(No Model.)

H. C. SERGEANT.

AIR COMPRESSOR.

No. 568,804. Patented Oct. 6, 1896.

Fig. 1.

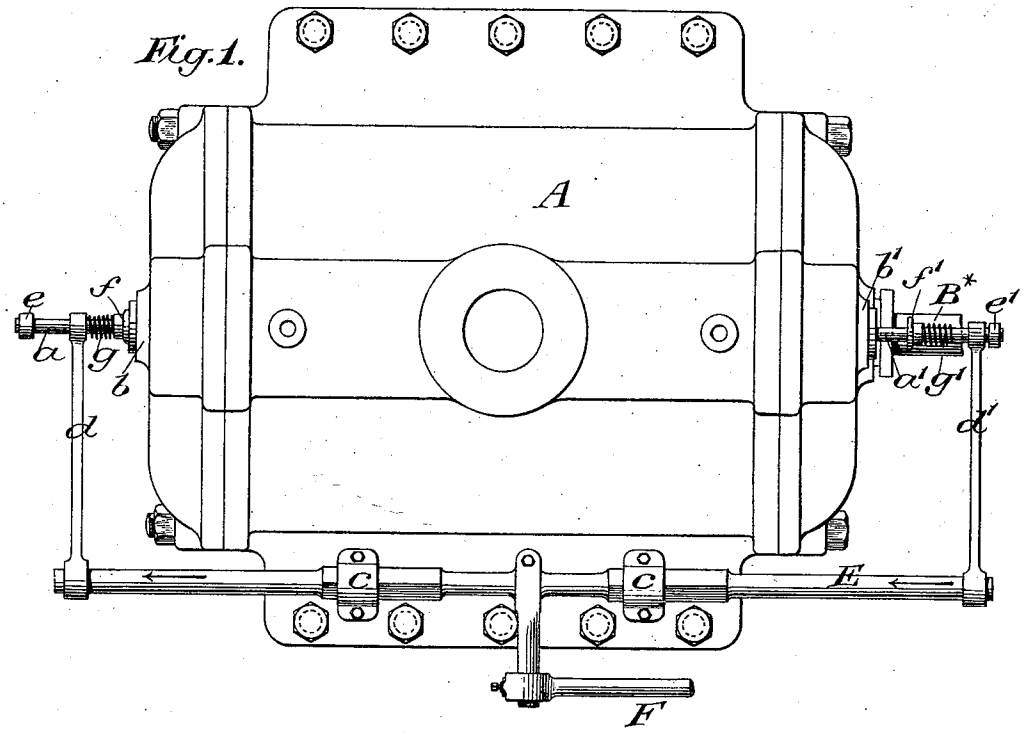
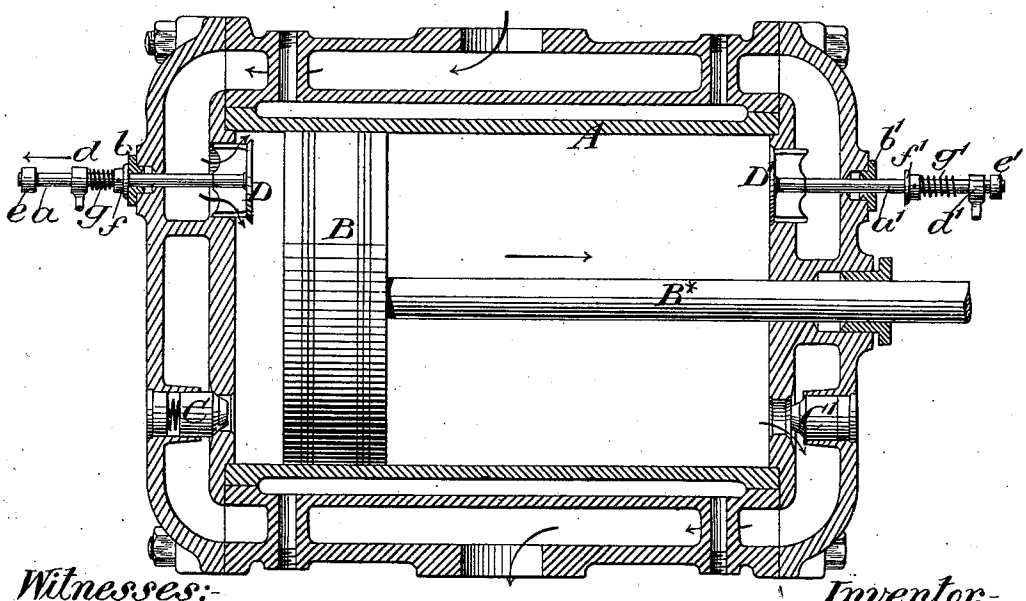


Fig. 2.



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

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 568,804, dated October 6, 1896.

