

No. 841,918.

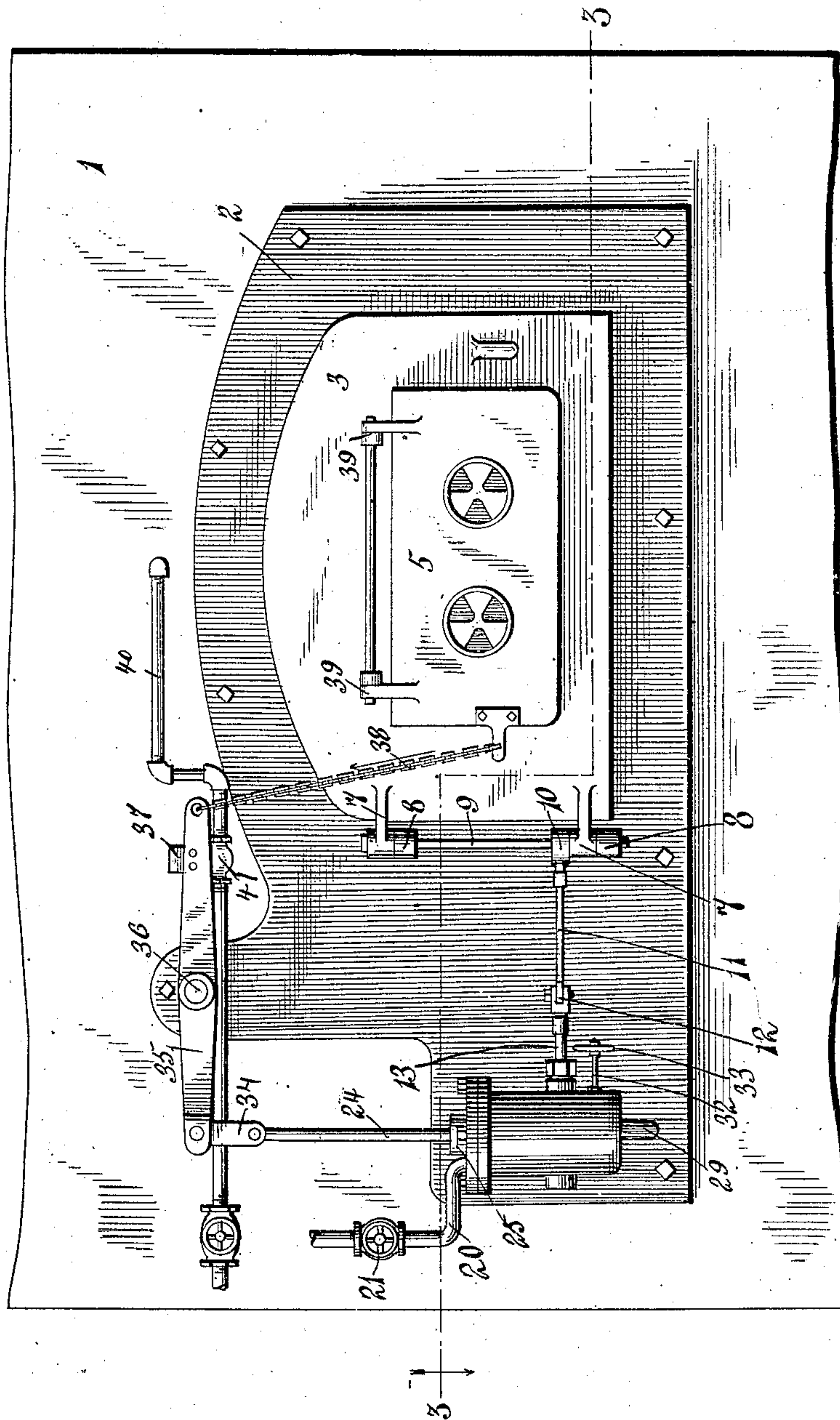
PATENTED JAN. 22, 1907.

O. AUBÉ & L. M. TREMBLAY.

SMOKE CONSUMER.

APPLICATION FILED NOV. 11, 1905.

4 SHEETS—SHEET 1.



Witnesses:

