2 Sheets--Sheet 1.

H. K. JONES.

Improvement in Marking Carpenters' Squares.

No. 126,307. Patented April 30, 1872.

Fig. 1.

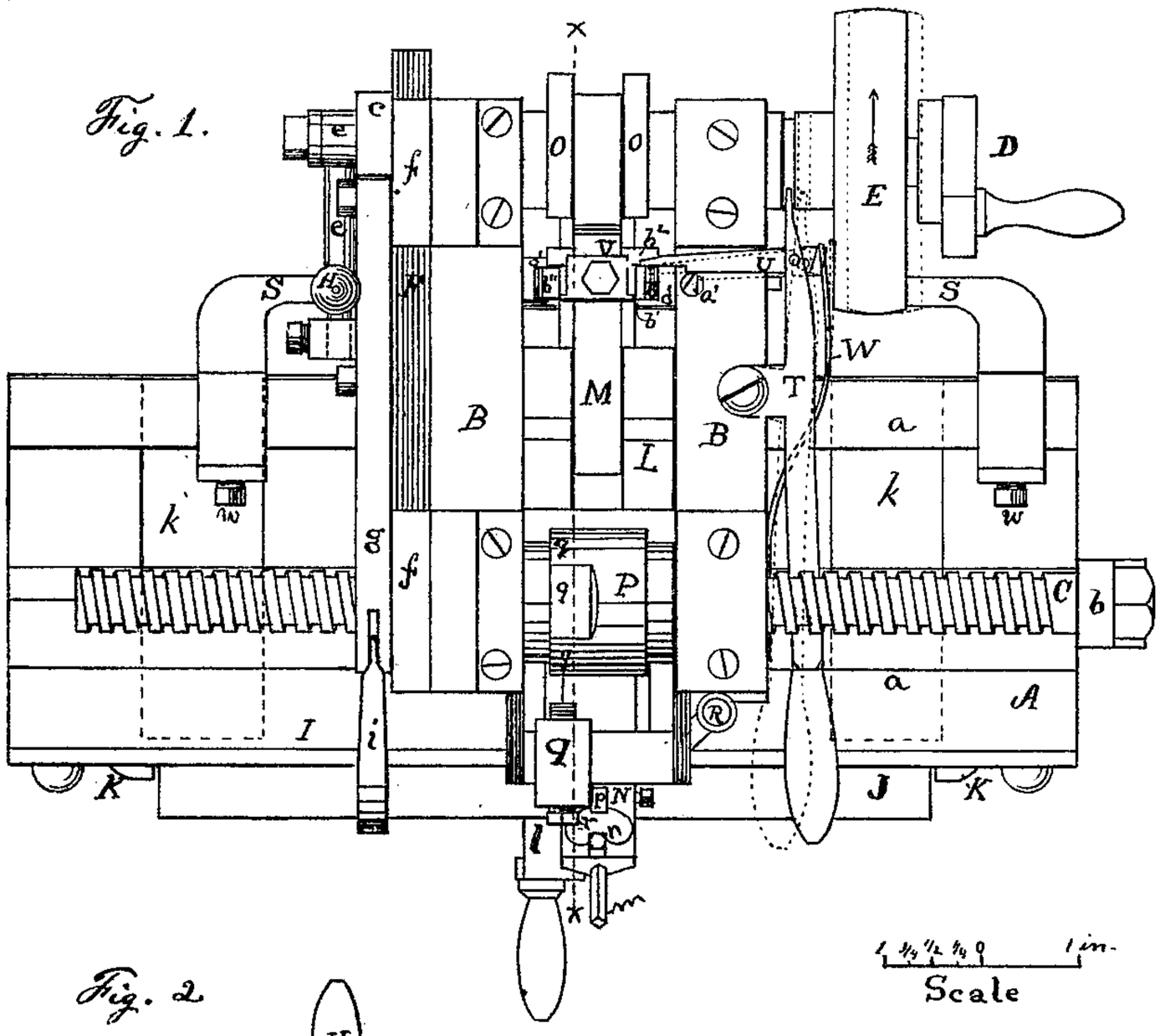
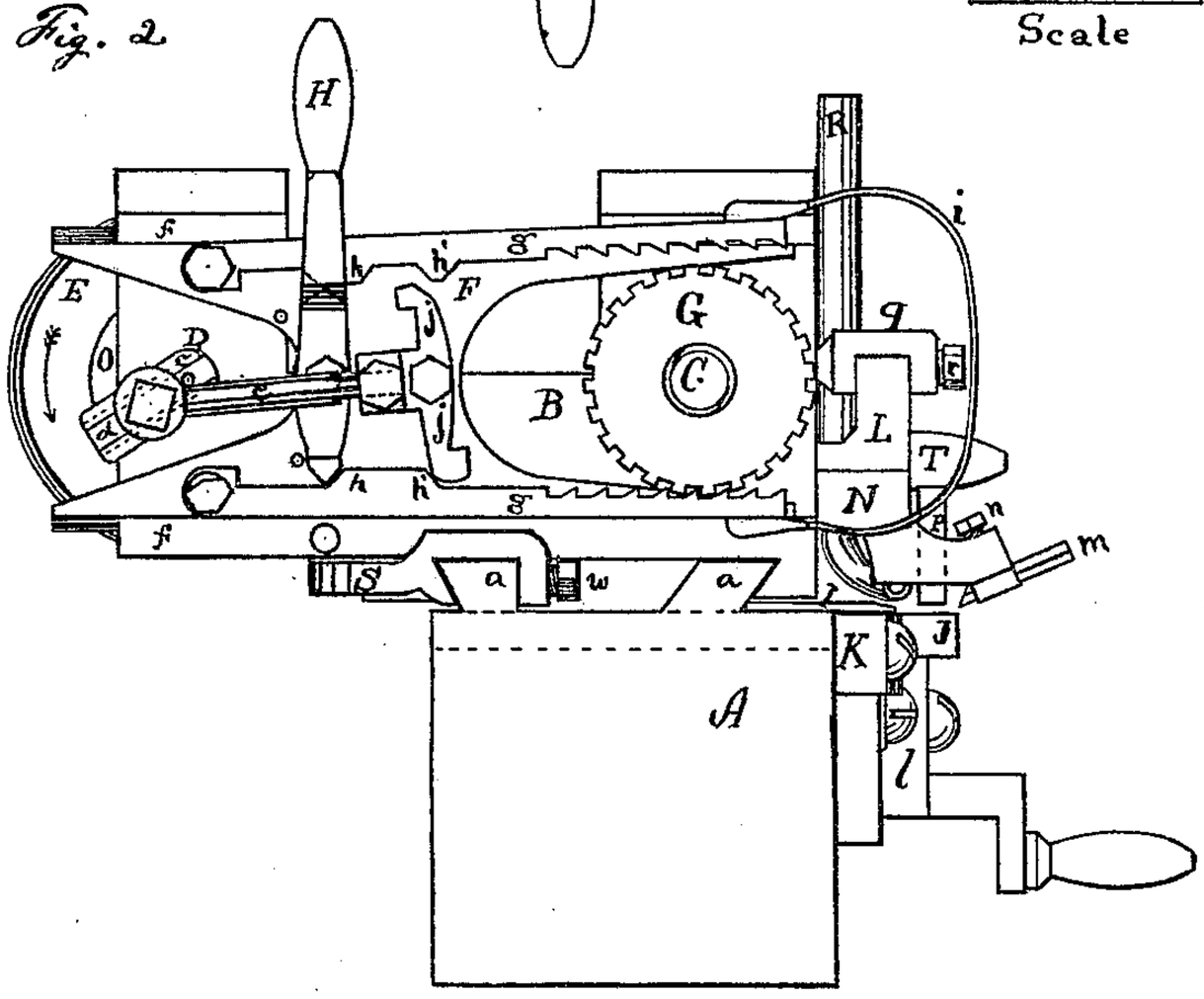


