2 Sheets--Sheet 1.

C. M. FIELD.

Machines for Cutting Diamonds, &c.

No. 153,555. Patented July 28, 1874.

Fig. 1.

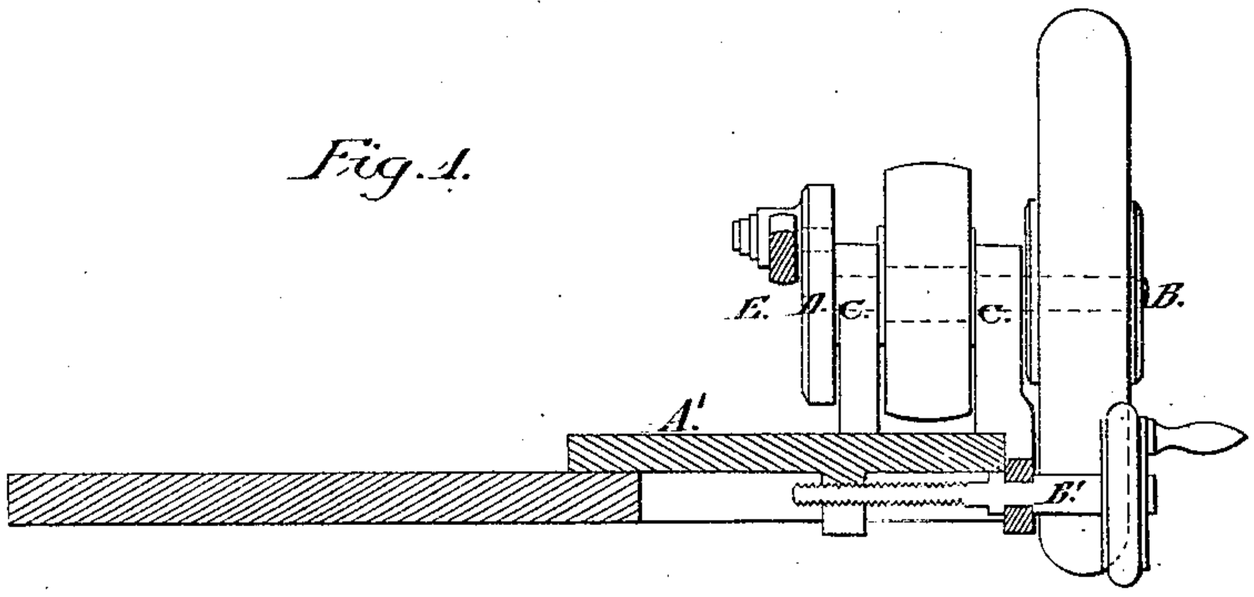


Fig. 2.

