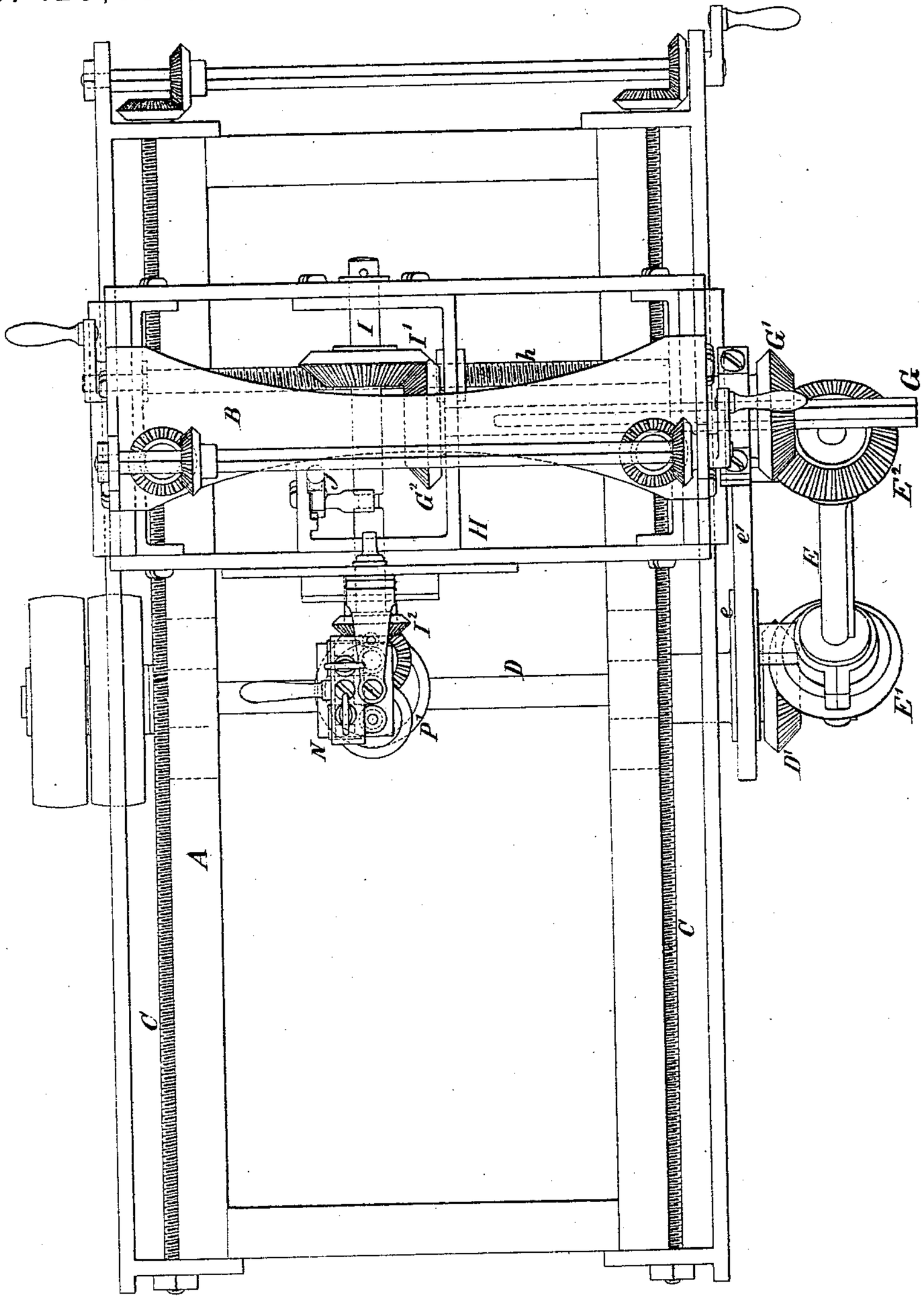
3 Sheets--Sheet 1.

ANTON SAFFER.

Improvement in Marble-Working Machines.

No. 125,990. Patented April 23, 1872.

Fig. 1.



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3 Sheets--Sheet 2.

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Fig. 2.

