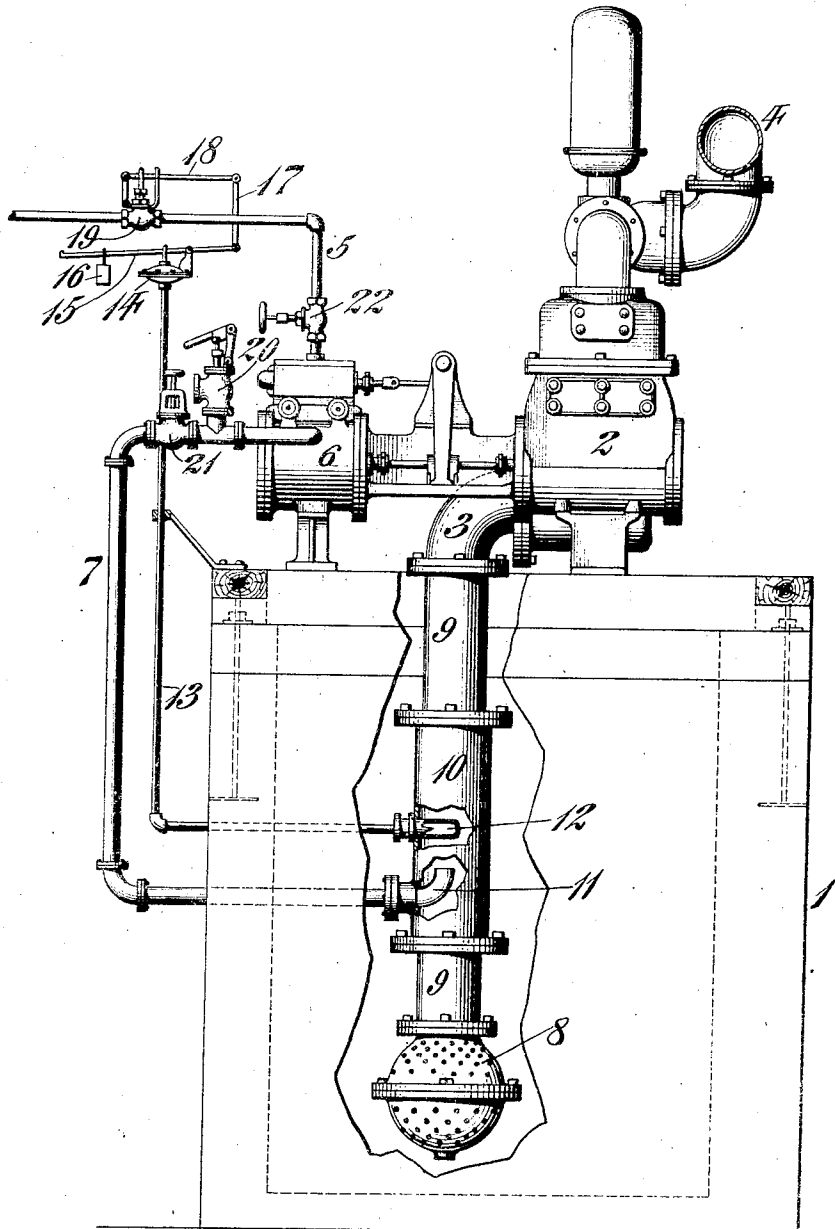


W. F. OTTO.
 AUTOMATIC DEVICE FOR CONTROLLING THE OPERATION OF PUMPS.
 APPLICATION FILED MAY 27, 1909.

943,369.

Patented Dec. 14, 1909.



WITNESSES

L. Conville,
P. F. Nagle.

INVENTOR

William F. Otto.
 BY *Wiedersheim & Friebauers.*
 ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM F. OTTO, OF WILKES-BARRE, PENNSYLVANIA, ASSIGNOR TO THE EYNON-
EVANS MFG. CO., OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENN-
SYLVANIA.

AUTOMATIC DEVICE FOR CONTROLLING THE OPERATION OF PUMPS.

943,369.

Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed May 27, 1909. Serial No. 498,756.

To all whom it may concern:

Be it known that I, WILLIAM F. OTTO, a citizen of the United States, residing at Wilkes-Barre, county of Luzerne, State of Pennsylvania, have invented a new and useful Automatic Device for Controlling the Operation of a Pump, of which the following is a specification.

This invention relates to a mining apparatus and more particularly an automatic device for controlling the operation of a pump used to remove water or the like from the bottom of a mine shaft.

It is well known in pumping operations in mines that it is common practice to carry the exhaust from the steam pump to the water inlet of the pump to assist the flow of water to the pump and it has frequently happened when all the water has been removed from the mine shaft that the hot exhaust which is then delivered directly to the pump cylinder renders the valves and other like parts inoperative.

In my present invention I have devised a construction whereby the pump automatically comes to a stop as soon as the water drops below the level of the end of the suction pipe and thereby damage of the pump or its parts is eliminated.

It further consists of other novel features of construction, all as will be hereinafter fully set forth.

