No. 647,883. Patented Apr. 17, 1900.

H. C. SERGEANT.

COMPRESSOR FOR AIR, &c.

(Application filed July 6, 1899.)

(No Model.) 2 Sheets—Sheet 1.

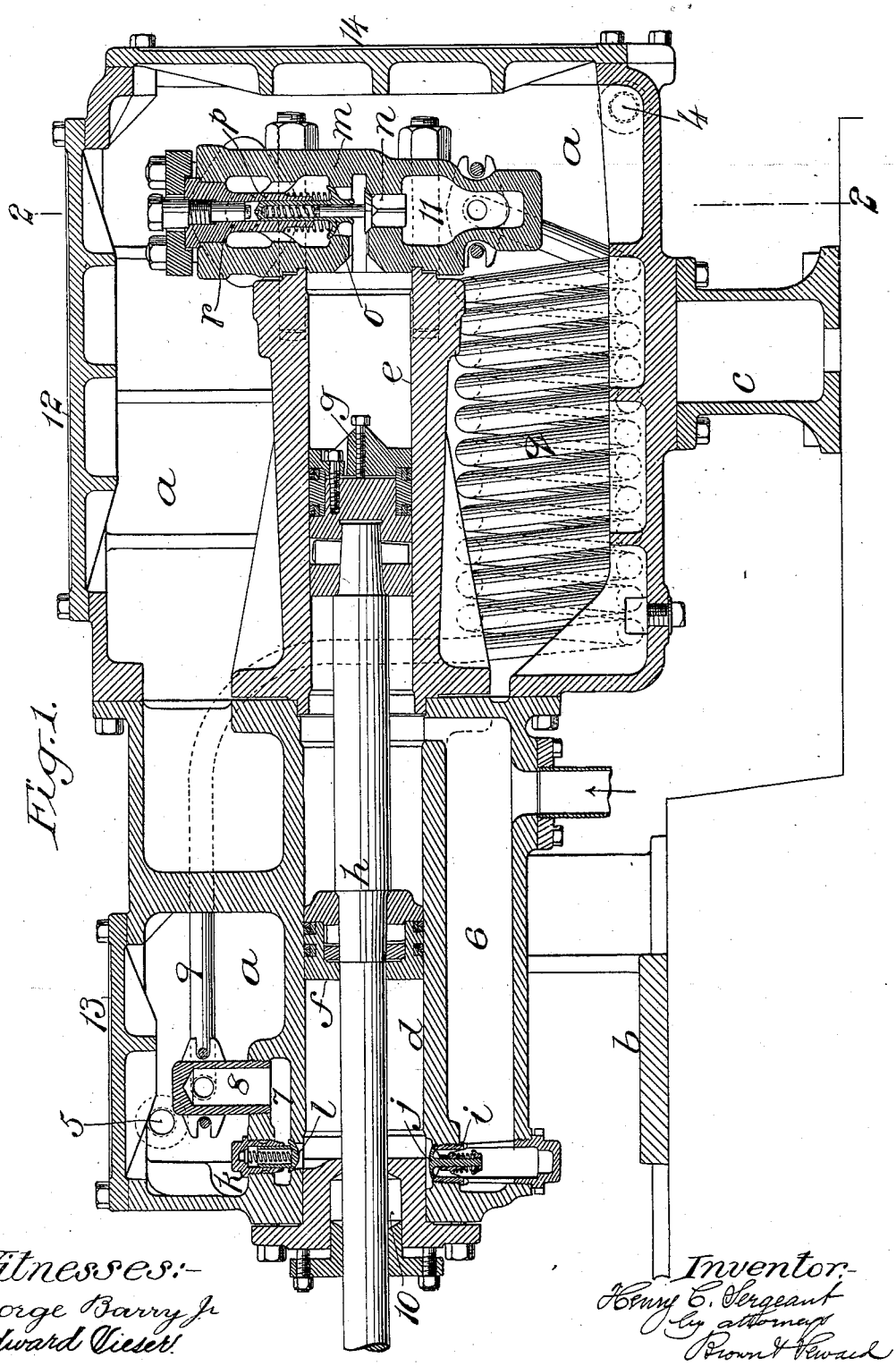

Fig. 1.

Witnesses:-
George Barry Jr.
Edward Vieser!

Inventor:-
Henry C. Sergeant
by attorneys
Brown & Howard

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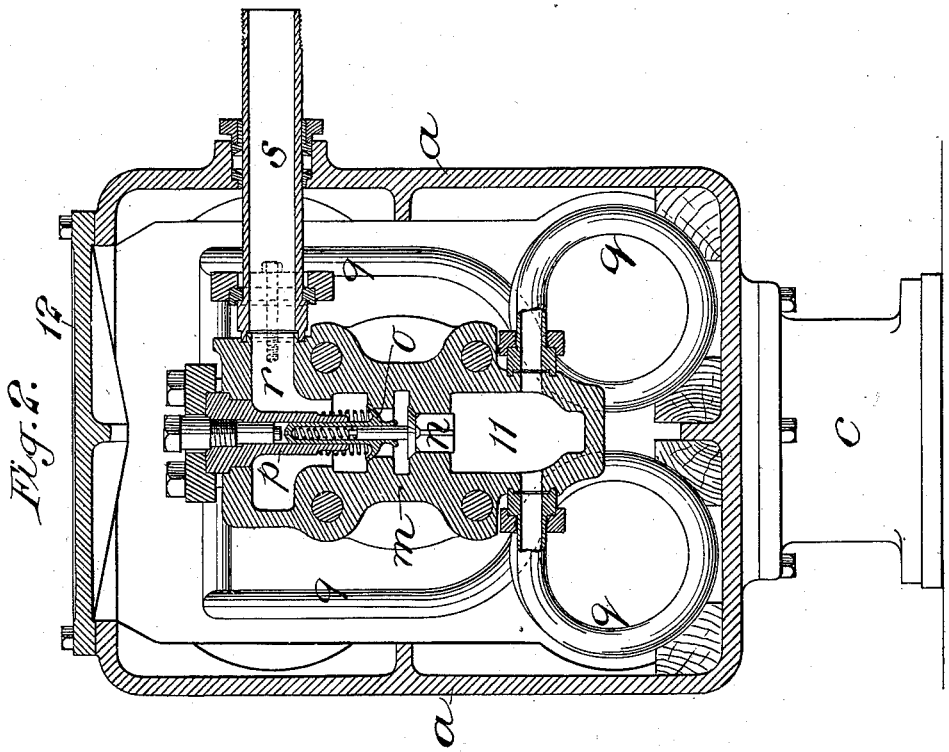

