

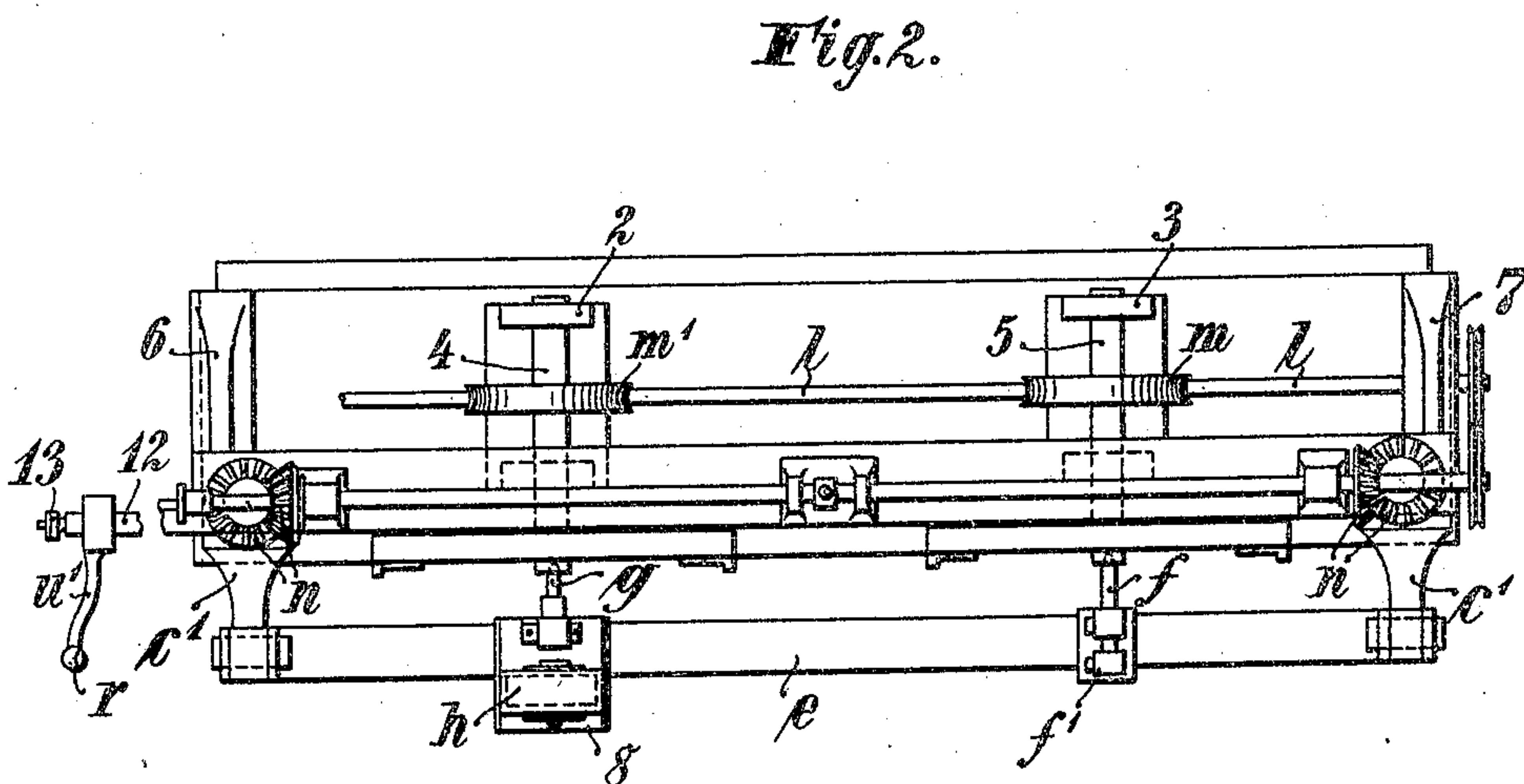