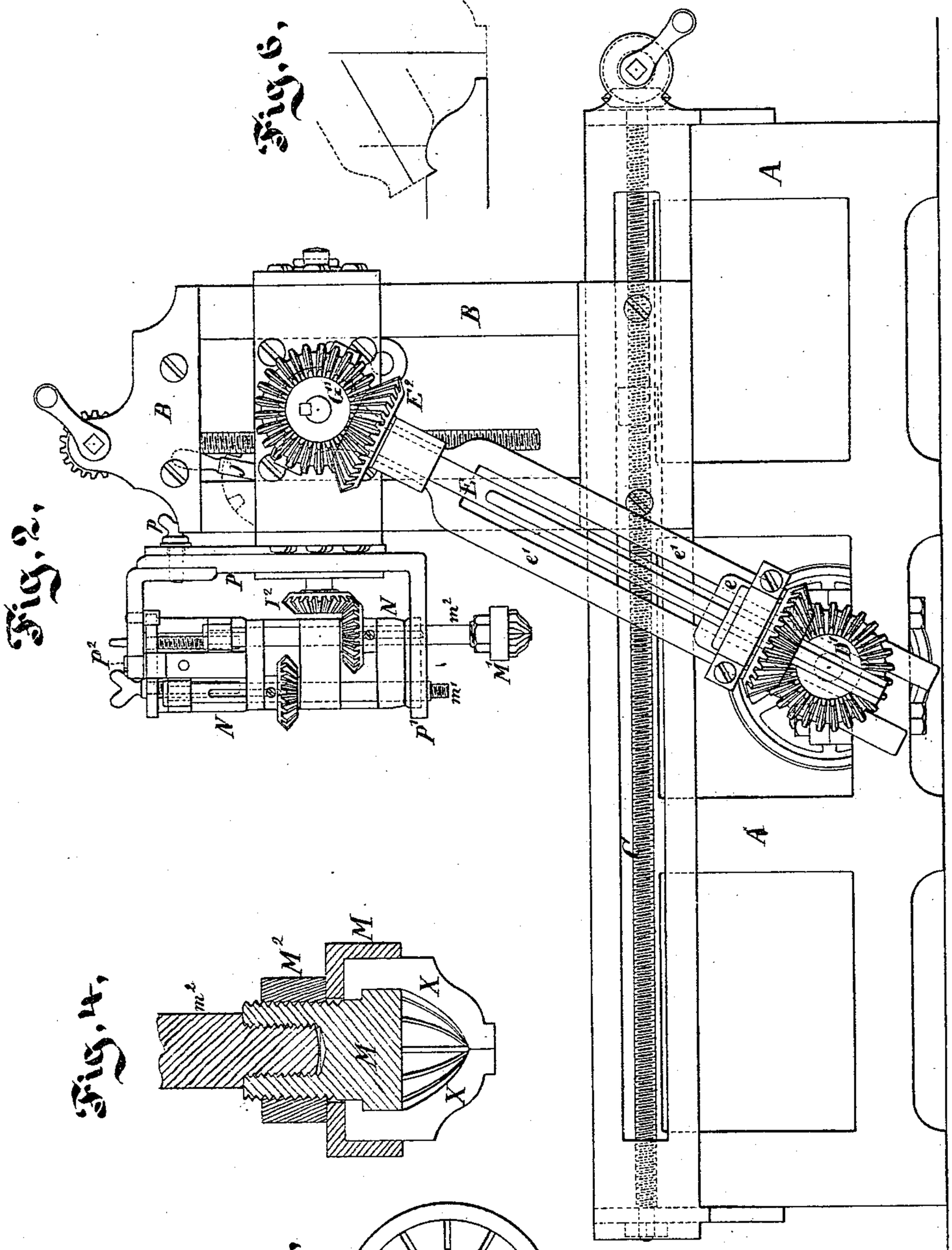
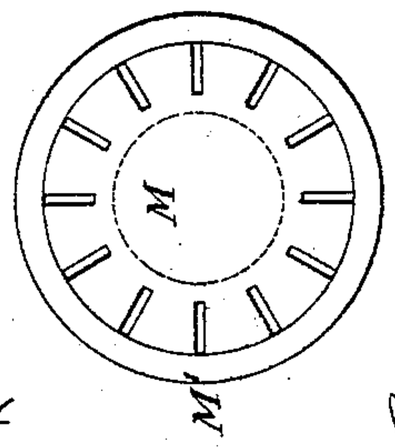


Fig. 3.

Fig. 5.



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3 Sheets--Sheet 3.

