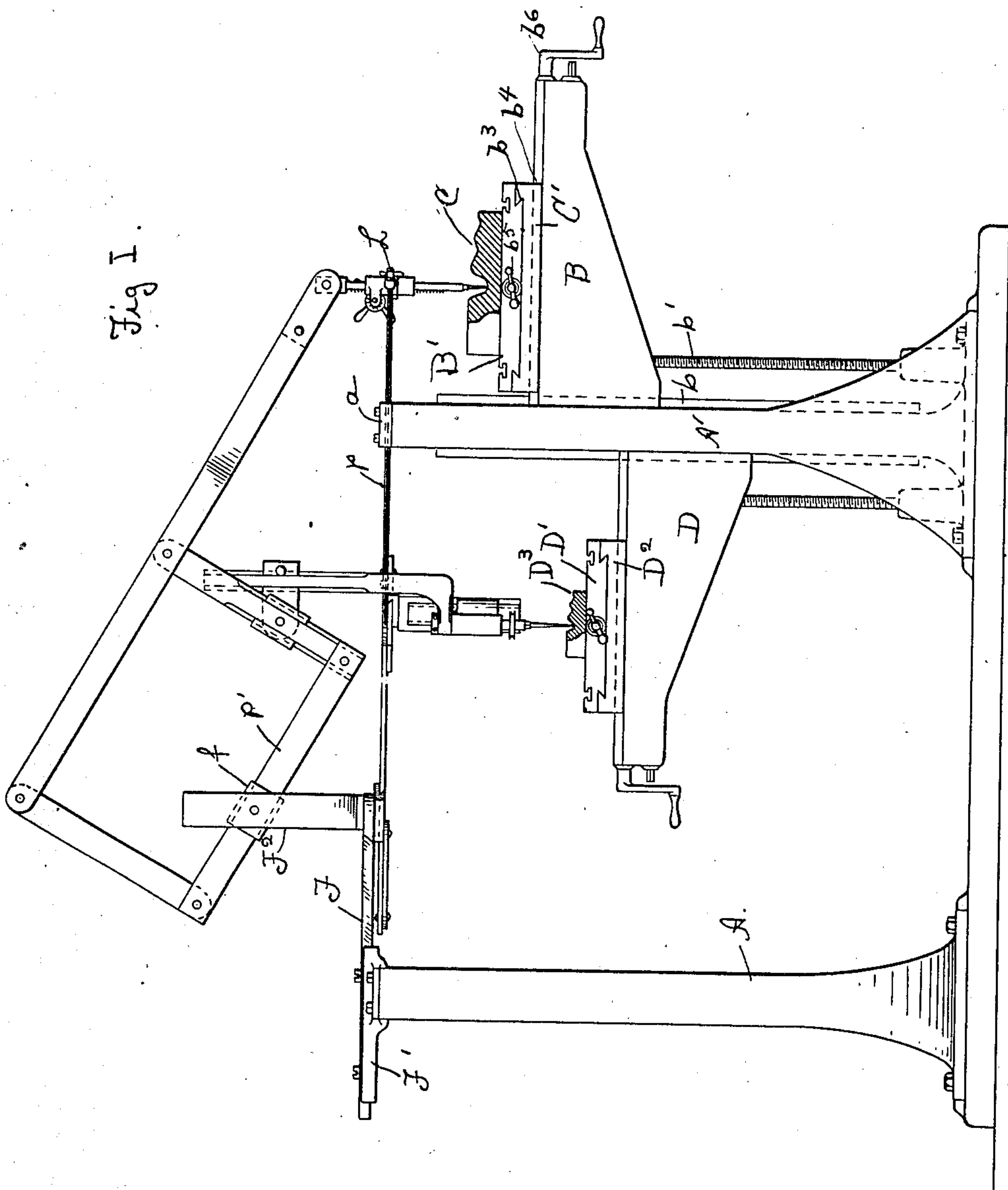


No. 885,428.

