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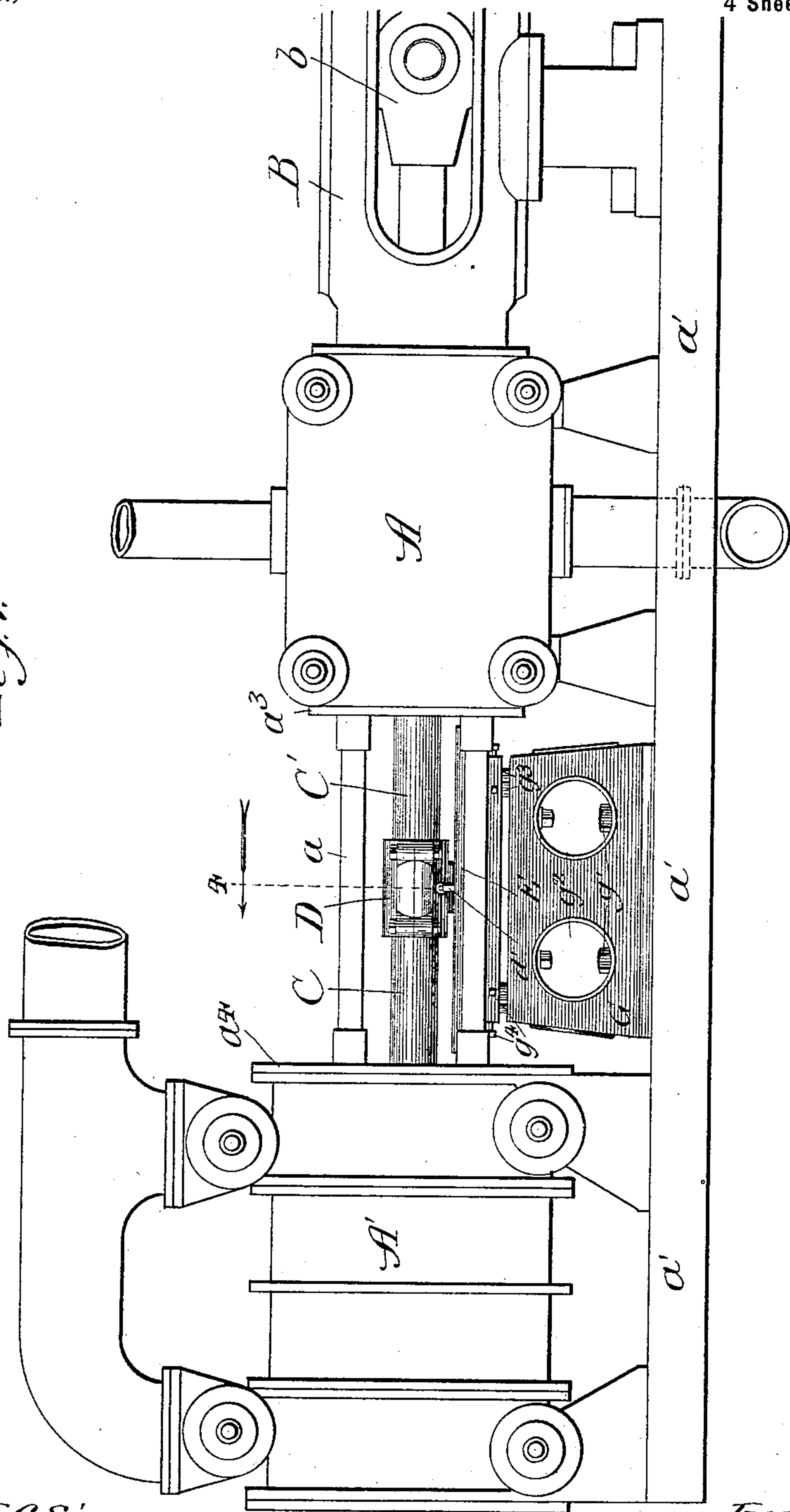
Patented Aug. 15, 1899.

J. R. GEORGE.
ENGINE.

(Application filed Jan. 25, 1899.)

(No Model.)

