

(No Model.)

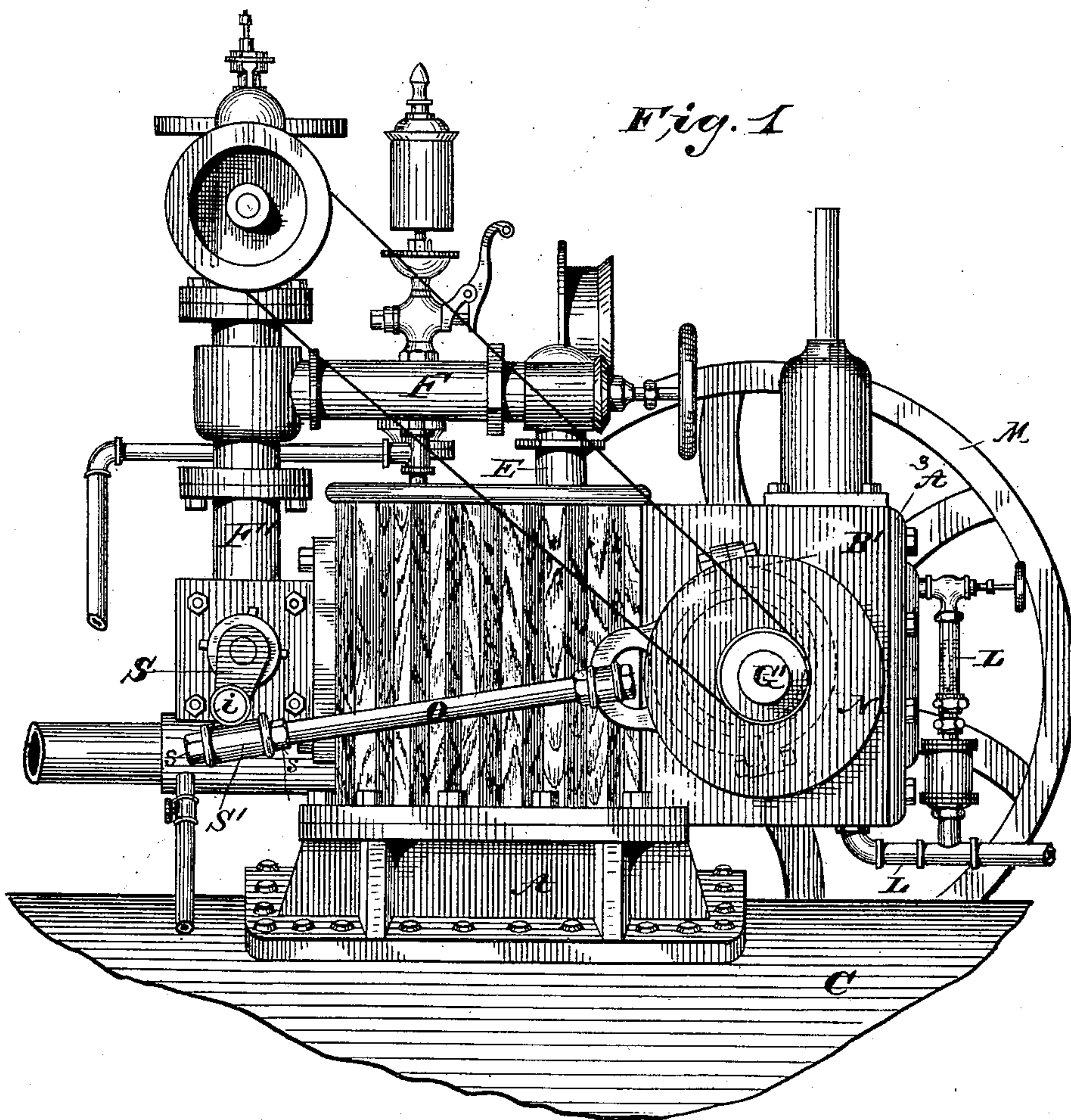
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J. WALRATH.

STEAM ENGINE.

No. 366,440.

Patented July 12, 1887.



Witnesses:

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S. B. Whitaker.

Inventor:

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(No Model.)

