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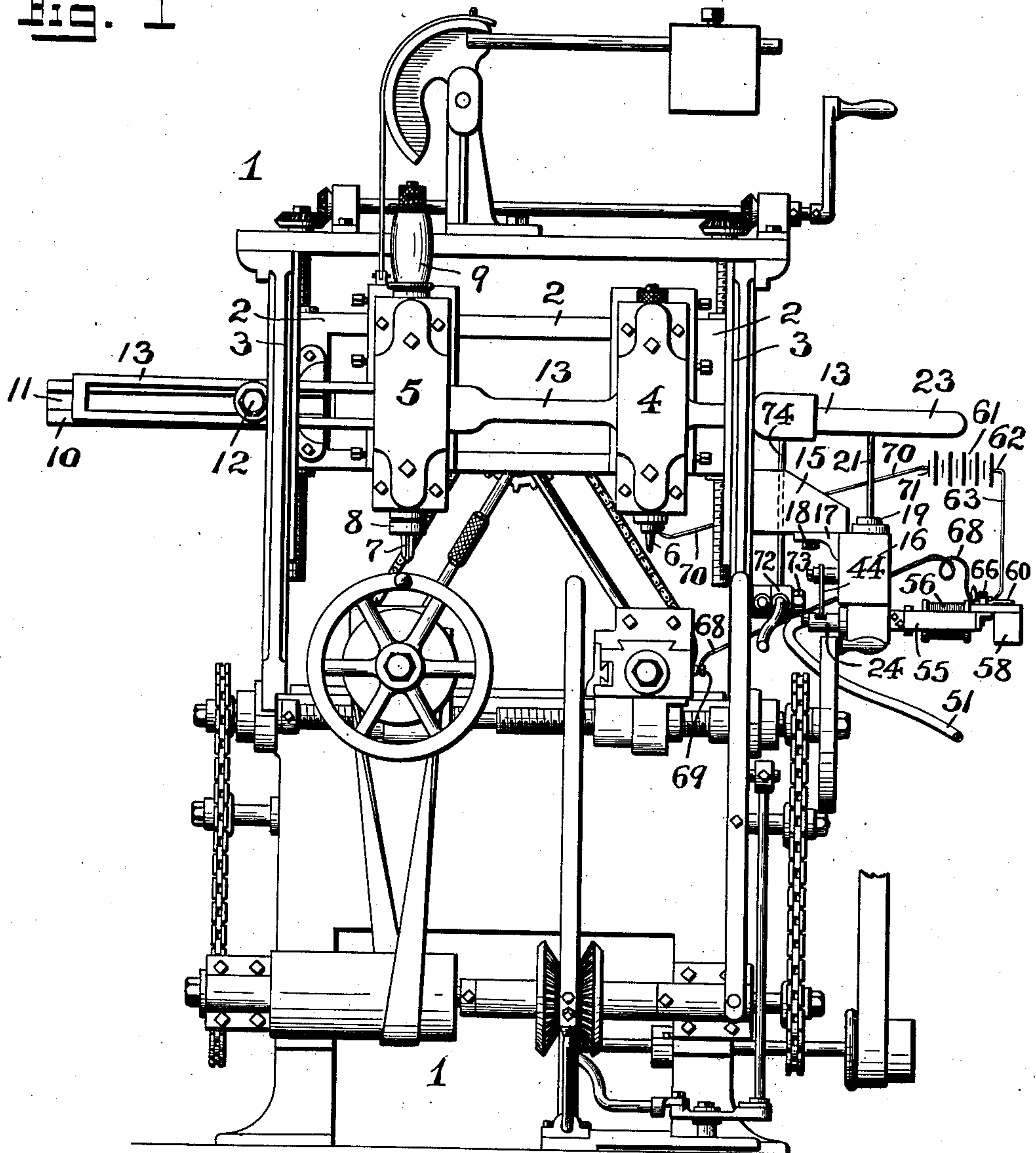
PATENTED JAN. 29, 1907.

H. M. ALBEE.  
ENGRAVING OR CARVING MACHINE.

APPLICATION FILED SEPT. 19, 1904.

