Feb. 20, 1962 G. W. MILLER 3,022,040

COMPRESSOR BLEED VALVE

Filed March 25, 1959

FIG. 1

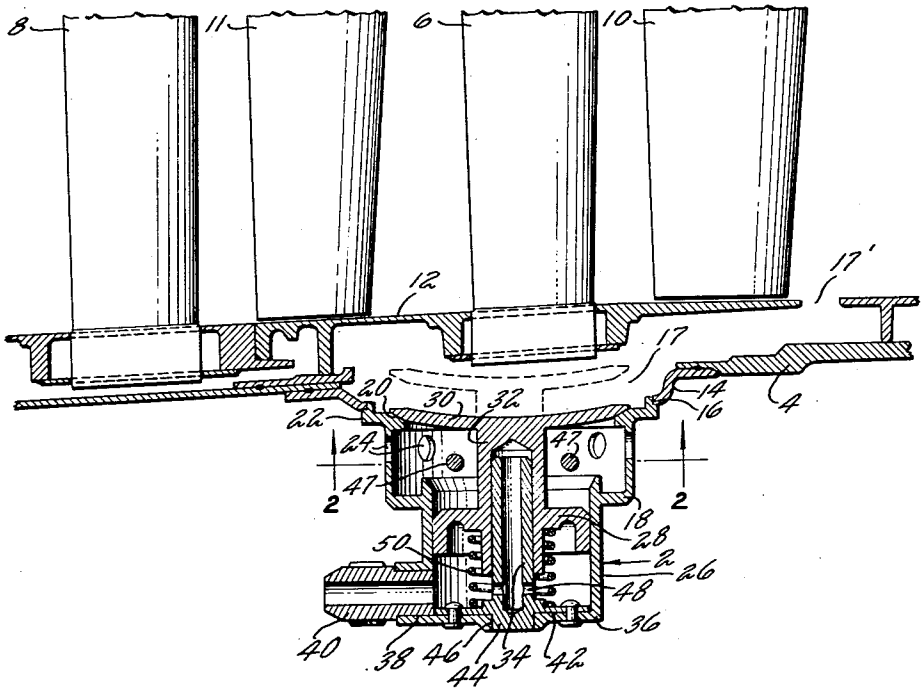
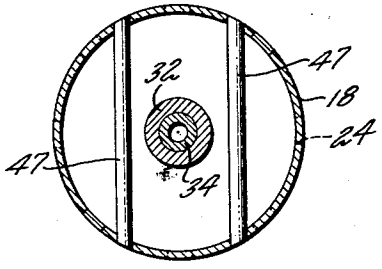


FIG. 2



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3,022,040
Patented Feb. 20, 1962

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3,022,040

COMPRESSOR BLEED VALVE

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Filed Mar. 25, 1959, Ser. No. 801,911
2 Claims. (Cl. 251—63)

This invention relates to a poppet valve mechanism and particularly to a valve adapted for bleeding compressors for improving the performance thereof.

A feature of this invention is a valve assembly which is complete in itself and is readily installed as a unit where a valve of this type is necessary. Another feature is a valve which is normally open and is adapted to be closed by a flow through the valve. Another feature is a valve of this type which is normally biased into open position and is moved into closed position by fluid pressure.

Other features and advantages will be apparent from the specification and claims, and from the accompanying drawing which illustrates an embodiment of the invention.

FIG. 1 is a sectional view through a portion of the axial flow compressor with the valve structure mounted thereon.

FIG. 2 is a sectional view along line 2—2 of FIG. 1.

In the arrangement shown the valve structure 2 is mounted on the main casing 4 of a multistage axial flow compressor. The latter has successive rows of vanes 6 and 8 within the outer casing and these rows of vanes alternate with rows of moving blades 10 and 11. The vanes may be carried by an inner casing 12 positioned within the casing 4 and piloted therein.

The valve mechanism is adapted to be mounted on a plate 14 attached to the compressor casing 4 and having an opening 16 which receives the valve mechanism. The opening 16 communicates with a chamber 17, and the purpose of the valve structure is to reduce the pressure in the chamber 17 which is formed between the compressor casing 4 and the inner casing 12. This chamber communicates with the gas path through the compressor as at the opening 17' represented by the row of vanes 6.

The valve mechanism includes a valve casing 18 having a valve seat 20 thereon with the valve seat facing toward the axis of the compressor. The valve casing also has a projecting flange 22 surrounding the valve seat by which it is mounted on the main casing in surrounding relation to the opening 16. The casing 18 has one or more rows of vent openings 24 therein in back of the valve seat. This casing also has a cylindrical portion 26 to receive a plunger 28 slidable therein.

The plunger 28 is integral with a valve element 30, these parts being interconnected by a sleeve or tube 32. The sleeve 32 is slidable over a stud 34 extending inwardly from the end cap 36 of the valve casing. This end cap is integral with the remainder of the casing 18 and has a vent opening 38 therein for the reception of a fluid pressure fitting 40. The stud 34 has a flange 42 thereon which engages with the inner surface of the end cap 36 and a centrally located boss 44 which fits within and is piloted by an opening 46. After the movable valve piece, including plunger 28, element 30 and sleeve 32 is in position, its movement is limited by stop rods 47 extending transversely across the valve casing on opposite sides of the sleeve between the plunger and the valve element.

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The stud 34 is hollow and has lateral passages 48 for venting the space at the inner end of the stud 34. A compression spring 50 positioned in the cylindrical portion 26 engages with the flange 42 on the inner surface of the end cap 36 and with the plunger 28 for normally urging the valve element 30 away from the valve seat into the dot-dash position shown. In addition to the spring 50 which holds the valve open as the compressor is started, the admission of fluid under pressure through the fitting 40 will assist the spring in keeping the valve open. When the space in back of the plunger is vented through the fitting 40 the pressures on the valve will be such when the compressor is in operation that the valve will close.

It is to be understood that the invention is not limited to the specific embodiment herein illustrated and described, but may be used in other ways without departure from its spirit as defined by the following claims.

I claim:

1. A valve construction including a main casing having an opening therein and forming a chamber from which gas under pressure is to be vented, a valve casing mounted on said main casing in surrounding relation to said opening, said valve casing having a valve seat facing the chamber and cooperating with said opening in providing communication between said casings, said valve casing comprising a cylinder forming an integral portion of said valve casing spaced from and coaxial of the valve seat and on the side of the seat remote from said main casing, said valve casing also having a stud thereon concentric with and projecting into said cylinder, and a movable valve element in said valve casing, said valve casing having vents therein between the valve seat and the cylinder, said element including a seat engaging valve, a piston received in said cylinder and a connecting element integral with said valve and piston, said cylinder having port means at the side of the piston remote from said vents, said piston and connecting element having an axial bore receiving said stud.

2. A valve construction as in claim 1 in which a spring positioned between the valve casing and piston urges the valve away from the seat for opening the valve.

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