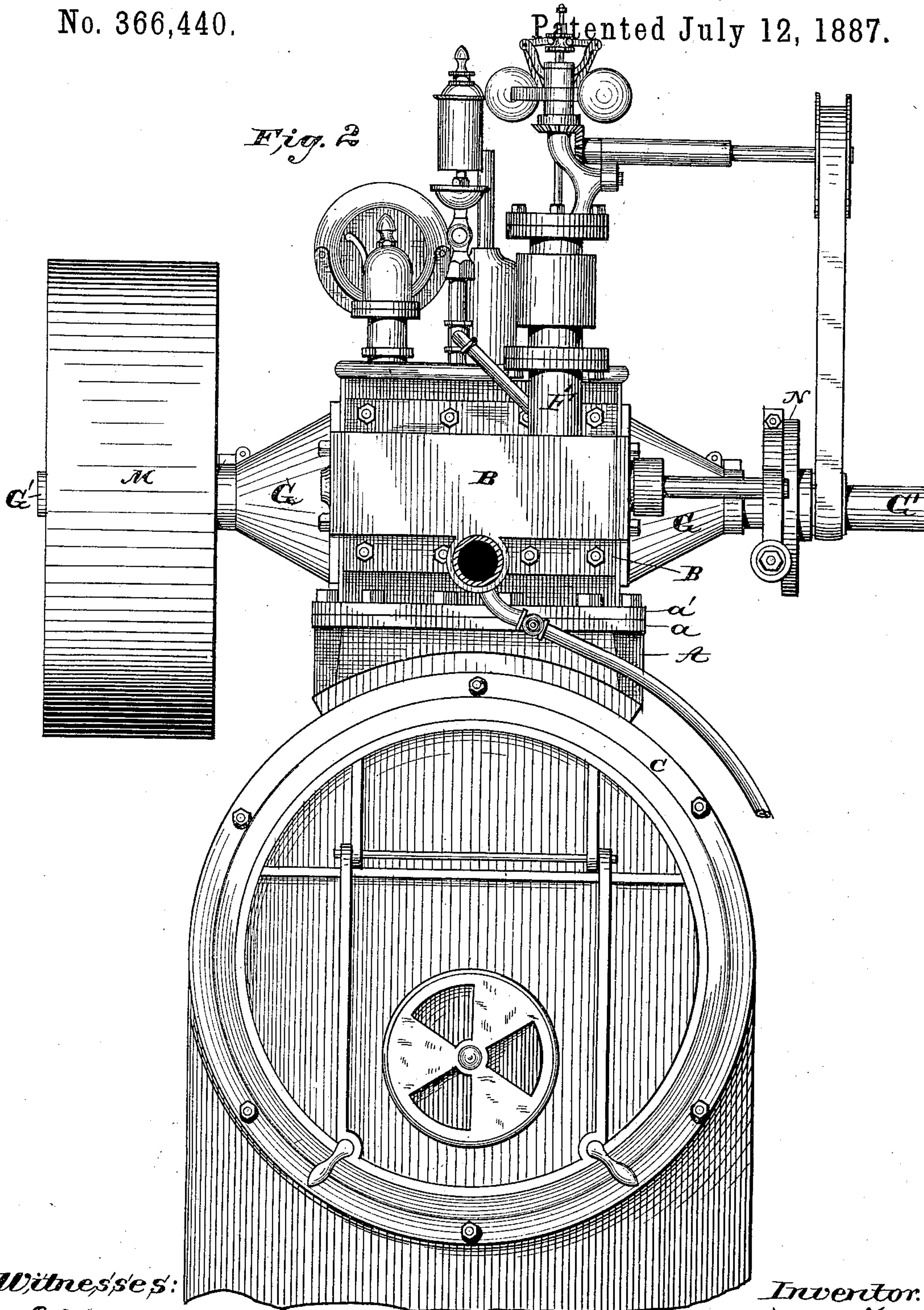
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Fig. 2