3 SHEETS—SHEET 1.

Fig. 1



WITNESSES:

*Geo. D. Richards*  
*Wm. Greenfield*

INVENTOR:

*Honestus M. Albee,*  
BY  
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ATTORNEY

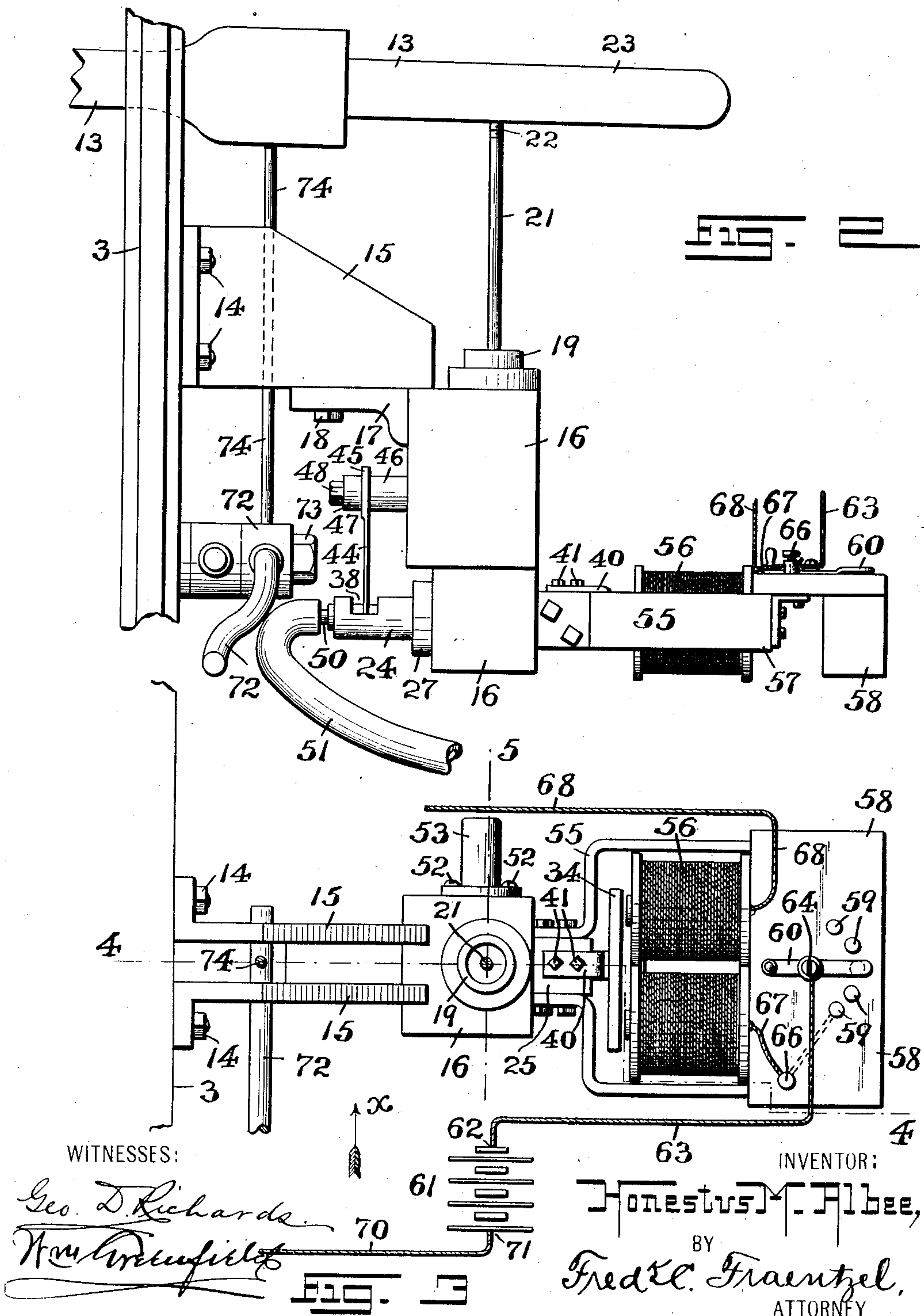
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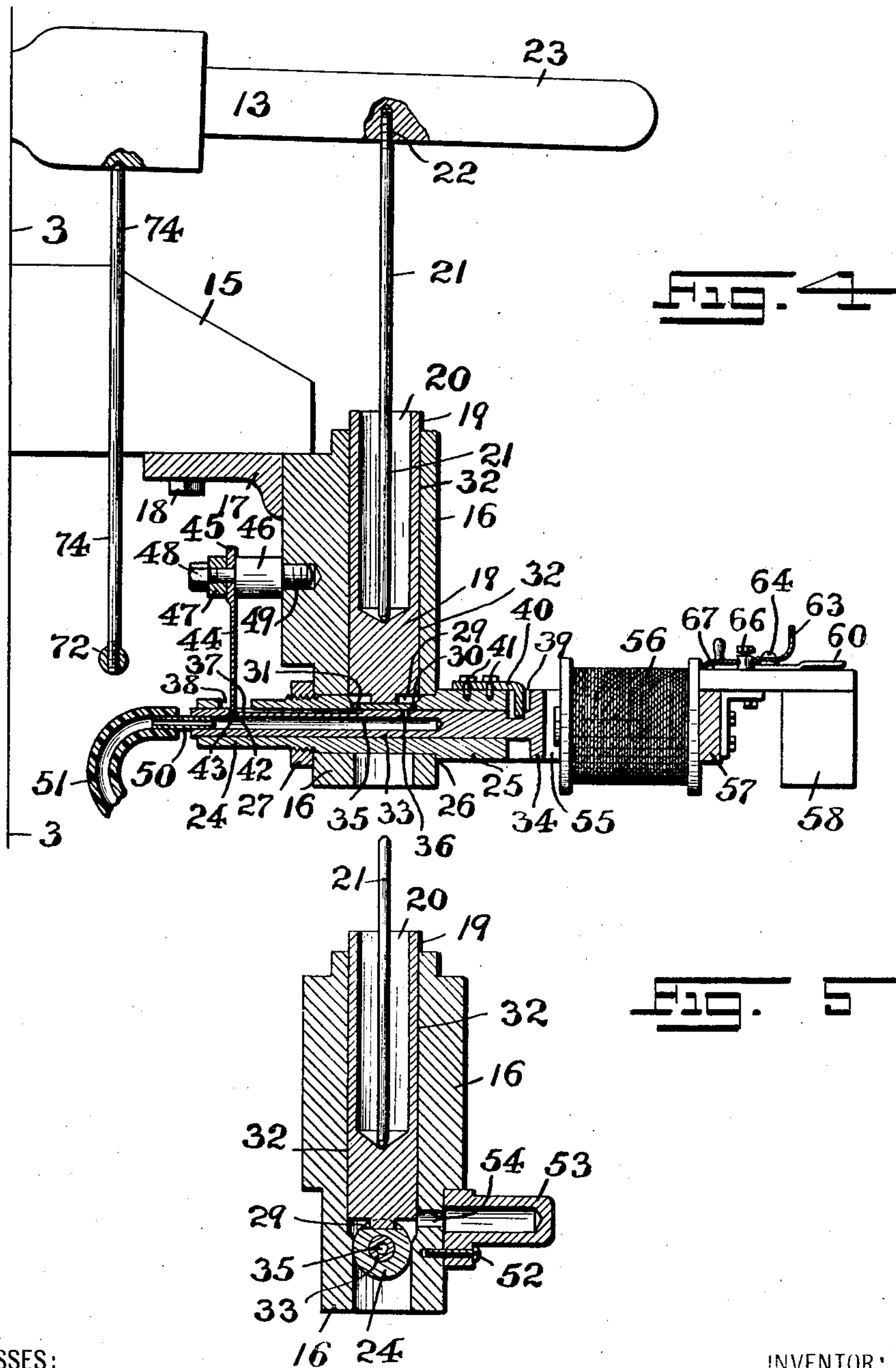
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3 SHEETS—SHEET 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

HONESTUS M. ALBEE, OF NUTLEY, NEW JERSEY, ASSIGNOR TO J. H. WILLIAMS & CO., OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

## ENGRAVING OR CARVING MACHINE.

No. 842,745.

