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PUMP.

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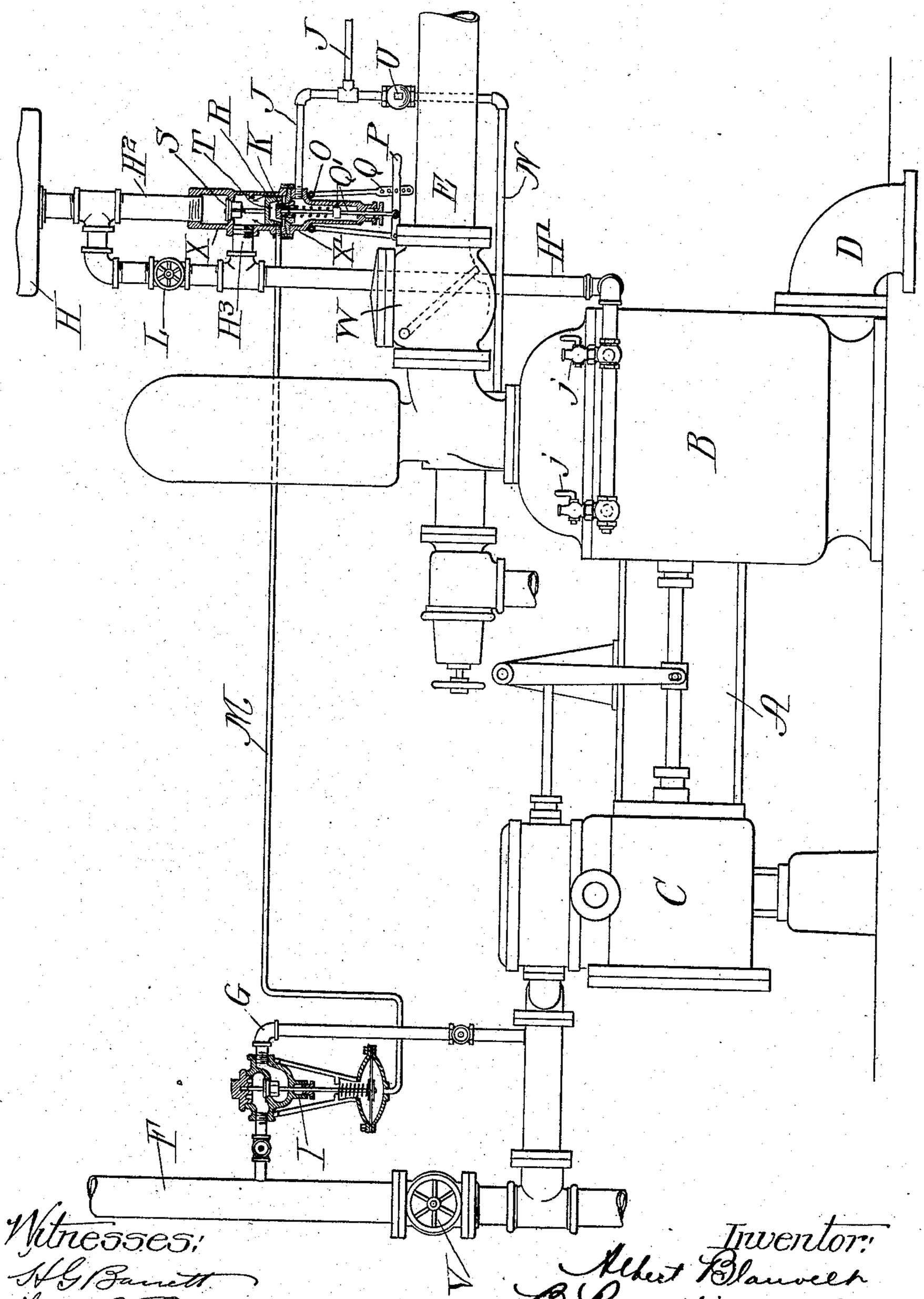


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# UNITED STATES PATENT OFFICE.

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## PUMP.

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Application filed May 21, 1907. Serial No. 374,821.

