June 17, 1941. E. S. CORNELL, JR 2,246,033

TURBINE CONTROL VALVE

Filed Sept. 3, 1938

Fig. 1.

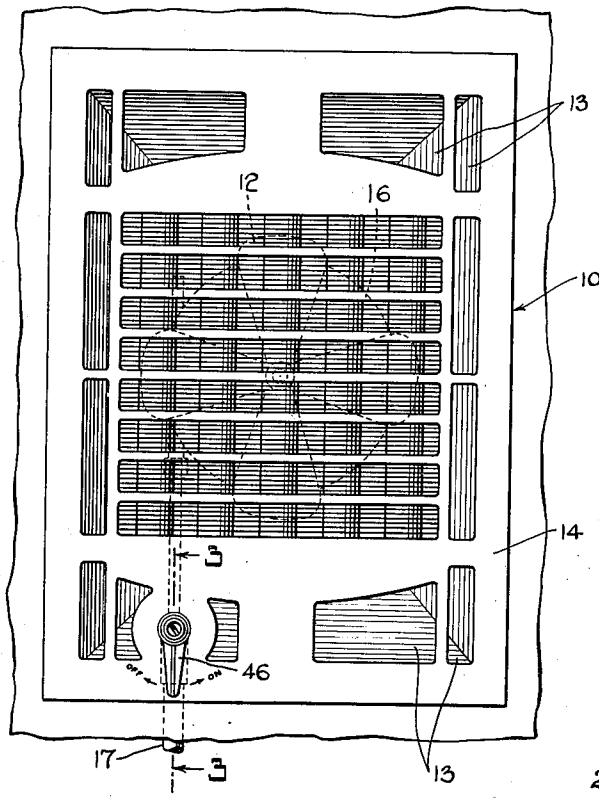


Fig. 2.

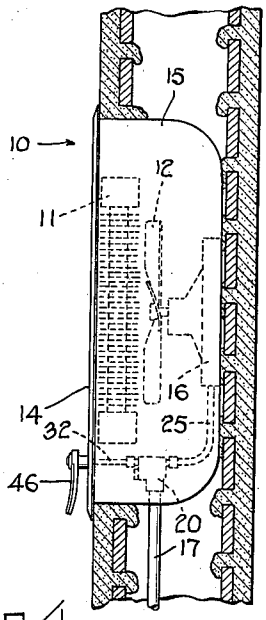


Fig. 4.

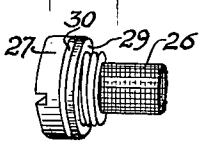
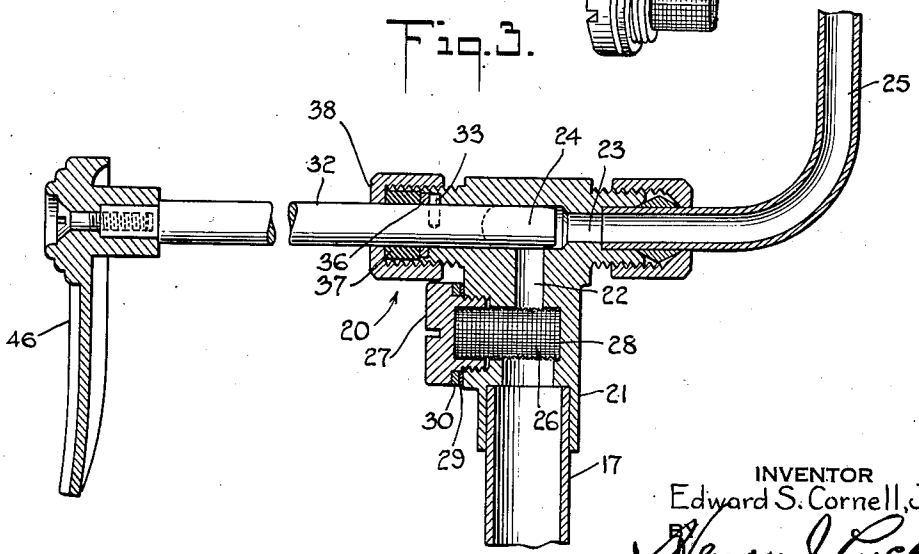


Fig. 3.



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TURBINE CONTROL VALVE

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3 Claims. (Cl. 183—41)

This invention relates to valves.

The invention finds particular application to valves for controlling the flow of air, water, steam or other fluid to a fluid-operated turbine. A typical example of service may be found in my U. S. Patent No. 2,038,347, granted April 21, 1936, entitled Air conditioned heating and cooling system, describing and claiming a heating system embodying heating units with which are associated fan means driven by an air operated turbine, compressed air for the operation thereof being generated by a central compressor plant. Said fan means directs a blast of air over the heating units, and warmed air is circulated throughout the enclosure served by such heating unit.

As will be apparent, control of the thermal output of the heating units may be effected by controlling the rate of rotation of the fan with consequent control of the volume of air directed over the heating units; a simple manner of accomplishing such control is to regulate the inflow of fluid to the turbine.

It is an object of the present invention to provide an improved valve for the control of such a turbine, and particularly, to provide a valve wherein suitable means are provided for straining or filtering the inflowing fluid to the turbine, to the end that the inflow nozzle of the turbine and the rotor of such turbine will not be clogged by inflowing dirt particles.

It is a further object of the invention to provide a control valve embodying filter means in which a substantial portion of the filter is maintained out of the path of fluid flowing through the valve, and thus protected from the clogging effect of dirt or the like carried by the flowing fluid, and providing a reserve filter portion which may be subsequently used after the initially exposed portion of the filter has become clogged.

