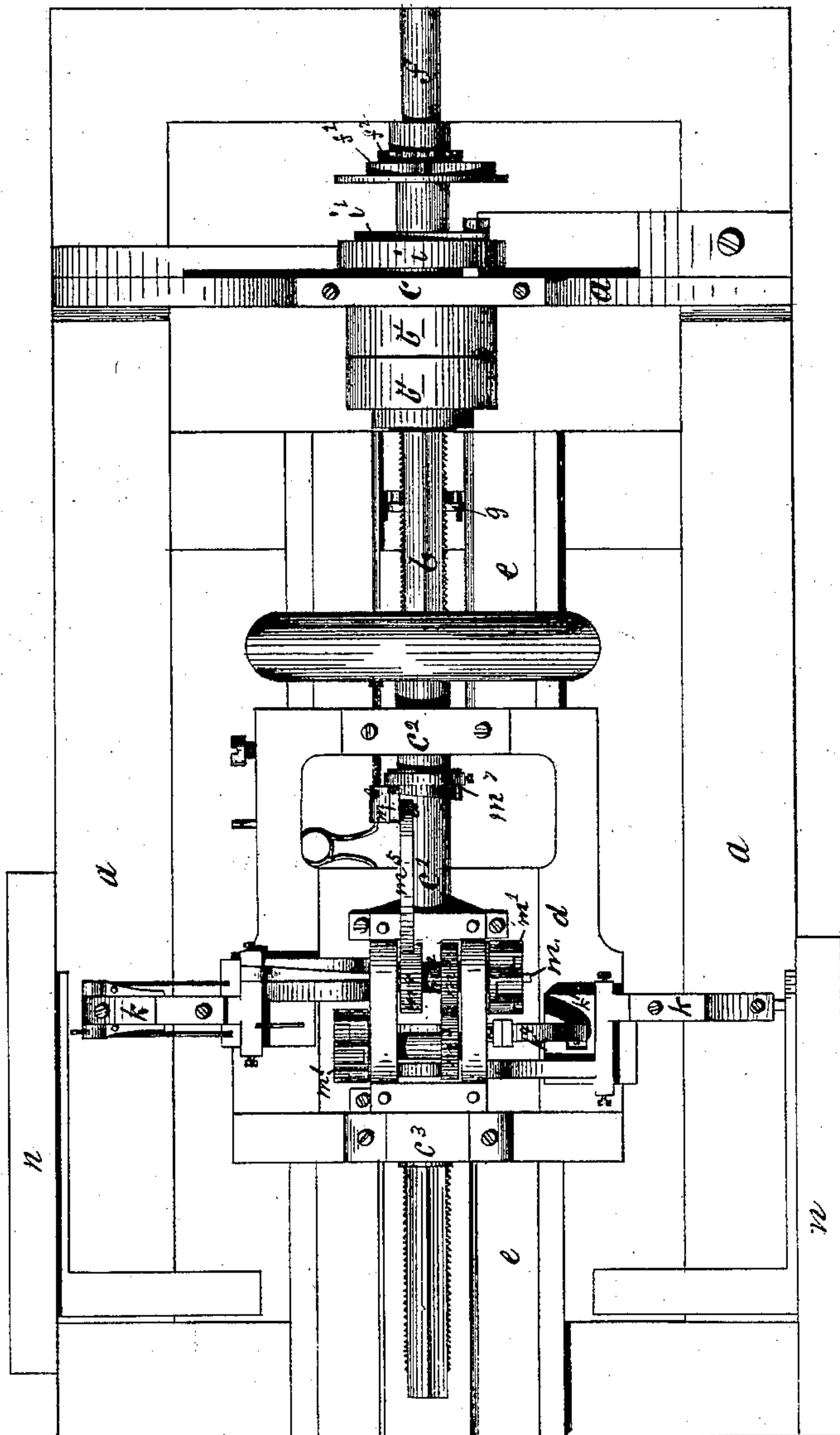


C. S. BEMENT.
MACHINE FOR GRADUATING SQUARES.

No. 104,249.

Patented June 14, 1870.

Fig. 1.