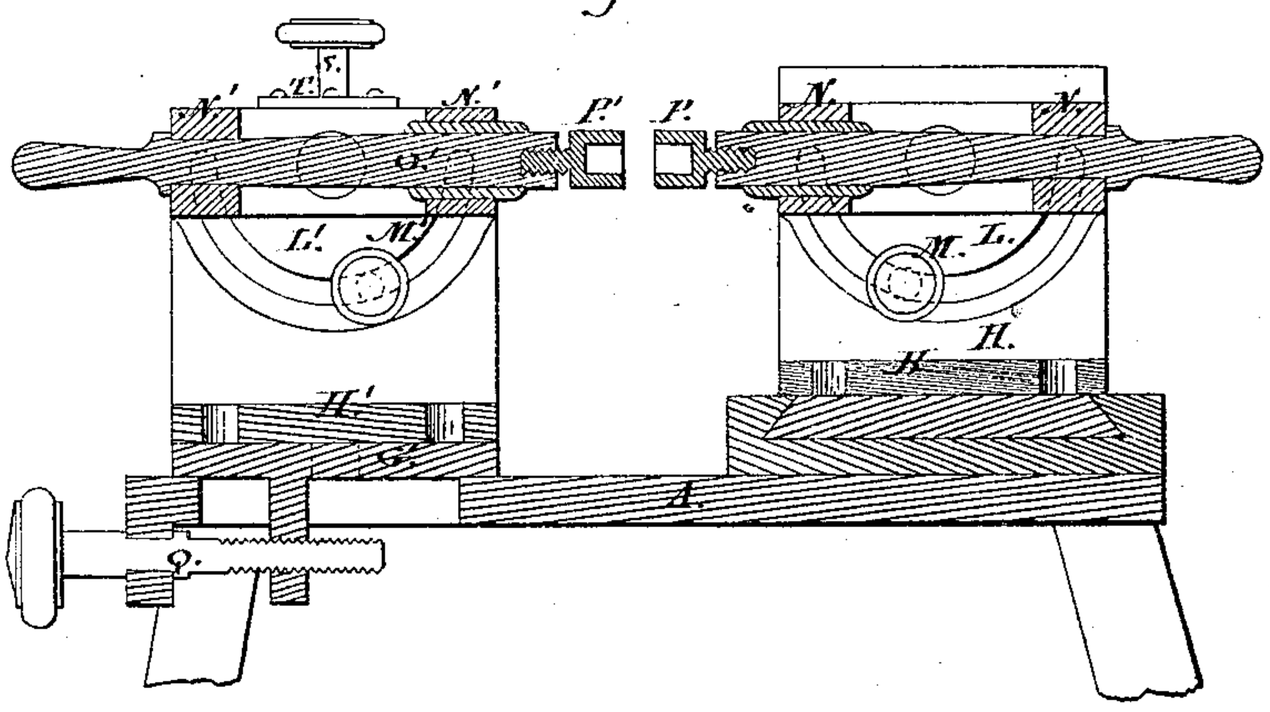
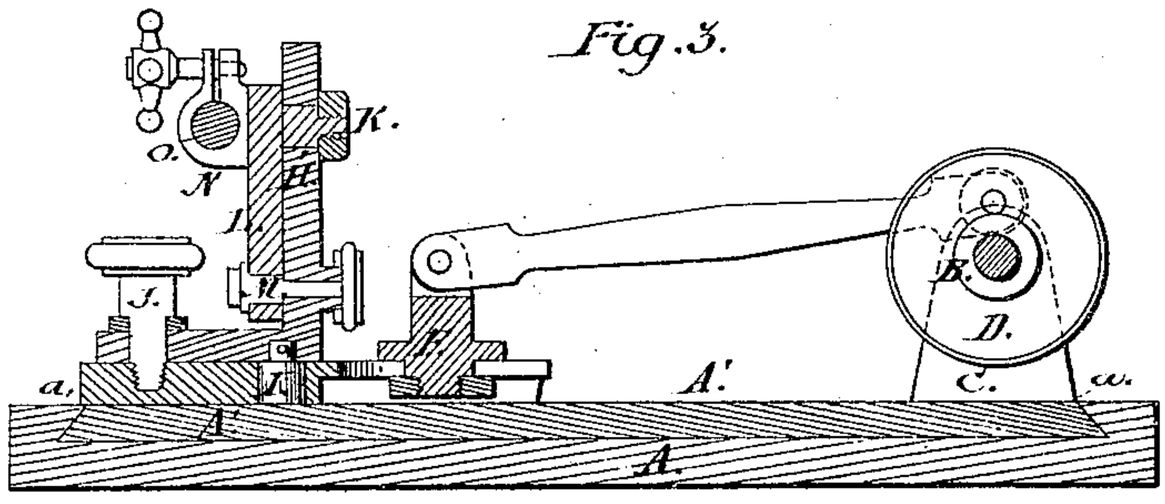


Fig. 3.



Witnesses:

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D. P. Cowl

Inventor:

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2 Sheets--Sheet 2.

C. M. FIELD.

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Fig. 4.