PATENTED APR. 21, 1908.

W. E. BRIERLEY.
ENGRAVING MACHINE.
APPLICATION FILED AUG. 23, 1905.

3 SHEETS—SHEET 1.



Witnesses:

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E. B. Drummell.

Inventor.

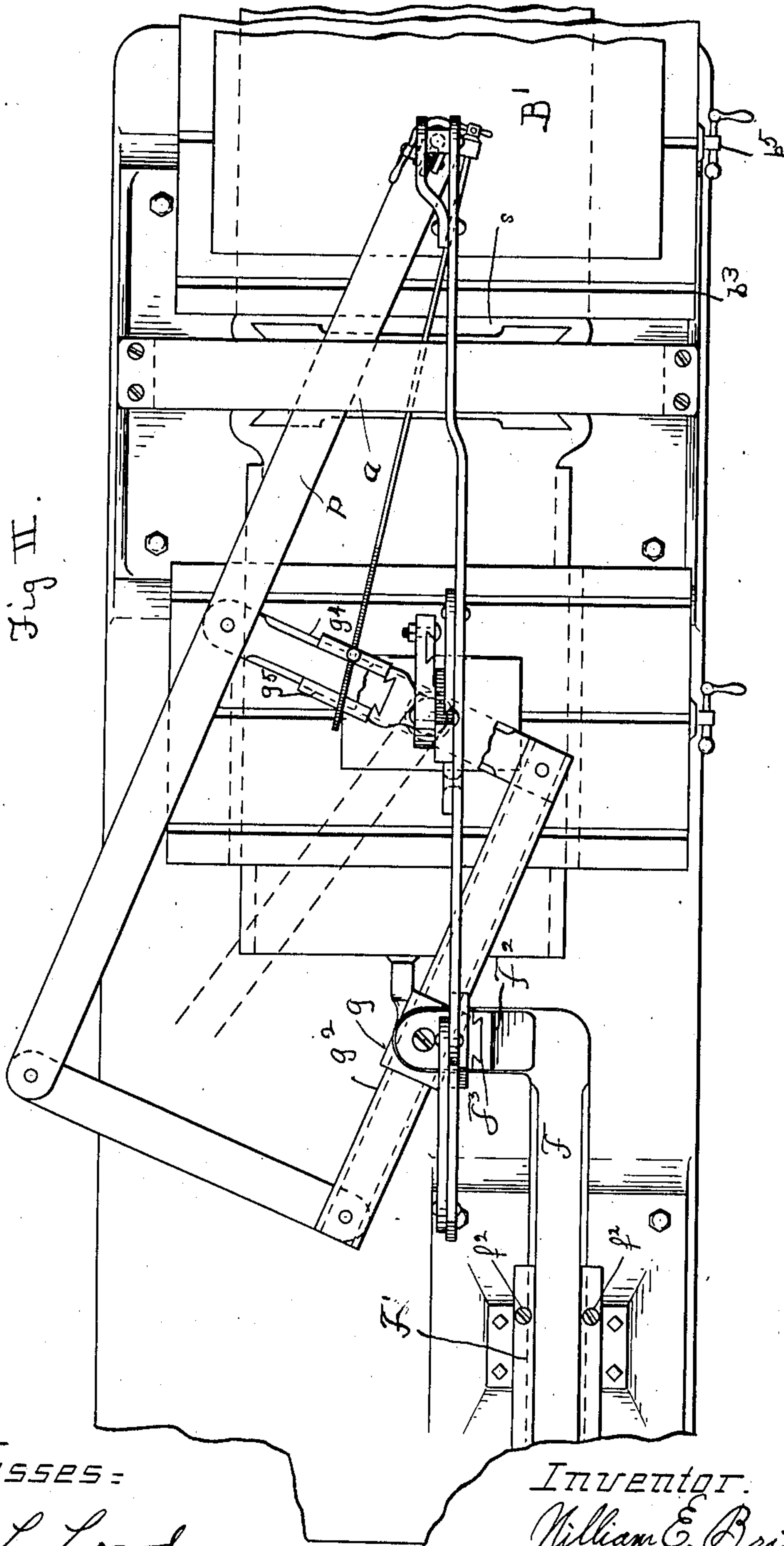
William E. Brierley.
by
J. E. Donnelly
his ATTORNEY.