*To all whom it may concern:*

Be it known that I, ALBERT BLAUVELT, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

My invention relates to pumps, more particularly fire pumps, and the object thereof is to provide simple, efficient and reliable means for priming and venting the same so that the pump may be started to operate properly and promptly even though the operator may be unskilled in the operation and care of such class of pumps. As is well-known pumps of this description are usually water-primed and air-vented by hand but as these operations are apt to be hurriedly or imperfectly performed by unskilled attendants, especially in cases of fire, the pumps may not, in consequence, operate satisfactorily or promptly in the pumping or forcing of the water.

It is therefore the object of my invention to make these operations more or less automatic and to bring such water-priming and air-venting as well as the warming and starting of the pump under the automatic control of a suitable pressure, the fluctuations in which, whether from accident or intention, are arranged to accomplish said results.

The various features of advantage and utility in my new construction of pumps will be made apparent from the description hereinafter given.

The drawing represents an elevation of one form of water pump in which my invention has been embodied, portions thereof being shown in section.

While for convenience of description and illustration I have shown my invention embodied in a steam fire pump it will be understood that the same may be embodied in pumps of other character which require priming or venting or both, such as the rotary or centrifugal or belt-driven types of pumps.

Referring to the present embodiment of my invention as herein shown the water pump A is of the usual and well-known construction comprising the water pump proper marked B, steam cylinder C, suction D and discharge E for the pump and the main steam supply pipe F for supplying the steam to the steam cylinder. This steam supply pipe F is provided with a by-pass G around the main valve V for the purpose of providing a limited supply of steam to the cylinder C. This by-pass is under the control of an hydraulically operated steam inlet valve I of any suitable type and adapted to wholly or partially open upon application of hydraulic pressure and to wholly or partially close upon the removal of such pressure, in the manner hereinafter more particularly explained.

As is usual in pumps of the character being described, a priming tank H, containing a supply of water for priming the pump, is provided and in the present instance the same is an elevated tank connected with the water pump by means of the pipe H′ which is controlled by a manually operated valve L. In the ordinary operation of such pumps the attendant or skilled operator primes the pump by opening this valve L to admit the priming water to the water pump and in opening the air vents or valves *j j*.

In order to make provision for the automatic water priming and air venting of the pump, hereinbefore referred to, I provide a casing X arranged to communicate both with the priming tank H direct and with the priming pipe H′, such communications together with said casing forming a by-pass around the hand valve L. In the present instance this casing communicates at its upper end with the direct connection $H^2$ with the priming tank and laterally with the priming pipe H′ through the short connection $h^3$. However, this by-pass connection is normally closed, the same being under the control of a valve S arranged within said casing and adapted to seat therein in the direction of the flow of water from the tank and through the connection or pipe $H^2$. Within the casing X is arranged to travel a piston R which is arranged to fit so loosely therein as to permit a leakage of air past it in the manner and for the purpose hereinafter explained. The casing X is provided with a lower section X′ secured thereto and having a port or passage therein communicating between a chamber or space T below the piston R and the lower portion or section of the casing and governed by a valve K. This latter valve is provided with a spring O tending to retract the valve and hold it from its seat, such spring being connected at one end to the valve and at the other end to a vertical rod Q′ which extends extraneous of the casing and is pivotally

connected at its lower end to the adjusting and controlling lever P which is held in any adjusted position by connection with a space pin-bar Q having a series of holes representing different relative positions of adjustment of the lever P. The lower section X′ of the casing is adapted to communicate with a pipe J leading to any available or desired source of constant controlling pressure such as water pressure from any suitable source. As shown in the drawing the upper portion of the pump is connected with the pipe J by a pipe N to permit the passage of air vented from the water pump to the pipe J. To prevent the passage of fluid in the opposite direction a check valve U is provided in the pipe N.