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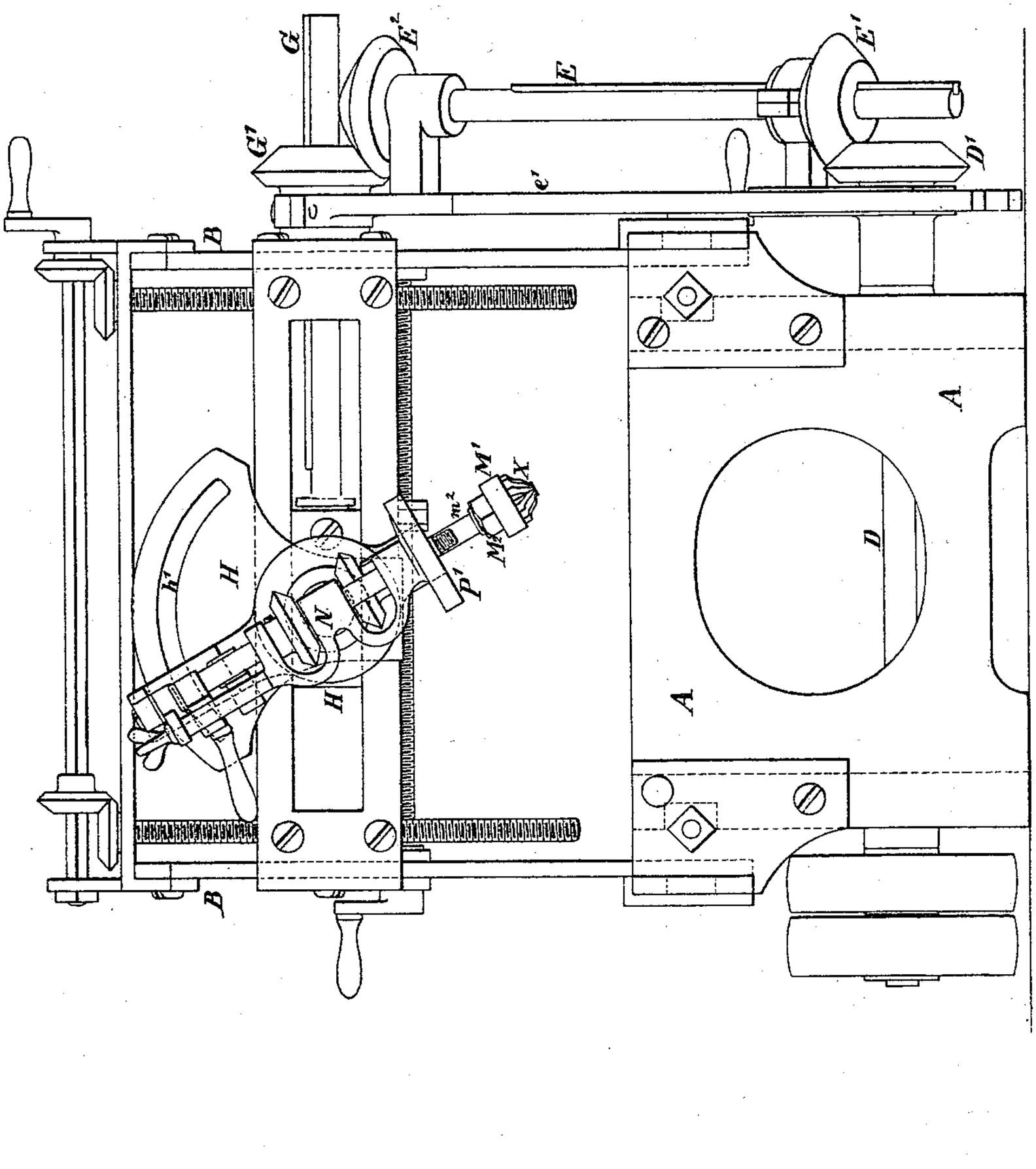
Fig. 3.



Witnesses,

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UNITED STATES PATENT OFFICE.

ANTON SAFFER, OF NEW YORK, N. Y.

IMPROVEMENT IN MARBLE-WORKING MACHINES.

Specification forming part of Letters Patent No. 125,990, dated April 23, 1872; antedated April 17, 1872.

