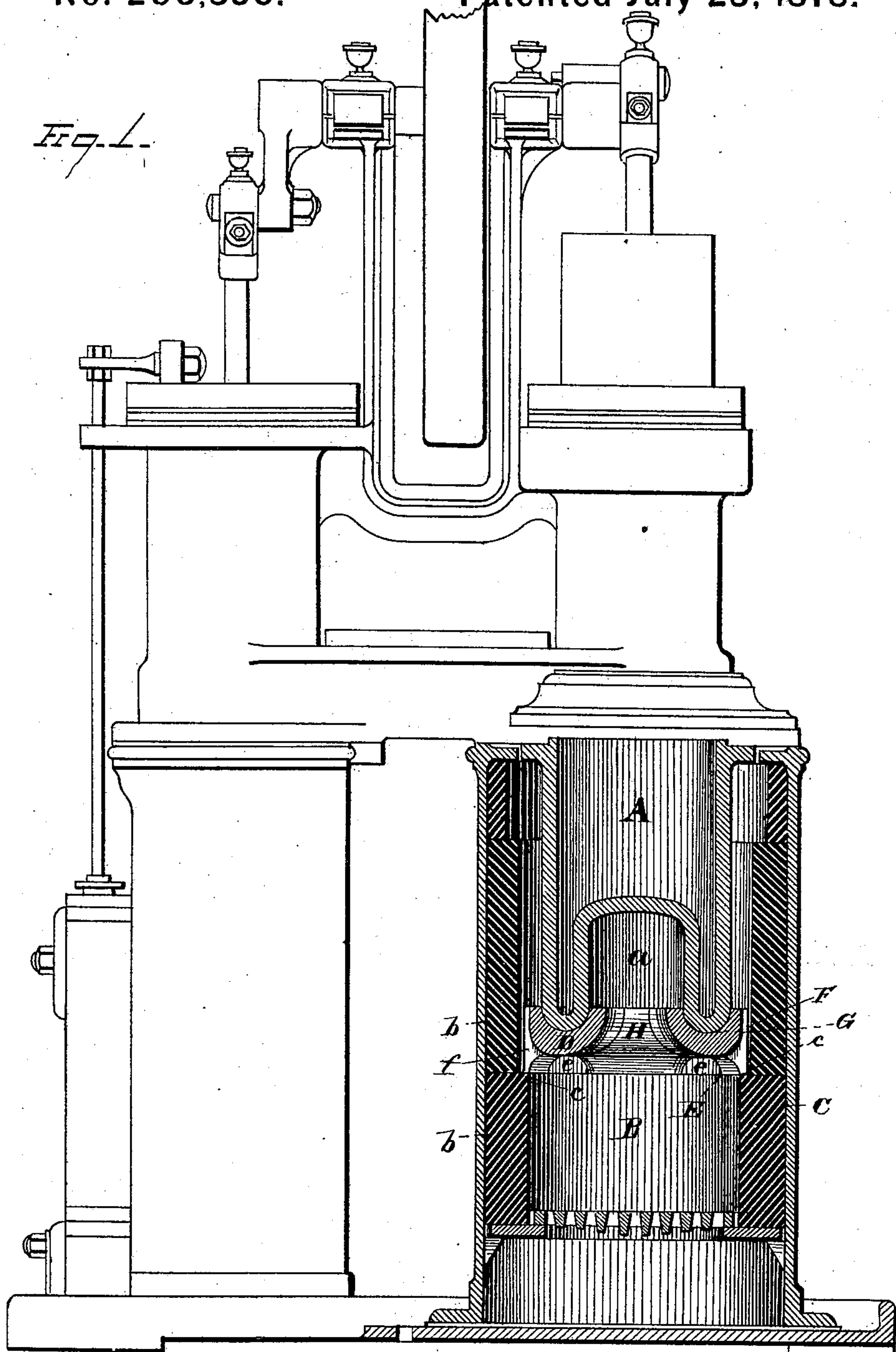


A. K. RIDER.  
Air-Engine.

No. 206,356.

Patented July 23, 1878.

Fig. 1.



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Fig. 2.

