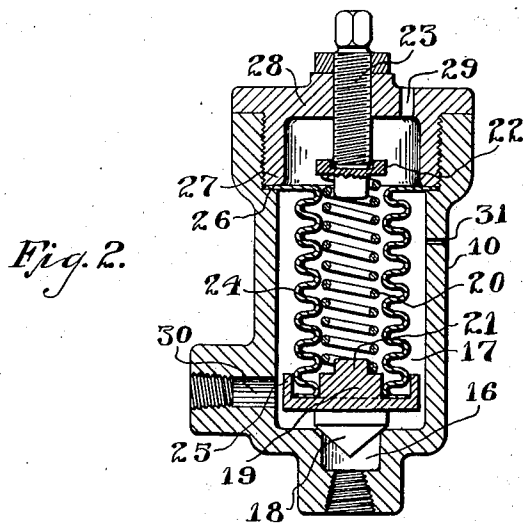
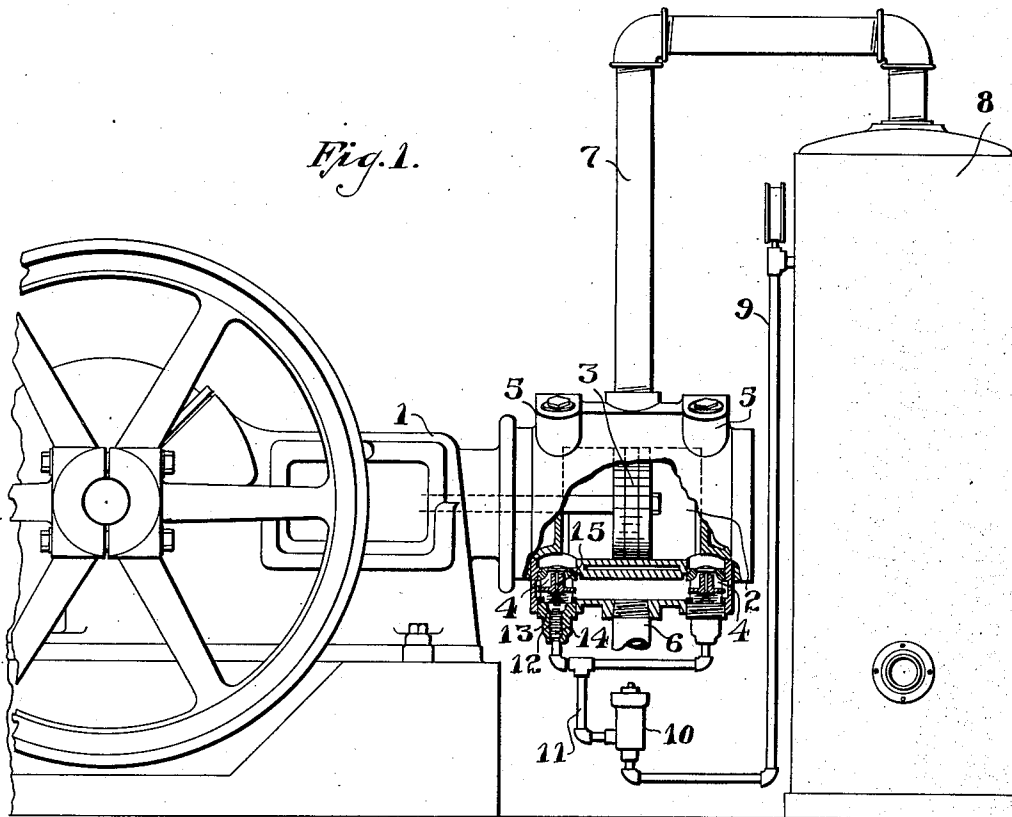


F. D. HOLDSWORTH.
COMPRESSOR CONTROLLING MECHANISM.
APPLICATION FILED JUNE 29, 1917.

1,377,981.

Patented May 10, 1921.



Inventor:
Fred D. Holdsworth.
by *Wm. L. [Signature]*
Att'y.

UNITED STATES PATENT OFFICE.

FRED D. HOLDSWORTH, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR TO SULLIVAN MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS.

COMPRESSOR-CONTROLLING MECHANISM.

1,377,981.

Specification of Letters Patent.

Patented May 10, 1921.

Application filed June 29, 1917. Serial No. 177,771.

To all whom it may concern:

Be it known that I, FRED D. HOLDSWORTH, a citizen of the United States, residing at Claremont, in the county of Sullivan and State of New Hampshire, have invented certain new and useful Improvements in Compressor-Controlling Mechanisms, of which the following is a full, clear, and exact specification.

My invention relates to compressor controlling mechanisms.

It has for its object to provide an improved compressor controlling mechanism especially adapted to use in a pressure controlled system. A more specific object of my invention is to provide an improved pressure actuated controlling element for compressors, adapted to minimize leakage and friction and at the same time to be more readily and cheaply manufactured. These and other objects of my invention will, however, hereinafter more fully appear.