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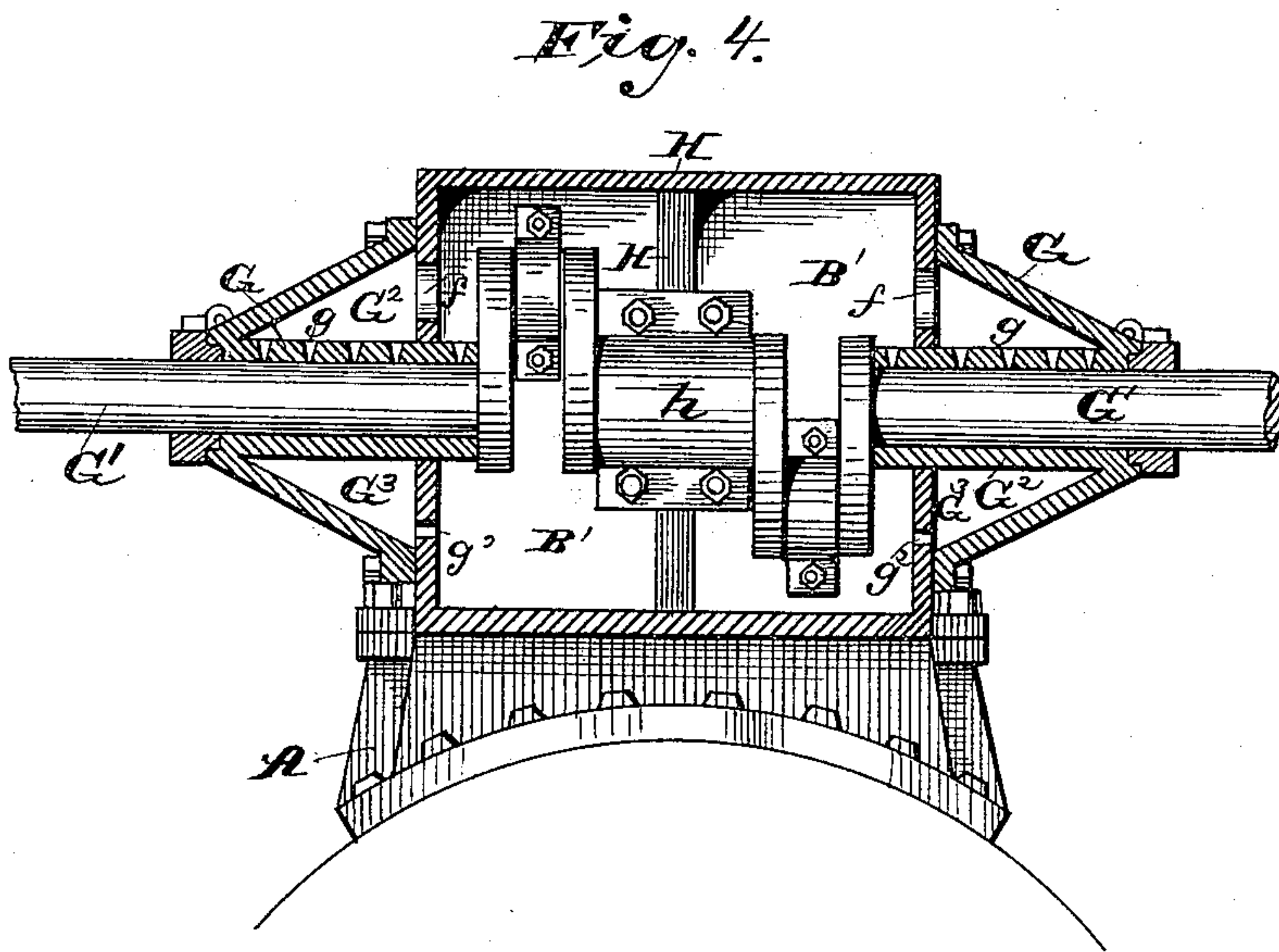
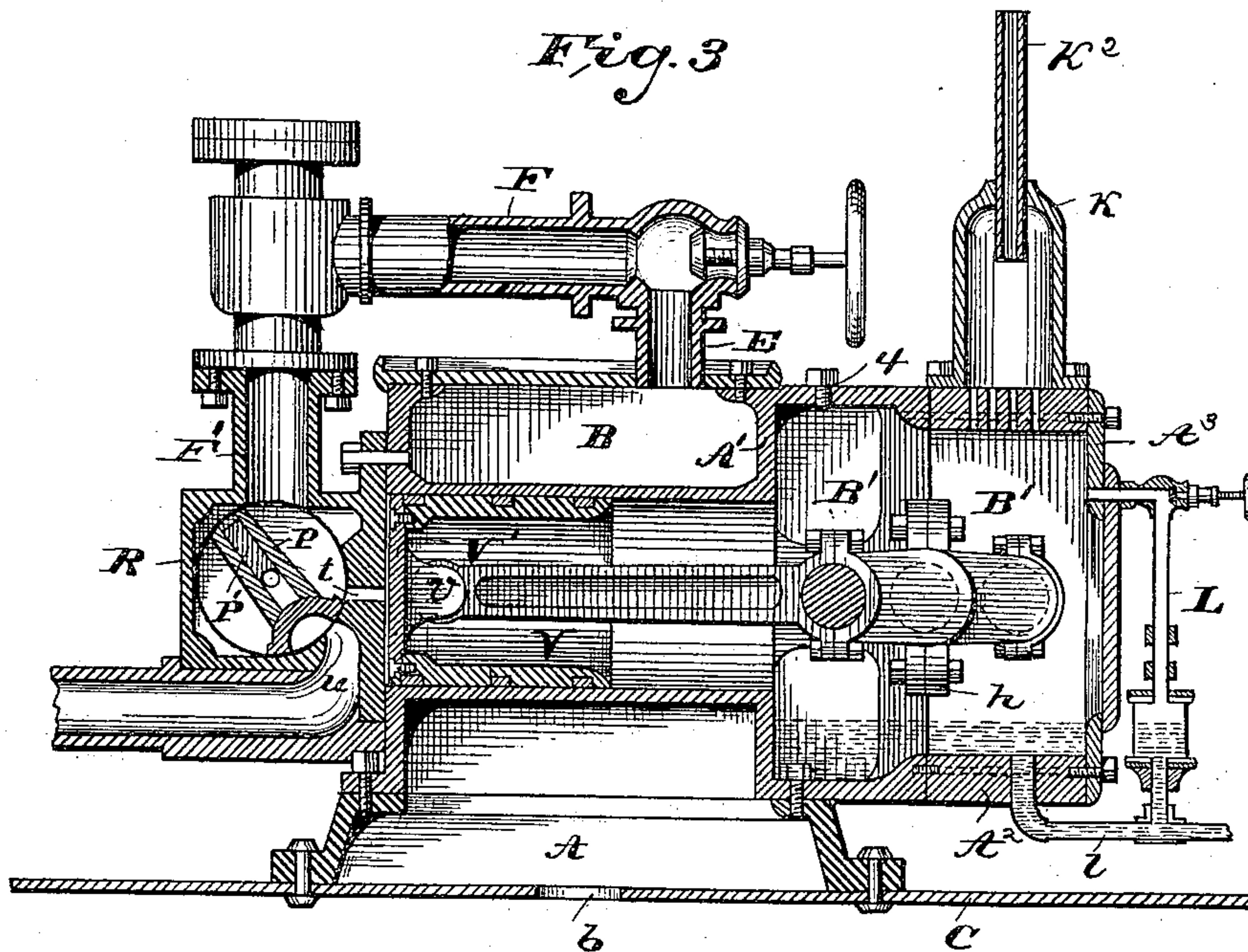