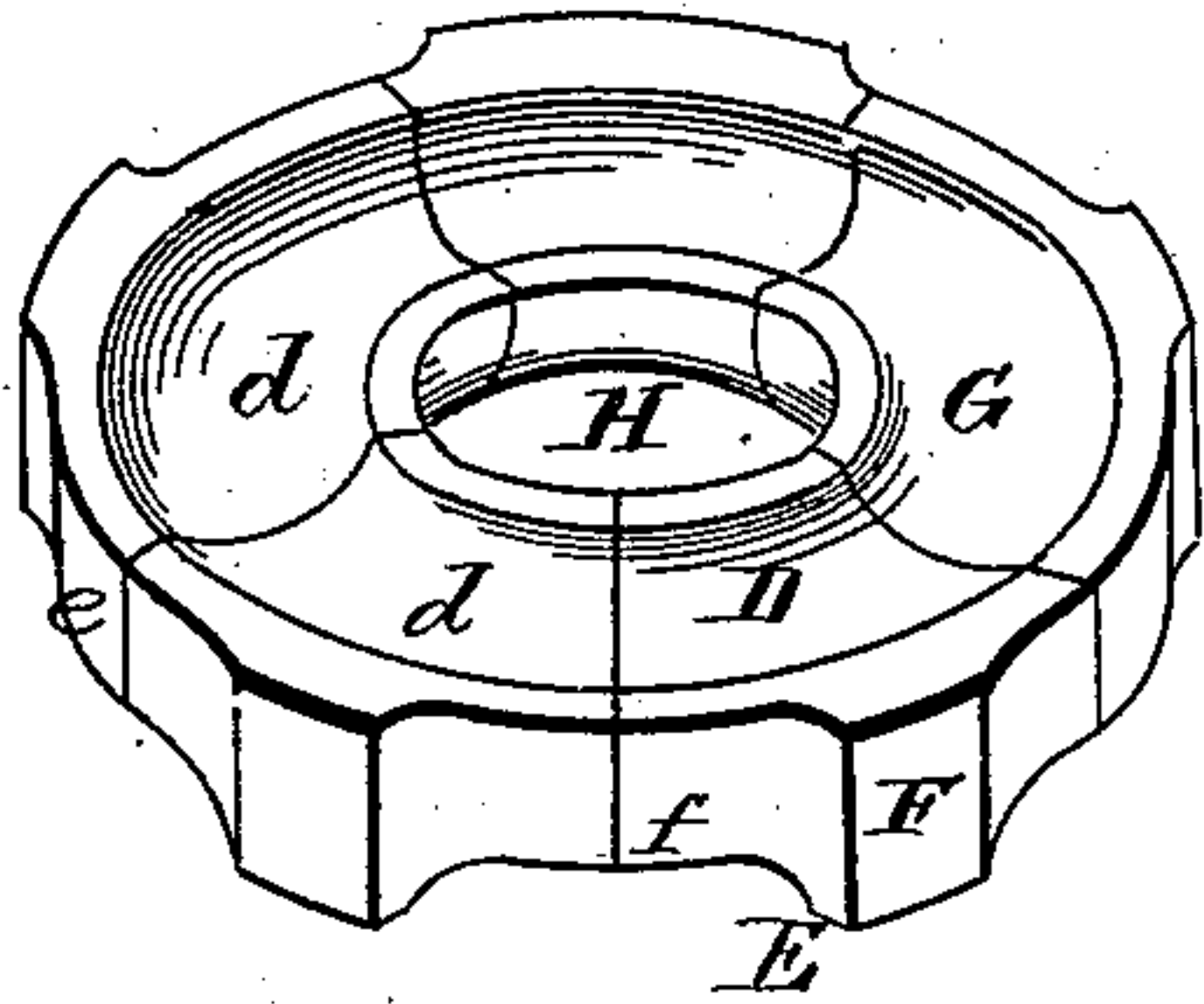