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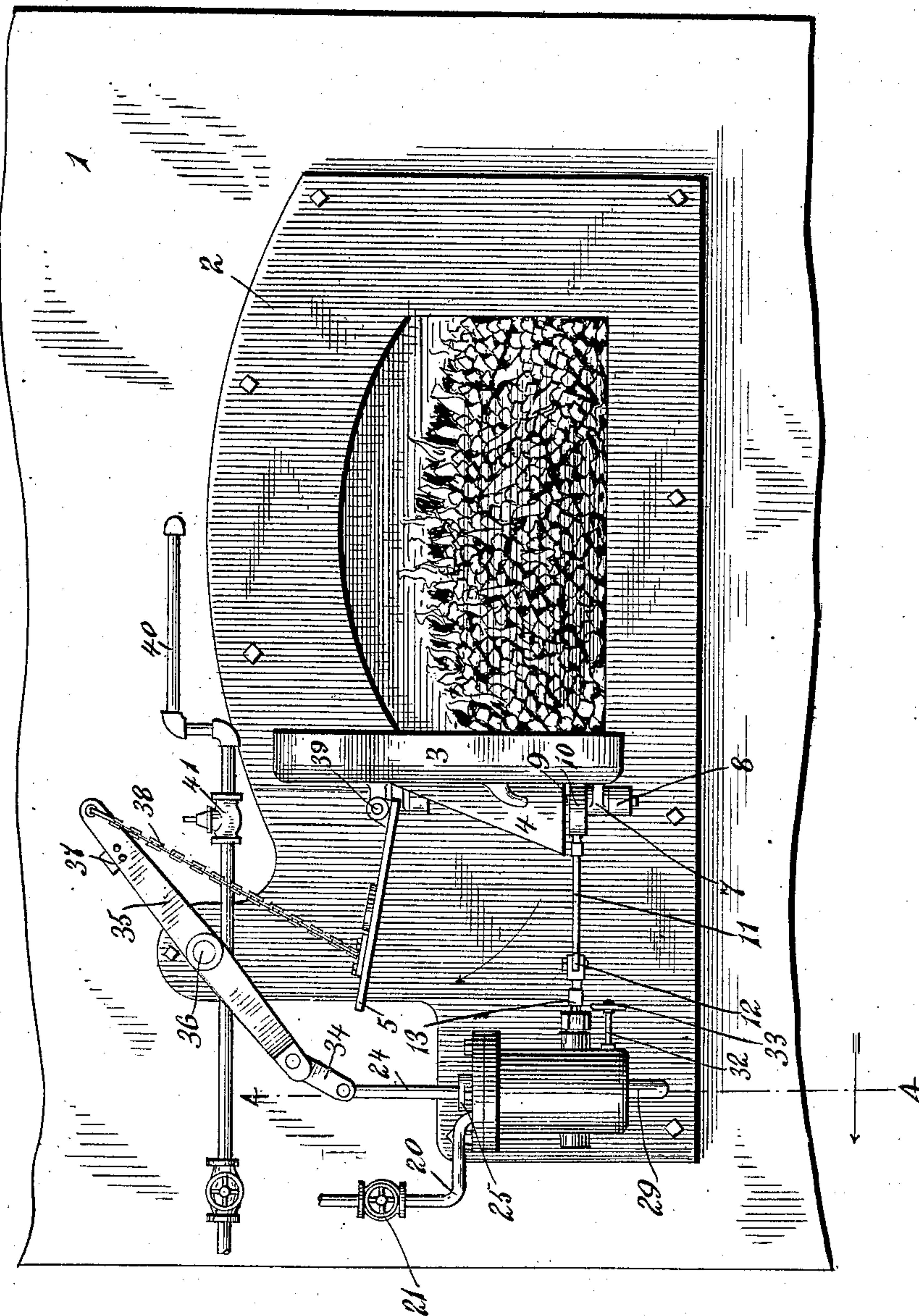
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4 SHEETS—SHEET 2.



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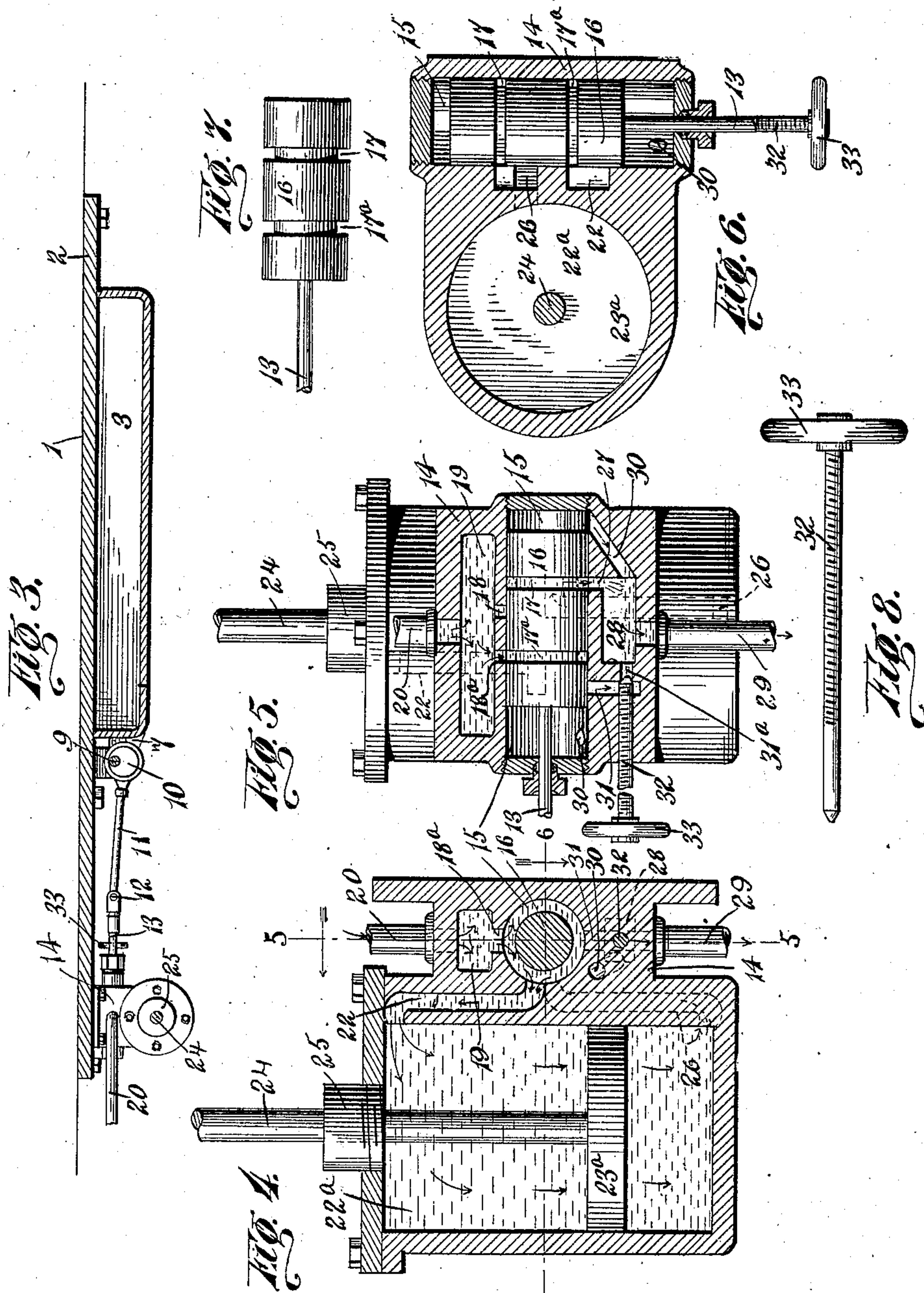
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4 SHEETS—SHEET 3.