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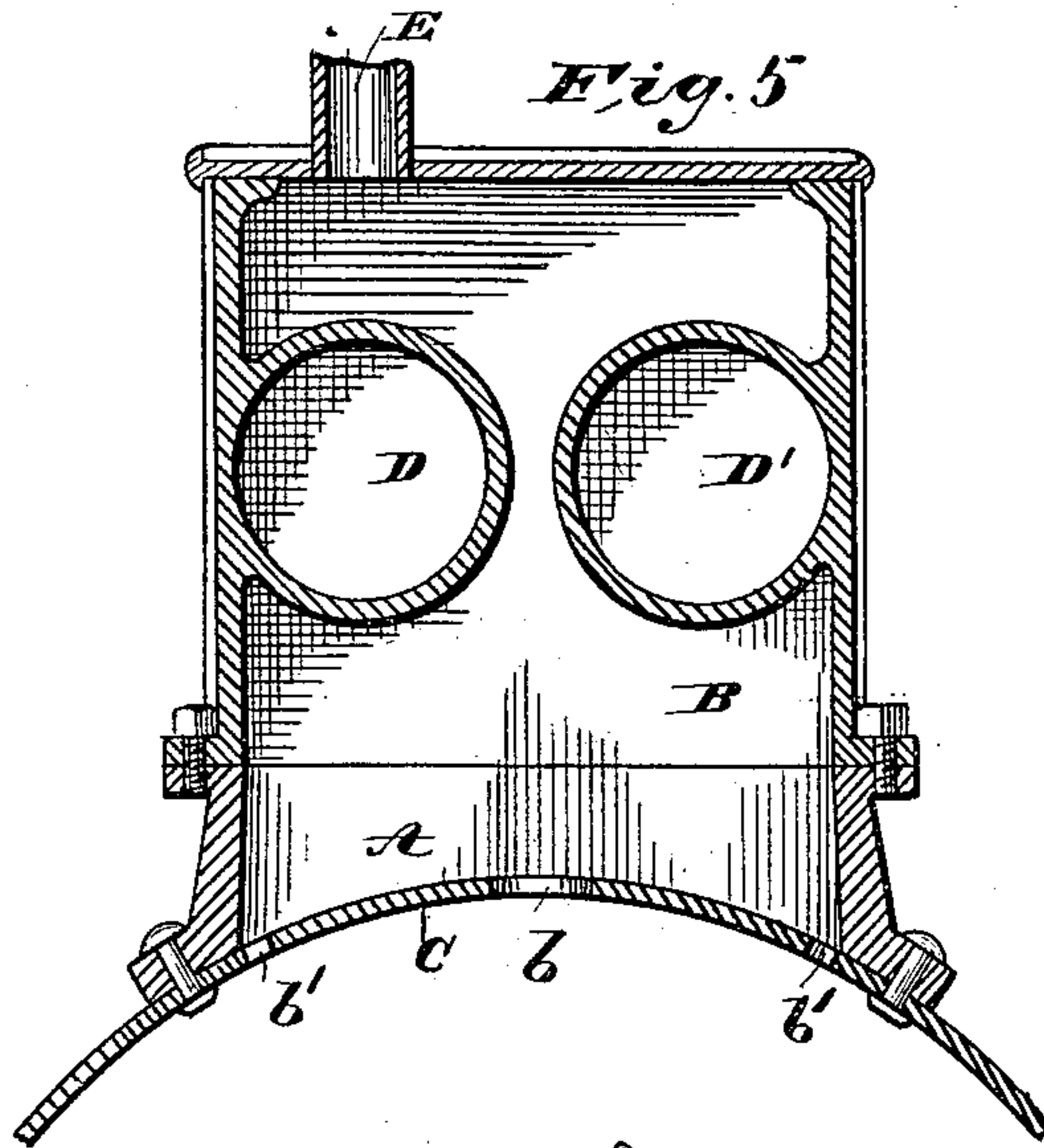