Specification of Letters Patent.

Patented Jan. 29, 1907.

Application filed September 19, 1904. Serial No. 225,001.

*To all whom it may concern:*

Be it known that I, HONESTUS M. ALBEE, a citizen of the United States, residing at Nutley, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Engraving or Carving Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to numerals of reference marked thereon, which form a part of this specification.

The present invention has reference generally to improvements in engraving or carving machines used for the purpose or reproducing designs in steel or other metals in the art pertaining to die-sinking and other kindred arts or for the purpose of reproducing designs in wood and other materials.

The main object of the present invention is to provide a novel means for automatically assisting and controlling a tracer in its passage across the face of the pattern or templet the ornamented surface of which is to be reproduced by the carving or cutting tool in the steel or other material placed upon the work-table or bed of the machine, and, furthermore, to provide a simple and cheaply-constructed and effectively-operating mechanism for accomplishing the above-mentioned result which is positive in its action and yet controls the point of the tracer in such a careful manner that patterns or templets of soft or other perishable material, and even electrotypes and patterns of lead-foil, may be employed without any risk of injuring their ornate surfaces.

Other objects of this invention not at this time mentioned will be fully set forth in the accompanying specification.

The present invention consists, primarily, in a tracer-assisting means for engraving or carving machines, and more especially in a pneumatic or compressed-air-controlled device coöperating with devices carrying a tracer for automatically assisting and controlling the tracer-point in its movements over an ornamented surface.

The invention consists, furthermore, in an electric controlling means for admitting compressed air beneath a plunger or piston in a

cylinder of such compressed-air-controlled device and means for closing the air intake or port to the piston-cylinder, the air-exhaust port being continually open.

My invention consists, furthermore, in the novel arrangements and combinations of mechanism and the various parts of the same, which comprise and constitute an essential feature of the said engraving or carving machine, as well as in the details of the construction thereof, all of which will be fully described in the following specification and then finally embodied in the clauses of the claim, which form an essential part of said specification and are appended thereto.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of an engraving or carving machine embodying the novel features of my present invention. Fig. 2 is a detail view drawn upon an enlarged scale, illustrating in side elevation my novel attachment for engraving or carving machines. Fig. 3 is a detail plan view of the parts shown in said Fig. 2, and Fig. 4 is a central vertical section taken on line 4 4 in said Fig. 3 looking in the direction of the arrow *x*. Fig. 5 is a detail cross-section taken on line 5 5 in said Fig. 3.

Similar characters of reference are employed in all of the above-described views to indicate corresponding parts.

Referring now to the said drawings, the reference character 1 indicates one type of engraving or carving machine, the general construction of which is shown and described in Letters Patent issued to me bearing date the 28th day of July, 1903, and numbered 734,792.

My present invention is shown as adapted to the type of engraving or carving machine described and shown in said Letters Patent above mentioned; but of course it will be understood that I do not limit myself to its adoption to said type of engraving or carving machine, for the present invention may be adapted to and used with any other well-known types of engraving or carving machines or with other machines carrying a tracer or similar appliance.

The reference character 2 indicates a vertically-adjustable sliding frame riding in bearings or otherwise movably arranged be-