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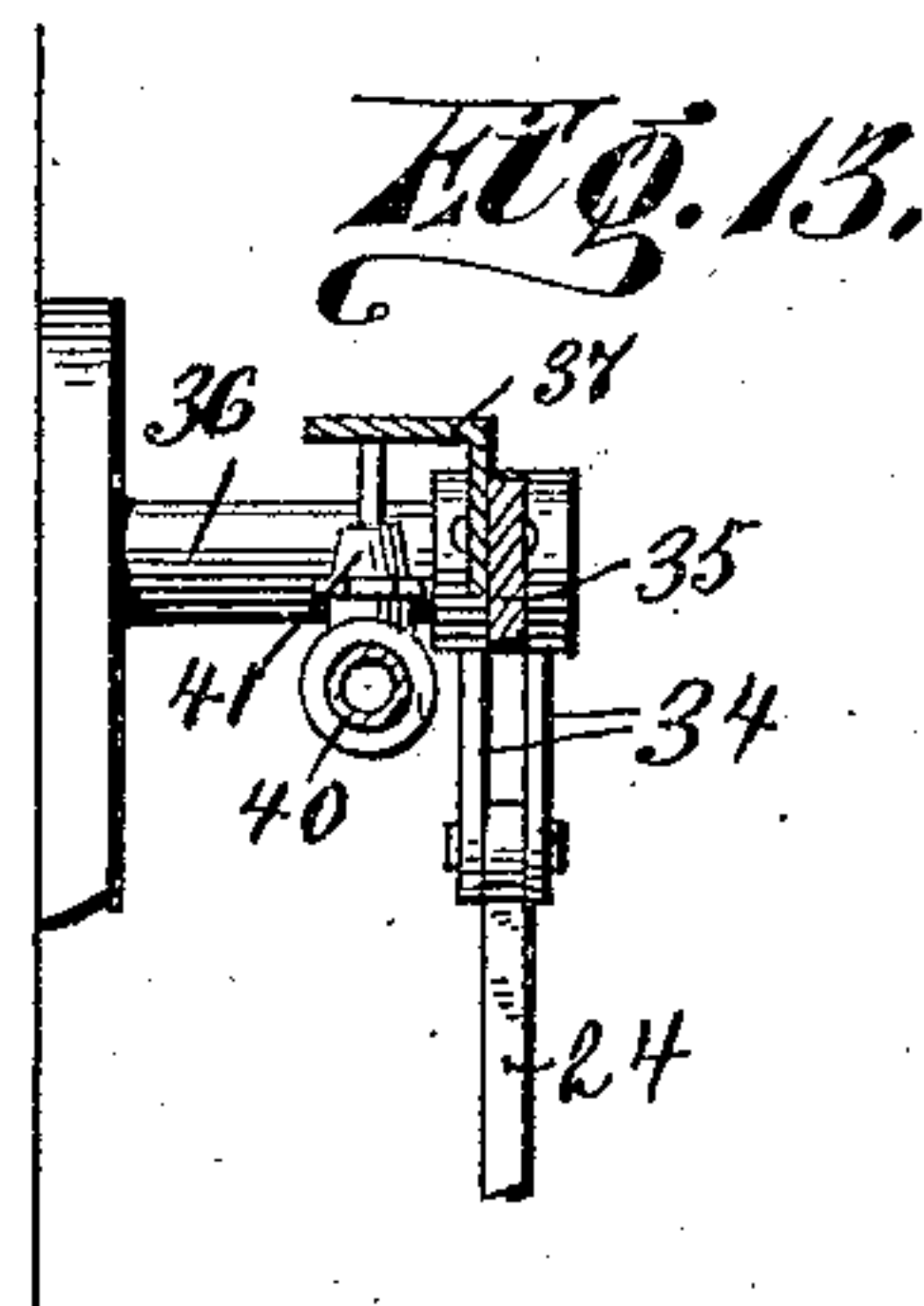
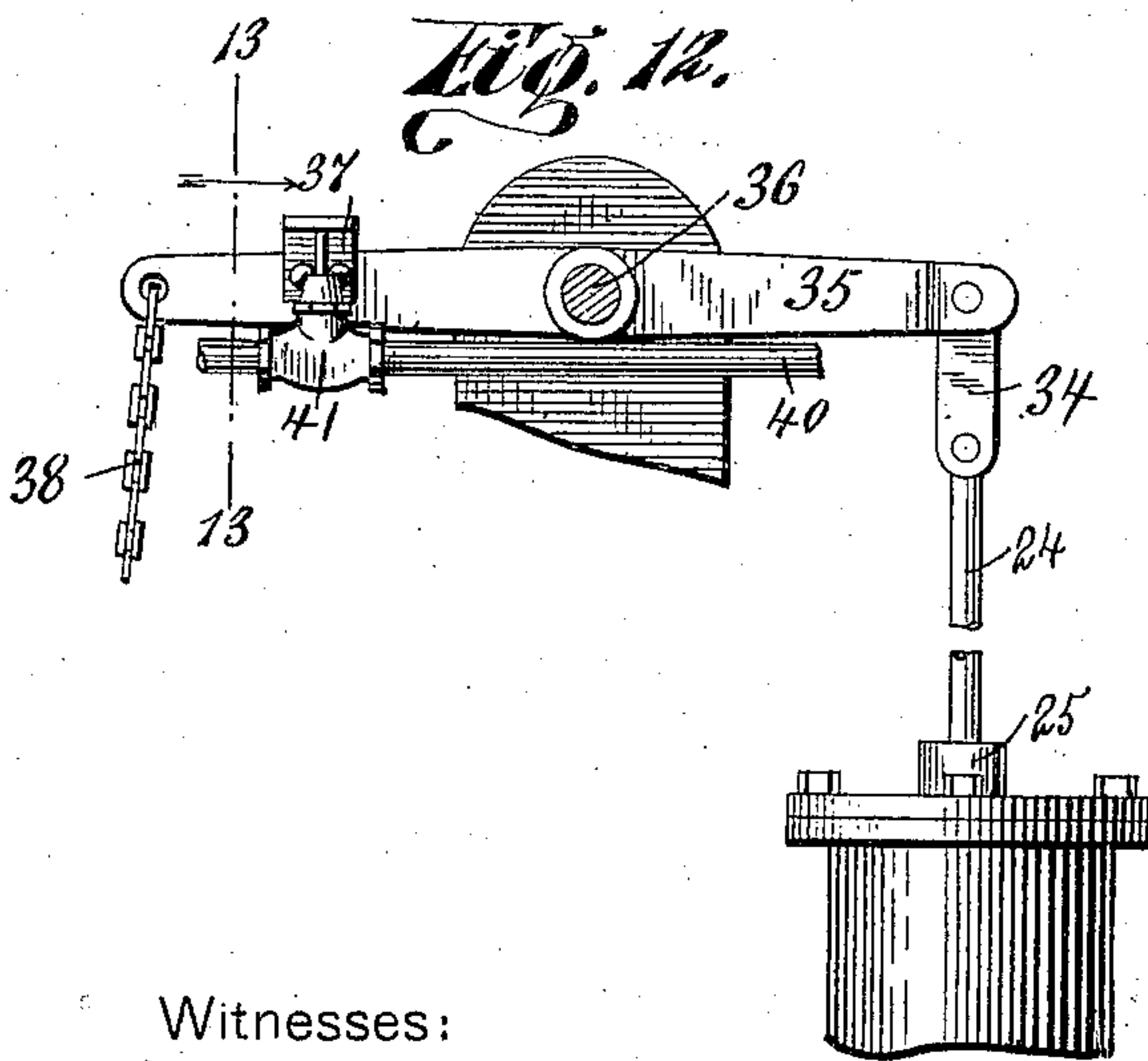