Fig. 6

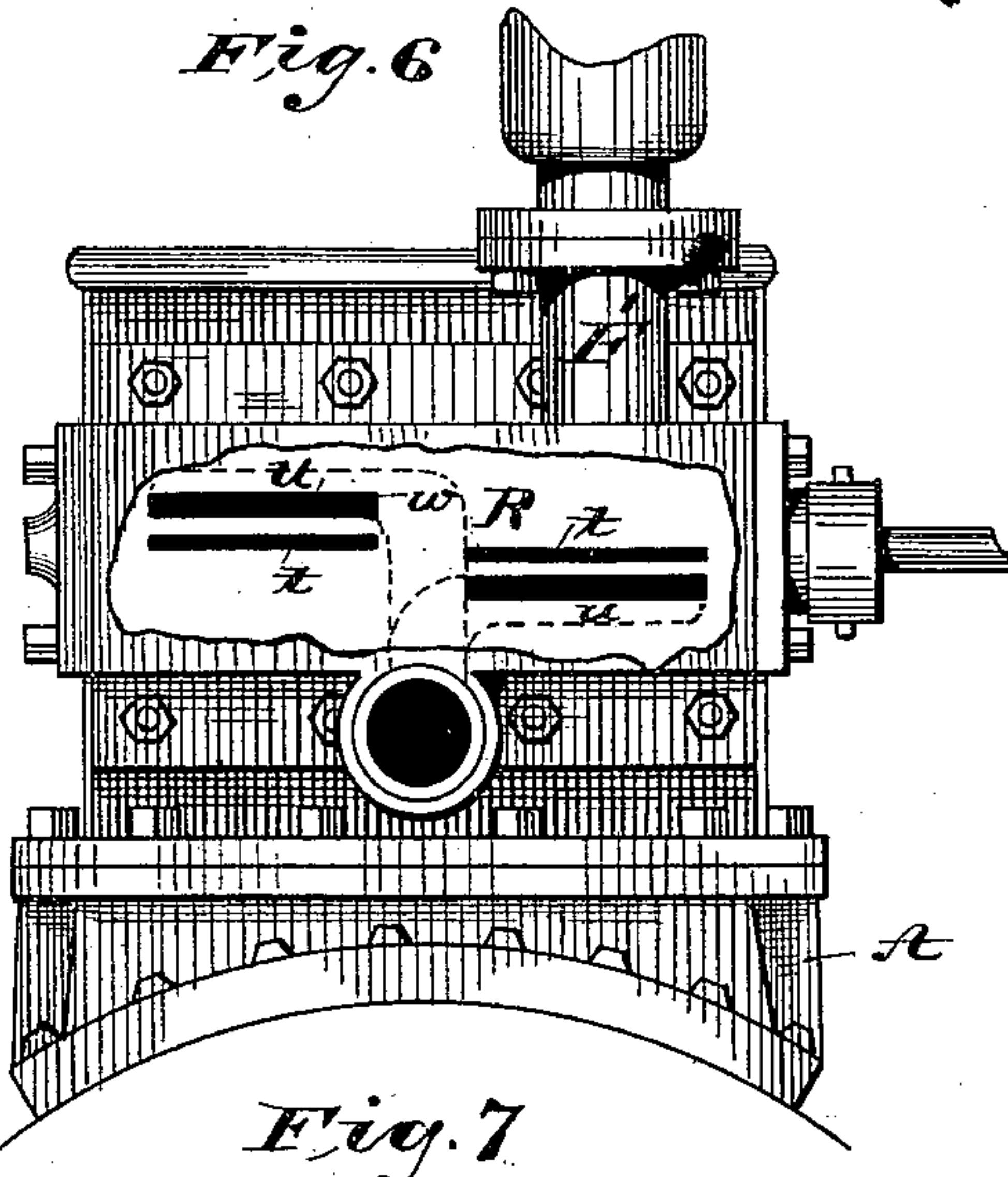


Fig. 7

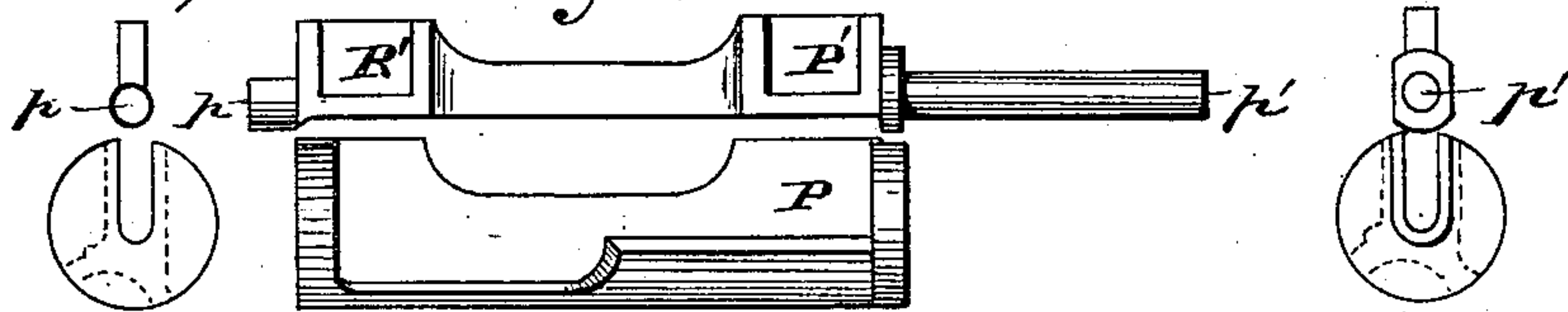


