

No. 749,323.

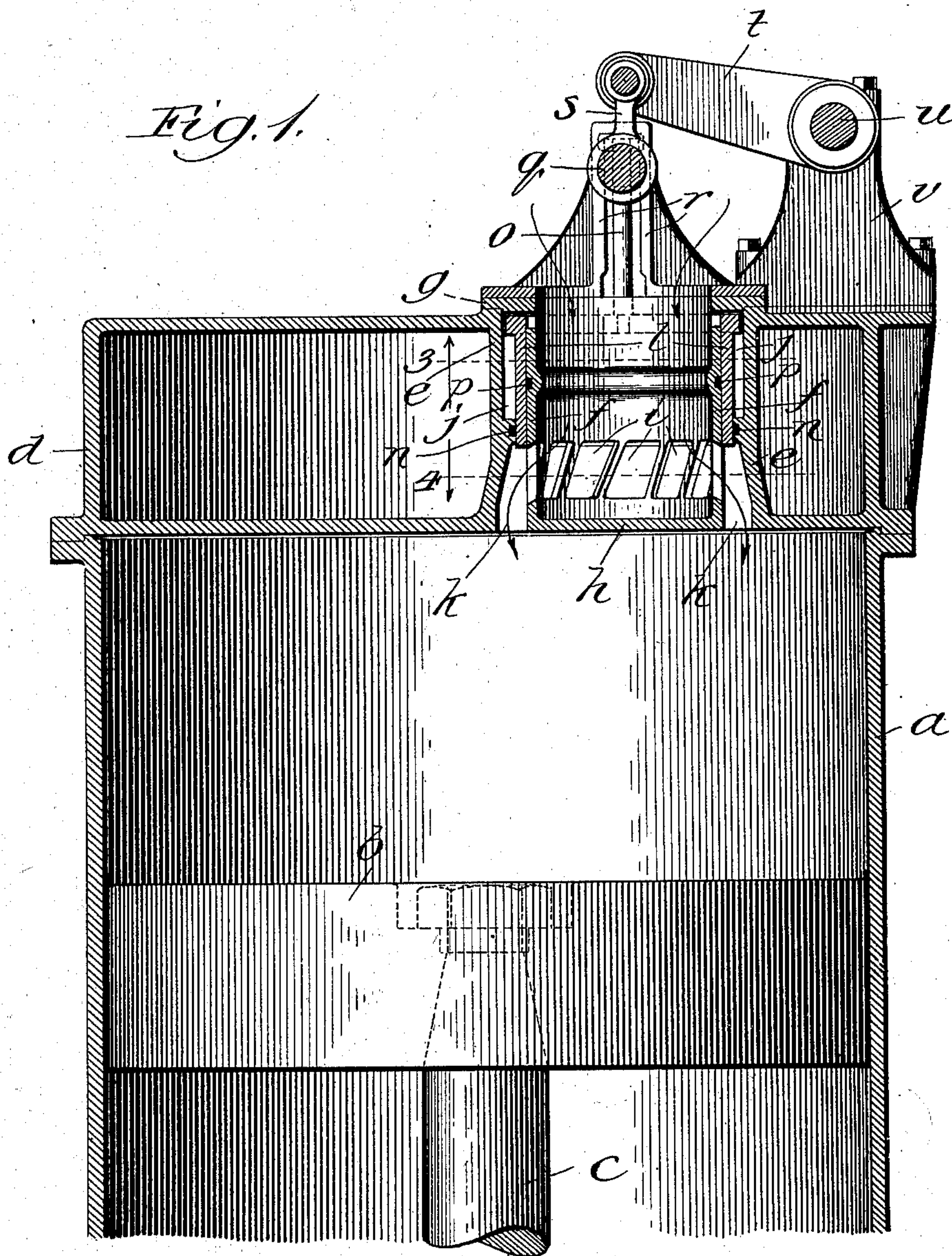
PATENTED JAN. 12, 1904.