Fig. 2



Witnesses.

L. N. Chapin

F. L. Hunger ford

Inventor.

Horace K. Jones

By James Shepard Atty.

2 Sheets--Sheet 2.

H. K. JONES.

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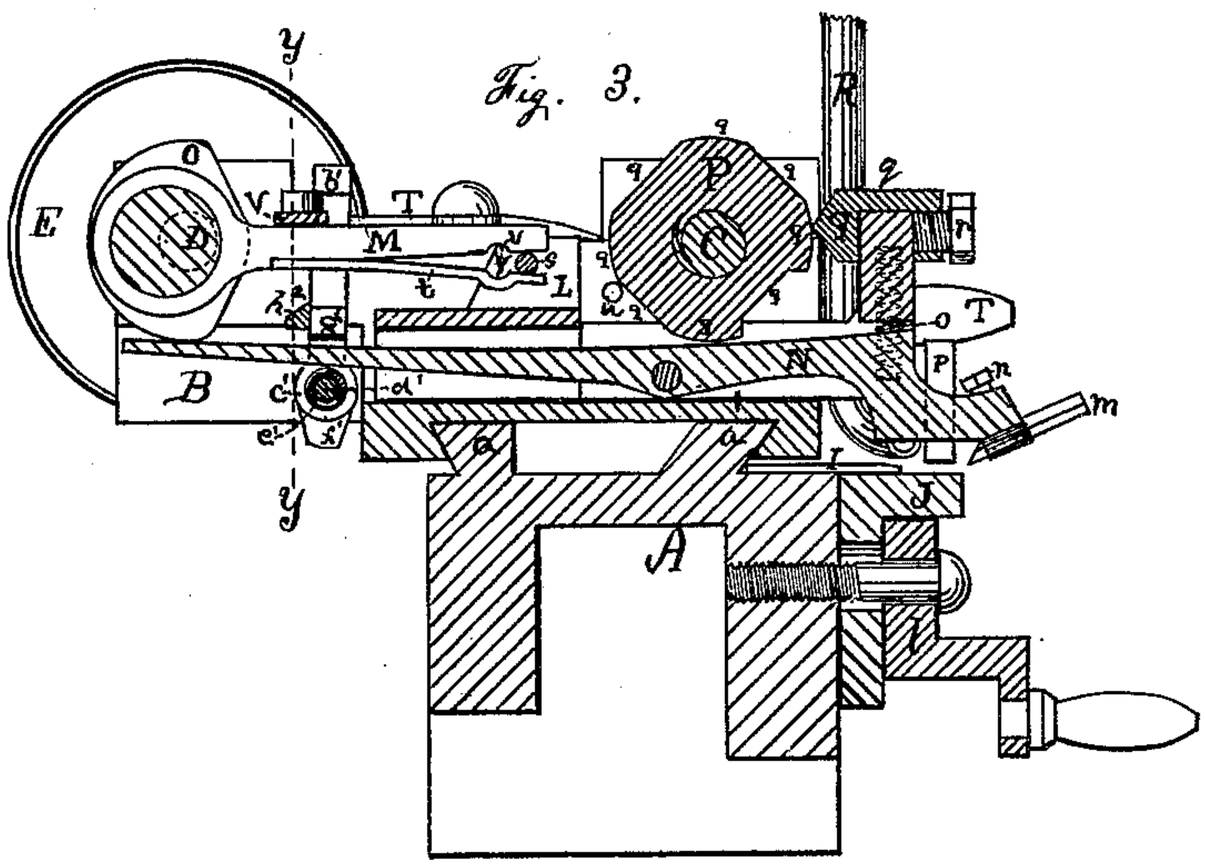
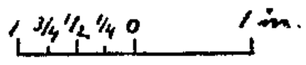
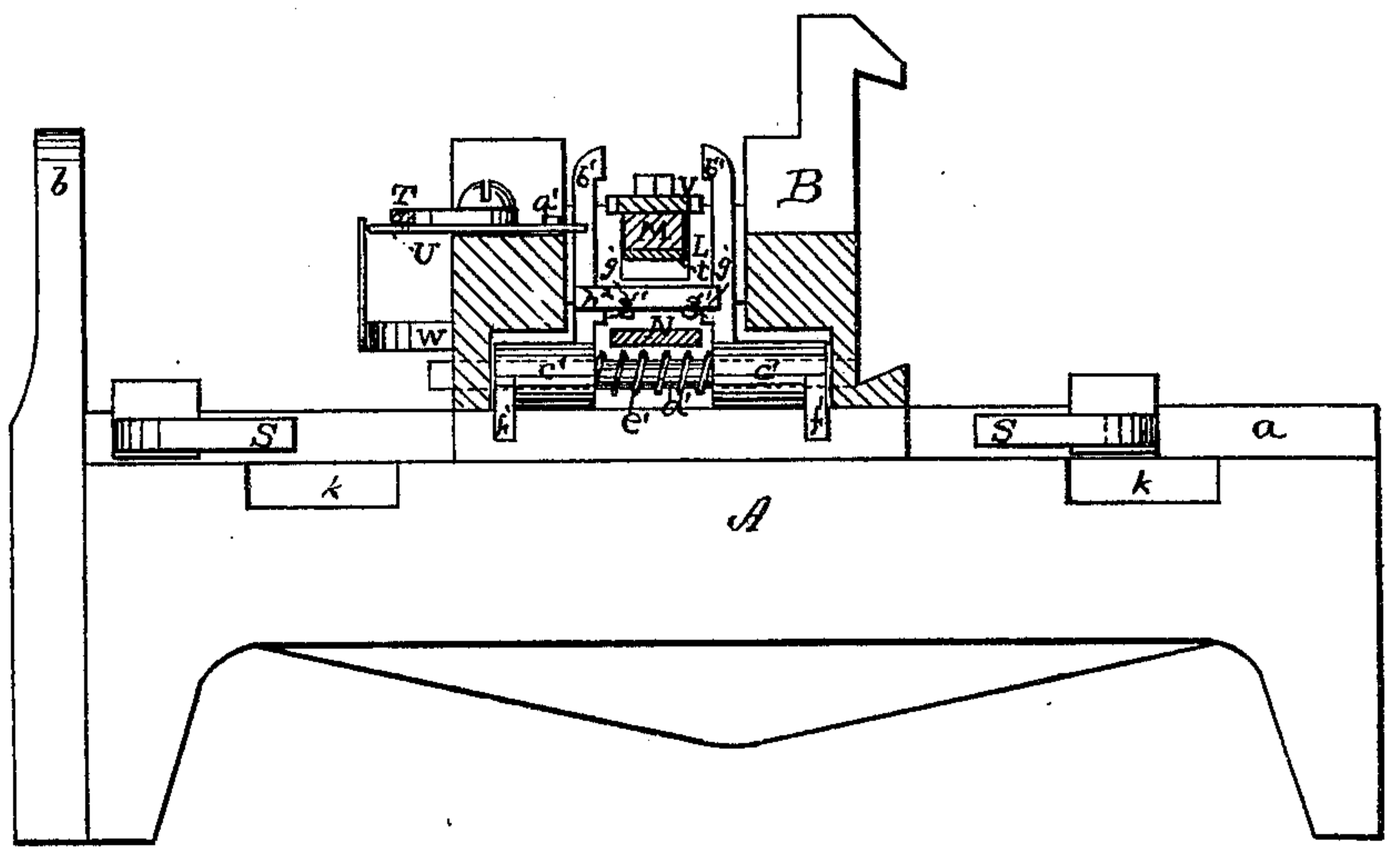
Fig. 3.