To all whom it may concern:

Be it known that I, ANTON SAFFER, marble-worker, of New York city, in the State of New York, have invented certain new and useful Improvements in Marble-Working Machines, of which the following is a specification:

My improvements may apply to many varieties of the present machines for cutting and shaping marble tables, mantels, and analogous marble work. The other parts of the machine may be varied within wide limits without affecting the features to which my invention relates.

I will proceed to describe what I consider the best means of carrying out the invention as applied to the machine described in the patent to J. W. Malloy, dated November 5, 1867. It constitutes a machine capable of performing some varieties of work for which no other machine known to me is so well adapted.

The accompanying drawing forms a part of this specification, and represents the novel parts with so much of the framing and ordinary parts as appears necessary to indicate their relations thereto.

Figure 1 is a plan view, and Fig. 2 is a side view of the machine. Fig. 3 is an end elevation. Fig. 4 is a central sectional view of the lower end of one of the shafts, and of my peculiar cutter-head attached, the cutters are shown in position for use. Fig. 5 is a plan view, seen from below of the cutter-head without the cutters. Fig. 6 is a diagram showing how the inclination of the cutter-shaft is useful in working grooves in the material. Strong right lines are shown, indicating two positions of the cutter-shaft, and dotted lines are shown in two sets, indicating the outlines of two symmetrical sets of cutters.

Similar letters of reference indicate corresponding parts in all the figures.

A is the fixed frame-work, and B is a massive carriage movable thereon. C C are endless screws, which being connected by a cross-shaft and gears at one end, move or feed the carriage B in one direction or the other, from one end to the other of the frame-work. The carriage B sustains or operates mechanism which is very clearly shown in the drawing, of which I will confine the description mainly to the novel features. The result of the action is to convey to two revolving spindles a connective rotatory motion, adapted to mill the edge or sink any desired figures on the face of the marble which is presented underneath. The novelty of the invention lies in the means for conveying power up into the movable parts; the arrangement of the revolving cutters; the provisions for inclining the cutters; and the construction of the cutters or cutter-heads. D is the main driving-shaft, mounted in fixed bearings in the frame-work A, and driven by a belt from a steam-engine, or other suitable power, not represented. This transmits motion by its bevel-wheel D′ to a bevel-wheel, E^1, which is mounted in a frame-work, *e*, and carries the feathered shaft E, which is free to slide longitudinally through the gear-wheel E^1. The piece *e* is grooved on each side to receive the two parallel arms of a long forked frame, *e′*, which, at its upper end is attached to the carriage B. As the carriage B is traversed from one end to the other of the framing A, the compound frame *e e′* inclines, and also contracts and elongates, to correspond to its changes of position. A bevel-gear wheel, E^2, is fixed on the upper end of the shaft E, and is supported by a bracket on the forked piece *e′*, so that it is always in gear with the bevel-gear wheel G^1, which is mounted on and turns the feathered shaft G. This horizontal shaft G carries at its other end a gear-wheel, G^2, and is so mounted that it moves endwise with the cross-traversing carriage H, which is traversed in the main carriage B by means of a screw, *h*, as required. The feathered shaft G slides freely through the gear-wheel G^1, and receives and transmits the power in any position. The wheel G^2 transmits its power to a bevel-wheel, I^1, on a shaft, I, which is mounted in bearings in the carriage H, and carries at the front end a bevel-gear, I^2, which gives the motion to one or the other of the cutter-spindles, or may be adjusted to turn idly at will. The hand-lever J pivoted, as represented, on the carriage H, takes hold of a groove in the shaft I, and moves the latter, with its connections endwise, as required. It may be moved backward so as to be out of gear with the cutter-spindles, and allow them to be changed in position, and then moved