Fig. 8

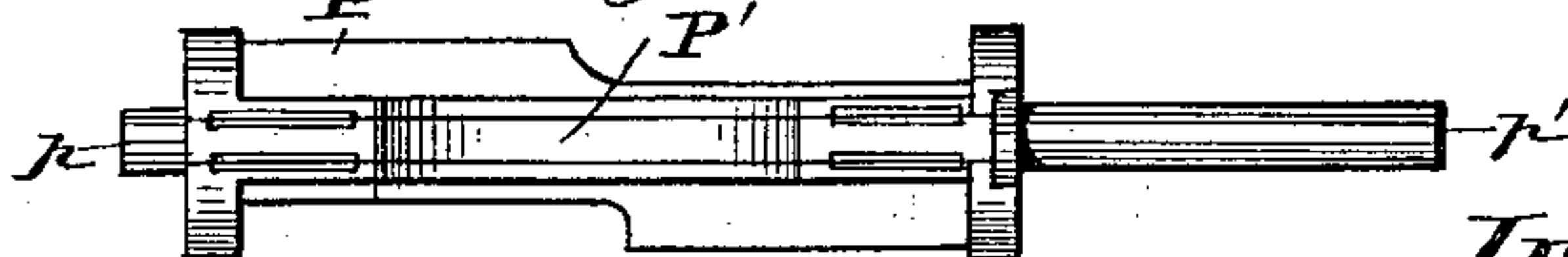
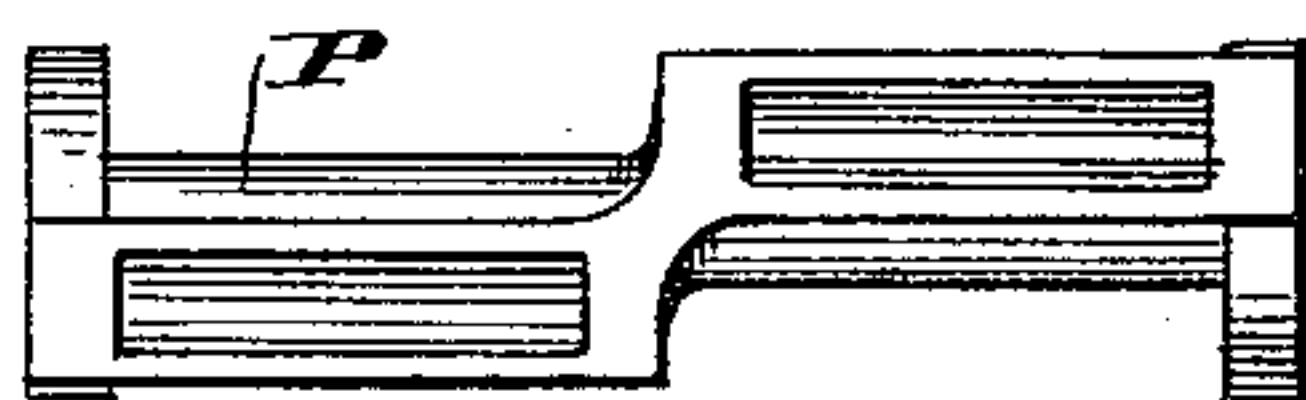