Application filed August 29, 1895. Serial No. 560,864. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. SERGEANT, of Westfield, in the county of Union and State of New Jersey, have invented a new and useful Improvement in Air-Compressors, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to compressors for the compression of air and gases; and it consists in certain means hereinafter described and claimed, whereby a very prompt opening of the inlet-valves to their full width is obtained and the closing of the inlet-valves is effected by positive motion, and to this end this improvement consists in the combination of parts hereinafter described and claimed.

Figures 1 and 2 of the drawings represent, respectively, a plan view and a central vertical sectional view of as much of an air-compressor as is necessary to illustrate my invention.

A is the compressor-cylinder; B, the piston; B*, the piston-rod; D D', the inlet-valves; C C', the discharge-valves. The discharge-valves C C' may be of any known or suitable kind, my invention not relating in any way to them. The inlet-valves D D' may be of any known or suitable kind capable of being closed by reciprocating tappets working parallel with the piston. They are represented as puppet-valves fitted to seats in the inner faces of the cylinder-heads and furnished with stems or rods *a a'*, which project outward through stuffing-boxes *b b'* in the cylinder-heads.

E is a reciprocating tappet-carrier, represented as consisting of a rod fitted to slide in a direction parallel with the movement of the piston in stationary guides *c c*, the said rod having affixed to it at or near its ends two tappet-arms *d d'*, each of which loosely embraces the stem of the inlet-valve at its respective end of the cylinder. The said rod is intended to make one stroke for each stroke of the piston, but in the reverse direction thereto. As such reciprocating tappet-rods furnished with tappet-arms for working the inlet-valves of air-compressors are not new, it is not necessary here to particularly describe the means which I employ for producing the movement of the rod E, though I have shown connected with the said rod a portion of a rod F, which is to derive motion from a crank-shaft (not shown) with which the piston-rod B* is connected.

The inlet-valve stems or rods *a a'* have provided or secured firmly upon them, at or near their outer ends, collars or projections *e e'*, against which the tappet-arms are caused to operate by the reciprocating movement of the tappet-rod for the purpose of positively closing the inlet-valve in either end of the cylinder at the termination of each stroke of the piston toward the other end. The said stems *a a'* have also fast upon them, farther from their ends, other collars or projections *f f'*, and between these latter collars and the tappets they have placed loosely upon them coil-springs *g g'* of proper strength for the purpose of opening the inlet-valves, as will be presently described, the said collars *e f* and *e' f'* being so arranged on each stem and the springs being of such length that the tappets have some play between the springs and the collars *e e'* and leave the springs free during a considerable portion of the movement of the tappet-rod.

The operation of the inlet-valves takes place as follows: The piston moving in one direction and the tappet carrier or rod E in the other direction, as the piston arrives near either end of the cylinder the inlet-valve D or D' at the other end is closed by the action of its respective tappet on its collar *e* or *e'*, while the inlet-valve at the first-mentioned end continues to be kept closed by the pressure of the air in front of the piston, notwithstanding the pressure of its tappet against its spring *g'* or *g*, and the consequent pressure of the spring upon its collar *f'* or *f*, the compression of the spring being insufficient to open the valve until the piston has started on its return stroke and the air-pressure behind it and the consequent resistance to the opening of the valve are sufficiently reduced, when by the assistance given by the spring to the pressure of the atmosphere or source of air or gas supply the valve is at once quickly thrown wide open for the free and full ingress of air to the cylinder. This operation is illustrated in Fig. 2, wherein the piston is represented as having moved a little

way in its stroke to the right and the tappets to have commenced moving to the left, the valve having been closed by the previous movement of the tappet d' to the right, and the spring g having been so compressed by the corresponding movement of the tappet d that almost immediately after the piston started to the right the valve D has been opened by the assistance given by the spring g to the pressure of the atmosphere on the outer face of said valve. It may be here remarked that the above operation of opening the valve will take place notwithstanding that the tappet d has or may have previously commenced moving to the left, the total length of movement of the tappets being very small compared with that of the piston stroke, and it will be understood that while the closing of the inlet-valve is effected by the direct action of the tappets and with a positive movement their opening is produced by the springs independently of the direct action of the tappets, which do not act directly to open the valves, but simply compress the springs sufficiently to make them do so.

What I claim as my invention is—

1. In an air-compressor, the combination with an inlet-valve upon which when closed the pressure of the air compressed within the compressor-cylinder acts with a tendency to keep it closed, a spring arranged on the stem of said valve, a reciprocating tappet-rod and a tappet on said rod for operation directly on said spring to compress the said spring during each stroke of the compressor-piston to a degree sufficient to cause the said spring to open the valve against such pressure of the air within the cylinder, substantially as herein described.

2. In an air-compressor, the combination with an inlet-valve having two projections on its stem, of a tappet-carrier and a tappet thereon engaging the valve-stem between said projections for acting positively on one of said projections to close the valve, and a spring applied between the tappet and the other of said projections for opening the valve, substantially as herein described.

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