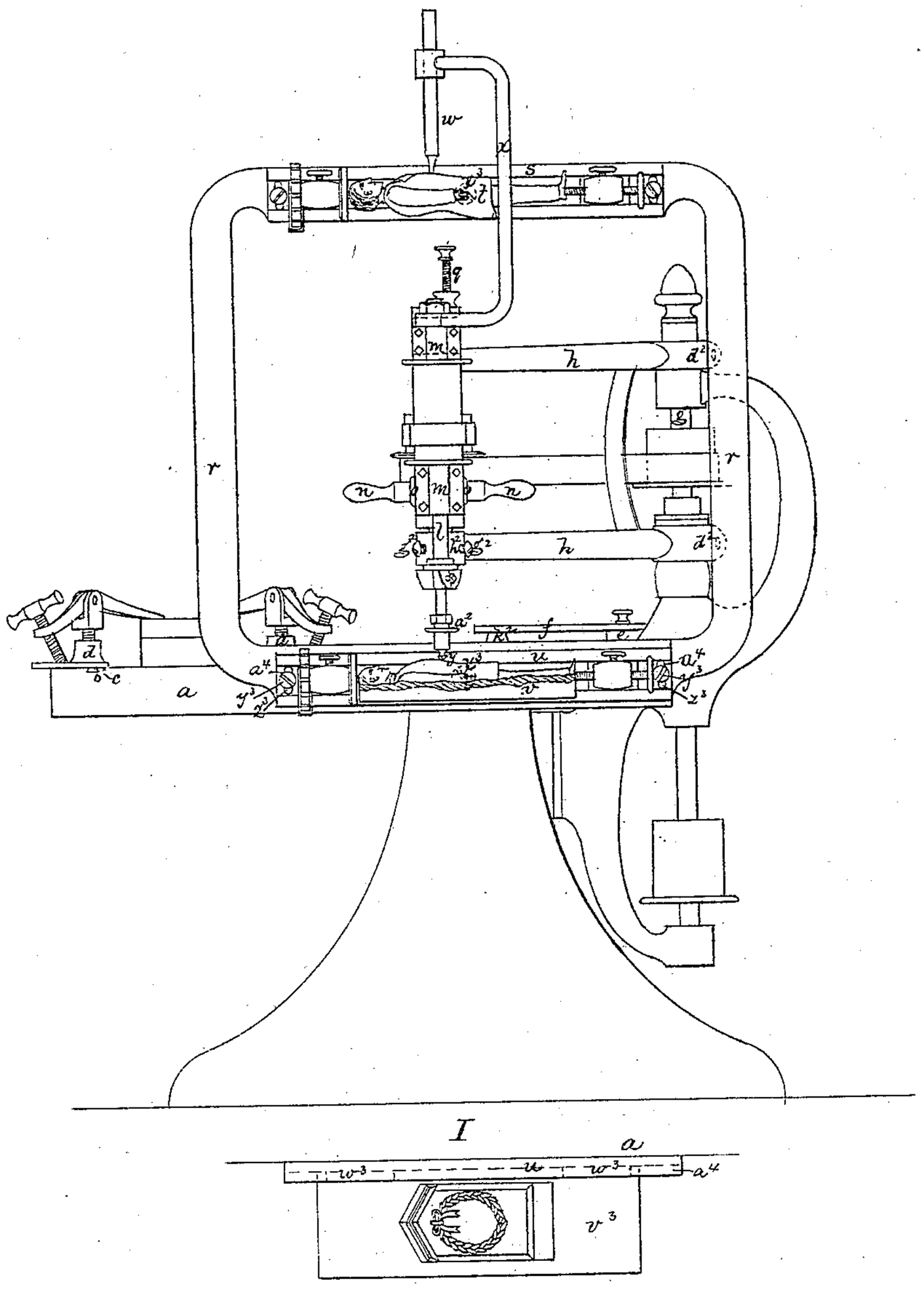
3 Sheets--Sheet 1.

A. S. GEAR.

Improvement in Molding and Carving Machines.

No. 126,198. Patented April 30, 1872.

A



Witnesses.
M. W. Frothingham.
S. B. Kidder

Alonzo S. Gear.
By his Attys.
Crosby & Gould.