Fig. 9



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UNITED STATES PATENT OFFICE.

JESSE WALRATH, OF RACINE, WISCONSIN.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 366,440, dated July 12, 1887.

Application filed February 16, 1887. Serial No. 227,817. (No model.)

To all whom it may concern:

Be it known that I, JESSE WALRATH, a citizen of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Steam-Engines; 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.

My invention relates, primarily, to steam-engines mounted upon or attached to the boiler.

The leading objects of my invention are to prevent condensation in the cylinders, to produce a construction economical in regard to cost, size of parts, and weight, to provide short steam-passages from the boiler to the engine, to avoid back-pressure, and to simplify all the parts, thereby lessening the degree of skill and care necessary in driving, and making it possible for one not expert in steam-engineering to use my engine with perfect safety and success.

The accompanying drawings fully illustrate my invention and will be referred to in the specification, similar letters indicating corresponding parts throughout.

Figure 1 is a side elevation of my engine and a portion of the boiler to which it is attached. Fig. 2 is a rear elevation of the boiler and engine. Fig. 3 is a longitudinal section on dotted line $x x$ of Fig. 2. Fig. 4 is a vertical section through the bearings of the main shaft. Fig. 5 is a cross-section through the center of the dome and cylinders. Fig. 6 is a rear view, with parts broken away, showing one end of the combined steam-chest and cylinder-heads. Figs. 7, 8, and 9 are plan, side, and bottom views of the steam-valve.

The saddle or support A is rigidly secured to the top of the boiler C, and firmly mounted upon this saddle, and retained in position by means of bolts and nuts, is the dome B. The steam-cylinders D D' are located within this dome, and are preferably cast in the same piece with it. The boiler is provided with openings b' , b' , and b —the latter to permit the passage of steam into the dome and the former to act as return-passages and outlets for any water which may result from condensation within the dome.

The cover of the dome, which in this instance is made separate and connected to the dome, is provided with a steam-pipe, E, and the steam entering the dome from the boiler is conducted through the pipe E and the two connected pipes F F' to the steam-chest R.

In the rear of the dome is formed an oil-receptacle and crank-chamber, B', which is separated from the steam-chamber of the dome by the partition A'. This chamber is formed in part by the dome and in part by an extension of the same, A², and end plate, A³, the extension and the end plate being attached to the dome by bolts, or in any other preferred manner.

G G are conical chambers provided with bearings for the ends of the crank-shaft G', and are attached rigidly to opposite sides of the crank-chamber B'. Near the center of the crank-chamber is the support H for the crank-shaft. This support is rigidly attached to the upper and lower walls of said chamber, and is preferably connected to partition A'. It is provided with a recess or curved portion midway its extremities, forming half of the bearing for the shaft, the said bearing being completed and the shaft held in place by the cap h , bolted to the main support H. This support may be cast in the same piece with the rear extension of the dome.

The shaft G' is cranked in opposite directions, as shown in Fig. 4, and is provided at one end with a fly-wheel, M.

The bearing-boxes G² G² are provided with openings g for the admission of oil.

The chamber B' is filled with oil to such a depth that the crank-arms, when in their lower positions, will dip into the same, and when in motion will splash the oil, through the openings f near the top of the crank-chamber, into the conical chambers G upon the bearing-boxes G² G², provided with perforations g . The bearing-boxes do not fill the entire space of the conical bearing-boxes; hence, in case there should be an excess of oil, it will find its way around the outside of the bearings G² G² and drop into the lower part of the chambers G³, and finally into the chamber B' through the openings g^2 . These bearings G² G² are closed at their outer ends by stuffing-boxes, as usual.

