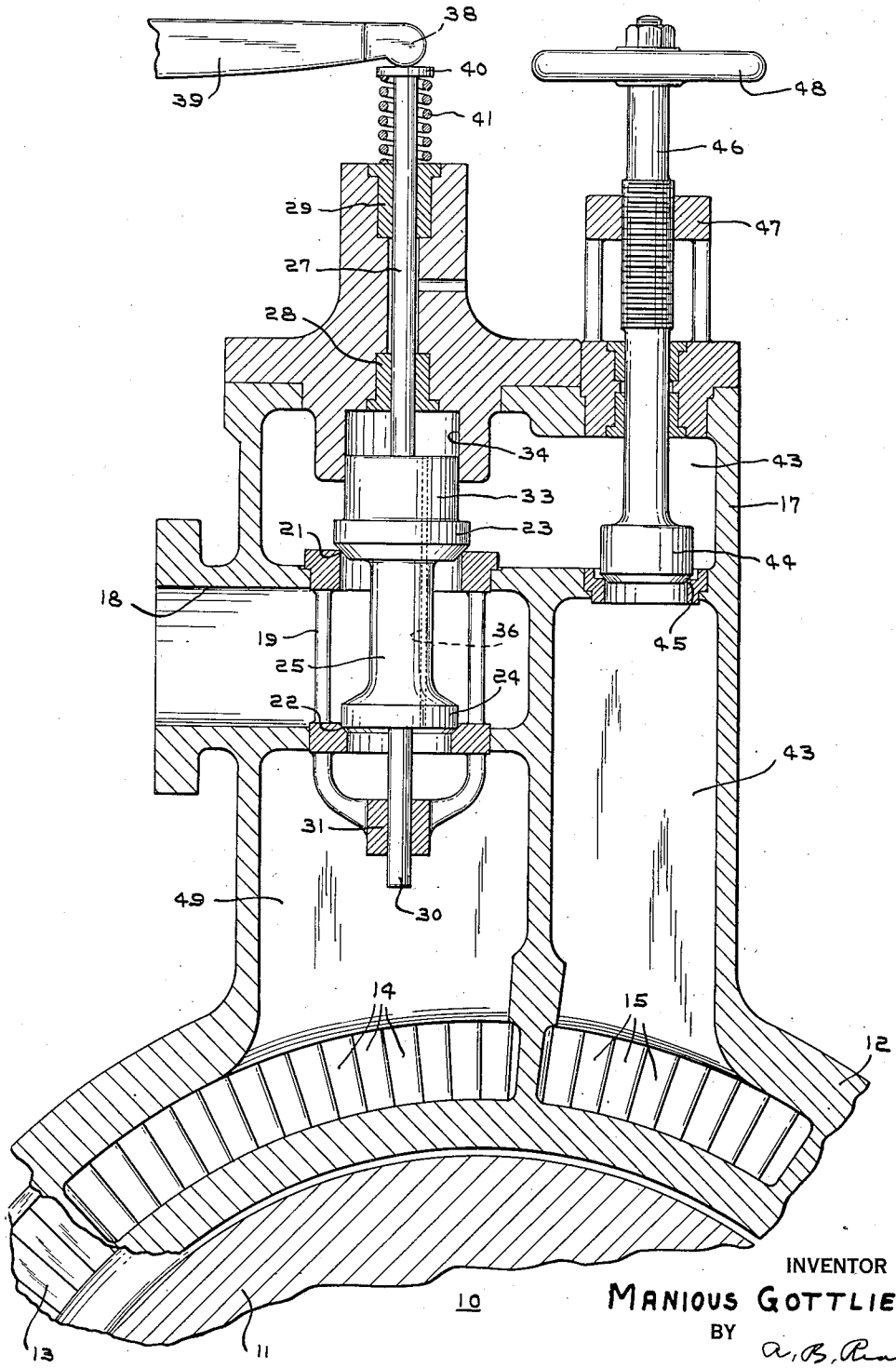
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CONTROL APPARATUS

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INVENTOR

MANIOUS GOTTLIEB.

BY A. B. Rines

ATTORNEY

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CONTROL APPARATUS

Manious Gottlieb, Philadelphia, Pa., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

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3 Claims. (Cl. 253—78)

This invention relates to valves, more particularly to an arrangement of valves for elastic-fluid utilizing devices, for example, steam or gas turbines, compressors, etc., and has for an object to provide improved apparatus of this character.

With small and medium size turbines, it has been common practice to use a single governor-controlled valve to admit steam to a chamber communicating directly with a first nozzle group and indirectly with a second nozzle group through a passage from the chamber, which passage is controlled by a manually-operable valve. With this arrangement, it is necessary to use a governor-controlled valve of sufficient size to provide for flow of the large valume of steam required under conditions of low pressure and with the manually-operable valve open to permit flow of the steam to both first and second nozzle groups. However, this produces the undesirable result that, with reverse conditions of high pressure and small volume and the manually-operable valve closed, the governor-controlled valve is so nearly closed that poorer control is obtained.