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Witnesses:

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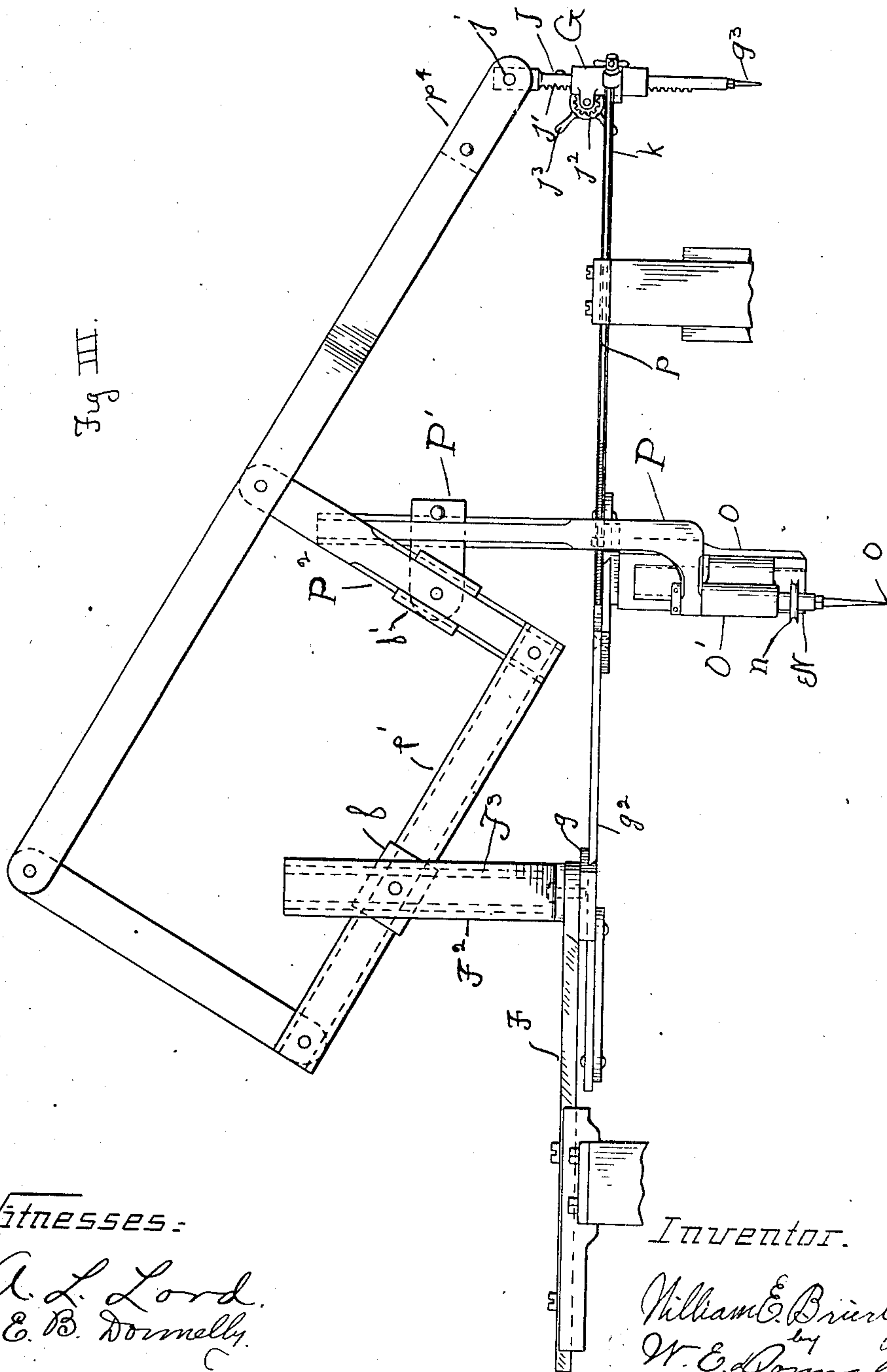
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3 SHEETS-SHEET 3.