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Edward Vieser

Inventor:-
Henry C. Sergeant
by attorneys
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UNITED STATES PATENT OFFICE.

HENRY C. SERGEANT, OF WESTFIELD, NEW JERSEY, ASSIGNOR TO THE INGERSOLL-SERGEANT DRILL COMPANY, OF NEW YORK, N. Y.

COMPRESSOR FOR AIR, &c.

SPECIFICATION forming part of Letters Patent No. 647,883, dated April 17, 1900.

Application filed July 6, 1899. Serial No. 722,918. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. SERGEANT, a citizen of the United States, and a resident of Westfield, in the county of Union and State of New Jersey, have invented a new and useful Improvement in Compressors for Air and other Gaseous and Aeriform Bodies, of which the following is a specification.

I will describe my invention in detail with reference to the accompanying drawings and afterward point out its novelty in the claim.

Figure 1 represents a central longitudinal vertical section of a compound compressor in which my invention is embodied; Fig. 2, a transverse vertical section approximately in the line 2 2 of Fig. 1.

Similar leters and numbers of reference designate corresponding parts in both figures.

a is a closed water-box supported on a bed-plate *b* and foot *c* and having located within it the two cylinders *d e* of the compressor, arranged in line with each other. Through this water-box there is intended to be kept up around the two cylinders a constant circulation of cooling-water, which is admitted by a pipe at 4 near the bottom and passes out by a pipe at 5 near the top. The two pistons *f* and *g*, working in the two cylinders, respectively, are solid or valveless and connected with the same operating-rod *h*, which passes through a stuffing-box 10 in the closed outer end of the cylinder *d*. The two cylinders are in free communication with each other at their adjacent ends. The valve-boxes, valve-seats, and valves are arranged at the outer ends of their respective cylinders. The valves are all represented of a well-known puppet kind.

The valve-box *i*, containing the inlet-valve *j* of the larger or low-pressure cylinder and the seat therefor, only one such valve being shown, is arranged at the bottom of said cylinder in a passage 6, which is formed between said cylinder and the bottom of the water-box *a* and with which is connected the inlet-pipe for the air or gas to be compressed. The box *k*, containing the discharge-valve *l* of the same cylinder and the seat therefor, is arranged in a passage 7 within the upper part of the cylinder, from which passage there rises within the water-box *a* a discharge-pipe 8, having branches 9, as will be hereinafter described.

The inlet and discharge valves of the smaller or high-pressure cylinder *e* are arranged in the hollow head *m* of said cylinder, the said head itself forming the box for and having formed within it the seats for the inlet-valve *n* and for the outlet-valve *o* and being contained entirely within the water-box *a*. The valve-boxes *i k* and the valves *j l* therein, furnished with closing-springs, are represented of a so well known kind as to need no description. The inlet-valve *n* is represented as having a stem fitted to a guide within the valve *o*, and the latter valve is represented with a stem fitted to a guide *p*, inserted into the cylinder-head *m*. The said valves *n o* are represented with closing springs of coil form, applied in so well known a manner as to need no description.

Between the discharge-pipe 8 of the low-pressure cylinder *d* and the inlet-chamber 11, provided in the head *m* of the high-pressure cylinder below the valve *n*, there is located in the lower part of the water-box *a* a cooler *q*, represented as consisting of two coils of pipe, each connected at one end with one of the branches 9 of the discharge-pipe 8 and at the other end with the said chamber 11. Above the discharge-valve *o* there is in the cylinder-head or valve-box *m* an outlet *r* for the finally-compressed air, and from this outlet a pipe *s* leads through the side of the water-box.

The water-box *a*, which is intended to be kept closed during the operation of the compressor, has in it suitable openings provided with covers 12 13 14, which are removable for access to the valve-boxes, valves, and cooler when necessary. The circulation of the cooling-water through the box *a* may be provided for by means of a pump or a sufficiently-elevated reservoir.

It will be understood that the valve-boxes and valves, as well as the cylinders, being submerged in the water in the box *a*, through which there is a constant circulation of cooling-water, will all be kept constantly cool, and therefore tendency to unequal expansion of the valves and their seats will be counteracted. It will also be well understood that by the arrangement of the two compressor-cylinders and the intermediate cooler all in the same water-box, in which all are surrounded by

cooling-water, a very simple and effective compound compressor is obtained.

What I claim as my invention is—

The combination in a compound compressor, of cylinders and pistons for successive compressions, a water-box in which said cylinders and their valves are contained, a cooler consisting of a plurality of coils of pipe arranged in said water-box, a discharge-pipe from the first or low-pressure cylinder having a plurality of branches communicating with said coils at one end of each, a chamber of communication common to the other ends of the several coils and a valved communication between the said chamber and the high-pressure cylinder, substantially as herein described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 5th day of July, 1899.

HENRY C. SERGEANT.

Witnesses:
FREDK. HAYNES,
LIDA M. EGBERT.