

No. 662,390.

Patented Nov. 27, 1900.

W. BLACK.
MORTISING MACHINE.

(Application filed May 20, 1898.)

(No Model.)

2 Sheets—Sheet 1.

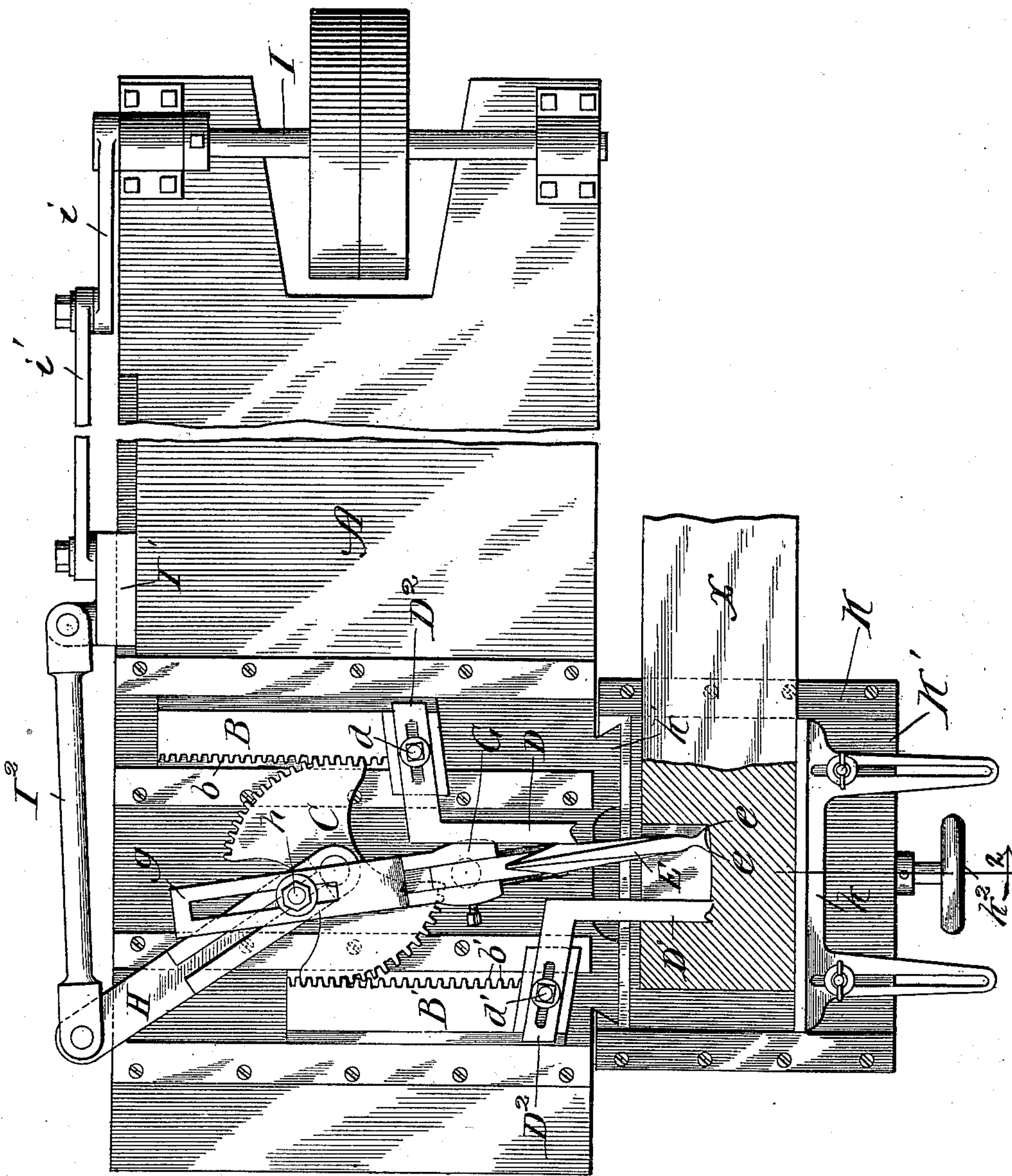


Fig. 1.