Witnesses

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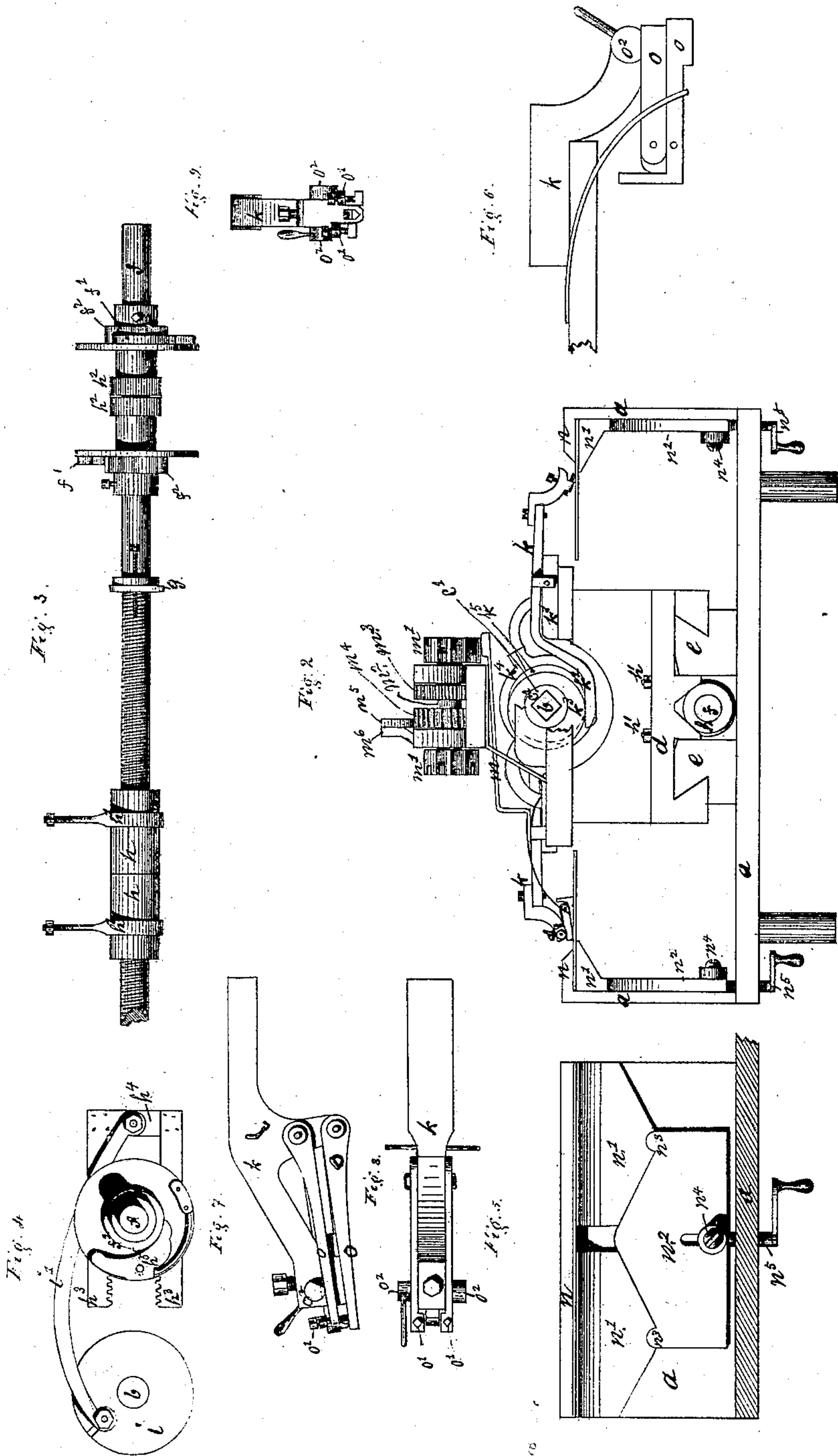
Inventor.

Charles S. Bement

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Witnesses.
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CHARLES S. BEMENT, OF SOUTHTON, CONNECTICUT.

Letters Patent No. 104,249, dated June 14, 1870.

IMPROVEMENT IN MACHINE FOR GRADUATING SQUARES, &c.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, CHARLES S. BEMENT, of Southington, county of Hartford and State of Connecticut, have invented certain new and useful improvements in Machine for Graduating or Marking Carpenters' Rules or Squares, &c.; and to enable others skilled in the art to make and use the same, I will proceed to describe its construction and operation, referring to the drawing, in which the same letters indicate like parts in each of the figures.

