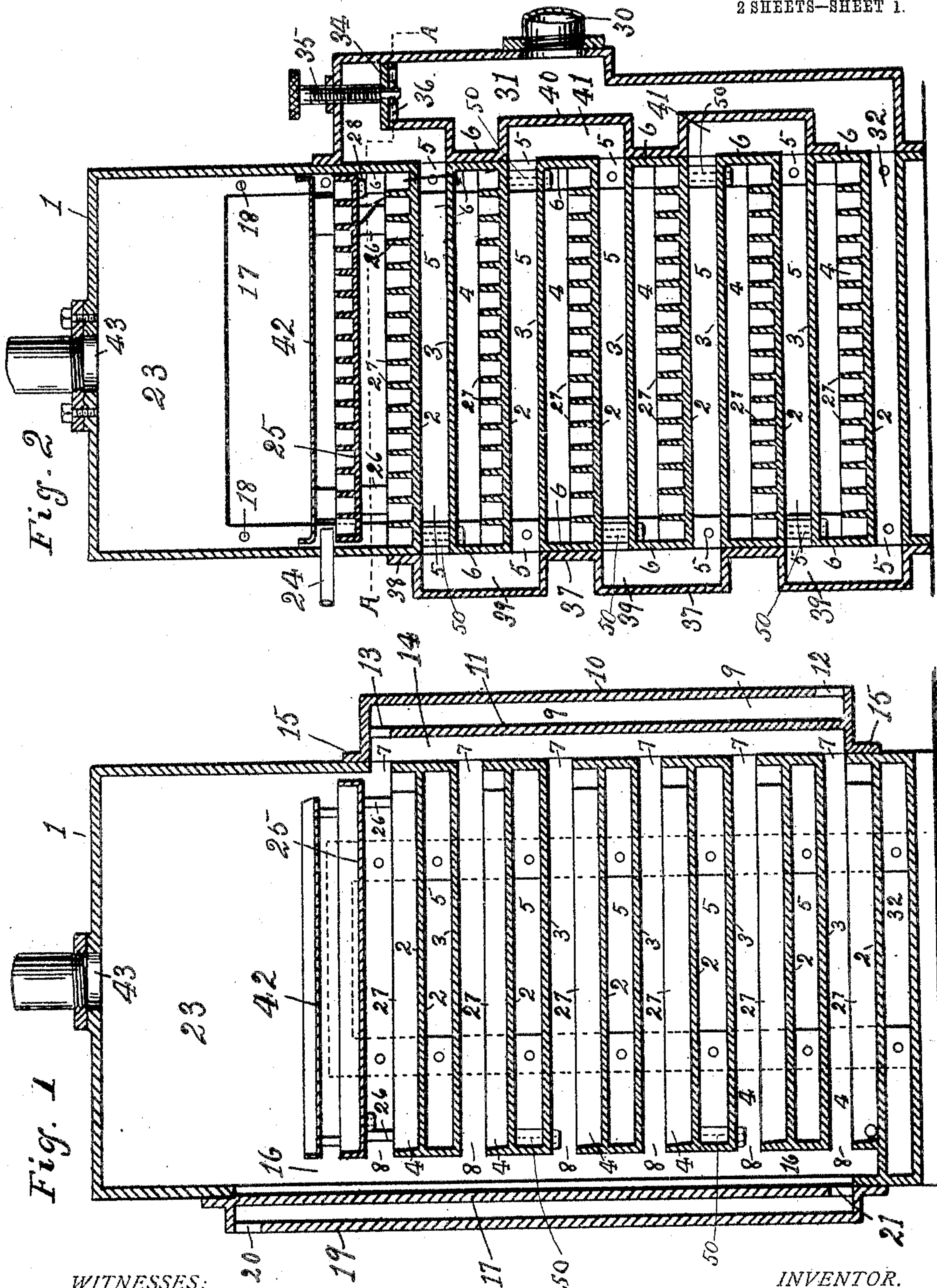


H. L. JESSEN.  
CARBURETER FOR EXPLOSIVE ENGINES.

APPLICATION FILED APR. 21, 1902.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3.

