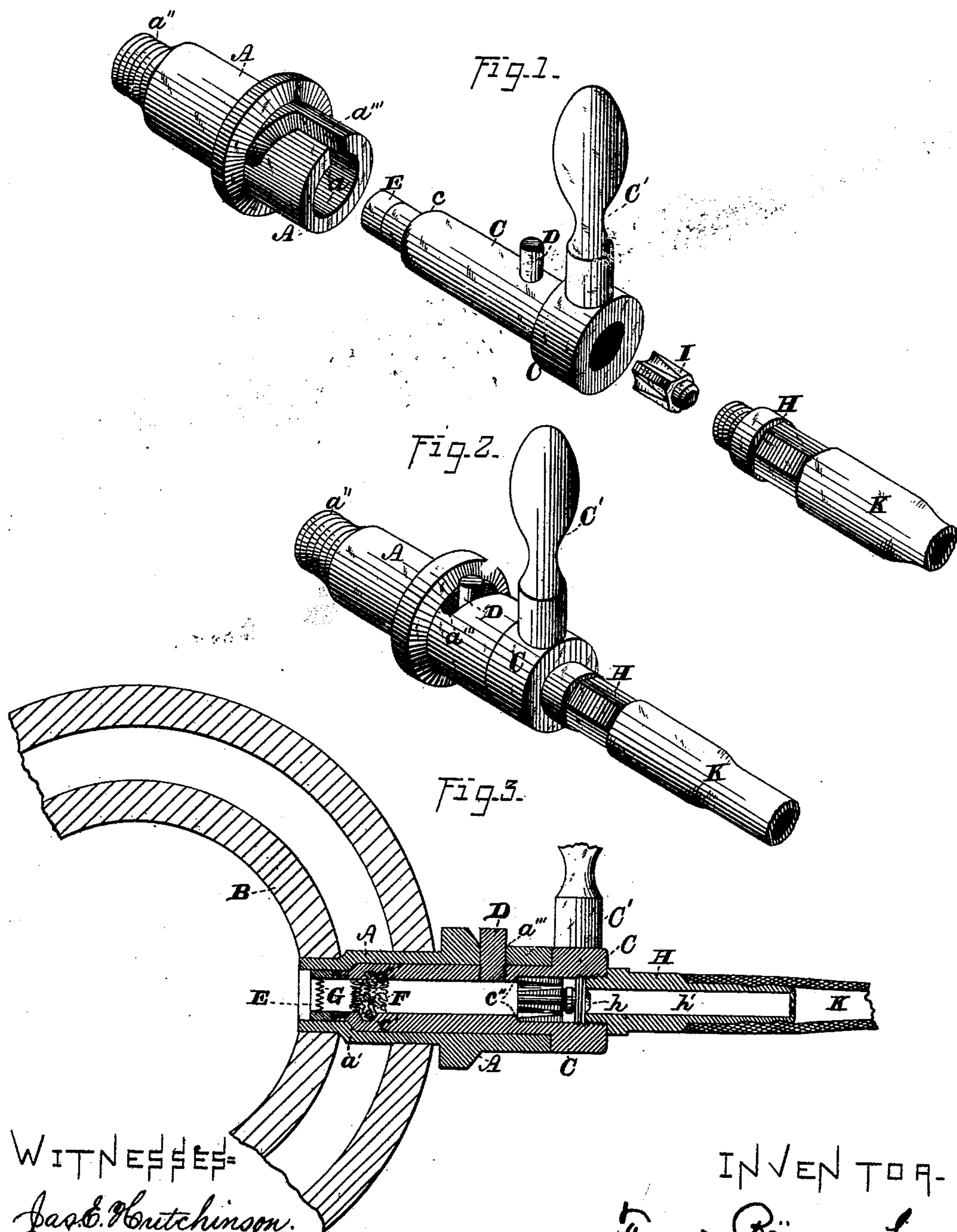


F. BÜRGER.
Gas-Engine.

No. 222,569.

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WITNESSES
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UNITED STATES PATENT OFFICE.

FRANZ BÜRGER, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN GAS-ENGINES.

Specification forming part of Letters Patent No. **222,569**, dated December 16, 1879; application filed May 5, 1879.

To all whom it may concern:

Be it known that I, FRANZ BÜRGER, of Washington, in the county of Washington, and in the District of Columbia, have invented certain new and useful Improvements in Gas-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the parts of my device separated from each other. Fig. 2 is a like view of said device as arranged for use, and Fig. 3 is a central longitudinal section of the same and the side wall of a cylinder to which it is attached.

Letters of like name and kind refer to like parts in each of the figures.

In the use of gas-engines great difficulty has heretofore been experienced in igniting the explosive mixture within the cylinder, the gas-jet employed for such purpose being usually extinguished by the explosion, unless complicated and expensive mechanism was used for cutting off communication between said jet and the interior of said cylinder at the instant said explosive mixture was ignited, and even such mechanism has not been certain in its operation.

To remedy this difficulty is the design of my invention, which consists, principally, as a means for igniting an explosive mixture within a gas-engine, in a gas-burner provided with a heat-storing device, composed of platinum or other metal, so arranged as to receive heat from the gas when ignited, and to ignite the same when extinguished by an explosion, substantially as hereinafter specified.

It consists, further, in a gas-burner for igniting gas within a gas-engine, provided with a heating and expansion chamber directly in rear of the point where the gas is consumed, substantially as and for the purpose hereinafter shown.