The oil may be supplied to the crank-chamber by means of an opening, 4, in the top of

the chamber, or through the bottle-shaped vent K, which is primarily for the purpose of allowing the escape of air and vapor from the crank-chamber, and the same is provided

5 with an open vent-pipe, K².

The amount of oil in the chamber B' is shown by an oil-gage, L, of ordinary construction. This gage is connected with the chamber by the pipe l.

10 The crank-shaft is mounted at right angles to the cylinders D D, and occupies such a position in relation to them that when the crank-arms are horizontal the piston-rods attached thereto will pass through the center of the

15 cylinders.

Mounted upon the crank-shaft is the eccentric-plate and eccentric N, both preferably cast in one piece. This plate is made thicker at the point opposite the eccentric, for the

20 purpose of furnishing a counter-balance for such eccentric and providing an even and easy movement.

The single rotary slide-valve is constructed substantially as shown in Figs. 3, 7, 8, and 9.

25 This valve is made in two parts, P and P'.

The part P is provided with exhaust-pockets and has at each end a circular part accurately fitted to circular recesses in the ends of the valve-chamber. It is also provided with a

30 slot extending from the opposite side to near the working-face of the valve. In this slot is placed the flat central part, P', which is provided with journals p p', fitting bearings

in the ends of the valve-chamber, the journal

35 p' extending through the wall of the chamber. Outside of the chamber the journal p' is provided with the crank S, the crank-pin

40 i of which enters a socket on the sleeve S' on the rod O, connected to the strap of the eccentric. This rod O is screw-threaded, and

at each end of the sleeve there is a nut, s, by which any required adjustment of the sleeve may be secured.

It will be noticed that the steam and exhaust

45 ports of the cylinders are arranged in a peculiar manner. The steam-ports t are arranged on opposite sides of a line running transversely of the steam-chest, and the exhaust-

ports u are arranged one above and the other

50 below the steam-port of its cylinder, or on opposite sides of the steam-port. The dotted lines in Fig. 6 show the connection with the exhaust-pipe which leads to the smoke stack.

The position of the exhaust-pockets in the

55 valve P corresponds to the relative positions of the exhaust-ports of the two cylinders, as shown in Fig. 9.

I construct my piston in two parts, V and

60 V', the latter forming the head or face of the piston. This part V' is provided with lugs v, to which the piston-rod is pivoted. This arrangement cheapens the construction and enables me to secure an accurate fitting of the

parts. The head V' is secured to the part V

of the piston by bolts, as shown, or in any 65 other secure manner.

I may, if at any time it is found desirable, apply my dome and cylinders to other forms of engines than that shown, and may employ 70 but a single cylinder whenever it may be found desirable to do so.

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

1. The combination, with a boiler and dome, of the extension A' and end plate, A³, forming the crank-chamber, substantially as described. 75

2. The combination, with the dome provided with a crank-chamber connected therewith, of the conical bearing-boxes provided with perforated bearings attached to each side of the same, the said crank-chamber being provided with openings communicating with the interior of said bearing-boxes, substantially as described. 80

3. A steam-dome provided with a crank-chamber having a central bearing, H h, and the conical bearing-boxes G at each side of said crank-chamber, substantially as described. 85

4. The combination, with a steam-dome, of two engine-cylinders within said dome, one of said cylinders being attached to and integral with one of the sides of said dome and the other attached to and integral with one of the other sides, substantially as described. 90

5. The combination, with a steam-dome, of two engine-cylinders within said dome, said cylinders being longitudinally attached to and integral with two of the sides of said dome, substantially as described. 95

6. The combination, with two engine-cylinders, a steam-chest connected with each of said cylinders, narrow elongated steam-ports on opposite sides and adjoining a line passing longitudinally through the steam-chest, and exhaust-ports located in close relation to said steam-ports and on opposite sides of the same, of a valve provided with exhaust-pockets located on opposite sides of a line running longitudinally of the same and in close relation to its closing surface, substantially as described. 100

7. Two cylinders having steam-ports on opposite sides of and adjoining to a line passing longitudinally through the steam-chest, the said steam-chest having exhaust-ports located above and below said steam-ports, in combination with a single valve having exhaust-pockets on opposite sides of a line running transversely of said valve and on opposite sides of a line running lengthwise of the same, substantially as described. 115

In testimony whereof I affix my signature in presence of two witnesses. 120

JESSE WALRATH.

Witnesses:

CHARLES H. LEE,
GEO. L. EDDY.