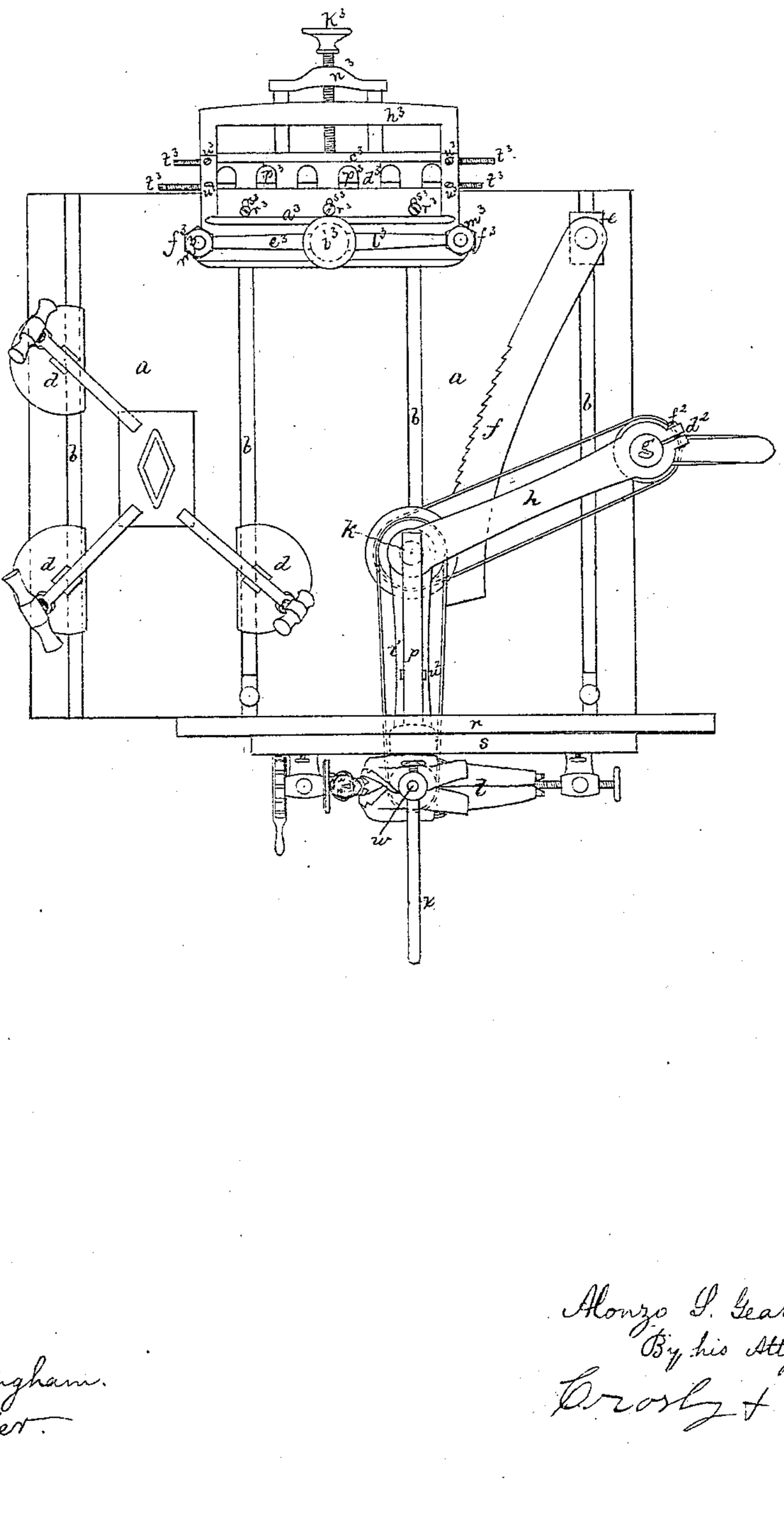
3 Sheets--Sheet 2.

A. S. GEAR.

Improvement in Molding and Carving Machines.

No. 126,198. Patented April 30, 1872.

B.



Witnesses.
M. W. Frothingham.
J. B. Kidder.