Assuming that the pump is at rest as shown in the drawing and the water pump proper contains no water but as usual contains air at the water end and assuming, as is usual under ordinary working conditions, that the discharge pipe E is under heavy hydraulic pressure pressing against the usual check valve W therein, and assuming also that either by accident or design the pressure in the pipe J has been decreased, the pressure therefrom which has been holding the valve K seated against the tension of the spring O being now relieved to some extent, such spring will withdraw or retract the valve K and unseat the same with the result that the pressure from such pipe J though somewhat reduced, will enter the space T above the valve K, which is now opened, and against the underside of the piston R. This piston will now be moved upwardly in the casing X and the valve S thereby unseated so as to admit the priming water directly from the tank to the water pump in automatic manner. At the same time, as soon as the piston R is thus moved or raised, the pressure will pass from the casing X to the automatic steam inlet valve device I through the connecting pipe M and thereby either wholly or partially open the steam valve by-pass pipe G for the purpose of admitting a limited supply of steam pressure to warm and start the steam pump. As soon as the pump is thus started the air in the water end of the water pump will be forced therefrom through the pipe N, past the check valve U, into pipe J and into the space T below the piston R. Such vented air will then escape by leakage around the piston R and will pass upwardly and bubble through the priming water now passing downwardly through the connection $H^2$ to the water pump and will eventually pass into and escape from the priming tank which is of the usual construction open to atmosphere. In this manner and by these means, the pump is automatically water-primed, air-vented, warmed and started so that a skilled attendant is not necessary as the pump will be automatically placed under the right conditions for prompt and proper service. In the event of the attendant being present or subsequently reaching the pump, he is free to prime such pump by the manually operated valve L and to vent the pump by means of the air valves or cocks *j j* and also is free to admit steam at his discretion to the steam cylinder of the pump by the main throttle valve V. If the attendant or operator should at any time desire to stop the pump and restore the conditions existing prior to the decrease in pressure in the pipe J, this result can be brought about by freeing the lever P and raising the same to reseat the valve K. The pressure in the intermediate space or chamber T then leaks past the loosely fitting piston R and becomes negligible thus permitting the piston R and valve S to descend and close off the supply of priming water from the tank, also relieving the pressure pipe M and permitting the closing of the steam valve device I, it being understood of course that the valves L and V are also closed. The degree of pressure in the pipe J that will permit of the opening of the valve K may be predetermined by different adjustments of the hand lever P whereby the tension of the spring O is increased or decreased with the result that the valve K will be permitted to open at any desired or predetermined degree of pressure in said pressure pipe J.

I claim:

1. In a water pump, the combination, with such pump, of fluid pressure controlled means for governing the water priming thereof; substantially as described.

2. In a water pump, the combination, with such pump, of manually operated means for water priming the pump, and supplemental means for such water priming; substantially as described.

3. In a water pump, the combination, with such pump, of manually controlled means for water priming the pump, and independently operated means under the control of fluid pressure for such water priming; substantially as described.

4. In a water pump, the combination, with such pump, of means under the control of fluid pressure for governing the water priming thereof, said means being normally arranged to prevent water priming but arranged to permit of the same, when the pressure is decreased; substantially as described.

5. In a water pump, the combination, with such pump, of fluid pressure controlled means for governing the air venting thereof; substantially as described.

6. In a water pump, the combination, with such pump, of fluid pressure controlled means arranged to govern both the water priming and the air venting of the pump; substantially as described.

7. In a water pump, the combination, with such pump, of fluid pressure controlled means arranged to govern the water priming and air venting and also the starting of the pump; substantially as described.

8. In a water pump, the combination, with such pump, of manually controlled means for water priming the pump consisting of a valve governed water pipe arranged to communicate with a source of water supply and with the pump, a by-pass in such pipe around said valve, and fluid pressure controlled means for governing the passage through such by-pass; substantially as described.

9 In a water pump, the combination, with such pump, of manually controlled means for water priming the pump consisting of a valve governed water pipe arranged to communicate with a source of water supply and with the pump, a by-pass in such pipe around said valve, a valve in the by-pass pipe, a piston for actuating such last-named valve, and an admission valve for admitting fluid pressure against said piston to operate the valve in the by-pass and thereby open the latter and water prime the pump; substantially as described.