Scale

Fig. 4.



Witnesses.
S. N. Chapin
F. L. Hemingford.

Inventor.
Horace K. Jones.
By James Shepard Atty.

UNITED STATES PATENT OFFICE.

HORACE K. JONES, OF KENSINGTON, CONNECTICUT, ASSIGNOR TO HART MANUFACTURING COMPANY, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR MARKING CARPENTERS' SQUARES.

Specification forming part of Letters Patent No. 126,307, dated April 30, 1872.

To all whom it may concern:

Be it known that I, HORACE K. JONES, of Kensington, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Graduating Carpenters' Squares, of which the following is a specification:

My invention consists in the combination, arrangement, and peculiar construction of the various parts, as hereinafter described.

In the accompanying drawing, Figure 1 is a plan or top view of a machine for graduating squares, which embodies my invention. Fig. 2 is a side elevation of the same, showing its peculiar feed-motion. Fig. 3 is a vertical section of the same on line *x x;* and Fig. 4 is a detached sectional view of the back of said machine on line *y y*, showing its peculiar stop-motion.

A designates the bed or frame of the machine, provided with longitudinal ways *a a*, upon which the carriage B, carrying the entire working mechanisms of the machine, (except the clamp, stops, and feed-screw,) moves from side to side. A feed-screw, C, is rigidly and immovably secured over the bed A to the post *b*. At the rear part of the carriage B, and having its bearings in said carriage, is the driving or main shaft D and its driving-pulley E. On the opposite end of the driving-shaft D is a crank, *c*, provided with a longitudinal dovetail slot, *d*, (see Fig. 2,) in which the crank-pin at one end of the pitman *e* is secured, which pitman is connected to the feed-carriage F. Said carriage F moves in ways *f* transversely with and at the end of the carriage B. The feed-wheel G has an internal thread, and is therefore a nut which revolves upon the fixed screw C, and is provided with square or straight sided teeth, (see Fig. 2,) so that the racks *g g* may operate said wheel in either direction. The racks *g g* are pivoted or hinged to the feed-carriage F—one rack, *g*, immediately above, and the other immediately below the feed-wheel G. Said racks, at a point between their teeth and pivot, are each provided with projections *h* and *h'*. A reversing-lever, H, is hung upon the feed-carriage F, which lever has a projection on its back side, which, when brought into the position shown in Fig. 2, engages with the projection *h* on the upper one of the racks *g g*, and prevents said rack from engaging with the feed-wheel G, but allows the spring *i* to cause the lower one of said racks to engage with said wheel. As the crank *c* moves forward it carries the feed-carriage F with it, and, by means of the rack *g*, rotates the feed-wheel until the pitman *e* is directly in line with the center of the driving-shaft D and screw C, when the cross *j* on the end of the pitman *e* engages with the elevation *h'* of the lower one of the racks *g g*, and causes said rack to disengage entirely from the feed-wheel G during the backward movement of the feed-carriage. As soon as the crank *c* falls below the center line of its shaft D the cross-arm *j* disengages from the projection *h'*, and allows the spring *i* to throw the rack *g* again upon the feed-wheel G and move it another part of a revolution, whereby motion is imparted to the carriage B. To reverse the motion of the feed-wheel G, and consequently feed the carriage B in the opposite direction, the top of the lever H is pushed toward the shaft D, which disengages said lever from the elevation *h* on the upper one of the racks *g g*, and causes its lower end to rest upon the elevation *h* of the lower one of the racks *g g*, whereby said rack is prevented from engaging with the feed-wheel G, while the upper rack is then allowed and does engage with said wheel G, and feeds it as before described, only in the opposite direction, by reason of being fed from the upper instead of the lower side of the feed-wheel. The feed-motion should be reversed only when the crank *c* is above the center of its shaft and the cross-arm *j* engaged with the racks *g g*, so as to disengage both racks from the feed-wheel G. This will always insure the feeding of the feed-wheel and carriage B the same distance for each movement of the crank *c*, and cause said carriage B to stop at the same points when moving in either direction. The pitman *e* may be adjusted in the dovetailed slot *d* of the crank *c* so as to cause the carriage B to move any desired distance at each revolution of the shaft D. By arranging the screw C in a fixed position directly over the bed and revolving the nut the screw occupies no more space from side to side than does the bed A, whereas, if the feed-screw revolved as in the ordinary machines, it would, when the graver

was near one end of the square, project beyond that side of the bed nearly the whole length of the screw; and thus a revolving feed-screw requires nearly twice as much space to operate in than does my improved fixed screw.

The driving-pulley E, being attached to and movable with the carriage B, is belted to a long drum, the face of which is traversed by the driving-belt, which belt follows the movement of the pulley E as it moves with the carriage from side to side. Transversely with the bed A are grooves *k k*, which pass under the ways *a a* so that the ways are unbroken. These grooves *k k* are to receive one arm of the square while the other arm is being graduated, and by placing all the working mechanism above them the carriage is allowed to pass over the entire length of the square. Upon the top of the bed or frame A, and at its front edge, is a plate, I, and immediately under said plate is an adjustable bed, J, secured to the front of the bed A by means of bolts or screws passing through slots so as to allow a perfect adjustment vertically of the bed J or of either end thereof. The bed J is raised and lowered by a single cam, *l*, at its center, by means of which a square, whether straight or tapering in thickness, may be firmly clamped between the plate I and bed J. At both ends of the bed J are gauges K K by which to set the square in position for clamping. Transversely with the carriage B is the graver-carriage L, which moves in ways by means of the pitman M operated by an eccentric upon the main shaft D. In the carriage L is pivoted the graver-stock N, (most clearly shown in Fig. 3,) provided with the graver *m* at its front end, said graver being held in place by a set-screw, *n*, and depressed by a spring, *o*, represented in broken lines in Fig. 3. The rear end of the graver-stock N is immediately below cams O O upon the main shaft D, which, at each revolution of said shaft, depress the rear end, and thereby raise the front end of the graver-stock N and its graver *m*, and hold it in an elevated position during its forward movement. The cams O O are so formed that as soon or a little before the pitman M begins to draw the graver-carriage L backward they release their hold on the graver-stock N, and allow the spring *o* to depress the graver *m*, and cause it to engrave a mark on the side of the square. An adjustable shoe, *p*, governs the depth of cut for the graver *m*. Said shoe is placed on a line with the graver instead of at one side, as in ordinary machines. By this arrangement the depth of cut will be more uniform, by reason of being gauged immediately in front of the point of the cutting-tool, so that if any depressions or inequalities occur in the surface of the square the shoe and graver pass in one and the same path through said depression, and thereby make a cut of the same depth as at the other parts of the square.