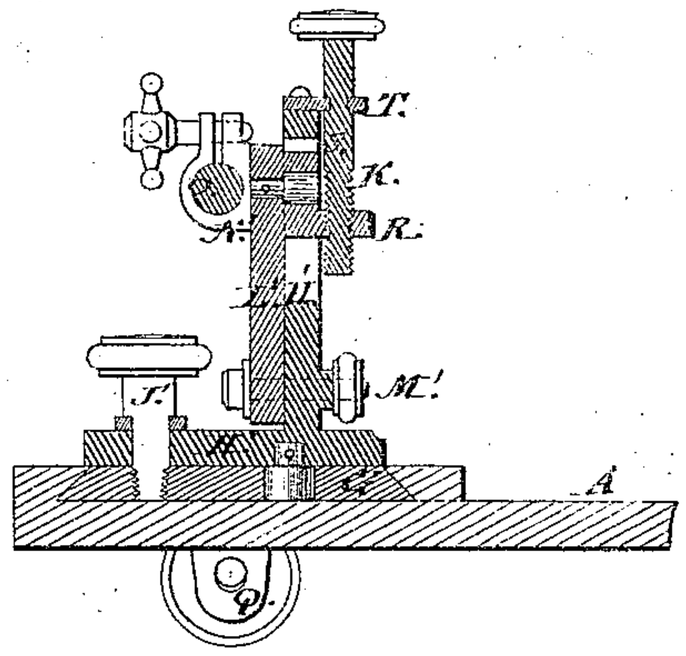
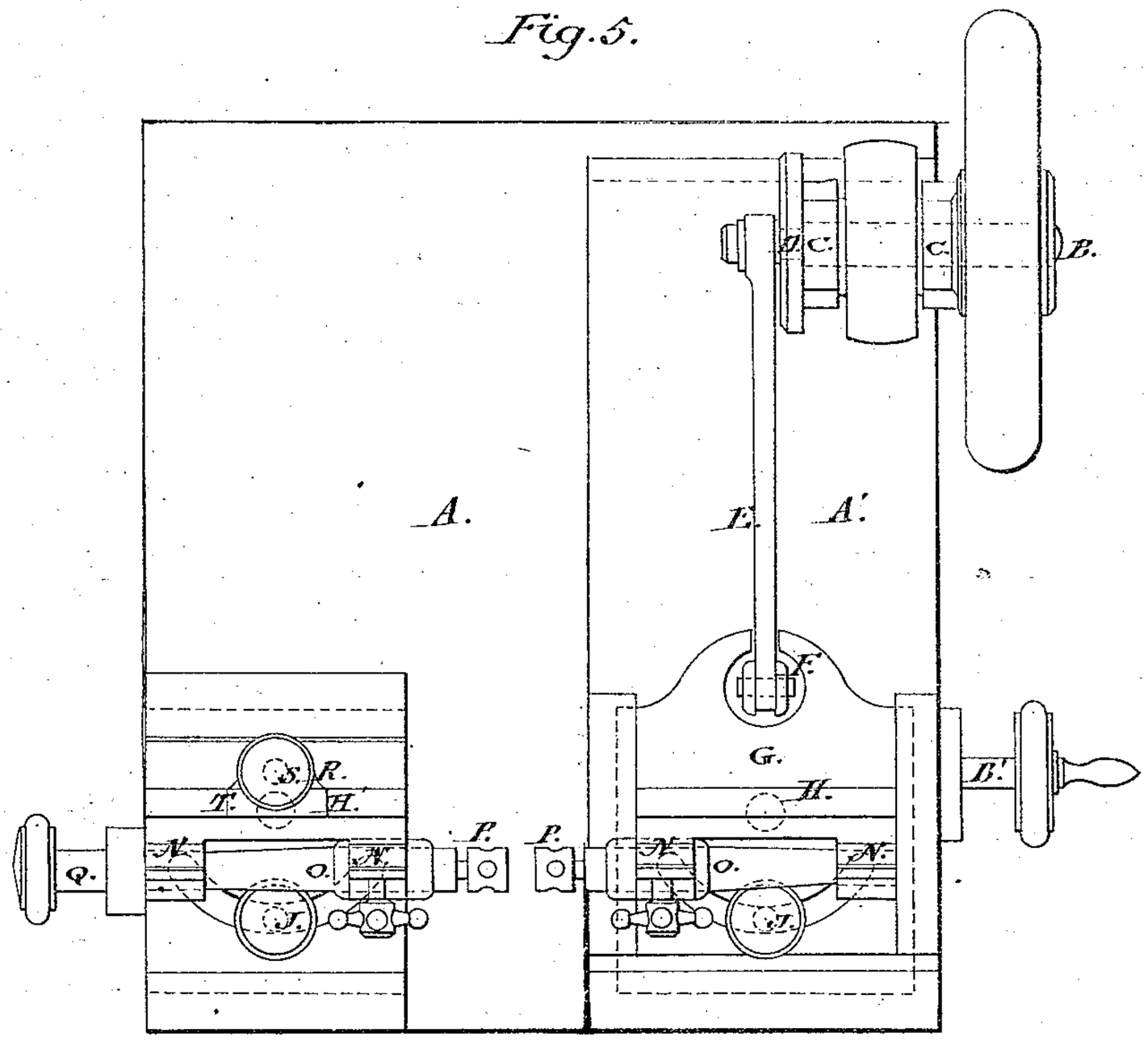