tween channels or guides 3, connected with the side frames of the said machine. Upon the said sliding frame 2 are arranged in a manner to be presently described two tool-carriers 4 and 5. Suitably connected with the said tool-carrier 4 is a tracer or other similarly-constructed tracing device 6. Similarly connected with the tool-carrier 5 is a carving or cutting tool 7, which is preferably secured in its proper position by means of any suitable form of chuck 8, connected at the one end with a vertical shaft riding in bearings in the said tool-carrier 5 and having upon the other end of said shaft a pulley 9, by means of which the shaft, chuck 8, and the carving or cutting tool 7, secured in said chuck, are caused to revolve to accomplish the desired object of carving or cutting the die or other work placed upon the work-table or bed of the machine. The sliding frame 2 is provided with an arm or extension 10, formed with a suitably-disposed channel or groove 11 or other suitable means, in which rides and is adjustably arranged a fulcrumal bolt or pin 12 of a lever arm or bar 13, the said lever arm or bar carrying the said tool-carriers 4 and 5 and being capable of vertical adjustment or movement in the channels or guides 3 of the machine. The vertical movement of this lever arm or bar 13 permits the tracer 6 to ride over the depressions or ornamentations of the pattern or templet, the force of gravity causing the said tracer 6 to sink into the depressions, and the novel means to be presently described assisting the tracer 6 to ride up upon the raised portions of the pattern or templet and in a manner plainly to be understood causing a duplication of movement by the carving or cutting tool 7. The construction and arrangements of the parts of this novel means or mechanism employed to assist the ascending movements of the tracer 6 will now be described, the manner of the operations of the parts thereof being more fully set forth hereinafter.

Secured to the side frame of the engraving or carving machine by means of bolts 14 or in any other suitable manner are a pair of supporting-brackets 15, which support a cylinder-block 16 or similar device, the latter being also preferably provided with a bracket or support 17, fastened by means of bolts 18 to the supporting-brackets 15 for the purpose of gaining greater strength and rigidity in the support of the said cylinder-block 16. Fixed within the said cylinder-block 16 is a piston or plunger 19, provided with a cup-shaped or tubular portion 20, within which is supported and suitably held the one end of a connecting or lifting arm or rod 21, the said arm or rod 21 being secured at its opposite end by means of a screw-threaded portion 22 or other suitable means to an extension 23 of the said lever arm or bar 13. Arranged

within and extending laterally across the lower portion of the said cylinder-block 16 is a tubular or cylindrically-shaped shell or outer valve member 24, having its ends extending on opposite sides of the cylinder-block 16, one of the said projecting ends being provided, preferably, with a squared or other suitably-shaped or flanged portion 25, the shoulder 26 formed thereby fitting against the outer face of the cylinder-block 16; and at a convenient distance from the other end the said shell or outer valve member 24 is provided with a screw-threaded portion, upon which may be secured a lock-nut 27 for the purpose of locking the said shell or outer valve member 24 in its fixed and operative relation within the lower portion of the cylinder-block 16. The said outer valve member 24 is constructed with a cut-away or open portion 29, corresponding with the bore or piston-chamber of the cylinder-block 16, situated directly beneath the lower face of the movable piston or plunger 19 within said chamber or bore of the cylinder-block 16, as clearly illustrated in Fig. 4 of the drawings. At each end or other suitable parts of this cut-away portion 29 are two ports or openings 30 and 31 in the said shell or outer valve member 24, the said ports or openings forming ducts or passageways, which extend from the interior of the shell or outer valve member 24 and open directly into the bore or chamber 32 of the cylinder-block 16, substantially as illustrated. Slidably arranged within the said shell or outer valve member 24 is an inner valve member 33, which is provided at its one end with an electromagnet-armature 34. The said inner valve member 33 is formed with a chamber or duct 35, which extends from the opposite end of the said inner valve member to a point beyond the port or duct 30, the said inner valve member being also provided with a port or duct or opening 36. Upon the upper outer surface of the said inner valve member 33 is a grooved or channeled portion 37, which extends beneath the port or opening 31 in the outer shell or valve member 24 and extends also in an outward direction beneath another opening 38 in the said outer shell or valve member 24 for the purposes hereinafter more fully set forth. Near the end of the inner valve member 33 whereat the said armature 34 is situated is a cut-away portion 39, and extending into the same is a tongue or angle-piece 40, which is secured to the squared head or flanged portion 25 of the said outer shell or valve member 24 by means of suitable bolts 41 or in any other convenient manner. The purpose of this tongue or angle-piece 40 is to limit the reciprocatory sliding movements of the inner valve member 33 within the outer shell or valve member 24 when actuated in the manner to be presently described. At the oppo-



site end of the said inner valve member 33 is another cut-away portion or opening 42, and extending into the same is the free end 43 of a suitable spring 44, the opposite end of which is rigidly secured to a stud 46 by means of a washer 47 and a nut 48, the said stud 46 being screwed into a receiving-socket 49 upon the cylinder-block 16. When these parts are in their normal initial positions, (indicated in Figs. 2 and 4,) then the spring 44 assumes the position shown in said drawings; but as soon as the armature 34 is attracted in the manner to be presently described, by an electromagnet, the lateral movement of the valve member from left to right sufficiently distorts said spring that when said magnet releases said armature 34 the distorted end of the spring immediately causes the return of the said valve member to its normal initial position.