The length of the cut is regulated as follows, viz.: Upon the screw C, and affixed to and revolving with the feed-wheel or nut G, is a gauge-wheel, P. The periphery of the gauge-wheel P has several planes or rests *q* at varying distances from the center of said wheel, as shown in Fig. 3. These rests *q* may be arranged in several zones, and the gauge Q may be adjusted upon the carriage L by means of set-screws *r*, so as to be in front of any of said zones.

The pitman M is secured to the graver-carriage L by means of a pin, *s*, (see Fig. 3,) rigidly affixed to said carriage, and a spring, *t*, upon the under side of the pitman M. The pressure of the spring *t* and pitman M upon the pin *s* creates sufficient friction to throw the carriage L forward until it is stopped by contact with the stop *u*, when said spring and pitman continue to move forward until the pin *s* is received in the recesses *v v*. At this point the cams O O release the graver-stock N, when the graver is depressed, the pitman draws backward, drawing with it the carriage L and its graver, (the graver cutting meantime,) until the gauge Q strikes the gauge-wheel P, (see Fig. 3,) when the graver and its carriage can move backward no further, but as the pitman has still further to travel the spring *t* and pitman M yield to the power thus exerted upon them and spring open sufficient to allow the pin *s* to disengage from the recesses *v v*, and the pitman and the spring pass on, as shown in Fig. 3. The forward movement of the pitman M throws the graver-carriage L again forward, as before described, during which forward movement the feed arrangement before described moves the carriage B a given distance proper for the next gradation or mark upon the square, and, at the same time, partially rotates the gauge-wheel P, whereby the next backward movement of the pitman M makes another cut upon the square, the length of which is determined by the gauge Q striking the succeeding rest *q*, which, being a different distance from the center of the said gauge-wheel than the rest *q* last acted upon, makes a cut of a different length, and so on through the length of the square, thus marking it with the eighths, quarters, halves, and inches, or, by the employment of a different zone of rests upon the gauge-wheel, graduating the square into any gradation that may be desired.

By arranging the gauge-wheel P and the feed-wheel G rigidly together and having them both revolve upon a common axis, I dispense with the separate mechanism for revolving the gauge-wheel usually employed in other graduating-machines.

It will be obsèrved that the shoe *p* and graver *m* traverse the whole length of the square. It is, therefore, very important that the chips from the graver or other foreign substances shall be kept from between the shoe and the square. Such chips if allowed to get under the shoe would hold it up and prevent the graver from making a cut of the proper depth. To this end a wind-pipe, R is secured to the carriage B and points toward the under

side of the shoe *p*. In order to allow the wind-pipe R to travel with the carriage B from side to side of the machine it is connected by means of an elastic or flexible tube to a blower, and thus a current of air passed through the pipe R with sufficient force to remove all chips or other foreign matter from under the shoe *p*.