In the accompanying drawings I have shown for purposes of illustration one embodiment which my invention may assume in practice.

In these drawings,

Figure 1 is a side elevation, partially in section, of a compressor equipped with my improvement.

Fig. 2 is a vertical sectional view of the controlling element.

In this illustrative construction, I have shown my invention as applied to a compressor 1, which may be of any desired form, having a cylinder 2 in which a piston 3 is reciprocable, the cylinder being shown as provided with inlet valves 4 of the puppet inlet type and discharge valves 5 of any usual type and respectively communicating through a suitable intake 6 with the atmosphere and through a suitable pipe 7 with a receiver 8. It will also be noted that this receiver 8 is connected through a pipe connection 9 with a suitable controlling element 10, hereinafter more fully described, which is in turn connected through a pipe connection 11 with suitable cylinders 12 formed in removable plugs 13 located beneath the suction valves 14 and having pistons 15 reciprocable therein into engagement with the usual spring pressed valve stems 15 of those valves.

In my improved construction it will be noted that the air supplied from the receiver through the pipe connection 9 enters,

through a port 16, a suitable chamber 17 formed in the casing of the controlling element 10, and that this port 16 is normally closed by a needle valve 18 disposed within the chamber 17 and having a body portion 19 of slightly smaller diameter than the diameter of the chamber. As shown, the needle valve 18 is preferably normally depressed by means of a coiled spring 20 operating between a suitable projection 21 on the body 19, and a nut 22 on a suitable adjusting member or set screw 23 carried at the opposite end of the casing. As shown, this spring is inclosed within a suitable compound diaphragm member 24 of extensible and compressible corrugated form, the lower end of which is suitably fixed to the member 19 and preferably housed in suitable flanges 25 formed on that member, while the upper end of the same is flanged or disposed laterally, as shown, and clamped between a shoulder 26 on the casing 10 and a collar 27 on a cover plate 28, the latter preferably carrying the screw 23, as shown, and also being provided with a port or vent 29 communicating with the atmosphere and adapted to admit atmospheric pressure to the inside of the member 24. Thus it will be observed that the space within the member 24 forms a chamber communicating only with the atmosphere, while the space outside this member forms a chamber adapted to communicate with the receiver through the port 16, and with the pipe connection and the inlet valve actuating plungers through a port 30, a small vent 31 to the atmosphere also being provided.

In the operation of my improved controlling mechanism, it will be noted that when the pressure in the receiver 8 rises sufficiently to overcome the combined effect of the atmospheric pressure and the pressure of the spring 20, the member 24 will be compressed and the needle valve 18 will be lifted from its seat in such a manner as to open communication between the passage 16 and the passage 30 communicating with the pipe 11. Thus, it will be observed that receiver pressure will be admitted beneath the plungers 14 in such a manner as to force the same to engage with the lower ends of the stems 15 of the suction valves 4 to lift the latter from their seats and unload the compressor. Obviously, this condition will continue so long as the pressure in the re-

ceiver 8 is above any predetermined point determined by the position of adjustment of the screw 23. When, however, the pressure in the receiver 8 falls below this limit, the atmospheric pressure available through the vent 29 plus the pressure of the spring 20 will be sufficient to cause the member 24 to be extended and the needle valve 18 to be seated and thereby cut off the supply of pressure fluid from the receiver to the valve actuating pistons 14 in such a manner as to enable the valves 4 to seat and load the compressor after the air beneath the same has exhausted through the vent 31.

By the use of my improved construction including the extensible and compressible corrugated member 24, it will be noted that all necessity for a tight fit within the chamber 17 is entirely avoided, thereby eliminating the difficulty with leakage or friction which has heretofore been experienced with certain regulators of this type when operating at relatively high pressures. It will also be observed that all necessity for machining this chamber has also been eliminated and that the entire mechanism may be very cheaply manufactured and conveniently assembled, at the same time that the working parts of the same are rendered very readily accessible and adjustable whenever desired. These and other advantages of my improved construction will, however, be clearly apparent to those skilled in the art.

While I have in this application specifically described one embodiment which my invention may assume in practice, it is to be understood that the form thereof shown herein is used for purposes of illustration and that the invention may be modified to assume various forms without departing from its spirit, it being my intention to include all such modifications within the scope of the appended claims.

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

1. In a compressor controlling mechanism, a casing, a longitudinally extensible and compressible member therein, a valve for admitting fluid pressure to said casing carried by said member, and means normally seating said valve.

2. In a compressor controlling mechanism, a casing having an atmospheric vent communicating with the interior thereof, a longitudinally extensible and compressible member therein, a valve carried by said member, and means normally seating said valve.

3. In a compressor controlling mechanism, a casing, a longitudinally extensible and compressible diaphragm member therein, a valve for admitting fluid pressure to said casing carried by said member, and resilient means normally seating said valve.

4. In a compressor controlling mechanism,

a casing having a chamber provided with a continuously open atmospheric vent, a diaphragm member in said chamber, a valve carried by said member, and resilient means normally seating said valve.

