(No Model.)

W. F. NIEBLING.

SPRING ADJUSTMENT FOR VALVES.

No. 592,434. Patented Oct. 26, 1897.

Fig. 1.

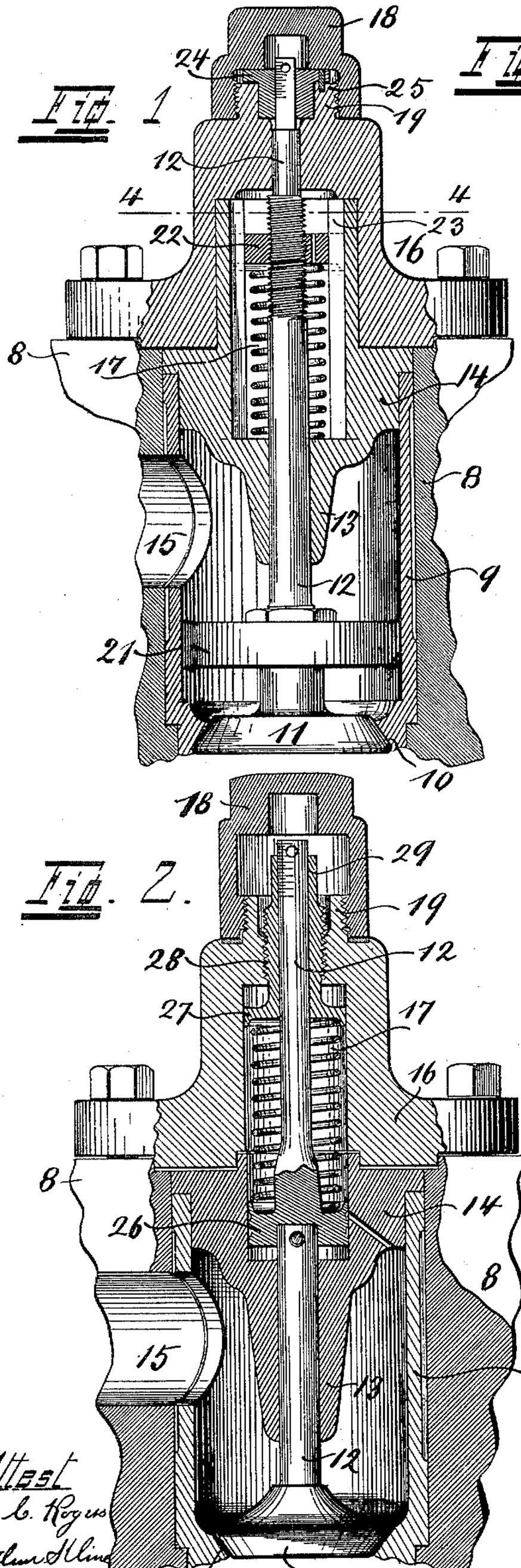


Fig. 3.