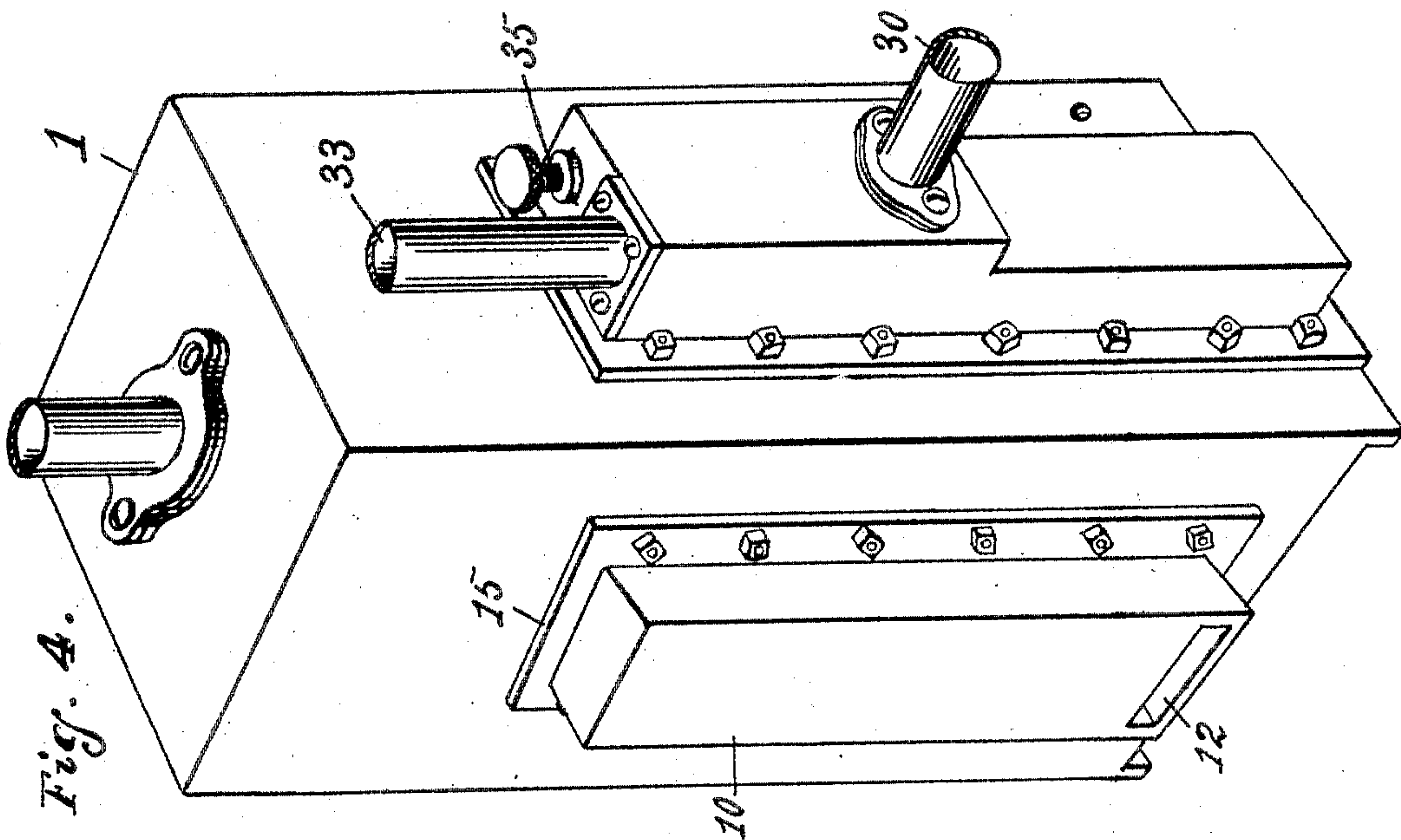
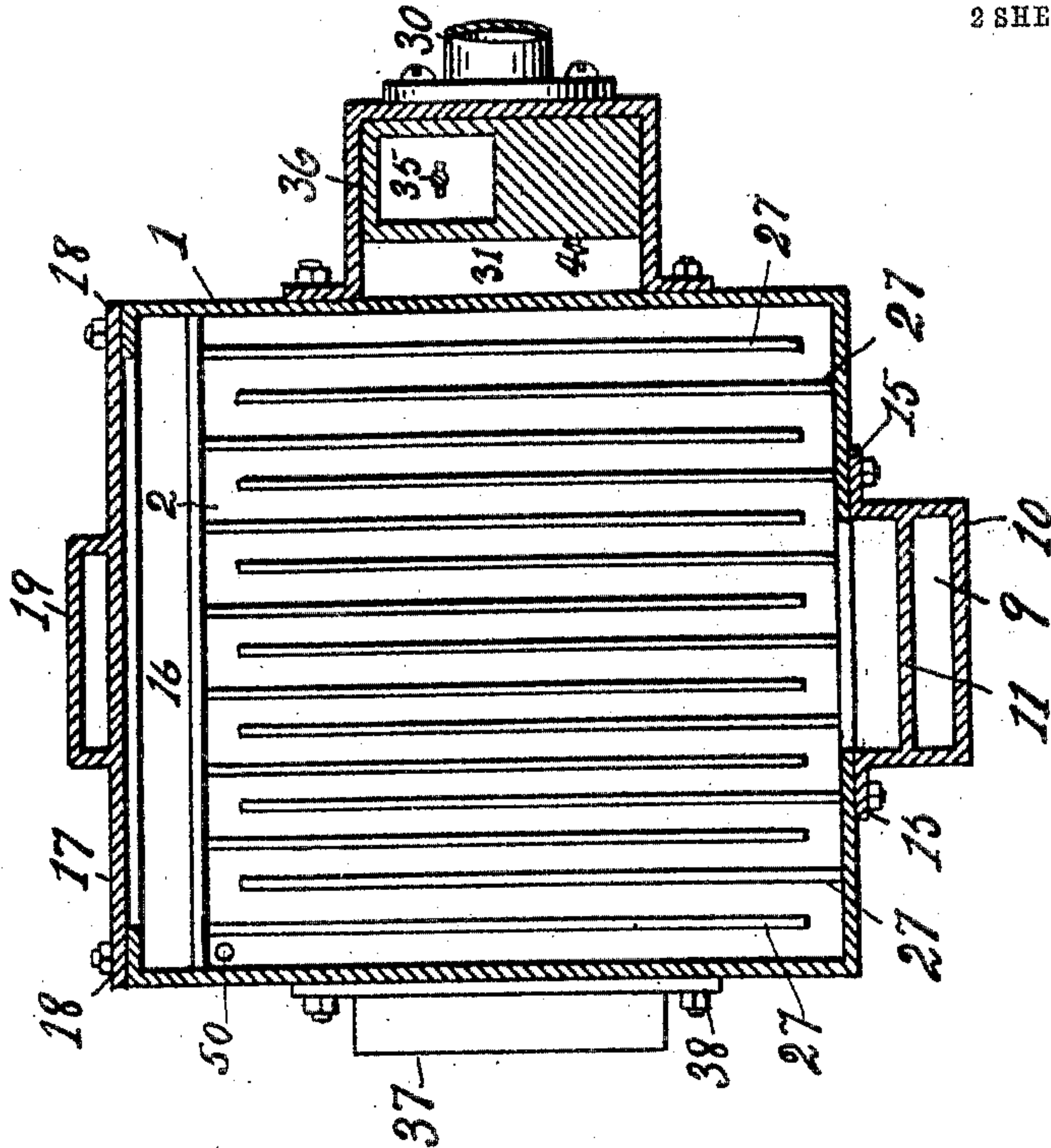