4 Sheets—Sheet 1.



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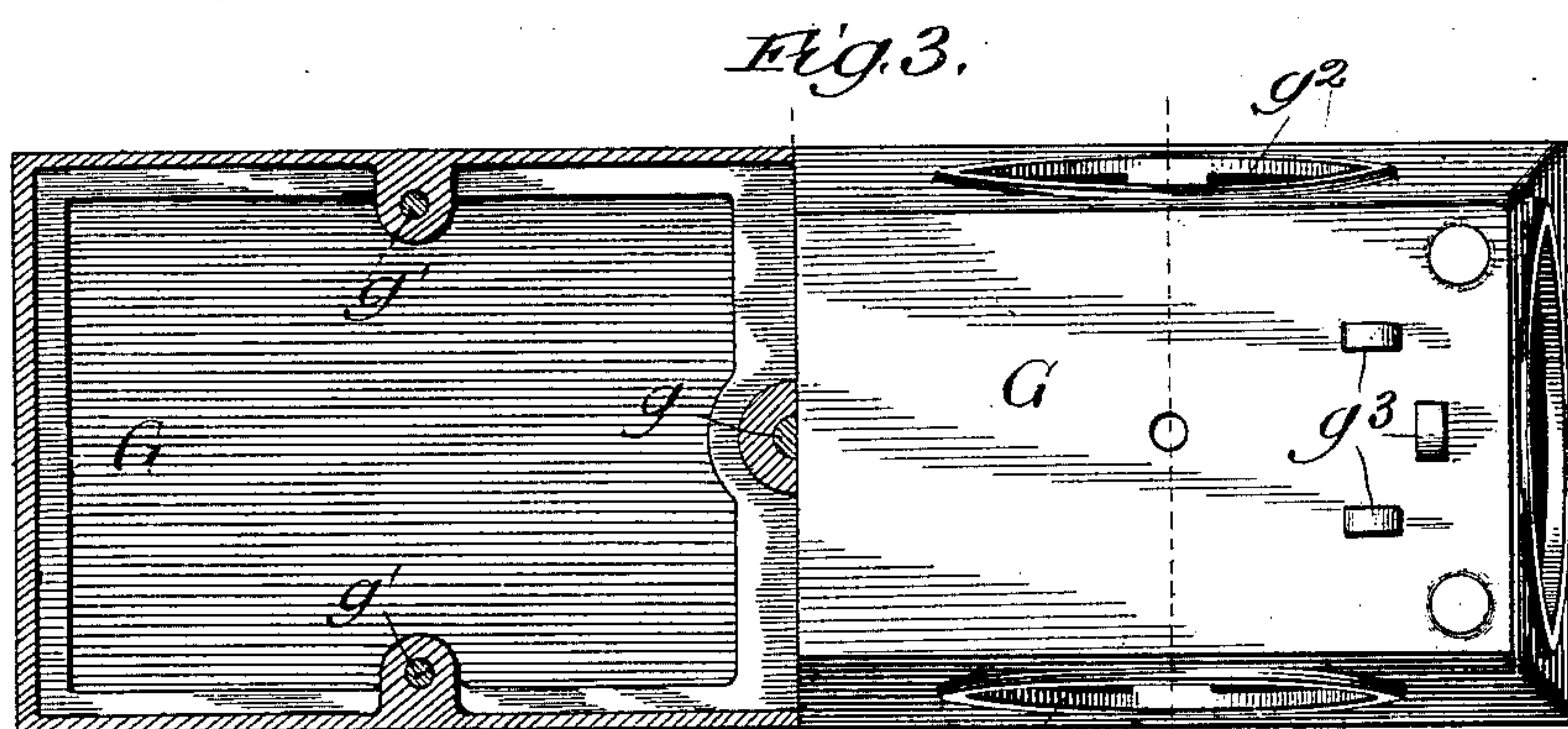
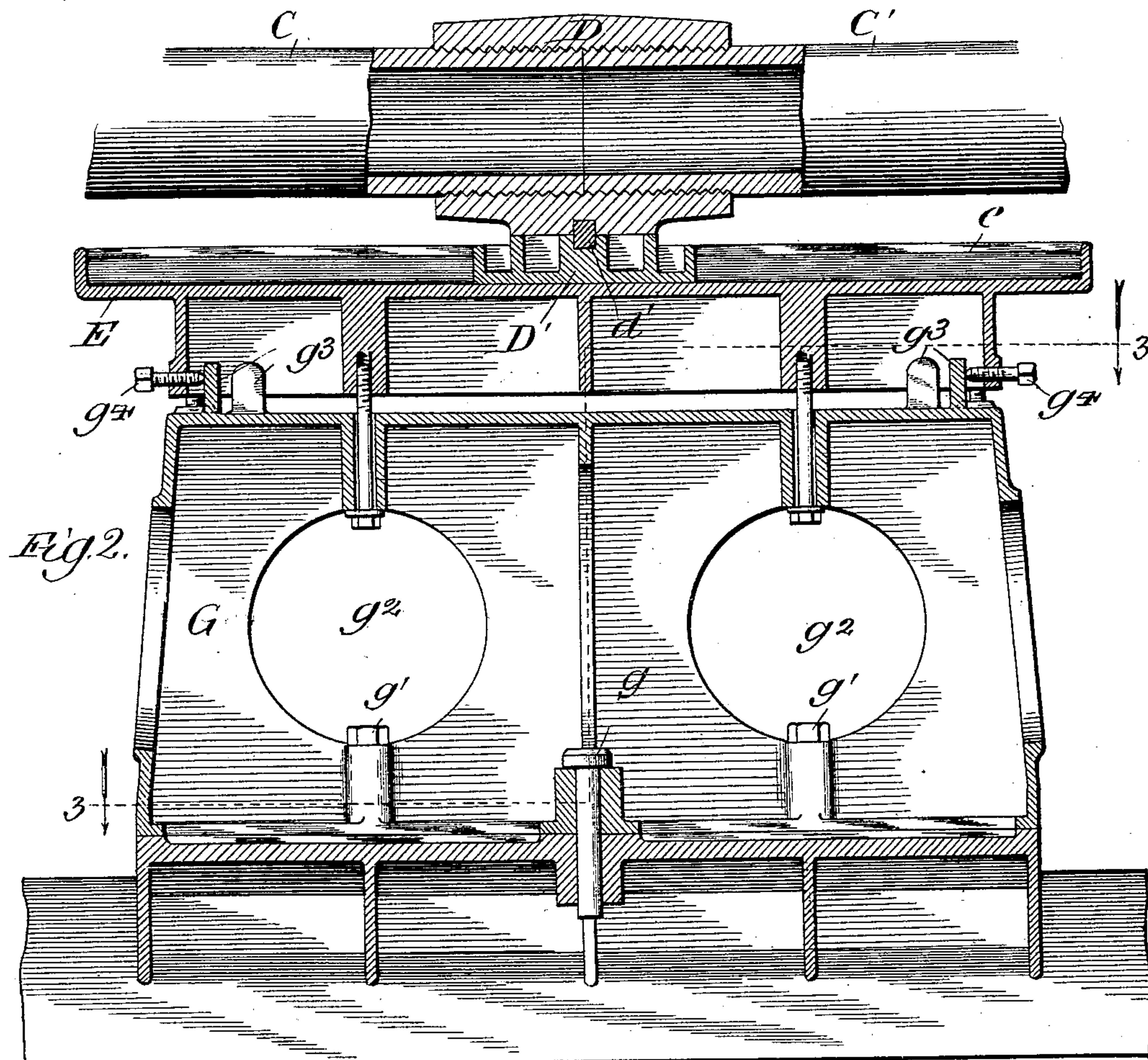
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4 Sheets—Sheet 2.