Into the open end of the chamber 35 is screwed or is otherwise connected therewith the one end of a nipple or connection 50, with the opposite end of which is connected a suitable pipe or duct 51, leading from a compressed-air supply, which, however, is not shown in the accompanying drawings.

Referring now more particularly to Fig. 5 of the drawings, it will be noticed that attached to one side of the cylinder-block 16, by means of screws 52 or in any other manner, is a cup-shaped or chambered member 53, closed at one end and having its opposite open end connected by an opening 54 in the said cylinder-block 16 with the bore of piston-chamber 32. The purpose of this device is intended to provide an air-cushion, so that the quick descent or fall of the plunger or piston 21 will be checked, and thus do away with any danger of injury to the parts by reason of the pounding of the said plunger or piston 21 upon the upper surface of the outer shell of valve member 24.

Secured in an operative manner to the squared or flanged portion 25 of the outer shell or valve member 24, by means of a bracket 55 or in any other suitable manner, are a pair of electromagnets 56, and upon the rear end portion 57 of the bracket 55 is secured a resistance-box 58 of any well-known form or construction, which is provided with a suitable switch 60 and electrical contacts or connections 59.

Having thus described the mechanical construction of my novel attachment for carving or engraving machines, it remains to describe the electric circuit by means of which the mechanism sare put in operation. Referring, therefore, more particularly to Figs. 1 and 3 of the drawings, the reference character 61 indicates any well-known form of electric battery; but it will be understood that any source of electrical generation may be used.

Hence I do not limit myself to the use of this particular form of electrical supply. Be-

ginning with the positive pole 62 of the said battery 61, the course of the electric current is into and through the wire 63 and into the binding-post 64 of the switch 60, thence through one of the electrical contacts 59 and through the resistance-box 58 into the binding-post 66, and then through the wire 67 into the electromagnets 56, the wire 68 issuing from the electromagnets 56 being connected with the binding-post 69 on the templet or pattern holding or supporting table of the machine or any other convenient portion of the machine, thereby charging the said table and templet or pattern thereon with the electric current. The electrical contact is made when the tracer 6 touches the charged surface of the templet or pattern, and the current then proceeds through the tracer 6 into the wire 70, connected therewith and which leads back into the south pole 71 of the battery 61 or other source of electrical energy.

It now remains to describe the operation of the parts and devices hereinbefore set forth. When the templet or pattern is fixed in its place upon the templet-holding table, the force of gravity brings the tracer 6 down until it touches upon the surface of said templet or pattern. The machine is then set in operation and the templet-holding table moves, carrying the templet or pattern forward beneath the tracer, and the carving-tool 7 does its work. At the same time that the tracer touches the templet electrical contact is made and a complete electric circuit is established, which sets in operation, in the manner to be presently set forth, the pneumatic or compressed-air controlling device, which assists the lifting mechanism during the movements of the tracer over the ornamented surface of the templet. Immediately the electromagnets 56 attract the armature 34 and cause the inner valve member 33 to slide forward until the slot, port, or opening 36 in the said inner valve member is brought directly beneath the slot, port, or opening in the outer shell or valve member 34, and immediately the compressed air which is taken into the chamber 35 passes through the duct thus provided into the bore or piston-chamber 32 of the cylinder-block 16. This causes the piston or plunger 19 to rise, the upward movement thereof being communicated, through the connecting-rod 21, to the lever arm or bar 13 and thence to the tool-carriers 4 and 5 thereon. It will therefore be seen that the tracer 6 will continue to rise as long as the electrical contact is maintained and the flow of compressed air continues to enter the bore or piston-chamber 32 of the cylinder-block 16. As soon as the tracer reaches the highest point in the pattern or templet it is lifted off, owing to the continued upward pressure of the air upon the under surface of the plunger or piston 19 within the cylinder-block 16, resulting in immedi-



