

No. 616,250.

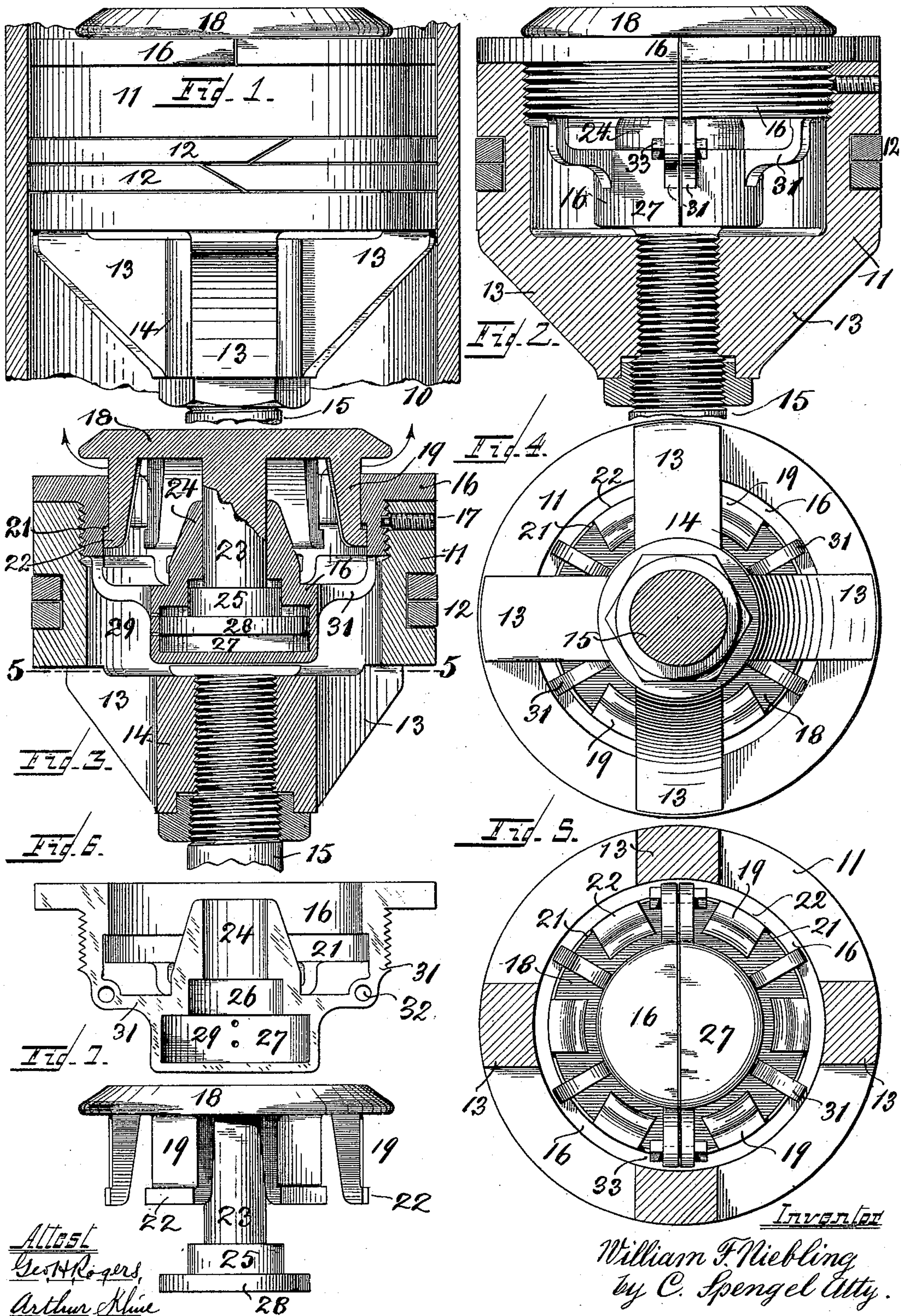
Patented Dec. 20, 1898.

W. F. NIEBLING.

PISTON VALVE.

(Application filed Dec. 23, 1897.)

(No Model.)





# UNITED STATES PATENT OFFICE.

WILLIAM F. NIEBLING, OF CINCINNATI, OHIO.

## PISTON-VALVE.

SPECIFICATION forming part of Letters Patent No. 616,250, dated December 20, 1898.