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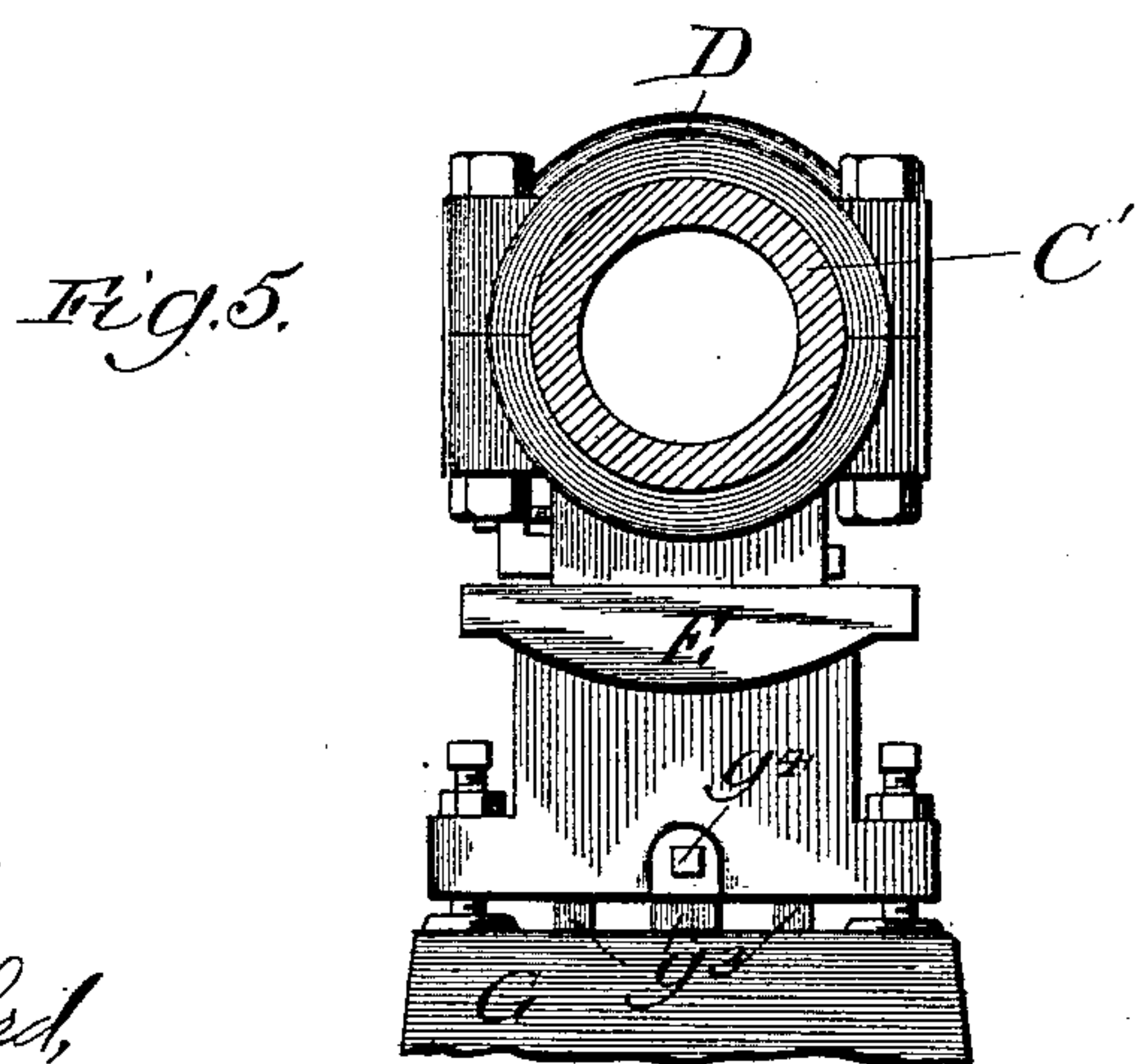