The nature of this invention consists principally of the arrangement of its mechanism, whereby one or more rules, squares, and other like articles, can be held and graduated or marked by each movement, in opposite directions, of the graver, located upon the reciprocating frame of the machine, and with accuracy of scale; the object of which is to more perfectly and rapidly and cheaply execute the marking or graduation of squares, rules, &c.

In the accompanying drawing—

Figure 1 is a top or plan view.

Figure 2 is a partial end view.

Figure 3 is a feed-screw shaft, having its appendages thereon, by the action of which, the tool-stock upon the reciprocating frame, with its appendages, are reciprocated to and fro to mark the surface of a rule or square, alternately and successively, from one end to the other.

Figure 4 shows the mechanism by which each stroke of the graver-tool is actuated.

Figure 5 shows the clamping device for holding the rule, square, or other article to be marked, firmly in a fixed position while the marking is being performed.

Figure 6 shows a portion of the tool-stock, in which the graver-tool is held and regulated.

Figures 7, 8, and 9 show a side, edge, and end views of the graver-stock detached from the reciprocating-frame or sliding head.

a is the frame-work of the machine, made of any suitable material, as iron or wood.

b is the driving-shaft, one end of which takes its bearing in the box *c*, the body of this shaft being round or square, and is fitted into, and works in the central orifice of the sleeve *c'* in any of the common ways, so that said sleeve shall revolve with the shaft, and traverse alternately back and forth thereon. The ends of this sleeve take their bearing in the boxes *c'' c'''* of the reciprocating-frame *d*.

This frame *d* is fitted firmly and closely, so as to move easily and alternately back and forth upon the V-shape bed *e*.

f is a feed-screw shaft, which is fitted and held firmly in a fixed position at one end of the bed *e* by means of a clamp-box, *g*, in which it revolves, so as to prevent endwise play of the feed-screw *f*. Its action

is connected to the under side of the reciprocating-frame *d* by means of adjustable compensating screw-nuts, *h h*. The external shape of these nuts is round. They are fitted closely to the screw, so that if, by wear, the screw works loosely in the nuts, simply by turning one nut firmly against the other they will act together as set-nuts, to take up the play. Then the two nuts are firmly secured or compressed into the A-shape trough or way in the under side of the sliding frame *d* by means of strap-bolts *h' h'*.

This screw-shaft is actuated forward and backward, alternately, by right and left-hand pawls and ratchets.

The ratchets *f''* are secured firmly to the screw-shaft, and serve as collars to hold the pawl-plates in place, while the pawl-plates, with their driving-gears *h'' h''*, are secured upon sleeves, and are fitted closely and turn freely upon the screw-shaft *f* between said ratchet-collars.

h'' h'' are toothed racks. One end of each of these racks are firmly secured together in their relative positions astride of their actuating-gears *h'' h''* by a connecting-plate, *h''*.

f' is a spring-pawl, secured to pawl-plate. Its outer edge is provided with notches or depressions, into which the end of the spring works to hold the pawl in or out of contact with the notches of the ratchet-wheels.

i is a crank-plate, secured upon the end of the shaft *b*, and is provided with a connecting-arm, *i'*, the lower end of which is secured by a screw or bolt to the plate *h''*.

Thus it will be seen that, while the shaft *b* has a continuous revolving motion in one direction, the feed-screw shaft *f* may, through the crank-plate *i*, connecting-arm *i'*, pawls and ratchets *f' f''*, and rack and pinions *h'' h''*, be actuated, and move the graver-tool or frame *d* alternately back and forth upon the bed *e*, the distance of each alternate movement of the frame *d* being regulated by the teeth in the ratchet-wheels *f''*, and the adjustment of the connecting-arm *i'* on the crank-plate *i*.

k are graver-stocks, arranged and secured upon each side of the reciprocating table *d* to the sliding-heads *k'*. These stocks *k* are provided with arms, *k''*, which curve down under the rings *k'''*. These rings are provided with a cam projection at that point on the face of said rings, so as to act to press down the arm and lift the graver-tool up from the face of the work being marked.