forward again into gear. The cutter-spindles and the provisions for rotating them, are set forth in previous patents, with the exception of my provision for inclining them, which I will presently describe. The two spindles m^1 m^2 are feathered, or otherwise adapted to receive motion from bevel-gear wheels mounted at a fixed elevation, and to allow the spindles to be raised and lowered to a considerable extent. Screws are provided at the top to depress either, as required, and the whole framing in which they are mounted, marked N, may be revolved half round on the horizontal plane. The bearing at the bottom is in a large ring, P^1, and the bearing at the top is a small pivot, P^2; both of which bearings P^1 and P^2 are formed on a stout movable frame, which is marked collectively P, and is capable of being turned in the vertical plane, the axis of the shaft I being the center of its motion. The bearing is formed by a large ring forming a part of the carriage H; and the entire carriage P with its connections is secured in the upright position, or at any desired degree of inclination, by the aid of the thumb-screw *p*, which passes through a curved slot, *h'*, in the carriage H. I have not represented the table which holds and moves the marble. I prefer a sub-table moving on longitudinal ways, and carrying a top or main table, which moves on transverse ways on the sub-table. In the main table I have a revolving wheel, on which the marble may be mounted and turned to produce circular, oval, and analogous work, by presenting the edges properly to the cutters, the tables being properly moved below, either at the will of an attendant or as it is guided by a pin in a groove of a suitable form, or otherwise. It will be understood that all the ordinary or any suitable provisions may be made for presenting the marble below. The two spindles m^1 m^2 afford facilities for carrying two separate cutters of small size, and for bringing either down and lifting the other up out of the way promptly, as the nature of the work requires. I propose to use any ordinary small cutters with this mode of operating, and to incline the frame P, and consequently to incline the cutters, as may be required, to vary the pattern produced by one or more cutters, or to work out grooves and devices which could not be otherwise produced. Fig. 6 is a diagram showing how the inclination of the cutters may enable this machine to produce grooves which could not be practically executed by cutters mounted on spindles held in their ordinary upright positions.

For some varieties of work, as, for example, sinking the main surface of a marble-topped wash-stand, leaving the rim elevated, I have devised a construction of cutters and cutter-heads peculiarly adapted. The cutters are made very stiff, and I provide novel means for holding them strongly by their upper ends alone. I can carry twelve, or other suitable number, to succeed each other in action, and avoid concentrating the effect all on one cutting-edge; and my arrangement allows the cutters to be brought together at their lower ends to form a small milling or cutting-circle, or to be spread out at their lower ends and cut a larger circle. The latter mode is particularly desirable in milling around the bosses or thickened portions where the hot and cold water-pipes come up through the top. Referring to Fig. 3, m^2 is the lower end of one of the spindles. M is a stout piece adapted to receive it, and to form the nucleus or main body of the cutter-head. M^1 is a stout internally-flanged ring, having the form represented; X X are the cutters. Each cutter X is formed with a stout hook or L at its upper end. The body of each cutter is rectangular in section, and adapted to fit in a corresponding rectangular recess in the body M of the cutter-head. The ring M^1 fits closely against the outer edge of each cutter, and on being forced down strongly by the nut M^2, which is tapped on a thread on the shank of the piece M, confines the cutters very strongly and stiffly by embracing them and their hooked heads, as represented. I provide several sets of the cutters, X, according to the varieties of the edge which I wish to mill, or the boundaries of the sunk surfaces which I wish to produce.

My machine is capable of doing all the work which can be done by the Malloy, or analogous previously-known machines, while my peculiar cutter-head allows it to mill or rout the face of the work, so as to sink uniformly the surface over the whole, or such parts of a piece of marble as may be desired, with great facility and perfection; and, also, by the same or different cutters, and with little labor dresses around a boss or part which is to be left thick, with great nicety. My cutter-head and cutters may be used with success, and realize a portion of the advantages of my invention in connection with machines otherwise of the ordinary or previously-known styles. I prefer, however, all the parts of my invention employed together. My cutter-head having a large surface, and carrying a number of cutters easily exchangeable, as shown, is particularly effective in cutting grooves along the edges of marble, or analogous material.

I claim as my invention—

1. The extensible connecting frame *e*, and the shaft E, and gear-wheels E^1 E^2 mounted thereon, arranged to serve as represented, relatively to the driving means D D', and the machinery carried on the movable head B, as specified.

2. The inclinable frame P and its confining means *p*, in combination with the shaft I and wheel I^2, for communicating power to one or more cutter-spindles m^1 with suitable cutters, all combined and adapted to serve together, substantially as herein specified.

3. The duplicate cutter-spindles m^1 m^2,

mounted in a revolving support, N, above the table for carrying the work, and provided with means E E^1 E^2 for conveying the driving power thereto in changeable positions, substantially as herein specified.

4. The cutter-head M M^1 M^2, adapted to confine and release the correspondingly-formed cutters X, and combined therewith, substantially as herein specified.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

ANTON SAFFER.

Witnesses:
THOMAS D. STETSON,
CAMPBELL C. LIVINGS.