5. In a compressor controlling mechanism, a casing, a longitudinally extensible and compressible diaphragm member therein, a valve carried by said member, and resilient means housed in said member normally seating said valve.

6. In a compressor controlling mechanism, a casing, a longitudinally extensible and compressible diaphragm member therein, a valve carried by said member, resilient means housed in said member normally seating said valve, and means for adjusting the tension of said resilient means.

7. In a compressor controlling mechanism, a ported casing, a longitudinally extensible member therein and having a closed end and one end communicating with the atmosphere, a valve carried by said member and adapted when open to admit fluid pressure to said casing, and means normally tending to extend said member and seat said valve.

8. In a compressor controlling mechanism, a casing having a continuously open atmospheric vent, a longitudinally extensible member therein having a closed end and one end communicating with the atmosphere, a valve carried by said member, and means normally tending to extend said member and seat said valve, said casing having a small continuously open atmospheric vent.

9. In a compressor controlling mechanism, a ported casing, a longitudinally extensible member therein and having a closed end and one end communicating with the atmosphere, a valve carried by said member and adapted when open to admit fluid pressure to said casing, and resilient means normally tending to extend said member and seat said valve.

10. In a compressor controlling mechanism, a casing having a plurality of ports therein and a plurality of vents to the atmosphere, a longitudinally extensible and compressible diaphragm element disposed between said vents, and a valve carried thereby and controlling one of said ports.

11. In a compressor controlling mechanism, a casing having a plurality of ports therein and a plurality of vents to the atmosphere, a longitudinally extensible and compressible diaphragm element disposed between said vents, a valve carried thereby and controlling one of said ports, and resilient means normally holding said element in extended position.

12. In a compressor controlling mechanism, a casing having a chamber therein and having a plurality of ports communicating with said chamber and a plurality of

vents communicating with the atmosphere, a valve carrying member controlling one of said ports and movable in said chamber, means including an extensible and compressible diaphragm member connected to said valve carrying member and of smaller diameter than said chamber disposed between said vents, and means normally seating the valve carried by said member.

13. In a compressor controlling mechanism, a casing having a chamber therein and a plurality of ports communicating with said chamber, a valve member controlling admission of fluid pressure to said chamber through one of said ports and movable in said chamber, means including a normally extended extensible and compressible diaphragm member connected to said valve member and of smaller diameter than said chamber, and a cover carried by said casing having a port therein communicating with the interior of said diaphragm member.

14. In a compressor controlling mechanism, a casing having a chamber therein and a plurality of ports communicating with said chamber, a valve member controlling admission of fluid pressure to said chamber through one of said ports and movable in said chamber, means including an extensible and compressible diaphragm member connected to said valve member and of smaller diameter than said chamber, a cover carried by said casing having a port therein communicating with the interior of said diaphragm member, and resilient means normally tending to extend said diaphragm member.

15. In a compressor controlling mechanism, a casing having a chamber therein and a plurality of ports communicating with said chamber, a valve member controlling admission of fluid pressure to said chamber through one of said ports and movable in said chamber, means including an extensible and compressible diaphragm member connected to said valve carrying member and of smaller diameter than said chamber, a cover carried by said casing having a port therein communicating with the interior of said diaphragm member, resilient means normally tending to expand said diaphragm member, and means operable from the exterior of said cover to adjust the tension of said resilient means.

16. In a compressor controlling mechanism, a casing having a plurality of ports

therein and a plurality of vents normally in communication with the atmosphere, a longitudinally extensible and compressible diaphragm element disposed between said vents, and a valve carried thereby and controlling one of said ports.

17. In a compressor controlling mechanism, a casing having a plurality of ports therein and a plurality of vents constantly in communication with the atmosphere, a longitudinally extensible and compressible diaphragm element disposed between said vents, and a valve carried thereby and controlling one of said ports.

18. In a compressor controlling mechanism, a casing, a longitudinally extensible and compressible member dividing the casing into two compartments, and two ports and a vent in said casing in communication with one of said compartments.

19. In a compressor controlling mechanism, a casing, a longitudinally extensible and compressible member dividing the casing into two compartments, a plurality of ports and a venting means in the casing in communication with one of said compartments, and a valve carried by said compressible member for normally closing one of said ports.

20. In a compressor controlling mechanism, a casing, a longitudinally extensible and compressible member dividing the casing into two compartments, venting means for each of said compartments, and a plurality of ports in communication with one of said compartments.

21. In a compressor controlling mechanism, a casing, a longitudinally extensible and compressible member dividing the casing into two compartments, venting means for each of said compartments constantly in communication with the atmosphere, and a plurality of ports in communication with one of said compartments.

22. In a compressor controlling mechanism, a casing, a longitudinally extensible and compressible member dividing the casing into two compartments, venting means for each of said compartments, a plurality of ports in communication with one of said compartments, and a valve member carried by said compressible member for normally closing one of said ports.

In testimony whereof I affix my signature.

FRED D. HOLDSWORTH.