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UNITED STATES PATENT OFFICE.

WILLIAM E. BRIERLEY, OF CLEVELAND, OHIO.

ENGRAVING-MACHINE.

No. 885,428.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed August 23, 1905. Serial No. 275,468.

To all whom it may concern:

Be it known that I, WILLIAM E. BRIERLEY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Engraving-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 pertains to make and use the same.

My invention relates to engraving machines, adapted for engravings of all kinds, such as letters, designs and dies, and has for its object the accurate and simple operation and construction which by the employment of a pattern a facsimile of the design may be obtained in all of its lines and facets and be so obtained in increased or decreased size by the employment of a stylus and a carving or cutting tool.

My invention also consists in the employment and combination in the engraving machine of co-acting pantographs arranged in relation to each other at an angle so as to co-act and follow the lines and depressions of the pattern and impart the same design in increased or diminished size to a die or other article.

My invention also consists in the general design and operation of the machine and means for adjusting the parts thereof as will be hereinafter fully set forth and claimed.

In the drawings Figure I is a view in side elevation of a machine embodying my invention; illustrating the machine with the pattern and with the article to be operated upon in position. Fig. II is a top plan view of the machine as constructed according to the design shown in Fig. I. Fig. III is an enlarged, detached, view in side elevation of the pantographs showing their relation, construction and coöperation more clearly.

The standards A and A', of the machine, act as supports for the machine. A' being the main support for the platens or tables, to which the pattern and the article to be cut, are secured. The platen or table B is designed to receive and hold the pattern and is made adjustable in a vertical direction through slide ways b, and adjusting screw b', and the slides B', C' are adjustable in directions at right angles in horizontal planes by means of slide ways b³ and b⁴ respectively and adjusting screws b⁵ and b⁶. The pattern

C is adjusted on the upper slide B' and secured thereto in any suitable manner. The platen or table D is also adjustable in the same manner as platen B, and the slides D' and D² are likewise adjustable as the slides B', C' respectively, and the slide D' is adapted to hold the article, D³, to be operated upon.

At the upper end of the standard A' a slideway a receives the arm p of the horizontal pantograph, allowing free action of the same, but also keeps the arm p in horizontal position while it moves or is being moved during the operation of the machine.

At the rear end, slidably mounted upon the standard A, is secured a slide F, mounted in a slideway F', thus being adjustable forwardly and backwardly in relation to the forward part of the machinery. The slide F is provided with a standard F² (see Figs. I and III) extending upward from said slide, F, provided in turn with a sliding block f, pivotally attached thereon. This slide F is provided with means, such as screws f² for tightening it in its predetermined position, after it has been adjusted; and the standard F² may also be provided with slideways F³, to allow of the vertical adjustment of the sliding block f. It is by this means, namely, the slide F the standard F² and the pivoted sliding block f that the vertical pantograph is sustained; the arm p' of the pantograph engaging the slides in the sliding block, f. The arm, g², of the horizontal pantograph is both pivotally and slidably secured within the slide block g, (see Fig. II). Thus it will be seen that the blocks f and g form adjustable fulcrums for the horizontal and vertical pantograph, said fulcrums being at right angles or in other words, at an angle of 90 degrees to each other.