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES M. FIELD, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR CUTTING DIAMONDS, &c.

Specification forming part of Letters Patent No. **153,555**, dated July 28, 1874; application filed July 18, 1874.

To all whom it may concern:

Be it known that I, CHARLES M. FIELD, of Boston, Suffolk county, Massachusetts, have invented certain Improvements in Machinery for Cutting Diamonds or other Gems, of which the following is a specification:

This invention relates to improvements in cutting diamonds and other precious stones by machinery.

In a pending application for Letters Patent I have described and represented a machine for that purpose, in which I make claim, broadly, to the combination with a tool-carrier of a stone-holding carriage or head-stock, adjustable in any required direction; and also to a bed-plate disposed adjustably upon a suitable tablet or support, and bearing a tool-holding carrier or "head-stock," to which alternating motions are imparted.

The invention herein described and claimed refers to the construction and organization of the particular means which I employ in order to obtain the needed adjustments and movements of the tool-carrier and stone-holder. It can best be explained and understood by reference to the accompanying drawings, in which—

Figure 1 is a vertical section of my machine taken through the main bed or base plate and its adjusting-screw. Fig. 2 is a vertical section through the said main bed or base plate and the tool holder or carrier, to be explained. Fig. 3 is a vertical section of the tool holder or carrier; Fig. 4, a section of the stone-holding carriage; Fig. 5, a plan of the machine embodying my improvements.

In the above-named drawings, A represents a flat rectangular table or tablet, supported upon suitable standards or legs, whereby it is maintained in a horizontal position. A′ represents a flat rectangular oblong plate, which I term the main or working bed-plate, this plate being placed upon the top of the tablet A, and extending, preferably, from front to rear thereof, and also capable of sliding movements in the direction of its shortest plane upon the tablet, it being guided in its working path thereupon by the guides or ways *a a*, and provided with a feed or adjusting screw, B′, by which its position upon the tablet may be varied, in order to advance the tool-carrier toward the diamond-holding carriage or arbor, or vice versa. The driving-shaft of the machine is a horizontal one, and is shown at B as revolving in uprights C C, erected upon the right rear corner of the tablet A. Upon the inner end of the shaft B I affix a crank or crank-wheel, D, to the wrist of which I pivot the rear end of a pitman, E, the opposite end of such pitman being pivoted to a post, F, erected upon the rear end of a horizontal flat plate, G, disposed upon the top of the bed-plate A′ at the right front corner of the latter, and sliding in dovetailed or other grooves or ways making part of such plate A′, the said post being applied to the plate in an adjustable manner, as represented, in order to vary the line of coincidence of the two arbors of the machine, to be hereinafter described. The revolution of the crank-wheel imparts alternating or reciprocating movements to the plate G upon the main plate A′. Upon the top of the plate G, and at about its center, I dispose an upright L-shaped plate or standard, H, and I pivot this standard to the plate G by a vertical pivot, I, by which rotary motion of the standard and its arbor or spindle is permitted upon said plate G, the standard being confined to the plate in any desired position or angle by a clamp-screw, J, as shown in Fig. 3 of the drawings. To the outer or front face of the standard H I pivot, by a horizontal journal, K, a sectoral plate or head, L, said head being susceptible by means of the pivot of a swiveling movement in the arc of a circle upon the standard, and of being set in any desired or given position thereupon by a clamp-screw, M. Upon the upper part of the head L I form bearings N N, and within these bearings I mount a horizontal arbor or spindle, O, such spindle being the support of the cutting-tool. This cutting-tool is in practice a diamond of inferior grade, and is secured in a collet, P, whose shank enters a socket created in the end of the spindle, the diamond being secured within or to the collect by cement or solder, or by any of the methods now employed to hold diamonds in hand-tools. The "tail-stock" of the machine, or the carriage which supports the gem to be cut, is similar in general construction to the tool-carrier hereinbefore described, except that its bed G has no alternat-