Alonzo S. Gear.
By his Attys.
Crosby & Gould

3 Sheets--Sheet 3.

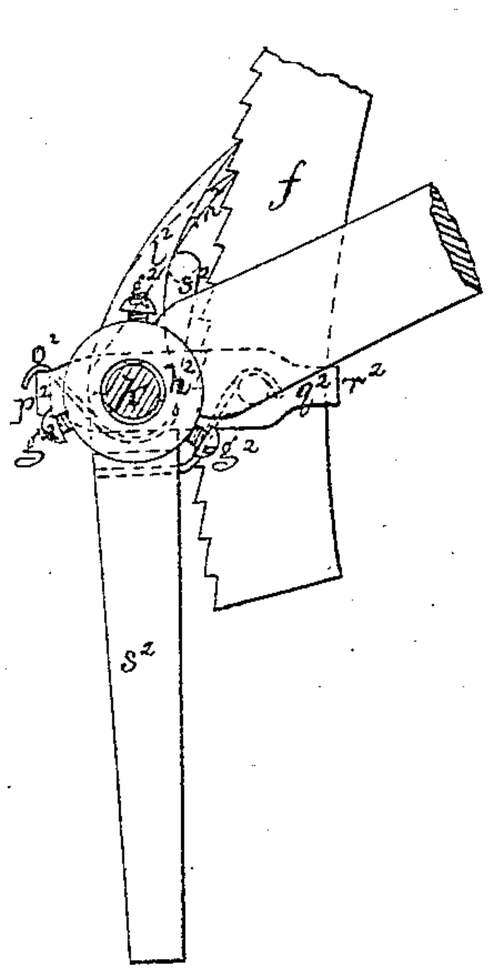
A. S. GEAR.

Improvement in Molding and Carving Machines.

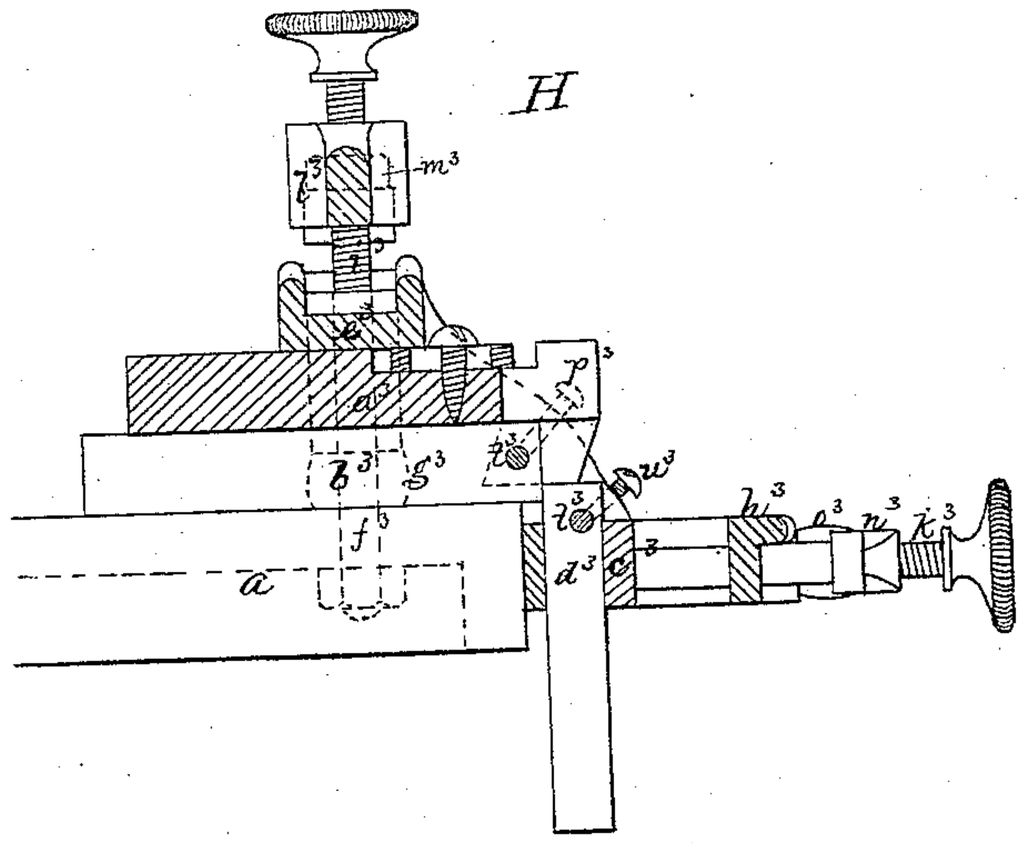
Patented April 30, 1872.

