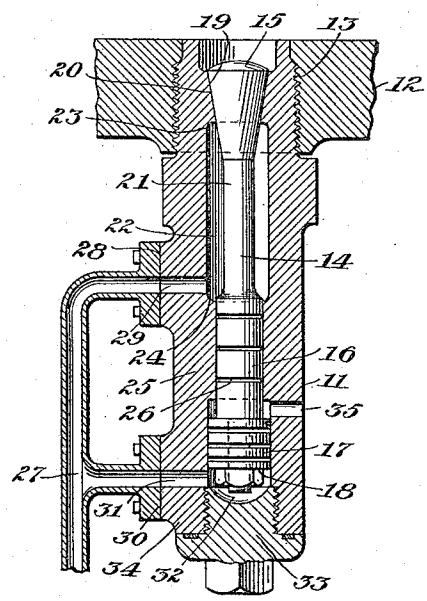
G. MELLEN.

CONTROLLING VALVE.

APPLICATION FILED APR. 20, 1912.

1,165,616. Patented Dec. 28, 1915.



Witnesses:
Robert D. Hulsizer.
C. H. Potter.

Inventor:
Greville Mellen
by Byrnes Townsend & Brickenstein
Attys.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GRENVILLE MELLEN, OF EAST ORANGE, NEW JERSEY.

CONTROLLING-VALVE.

1,165,616. Specification of Letters Patent. Patented Dec. 28, 1915.

Application filed April 20, 1912. Serial No. 692,150.

To all whom it may concern:

Be it known that I, GRENVILLE MELLEN, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Controlling-Valves, of which the following is a specification.

My invention relates to devices adapted to maintain a constant pressure within an apparatus requiring a high and constant pressure, and in which the pressure is constantly diminishing by reason of work being performed within the apparatus.

The object of my invention is to produce a device which will deliver a suitable fluid, under pressure to an apparatus in which the compressed fluid expands and does work. When the pressure within the apparatus is lower than the fluid pressure, the valve automatically opens and admits fluid to the apparatus; when the pressure within the apparatus exceeds the fluid pressure, the valve automatically closes and shuts off the supply of fluid to the apparatus.

One use in which I find this valve particularly efficient is in connection with my process for making extruded articles of metal or other material, an application for which was filed on April 20th, 1912, bearing Serial Number 692,151. In this process, water, oil or gas is sufficiently compressed to force molten metal from a crucible or chamber containing it, through a suitable die to form metal plate, rod, bar, pipe, wire, etc. When compressed water is used, it is injected into the crucible through the valve which opens by reason of the absence of counter pressure in the crucible. The injected water absorbs heat from the heated crucible and molten metal, and is at once converted into steam. When the steam pressure exceeds the water pressure, the valve head is compressed and closes the valve. Upon the reduction of the steam pressure, due to its expansion and forcing the molten metal through the die, the valve again opens, admitting more water, which forms more steam, closing the valve and expanding against the molten metal. The piston reciprocates in this manner, admitting water as soon as the steam pressure drops below the water pressure, thus maintaining a substantially constant pressure within the crucible or chamber.

The annexed drawing illustrates diagrammatically a valve operating upon this principle.

11 indicates the valve-body screwed into a wall 12 of a crucible or chamber, at 13. Within the valve-body is the reciprocating piston 14, bearing the valve-head 15, the collar 16, and the head 17. The convex end of the valve-head 15 has the same area as the end 18 of the head 17. The valve-head has a cone-shaped shank 19 which is accurately ground into the valve seat 20, affording a passage for water with a very slight movement of the valve. Within the valve body, and surrounding the connecting-rod 21 is an enlarged space or reservoir 22 for water or other suitable fluid to be used in the crucible or other chamber. The opening at the inside end 23 of the valve seat 20 has the same area as the opening at the end 24 of the shaft bearing 25; this arrangement gives the same surface at each end of the connecting-rod 21, the effect of the water pressure in the reservoir 22 is therefore neutralized so far as its retarding the free movement of the piston is concerned.

