

F. E. NORTON.
 FLOAT VALVE FOR CENTRIFUGAL COMPRESSORS.
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1,060,012.

Patented Apr. 29, 1913.

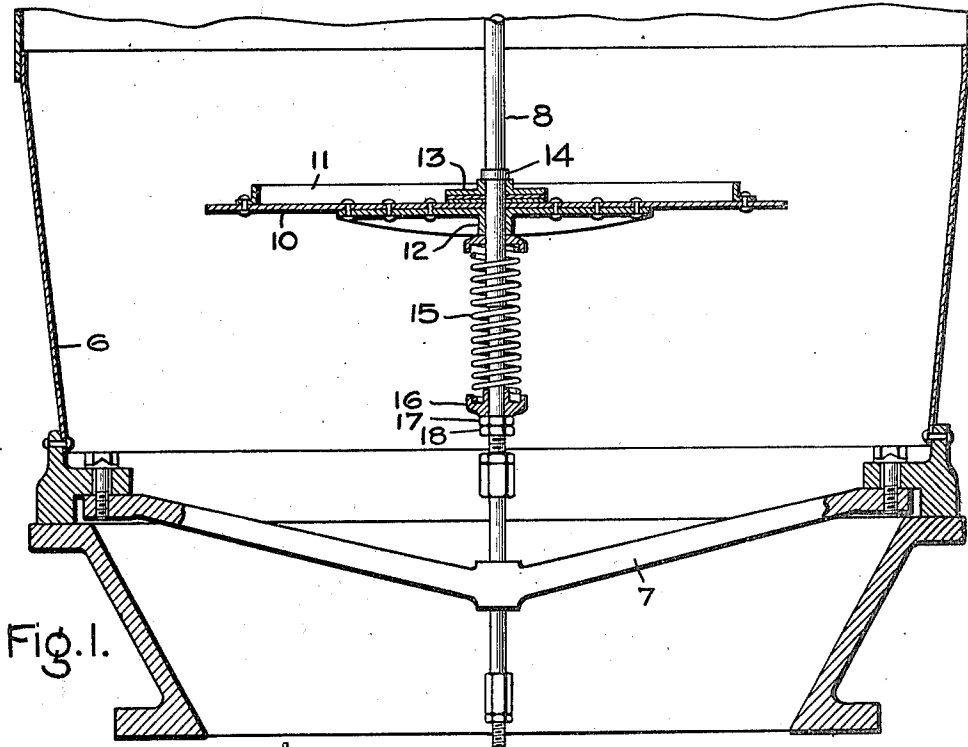


Fig. 1.

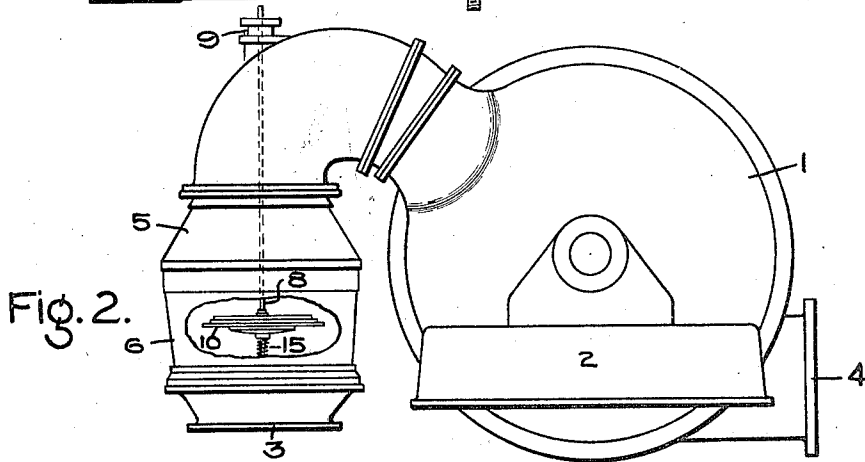


Fig. 2.

Witnesses:

Benjamin B. Bruce
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Inventor,
 Fred E. Norton,
 by *Alfred J. Davis*
 Att'y.

UNITED STATES PATENT OFFICE.

FRED E. NORTON, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

FLOAT-VALVE FOR CENTRIFUGAL COMPRESSORS.

1,060,012.

Specification of Letters Patent.

Patented Apr. 29, 1913.

