge, or other suitable means. The collar 40 has a handle 42, which serves to raise and lower the shaft 16, and the ring 41 turns with said shaft in the collar 40, and is adjustable on the shaft 16 to fix the limit of its downward movement.

A round hole may be cut by this machine by simply lifting the elliptical guide-frame upward, so as to take it out of operating position, and thus leaving the cutters free to be fastened firmly into the arms of the revolving carrier.

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

1. In a marble-cutting machine, a main frame and a rotating cutter-frame having a spindle vertically adjustable in the main frame, said cutter-frame having radial slots for the adjustment of the cutters, in combination with the cutters and cutter-heads supported in the slotted arms and the counterbalance connected with the cutter-frame, substantially as described.

2. The revolving frame having slotted arms, cutter-carriers supported in said slots, said cutters having spindles free to turn in said carriers, a frame having a circular guideway, and guide-arms rigid with the cutter-spindles working in said guideway, substantially as described.

3. The guide-frame provided with a circular track, a revolving frame beneath said guide-frame, having arms with slots in their outer ends, in combination with cutter-heads supported in said slots and having guide-arms provided with rollers working in said circular track, substantially as described.

4. A guide-frame for a marble-cutting machine, made in sections adjustable toward and from each other and having an elliptical track or guideway for directing the cutters, substantially as described.

5. In a marble-cutting machine, a guide-frame for the cutters, having an elliptical track therefor and formed in sections to extend the length of the ellipse, and a cutter-head guided in said track and having cut-

ters laterally adjustable, substantially as described.

6. The revolving frame and the shaft thereof movable vertically and the stationary frame having an elliptical path or track to guide the cutters, in combination with carriers for the cutters, movably supported upon the arms of the revolving frame, and cutter-heads having arms with anti-friction wheels supported on said carriers and working in said track or guide, substantially as described.

Witness my hand to the foregoing specification this 28th day of July, 1890.

AUGUST H. MILLER.

Witnesses:
H. T. FISHER,
NELLIE L. MCLANE.