Application filed December 23, 1897. Serial No. 663,131. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM F. NIEBLING, a citizen of the United States, and a resident of Cincinnati, Hamilton county, State of Ohio, have invented certain new and useful Piston-Valves; and I do declare the following to be a clear, full, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, attention being called to the accompanying drawings, with the reference-numerals marked thereon, which form a part of this specification.

This invention relates to improvements in piston-valves, which are usually valves carried in the pistons of single-acting pumps used for various purposes, but generally found in compressors of refrigerating-machines. They are usually suction-valves which open on one stroke of the piston to admit the matter being pumped to pass to the other side of the receding piston and close on the return stroke of the advancing piston, at which time the latter expels the matter from the pump-cylinder.

The object of my invention is to seat and mount the valves in the piston in a new manner, which requires no bolts or screws to make connections, thereby preventing the valves or any parts from becoming loose and when loose from dropping into the cylinder, which when such detached parts become lodged between piston and cylinder-head leads frequently to serious consequences.

In the following specification, and particularly pointed out in the claims, is found a full description of the invention, its operation, parts, and construction, which latter is also illustrated in the accompanying drawings, in which—

Figure 1 shows a side elevation of the piston carrying such a valve, a part of the cylinder being shown in section. Fig. 2 is a vertical central section of the piston, showing the valve-housing within in elevation. Fig. 3 is a similar view, the section being, however, extended to pass also through the valve-housing and valve, which latter is shown open. Fig. 4 is an end view of the piston with the piston-rod in section. Fig. 5 is a horizontal section of it, taken on line 5 5 of Fig. 3. Fig. 6 is an elevation of one of

the halves of the valve-housing, showing the inside thereof; and Fig. 7 is an elevation of the valve detached.

10 is a part of the cylinder of a suitable pump or compressor.

11 is the piston, consisting substantially of a short hollow cylinder recessed on its outside to receive the customary packing-rings 12. From one end of the piston extend outwardly a number of arms 13, which approach each other and at their junction form and support a hub 14, which receives the piston-rod 15. From the other end inwardly a part of the inside of the open piston is screw-threaded to receive on the outside the similarly-threaded valve-housing 16. When the latter is in place, it is locked by a lock-screw 17, which in turn is prevented from becoming loose by the cylinder, which covers it when the piston is in position therein.

18 is the valve, being seated against the outer end of the valve-housing. It is guided in its movements to and from its seat by a number of inwardly-projecting lugs 19, preferably integral with the valve and all fitted against the inside of the valve-housing. To prevent the valve from dropping out of its housing, the latter at its inner end is recessed, as shown 21, which recess is occupied by the lower or inner end of lugs 19, which ends, as shown at 22, are laterally extended and fitted into said recess 21. Outside of lugs 19 the valve is guided by an inwardly-extending stem 23, received by a neck 24, and it is further secured against leaving its position by a flange 25 on said stem, fitted into an annular recess 26 in the bore of neck 24. Below this recess the bore is extended to form a chamber 27, into which is fitted a piston 28, forming also a part of stem 23. Openings 29 are provided in the side of chamber 27, which admit to the latter some of the matter pumped or perhaps some of the lubricant, which matter being on either side of the piston 28 serves as a means to cushion the motion of the valve.

The structure comprising neck 24 and chamber 27 below it is sustained by arms 31, reaching from it to valve-housing 16, the whole forming practically one structure. In order to admit the valve—that is, certain of its projecting parts, like projections 22, flange 25, and piston 28—the valve-housing, with all



of its parts which receive the parts first mentioned, is vertically—that is, axially—divided in two halves, as is most plainly shown in Figs. 2 and 5, and in Fig. 6, which shows one of such halves by itself. The line of division is preferably so located as to be in line with some of the arms 31, so as to bring two of them against each other at each side, thus permitting them to be utilized for purposes of connecting the separated sections of the valve-housing. For such purpose these contiguous arms are provided with bolt-holes 32, as shown in Fig. 6, which receive bolts 33 to complete the connection.

In assembling the parts the valve, with all its appendages, is first laid into one of the open halves of the valve-housing, after which the other half is laid on and connected by means of bolts 33. The united valve-housing, with the contained valve, is next screwed into the open end of the piston and secured by locking-screw 17.