ately breaking or interrupting the complete electrical circuit, and thereby releasing the armature from its held relation with the electromagnets. The spring 44 then acts to return the inner valve member 33 to its normal initial position, thus shutting off the supply of compressed air. The air contained in the cylinder or piston-chamber 32 escapes through the slot, port, or opening 31 into the grooved or channeled portion 37 and thence through the opening 38 into the air, all of which will be clearly evident from an inspection of the several figures of the drawings. From an inspection of Figs. 4 and 5 of the drawings it will be clearly understood that the exhaust-port formed by the parts 31 and 37 is always open, the grooved or channeled portion 37 extending under the opening or port 31 in such a manner that when the air-intake, consisting of the opening 30 and the parts 35 and 36, has been opened the air which enters the piston-chamber 32, being under pressure, enters said chamber more rapidly than it can escape through the exhaust-port, so that the piston will be raised notwithstanding the fact that the exhaust-port is open. The piston or plunger 19 and the lever arm or bar 13, as well as the tool-carriers 4 and 5, are then no longer supported by the lifting mechanism and will descend by reason of the force of gravity. It will be understood that as soon as the depressions in the templet or pattern are reached the surface of the said templet or pattern is being constantly withdrawn from the tracer 6, so that the electrical contact is continually being broken until the lowest point in the depressed surface of the templet or pattern is reached. Hence the tracer continues to gradually descend until the surface of the templet or pattern again begins to slope upward, whereupon a continuous electrical contact is again established as the surface of the templet or pattern is forced against the point of the tracer, and the hereinabove-described operation of assisting the ascending movements of the tracer is again repeated.

For the purpose of raising the tool-carriers 4 and 5 and their respective tools to give the operator an opportunity to examine the work or for any other purposes an ordinary hand-lever 72 may be employed, the same being fulcrumed at 73 and being provided with a connecting-rod 74 at one end, said connecting-rod 74 communicating the movement of the hand-lever 72 to the lever arm or bar 13 and raising the same to the point desired.

It will thus be understood that I have produced in connection with an engraving or carving machine a novel means for assisting and controlling the movements of the tracer-tool over the templet or pattern which is absolutely positive in its action and which operates automatically, so as to require no

attention on the part of the operator of the machine, and which at the same time is so sensitive that the most fragile templet or pattern may be used without risk of injury.

Having thus described my invention, what I claim is—

1. The combination, with an engraving or carving machine provided with a vertically-movable tracer and a tool-carrying lever-arm, of a pneumatic means for assisting the ascending movements of the tracer, consisting, essentially, of a cylinder and a piston or plunger therein, a connecting-rod between the tool-carrying lever-arm and the said piston or plunger, and a valve for automatically operating the said pneumatic means consisting of an outer shell or valve member communicating with the said cylinder, said outer shell or valve member having a port or air-passage for the entrance of the air into the cylinder and an air-exhaust passage to permit an exhaust of the air from the cylinder, an inner valve member slidably arranged within the said outer shell or valve member, said inner valve member being provided with an air-receiving chamber and having an air passage or port which when introduced beneath the said air passage or port in the outer shell or valve member opens into the said cylinder, said inner valve member being also provided with a channel for conducting the exhaust-air from the said cylinder, and means for operating said inner valve member, substantially as and for the purposes set forth.

2. The combination, with an engraving or carving machine provided with a vertically-movable tracer and a tool-carrying lever-arm, of a pneumatic means for assisting the ascending movements of the tracer and tool consisting, essentially, of a cylinder and a piston or plunger therein, a connecting-rod between the tool-carrying lever-arm and the said piston or plunger, and a valve for automatically operating the said pneumatic means consisting of an outer shell or valve member communicating with the said cylinder, said outer shell or valve member having a port or air-passage for the entrance of the air into the cylinder and an air-exhaust to permit an exhaust of the air from the cylinder, an inner valve member slidably arranged within the said outer shell or valve member, said inner valve member being provided with an air-receiving chamber, and having an air passage or port which when introduced beneath the said air passage or port in the outer shell or valve member opens into the said cylinder, said inner valve member being also provided with a channel for conducting the exhaust-air from the said cylinder, and means for operating said inner valve member, consisting of an armature and an electric circuit connected with the machine-frame and templet, and with the



tracer, a pair of electromagnets, a resistance box or rheostat, a source of electrical generation in said electric circuit, and a spring in engagement with said inner valve member  
5 for returning the said inner valve member to its normal initial position, substantially as and for the purposes set forth.