I. H. REYNOLDS.
INLET VALVE FOR COMPRESSING ENGINES.

APPLICATION FILED DEC. 15, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
Ed. Gaylord,
Geo. C. Brown

Inventor:
Irving H. Reynolds,
By *Thomas F. Sheridan,*
Att'y

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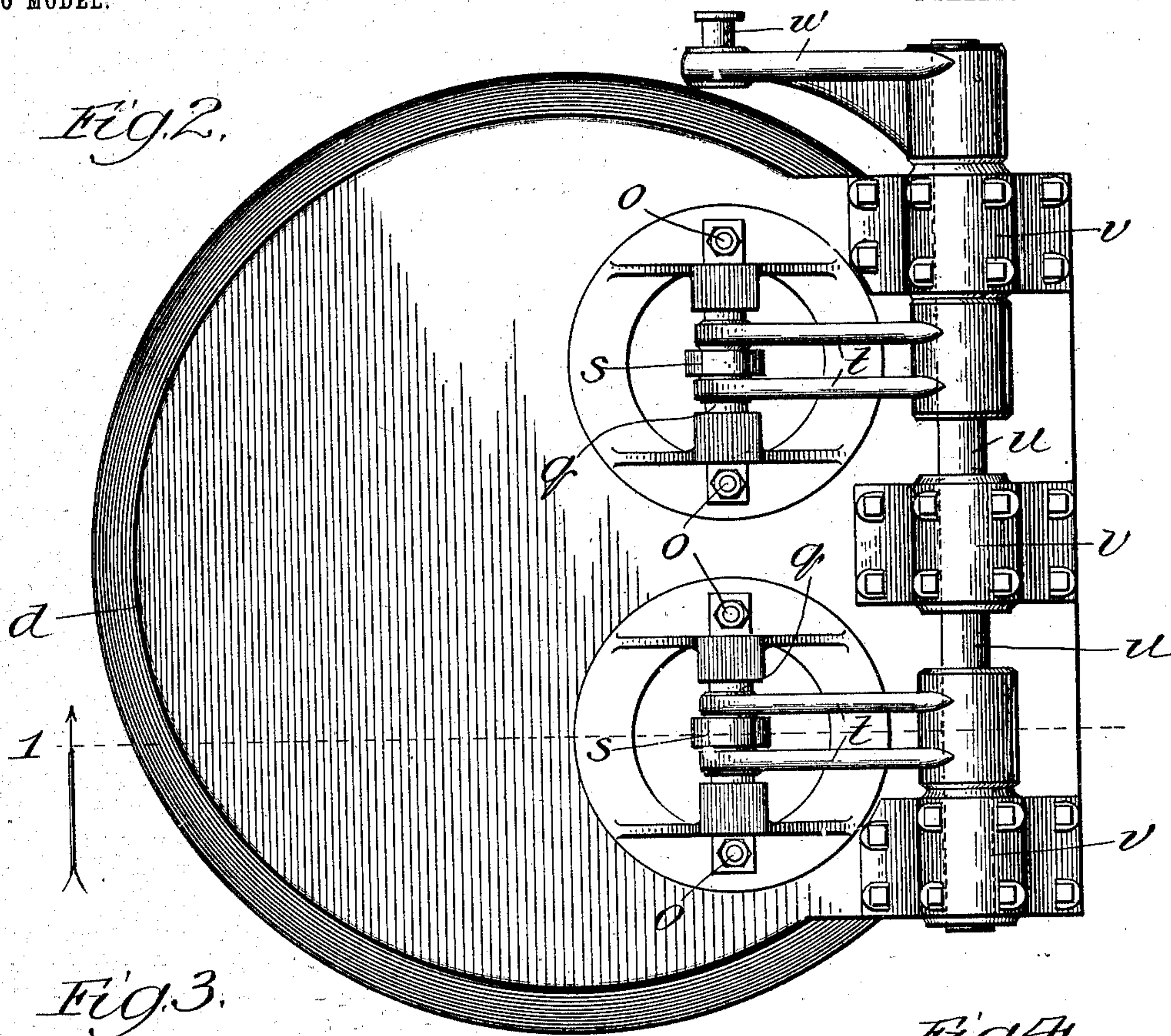
T. H. REYNOLDS.

INLET VALVE FOR COMPRESSING ENGINES.

APPLICATION FILED DEC. 15, 1902.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses:
 Carl Gaylord
 Ed. Larison.

Inventor:
Irving H. Reynolds,
By Thomas F. Sheridan,
Att'y.

UNITED STATES PATENT OFFICE.

IRVING H. REYNOLDS, OF MILWAUKEE, WISCONSIN.

INLET-VALVE FOR COMPRESSING-ENGINES.

SPECIFICATION forming part of Letters Patent No. 749,323, dated January 12, 1904.

Application filed December 15, 1902. Serial No. 135,307. (No model.)

To all whom it may concern:

Be it known that I, IRVING H. REYNOLDS, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Inlet-Valves for Compressing-Engines, of which the following is a specification.