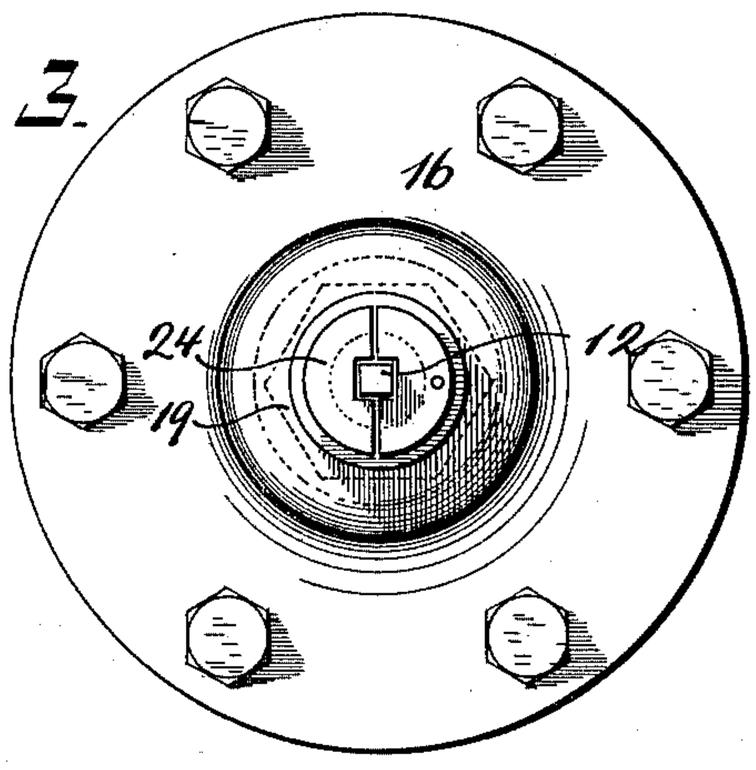


Fig. 4.

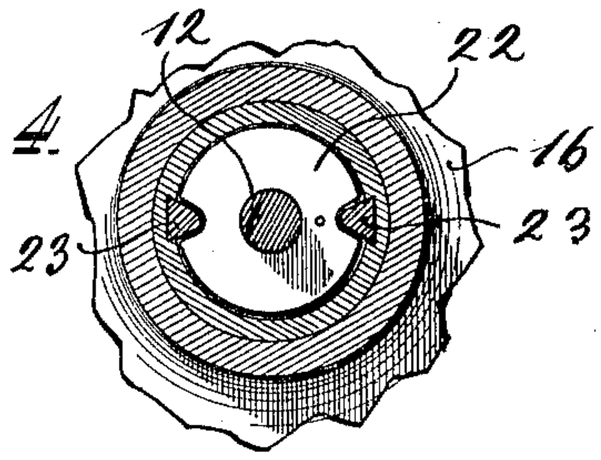
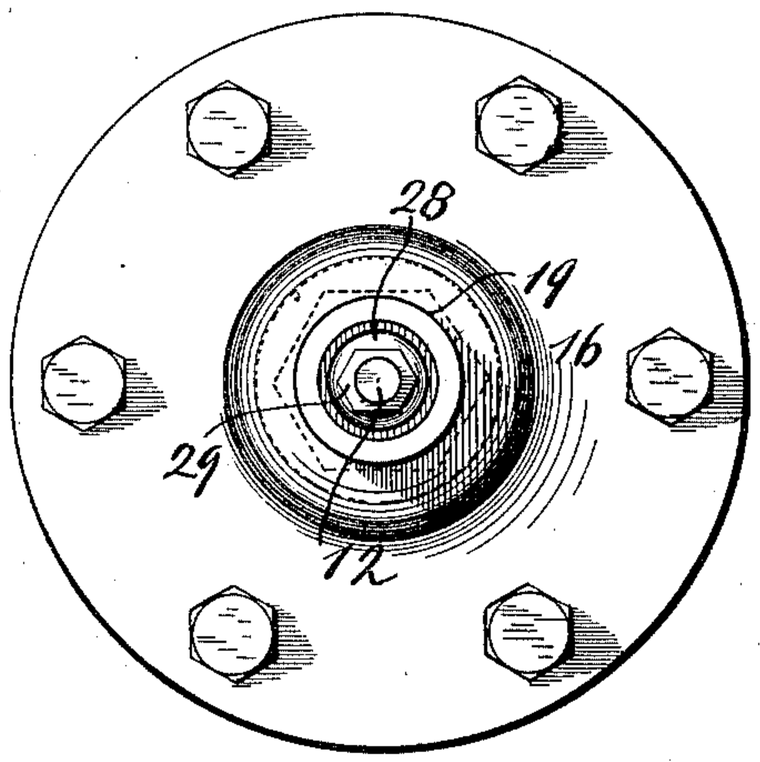


Fig. 2.

Fig. 5.



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SPRING ADJUSTMENT FOR VALVES.

SPECIFICATION forming part of Letters Patent No. 592,434, dated October 26, 1897.

Application filed April 10, 1897. Serial No. 631,505. (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 a certain new and useful Spring Adjustment for 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 valves used in connection with the cylinders of pumps, compressors, and similar machines.

