E. S. WINCHESTER.

Check Valves for Air Compressers.

No. 161,999. Patented April 13, 1875.

Fig. 1.

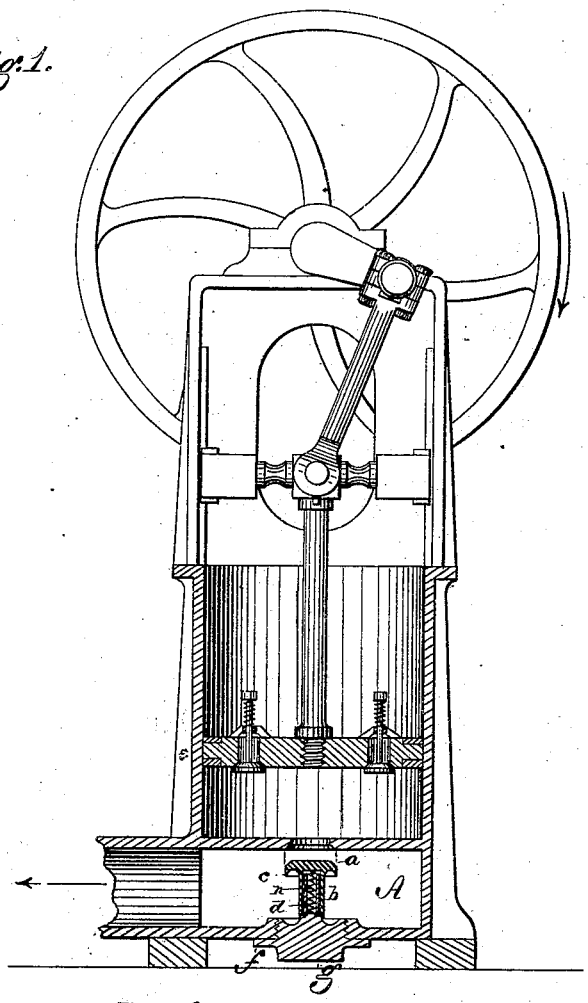
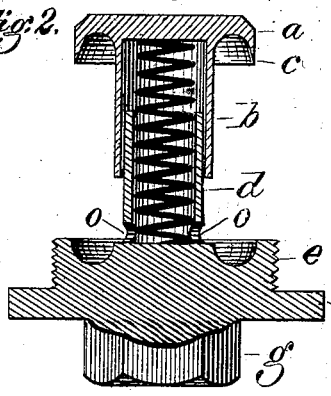


Fig. 2.



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UNITED STATES PATENT OFFICE.

EDWARD S. WINCHESTER, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN CHECK-VALVES FOR AIR-COMPRESSORS.

Specification forming part of Letters Patent No. **161,999**, dated April 13, 1875; application filed March 13, 1875.

To all whom it may concern:

Be it known that I, EDWARD S. WINCHESTER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Valves for Air-Compressors, of which the following is a specification:

My invention relates to a check-valve for air-compressors and similar engines; and its novelty consists in constructing the valve-head with a tubular stem fitting over and working on the outside of a guide-rod or tubular support. It further consists in providing the valve or head with a depending rim, all as hereinafter more fully described.

Figure 1 is a vertical section of a portion of a compressor, showing my improved valve applied thereto; and Fig. 2 is a transverse vertical section of the valve, showing its construction.

Heretofore valves for air-compressors have been made with a solid stem projecting from the under side of the head *a*, which stem worked inside of a tubular guide.

This construction of the valve was attended with several bad results, which my improvements are designed to obviate. In the first place the valve-head when cast with the solid stem was very liable to crack or have flaws in the metal at the point where the stem joined the head, owing to the unequal contraction of the parts in cooling, a difficulty common in castings of this kind; second, as is well known, a high degree of heat is evolved by the rapid compression of air, and this heat, acting on the valve, caused its stem to expand, whereby its free and ready action was prevented; third, the oil or other material, dust, &c., would get inside of the tubular guide, and either cause the stem to stick or cut and wear away, and thereby cause the valve to work imperfectly, and soon become useless.

To overcome these difficulties, I construct my valve as shown in detail in Fig. 1. The head *a*, as there shown, is cast with a tubular stem, *b*, by which the diameter of the stem is much increased at its junction with the head, thereby increasing its strength, and rendering it less liable to break off at that point. By this construction it is also rendered much less liable to have cracks or flaws at that point. This tubular stem *b* is bored out true, and fitted to slide freely over the tubular guide pin or stud *d*, which is provided with a large screw head or base, *e*, having a radial flange, *f*, and polygonal boss *g*, for the purpose of screwing the valve as a whole into a suitable hole or opening in the bottom of the receiving-chamber A, as shown in Fig. 2, the valve-head *a* fitting, when closed, in an opening in the upper wall of said chamber. Within the tubular guide *d* is located a spiral spring, *n*, which allows the head *a* to yield to the pressure of the incoming air, and serves to close the valve at the upward stroke of the piston of the compressor.

By having the valve-stem *b* work on the outside of the guide *d*, it will be seen that the expansion of the head *a* and its stem *b* will not interfere with the free working of the stem *b* on its guide *d*, and at the same time this arrangement of the parts prevents oil, dust, and other substances from getting between the stem and its guide, thereby obviating the sticking of the parts, and also the grinding or cutting away of them.

In order to still further protect the stem and its guide from the effect of the oily gum or similar substances which work down from the cylinder above, I form a depending flange, *c*, around the under side of the head *a*, as shown in Fig. 2, so that whatever material of this kind drips or works down upon the valve, instead of running along the under side of the head *a*, and thence down the stem *b*, and onto the guide *d*, where it would interfere more or less with the free working of the parts, will drop from the lower edge of this flange *c* upon the base below without coming in contact with the working parts. At the base of the tubular guide *d* one or more holes, *o*, are made, as shown in Fig. 2, to allow of the free entrance and exit of air, which is necessary to the free working of the valve.

By this construction and arrangement of the parts I obviate the difficulties mentioned, and produce a valve that works much better, and that is far more durable.

What I claim as my invention is—

1. The valve-head *a*, provided with the tubular stem *b*, constructed to work upon the outside of the guide or stud *d*, substantially as and for the purpose set forth.

2. In combination with the valve-head *a*, arranged to seat itself within an opening, as shown, the depending flange or rim *c* to deflect the drip or sediment, and prevent it from coming in contact with the bearing-surface of the guide *d*, as set forth.

3. The combination of the valve-head *a*, provided with the tubular stem *b*, and the tubular guide *d*, with the spring *n*, all constructed and arranged to operate substantially as shown and described.

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