This invention relates to that class of valves which are adapted to cover and uncover the inlet opening or openings in air compressing and blowing engines, and particularly to the details of construction and arrangement thereof, as will more fully hereinafter appear.

The principal object of the invention is to provide a simple, economical, and efficient inlet-valve for air compressing and blowing engines.

Further objects of the invention will appear from an examination of the drawings and the following description and claims.

The invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical sectional view of part of an air compressing and blowing engine as it appears when fitted with an inlet-valve constructed in accordance with these improvements, taken on line 1 of Fig. 2 looking in the direction of the arrows; Fig. 2, a plan view of the same looking at it from above; Fig. 3, a cross-sectional detail taken on line 3 of Fig. 1 looking in the direction of the arrow, and Fig. 4 a similar view taken on line 4 of Fig. 1 looking in the direction of the arrow.

In illustrating and describing these improvements I have only shown and described that which I consider to be new, taken in connection with so much as is old as will properly disclose the invention to others and enable those skilled in the art to practice the same, leaving out of consideration other and well-known parts which, if shown and described herein, would only tend to confusion, prolixity, and ambiguity.

In constructing and carrying out these improvements I take an air compressing or blowing engine having a cylinder *a*, with a compressing-piston *b* reciprocatingly mounted

therein, all constructed and arranged in the usual manner and the piston being provided with a piston-rod *c*, which is connected with the prime mover in the well-known manner. One or both ends of this engine-cylinder may be provided, as occasion requires, with a cylinder-head *d*, through which is arranged a cylindrical passage formed by the fixed wall *e*. This cylindrical passage, formed by the fixed wall *e*, forms a part of and, in fact, is the main part of the inlet-passage through which the air is admitted to the engine for purposes of compressing. To provide simple and economical inlet-valve mechanism, this cylindrical opening has a flanged cup-shaped piece or wall *f* axially and removably secured therein, with its outer end flanged at *g* and also open and its inner end formed of an imperforate wall *h*. The flange of this cup-shaped wall is removably secured to the cylinder-head in any well-known manner, either by bolts or nuts, and its side walls are provided with a series of quadrangular inlet-perforations *i*, diagonally arranged therein at or near its lower imperforate end. The body of this cup-shaped removable wall is also cylindrical and of a diameter smaller than the fixed wall, so as to provide an annular valve-chamber *j* between it and the adjacent fixed wall. The lower part of this annular valve-chamber is enlarged at *k* to a diameter exceeding that of the upper part of such annular valve-chamber, so that the air may have ready ingress, and thus minimize the frictional resistance as it enters the compressing-chamber. To cover and uncover the inlet-perforations *i*, a reciprocating sleeve-shaped valve *l* is provided and mounted in the annular valve-chamber. The upper part of this sleeve-shaped valve is preferably provided with an outwardly-extending flange *m*, which fits the valve-chamber at its greatest diameter. A packing *n* is arranged in the fixed wall between it and the reciprocating valve, and a second packing *p* is arranged in the removable wall between it and the reciprocating valve to seal the connections between such parts and prevent the ordinary leakage of air therethrough. The upper part of the valve-chamber is thus sealed at its lower end, but is provided with small openings in

the upper end through the wall 1, forming passages for air to and from the upper part of the valve-chamber. To reciprocate such valve and alternately cover and uncover the inlet-perforations during the operation of the engine, a cross-head *q* is provided and slidably mounted in the guideways *r*, secured to a relatively immovable part of the cylinder-head. This cross-head is secured to the reciprocating valve by means of two pins *o* and by means of a link *s* and lever-arm *t* is also secured to a rock-shaft *u*, mounted in brackets or standards *v* on the cylinder-head. This rock-shaft is provided with a crank and pin *w*, by which it may be secured to some mobile part of the engine—for instance, by means of an eccentric-rod mounted upon an eccentric secured to a rotating shaft on such engine. It will be seen, therefore, that during the ordinary operations of the engine this rock-shaft will be vibrated the desired amount and the valve reciprocated to alternately cover and uncover the inlet-passages.

I claim—

1. In mechanisms of the class described, the combination of an engine, a cylinder-head secured thereto having fixed and removable walls forming an annular valve-chamber therebetween, one of which walls is provided with inlet-perforations, a sleeve-shaped valve in such annular chamber for alternately covering and uncovering the inlet-perforations, and means for actuating said valve during the operations of the engine, substantially as described.