Application filed August 16, 1911. Serial No. 644,433.

To all whom it may concern:

Be it known that I, FRED E. NORTON, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Float-Valves for Centrifugal Compressors, of which the following is a specification.

This invention relates to air compressors of the centrifugal type and especially those used for supplying air to blast furnaces. In a patent granted to Richard H. Rice, April 27, 1909, No. 919,953, there is shown an embodiment of such a compressor in which the driving motor is controlled by a float located in an enlargement of the air intake and responsive to variations in the volume of air passing through said intake. Under some conditions of operation, there is liable to be a backward flow of air in the intake, and the present invention has to provide a cushioning or safety device for the float so as to make allowance for this back pressure in the intake, in order to prevent any damage to the regulating device and avoid any interference with the regulation during the period of backward flow of air.

In the accompanying drawing, Figure 1 is a section of a portion of the intake and float, the latter being equipped with my cushioning device, and Fig. 2 is an end elevation of the centrifugal compressor, the intake being broken away to show the float.

The compressor has a casing 1 supported on a base 2 and provided with an intake 3 and a delivery nozzle 4. The intake has an enlargement composed of two frusto-conical sections 5 and 6 united at their bases and affording a chamber for the float. A bridge or yoke 7 spans the lower part of said chamber and affords a guide for the lower end of a stem or rod 8 on which the float is mounted, the upper end of the stem passing through a stuffing box 9 and being operatively connected to the driving motor-controlling devices in any suitable manner.

The float consists of a disk 10 preferably stiffened by an annular angle iron 11 and provided with a hub 12 which has a sliding fit on the stem. A collar 13 may be secured to the upper side of the disk to afford a bearing surface to abut against a shoulder 14 on the stem. The float is supported yieldingly by a helical spring 15 which abuts at its upper end against the hub and at its lower

end against a collar 16 slidable on the stem and sustained by a nut 17 and a lock nut 18 engaging with threads on said stem. By adjusting said nuts, the tension of the spring can be adjusted.

When the direction of flow is upward, the air acts against the under side of the disk, and as this is firmly pressed by the spring against the shoulder 14, it exerts a positive thrust on the stem and operates the motor-regulating mechanism as usual. But if for any reason there is a backward flow of air, the spring permits the disk to yield to the pressure on its upper side and slide downwardly on the stem, so that the latter is not actuated, and the regulating mechanism is not disturbed. Upon a cessation of the back-pressure, the spring returns the disk to its normal position in engagement with the shoulder.

In accordance with the provisions of the patent statutes I have described the principle of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is,

1. The combination with a conduit through which air is caused to flow by the action of an air compressor to which it is connected, of a rod longitudinally and slidably mounted in a portion of said conduit and having an abutment thereon, a float arranged in the conduit and of smaller size than the surrounding portion of said conduit so that the air flows between its edge and the wall of the conduit, said float being slidably mounted on the rod adjacent the abutment and riding on the moving column of air, and spring means carried by the rod that tends to hold the float against the abutment during the flow of the air in the normal direction but permits it to move in the opposite direction under other conditions of flow.

2. The combination with the intake of an air compressor, of a rod axially and slidably mounted in a portion of the intake and having a shoulder thereon, a collar on the rod below the shoulder, a float of smaller diameter than the surrounding portion of the intake that is slidably mounted on the

rod adjacent to the shoulder and arranged to ride on the incoming column of air, and a spring arranged between the float and the collar that tends to hold the float against the shoulder.

3. A motor driven air compressor having a controlling device for the motor, in combination with a conduit connected to the compressor and through which air is caused to flow by the action of said compressor, the conduit having a straight portion and a connected curved portion, a rod axially and slidably mounted in the straight portion and extending outward through the wall of the curved portion to actuate said controlling device, an abutment on the rod, a disk-like float slidably mounted on the rod adjacent to the abutment so as to ride on the

column of air flowing through said straight portion, the diameter of the float being less than that of the surrounding portion of the conduit so that the air flows through the annular space between its edge and the wall of the conduit, and a spring carried by the rod which tends to hold the float against the abutment during flow of air in the normal direction but permits the float to yieldingly move in the opposite direction if a backward flow occurs.

In witness whereof, I have hereunto set my hand this 14th day of August 1911.

FRED E. NORTON.

Witnesses:

JOHN A. McMANUS, JR.,
ROBERT SHAND.