The tracer holding mechanism, J, is pivotally secured to an extending arm p⁴ of the vertical pantograph as at j, thus allowing the tracer to be raised and lowered according to the depressions or elevations of the pattern, and for this purpose I have illustrated a holder J as being mounted within the slide journal G and being provided with a rack j' which engages with the pinion j² operated by a hand wheel j³. The slide journal G is in turn mounted on the extending arm p of the horizontal pantograph; this causes the horizontal and vertical pantograph at all parts to move in unison so as to allow the tracer g³ to follow the elevations and depressions to

a greater or less degree. The cutter *o* being adjustably mounted upon the slide plate *O* which in turn is carried in a horizontal direction by the arm *g*⁴ through the sliding block *g*⁵.

5 The tool holder *N* is provided with a pulley *n* whereby it is operated and the cutting tool *o* is attached to the tool holder by means of a chuck or other suitable means inasmuch as these tools may be of different sizes and
10 shapes. This is also the case in the tracer *g*³ and its attachment to the holder *J*. The cutter holder *N* is mounted in a vertical slide journal *O'* which slides upon the sliding plate *O* in a vertical direction, an arm *P* is secured
15 to the journal so as to raise and lower it and with it the tool *o* inasmuch as the arm *P* is connected through an adjustable block *P'* which in turn is pivotally connected to the sliding block *f'*, which slides upon the arm *P*²
20 of the vertical pantograph. The motion of the vertical pantograph imparts to the arm *P*², according to the adjustment of the block *f'* on said arm *P*², vertical motion through the block *P'* of the arm *P* which in turn is im-
25 parted to the journal *O'*, tool holder *N* and tool *o*. The extent of this vertical motion being governed by the adjustment of the block *P'* on the arm *P* and thus the vertical operation of the tool *o* is controlled by the
30 vertical movement of the tracer *g*³ working with the arm *P* of the pantograph.

It will be seen from the above that in the first place the horizontal and vertical pantographs being arranged at an angle of 90 de-
35 grees, in relation to each other, and being both connected to the tracing mechanism and cutting mechanism, and so connected that according to the adjustment of the cutting mechanism in relation to both panto-
40 graphs, the complete reproduction, in counterpart, both as to detail, alinement and clearness is obtained by operating the tracing tool *g*³, over and in contact with the surface of the
45 pantograph.

When the work is large, the tool and tracer *g*³ may be formed for roughing-out work, and finer tools be employed in the subsequent treatment.

Both the pantographs work together at the
50 tracing point in a horizontal sweep, whether this sweep be curved or straight and hence both pantographs at the tracing point, move together and in unison, the vertical pantograph taking care of the elevations and de-
55 pressions as the tracer works over the surface; and the horizontal pantograph determining the alinement and design of the elevations and depressions.

It will be noticed by the construction of a
60 machine made according to the drawings as above set forth, it renders a machine capable of reproducing any and all designs either of a flat, curved, or regular surface or formed angular to their base. The engraving can be
65 accomplished by this machine as can also a

more crude or rough kind; this being determined by the tools employed and the fineness of the design pattern *C*.

It will be noticed that the pattern piece *C* can be formed of plastic material which is
70 subsequently dried, or can be molded or engraved, and that it will subserve the purpose of a pattern for the reproduction of any required number of the articles *D*². As a
75 matter of fact the pattern piece may be formed of any suitable material over which the tracing tool *g*³ will pass and that the design of the same may be formed in any suitable manner. The cutting tool holder *N* is
80 revolved by suitable belts illustrated in dotted lines in Fig. II from any source or power; these cutting tools being formed with milling parts or surfaces of the proper contour according to the surface.

What I claim is:

1. An engraving machine comprising two
85 pantographs, located and operating at right angles to each other, each having an adjustable fulcrum, said fulcrums being in vertical alinement, said fulcrums comprising
90 sliding blocks, pivotally secured for the purpose set forth.

2. The combination in an engraving machine of two pantographs, having a
95 pivotal and adjustable connection with each other, a tracer holder adjustably connected with the said pantographs, and a tool holder, adjustably connected with said pantographs, to control the adjustment of the tracer
100 holder, and tool holder, to varying surfaces, and to positively control the relative motion of the tracer and tool holder, and to control the ratio of adjustment, also to control the adjustment after the ratio has been set to a
105 desired adjustment.