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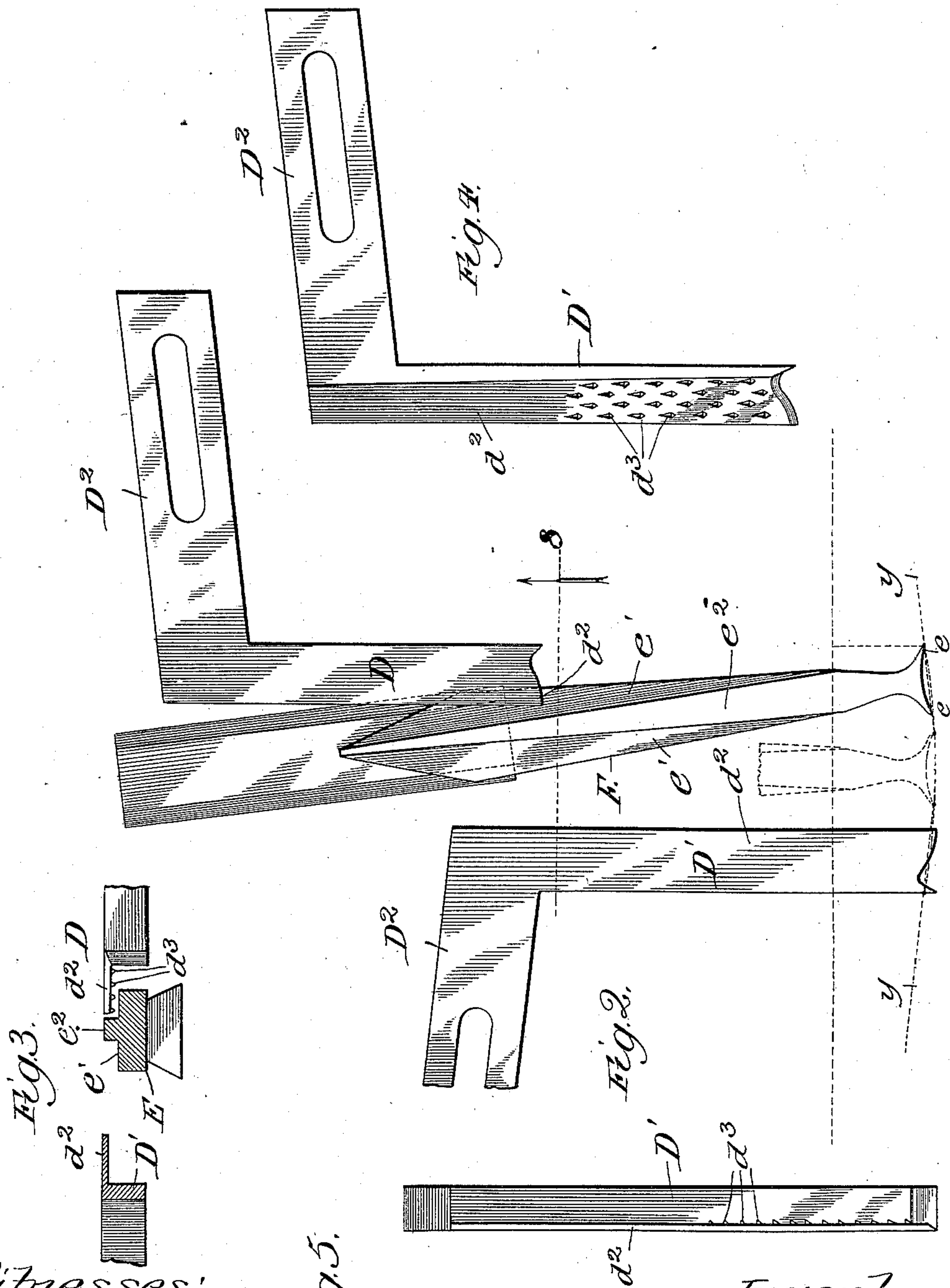
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Fig. 5.

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UNITED STATES PATENT OFFICE.

WALTER BLACK, OF CHICAGO, ILLINOIS.

MORTISING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 662,390, dated November 27, 1900.

Application filed May 20, 1898. Serial No. 681,203. (No model.)

To all whom it may concern:

Be it known that I, WALTER BLACK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mortising-Machines, of which the following is a specification.