k'' are strap cam arms, which are arranged upon the eccentric cams *k'''*, so that their action upon the arms *k''* shall move or actuate said arms alternately back and forth, in opposite directions, so that each graver shall operate at the same time upon a distinct piece of work. These cams *k'''* and ring *k'''* are secured fast

upon the sleeve c^1 . One end of the arms k^1 is connected to, and operates, the sliding heads k^1 , and moves said heads, with its graver stock thereon, alternately backward and forward. Each of these graver-stocks k is provided with arms m , which extends back, and directly under the revolving graduating pattern m^1 . These patterns m^1 are provided with depressions of variable lengths, according to, or to regulate, the length it is desirable to have the graver cut upon the work to indicate one inch, half inch, one-fourth inch, one-eighth inch, &c., so that, as the graver is moved back and forth to cut or mark the divisions, the length of cut or mark of the graver will be regulated by the action of the cam-patterns upon the rear end of the arm m , the object of which is to cut short or prolong the cutting action of the graver-tool upon the face of the rule or square, &c.

These graduating patterns m^1 are arranged upon the outer ends of the shaft m^2 . These two shafts are connected, so as to work uniformly together, by means of gears, m^3 .

m^4 is a ratchet-wheel, arranged upon the shaft m^2 , and is actuated by the pawl m^5 upon the vibrating lever m^6 . The lower end of this vibrating lever m^6 is secured to the lower portion, or bed, of the reciprocating-frame d , and is actuated forward by a side cam, m^7 , and is reacted to its resting-place by a weight or spring. This pawl is secured to the upper end of the lever m^6 , and works in the teeth of the ratchet-wheel m^4 , by means of which the cam-wheels or patterns m^1 are changed each revolution of the shaft b , and thus secure the fixed length of the graver mark upon the surface of, or upon which it works, varying according to the measurement required to be indicated upon a rule or square, as one inch, half inch, quarter inch, one-eighth, &c.

n is the upper portion of the jaw or clamp for holding the rule or square-blade. This upper jaw n is fixed in its position on the frame a , directly underneath which are provided two oscillating jaws, n^1 . Underlying these jaws is a follower, n^2 , having bearing points, n^3 , that work in the under edge, and near the center of the jaws n^1 , and is held in its proper place by a bolt, n^4 , passing through an orifice in the side of said follower, and the whole tightened, or loosened, by the clamp-screw n^5 .

The graver-stock k is provided with an orifice or recess to receive the graver, and a fastening-screw to hold the same in place. It is also provided with an arm, or arms, o , to guide the graver upon the surface of the rule, &c., being marked, and to regulate the depth of cut. Also, with adjusting-screws, o^1 , by

which the action is more perfectly regulated. Also, with an eccentric, o^2 , by means of which one arm, or pair of arms, may be elevated, while the others are depressed, or both pairs of arms may be depressed at the same time, for the purpose of more perfectly regulating the action of the graver.

Now, it will be seen that, by firmly securing a rule or square in the jaws, though it (the rule surface) may be somewhat irregular, or out of a true surface, the jaws will bring and hold the upper surface straight to the action of the graver, and by applying the power to the driving-pulleys b^1 , and the pawl depressed into the notches of the ratchets, the feed-screw shaft will move the frame d in either direction by simply changing the pawls, throwing one out and the other into connection with the ratchet. When the frame has traversed the length of the bed, every revolution of the shaft b will produce one action of the gravers, and each revolution of said shaft will, through the side cam m^7 vibrating lever m^6 , pawl m^5 , and ratchet-wheel m^4 , cause the pattern-cams m^1 to change in regular succession, in uniformity with the action of the gravers, and produce the desired scale for which the machine is set to work.

I believe I have thus shown the nature, construction, and advantage of this invention, so as to enable others skilled in the art to make and use the same therefrom.

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

1. The combination of the arms o , provided with set-screws o^1 , adjusting-cams o^2 , with the stock k for regulating the depth of cut of the graver.

2. The pattern-wheels m^1 , with the arms for lifting the graver, in combination with the stock k , side cam m^7 , arms m^6 , pawl m^5 , ratchet-wheel m^4 , and gears m^3 , substantially as and for the purpose set forth.

3. The nuts h , in combination with the clasp-bands h^1 , and screw-shaft f for taking up or compensating for loss of motion, substantially as set forth.

4. The combination of the racks h^3 , pinions h^2 , pawl and ratchets h^5 f^2 , upon the shaft f , with the connecting-arm i and crank-plate i , substantially as set forth.

5. The clamping device for holding the work, the fixed jaw n , oscillating jaws n^1 , clamping jaw or follower n^2 , with the screw n^5 , substantially as and for the purpose set forth.

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Witnesses:

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