It relates more particularly to the valves of compression-pumps used in connection with ice-machines. In these pumps the valves are usually operated in one direction—that is, for the purpose of opening by the combined action of the piston and the pressure of the matter passing through the pump. Operation in the other direction for the purpose of closing the valves again is by springs which are usually compressed by the first motion of the valves when opening, and therefore close the latter by their expansive action when returning to their normal position. These springs are subject to influences which may more or less interfere with their action—as, for instance, breakage, and changes of degree of elasticity, any one of which may more or less disturb the proper operation of the valve and pump.

In most pumps as at present constructed a faulty operation of the valves is not readily detectable unless all parts, such as valve housings and chests, are completely disconnected to render the valve accessible for inspection. Outside of the loss of time it involves also a stoppage of machinery, which in case of an ice-machine and during the hot season is of considerable consequence.

The object of my invention is therefore twofold and comprises, accordingly, two features whereby these objects are attained. Under the first feature I construct, inclose, and support the valves in a manner that their operation—that is, lift—becomes visible and may be observed without taking any of the parts apart, such inspection, therefore, not necessitating any stoppage of machinery. It thereby saves also unnecessary work, such as taking apart of the valve-chests of any valves not involved in the disturbance. It also shows the action of the springs, their energy, and promptness with which they operate for the purpose of closing the valves.

The other feature of my invention comprises means and a construction whereby the tension of any of the springs may be regulated when such after the inspection above referred to is found necessary or desirable, such adjustment being also possible under the same conditions as the inspection mentioned—that is, without stopping the machinery.

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

Figure 1 shows in a vertical central section part of the head of a compression-pump fitted to receive one of the valve-chambers and its valve. This latter represents a suction-valve in this case. Fig. 2 illustrates in a similar view an exhaust or discharge valve and its parts. Fig. 3 is a top view of Fig. 1 with the cap at the extreme upper end removed. Fig. 4 is a horizontal section on line 4 4 of Fig. 1, and Fig. 5 is a top view of Fig. 2 with the cap at the extreme upper end removed.

8 is a part of the head, portions of which are so extended and shaped as to provide the necessary room for the valve-chambers 9. The lower ends of these latter are contracted and so shaped as to form the valve-seats 10 in each case.

11 are the valves fitted against the respective valve-seats. Each valve has a stem 12, the lower part of which is guided by a valve-guide 13, forming an inward extension of a cover 14, which closes the valve-chamber, resting loosely on the edge thereof.

15 are the pipes communicating with the valve-chamber and through which the matter controlled by the valves passes. In the case of the valve shown in Fig. 1 it would be an inlet-pipe, while in Fig. 2 it would be the out-

let-pipe. The valve-chambers and their covers 14 are held in place by heads 16, which are bolted to heads 8.

17 are the springs used for bringing the valves back to their seats and are contained in chambers formed within valve-covers 14 and valve-heads 16, both of which are bored out for such purpose, the latter being in addition extended outwardly to obtain the necessary space. The valve-stems pass through these extreme extended ends of heads 16, being also guided thereat, and project outwardly beyond them, so as to be visible, showing thus exactly the operation of the valve and extent of its lift without requiring removal of any of the more important parts. Ordinarily, simply for protection against injury and possible escape of any ammonia-gas, screw-caps 18 are used to cover these protruding ends, which caps are screwed against bosses 19 and may be readily removed at any moment. This description applies to the two kinds of valves shown.

21 in Fig. 1 is simply a valve-guard to prevent the valve from dropping into the cylinder in case of its detachment from the stem or breakage of the latter. It is perforated to permit passage.

The fact that in Fig. 2 the valve-stem is shown in two parts has no bearing on my invention, such being done simply for convenience in construction. The spring in each case is confined between two abutments, one of which is stationary, while the other is connected to the valve-stem, and thereby transmits its action to the latter and the valve. For the purpose of adjusting the tension of the springs one of these abutments is made adjustable and may be moved to or from the other abutment, thus decreasing or increasing the space occupied by the spring and accordingly affecting its tension.