Fig. 4.

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# UNITED STATES PATENT OFFICE.

HENRY L. JESSEN, OF OAKLAND, CALIFORNIA.

## CARBURETER FOR EXPLOSIVE-ENGINES.

No. 797,206.

Specification of Letters Patent.

Patented Aug. 15, 1905.

Application filed April 21, 1902. Serial No. 103,844.

*To all whom it may concern:*

Be it known that I, HENRY L. JESSEN, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Carbureters for Explosive-Engines, of which the following is a specification.

My invention relates to improvements in apparatus for utilizing the heat of the exhaust-gases of gas-engines for generating vapor from crude oil for consumption in said engines.

The objects of my invention are, first, to provide means for applying the heat of the exhaust-gases to the oil in the most effective manner to vaporize the same; secondly, to provide improved means for commingling air with the vapor generated from the oil, and especially to so commingle the air with the vapor so generated as not in so doing to lift any oil therefrom, thereby insuring that the vapor produced shall be as dry and clean as possible; thirdly, to provide an apparatus of this character in which the tortuous passages for the exhaust-gases and the oil-vapor shall be separated by walls which contain no joints which would permit escape from one of said passages into the other, thereby absolutely preventing in all cases the mixture of the exhaust-gases with the oil-vapor; fourthly, to provide an apparatus of this character in which the main body of the apparatus can be made in a single casting, requiring only the addition of sides or covers therefor; fifthly, to provide an apparatus of this character which shall be as free as possible from valves or other movable parts.

In the accompanying drawings, Figure 1 is a vertical section of the apparatus. Fig. 2 is a similar section at right angles to Fig. 1. Fig. 3 is a horizontal section on the line A A of Fig. 2. Fig. 4 is a perspective view of the apparatus on a reduced scale.