It is another object of the invention to provide an improved filter organization, as aforesaid, in which the filter element thereof is readily removable by the house owner or other operator of the heating system, and repositioned to bring the clean portion of the filter into operative position, while disposing the clogged portion of the filter out of the path of flowing fluid.

Other features and advantages will hereinafter appear.

In the accompanying drawing:

Fig. 1 is a front perspective of a heat exchange unit provided with a valve pursuant to the present invention;

Fig. 2 is an elevation, showing the installation of the unit of Fig. 1 within a wall of a building;

Fig. 3 is a section of a valve forming the subject matter of the present invention;

Fig. 4 is a perspective of the filter screen assembly.

A heating unit 10, which includes a suitable fin-tube heat exchanger 11 arranged for suitable connection with thermal fluid circulation pipes of a steam or hot water heating system, is provided with power driven fan means 12 to draw air from the room or enclosure being heated inwardly through marginal openings 13 in the grille 14, and discharge it into the room, after first passing it over the heated elements of the heat exchanger 11.

The heat exchanger and fan means, as described in my aforesaid U. S. Patent No. 2,038,347, may be contained within a suitable casing 15 "concealed" within the wall space of a building, see Fig. 2, the external cover plate or grille being adjacent the outer surface of such wall.

The fan 12 may, as in my aforesaid patent, be driven by an air turbine 16, supplied with compressed air through a conduit 17 connected to any suitable air compressor means. With suitable alteration of the turbine, the steam or water circulated through the heat exchanger 11, may actuate the turbine.

Control over the heat output of the heating units 10 may be exercised by suitable control over the speed of rotation of the turbine 16. To effect such control, there is provided a turbine control valve 20, which forms the subject matter of the present invention.

Advantageously, and as later described in detail, the valve is of the rotating, non-lift, plug type, such type affording economies in manufacture and operating advantages not present in conventional gate, globe or like valves.

Referring to Fig. 3, the valve includes a body 21, advantageously of the "angle" type. The body 21 has an inflow passage 22 and an outflow passage 23, at the intersection of which is disposed a valve plug 24. Suitable means for the connection of the valve to the fluid inlet line 17, and to a discharge (turbine inlet) line 25, are provided. Fig. 3 illustrates the use of a "sweat jointed" connection at 17, and a compression nut connection with discharge line 25.

Disposed intermediate the inlet line 17 and the inflow passage 22 there is provided a novel filter, see Figs. 3 and 10, comprising a tube 26 formed of fine mesh screen, an end of said tube being frictionally held within a suitable cavity within the shank of a screw 27.

To accommodate such screen and the supporting screw 27 thereof, the valve body 21 is provided with suitable openings, intersecting the line of flow from conduit 15 into inflow chamber 22. As seen in Fig. 3, such openings include a circular well 28, the side walls and base portion of which are closely contacted by the tube 26 when such tube is in operating position. The walls of such well 28 preclude possibility of a short circuit around the under side of the screen, and prevent the introduction of foreign matter into the inflow portion of the valve body. A suitable gasket 29 and bearing washer 30, may be inserted beneath the head portion of the filter screen mounting screw 27, to effect a fluid tight joint of such head portion with said valve body.

As indicated in Fig. 10, the filter may be removed from the valve body as a unit, merely by unscrewing the filter screw 27. As shown in Fig. 3, the entire opening of the valve inlet chamber 22 is located at the lower central portion of the screen 26. The screen 26 being frictionally held within the cavity within the shank of its supporting screw 27, such screen is readily removable from the screw, and should the screen be clogged with dirt, its efficiency may be restored, without a special cleaning operation, by merely removing the filter screen 26 from the screw 27 and turning it end over end to position the clogged portion of the screen within the shank of the screw and remote from the inlet chamber 22. The clean end of the screen must then necessarily be in the path of fluid flow.

Whereas I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

I claim:

1. In a valve, the combination with a valve body having a flow passage, of plug means removably passing through an opening in a wall of said valve body adjacent such flow passage, and filter means having a length of filtering surface substantially greater than the diameter of said flow passage removably secured to said plug means and withdrawable through such valve wall opening as a unit with said plug means upon removal of said plug means from said valve body wall, a portion of said filter means substantially equal to the diameter of said flow passage being shielded from flow of fluid through said valve passage by the cooperation of said plug means and said valve body, substantially the remainder of said filter means being positioned transversely of said flow passage in filtering relationship therewith.

2. In a valve, the combination with a valve body having a flow passage and an aperture through said valve body in the wall of said passage, of plug means screw threadedly secured in said aperture and having a shank provided with an axially disposed cavity of substantial depth defined by imperforate walls, and filter means having a width less than the diameter of said valve body aperture and a length of filtering surface substantially greater than the diameter of said flow passage, an end portion of said filter means being removably secured within said plug aperture by frictional engagement with the walls thereof, substantially one-half of the total filtering surface of said filter means being disposed in the path of fluid flow through said valve flow passage, and the remainder of said filtering surface being shielded from filtering association with said flowing fluid by the cooperation of said plug shank and said valve wall.

3. In a valve, the combination with the body thereof, of plug means removably associated with a wall of said body and accessible exteriorly of said body, and filter means removably secured to said plug means by engagement of an end portion of said filter means with said plug means, said plug means disposing a portion of said filter means transversely of the path of fluid flow through said valve, and said plug means and said valve body cooperating to shield substantially one-half of said filter means from contact with such flowing fluid.

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