The present invention eliminates this difficulty by the provision of a double-seated governor-controlled admission valve with a first passage for conducting elastic fluid from one of the seats to the first nozzle group and a second passage, entirely independent of the first passage, for conducting elastic fluid from the other of the seats to the second nozzle group. With this arrangement, each valve of the double-seat valve need be only large enough to pass the maximum volume of elastic fluid which may be required for one of the nozzle groups. This size is considerably smaller than that required for a valve passing elastic fluid for two nozzle blocks, as in the prior construction, and hence, when operating with minimum elastic fluid flow, the valve still has sufficient lift to permit of good control.

Therefore, a further object of the invention is to provide valve structure for controlling admission of elastic fluid to apparatus for utilizing such fluid, together with an arrangement of ports and passages controlled by the valve structure, such that satisfactory control may be obtained under all conditions of operation of the apparatus.

These and other objects are effected by the invention as will be apparent from the following description and claims taken in connection with the accompanying drawing, forming a part of this application, in which the single figure is a fragmentary transverse sectional view of apparatus involving the invention.

Referring to the drawing more in detail, there is shown, at 10, a turbine comprising a rotor 11 and a casing 12 therefor, the rotor and casing carrying rows of blades 13 to which suitable motive fluid, for example, steam, is supplied through a first group of nozzles 14 and a second group of nozzles 15.

Steam is admitted to the casing 17 through the passage 18, the latter having disposed therein a cage 19 provided with first and second spaced seats 21 and 22, respectively, adapted to cooperate with corresponding valve discs 23 and 24, respectively. These valve discs are carried in spaced relation upon a valve body 25, the latter having a valve stem 27 extending from one end thereof and slidable through bushings 28 and 29. A similar but shorter stem 30 extends from the opposite end of the valve body 25 and is slidably supported in the bearing 31, carried by the cage 19. The upper end 33 of the valve body 25 is slidably received in a bore 34 formed internally of the casing 17, the end 33 being of such size as to substantially balance the opposite end of the valve body formed by the valve disc 24. In order to balance the pressures at opposite ends of the valve body, the latter is provided with a passage 36 extending therethrough.

The valve stem 27 is of sufficient length to extend beyond the casing and to be received between the bifurcations 38 formed at the end of a lever 39 which is part of the governor mechanism linkage. The bifurcated end 38 of this lever bears against a shoulder 40 formed on, or secured to, the stem 37 to move the latter downwardly, upward movement of the stem being produced by the compression spring 41, positioned between the shoulder 40 and the casing 17.

Steam entering the casing through the passage 18 and passing through the upper valve seat 21 enters the passage 43 to flow to the second group of nozzles 15. However, flow of steam through the passage 43 is controlled by the valve 44, which engages with a seat 45. The stem 46 of the valve 44 is threadedly mounted in a spider 47, carried by the casing 17. The free outer end of the valve stem 46 is provided with suitable means, such as the handwheel 48, whereby the valve may be manually adjusted to control flow of steam or other motive fluid through the passage 43 to the second group of nozzles 15. Steam flowing from the passage 18 past the lower valve seat 22 enters a passage 49 which conducts it to the first group of nozzles 14.

The operation of this apparatus will be obvious to those skilled in the art and it will be appar-

ent that the objects and purposes set forth above are accomplished by the construction illustrated and described.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and it is desired, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What is claimed is:

1. In apparatus for utilizing elastic fluid; first and second groups of nozzles, means providing an inlet passage for elastic fluid, a double-seat valve for automatically controlling flow of elastic fluid through said inlet passage, and including closure members spaced a distance corresponding to the spacing of the seats, whereby both of said valve seats are uncovered and covered simultaneously means providing a first connecting passage for conducting elastic fluid passing one of the valve seats of said double-seat valve to the first group of nozzles, means providing a second connecting passage independent of the first connecting passage for conducting elastic fluid passing the other of the valve seats of said double-seat valve to the second group of nozzles, and a second valve for controlling flow of elastic fluid through said second connecting passage.

2. In apparatus for utilizing elastic fluid, first and second nozzle means, casing structure having an inlet passage for elastic fluid; a pair of opposed ports in opposite sides of said inlet passage; an annular seat associated with each of said ports; an automatically adjustable valve member including a pair of spaced circular closure members adapted, in one position of the valve member, to engage said seats and close said ports, and in another position of the valve member, to be spaced from the seats and open the ports; the spacing of said closure members corresponding to the spacing of the annular seats of the opposed ports, whereby both of said ports are opened simultaneously means providing a first connecting passage for conducting elastic fluid from one of said ports to the first nozzle means; means providing a second connecting passage independent of the first connecting passage for conducting elastic fluid from the other of said ports to the second nozzle means; and a second valve for controlling flow of elastic fluid through said second connecting passage.

3. In an elastic fluid turbine; a rotor, blading carried by the rotor; a casing for said rotor and blading; first and second groups of nozzles carried by the casing for delivering elastic fluid to the blading; means providing a first passage for admitting elastic fluid to the casing, said passage terminating in a pair of ports; means providing a pair of independent passages, one passage of said pair of passages being adapted to conduct elastic fluid from one of said ports to the first group of nozzles and the other passage of said pair of passages being adapted to conduct elastic fluid from the other of said ports to the second group of nozzles; first valve means responsive to governor action for opening and closing both of said ports simultaneously; and second valve means for regulating flow of elastic fluid through said other passage of said pair of passages when said first valve means is in position to open both of said ports.

MANIOUS GOTTLIEB.