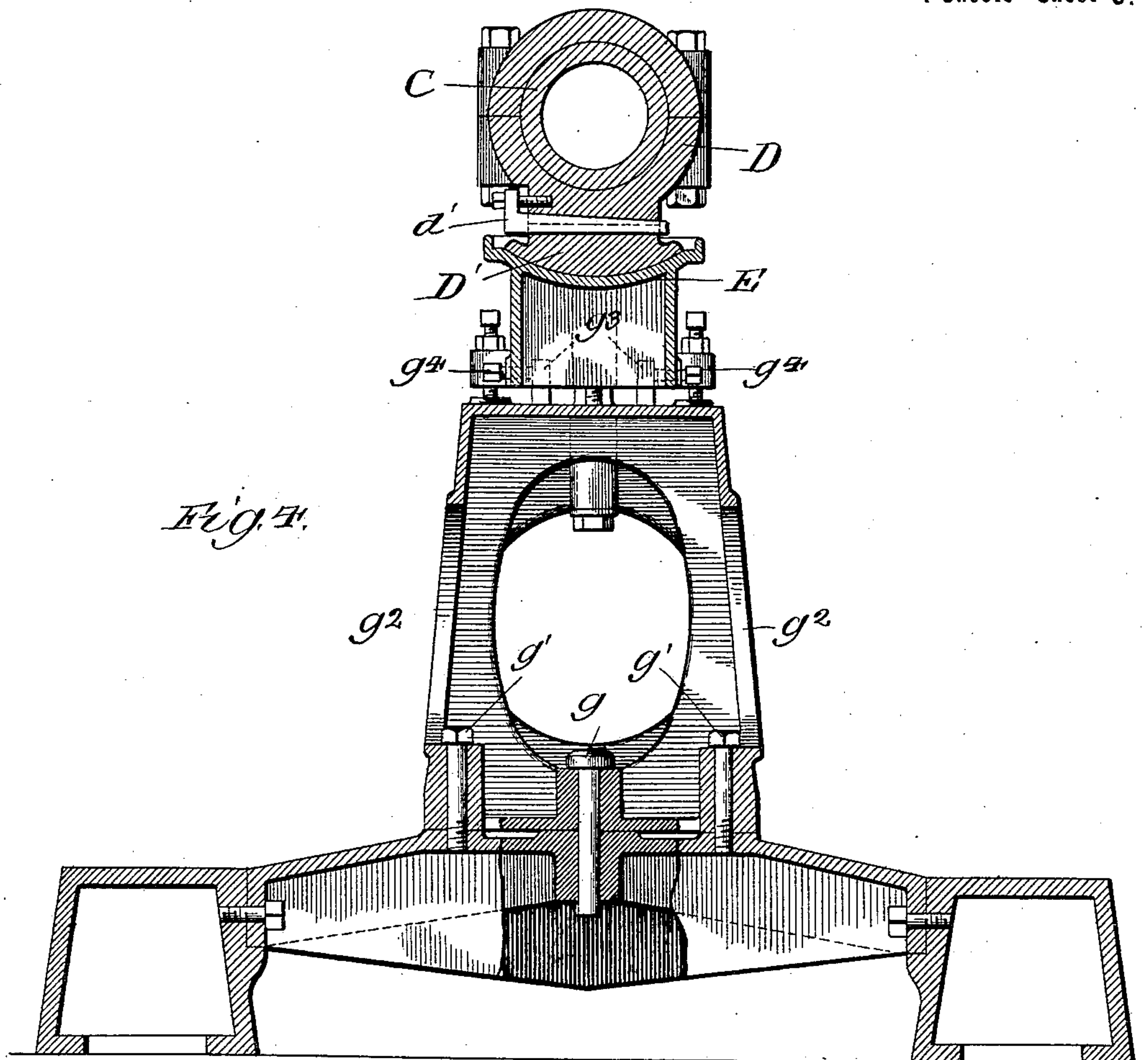
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4 Sheets—Sheet 3.