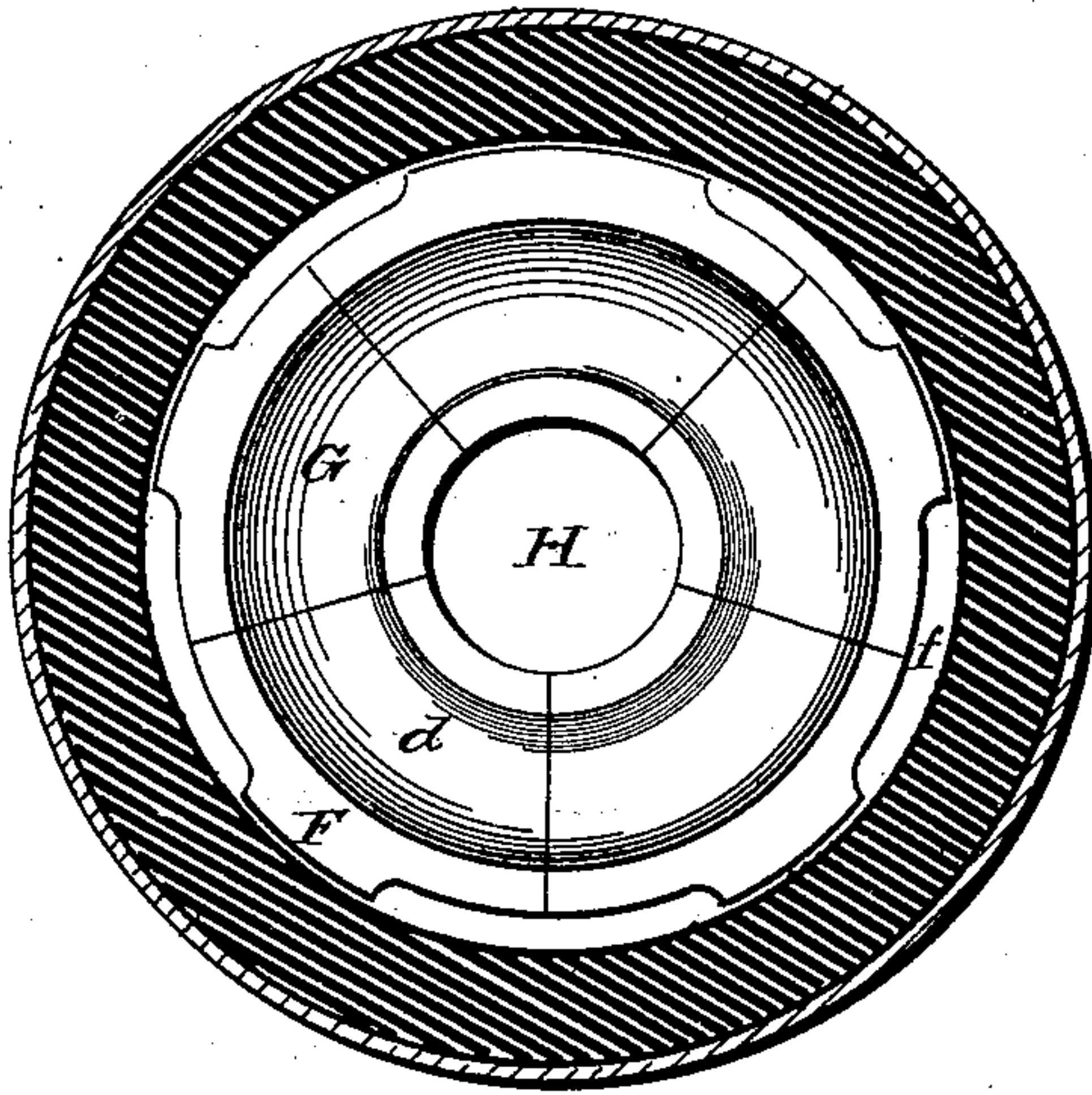