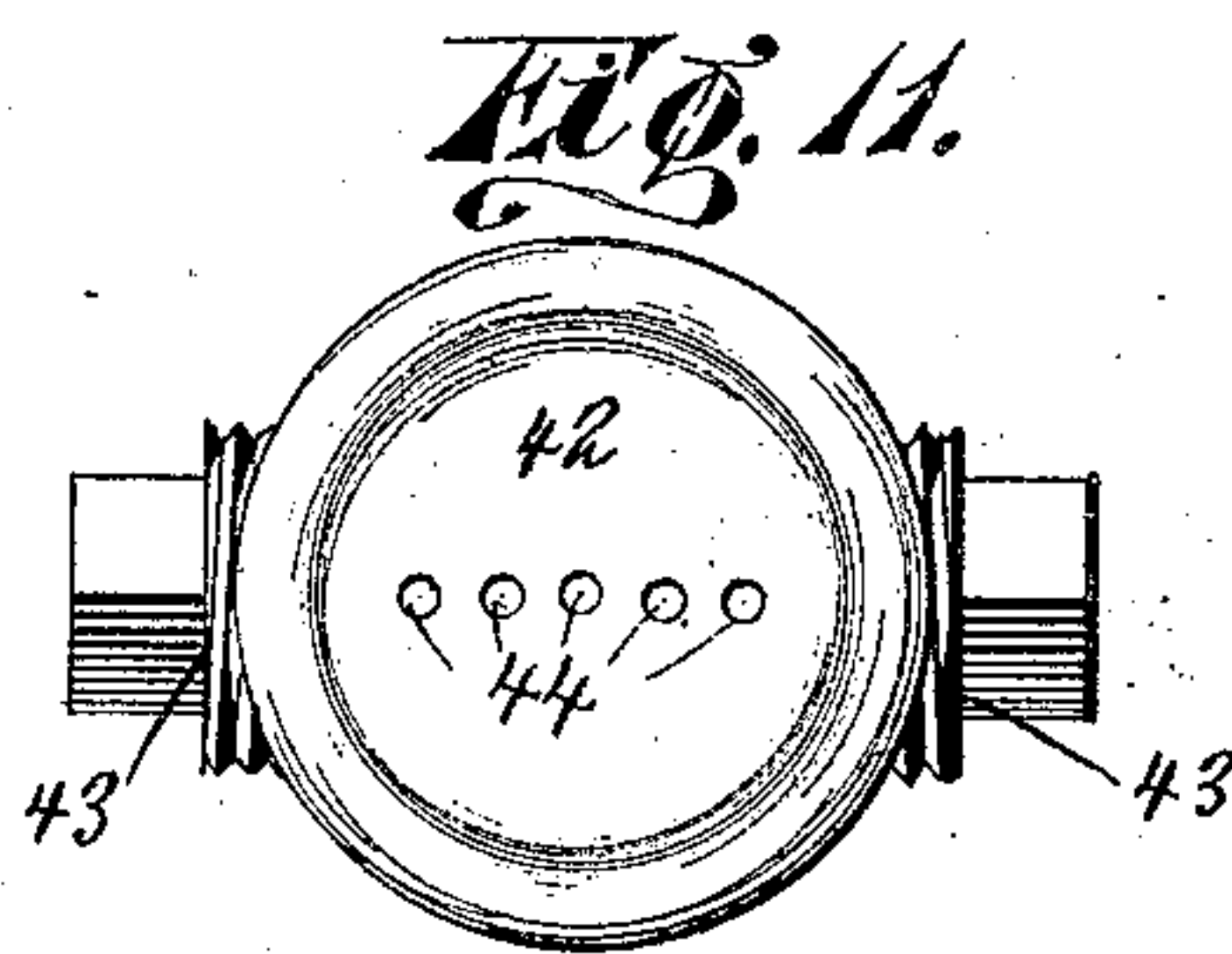
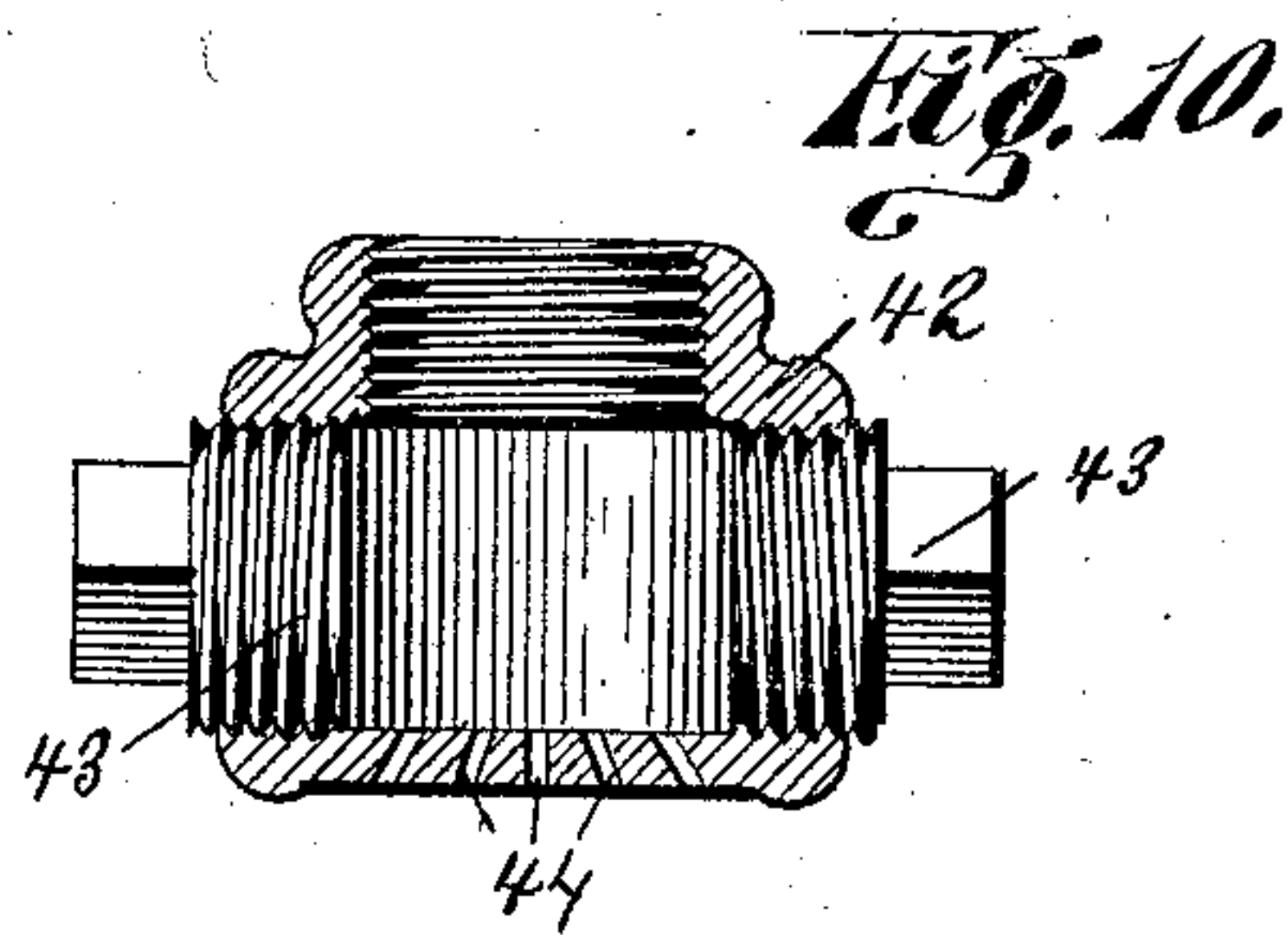
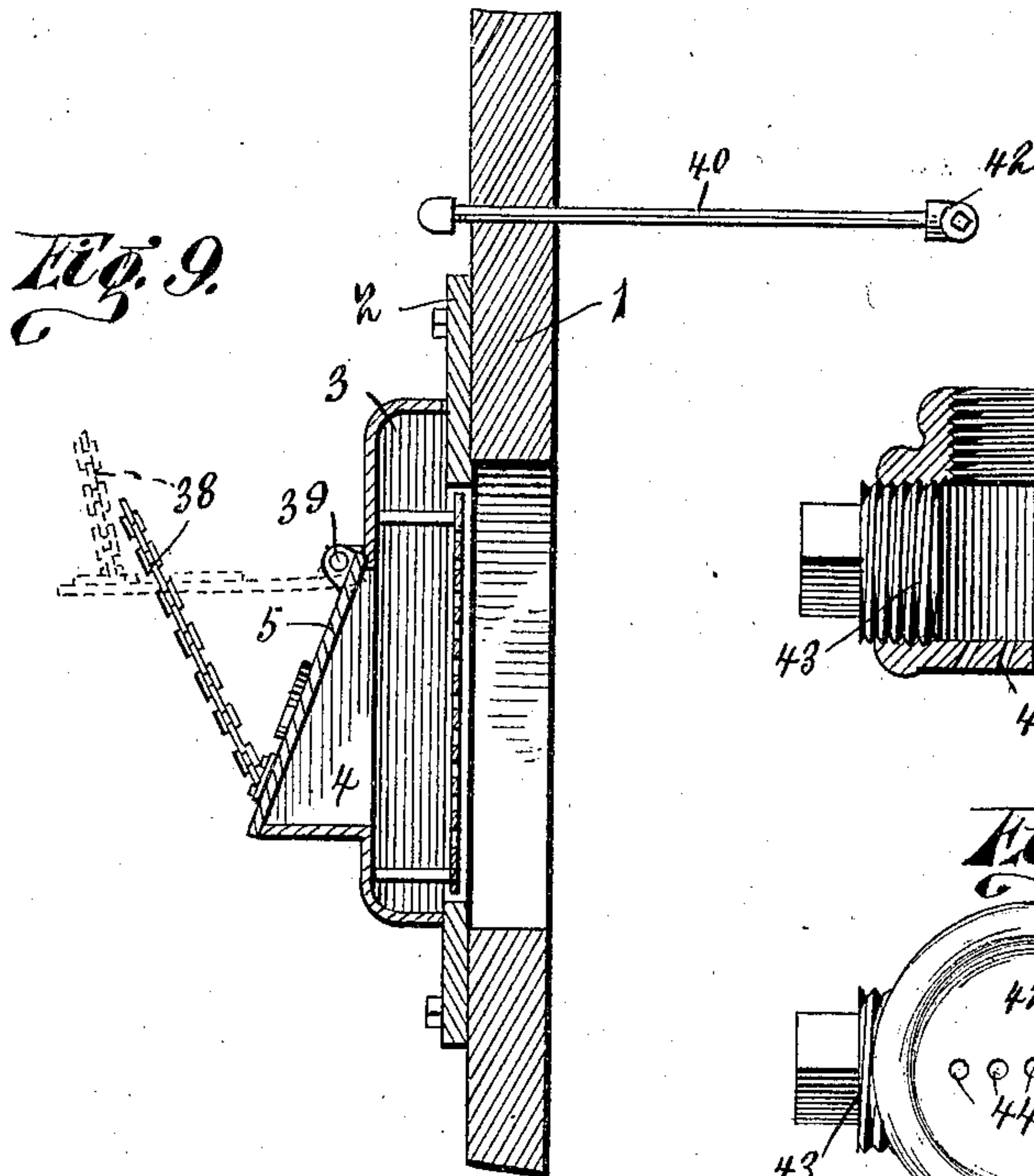
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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