Upon the rear one of the ways *a a* are secured adjustable stops S S, which, by means of set-screws *w w*, may be set in any desired position. The driving-pulley E is loose upon the shaft D when in the position shown in Fig. 1; but said parts are provided with an ordinary clutch, (not shown,) and the pulley E is connected to a shipping-lever, T, by which the pulley E is thrown into the position indicated by broken lines in Fig. 1, when the clutch is in gear, and said pulley drives the shaft D. A latch, U, is connected to the shipping-lever T by means of a pin, so as to form a joint. A notch is formed in one end of the latch U which catches on the catch *a'* and holds the clutch in gear. Immediately in front of one end of the latch U is one of a pair of arms, *b' b''*, which extends upward from hubs *c' c'*, which slide and swing upon a fixed rod, *d'*, underneath and at the rear of the carriage B. (See Fig. 4.) These hubs and arms are kept apart by the spiral spring *e'*, and each hub *c'* is provided with a short arm, *f'*, extending downward. The stops S S are so set that when the graver *m* makes the last mark at the end of the square one of said stops will be in contact with one of the arms *f*. The cams O O will hold the rear end of the graver-stock N depressed when the feed motion is moving the carriage B another degree. The arm *f'* being in contact with the stop S will hold said arm, its hub *c'*, and arm *b'* or *b''* stationary while the depressed end of the graver-stock N, by the movement of the carriage B, is brought under the projection *g* upon the arm *b'* or *b''*, which projection will hold the rear end of the graver-stock N in its depressed position after being released by the cams O O, and, therefore, the graver *m* is held up so that it cannot cut during its next backward movement. Upon the upper side of the pitman M is a cross-arm, V, which, during the last movement of the carriage B, was brought in front of the arm *b'* or *b''*, (according to the direction in which the carriage is being fed,) and, consequently, the backward movement of the pitman and its cross-arm V will throw the arm *b'* or *b''* backward when said arm strikes the latch U and releases it from its catch *a'* and allows the spring W to throw the pulley E sidewise into the position shown in Fig. 1, whereby the clutch is thrown out of gear and the machine stopped.

At the rear of the arm *b'* is a cross-arm, h^2, which extends back of the arm *b''*, so that when the latter is thrown backward by the cross-arm V the arm *b'* shall simultaneously therewith be moved backward and release the latch U. The shipping-lever T being operated by the backward movement of the pitman the machine is always stopped with the racks *g g* of the feed-motion, thrown out of gear with the feed-wheel, so that said feed-motion is in a proper position to be reversed, which being done, and another square inserted, the clutch is thrown into gear by means of the shipping-lever T, when the carriage moves in the opposite direction. The feed will then feed the carriage B one degree prior to any backward motion of the graver. Therefore, by holding up the graver *m* so that it cannot cut while the carriage B moves one degree after making the last mark at the end of the square, the graver will begin to operate upon its return movement at the same point that it made the last mark before being reversed.

The end of the latch U which is in contact with the spring W is beveled (see Fig. 1) so that the back corner only receives the power of the said spring. This causes the opposite end of the latch U to move forward and engage with its catch *a'*, so that the spring W answers to operate both the shipping-lever T and the latch U; but an independent spring may be employed for the latch, if desired.

I claim as my invention—

1. The combination of the feed-wheel G, carriage F, crank *c*, pitman *e*, cross-arm *j*, racks *g*, spring *i*, and lever H, all combined and operating together, substantially as and for the purpose described.

2. The grooves *k k*, formed in the bed or frame A below the ways *a a*, in combination with the carriage B and graving mechanism, substantially as described, whereby one arm of the square being graduated may lie in the groove under the ways while the graver passes over the entire length of the opposite arm.

3. The location of the shoe *p* and graver *m*, both on one and the same longitudinal line of the graver-stock N, whereby the graver follows the path of the shoe, substantially as and for the purpose described.

4. The bed A, post *b*, and screw C rigidly secured thereto, in combination with the revolving nut G P, carriage B, and its feeding mechanism, which moves laterally with said carriage, all substantially as and for the purpose described.

5. The combination of the gauge-wheel P, feed-wheel G, and the revolving nut, all attached together and operated by the same mechanism, substantially as and for the purpose described.

6. The combination of the graver-carriage L, its graving and gauging mechanisms, pitman M, spring *t*, recesses *v v*, and pin *s*, to accomodate the varying lengths in the stroke of the graver, substantially as described.

7. The combination of the catch *a'*, latch U, shipping-lever T, spring W, pulley E, shaft D, cams O O, graver-stock N, pitman M, with projections or cross-arm V, arms *b' b'' f' f'*, spring *e'*, and stops S S, substantially as and for the purpose described.

8. The feeding mechanism and graving mechanism in combination with the mechanisms for

preventing the graver from cutting during its last stroke, and the mechanism for stopping the shaft D with its eccentrics in a certain position, whereby the last cut of the graver when the carriage moves in one direction, and the first cut when it moves in the opposite direction, are both made at the same point, substantially as described.

9. The carriage B in combination with the driving-pulley or mechanism, feeding, graving, and gauging mechanisms, all moving together upon said carriage, substantially as and for the purpose described.

HORACE K. JONES.

Witnesses:
JAMES SHEPARD,
F. L. HUNGERFORD.