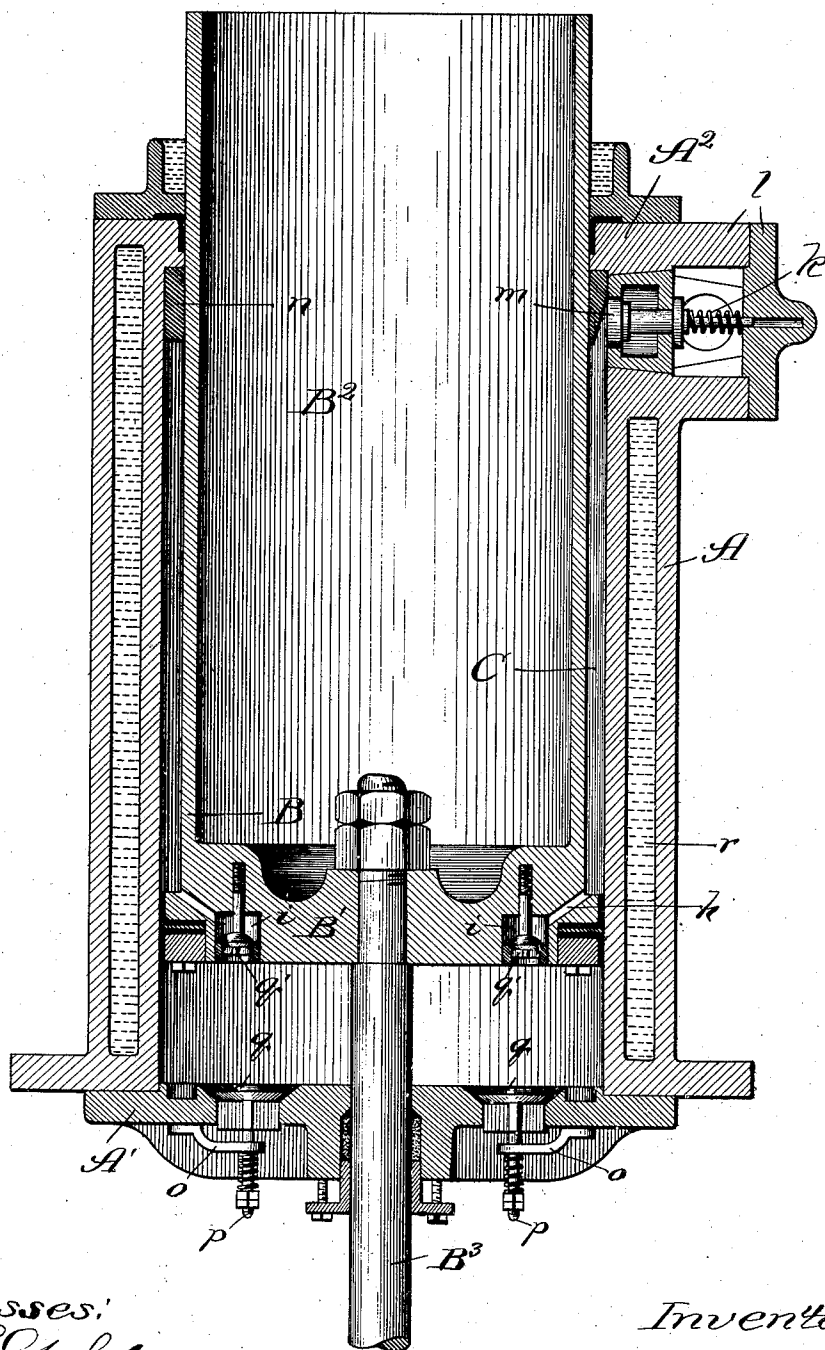


(No Model.)

B. F. TEAL.
AIR COMPRESSOR.

No. 474,034.

Patented May 3, 1892.



Witnesses:

Chas. C. Taylor.
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Inventor:

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UNITED STATES PATENT OFFICE.

BENJAMIN FRANKLIN TEAL, OF CHICAGO, ILLINOIS.

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 474,034, dated May 3, 1892.

Application filed March 30, 1891. Serial No. 386,976. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN FRANKLIN TEAL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Air-Compressors, of which the following is a specification.

The object of my invention is to provide an improved construction of compressor for air and gas, whereby a compound compression shall be produced in a single cylinder.