No. 126,198.

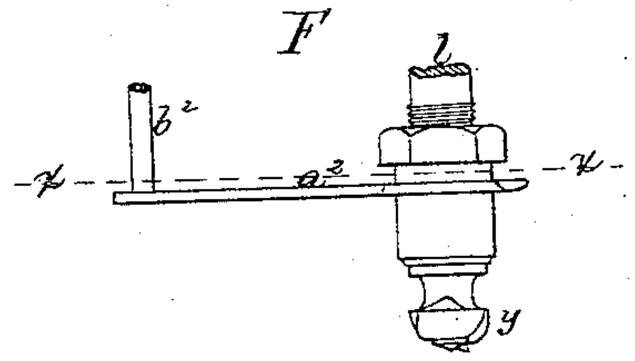
C



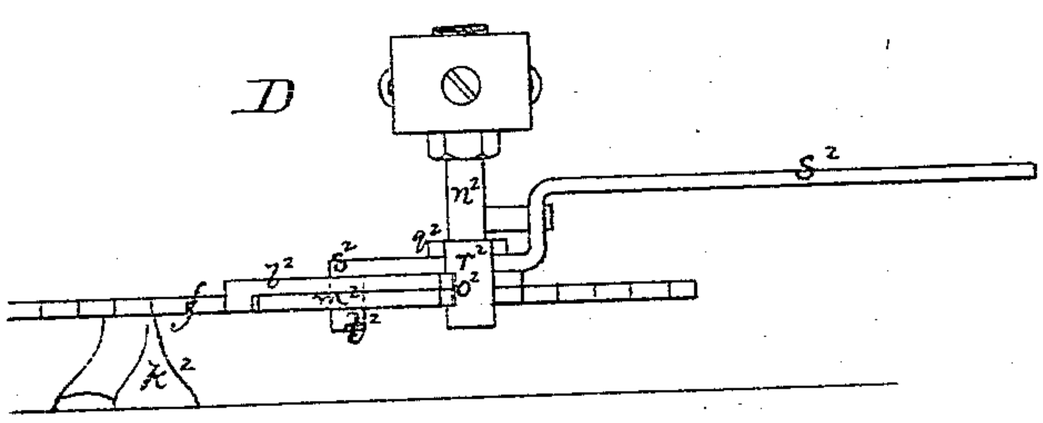
H



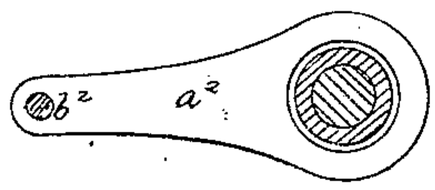
F



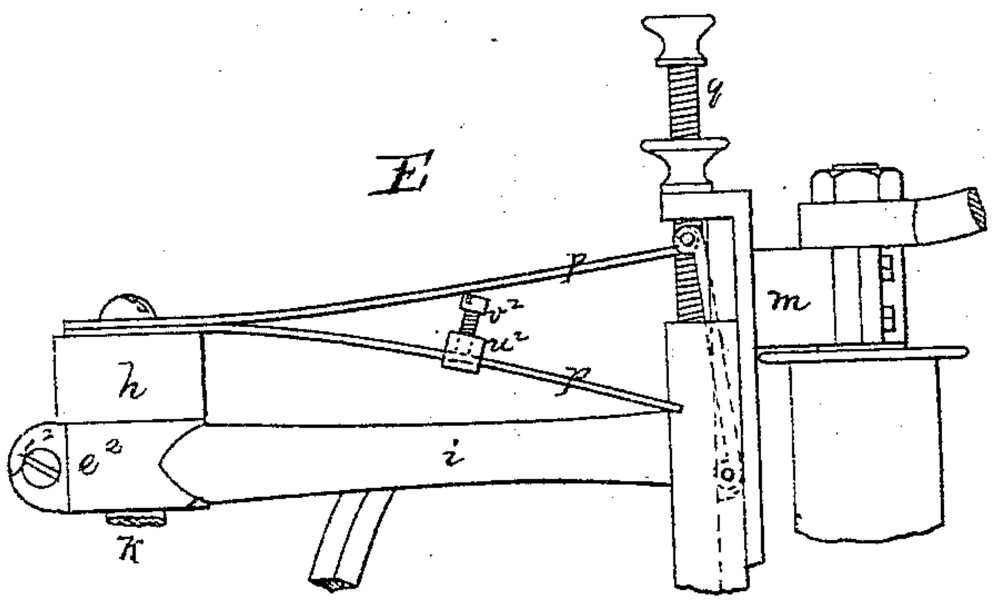
D



G.