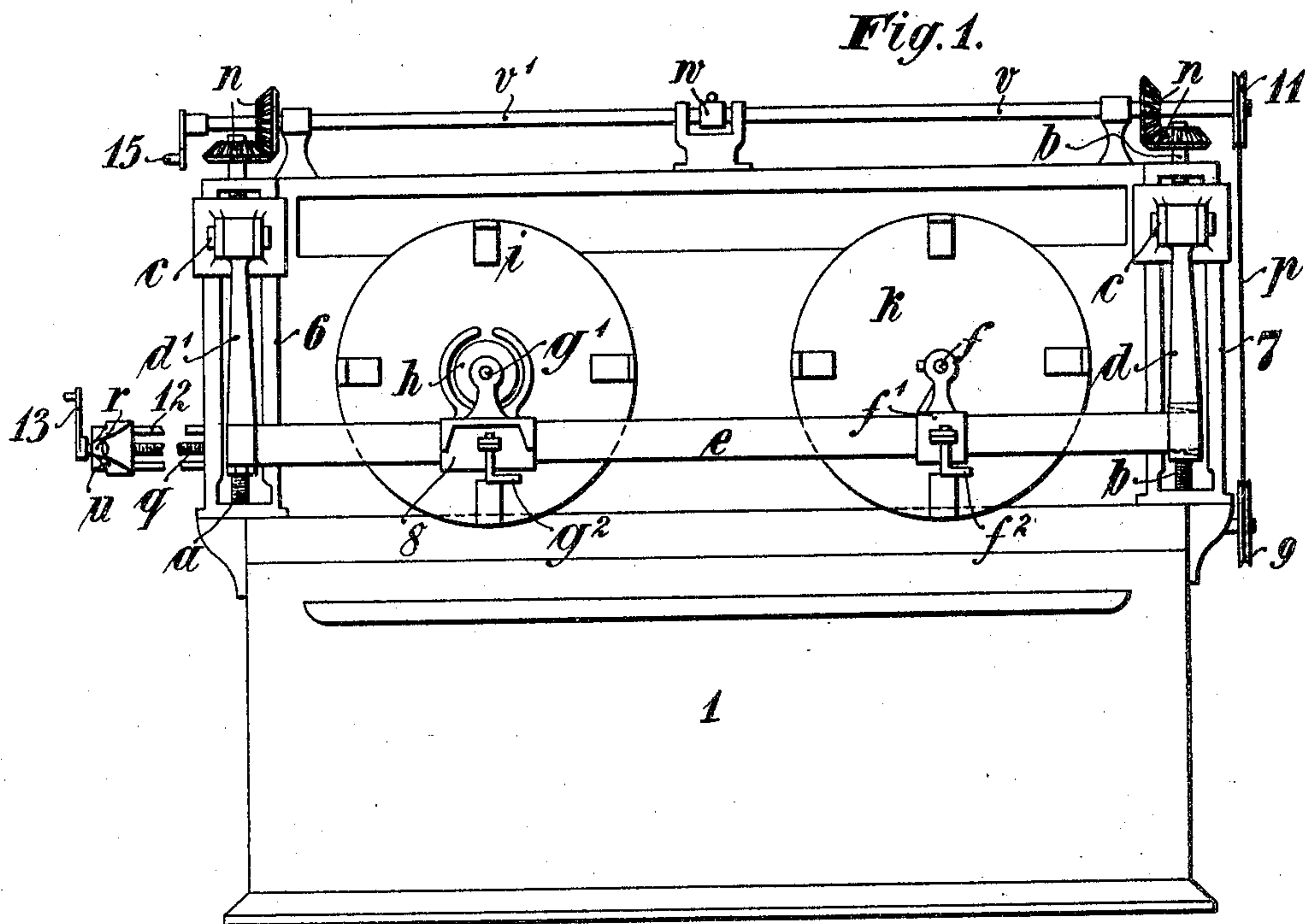
No. 793,580.