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No. 630,881.

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4 Sheets—Sheet 4.

Fig. 6.

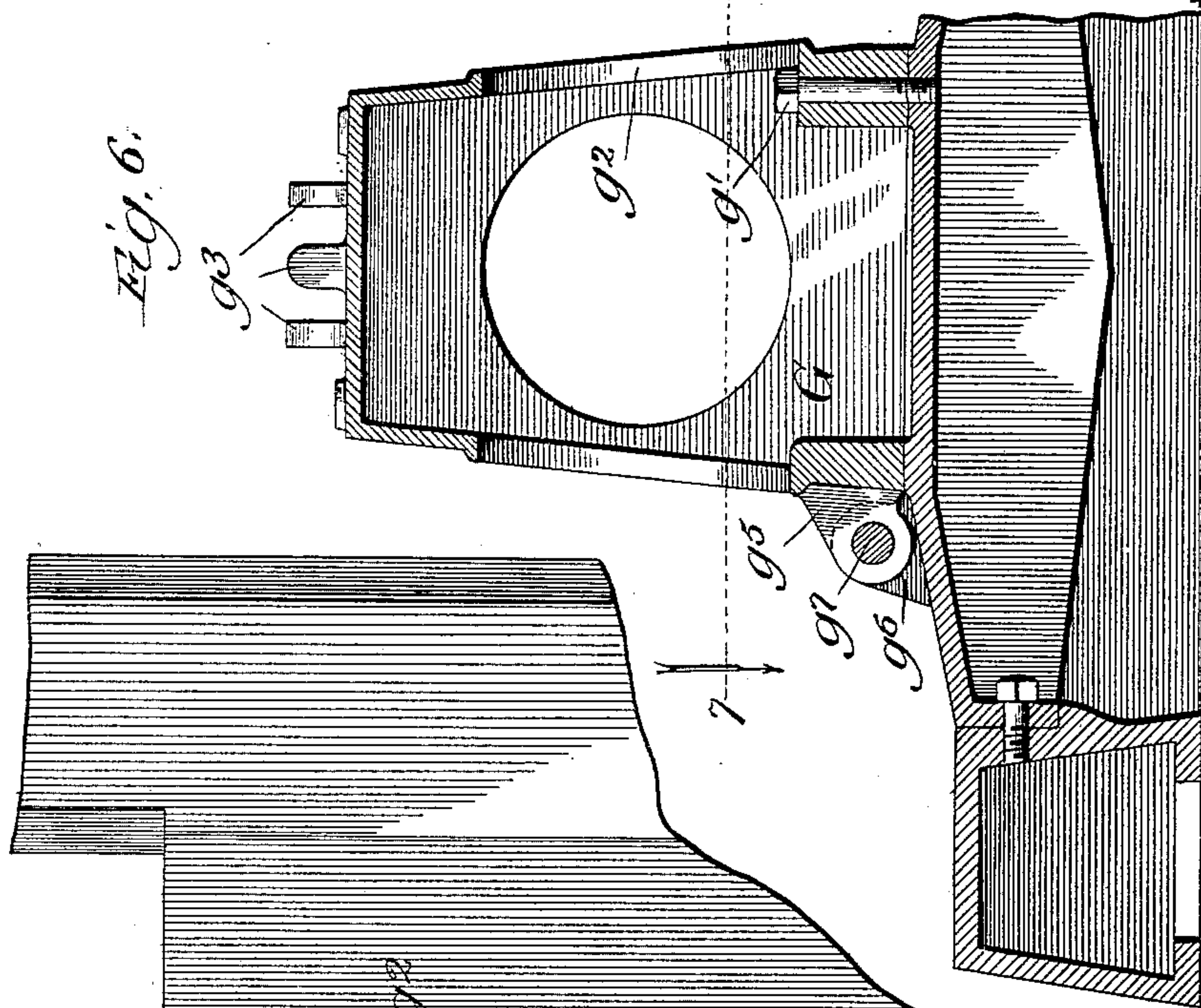
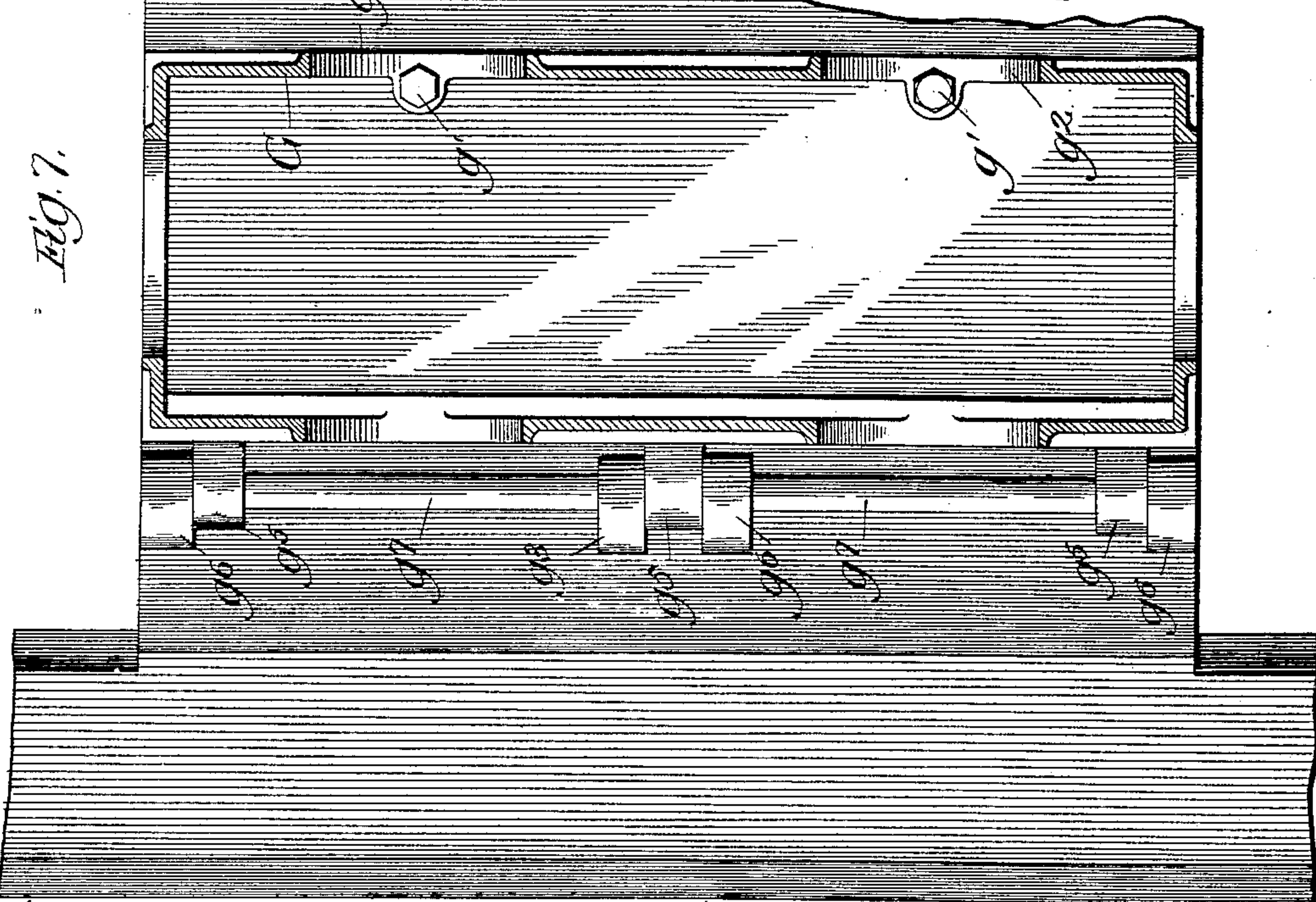