The object of my invention is to provide a simple, economical, and efficient mortising-machine; and the invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan view of a machine constructed in accordance with my improvements looking at it from the top; Fig. 2, an enlarged plan view of the cutters as they appear when removed from the machine and laid in an operative position; Fig. 3, a cross-sectional view taken on the line 3 of Fig. 2; Fig. 4, a plan view of the lower side of one of the reciprocating cutters, and Fig. 5 a side view of one of the cutters.

In the art to which this invention relates it is well known that the mortising or forming of a rectangular hole in a piece of wood, plank, or similar object is attended with considerable difficulty. It is further well known that several machines have been devised for the purpose of forming these holes automatically, and that these machines have what are known as two "reciprocating" cutters or chisels for indenting or cutting the grain of the wood transversely in advance of and in combination with a vibrating cutter which removes the bulk of the stock. The objections to this class of machinery are, first, that every time a different width of hole is to be formed it is necessary to move or adjust the cutter longitudinally as well as laterally, for the reason that they must cut or indent the grain slightly in advance of the vibrating cutter, and, second, the chips or shavings are apt to stay in the recess and be pounded therein so as to clog or interfere with the free operations of the machine. The principal object, therefore, of my invention is to provide a mortising-machine with cutting mechanisms that will assist in clearing the same of the chips, shavings, and the like and with reciprocating cutting-chisels so constructed and arranged that they will be automatically adjusted longitudinally whenever

they are moved laterally or sidewise, all of which will be more fully hereinafter set forth.

In constructing a mortising-machine in accordance with my improvements I make a main bed A of the desired size, shape, and strength to hold the operative and other parts in position. Upon this bed I mount two reciprocating slides B and B', having racks *b* and *b'*, engaged by a central oscillating segmental gear C, which is made preferably in the shape of a double segment, though this form is immaterial, as it may be made or formed in the shape of a plain spur-gear.

In order to cut the mortise in advance of the vibrating cutter, I secure to each of these slides what I term "reciprocating" cutting-chisels D and D' in any convenient manner, but preferably by means of the set-screws *d*. These reciprocating cutting-chisels project a considerable distance beyond the slide for the purpose of engaging a board or a piece of timber X, as shown particularly in Fig. 1.

In order to remove the bulk of the stock from the mortise and at the bottom of the recess, I provide what I term a "vibrating" or "oscillating" cutter E, which is provided with double cutting edges *e e*. This vibrating or oscillating cutter is mounted independently in a vibrating or swinging holder G, which has a slotted arm *g* extending to the rear thereof and engaging with an operating-lever H by means of a bolt *h*, which lever-arm is also connected to the central oscillating gear. By this arrangement it will be seen that the oscillating movements of the gear and the reciprocations of the cutting-chisels may be sustained in their normal movements, while the vibrations of the oscillating cutter may be adjusted to any desired movement without in any way interfering with the movements of the other parts.

In order to operate the cutting mechanisms, a main driving-shaft I is provided at one end of the machine, having a crank *i*, which is connected to a slide I' by means of a connecting-rod *i'* and which in turn, by means of a pitman I², is connected with the operating lever-arm H. The plank or board is held upon an adjustable bed K by means of the adjustable jaw *k*. This adjustable bed is mounted on a vertical dovetail *k'*, and its

upper portion K' is provided with a slide adapted to be moved by means of a threaded screw which is provided with a handle k^2 .