PATENTED JUNE 27, 1905.

G. HAELBIG.
COPYING OR SCULPTURING MACHINE.

APPLICATION FILED JUNE 4, 1904.

2 SHEETS—SHEET 1.



Witnesses

H. M. Kuchel
Edward L. Reed

Inventor

Gustav Haelbig.

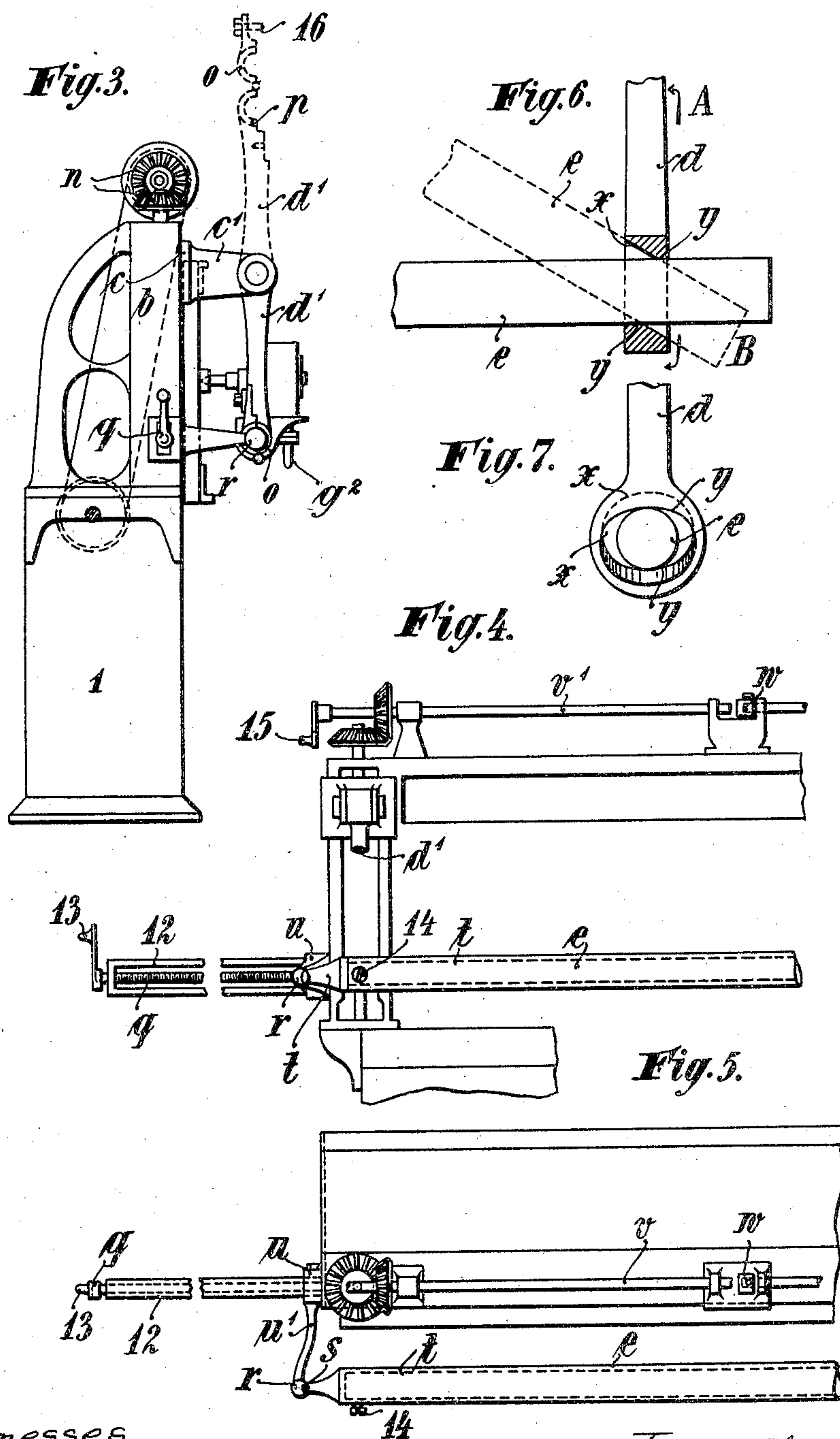
By Richards & Co.

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UNITED STATES PATENT OFFICE.

GUSTAV HAELBIG, OF BERLIN, GERMANY.

COPYING OR SCULPTURING MACHINE.

SPECIFICATION forming part of Letters Patent No. 793,580, dated June 27, 1905.

Application filed June 4, 1904. Serial No. 211,218.

To all whom it may concern:

Be it known that I, GUSTAV HAELBIG, a citizen of the Empire of Germany, residing at Berlin, in the Empire of Germany, have invented a new and useful Copying or Sculpturing Machine, of which the following is a specification.

My invention relates to copying or sculpturing machines of that kind in which two slowly-rotating face-plates in the same vertical plane are disposed on two spindles in the same horizontal plane and adapted to receive the pattern and the work, respectively; and my invention consists in improvements in such machines whereby a greater mobility is given to the tracer and tool-carrier, and the machine can be adapted to produce at pleasure works of the same size or of a smaller size than the pattern.

