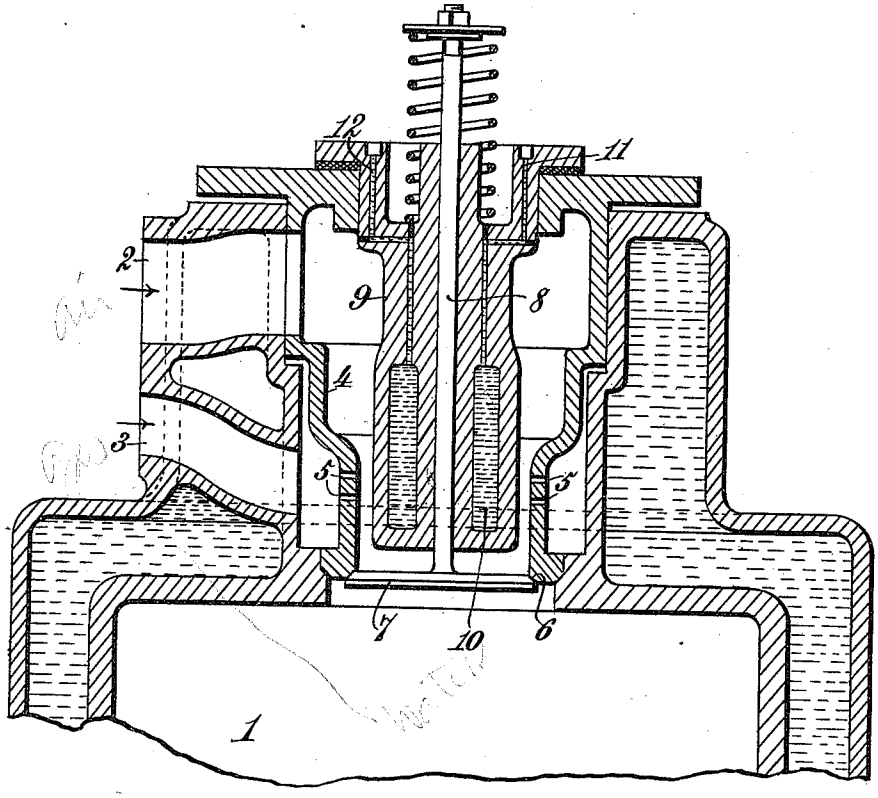
(No Model.)

B. WOLF.

GAS OR PETROLEUM ENGINE OR MOTOR.

No. 566,263. Patented Aug. 18, 1896.



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UNITED STATES PATENT OFFICE.

BELA WOLF, OF MÜLHEIM, GERMANY.

GAS OR PETROLEUM ENGINE OR MOTOR.

SPECIFICATION forming part of Letters Patent No. 566,263, dated August 18, 1896.

Application filed December 14, 1895. Serial No. 572,158. (No model.)

To all whom it may concern:

Be it known that I, BELA WOLF, a subject of the Emperor of Austria-Hungary, residing at Mülheim, Germany, have invented new and useful Improvements in Gas or Petroleum Engines or Motors, of which the following is a specification.

This invention relates to gas or petroleum engines or motors wherein combustible charges are ignited to drive or propel a piston moving in a working cylinder which is provided with an inlet-valve to control the admission of the charge into the cylinder at one side of the piston.

In the larger engines or motors of the character alluded to the fixed guide for the spindle of the inlet-valve becomes heated to such extent that the entering air is highly heated thereby and expands before entering the working cylinder, thus diminishing the weight of the combustible charge admitted into the cylinder and proportionately decreasing the power of the engine or motor.

The object of my invention is to avoid the objection stated by constructing the fixed guide for the spindle of the inlet-valve in such manner that it can be cooled internally and presents an expanded or large exterior cooled surface, whereby the entering air is effectually cooled by the spindle-guide in the chamber where the air and gas commingle and the charge enters the working cylinder without the air being expanded or rarefied.