OCTAVE AUBÉ AND LOUIS M. TREMBLAY, OF MONTREAL, QUEBEC, CANADA, ASSIGNORS OF ONE-SIXTH TO JOSEPH AUGUSTIN ODILON LABADIE AND ONE-SIXTH TO OVIDE PAPINEAU, OF MONTREAL, CANADA.

## SMOKE-CONSUMER.

No. 841,918.

Specification of Letters Patent.

Patented Jan. 22, 1907.

Application filed November 11, 1905. Serial No. 286,806.

*To all whom it may concern:*

Be it known that we, OCTAVE AUBÉ and LOUIS MARCELLIN TREMBLAY, subjects of the King of Great Britain, residing in the city and district of Montreal, in the Province of Quebec, Canada, have invented certain new and useful Improvements in Smoke-Consumers; and we do hereby declare that the following is 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.

This invention relates to smoke-consumers.

The object of the invention is to provide means for automatically turning on a blast of steam into the combustion-chamber of a boiler when the door thereof is opened.

A further object is to automatically open the draft-door of the combustion-chamber when the steam is turned on.

A further object is to provide means for regulating the length of time which the blast of steam will continue.

A further object is to provide means for automatically cutting off the blast of steam.

A further object is to provide means when the period of the blast of steam is once established to make the blast extend over the same period from the time the door is opened until the apparatus is again adjusted; and the invention consists of the construction, combination, and arrangement of parts, as herein illustrated, described, and claimed.

In the accompanying drawings, forming part of this application, is illustrated one form of embodiment of the invention, in which drawings similar reference characters designate corresponding parts, and in which—

Figure 1 is a front elevation of a portion of a boiler, showing the application of the invention. Fig. 2 is a front elevation of the boiler, showing the door of the combustion-chamber open and showing the application of the invention. Fig. 3 is a horizontal section on line 3 3 of Fig. 1. Fig. 4 is a vertical section on line 4 4 of Fig. 2. Fig. 5 is a vertical section on line 5 5 of Fig. 4. Fig. 6 is a horizontal section on line 6 6 of Fig. 4. Fig. 7 is a fragmentary detail in plan of a valve used in the invention. Fig. 8 is a frag-

mentary detail in plan of a screw-threaded rod adapted for use as a valve in the invention. Fig. 9 is a vertical section through the door of a portion of the front plate of the combustion-chamber. Fig. 10 is a vertical section through an injector-nozzle used in the invention. Fig. 11 is an elevation of the injector-nozzle used in the invention. Fig. 12 is a fragmentary detail, in rear elevation, of the regulating-lever, its supporting-pintle being shown in section; and Fig. 13 is a vertical section on line 13 13 of Fig. 12.