E



Witnesses.
M. W. Frothingham.
S. B. Kidder.

Alonzo S. Gear.
By his Attys.
Crosby & Gould

126,198

UNITED STATES PATENT OFFICE.

ALONZO S. GEAR, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MOLDING AND CARVING MACHINES.

Specification forming part of Letters Patent No. 126,198, dated April 30, 1872.

To all whom it may concern:

Be it known that I, ALONZO S. GEAR, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Machines for Molding, Carving, Paneling, Dovetailing, &c.; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

United States Letters Patent No. 97,188, dated November 23, 1869, have been granted to me for certain improvements in machines for cutting moldings, and United States Letters Patent No. 106,685, dated August 23, 1870, have also been granted to me for certain improvements in machines embodying to a greater or less extent the invention shown in said patent.

My invention relates particularly to details of construction of machines embodying to a greater or less extent the improvements shown in each of said patents, the improvements having reference to the better adaptation of the machines to carving, paneling, and molding work, and dovetailing work.

The drawing represents a machine embodying the invention.

A shows the machine in elevation looking toward the open frame, in which is mounted a model or pattern, and the work to be carved in reproduction of the pattern. B is a plan of the machine. C shows in plan, and D in side elevation, the ratchet-and-pawl mechanism for confining the inner arm of the compound cutter-spindle frame. E shows in side elevation the upper end of the cutter-spindle, and the spring for counterbalancing the arm or effecting its rise. F is a side view of the cutter and a guide for regulating the movement of the cutter in working inclined paneling. G is a section on the line *x x*, showing this guide in plan. H is a vertical section of the clamping mechanism for securing pieces to be mortised for dovetailing. I shows a shelf for supporting slabs or flat work to be carved or cut.

a denotes the horizontal bed or table supported upon a suitable post or standard, and provided with mortises *b* in its upper surface for receiving dovetailing tenons *c* on the bottoms of clamps or dogs *d*, and permitting such clamps to be slid from place to place, in accordance with the size or character of the panel-work to be cut, such mortises also serving to receive and guide a slide block, *e*, to which the ratchet-bar *f* is jointed. *g* denotes the vertical driving-shaft, to which is jointed the swinging arm or frame *h*, to the outer end of which arm the cutter-arm or frame *i* is jointed by a shaft, *k*, the inner arm swinging upon the driving-shaft and the outer arm upon the connecting-shaft *k*. At the front end of the outer arm is the cutter-spindle *l*, which is not journaled in bearings extending directly from the end of the arm, but in bearings in a frame, *m*, which slides vertically with respect to the arm *i*, being kept in its path of vertical movement by suitable guides. The cutter-spindle is driven by a belt running from a pulley on the spindle to a pulley on the intermediate shaft *k*, which shaft *k* in turn is driven by a belt running from a pulley on it to a pulley on the driving-shaft. The cutter-spindle or spindle-frame *m* is provided with suitable handles *n*, by which the movements of the spindle, both horizontally and vertically, are guided and controlled by the operator; and these handles are screw or nut threaded, so that, by rotating them, washers *o* may be forced against the head of frame *i* to clamp the cutter-spindle in vertical position, or may be thrown from said frame to permit the cutter-spindle to freely rise and fall. The stress of a spring, *p*, serves to counterbalance the weight of the spindle and spindle-frame, or to raise them, thereby facilitating the movements of the spindle by the operator; and the extent of downward movement of the cutter may be regulated by an adjusting pin or screw, *q*. To the front of the table *a* is clamped the vertical pattern-frame *r*, to the upper bar of which is secured the pattern-holder *s*, having a grooved front face, in which groove slide the bearings for the mandrels, upon which the pattern *t* is mounted. At the front edge of the table *a* is another holder, *u*, in which is similarly mounted the block *v*, to be cut in facsimile of the pattern *t*, the movements of the cutter *y* being controlled by the traverse of a guide-pin or pointer, *w*, over the surface of the pattern, such pin or pointer being mounted in the upper end of a bent arm, *x*, fastened at its lower end on top of the cutter-spindle.