3. The combination, with an engraving or carving machine provided with a tool-carry-  
10 ing lever - arm, and a vertically - movable tracer of a pneumatic means for assisting the ascending movements of the tracer and tool, consisting, essentially, of a cylinder and a piston or plunger therein, a connecting-rod be-  
15 tween the tool-carrying lever-arm and the said piston or plunger, said pneumatic means having an air-chamber adjacent to the lower end of said cylinder, a passage leading from said cylinder into said air-chamber, the said  
20 air-chamber forming an air-cushion at the bottom of said cylinder, and a valve for automatically operating the said pneumatic means, substantially as and for the purposes set forth.

4. The combination, with an engraving or carving machine provided with a tool-carry-  
25 ing lever - arm, and a vertically - movable tracer of a pneumatic means for assisting the ascending movements of the tracer and tool, consisting, essentially, of a cylinder and piston or plunger therein, a connecting-rod be-  
30 tween the tool-carrying lever-arm and the said piston or plunger, said pneumatic means having an air-chamber adjacent to the lower end of said cylinder, a passage leading from said cylinder into said air-chamber, the said  
35 air-chamber forming an air-cushion at the bottom of said cylinder, and a valve for automatically operating the said pneumatic means consisting of an outer shell or valve  
40 member communicating with the said cylinder, said outer shell or valve member having a port or air-passage for the entrance of the air into the cylinder and an exhaust-passage  
45 to permit an exhaust of the air from the cylinder, an inner valve member slidably arranged within the said outer shell or valve member, said inner valve member being provided with an air-receiving chamber and hav-  
50 ing an air passage or port which when introduced beneath the said air passage or port in the outer shell or valve member opens into the said cylinder, said inner valve member be-

ing also provided with a channel for conducting the exhaust-air from the said cylinder, 55 and means for operating said inner valve member, substantially as and for the purposes set forth.

5. The combination, with an engraving or carving machine provided with a tool-carry- 60 ing lever - arm, and a vertically - movable tracer of a pneumatic means for assisting the ascending movements of the tracer and tool, consisting, essentially, of a cylinder and piston or plunger therein, a connecting-rod be- 65 tween the tool-carrying lever-arm and the said piston or plunger, said pneumatic means having an air-chamber adjacent to the lower end of said cylinder, a passage leading from said cylinder into said air-chamber, the said 70 air-chamber forming an air-cushion at the bottom of said cylinder, and a valve for automatically operating the said pneumatic means consisting of an outer shell or valve member communicating with the said cylinder, said 75 outer shell or valve member having a port or air-passage for the entrance of the air into the cylinder and an exhaust-passage to permit an exhaust of the air from the cylinder, an inner valve member slidably arranged within 80 the said outer shell or valve member, said inner valve member being provided with an air-receiving chamber and having an air passage or port which when introduced beneath the said air passage or port in the outer shell 85 or valve member opens into the said cylinder, said inner valve member being also provided with a channel for conducting the exhaust-air from the said cylinder, and means for operating said inner valve member, consisting of an 90 armature and an electric circuit connected with the machine-frame and templet and with the tracer, a pair of electromagnets, a resistance box or rheostat, a source of electrical generation in said electric circuit, and a 95 spring in engagement with said inner valve member for returning the said inner valve member to its normal initial position, substantially as and for the purposes set forth.

In testimony that I claim the invention set 100 forth above I have hereunto set my hand this 13th day of September, 1904.

HONESTUS M. ALBEE.

Witnesses:

FREDK. C. FRAENTZEL,  
GEO. D. RICHARDS.