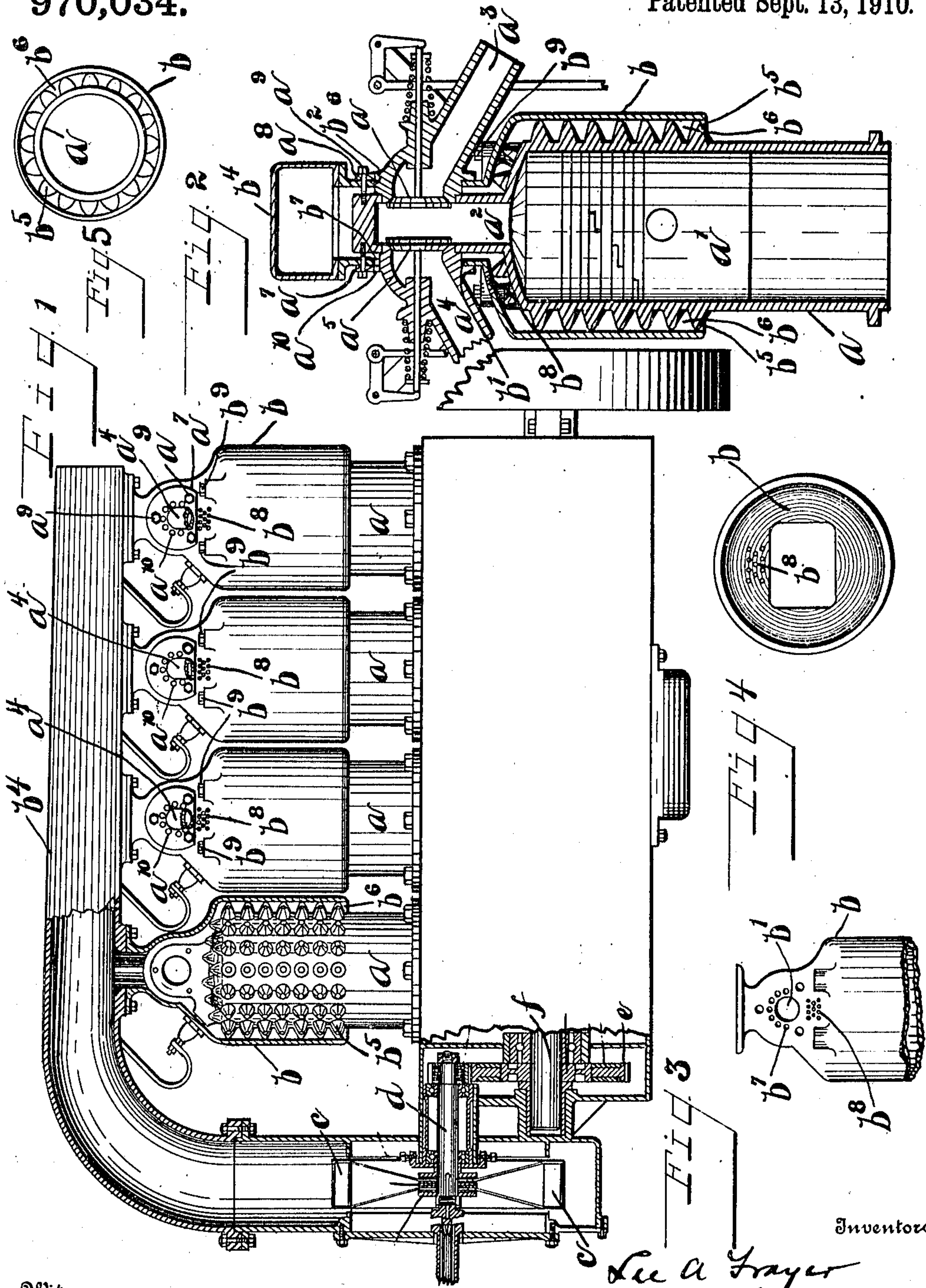


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EXPLOSIVE ENGINE.

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Patented Sept. 13, 1910.

970,034.



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UNITED STATES PATENT OFFICE.

LEE A. FRAYER, OF COLUMBUS, AND WILLIAM J. MILLER, OF SPRINGFIELD, OHIO,
ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE KELLY MOTOR TRUCK COMPANY, OF
SPRINGFIELD, OHIO, A CORPORATION OF OHIO.

EXPLOSIVE-ENGINE.

970,034.

Specification of Letters Patent. Patented Sept. 13, 1910.

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To all whom it may concern:

Be it known that we, LEE A. FRAYER, a citizen of the United States, residing at Columbus, in the county of Franklin, State of Ohio, and WILLIAM J. MILLER, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Explosive-Engines, of which the following is a specification.

This invention relates to improvements in explosive engines.

The objects of the invention are to provide improved means for cooling the valves and cylinders.