Fig. 7.



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UNITED STATES PATENT OFFICE.

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CHARLES L. MILLER, OF JOLIET, ILLINOIS.

ENGINE.

SPECIFICATION forming part of Letters Patent No. 630,881, dated August 15, 1899.

Application filed January 25, 1899. Serial No. 703,359. (No model.)

To all whom it may concern:

Be it known that I, JEROME R. GEORGE, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Engines, of which the following is a specification.

The invention relates particularly to that class of fluid-pressure engines known as "compound" engines, and especially to the means by which the connecting piston-rod is supported and guided in its movements.

The principal object of the invention is to provide a simple, economical, and efficient compound engine.

A further object of the invention is to provide a simple, economical, and efficient tandem compound engine, with means for supporting and guiding the connecting piston-rod in its movements.

Further objects of the invention will appear from an examination of the drawings and the following description and claims.

The invention consists principally in the combination of high and low pressure cylinders arranged in tandem relation, a reciprocating piston in each cylinder, a piston-rod connecting the high and low pressure pistons together, and a pivoted supporting-block for supporting and guiding the connecting piston-rod in its movements.

The invention consists, further and finally, in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a portion of a compound engine constructed in accordance with my improvements; Fig. 2, a longitudinal sectional elevation of a portion of the connecting-rod and the pivotal guiding and supporting block; Fig. 3, a plan sectional view of a portion of the mechanism, taken on line 3 3 of Fig. 2, looking in the direction of the arrow; Fig. 4, a sectional elevation taken on line 4 4 of Fig. 2; Fig. 5, an end view of the upper portion of the mechanism shown in Fig. 2; Fig. 6, a sectional elevation of a modified form of supporting-block, and Fig. 7 a plan sectional view taken on line 7 of Fig. 6.

In the art to which this invention relates it is well known that the weight of the piston

and piston-rods in compound engines of the tandem type is considerable and that as a consequence such pistons and rods in their movements are apt to wear the bore of the cylinder out of true and the packing of the stuffing-box in such manner that the efficiency of the engine is greatly impaired. In order to overcome this objection, supporting-blocks have been designed for the purpose of relieving the cylinder and metallic packings of the major part of the weight of the movable parts. As a requisite to this class of mechanisms this supporting guiding-block is necessarily large, cumbersome, and heavy, so that when it is desirable or necessary to remove the cylinder-heads for the purpose of repairing the cylinder, piston, or piston-rod the removal of the block is a prerequisite, and as it is large, cumbersome, and heavy its removal involves considerable time and expense.

The principal object of my invention, therefore, is to provide a block which will guide and support the connecting piston-rod in its movements and which is pivotally held in position, so that it may be turned or swung out of position to permit access to the desired parts and returned to its "in" position in minimum time and at a minimum expense, all of which will more fully hereinafter appear.