It consists, further, in a gas-burner for igniting gas within the cylinder of a gas-engine, in which are combined the following elements, to wit: a tube for the supply of gas, a heating or expansion chamber, an opening for the es-

cape and ignition of gas, and means whereby heat may be stored at or near said opening for the reignition of said gas when the same has been extinguished, substantially as hereinafter set forth.

It consists, finally, in the construction of the several parts of the burner and their combination with each other, substantially as and for the purpose hereinafter shown and described.

In the annexed drawings, A represents a cylindrical piece of metal, provided with a round axial opening, *a*, which has a uniform diameter from its outer end nearly to its opposite end, and is then decreased in diameter, so as to form at such point an inclined shoulder, *a'*, which operates as a seat or bearing.

The inner end of the cylinder or casing A is provided with an external screw-thread, *a''*, by means of which it is secured within the wall of the cylinder B of a gas-engine, while from its outer end a slot, *a'''*, extends longitudinally inward for a short distance, and thence circumferentially and slightly inward a farther distance equal to about one-fourth the circumference of said cylinder, said slot being substantially the same as that used in the collar of a bayonet.

Fitted within the cylinder A is a tube, C, which exteriorly conforms to and closely fills the interior of the same, and is provided with a radial stud, D, that passes into the slot *a'''*, and, when said tube is rotated, causes a shoulder, *c*, which corresponds to the seat *a'*, to be firmly pressed upon said seat.

At the outer end of the tube C is provided a radial handle, C', by which said tube is placed within or removed from the cylinder A, and at such point said tube is preferably increased in radial dimensions, so as to correspond in diameter to the diameter of the contiguous portion of said cylinder.

The interior of the inner end of the tube C is enlarged and threaded for a short distance, and within the same is fitted the reduced exteriorly-threaded portion of a thimble, E, which latter, when in place, forms a continuance of said tube, as shown.

Between the inner end of the thimble E and the inner end of the enlargement or recess *c'*

of the tube C is placed a gas-check, F, composed of one or more thicknesses of wire-gauze, or of a matted mass of fine wire, while within said thimble, in front of said check, is placed a piece of metal, G, preferably platinum, which has any desired form or dimensions that will permit of the passage of gas from said tube.

Within the outer end of the tube C is provided an enlargement or recess, *c''*, which, near its outer end, is threaded, and receives the reduced exteriorly-threaded end of a tube, H, while between said tube and the inner end of said recess is placed a valve, I, with a face upon its outer end which corresponds to a seat, *h*, upon the inner end of said tube.

The whole or a portion only of the opening *h'* through the tube H has such dimensions as to permit the passage of no more gas than is sufficient to supply the burner, the diameter of said opening being, preferably, about one-sixty-fourth of an inch.

The tube H is preferably connected with a gas-supply by means of a flexible tube, K, after which the burner is ready for use, as follows, viz: The tube C is removed from the cylinder or casing A, and the gas escaping from its inner end is ignited, after which said tube is replaced, so as to bring the flame inside of or in immediate proximity to the interior of the cylinder B, after which the engine may be started. As each charge of the explosive mixture is admitted to the cylinder B it is ignited by the burning gas at the inner end of the tube C, and in the explosion which immediately follows said gas is extinguished; but the piece of metal G, having become intensely heated by the flame which has surrounded it, retains sufficient heat to instantly reignite said gas, which is then ready to ignite another charge of the explosive mixture.

When the explosion occurs within the cylinder the valve I is instantly seated, and prevents all loss of pressure through the gas-supply tube; but when the pressure within said cylinder is once more normal, then said valve is opened by the inflowing current of gas.

The space between the gas-check F and the valve I operates as a chamber, within which the gas becomes heated and expanded to such a degree as to cause it to more readily burn,

and also to prevent it from cooling, materially or injuriously, the metal piece G.

It has been shown by practical use that the heat stored in the metal piece G is sufficient to always reignite the gas, and that nothing but a failure of the gas-supply will prevent the constant renewal of the light within the cylinder after the burner has once been started.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. As a means for igniting an explosive mixture within a gas-engine, a gas-burner provided with a heat-storing device, composed of platinum or other metal, arranged to receive heat from the gas when ignited, and to ignite the same when extinguished by an explosion, substantially as and for the purpose specified.

2. A gas-burner for igniting an explosive mixture within a gas-engine, provided with a heating and expansion chamber directly in rear of the point where the gas is consumed, substantially as and for the purpose shown.

3. A gas-burner for igniting an explosive mixture within the cylinder of a gas-engine, in which are combined the following-named elements, to wit: a tube for the supply of gas, a heating or expansion chamber, an opening for the escape and ignition of gas, and means whereby heat may be stored at or near said opening for the reignition of said gas when the same has been extinguished, substantially as set forth.

4. The hereinbefore-described gas-burner, consisting of the cylinder A, provided with the axial opening *a*, seat *a'*, and slot *a'''*, the tube C, having the shoulder *c*, threaded recesses *c'* and *c''*, and stud D, the thimble E, the gas-check F, the heat-retainer G, the tube H, provided with the seat *h*, and the valve I, said parts being constructed and combined to operate in the manner and for the purpose shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 20th day of December, 1878.

FRANZ BÜRGER.

Witnesses:

GEO. S. PRINDLE,

JAS. E. HUTCHINSON.