Having described my invention, I claim as new—

1. The combination with a hollow piston, of a valve carried thereby and adapted to close the opening therein, lugs 19 projecting inwardly therefrom and circularly arranged serve as a means to guide the valve in its movements, lateral projections on these lugs and recesses within the interior of the piston occupied by them to prevent the valve from becoming detached.

2. The combination with a hollow piston, of an open valve-housing 16 carried thereby and having the interior recess 21, a valve adapted to close the open valve-housing and provided with means to guide it and projections 22 fitted into recess 21 to prevent it from becoming detached, said valve-housing being axially divided in two halves which permits it to be laid open when removed from the interior of the piston to permit insertion of the valve.

3. The combination with a hollow piston, of a valve carried thereby, a stem on the latter to guide it, a neck 24 supported within the hollow piston which receives and guides the valve-stem, a recess 26 in said neck and an enlargement on the stem occupying this recess, said neck being in two halves to admit the parts which it receives.

4. The combination with a hollow piston, of a valve carried thereby, a stem on the latter to guide it, a neck 24 supported within the hollow piston which receives and guides the valve-stem, a chamber 27 formed at one end of the neck, a piston 28 on the valve-stem which occupies this chamber and openings 29 in the latter for the purpose described, said neck and chamber being in two parts to admit the stem with piston 28 thereon.

5. The combination with a hollow piston, of an open valve-housing carried thereby provided with an interior recess 21 and a neck 24, the latter having the recess 26, a valve adapted to close the open valve-housing, hav-

ing lugs 19 and a stem 23 fitted to the latter and neck 24 therein for the purpose of guiding the valve, and projections on lugs 19 and on stem 23 fitting respectively into recesses 21 and 26 to hold the valve in place, the receiving parts being separable to permit access to such recesses.

6. The combination with a hollow piston, of an open valve-housing carried thereby which is provided with an interior recess 21 and a neck 24, a chamber 27 formed at the inner end of the neck, a valve adapted to close the open valve-housing, having lugs 19 and a stem 23, the former fitted into the valve-housing and the latter into the neck 24 for purposes of guiding the valve, and a piston 28 formed on stem 23 and occupying chamber 27 for the purpose described, the receiving parts being separable to permit access to such recesses.

7. The combination with a hollow piston, of a valve carried thereby, provided with a stem 23 for guiding it, a neck 24 supported within the hollow piston, the bore of which receives stem 23, and is successively enlarged to form first a recess 26 and then a chamber 27 and an enlargement 25 and a piston 28 on stem 23 fitted respectively into recess 26 and chamber 27, the neck being separable to admit such parts.

8. The combination with a hollow piston, of an open valve-housing carried thereby, an interior recess 21 therein and a neck 24 centrally supported by it, the bore of the latter being successively enlarged to form first a recess 26 and a chamber 27, a valve adapted to close the open valve-housing, having lugs 19 and a stem 23 which are fitted, the first to the interior of the valve-housing and the other to the bore of neck 24, projections 22 on lugs 19 fitted into recess 21 and an enlargement 25 and piston 28 on stem 23 fitted respectively into recess 26 and chamber 27, the valve-housing and its connected parts being in two halves to admit the valve and its parts, and means to connect the parts of the valve-housing.

9. The combination with a hollow piston of an open valve-housing 16 carried thereby, a valve adapted to close the latter and guided by it, the interior diameter of the valve-housing back of the valve-seat being enlarged to admit correspondingly-enlarged parts of the valve whereby the latter is prevented from becoming detached, said valve-housing being axially divided in two halves which become separable when removed from the interior of the piston to admit the valve, and means to hold these halves of the valve-housing together to form a complete structure.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

WILLIAM F. NIEBLING.

Witnesses:

C. SPENGEL,  
ARTHUR KLINE.



It is hereby certified that in Letters Patent No. 616,250, granted December 20, 1898, upon the application of William F. Niebling, of Cincinnati, Ohio, for an improvement in "Piston-Valves," errors appear in the printed specification requiring correction, as follows: In line 5, page 1, after the word "useful" the words *improvement in* should be inserted; lines 67-68, same page, for "to receive on the outside the similarly-threaded" read *to receive the, on the outside, similarly-threaded* and line 15, page 2, after the word "parts," insert a comma, and same line and page, after the word "valve," strike out the comma; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 10th day of January, A. D., 1899.

[SEAL.]

WEBSTER DAVIS,  
*Assistant Secretary of the Interior.*

Countersigned:

C. H. DUELL,  
*Commissioner of Patents.*