2. In mechanisms of the class described, the combination of an engine provided with a head having a cylindrical opening therein, a cup-shaped piece or wall axially and removably secured therein forming the inlet-passage proper and having a plurality of inlet-perforations in the side walls thereof forming an annular valve-chamber between it and the outer immovable walls of the engine, and a cylindrical sleeve-shaped valve in such annular chamber for alternately covering and uncovering the inlet-perforation in said side walls during the operations of the parts, substantially as described.

3. In mechanisms of the class described, the combination of an engine, a cylinder-head secured thereto and having a cylindrical fixed wall forming an opening therethrough, a flanged cup-shaped piece or wall axially and removably secured therein with its flanged open end portion secured to the outer end of the cylinder-head and provided with a plurality of inlet-perforations in its side walls forming an annular valve-chamber between it and the fixed wall of the cylinder-head, a sleeve-shaped valve in such annular chamber for alternately covering and uncovering the inlet-perforations, a cross-head connected with said valve, and rock-shaft mechanism con-

nected with the cross-head, substantially as described.

4. In mechanisms of the class described, the combination of an engine, a cylinder-head secured thereto having a cylindrical opening therein, a flanged cup-shaped wall or piece removably and axially secured therein with its flanged open end at the outside and provided with a plurality of diagonally-arranged inlet-perforations in its side wall and forming an annular valve-chamber between it and the adjacent fixed wall, a reciprocating valve in such annular chamber for alternately covering and uncovering such inlet-perforations, guideways secured to a relatively immovable part of the engine, a cross-head in such guideways secured to the valve, and a rock-shaft for operating such cross-head, substantially as described.

5. In mechanisms of the class described, the combination of a main cylinder provided with a pressure-chamber, a cylinder-head secured thereto provided with an annular wall forming an opening communicating with the chamber of such cylinder, an annular wall mounted within such opening and provided with inlet-openings therethrough communicating with the inner chamber of the cylinder, and an annular valve movably mounted intermediate such annular walls, substantially as described.

6. In mechanisms of the class described, the combination of a main cylinder provided with a pressure-chamber, a cylinder-head secured thereto provided with an annular wall forming an opening communicating with the chamber of such cylinder, an annular wall mounted within such opening and provided with inlet-openings therethrough communicating with the inner chamber of the cylinder, an annular valve movably mounted intermediate such annular walls, and crank and shaft mechanism connected with such valve for operating it, substantially as described.

7. In mechanisms of the class described, the combination of a main cylinder provided with a pressure-chamber, a cylinder-head secured thereto provided with an annular wall forming an opening communicating with the chamber of such cylinder, an annular wall mounted within such opening and provided with inlet-openings therethrough communicating with the inner chamber of the cylinder, an annular valve slidably mounted intermediate such annular walls in sliding engagement with one of such walls and provided with a flange at one end in sliding engagement with the adjacent wall, and a packing-ring arranged in sliding engagement with such valve, substantially as described.

8. In mechanisms of the class described, the combination of a main cylinder provided with a pressure-chamber, a cylinder-head secured thereto provided with an annular wall forming an opening communicating with the pressure-

chamber of such cylinder, an annular wall mounted within such opening provided with an open outer end and openings near the inner end thereof, and an annular valve slidably mounted intermediate such annular walls, substantially as described.

9. In mechanisms of the class described, the combination of a main cylinder provided with a pressure-chamber, a cylinder-head secured thereto provided with an annular wall forming an opening communicating with the chamber of such cylinder, an annular wall removably mounted within such opening and provided with openings at the outer and inner ends thereof, and an annular valve mounted intermediate such annular walls in sliding engagement therewith, substantially as described.

10. In mechanisms of the class described, the combination of a main cylinder provided with a pressure-chamber, a cylinder-head secured thereto provided with an annular wall forming an opening communicating with the chamber

of such cylinder, an annular wall mounted within such opening having an open outer end and openings near the inner end thereof and provided with an imperforate wall at its inner end, a sleeve-valve slidably mounted intermediate such annular walls, and means for operating such sleeve-valve, substantially as described.

11. In mechanisms of the class described, the combination of an engine, a cylinder-head secured thereto, a removable inlet-cylinder in such head provided with inlet-openings in the walls thereof, a sleeve-shaped valve reciprocatingly mounted upon and encircling such removable cylinder to cover and uncover the inlet-perforations, and means for actuating such valve by and during the operations of the engine, substantially as described.

IRVING H. REYNOLDS.

Witnesses:

JOHANN FREDERICK MAX PATITZ,
JOHN DAY, Jr.