3. In an engraving machine the combination of two pantographs operating at different angles, said pantographs being pivotally
110 connected through adjustable clamps to a common pivotal member, a tracer holder carried on the pantographs and having an adjustable connection with said pantographs, a tool holder also carried by said
115 pantographs, and having an adjustable connection with said pantographs.

4. The combination in an engraving machine of a frame, or bed, for the machine, having a retaining arm, a pantograph having
120 an adjustable connection with the said arm, and an auxiliary pantograph, having an adjustable connection to the said arm, a tool holder, and a tracer holder, carried by the said pantographs, an adjustable work holder carried by the bed of the machine, and an adjustable pattern holder, carried by the bed of
125 the machine.

5. The combination in an engraving machine of a frame for the machine, an adjustable slide, carried by the frame, and a vertical
130 pantograph having an adjustable pivotal

connection with the said slide, and a horizontal pantograph having an adjustable pivotal connection with said slide, a tool holder carried by the said pantographs, and a tracer holder, carried by the said pantographs, an adjustable work holder, carried by the frame of the machine, and an adjustable pattern holder carried by the frame of the machine.

6. An engraving machine having a retaining bed, or frame, for the machine, an adjustable primary slide carried on the bed of the machine, an adjustable slide, carried on the primary slide, an adjustable work holder, carried on the auxiliary slide, an adjustable pattern slide, carried on the frame of the machine, an auxiliary pattern slide carried on the primary pattern slide, an adjustable pattern holder carried on the auxiliary pattern slide, a vertical pantograph having an adjustable pivotal connection with the bed of the said machine, a horizontal pantograph having an adjustable pivotal connection with the bed of the said machine and a tool holder, and a tracer holder, carried by the said pantographs.

7. The combination in an engraving machine comprising two pantographs operating at different angles to each other of a bed or frame for the machine, an adjustable work holder carried on the bed of the machine, an adjustable pattern holder carried on the bed of the machine, the said machine bed having a slot or guide-way to permit and control the movement of the pantographs, a horizontal pantograph adjustably hinged to the said machine bed and movable in the said guide-way, an auxiliary vertical pantograph adjustably hinged to the horizontal pantograph, and a tool holder, and tracer holder carried by the said pantographs.

8. The combination in an engraving machine of a machine bed or frame having a guide-way for an adjustable work holder, an adjustable work holder carried in the said

guide-way, the said machine bed having a flange guide-way for engagement of an engraving machine, a slide carried by the said guide-way, a vertical pantograph having an adjustable operative connection with the said slide, an auxiliary pantograph, having an adjustable operative connection with said slide an adjustable tool holder carried by said pantographs, and a tracer holder carried by the said pantographs.

9. The combination in an engraving machine of a vertical pantograph, and a horizontal pantograph, having operative connection with each other, an adjustable tool holder carried on the horizontal pantograph and having a cylindrical part, an arm carried on the vertical pantograph and engaging with the cylindrical part of the tool holder, and permitting a reciprocating movement of the tool holder, and a rotary movement of the arm about the tool holder, and a tracer carried by the pantographs.

10. The combination in an engraving machine of a vertical pantograph, and a horizontal pantograph, and an adjustable operative connection between said pantographs, an adjustable tool bracket having a guide-way for an adjustable tool holder; a tool holder carried in said guide-way; and having a cylindrical part; an adjustable arm carried on said vertical pantograph and engaging with the cylindrical part of the tool holder to permit and control a reciprocating and rotary motion between the tool holder, and the adjustable arm and a tracer holder carried by the said pantograph.

Signed at Cleveland in the county of Cuyahoga and State of Ohio, this 3rd day of August, 1905.

WILLIAM E. BRIERLEY.

Witnesses:

E. B. DONNELLY,
L. C. MARBACH.