Ordinarily it is not difficult to provide means for such adjustment and to adjust the tension of springs where parts are readily accessible or where they may be taken apart for such purpose. In this latter case a stoppage of machinery is, however, required, which is detrimental in many instances, and my object is therefore, as already stated, to have the parts so constructed that this adjustment may be accomplished without taking any parts apart and without any stoppage of machinery. Since the action of the springs in the types of valves shown is in one opposite to the other, it follows that the construction of the adjusting means must accordingly be slightly varied to meet these exigencies.

In Fig. 1 the inner end of the bore in valve-cover 14 forms one of the abutments for the spring, while the other is formed by a nut 22, mounted on the valve-stem, part of which is screw-threaded above and below the nut. This latter is prevented from turning on the stem by means of projections 23, either integral with the inner wall of the spring-housing or in shape of keys inserted therein and which engage with notches in the nut. Two of these projections are shown, but one might be sufficient. They also could be on the nut and project into grooves in the inner wall of the valve-housing.

The valve-stem is prevented from turning voluntarily by a collar 24, preferably split to facilitate manufacture and provided with a square bore which fits around the square outer end of the valve-stem. The collar itself is prevented from turning by any suitable locking means—as, for instance, by a pin 25, engaging with the outer end of boss 19. If observation of the operation of this valve is desired, it is only necessary to remove cap 18, when the protruding valve-stem reveals at once the action of the valve.

If the tension of the spring requires adjustment, collar 24 is taken off, which permits turning of the valve-stem by means of a suitable tool or wrench. The effect of such turning is a movement of nut 22 either in or out on the valve-stem, since it cannot turn with the latter, being prevented by projections 23.

According to the direction in which the valve-stem is turned nut 22 is caused to move either in or out, increasing or decreasing the tension of the spring accordingly. In Fig. 2 one abutment is formed for the spring by a flange or collar 26, permanently affixed to the valve-stem, while the other consists of a flange 27, projecting from a sleeve 28, supported in the outer end of head 16. This sleeve is bored to admit the valve-stem, which works therein and passes through it without any connection except being guided thereby. The support of this sleeve is by a screw connection, it being threaded exteriorly and fitted into the threaded outer end of head 16. It projects beyond boss 19 thereof, so as to be accessible thereat, the projecting end 29 being of a shape other than round, preferably hexagonal. For inspection in this case the outer cap is again removed, same as in the other case. For adjustment of the spring-tension a tool is applied to end 29 of sleeve 28, which permits flange 27 to be moved in or out, the same as nut 22 in Fig. 1 and with the same results.

The visible ends of the valve-stem are provided with a scale which shows readily the amount of lift of the valves.

Having described my invention, I claim as new—

1. The combination of a valve-housing, valve and valve-stem, a spring to keep the valve normally seated, a chamber within which this spring is confined, a cover 14 which entirely separates the valve-housing from the spring-chamber, which latter contains two abutments between which the aforesaid spring is confined and one of which is connected to the valve-stem, one of said abutments being also adjustable to or from the other one and means accessible from the outside for adjusting such abutment.

2. The combination of a valve-housing and a head to close it, a valve and valve-stem, a

spring which keeps the valve seated, and is confined in a suitable chamber, being seated against the end thereof, with a nut 22 at its other end which is adjustably mounted on the valve-stem by a screw connection, but prevented by suitable means from turning thereon, said valve-stem being extended beyond the inclosing head so as to be accessible from the outside to permit it being rotated for purposes of adjusting the position of nut 22.

3. The combination of a valve-housing and a head to close it, a valve and valve-stem, a spring which keeps the valve seated, and is contained in a suitable chamber part of which is formed by a bore within the head above mentioned, the spring being confined between a collar 26 and a flange 27, fitted to said bore the first connected to the valve-stem the other to a sleeve 28 which is adjustably supported within the end of the inclosing head through which end it is extended so as to be accessible from the outside for purposes of adjusting the position of flange 27.

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

WILLIAM F. NIEBLING.

Witnesses:
C. SPENGEL,
ARTHUR KLINE.