In illustrating and describing my improvements I have only shown and described so much as is old, in connection with what is new, as will enable those familiar with the art to practice the invention, leaving out of consideration other and well-known mechanisms which if considered here would only tend to confusion and ambiguity.

In constructing an engine in accordance with my improvements I provide a high-pressure cylinder A and a low-pressure cylinder A', arranged in tandem relation and rigidly connected together by means of the stay-bolts *a* and the foundation or base plate *a'*. These fluid-pressure cylinders are provided with the usual admission and exhaust valves, arranged to be operated in any desired or usual manner. The high-pressure cylinder is provided with a cross-head guide B, in which a cross-head *b* is mounted and to which the usual connecting-rod may be secured. Each

of these fluid-pressure cylinders is provided with a movable or reciprocating piston, connected together by a jointed hollow piston-rod which is made in two parts C and C', connected together by means of the coupling-guide D, which, as shown in Fig. 4, is made in two parts -screwed together, and a lower part D', which forms the guide proper and which is connected with the upper part, so as to move therewith, by means of the wedge-shaped key d'. In order to support and guide this connecting piston-rod in its movements, a rectangular or oblong guide-block E is provided, which has a curved channel e therein adapted to receive the guide portion of the coupling. This block is secured so as to practically form a part of the rectangular block G, arranged on the frame-base and pivotally secured thereto by means of a king-bolt g, so that it may be swung at right angles thereto whenever desirable or necessary. By making this supporting-block rectangular or oblong and arranging its longest portion parallel with the cylinder it presents its narrow side when swung at right angles and enables the cylinder-heads a^3 and a^4 to be removed without interfering with the same. To hold this supporting-block rigidly in position, a plurality of cap screws or bolts g' is provided, which may be reached through the openings g^2 in the supporting-block whenever desirable or necessary.

It is oftentimes desirable or necessary to adjust the position of the guiding-block. In order to accomplish this result, the supporting-block is supplied with a number of lugs g^3 and the guiding-block with a number of set-screws g^4 , adapted to bear against these lugs or some part or portion of the supporting-block and adjust the guiding-block to its longitudinal or horizontal position.

From the foregoing it will be seen that whenever it is desirable to get at either cylinder or piston-rod for the purpose of repair all that is necessary is to drive out the wedge-shaped key and remove the guide portion of the coupling. By releasing the cap-screws or bolt g' the supporting and guiding block may be rotated at right angles to its operative position, and thus enable the workmen to remove the cylinder-heads, pistons, and other parts, as may be deemed desirable or necessary.

In Fig. 6 I have shown a modified form of

supporting-block in which the supporting-block and base-plate are provided with a set of lugs g^5 and g^6 , a hinge-rod g^7 being passed through all of the lugs and rigidly secured to one set, thus forming a hinge. When it is desired to get at the parts for the purposes of repair, renewal, or for any other purpose, the "guide-block" as well as the "coupling-guide" are first removed, the cap-screws g' released, and the block swung out of position.

While I have described my invention with more or less minuteness as regards details of construction and arrangement, as being embodied in certain precise forms, and as adapted to specific uses, I do not desire to be limited thereto unduly or any more than is pointed out in the claims. On the contrary, I contemplate all proper uses, changes in form, construction, and arrangement, the omission of immaterial elements, and the substitution of equivalents as circumstances may suggest or necessity render expedient. For instance, my invention may be used in blowing-engines where the blowing or compressing cylinder is in line with the fluid-pressure cylinder, and for that purpose the cylinder A' shown in the drawings might be treated as a blowing-cylinder. It will thus be seen that it can be adapted to that class of engines without in any sense departing from the spirit of the invention.

I claim—

1. In an engine of the class described, the combination of high and low pressure cylinders arranged in tandem relation, a reciprocating piston in each cylinder, a piston-rod connecting both of such pistons together, and a pivoted supporting guiding-block for the connecting piston-rod adapted to be swung into or out of operative position, substantially as described.

2. In an engine of the class described, the combination of high and low pressure cylinders arranged in tandem relation, a reciprocating piston in each cylinder, a piston-rod connecting both of such pistons together, and a pivoted supporting guiding-block for such connecting piston-rod adapted to be swung at right angles into and out of operative position, substantially as described.

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