

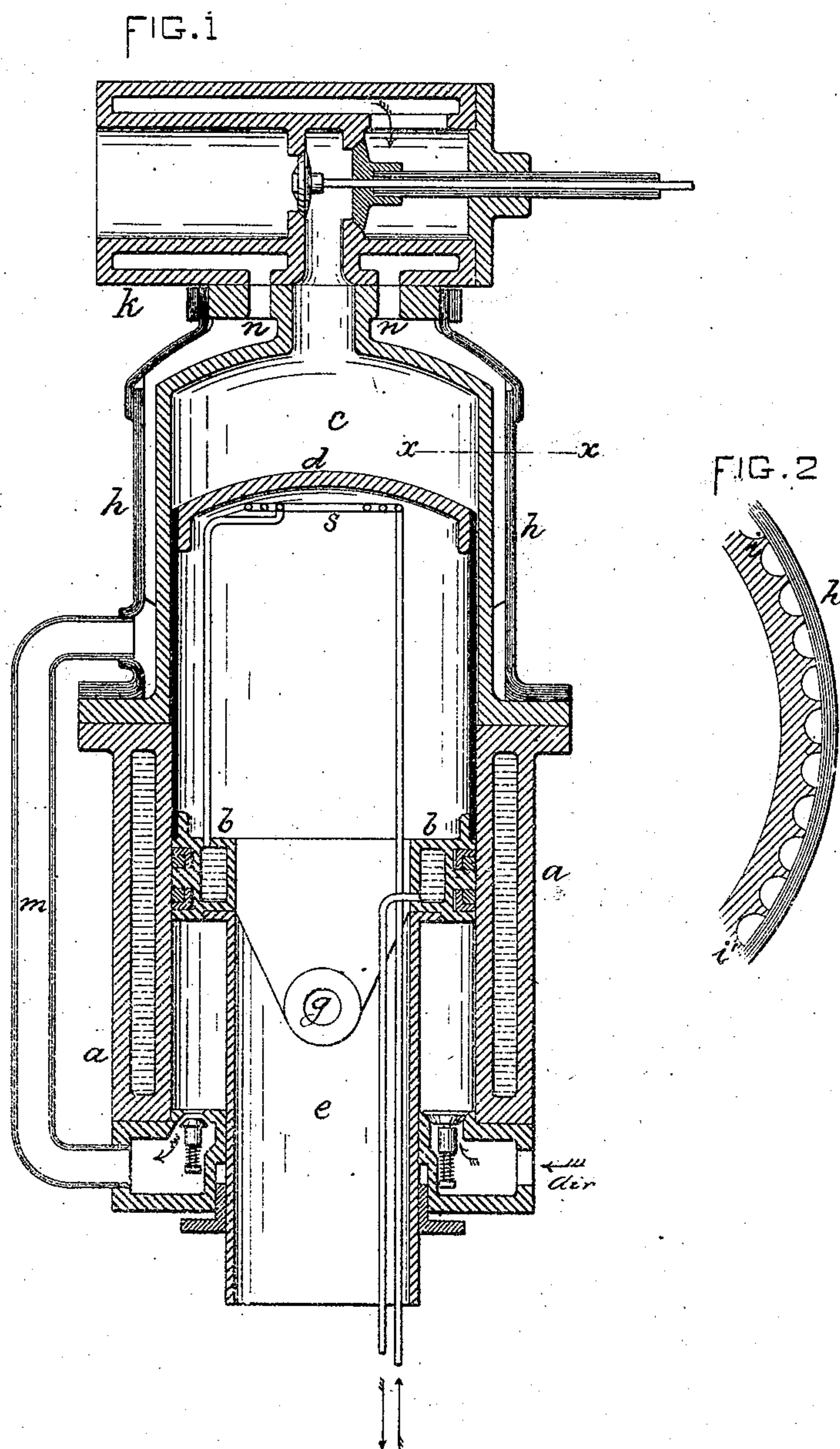
(No Model.)

S. WILCOX.

GAS ENGINE.

No. 343,744.

Patented June 15, 1886.



WITNESSES:

*Aug. H. H. H.*  
*M. R. Sanders*

INVENTOR

*Stephen Wilcox*

BY

*Chas. W. Forbes*

ATTORNEY



# UNITED STATES PATENT OFFICE.

STEPHEN WILCOX, OF BROOKLYN, NEW YORK.

## GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 343,744, dated June 15, 1886.

Application filed October 12, 1885. Serial No. 179,666. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN WILCOX, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Gas-Engines, of which the following is a specification, reference being had to the accompanying drawings, forming part of the same, in which—

Figure 1 represents a longitudinal section of a gas-engine, cylinders, and adjuncts embodying my invention; and Fig. 2, a transverse section of a portion of the cylinder-wall through the line *x x*, Fig. 1.

In the present instance my invention is embodied in a single-acting engine trunked at its cool end to form an air-pump, and at the opposite end of the cylinder provided with an extension-chamber, in which the hot gases act upon a plunger connected to the working-piston.

The object of my invention is to avoid the serious loss of heat occasioned in the cylinder by the surrounding water-jacket, and to prevent the destruction of the cast-iron shell of the extended chamber of the cylinder by warping and cracking under the internal fluctuations of temperature and pressure, and consequent expansion and contraction.

The invention consists in providing the shell of the extended chamber with a close-fitting jacket of wrought-iron for supporting and strengthening the same, the elasticity of the wrought-iron jacket providing for the individual expansion and contraction of the shell of the inclosed chamber.

The invention further consists in providing the shell of the extended chamber with a series of external ribs or projections, and surrounding the same with a close-fitting jacket of wrought-iron, whereby a chambered space is provided between the shell and jacket for the passage of air.

The invention also consists in arranging a water-coil within and against or adjacent to the plunger, for the purpose of maintaining the latter at a safe temperature, all as herein-after described and claimed.

In the drawings, *a* represents the cylinder, in which the piston *b* reciprocates; and *c*, the extended chamber of the cylinder, in which the hollow plunger *d* is arranged, the latter

being connected directly with the piston *b*, and acting coincident therewith. The piston *b* is constructed with a trunk, *e*, that passes through a stuffing-box, and is also provided with an interior connection, *g*, to which the connecting-rod of the engine is attached, this trunk arrangement providing an annular space that is utilized as the air-pump chamber, the piston *b* acting as the air-pump.

*h* represents a wrought-iron jacket surrounding the cast-iron shell of the extended cylinder-chamber *c*, the latter being constructed with external ribs or projections *i*, (shown in the cross-sectional view, Fig. 2,) against which the jacket is closely fitted. This jacket *h* firmly supports the cast-iron shell of the chamber *c*, and its elasticity provides for the incidental contraction and expansion of the cylinder, the expansion of the latter tending to straighten the wrought-iron jacket between its points of bearing on the external projections of the cylinder. The construction of the external surface of the cylinder shown in connection with the surrounding jacket also provides space for the passage of the air from the air-pump to the valve-chamber *k*, from which it is admitted to the combustion chamber or cylinder.

In passing the compressed air on its way from the air-pump to the combustion or cylinder-chamber through the space provided between the chamber and its surrounding jacket, both are kept at a safe temperature, and at the same time the air is heated. The air enters the jacket through a pipe, *m*, leading from the air-pump, connected near the cylinder, and passes into the valve-chamber through openings *n* in the flange of the valve-chamber nozzle, thus passing immediately over the entire surface of the cylinder-chamber *c*. The working-cylinder is water-jacketed as far as the piston reciprocates, the latter being also made hollow, to provide for water-circulation. The plunger *d* is kept at a safe temperature through the medium of a coil of water-pipes, as shown at *s*, which are connected to the water-circulation in the manner shown, or in any convenient way. This water-coil *s* may be arranged in proximity to the plunger, as shown, whereby the stratum of adjacent air is cooled, and, if desired, the coil may be extended to



occupy the whole width of the plunger, or arranged in contact with its surface.

Having now fully described the various details of construction to which my invention is confined, I do not deem it necessary to a complete understanding of the invention to herein repeat its well-known mode of operation. Therefore,

What I claim, and desire to secure by Letters Patent, is

1. A cylinder of a gas-engine provided with a close-fitting continuous wrought-iron jacket for strengthening the same, and to allow by its elasticity for the expansion and contraction of the cylinder.

2. A cylinder of a gas engine provided with ribs or projections upon its external surface and a close-fitting continuous wrought-iron jacket, whereby the range of elasticity of the

latter is increased and an intermediate space provided, through which the compressed air passes on its way to the cylinder.

3. In a gas-engine, substantially as described, a water-circulating pipe or coil arranged within and adjacent to or in contact with the piston-plunger.

4. A cylinder of a gas-engine having its extended portion constructed with a grooved external surface and provided with a close-fitting wrought-iron jacket to form a passage for the compressed air flowing to the cylinder, and having that portion of its surface adjacent to the piston provided with a water-jacket.

STEPHEN WILCOX.

Witnesses:

AUG. WHITE,  
CHAS. W. FORBES.