ing motion, and is disposed directly upon the tablet A in lieu of upon the main bed-plate A′, and is changed in position upon such tablet, and toward or away from the tool-carrier, by a feed or adjusting screw, Q, arranged as shown in Fig. 5 of the drawings. Another difference also exists in that the tail-stock is susceptible of vertical adjustment by extending its horizontal pivot through a boss or arm, R, extending rearward from the upright or L-shaped standard H′, and screwing through this boss a vertical screw, S, the upper part of which is swiveled within a shelf, T, departing from the top of the said standard H′. The feed-screw B is for adjusting the position of the main bed-plate.

As the tool borne by its carrier moves in a reciprocating path past a diamond held in or upon the arbor of the tail-stock, it acts upon the diamond with abrasive effect similar to the same operation by hand labor, but much more rapidly, and I am enabled to reduce a diamond or other stone to its finished form with the mathematical exactness and finish always resulting from mechanical means as distinguished from the results of hand labor.

I obtain by my arrangement of parts great range and freedom of motion for the tool-carrier and diamond-holder, which enables me to instantly and easily present the diamond to the tool, or cause the tool to act upon the diamond at any desired angle, which is a matter of great importance in cutting many-faced stones.

The only skilled labor requisite in the operation of this machine is in applying the diamond to be cut to its supporting-arbor, and adjusting its position to the tool. This being done, women or inexperienced persons can tend the machine while it is reducing the face thus determined, as no calculation or judgment is involved.

As one person of experience can apply and adjust the diamonds to a number of machines, and as the cutting of the face is accomplished by the machine in much less time than by hand, it will be seen that a great economy is effected.

In conclusion, I desire it to be distinctly understood that I do not here claim the combination, in an organized machine for cutting diamonds, with the tool-carrier, of a stone-supporting carriage adjustable in any required direction. That claim, as hereinbefore stated, is the subject-matter of my pending application for Letters Patent filed on or about July 23, 1873, and now in interference with a pending application for Letters Patent in the name of one Isaac Herman; nor do I broadly claim here, in combination, means for adjusting the tool-carrier and reciprocating the same, or for effecting all needed adjustments and movements of either the tool-holder or the stone-holder. These features are also subject-matter of claims contained in my aforesaid application.

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

1. The adjustable base A′, carrying the standard C, crank-shaft B, and connecting-rod E, in combination with the sliding bed G, adjustable post F, pivoted standard H, adjustable head L, turning on a horizontal axis on standard H, and tool-arbor bearings N, all constructed and arranged as shown and set forth.

2. The stone-holding mechanism, consisting of the adjustable bed G′ and standard H, pivoted thereto by a vertical pivot, in combination with vertically-moving boss R, adjusting-screw S, and stone-supporting head L′, pivoted to said boss by a horizontal pivot, all constructed and arranged as shown and set forth.

In testimony whereof I have hereunto signed my name this 18th day of July, A. D. 1874.

CHARLES M. FIELD.

Witnesses:

EWELL A. DICK,

M. BAILEY.