Referring to the drawings, 1 designates the front plate of a combustion-chamber of a boiler. The front plate 1 is provided with a suitable opening, over which is disposed a plate 2, secured in position in any suitable way and provided with the usual fuel-opening. Disposed over the fuel-opening in the plate 2 is a door 3, provided with a draft-opening 4, which opening is covered by a draft-door 5.

The door 3 is provided with lugs 7, disposed on the lugs 8, formed on the plate 2, said lugs being pivotally connected by means of the pintle 9. Disposed on the lower lug 7 is an eccentric 10, to which is connected a rod 11, pivotally connected at 12 to a valve-rod 13.

Secured on the plate 2, adjacent the end of the valve-rod 13, is an extension 14, provided with a horizontal chamber 15 on its side adjacent the plate 2. Disposed in the chamber 15 is a valve 16, which is connected to the valve-rod 13. The valve 16 is provided with the circumferential grooves 17 17<sup>a</sup>.

Leading from the chamber 15 are ducts 18 18<sup>a</sup>, connecting the valve-chamber 15 with an upper chamber 19 in the upper part of the casing 14 on its side nearest the plate 2. Communicating with and leading from the chamber 19 is a supply-pipe 20 in connection with a suitable source of water and provided with a valve 21, adapted to regulate the water-supply.

Leading upward from the chamber 15 is a port 22, communicating with the upper part of a valve-chamber 22<sup>a</sup>, the lower end of the port 22 being L-shaped in vertical section, as shown in dotted lines in Fig. 5, so that the



lower portion of said port is in communication with the circumferential groove 17<sup>a</sup>.

Disposed in the piston-chamber 22<sup>a</sup> is a piston 23<sup>a</sup>, to which is connected a rod 24, a  
5 suitable packing 25 being disposed around the rod where it passes through the casing 14.

Leading from the chamber 15 is a port 26, which communicates with the lower portion of the chamber 22<sup>a</sup>, the upper portion of said  
10 port being L-shaped in vertical section, as best shown in dotted lines in Fig. 5.

Leading from the lower part of the chamber 15 is a duct 27, which communicates with an exhaust-chamber 28, which exhaust-  
15 chamber has an exhaust-pipe 29 leading therefrom.

The casing is provided with suitable exhaust-ports 30, leading from the opposite ends of the chamber 15 to the exhaust-cham-  
20 ber 28, which ducts are adapted to carry off any water which accumulates in the chamber 15 at the ends of the valve 16.

Leading from the lower part of the chamber 15 is a passage 31, which is connected to  
25 the exhaust-chamber 28 by means of the passage 31<sup>a</sup>, which latter is adapted to be closed by the pointed end of the screw-threaded rod 32, which serves as a valve, the outer end of said rod being provided with a hand-  
30 wheel 33.

Pivotaly connected to the upper end of the rod 24, which is connected to the piston 23, is a link 34, its opposite end being pivotaly connected to a lever 35, which lever is  
35 pivoted at 36 to the plate 2. Secured on the lever 35 is an angle-iron 37. Connected to the end of the lever 35 is a flexible member 38, preferably a chain, the opposite end of which is connected to the draft-door 5, which  
40 is hinged at 39 to the fuel-door 3.

Disposed adjacent the front of the plate 1 above the door 3 is a steam-pipe 40, one end of which is connected to a suitable source of supply and the other end of which extends  
45 into the combustion-chamber. Disposed on the pipe 40 in the path of movement of the angle-iron 37 on the lever 35 is a valve 41 of any suitable construction, which is adapted to be turned by the movement of the angle-  
50 iron.

Secured on the end of the steam-pipe which communicates with the combustion-chamber, is a nozzle 42, having the screw-threaded plugs 43, which may be removed  
55 for the purpose of cleaning the nozzle to remove the accumulations left by the steam, and provided with a line of perforations 44.

The door 3 being in closed position, as shown in Fig. 1, and the piston 23 being adjacent the upper part of the casing 14, the door 3 may be opened on its hinges, and the eccentric 10 and its connections cause the valve 16 to move to the position shown in Fig. 5. When in this position, water in the cham-  
65 ber 19 will pass through the duct 18<sup>a</sup>, around