All the mechanism so far described is the

same or substantially the same as is shown in the above-mentioned patents, or more particularly in the patent No. 106,685.

The machine is sometimes employed in cutting inclined panel work, and to regulate the depth of action of the cutter *y*, I place around the spindle a guide-collar or ring, a^2, having a tail-piece or shank, by which it is fastened to a vertical slide rod, b^2, by means of which the guide is positioned, the rod being fastened in place, when the guide is properly located, by a clamp-screw. The mechanism being arranged so as to permit free vertical movement of the cutter-spindle for such inclined work, the contact of the guide a^2 with the plane surface of the face of the work to be paneled will thereby at all times regulate the depth of cut of the cutting-tool, or will cause it to cut to a uniform depth with relation to the inclined face of the work. This constitutes one feature of my present invention.

Another feature of the invention relates to a provision for bringing the intermediate shaft *k* at any time into exact vertical position. The arm *h* is hung upon the main shaft by split bearings d^2, and the intermediate shaft *k* is mounted and fastened in the outer ends of the frame *h*, the cutter-spindle arm *m* turning upon said shaft, being hung thereto by split bearings e^2. As the bearings d^2 e^2 wear they are brought up to the shaft by screws f^2. To secure the perpendicularity of the cutter-spindle the intermediate shaft is made adjustable, so that, as the bearings e^2 wear, the shaft *k* may be so adjusted as to bring the upper and lower bearings into exact vertical line, this adjustment being effected by means of three set-screws, g^2, extending radially through the shaft surrounding end h^2 of the arm *h*, the cutter-spindle being at any time readily turned or brought into vertical position by means of the screws g^2.

In my patent No. 106,685 I show a mechanism for locking or detaining in position the inner frame, leaving the outer one with the cutter-spindle free to swing, such mechanism consisting of a ratchet-bar pressed up toward the intermediate shaft by a suitable spring and a pawl connected with said shaft, the pawl being thrown into engagement with the ratchet-teeth by the operator, and the cutter-spindle then swinging only on this shaft as a center, enabling the cutter to be moved and to cut only in a fixed path. This pawl mechanism I now so construct or organize as to insure the locking of the inner arm, when required, without danger of its being jarred from position, while, when the pawl is thrown from the ratchet (as it is by the action of a spring when the operator releases the pawl-lever) both arms are free to move and the cutter to have a compound or lateral motion in every direction. *f* denotes the ratchet-bar, hung and swinging horizontally on a pin projecting from a block, *e*, which slides in one of the grooves *b*, the front part of the bar being kept in proper position above the table by a shoe, k^2. l^2 m^2 denote two pawls, hung on the projecting pin n^2 at the end of the shaft *k*. Said pawls are pressed forward by springs o^2, but the outer ends of such springs bear against an arm, p^2, extending from a swing-plate, q^2, (swinging upon the pin n^2,) said plate having at its opposite end an arm, r^2, which projects down by the edge of the ratchet-bar. The pawl-lever s^2 is also hung on the pin n^2, and has a pin, t^2, under its front end, movement of the rear arm of the lever in one direction by the operator causing this pin to act upon the pawls and throw them out of engagement with the ratchet-bar, while movement in the opposite direction throws the plate around and brings the pawls into engagement with the ratchet-teeth, said movement at the same time bringing the arm r^2 against the ratchet-bar, and thereby locking the ratchet-bar and pawl mechanism together so long as the lever is so held by the operator, the stress of the springs keeping the pawls pressed forward, while the arm r^2 prevents the ratchet-bar from swinging back or locks it in position with respect to the shaft *k* or frame *h*. This construction constitutes another feature of my invention. The spring *p*, that counterbalances or presses up the cutter-spindle, is so made as to permit very free but smooth vertical play of the cutter. Sometimes it is desirable to arrest the easy downward play of the spindle at a certain preregulated point, in accordance with the character of the work. For this purpose I place upon one part of the spring a slide, u^2, which may be slid to any point between the springs, the slide being fastened in position by a suitable screw, v^2, or other device, and the screw, or the slide, or a projection therefrom, forming a stop for the free movement of the upper part of the spring (in accordance with the position of the slide) and of the cutter-spindle connected thereto.