To accomplish this object my invention involves the features of construction, the combination or arrangement of parts, and the principles of operation hereinafter described and claimed, reference being made to the accompanying drawing, in which the figure is a central sectional view of one end portion of the working cylinder of a gas or petroleum engine or motor embodying my invention.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawing, wherein—

The numeral 1 indicates the working cylinder of a gas or petroleum engine or motor. This cylinder may be provided, as usual, with a water-jacket for cooling the same, and at one end portion the cylinder is reduced in diameter and constructed with an air-inlet 2 and a gas-inlet 3. At one end of the cylinder is arranged a mixing-chamber composed of a cylindrical tubular portion 4, provided with lateral inlet-orifices 5 and having its inner end constructed with a valve-seat 6, against which seats the inlet-valve 7. The inlet-valve is provided with a long spindle 8, extending through the center of a spindle-guide 9, secured in the outer end portion of the cylindrical tubular part 4. The inner end portion of the spindle-guide is expanded or enlarged and is provided internally with a water-circulating chamber 10, communicating with inlet-passages 11 and 12 of comparatively small diameter in such manner that a cooling fluid, such as water, can be introduced into the passage 11 and caused to circulate through the chamber 10 and escape through the passage 12, thereby cooling the spindle 8 of the inlet-valve 7. The enlarged or expanded inner end portion of the spindle-guide is also cooled externally and presents a very large cooling-surface, so that the air entering the inlet 2 into the mixing-chamber, into which the spindle-guide extends, is effectually cooled, so that it will not expand. By this means the weight of the charge introduced into the working cylinder is not diminished and the full power of the engine or motor is secured.

The gas or other combustible fluid entering the inlet 3 passes through the orifices 5 into the mixing-chamber surrounding the inner end portion of the spindle-guide, where such fluid commingles or mixes with the cooled air. In the arrangement shown the gas or other combustible fluid entering the inlet 3 is also cooled by the expanded or large cooling-surface afforded by the inner end portion of the spindle-guide. The cooling of the gas or other combustible fluid, however, owing to its small quantity in proportion to the quantity of air, is less important than the cooling of the air, and therefore the gas or other combustible fluid may be caused to enter through a special valve, as in ordinary gas-engines.

The extended or large cooling-surface afforded by the expanded inner end portion of the spindle-guide also serves to cool the cy-

lindrical tubular portion or valve-casing 4, so that this valve-casing, as well as the spindle of the inlet-valve, and the inlet-valve itself, are protected against superheating by the gases of explosion, and, further, the ignition of the charge on the valve itself is prevented.

In large gas or petroleum engines the inlet-valves are easily heated to a considerable extent, so that the entering air takes up considerable heat by contact with the hot walls of the valves, the spindle-guides, and the valve-spindles.

It has been proposed to cool the casings of the inlet-valves from the exterior, but this cooling is not effective, in that the spindle of the inlet-valve and the guide of the spindle are not prevented from becoming hot. Further, the casing of the valve is often surrounded by the gas-channel, so that one portion of the outer cooling-surface is lost. By my invention the casing of the inlet-valve is cooled from the inside by allowing water to flow through the circulating-chamber in the guide for the spindle of the inlet-valve. To secure the result attained by me, it is essential that the inner end portion of the spindle-guide be enlarged in order that it will present an extended or large cooling-surface to the air in the mixing-chamber.

Having thus described my invention, what I claim is—

1. The combination with the working cylinder of a gas or petroleum engine, having air and gas or petroleum inlets, and an inlet-valve provided with a spindle, of a spindle-guide arranged in the path of the entering air and having its inner end portion expanded and constructed with an internal water-circulating chamber, for the purpose of cooling the air prior to the charge entering the working cylinder through the inlet-valve, substantially as described.

2. The combination with the working cylinder of a gas or petroleum engine, having air and gas or petroleum inlets, and a mixing-chamber provided with an inlet-valve controlling communication with the working cylinder, of a guide for the spindle of the said inlet-valve, extending into the said mixing-chamber and having an expanded or widened inner end portion containing an internal water-circulating chamber for cooling said guide and thereby cooling the valve-spindle and the air which enters the mixing-chamber in transit to the working cylinder, substantially as described.

3. The combination with the working cylinder of a gas or petroleum engine, of a spindle-guide having its inner end portion expanded laterally and constructed with an internal, cool-fluid-circulating chamber and passages for the inlet and outlet of the cool fluid, a mixing-chamber surrounding the laterally-expanded end of the spindle-guide, a gas-chamber surrounding the mixing-chamber and communicating therewith through suitable orifices, an air-inlet to the mixing-chamber, a gas-inlet to the gas-chamber, and an inlet-valve arranged at the inner end of the mixing-chamber and having a spindle extending longitudinally through the spindle-guide, whereby the air and gas and valve-spindle are cooled, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

BELA WOLF.

Witnesses:
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MARIA NAGEL.