10. In a water pump, the combination, with such pump, of manually controlled means for water priming the pump consisting of a valve governed water pipe arranged to communicate with a source of water supply and with the pump, a by-pass in such pipe around said valve, a valve in the by-pass, a piston for actuating such last-named valve, an admission valve for admitting pressure against said piston to open the valve in the by-pass, and a spring coöperating with the admission valve and tending to withdraw it from its seat against fluid pressure tending to seat it; substantially as described.

11. In a water pump, the combination, with such pump, of manually controlled means for water priming the pump consisting of a valve governed water pipe arranged to communicate with a source of water supply and with the pump, a by-pass in such pipe around said valve, a valve in the by-pass, a piston for actuating such last-named valve, an admission valve for admitting pressure against said piston to open the valve in the by-pass, a spring coöperating with the admission valve and tending to withdraw it from its seat against fluid pressure tending to seat it, and means for adjusting the tension of the spring; substantially as described.

12. In a water pump, the combination, with such pump, of manually controlled means for water priming the pump consisting of a valve governed water pipe arranged to communicate with a source of water supply and with the pump, a by-pass in such pipe around said valve, a valve in the by-pass, a piston for actuating such last-named valve, an admission valve for admitting pressure against said piston to open the valve in the by-pass, a spring coöperating with the admission valve and tending to withdraw it from its seat against fluid pressure tending to seat it, and an adjustable rod, one end of the spring being connected to the valve and the other end to the rod; substantially as described.

13. In a water pump, the combination, with such pump, of manually controlled means for water priming the pump consisting of a valve governed water pipe arranged to communicate with a source of water supply and with the pump, a by-pass in such pipe around said valve, a casing communicating at one end with said by-pass pipe and towards the other end with a source of fluid pressure, a piston therein for operating the by-pass valve, and an admission valve normally held seated by said fluid pressure but arranged to admit such pressure against the piston when that pressure is reduced; substantially as described.

14. In a water pump, the combination, with such pump, of manually controlled means for water priming the pump consisting of a valve governed water pipe arranged to communicate with a source of water supply and with the pump, a by-pass in such pipe around said valve, a casing communicating at one end with said by-pass pipe and towards the other end with a source of fluid pressure, a piston therein for actuating the by-pass valve and constructed to permit leakage past it, a check valved vent pipe or connection communicating with said casing, and an admission valve normally held closed by said pressure but arranged to admit the same against the piston when the fluid pressure is decreased; substantially as described.

15. In a water pump, the combination, with such pump, of manually controlled means for water priming the pump consisting of a valve governed water pipe arranged to communicate with a source of water supply and with the pump, a by-pass in such pipe around said valve, a casing communicating at one end with said by-pass pipe, a fluid pressure supply pipe communicating with the casing towards its other end, a check valved vent pipe communicating between the pump and the supply pipe, a piston in the casing for actuating the by-pass valve and arranged to permit leakage past it, and an admission valve in the casing normally held closed by said pressure but arranged to admit the same against the piston when such pressure becomes reduced; substantially as described.

16. In a water pump, the combination, with such pump, of manually controlled means for water priming the pump consist-

ing of a valve governed water pipe arranged to communicate with a source of water supply and with the pump, a by-pass in such pipe around said valve, a casing communicating at one end with said by-pass pipe and towards the other end with a source of fluid pressure, a piston therein for operating the by-pass valve, a fluid pressure controlled valve device for governing admission of steam to the pump and communicating with said casing, and an admission valve in such casing for admitting pressure against said piston to operate the by-pass valve and to the said valve device to admit steam to the pump; substantially as described.

17. In a water pump, the combination, with such pipe, of manually controlled means for water priming the pump consisting of a valve governed water pipe arranged to communicate with a source of water supply and with the pump, a by-pass in such pipe around said valve, a casing communicating at one end with said by-pass pipe, a fluid pressure supply pipe communicating with the casing towards its other end, a check valved vent pipe communicating between the pump and the supply pipe, a piston in the casing for actuating the by-pass valve and arranged to permit leakage past it, a fluid pressure controlled valve device for governing admission of steam to the pump, a pressure pipe communicating between the valve device and said casing, and an admission valve in the casing normally held closed by pressure from the supply pipe but arranged to admit the same against the piston when such pressure becomes reduced; substantially as described.

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