Fig. 3.



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# UNITED STATES PATENT OFFICE.

ALEXANDER K. RIDER, OF WALDEN, NEW YORK.

## IMPROVEMENT IN AIR-ENGINES.

Specification forming part of Letters Patent No. **206,356**, dated July 23, 1878; application filed June 26, 1878.

*To all whom it may concern:*

Be it known that I, ALEXANDER K. RIDER, of Walden, in the county of Orange and State of New York, have invented certain new and useful Improvements in Air-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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in air-engines, the object being to provide suitable and efficient means to insulate the heaters of air-engines from the direct action of the flames or fuel in the combustion-chamber, and thereby impart increased durability and effectiveness to the heaters; and to this end my invention consists, first, in an air-engine, a stationary shield, composed of any suitable refractory material, interposed between the heater and combustion-chamber, for the purpose of preventing the fuel or flames from impinging or coming in direct contact with the heater, and thus prevent the deterioration and disintegration of the latter, which would otherwise result from the oxidating and sulphureting properties of the fuel.

My invention further consists in a shield composed of any suitable refractory material, and provided with a central opening, said shield interposed between the heater and combustion-chamber of an air-engine, whereby the fuel or flames are prevented from impinging or coming in direct contact with any portion of the heater, while the heat may pass through the center of the shield and impinge against the crown of the heater.

My invention further consists in a shield composed of any suitable refractory material, and provided with wings on its periphery, said shield interposed between the heater and combustion-chamber of an air-engine, whereby the heat may flow from the combustion-chamber through the passages formed between the shield and wall of the combustion-chamber, and impinge against the periphery of the heater.

My invention further consists in certain details of construction, as will hereinafter be described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a front elevation of my improved air-engine, showing the heater, shield, and combustion-chamber in vertical section. Fig. 2 is an isometric view of the shield, and Fig. 3 a plan view of the shield, when in its proper position.

A represents the heater of an air-engine, constructed with a crown, *a*. B is the combustion-chamber, the walls of which are protected by a lining, C, composed of fire-clay or other suitable refractory material. Lining C is made up of two or more sections, *b*, the lower section being of the greatest thickness, to effectually resist the greater heat, to which it is subjected, it being in direct contact with the fuel and flames in the combustion-chamber. At the juncture of the lower section of the lining and the section supported thereon is formed an annular ledge, *c*, which serves an important function, as will be hereinafter explained. D represents a shield, formed of fire-clay or other suitable refractory material, and is preferably made in sections *d*, of any number desired. The lower surface of the shield is provided with feet or lugs E, and the periphery with wings F. The feet or lugs E rest upon the annular ledge *c*, formed by the inwardly-projecting lower section of the lining of the combustion-chamber, and thus serve as vertical supports for the shield, while the wings F abut against or rest in close proximity to the second course of the lining, *b*, and serve to prevent any lateral displacement of the shield. Between the feet or lugs E are passages *e*, which connect with passages *f*, formed between the wings F, and through said passages *e f* the heat from the combustion-chamber has an unobstructed passage to the annular space between the outer surface of the heater and wall or lining of the cylinder. The upper side of the shield D is formed with an annular groove, G, which corresponds in size and shape to the lower end of the heater. A central opening, H, is formed in the shield, to allow the heat to flow from the combustion-chamber through the shield and impinge on the crown of the heater.

From the foregoing it will be observed that the lower end of the heater is perfectly insulated from the direct contact of either the fuel or flames in the combustion-chamber, and



hence cannot be subjected to the injurious effects otherwise resulting in oxidating or sulphureting the lower end of the heater.

Another important result gained by the employment of my improved shield consists in the formation of a reverberatory chamber around the sides of the heater above the shield, which insures an even and diffused temperature to the heater.

In the foregoing description of my improvement I have set forth the preferable form and arrangement of a shield to effect the results specified; but I would have it understood that I do not limit myself to the exact form shown and described, as it is evident that many changes might be made which would not depart from the spirit and gist of my invention—as, for instance, the shield may be of the form of a flat disk, with or without a scalloped periphery, and perforated in any desired manner for the passage of heat. Again, it may be made in a single piece, or of any desired number of sections jointed together, as found most expedient in practice; and hence I do not restrict myself to the particular construction and arrangement of parts, as hereinbefore specified, but may vary the form to suit any conditions or form of combustion-chamber without impairing the efficiency of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an air-engine, a removable shield composed of any suitable refractory material, and interposed between the heater and combustion-chamber of the engine, substantially as set forth.

2. In an air-engine, a removable shield constructed of any suitable refractory material, and provided with a central passage or opening, said shield interposed between the heater and combustion-chamber of the engine, substantially as set forth.

3. The combination, with the heater and combustion-chamber of an air-engine, of a shield composed of any suitable refractory material and provided with radial wings, substantially as set forth.

4. The combination, with the heater and combustion-chamber of an air-engine, of a shield provided with feet or lugs, which rest upon an annular ledge in the combustion-chamber, substantially as set forth.

5. A shield for air-engines constructed with central and circumferential passages, substantially as set forth.

6. The combination, with the heater and combustion-chamber of an air-engine, of a shield interposed between said heater and combustion-chamber and suitable refractory lining for the fire box or chamber, the several parts being arranged to constitute a reverberatory chamber around the sides of the heater, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 22d day of June, 1878.

ALEXANDER K. RIDER. [L. S.]

Witnesses:

GEO. W. STODDARD,  
W. G. RUTHERFORD.