For the purpose of illustrating my invention I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

The figure represents an elevation of a device embodying my invention.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates the frame work of a mine shaft and preferably the lower end of the same adjacent the bottom and upon which at a suitable place is mounted a steam pump 2 provided with the usual water inlet 3 and discharge outlet

4 on the water end of the pump, while on the steam end a pipe 5 serves as a conduit delivering the steam to the cylinder 6, from which it is exhausted by way of the pipe 7. The water inlet pipe, as here shown, is suitably connected to a strainer inlet 8 located adjacent the bottom of the shaft in position to remove practically all of the water from the shaft while at a suitable point in the length of pipe 9 a short section of pipe 10 is inserted communicating with the interior of which I provide an exhaust outlet 11 preferably curved in the direction of flow of the water to the pump, the said exhaust outlet being connected in any well known manner to the pipe 7.

12 designates a closed end fitting projecting interiorly of the pipe 10 and located adjacent the outlet 11 so as to be within the path of the exhaust steam issuing therefrom. This fitting 12 is connected with a line of pipe 13 extending to a point in close proximity to the pump 2 and there terminating in connection with diaphragm pressure regulator 14 of any well known type, one side of which is controlled by the lever 15 carrying a counterweight 16 thereon, whereby the movement of the diaphragm under internal pressure may be regulated as desired. The lever 15 is suitably connected by link 17 to a bar 18 having a connection with a steam controlling valve 19, whereby the flow of steam through the pipe 5 is properly controlled.

It will be understood that water or some suitable liquid is normally maintained in the pipe 13 and fitting 12 the expansion pressure of which, under heat, will cause the diaphragm 14 to operate and close the valve 19, in this way bringing the pump to a stop.

20 designates a suitable relief valve located in the pipe 7 and permitting the exhaust to be delivered to the atmosphere under certain conditions.

21 designates a suitable over-pressure valve, the same being of any well known type and here shown positioned in the exhaust pipe 7, in order to permit a predetermined definite pressure to be discharged through the exhaust 11.

22 designates a suitable globe valve adapted to control the admission of steam to the pump and operated manually as in ordinary practice.

In operation, if it is desired to remove a surplus amount of water from the bottom of the mine shaft, the valve 22 is opened to admit steam to the cylinder 6 and start the pump in operation whereupon a flow of water will be started through the inlet strainer 8, the pipe 9 and thence to the discharge outlet 4. While this is taking place, the exhaust from the cylinder 6 is being delivered to the outlet 11 and the condensation which takes place produces a higher vacuum to assist the pump in withdrawing the water from the shaft. As long as there is any water passing through the pipe 9 the apparatus works normally as usual but as soon as the level drops below the suction strainer 8, which it does at practically the time all of the water has been removed from the shaft, the exhaust steam from the outlet 11 will then be discharged directly against the fitting 12. The heat of this exhaust will cause the fluid in the fitting 12 and pipe 13 to expand and as soon as the pressure thereof is sufficient to overcome the counterweight 16 a movement of the levers 15, 17 and 18 will take place and cause the valve 19 to close, thus automatically cutting off the supply of steam to the pump and thereby preventing heating of the valves and other delicate parts of the pumping end of the pump.

It will now be apparent that I have devised a simple, compact and efficient regulating device for controlling the operation of the steam pump and by means of which injury to the mechanism by hot exhaust steam passing therethrough is prevented. It will further be noted that my novel device may be readily attached to any pumping mechanism without necessitating taking down or reassembling the different parts as already set up, since the short section of pipe to which the parts are connected may be quickly and easily joined to the suction pipe.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a device of the character described, a pump, a suction pipe connected thereto, a steam exhaust pipe communicating with said suction pipe, a steam supply for said

pump, and means controlled by the height of water in said suction pipe to cut off said steam supply.

2. In a device of the character described, a pump, a suction pipe connected thereto, a pipe section adapted to form a part of said suction pipe, a steam exhaust pipe communicating with said pipe section, a steam supply for said pump, and means controlled by the height of water in said suction pipe to cut off said steam supply.

3. In a device of the character described, a suction pipe connected thereto, a steam exhaust pipe communicating with said suction pipe, a steam supply for said pump, and a pressure regulating mechanism controlled by the height of water in said suction pipe, adapted to cut off said steam supply.

4. In a device of the character described, a pump, a suction pipe connected thereto, a pipe section forming a portion of said suction pipe, a steam exhaust pipe communicating with said pipe section, a steam supply for said pump, and a pressure regulating mechanism controlled by the height of water in said suction pipe adapted to cut off said steam supply.

5. In a device of the character described, a pump, a suction pipe connected thereto, a steam exhaust pipe communicating with said suction pipe, a steam supply for said pump, a fitting projecting into said suction pipe adjacent said exhaust pipe, a pressure regulator connected to said fitting, and means in said fitting adapted to operate said regulator at a predetermined height to cut off said steam supply.

6. In a device of the character described, a pump, a suction pipe connected thereto, a steam exhaust pipe communicating with said suction pipe, a steam supply for said pump, a fitting projecting into said suction pipe adjacent said exhaust pipe, a pressure regulator connected to said fitting, and an expansible fluid in said fitting adapted to operate said regulator at a predetermined time to cut off said steam supply.

WILLIAM F. OTTO.

Witnesses:

THOMAS M. EYNON,
THOMAS EVANS.