The collar 16 and head 17 have suitable packing 26 to afford tight joints with their respective bearing and cylinder surfaces. A supply-pipe 27 is suitably connected at 28 through an opening 29 with the fluid reservoir 22; and at 30, through the opening 31, with the cylinder space 32. A suitable closure 33 is inserted in the end 34 of the valve-body 11. The vent 35 is open to the air, and permits the free reciprocation of the piston.

The drawing illustrates the cylinder space 32 and the fluid reservoir 22 supplied by fluid from the same source. However, it is sometimes desirable to supply them from different sources, and they may then be separately connected to the respective sources of supply.

Upon supplying water-pressure to the pipe 27, water enters the reservoir 22, and since the areas of the openings in its ends are equal, no unequal pressure is exerted on the end of the piston collar 16 and the inside end of the valve head 15. The water supplied to the cylinder space 32 presses the head 17 against any pressure in the crucible or chamber acting on the outside of the valve head 15, and since they have the same area, the piston remains stationary when the pressures are equal; when a greater pressure is exerted on the head 17, the valve opens, admitting water to the cru-

cible or chamber, and forming steam; when the steam pressure in the crucible exceeds the water pressure, the valve closes, shutting off the water supply, until the steam pressure drops below the water pressure. The operation is continuous and automatic.

I claim:—

1. A controlling valve, comprising a valve-body, a fluid pressure cylinder and a fluid inlet thereto, a fluid reservoir and a fluid pressure inlet thereto, a central bearing separating the fluid pressure cylinder and the fluid reservoir, a reciprocating piston, a central collar on the piston supported by the bearing, a valve-head at one end of the piston and having a cone-shaped shank, the inside end of the cone-shaped shank constituting a reservoir piston-head, the adjacent end of the collar constituting a second reservoir piston-head, both reservoir piston-heads having substantially the same area whereby they receive equal pressure in opposite directions from a source of fluid pressure.

2. A controlling valve, comprising a valve-body, a fluid-pressure cylinder at one end of the valve-body adapted to be connected to a supply of fluid under pressure, a fluid reservoir at the other end of the valve-body and connected to a supply of fluid under pressure, a fluid outlet from the fluid reservoir, a bearing separating the fluid-pressure cylinder from the fluid reservoir, a reciprocating piston having a central collar supported by the bearing, a head at one end of the reciprocating piston and within the fluid-pressure cylinder, an air vent in the fluid-pressure cylinder between said head and the bearing, a valve-head having a cone-shaped shank on the other end of the reciprocating piston, a cone-shaped valve-seat in one end of the fluid reservoir coöperating with the valve-head shank to open the fluid outlet when the piston moves in one direction, and to close the fluid outlet when the piston moves in the opposite direction, the inside end of the cone-shaped shank constituting a reservoir piston-head, the adjacent end of the collar constituting a second reservoir piston-head, both reservoir piston-heads having substantially the same area whereby they receive equal pressure in opposite directions from a source of fluid pressure.

3. A controlling valve, comprising a valve-body, a fluid-pressure cylinder at one end of the valve-body and having a fluid-pressure inlet, a fluid reservoir at the other end of the valve-body having a fluid-pressure inlet and a fluid outlet therefrom, a bearing separating the fluid-pressure cylinder from the fluid reservoir, a reciprocating piston supported by the bearing, a central collar on said piston, a head at one end of the reciprocating piston, a valve-head at the other end of the reciprocating piston in the fluid outlet of the fluid reservoir, the area of the surface of the head being the same as the area of the exposed surface of the valve-head, the valve-head closing the fluid outlet when an external pressure against the valve-head exceeds the pressure in the fluid-pressure cylinder against the head, and opening the fluid-outlet when the external pressure against the valve-head is less than the pressure in the fluid pressure cylinder against the head, said valve-head having a cone-shaped shank, the inside end of the cone-shaped shank constituting a reservoir piston-head, the adjacent end of the collar constituting a second reservoir piston-head, both reservoir piston-heads having substantially the same area whereby they receive equal pressure in opposite directions from a source of fluid pressure.

In testimony whereof I affix my signature in presence of two witnesses.

GRENVILLE MELLEN.

Witnesses:
ALBERT F. JAECKEL,
E. M. INSLEE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."