Referring to the drawings, 1 represents a casting formed with plates 2 and 3 alternating with each other, of which the plates 2 of one series form the floors of the oil-chamber sections 4, while the plates 3 of the other series form the tops of said oil-chamber sections and the floors of the exhaust-chamber sections 5. The oil-chamber sections are closed at two opposite sides, as shown at 6, and are open at two opposite sides, as shown at 7 and 8, one of said openings extending less than half the width of the oil-chamber to admit air thereinto, while the opening 8 on the opposite side extends the whole width of the oil-chamber

to permit the commingled air and vapor to flow therefrom. The air which flows into said oil-chamber sections comes from a flattened vertical passage or conduit 9, formed in a wall 10, secured on the side of the casting 1, said passage being divided from the openings 7 by a partition 11, the air entering through an opening 12 in the bottom of said wall 10, flowing through said conduit 9 to the top thereof, and then flowing through an opening 13 in the partition 11 into the downwardly-extending conduit 14, which is connected with each of the openings 7, leading into the oil-chamber sections. Said wall 10 and partition 11 are formed all in one casting and are secured to the casting 1 by means of the flanges 15. The air flowing over the oil in the oil-chamber will commingle with the oil-vapor rising therefrom, and the commingled air and vapor will flow upward through a conduit 16 formed between the ends of the oil-chamber sections and a removable wall 17, secured, as shown at 18, to the side of the casting 1 opposite to the wall 10. The result of too strong a current of air passing over the oil in the oil-chambers would be to lift some of the oil therefrom while in its liquid condition, which would have the effect of rendering the gas oily, which is undesirable for use in vapor-engines. To prevent this, I provide a supplemental air-inlet, which consists of a shallow conduit between the wall 17 and an outer wall 19, said walls being formed all in one piece. An opening 20 is provided at the top through the wall 19 to admit the air which flows down and is admitted into the conduit 16 through an opening 21 at the bottom of the wall 17.

The casting 1 is formed so as to have at the top a reservoir 23, and below said reservoir enters the oil-pipe 24. Oil is fed into the apparatus through said pipe and drops upon a pan 25, supported by means of legs 26 upon the ribs 27 of the uppermost oil-chamber section. The oil is thus slightly heated before dropping onto said uppermost oil-chamber section, which it does through a hole 28 in the bottom of said pan 25. Each oil-chamber section is divided by alternating or zigzag ribs 27 to form a tortuous path for the oil, the oil at the end of the path of each section passing into the path of the next section by means of a pipe 30, cast integral with both sections. In said next lower section it again travels over a tortuous path, and so on to the lowermost section. During the whole of this movement it is exposed to the heat of the exhaust-gases



which surround said gas-chamber sections. Said sections are heated by means of the exhaust-gases passing between them, under and over each section in turn. The exhaust-gases are admitted by means of an opening 30 into a conduit 31, down which they pass to the bottom, and thence into the exhaust-gas chamber 32—that is to say, underneath the lowest gas-chamber to the opposite side, then up past the side of said gas-chamber and over the top thereof and underneath the next higher gas-chamber to the original side of the apparatus, and so on up to the top, eventually escaping by means of an opening 33. A valve 34 is raised by a screw 35 from its seat 36 to admit the exhaust-gases to pass in part directly to the opening 33 when desired if the heat supplied by said exhaust is greater than necessary or desirable, thereby permitting only a part of the exhaust-gases to pass around the oil-gas chamber. The conduit 31 for the exhaust and the turns in the tortuous exhaust-gas chamber on the side of the apparatus are both provided at the same time by means of a suitable casting 37, attached by its vertical flanges 38 to the side of the casting 1, so that each of the recesses 39 in the inner side of said casting register with two of the exhaust-gas-chamber sections, as shown. In the same way on the opposite side of the apparatus the exhaust-gas-chamber sections are united in pairs by means of a zigzag vertical plate 40, having recesses 41 sufficiently wide to register with two of the said exhaust-chamber sections.

It will be observed that with this construction of apparatus the main casting 1 is open at all four sides; but the openings on two opposite sides do not communicate with the openings on the other two sides. On two opposite sides are added plates or covers 37 40, which when connecting to the casting furnish a tortuous path for the exhaust-gases, and on the other two sides at right angles to the former two sides are provided removable walls which, secured to the casting 1, form a passage interlacing with the exhaust-vapor passage for the air and oil-gas to flow in a direction at right angles to the direction of flow of the exhaust-gases. By this means I insure that the full heat of the exhaust-gases can be utilized when desired, thus obtaining the greatest efficiency in the apparatus. I also provide a thorough circulation of the air over the oil-chambers and of the vapor rising therefrom, thus insuring a thorough commingling of the air and oil-vapor. It will also be observed by providing the walls 10 and 17, having long shallow vertical passages for the admission of air on both sides of the apparatus, I dispense with the necessity of check-valves to prevent the escape of the oil-vapor.