The objects of my improvement are, first, to provide two slides adapted to be simultaneously moved by two vertical screw-spindles; second, to suspend the horizontal tracer and tool-carrier from these two slides by means of two links rocking around the same horizontal axis; third, to provide on the tracer and tool-carrier a small electric motor for driving the tool; fourth, to provide means for rendering the one slide with its vertical screw-spindle and its link at pleasure inactive; fifth, to provide a slide with a cup-shaped bearing and adapted to be moved by a horizontal screw-spindle, and, sixth, to provide the one end of the tracer and tool-carrier with an extensible longitudinally-movable rod with a ball-shaped end adapted to move in the cup-shaped bearing. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of the copying or sculpturing machine when arranged for producing work-pieces of the same size as the pattern, part of the horizontal screw-spindle and guide being broken away. Fig. 2 is a plan of the same. Fig. 3 is an end view of the same seen from left to right in Fig. 1. Fig. 4 is an elevation of a part of the same machine when arranged for producing work-pieces of a smaller size than the pattern. Fig. 5 is a plan of the same. Fig. 6 shows in elevation the right end of the tracer and tool-

carrier and part of the right link carrying same, partly in section; and Fig. 7 is a vertical section through the line A B in Fig. 6.

Similar characters of reference refer to similar parts throughout the several views.

On the bed 1 are secured two supports 2 and 3, in which the spindles 4 and 5, carrying the two face-plates *i* and *k*, respectively, are mounted to turn. The two face-plates are of any known and approved construction, and the one, *k*, of them is destined for holding the pattern, (not shown,) and the other face-plate *i* for holding the work-piece. (Equally not shown.) In the two standards 6 and 7 two vertical screw-spindles *a* and *b*, respectively, are mounted to turn and adapted to carry the two slides *c c* by means of suitable nuts. The two slides *c c* are provided with brackets *c' c'*, which are pivotally connected with the two hanging links *d* and *d'*. The right link *d* has at its lower end *y* an opening *x* (see Figs. 6 and 7) of irregular shape, in which the right end of the cylindrical tracer and tool-carrier *e* can move in all directions. The left link *d'* has at its lower end a two-part bearing *o p* for the left end of the tracer and tool-carrier *e*. The two bearing-halves *o* and *p* are hinged together and adapted for tightly grasping the carrier *e*, whereby the latter is prevented from longitudinally shifting. On the carrier *e* are conveniently fastened a holder *f'* for the tracer *f* and a support 8 for the tool *g*, as usual. The latter is a milling-cutter, preferably driven by an electric motor *h* of any known and approved construction. This electric motor *h* is secured on the support 8 and is conveniently connected by two wires (not shown) or the like with the source of electricity. (Equally not shown.) The tool *g* may be secured in the armature-shaft *g'*. The two screw-spindles *a* and *b* can be driven simultaneously from the top shaft *v v'* by means of bevel-wheels *n n*, and the two slides *c c* normally occupy the position shown at Fig. 1, so that the tracer *f* and the tool *g* point at the centers of the two face-plates *i* and *k*, respectively. The carrier *e*, with the tracer *f* and the tool *g*, can thus rock with the two links *d d'* around the same horizontal axis and be pressed toward the two face-

plates by means of the two handles f^2 and g^2 . The two face-plates i and k can be simultaneously put into slow rotation from the shaft l by means of worms, (not shown,) the two worm-wheels m m' , and the two spindles 4 and 5. The shaft l is arranged to be driven from any motor, (not shown,) preferably an electric motor. The rotation of the shaft l is transmitted to the top shaft v v' by means of cord pulleys 9 11 and an endless cord 10 or the like.

The machine described so far is arranged for producing work-pieces of the same size as the pattern and is operated as follows: The pattern is secured on the one face-plate k and the work-blank on the other face-plate i . After longitudinally adjusting the tool g the two electric motors are started and the carrier e is by hand conveniently pressed by means of the two handles f^2 g^2 —i. e., moved toward the two face-plates i k and therefrom away—the tracer f remaining in contact with the pattern. The two face-plates k and i will be slowly and uniformly rotated, and at the same time the two slides c c will be slowly and uniformly lowered by means of the two screw-spindles a and b . Thus the carrier e will always remain horizontal while being lowered and moved, so that the tracer f and the tool g , which are moved in vertical planes, are invariably held at equal distances from the centers and the planes of the face-plates. The tool g is at the same time rotated by the electric motor h to perform its work in the usual manner. The work will then be of the same size as the pattern. Of course the directions of the motions may be reversed, if so preferred—i. e., the tracer and tool-carrier e may be raised during the operation of the tool g . It is obvious that the operation of the tracer and tool-carrier is rendered very easy by the arrangement described.