through the circumferential groove 17<sup>a</sup>, and thence through the port 22 to the chamber 22<sup>a</sup> and force the piston 23<sup>a</sup> downward in the direction indicated by the arrows in Fig. 4. This movement of the piston causes a down-  
70 ward movement of the piston-rod 24 and the consequent rocking of the lever 35 to the position shown in Fig. 2. The rocking of the lever 35 by means of the angle-iron 37 actuates the valve 41 and turns on a blast of  
75 steam through the nozzle 44 into the combustion-chamber. The blast of steam will continue until the lever 35 is actuated back to the position shown in Fig. 1. In order that the piston 23 may ascend to rock the  
80 lever back to the normal position, the water above the piston must pass back through the port 22 to the chamber 15. In the meantime, the door 3 having been closed, the rod 11 is actuated to throw the valve 16 so that  
85 the circumferential groove 17<sup>a</sup> registers with the passage 31, through which the water may escape into the passage 31<sup>a</sup> and thence to the exhaust-chamber 28 and out through the exhaust-pipe 29. The length of the period of  
90 the blast will be thus proportioned to the size of the passage 31. By adjusting the rod 32 so that its pointed end closes the passages 31 and 31<sup>a</sup> the length of the blast may be regulated. The valve 16 having been actu-  
95 ated so that the circumferential groove 17<sup>a</sup> registers with the passage 31, the circumferential groove 17 will register with the duct 18, so that the passage of water from the chamber 19 will be through the duct 18,  
100 around the circumferential groove 17, and through the port 26 to the bottom part of the casing 14, beneath the piston 23, which will be actuated upward thereby. The door being again opened, the piston 23<sup>a</sup> will be actu-  
105 ated downward, the water thereunder being exhausted through the port 26, the circumferential groove 17, and the duct 27 to the exhaust-chamber 28 and from thence out through the exhaust-pipe 29. The rod 32  
110 having once been adjusted for a certain length of blast, no further adjustment is necessary, and the same period of time will be consumed for each blast of steam until the rod is again adjusted.  
115

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a furnace, the combination of a combustion-chamber, a fire-door therefor, a pipe  
120 for supplying steam to the combustion-chamber, a fluid-operated cylinder and piston for controlling said steam-supply, an inlet-chamber, an exhaust-chamber, a valve-casing provided with ports communicating with said  
125 cylinder and with ducts communicating with said inlet and exhaust chambers, a shiftable valve in said casing for controlling communication between said ports and ducts, adjustable means for regulating one of said ex- 130



haust-ducts, and operative connections between said valve and fire-door, substantially as described.

2. In a furnace, the combination of a combustion-chamber, a pivotally-supported fire-door therefor, a pipe for supplying steam to the combustion-chamber, a fluid-operated cylinder and piston for controlling said steam-supply, an inlet-chamber, an exhaust-chamber, a valve-casing provided with ports communicating with said cylinder and with ducts communicating with said inlet and exhaust chambers, adjustable means for regulating one of said exhaust-ducts, a shiftable valve in said casing for controlling communication between said ports and ducts, a cam on said pivotal support of the fire-door, and a link connection between said cam and valve, substantially as described.

3. In a furnace, the combination of a combustion-chamber, a fire-door therefor, a draft-door on said fire-door, a pipe for supplying steam to the combustion-chamber, a fluid-operated cylinder and piston for controlling said draft-door and steam-supply, an inlet-chamber, an exhaust-chamber, a valve-casing provided with ports communicating with said cylinder and with ducts communicating with said inlet and exhaust chambers, a shiftable valve in said casing provided with peripheral grooves for controlling communication between said ports and ducts, adjustable means for regulating one of said exhaust-ducts, and connecting means operated by said fire-door for shifting said valve, substantially as described.

4. In a furnace, the combination of a combustion-chamber, a fire-door therefor, a pipe for supplying steam to the combustion-chamber, a fluid-operated cylinder and piston for controlling said steam-supply, an inlet-chamber, an exhaust-chamber, a valve-casing provided with ports communicating with said cylinder and with ducts communicating with said inlet and exhaust chambers, a shiftable valve in said casing for controlling communication between said ports and ducts, adjustable means for regulating one of said exhaust-ducts, means for maintaining free communication between said exhaust-chamber and valve-casing at points beyond the valve travel, and operative connections between said valve and fire-door, substantially as described.

5. In a furnace, the combination of a combustion-chamber, a fire-door therefor, a pipe for supplying steam to the combustion-chamber, a fluid-operated cylinder and piston for controlling said steam-supply, an inlet-cham-

ber, an exhaust-chamber, a cylindrical valve-casing provided with ports communicating with said cylinder and with ducts communicating with said inlet and exhaust chambers, a shiftable valve in said casing provided with peripheral grooves for controlling communication between said ports and ducts, said ports formed of sufficient axial dimension to be maintained in communication with the peripheral grooves of the valve during the entire travel of the latter, adjustable means for regulating one of said exhaust-ducts, and connecting means operated by said fire-door for shifting said valve, substantially as described.

6. In a furnace, the combination of a combustion-chamber, a fire-door therefor, a draft-door on said fire-door, a pipe for supplying steam to the combustion-chamber, a regulating-valve in said pipe, a lever for controlling said regulating-valve, a connection between said lever and draft-door, a fluid-operated cylinder and piston for actuating said lever, an inlet-chamber, an exhaust-chamber, a valve-casing provided with ports communicating with said cylinder and with ducts communicating with said inlet and exhaust chambers, adjustable means for regulating one of said exhaust-ducts, a shiftable valve in said casing for controlling communication between said ports and ducts, and operative connections between said valve and fire-door, substantially as described.

7. In a furnace, the combination of a combustion-chamber, a fire-door therefor, a draft-door on said fire-door, a pipe for supplying steam to the combustion-chamber, a regulating-valve in said pipe, a lever arranged to engage said regulating-valve, a flexible connection between said lever and draft-door, a fluid-operated cylinder and piston for actuating said lever, an inlet-chamber, an exhaust-chamber, a valve-casing provided with ports communicating with said cylinder and with ducts communicating with said inlet and exhaust chambers, adjustable means for regulating one of said exhaust-ducts, a shiftable valve in said casing for controlling communication between said ports and ducts, and operative connections between said valve and fire-door, substantially as described.

In witness whereof we have hereunto set our hands in the presence of two witnesses.

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LOUIS M. TREMBLAY.

Witnesses:

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