The commingled air and oil-vapor rise into the reservoir 23, and any vapor condensed therein will fall upon a shelf 42, thence upon the pan 25, and will drop therefrom upon the

upper gas-chamber section to again travel through said gas-chambers and be vaporized therein. The commingled air and vapor will pass from the reservoir by means of an opening 43, in the top thereof, to the engine to be utilized in the usual manner.

I claim—

1. An apparatus of the character described, provided with walls forming oil-chamber sections having openings on two opposite sides, walls forming a conduit on each of said sides connected with said openings, means for heating said oil-chamber sections, a discharge-passage for the vapor generated from said oil connected with one of said conduits, the other conduit being connected with the external atmosphere to supply air to said oil-chamber sections, and an inlet to the conduit connected with the discharge-passage, independent of the passage through the oil-chamber sections, substantially as described.

2. An apparatus of the character described, provided with walls forming oil-chamber sections, having openings on two opposite sides, means for heating said sections, walls secured on said opposite sides, spaced therefrom to form conduits connected with said openings, one of said walls having an opening in the upper portion thereof to admit air to the oil-chamber sections, and a discharge-passage with which the other conduit connects, the wall forming the latter conduit having an opening in its lower portion to admit air directly to said passage, substantially as described.

3. An apparatus of the character described, comprising a single casting having walls forming fluid-fuel-chamber sections, and exhaust-gas-chamber sections alternating with each other, the fuel-chamber section opening to the outside on two opposite sides, and the exhaust-gas-chamber sections opening to the outside on the other two opposite sides, means for closing the openings to the fuel-chamber sections to provide inlets and outlets for the passage of air therethrough and means for closing the two opposite sides of the exhaust-gas-chamber sections to provide inlets and outlets for the passage of exhaust-gas therethrough, and means for conveying fluid fuel through said fuel-chamber sections in succession independently of the passages for the air and exhaust-gas, substantially as described.

4. An apparatus of the character described, comprising a main casting provided with walls forming fluid-fuel-chamber sections and exhaust-gas-chamber sections alternating with each other, said fuel-chamber sections having openings on two opposite sides, and said exhaust-gas-chamber sections having openings on the other two opposite sides, removable plates closing the opposite sides of the fuel-chamber sections and spaced therefrom to form conduits into and out of said sections, and removable plates closing the opposite



sides of the exhaust-gas-chamber sections, each of said plates being recessed to register with the openings in two of the exhaust-gas-chamber sections on that side, said recesses on opposite sides of the main casting alternating with each other, thereby forming a tortuous exhaust-gas chamber around the fuel-chamber sections, substantially as described.

5. An apparatus of the character described, comprising a main casting having walls, forming fluid-fuel-chamber sections in vertical series, means for inclosing the ends of the fuel-chamber sections to form connecting-passages, detachable means for inclosing the ends of the spaces between said fuel-chamber sections to form connecting-passages between said spaces, said passages being independent of each other, substantially as described.

6. An apparatus of the character described comprising walls forming a vertical series of fluid-fuel chambers, walls forming a vertical series of chambers for a heating medium, alternating with said fuel-chambers, said heating-chambers being connected in succession alternately at opposite sides to form a tortuous but continuous heating-chamber, whereby each fuel-chamber is inclosed above and below by a portion of said tortuous heating-chamber, means for supplying a heating medium to said heating-chamber, means for supplying fluid fuel to one of the fuel-chambers, means for connecting the fuel-chambers, and means for

drawing off the gas generated from said oil-chamber, substantially as described.

7. In a vapor-generator, the combination of a casing having separate openings in its front and side walls, a vertical series of hollow separated boxes in said casing, means for supplying oil to the upper surfaces of the uppermost box of the series of boxes, said boxes having communicating passages directing the oil from one surface to the other successively, a cap covering the front opening of the casing, cooperating instrumentalities associated with the boxes and said cap forming a continuous circuitous course through all the boxes, said cap also having a channel communicating with the course through the boxes, a pipe for exhaust-vapor discharging into said channel, a discharge-pipe leading from the upper end of the course, and a second cap covering the side opening of the casing and having a channel therein communicating with the exterior air and therebelow with the base of the casing whereby air is supplied thereto, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HENRY L. JESSEN.

Witnesses:

FRANCIS M. WRIGHT,  
BESSIE GORFINKEL.