For producing work-pieces of smaller size than the pattern the machine is arranged as follows: On the left standard 6 is fastened a suitable bracket or guide 12, in which a horizontal screw-spindle q is mounted to turn. A slide u engages, by means of a nut, with this screw-spindle q and can be moved horizontally on the guide 12 with the aid of a hand-crank 13. The slide u is provided with an arm u' , the end of which is formed to a cup-shaped bearing r . The two top shafts v and v' can be connected and disconnected at pleasure by means of a clutch w of any known construction. The left link d' is adapted in any known manner to be turned upward into the position indicated by the dotted lines in Fig. 3, if so desired. The cylindrical carrier e is made hollow on its entire length or part of the same. A rod t is inserted in the bore of the carrier e from the left in Figs. 4 and 5 and can be therein longitudinally moved and secured by means of a screw 14. The rod t terminates in a ball-shaped end s , which is adapted to

bear against the cup-shaped bearing r on the arm u' .

For reducing the size of the work-piece the top shaft v' is disconnected from the other one, v , by shifting the clutch w and then turned with the hand-crank 15, so as to raise the left slide c , with the link d' , and thereby to incline the carrier e . Then the bearing half o is opened by unscrewing a screw 16, Fig. 3, to release the carrier e . The latter is returned to its horizontal position (see Fig. 6) and now permits the link d' to be turned upward. The hand-crank 13 is turned to shift the slide u and adjust the cup-shaped bearing r at the desired distance from the center of the face-plate k , and thereby to determine the proportion of the radii from r to the centers of the two face-plates i and k —i. e., the ratio at which the work is to be reduced with reference to the pattern. The rod t is thereupon drawn out and so adjusted that its end s rests against the bearing r . Now the machine is operated much in the same manner as before, only that the carrier e is no longer held in a horizontal position, as before, but is so moved as to describe the convex surface of a cone. This motion of the carrier e is permitted by the irregular opening x in the end y of the right link d , Figs. 6 and 7, in which the right end of the carrier slides, while the link d is by hand moved toward the machine-frame and therefrom away and mechanically lowered or raised, as before.

The copying or sculpturing machine may be varied in its details without deviating from the spirit of my invention. The supports 2 and 3 may be arranged to be shifted on the bed 1. The shaft l , with the two worms, may be replaced by a screw-spindle. The cup-shaped bearing r on the arm u' may be so constructed in any known manner as to engage the ball s , and thereby to extend the rod t from the carrier e or to push it in the latter on the slide u being moved outward from right to left in Figs. 4 and 5 or in the opposite direction.

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

1. In a copying or sculpturing machine, the combination with two face-plates at the same height and in the same vertical plane, the one for the pattern and the other for the work-piece, of means for simultaneously and equally rotating said two face-plates, two parallel vertical guides, two slides on said two vertical guides and having each a horizontal pin, means for simultaneously and equally feeding said slides while retaining their two horizontal pins in a common line, two links hanging on the two horizontal pins of said two slides, a horizontal straight carrier secured between the lower ends of said two links and parallel to said two face-plates, a tracer-holder and a support on said horizontal straight carrier in the vertical planes of the

axes of said two face-plates respectively, a rotatory tool in said support, and means for driving said rotatory tool.

2. In a copying or sculpturing machine, the combination with two face-plates at the same height and in the same vertical plane, the one for the pattern and the other for the work-piece, of means for simultaneously and equally rotating said two face-plates, two parallel vertical guides, two slides on said two vertical guides and having each a horizontal pin, means for simultaneously and equally feeding said two slides while retaining their horizontal pins in a common line, two links hanging on the two horizontal pins of said two slides, a horizontal straight carrier secured between the lower ends of said two links and parallel to said two face-plates, a tracer-holder and a support on said horizontal straight carrier in the vertical planes of the axes of said two face-plates respectively, an electric motor on said support, and a tool on the armature-shaft of said electric motor.

3. In a copying or sculpturing machine, the combination with two face-plates at the same height and in the same vertical plane, the one for the pattern and the other for the work-piece, of means for simultaneously and equally rotating said two face-plates, two parallel vertical guides in the same plane paral-

lel to said two face-plates, two slides on said two vertical guides and having each a horizontal pin, means for feeding either of said two slides simultaneously and equally while retaining their two horizontal pins in a common line, or the one of them alone, two links hanging on the two horizontal pins of said two slides and one of them adapted to be moved aside at pleasure, a straight carrier adapted to be secured between the lower ends of said two links or to slide in the one link while the other is moved aside, a tracer-holder and a support on said straight carrier, an electric motor on said support, a tool on the armature-shaft of said electric motor, a horizontal guide parallel to said two face-plates, a fulcrum-slide on said horizontal guide and provided with a cup-shaped bearing, and an extensible rod longitudinally movable and adjustable in said straight carrier and shaped on its free end like a ball for engaging in the cup-shaped bearing of said fulcrum-slide.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GUSTAV HAELBIG.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.