From the foregoing description of construction and operation it will be seen that means are provided for cutting a rectangular hole or mortise in a piece of timber. It will, further, be noted that the cutters are provided with shank portions D^2 . It is highly desirable when the cutters are moved laterally or sidewise that they be provided with means or so arranged that they are automatically adjusted longitudinally and at the same time to provide for the initial cutting of the material. In order to accomplish this result, the shanks of the cutters are arranged at an angle greater than a right angle, or, in other words, an obtuse angle and practically parallel with lines Y , (shown in Fig. 2,) which lines are chords of one-half of the extreme arc through which the oscillating cutter may be swung. It will thus be seen that when the cutters are moved laterally or sidewise their shanks are so arranged that they provide for the positioning of the cutters, so that they will always act slightly in advance of the oscillating cutter. This is quite an advantage in that it provides for the running of the machines by comparatively inexperienced or ordinary help, for the reason that the machine can be adjusted practically by unskilled help, and the usual final adjustment, such as providing for the initial lead, is obtained automatically. It is also desirable that a provision be made for withdrawing the chips, shavings, and the like from the mortise, so as to prevent clogging or interfering with the operation of the machine. In order to produce this result, I make the bed of the cutters substantially L-shaped in cross-section, and they are provided with a cutting portion D and a flank or flange portion d^2 , which stands substantially at right angles therewith. This flange portion on its inner side is provided with a number of rasp-like projections d^3 , which may be formed in any desirable manner and which engage with the shavings and withdraw the same from the cut. The advantage, therefore, of this flank or flange is twofold: It gives strength to the cutter and provides means for withdrawing the shavings. In order to provide room for the operation of this flank or flange without taking up too much space and permit of the forming of a very narrow mortise, the oscillating cutter is cut away, as at e' , so as to form a rib e^2 , which is in a plane with the extreme width of the cutting edge. This cutting away permits the flank or flange of the cutting-chisels to pass over the top of the vibrating cutter and not interfere or be interfered with during its operations.

I claim—

1. In a mortising-machine, the combination of a vibrating or oscillating cutter, and two reciprocating cutting-chisels, one each side of the cutter and each having a straight line

thrust in a plane approximately at right angles to the line of movement of the cutter and each having a stock with a continuing lateral shank diagonally extended at an incline approximately parallel with the chord of semi-arc through which the vibrating cutter moves on each side from the point of central rest, substantially as described.

2. In a machine of the class described, the combination of an oscillating cutter, two reciprocating chisels operating substantially at right angles thereto each provided with a cutting-stock for removing the stock transversely of the hole and having such cutting-stock provided with a right-angular flange for strengthening the cutters, substantially as described.

3. In a machine of the class described, the combination of an oscillating cutter provided with a central longitudinal outwardly-projecting rib and a web portion at right angles thereto extending laterally and below the plane of the rib such rib being arranged in a plane coincident with the side edge of the cutter, and two reciprocating cutting-chisels operating substantially at right angles to the movement of the oscillating cutter provided with right angular extending flanges which lie in a plane substantially with the outer portion of the oscillating cutter, substantially as described.

4. In a mortising-machine, a reciprocating chisel for removing the material transversely of the mortise having a stock provided with a cutting edge at its acting end, a continuing shank from the upper end of the stock extending laterally at an angle with the stock, and inwardly-extending lateral flange on the stock and at right angles thereto with a cutting edge adjoining and at right angles to the cutting edge of the stock and having the lower portion of its inner face provided with a plurality of pointed or sharp projections, substantially as described.

5. In a mortising-machine, the combination of a vibrating or oscillating central cutter, and two reciprocating cutting-chisels one on each side of the central cutter and each having a straight-line thrust in a plane approximately at right angles to the line of movement of the cutter and each having a stock with a continuing lateral shank diagonally extended at an incline approximately parallel with the chord of the semi-arc through which the central cutter swings on each side from the point of central rest and each cutting-chisel adjustable laterally by moving its shank in or out of its support, substantially as described.

6. In a mortising-machine, the combination of a vibrating or oscillating central cutter, and two reciprocating cutting-chisels one on each side of the central cutter and each having a straight-line thrust in a plane approximately at right angles to the line of movement of the central cutter and each having a continuing lateral shank diagonally extended at an incline approximately parallel with the

chord of the semi-arc through which the cutter moves on each side from the point of central rest, a slot in each shank running parallel with the inclination of the shank, a reciprocating carrier for each chisel and to which the chisel is attached by the lateral shank and a clamping-bolt passing through the diagonal slot of each shank and permitting the adjustment of the shank on its support for a lateral adjustment of the chisel, substantially as described.

7. In a mortising-machine, a reciprocating chisel for removing the material transversely of a mortise having a stock provided with a

cutting edge at its acting end, a continuing shank from the stock laterally at an angle with the stock, an inwardly-extending lateral flange from the stock and at right angles thereto and having an in and out curved cutting edge with the inner curve adjacent to the cutting edge of the stock and the outer curve terminating in the plane of the cutting edge of the stock, substantially as described.

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Witnesses:

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