To this end my invention consists in the general construction of my improved device; and it also consists in details of construction and combinations of parts.

The accompanying drawing shows my improved compressor by a view in sectional elevation with the piston-rod broken away.

A is the cylinder, which should be provided, as shown, with a circumferential chamber *r* for the cooling medium (water) and in the head *A'* of which is a suitable number of inwardly-opening check-valves *q q*, the stems *p* of which are spring-controlled, whereby their tendency is to close, and are movable in guides *o* in the cylinder-head.

B is the piston, comprising a head *B'* and a trunk *B²*, the head being suitably packed and fitting closely the bore of the cylinder A and having the piston-rod *B³* connected with it and the trunk passing through the head *A²* of the cylinder, where the latter is properly packed and the trunk closely fits it. A ring *n* loosely surrounds the trunk below the cylinder-head *A²*. The trunk *B²*, the piston-head *B'*, and cylinder-head *A²* form, with the cylinder A, an annular chamber C, and in the end thereof nearest the head *A²* is a spring-controlled or balanced check-valve *m* in a bearing *l*, from which leads the outlet *k* to the point of utilization or storage of the fluid compressed by the device, the spring of the valve *m* merely serving to control it to bear against its seat when not forced open by the operation of the piston.

In the piston-head B is a desired number of inwardly-opening check-valves *q'*, which should correspond in number and construction with the check-valves *q*, and from the chambers *i* of which ducts *h* lead into the annular chamber C.

The operation is as follows: As air affords the most convenient medium for explanation of my improvement, I confine the explanation thereto, though it will be understood that my improved device is equally useful for compressing other forms of gaseous fluid than air. The first outward stroke of the piston by the suction effect it exerts upon the valves *q* opens the latter and admits air into the cylinder A. The succeeding inward stroke compresses the air between the cylinder-head *A'* and the piston-head sufficiently to cause opening of the valves *q'* in the latter and permit the introduced air to enter the annular chamber C through the ducts *h*. Each succeeding outward stroke obviously not only effects introduction into the cylinder A of a fresh supply of air, but compresses that previously forced into the annular chamber C until the pressure or resistance at the back of the valve *m* is overcome, when the pressure in the chamber C opens that valve and escapes to the outlet *k*, and each succeeding inward stroke of the piston as obviously effects compression of the air into the annular chamber by forcing into it the air admitted through the cylinder-head *A'* by the preceding outward stroke. Thus, as will be seen, the complete compression is superinduced by both the inward and outward strokes of the piston, the piston and trunk being so proportioned that their effective areas shall produce approximately the same total pressure by either stroke.

The details of construction herein described may be variously modified without thereby departing from the principle of my invention hereinbefore mentioned. Hence I do not limit my improvement to such details.

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

1. In a compressor for gaseous fluid, the combination of an outer cylinder and a piston therein, the latter comprising a trunk and a head forming, with the cylinder, an initial compression-chamber at the face of the head opposite that carrying the trunk and between the cylinder and trunk, an annular space affording a final compression-chamber, the said piston operating by its successive strokes alternately to introduce the gas at normal pressure into the initial compression-chamber and

to compress it, thence from one side of the head into the initial compression-chamber at the opposite side of the head, substantially as described.

5 2. A compressor for gaseous fluid, comprising, in combination, a cylinder A, containing a piston B, formed with a head B' and trunk B'', an annular chamber C between the piston and cylinder, controlled by a check-valve *m*
10 between the said chamber and its outlet *k*

and controllably communicating with the inlet end of the cylinder, and inwardly-opening check-valves in the piston-head and adjacent cylinder-head, the whole being constructed and arranged to operate substantially as and 15 for the purpose set forth.

BENJAMIN FRANKLIN TEAL.

In presence of—

J. W. DYRENFORTH,

M. J. FROST.

It is hereby certified that in Letters Patent, No. 474,034, granted May 3, 1892, upon the application of Benjamin Franklin Teal, of Chicago, Illinois, for an improvement in "Air-Compressors," an error appears in the printed specification requiring the following correction, viz.: In line 2, page 2, the word "initial" should read *final*; and that the said Letters Patent shor'd be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 14th day of June, A. D. 1892.

[SEAL.]

CYRUS BUSSEY,

Assistant Secretary of the Interior.

Countersigned:

W. E. SIMONDS,

Commissioner of Patents.