The invention consists in the constructions and combination of parts hereinafter described and set forth in the claims.

In the accompanying drawings, Figure 1 is a side elevation partly in section of a device embodying this invention. Fig. 2 is a vertical sectional view through one of the cylinders, its air jacket, supply and exhaust chambers and connected parts. Fig. 3 is a side elevation of a portion of the air jacket of one of the cylinders. Fig. 4 is a bottom plan view of the air jacket. Fig. 5 is a detail view of the fan showing the hub and projections.

Like parts are represented by similar characters of reference in the several views.

In the said drawings, *a* represent the respective cylinders of the engine, four of which are shown in the present instance.

*a*¹ is the piston connected in the usual way with the crank-shaft. Connected integrally with the upper end of the cylinder and opening thereinto is the combustion chamber, *a*², in the walls of which are the outlet and inlet openings communicating, respectively, with the supply and exhaust chambers, *a*³ *a*⁴, arranged opposite each other in the present instance. These openings are closed by the spring-pressed valves, *a*⁵ *a*⁶, operated in the usual way. Bolts, *a*⁹ secure the valve chambers to the combustion chamber.

Surrounding the cylinder and combustion chamber is an air jacket or casing, *b*, having openings *b*¹ and *b*² opposite the openings in the combustion chamber to permit the insertion of the exhaust and supply chambers. This air-jacket fits snugly about the exhaust and supply chambers, which chambers are

provided, respectively, with shoulders or flanges, *a*⁷ and *a*⁸ fitting closely against the outside of the said air-jacket; the bolts, *a*⁹, which secure the parts together passing through these flanges and the air-jacket and being secured in the walls of the combustion chamber. The air-jacket is further secured to the cylinder by bolts, *b*⁹, which pass through bosses on the air-jacket and into bosses on the head of the cylinder. The cylinder is also provided with series of spines or, spikes, *b*⁵, cast integrally therewith against which the air-jacket rests to support the same and prevent it from rattling; these spikes also furnishing a greater radiation for the cooling of the cylinder proper.

Secured to the upper end of the air-jacket and communicating therewith is an air-conduit, *b*⁴, adapted to receive a supply of air from a fan, *c*, of any suitable construction, secured to the starting shaft, *d*, which starting shaft is geared to the crank shaft *f* of the angle. The air jacket is sufficiently removed from the cylinder and combustion chamber to permit the free passage of the air about these parts, but the lower part of the air-jacket is partly closed by the lower series of spines or spikes, *b*⁵, so as to form in effect a series of openings, *b*⁶, at the lower end of the air-jacket to retard the passage of the air, so as to cause a considerable portion of it to pass out around the exhaust valve chamber, which is one of the most highly heated portions of an engine of this character. The flange, *a*⁷, of the exhaust chamber has a series of openings, *a*¹⁰, arranged above and on the sides of said chamber, and formed in the air jacket and adapted to register with these openings, *a*¹⁰, is a series of openings, *b*⁷. Also located in the air jacket directly beneath the exhaust chamber is a second series of openings, *b*⁸. By this construction it will be seen that a considerable portion of the air is discharged completely about the exhaust valve chamber through the series of openings before the air has become heated to any extent from the other parts, the remainder of the air passing down about the cylinder and through the openings, *b*⁶.

Having thus described the invention, we claim:

1. In a hydrocarbon engine, the combination with a cylinder, of a jacket which par-

5 tially incloses said cylinder, an air conduit which communicates with said jacket at the top of the cylinder, said air jacket being closed with the exception of a few small openings at the bottom thereof, and a valve casing also surrounded by said air jacket, said air jacket having a number of openings formed in the wall thereof adjacent said valve casing.

10 2. In a gas engine, the combination with a plurality of cylinders, and air jackets partially inclosing each of said cylinders, a fan, a conduit leading from said fan and extending along the tops of all of said cylinders, said conduits being in communication with each of the air jackets at the top thereof, valve casings also inclosed by said air jackets, said air jackets having a number of openings formed in the walls thereof adjacent said valve casings, and said air jackets being closed at their bottoms with the exception of a few small openings to thereby cause the major portion of the air from the conduit to pass out around the valve casings.

25 3. In a gas engine, the combination with a plurality of cylinders, of air jackets par-

tially inclosing each of said cylinders, a fan, a conduit leading from said fan and extending along the tops of all of said cylinders, said conduits being in communication with each of the air jackets at the top thereof, valve casings also inclosed by said air jackets, said air jackets having a number of openings formed in the walls thereof adjacent said valve casings, said air jackets being closed at their bottoms with the exception of a few small openings to thereby cause the major portion of the air from the conduit to pass around the valve casings, and a plurality of pins which extend between the cylinder and the air jacket.

In testimony whereof, we have hereunto set our hands this 25th and 14th days of July, 1908, respectively.

LEE A. FRAYER.

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