On one side of the table *a* is seen the mechanism for clamping work to be dovetailed. a^3 denotes the clamp for fastening upon the table one strip or piece, b^3, to be dovetailed at its edge; c^3, the clamp for fastening another piece, d^3, in vertical position against the front edge of the table, the upper edge of the vertical piece and the front edge of the horizontal piece being in relative position for the cutter to cut through the piece d^3 from the front, and into the edge of the piece b^3, so as to form tenons and mortises on the respective pieces, which match and interlock to join the pieces together in relative right-angular position—this process of forming the joint and the construction of the joint being that shown and described in United States Letters Patent No. 99,446. The clamps are shown as arranged in a frame having a cross-bar, e^3, over the table, (said bar being mounted on vertical screws or pins f^3, and resting upon springs g^3, the clamp a^3 being directly fastened to the under side of this bar,) and a cross-bar, h^3, at the front of the table, a feed-screw, i^3, forcing down the whole frame, and in forcing it down clamping the piece b^3 upon the table, and a screw,

k^3, forcing forward the clamp c^3 to clamp the board d^3 to the front edge of the table. The screw i^3 works through a nut-thread at the center of a cross-bar, l^3, said cross-bar being mounted on the screws f^3, and being made adjustable thereon by means of nuts m^3. The screw k^3 works through a nut-thread in a cross-bar, n^3, a spring, o^3, being interposed between the bar n^3 and the bar h^3. By means of the springs g^3 o^3 the clamps are thrown back and the work released as the screws are turned back, and the work is lightly secured and held in position by the stress of the springs, so that after being lightly clamped the edges may be properly adjusted relatively to each other, the screws being then turned up to tightly secure them for the operation of the dovetailing cutter. By means of the screws f^3 and their nuts the bar l^3 is positioned in accordance with the thickness of the work to be dovetailed. The cutters in entering from the front are guided by suitably-formed projections or guides p^3, as in said patent No. 99,446; and to position these guides in accordance with the thickness of the front or vertical piece d^3, said guides are made as projections from the front of the clamp bar or plate a^3, and said bar is made adjustable forward and back with relation to the clamp-frame by screws r^3 and slots s^3, the clamp-bar being moved forward until the front ends of the projections are flush with the front face of the piece d^3, and the screws r^3 being then tightened to fix the guides in position. To adjust and keep the pieces b^3 and d^3 in lateral position set-pins t^3 are used, these pins extending through the side cheeks of the clamp-frame and being brought up to the pieces b^3 d^3, and then fixed in position by screws w^3, or by being made as screws working through nut-threads.

By the construction of the dovetailing-frame, and holding the clamps each by its own screw, it will readily be seen that each piece, b^3 d^3, may be set or adjusted and fixed in position without disturbing the other.

The construction of the clamp-frame and the provisions for adjusting the guides, setting the work, and fixing the clamps, constitute features of the invention.

In working flat surfaces in relief, as in carving stone slabs, &c., I employ an auxiliary table or shelf, v^3, for supporting the work, this table having a tenon or tail-piece, w^3, which slides in a groove, a^4, made in the rail u or in the front edge of the table a, thereby bringing the work into position, as seen at I. The pattern t and the block v are made movable axially, each upon its own mandrels or pivots, an index-wheel or other suitable mechanism being applied to each, so that corresponding movements shall be given to both. Besides such movements, each pattern or block-holder is mounted on a horizontal center-pin, x^3, so that the block or pattern may be tipped vertically, screws y^3 passing through slots z^3, so that the pattern or block frame may be secured in position.

I claim—

1. The guide a^2, in combination with the vertically-moving cutter-spindle, when arranged to be adjusted relatively to the cutter in the manner substantially as shown and described.

2. In combination with the intermediate shaft k and arm p, the set-screws g^2 for adjusting the shaft to position, substantially as described.

3. The mechanism for locking together the ratchet-bar f and the arm or frame h, substantially as shown and described.

4. In combination with the clamp-frame, the springs g^3 o^3, substantially as described and shown.

5. The dovetailing-clamp frame herein described and shown, having two separate clamps, in combination with the adjustable guides p^3, as and for the purpose specified.

6. In combination with the clamp-frame herein described, the adjusting-screws or pins t^3 for positioning the work, substantially as shown and described.

ALONZO S. GEAR.

Witnesses:
FRANCIS GOULD,
M. W. FROTHINGHAM.