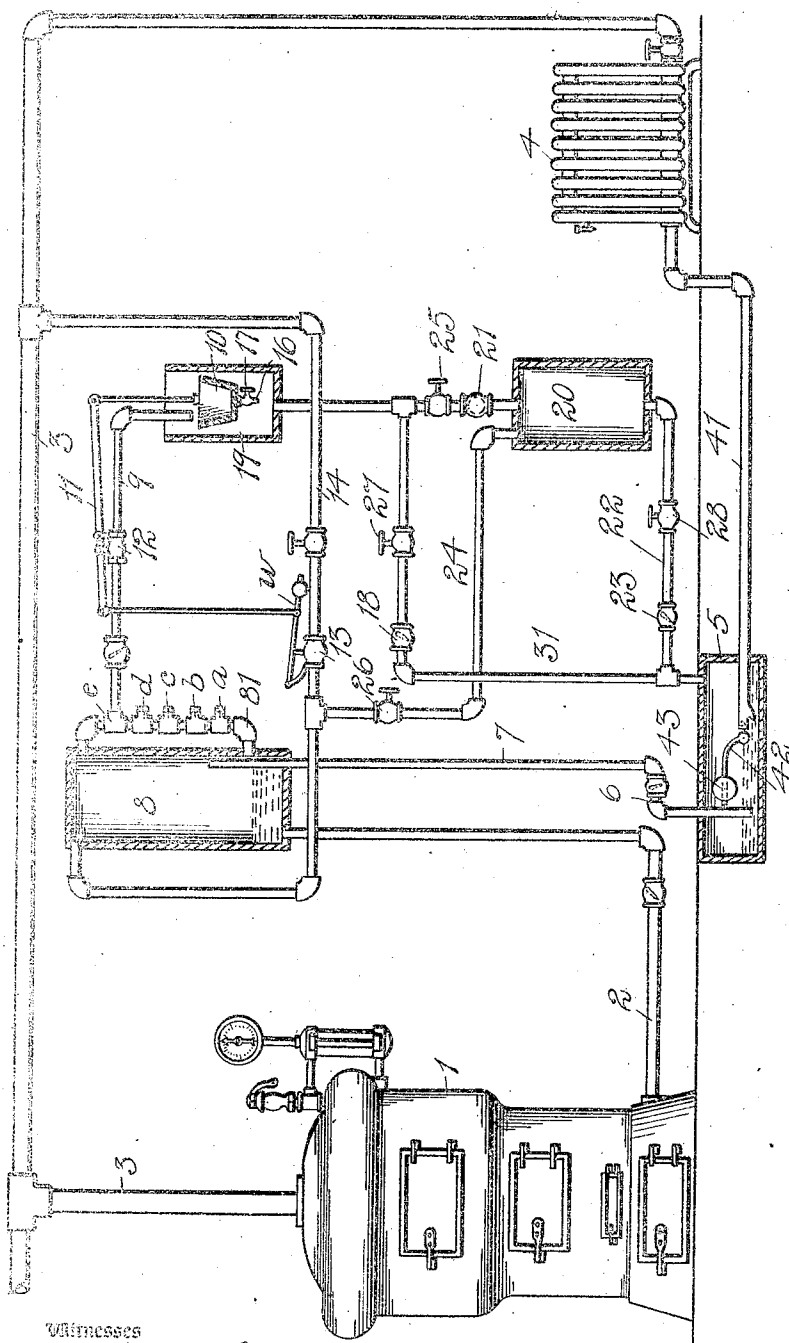


N. ENGLISH.
BOILER FEEDER.

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902,263.



Witnesses

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UNITED STATES PATENT OFFICE.

NORMAN ENGLISH, OF DETROIT, MICHIGAN.

BOILER-FEEDER.

No. 902,283.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, NORMAN ENGLISH, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Boiler-Feeders, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to boiler feeders.

It has for its object an improved means for collecting and returning water of condensation to the boiler automatically.

The drawing is a diagram of the apparatus.

1 indicates the boiler into which the water is fed through pipe 2, and from which the steam emerges through pipe 3. The steam passing through pipe 3 to its place of use is condensed in the various pipes and coils, as in coil 4, and the condensed steam runs by gravity into a well 5, in which it gradually accumulates. From the well 5 the water is lifted by the force of the steam in the system, past check valve 6, through pipe 7 into a stationary tank 8, and accumulates in the stationary tank 8 until it rises above the outflow pipe 9, through which the water passes and is delivered into a hanging receptacle 10.

The receptacle 10 hangs on the end of a lever 11, which controls two valves; the one valve 12 is a balance valve in the pipe 9, and the other valve 13 is a balance valve in a steam pipe 14, that leads from the main steam pipe 3 into the top of the tank 8. The receptacle 10 has a water outlet 16, closed by a hand actuated valve 17, which is normally open. The receptacle 10 hangs in a guard vessel 19, into which drops the water passing through the outlet 17, and from the guard vessel the water is conveyed, or may be conveyed, into the well 5, or into any suitable receptacle for the water that has been used to actuate the lever 11. The large outlet of the pipe 41 which leads from the radiator into the well 5 is closable by a float actuated valve 42 that closes by the dropping of the float 43 by gravity when the well is emptied. The outlet from the pipe 41 is not entirely closed, but the greater part of it is closed off, leaving a by-pass 43^a for water to enter the tank 5, but closing off the large aperture, and preventing the excessive inflow of steam into the well until the full orifice is opened; the small

amount of steam escaping into the well through the downwardly directed opening 43^a condenses.

The operation of the device is as follows:—

The pipes being filled with steam, some part of the steam condenses, and the water of condensation flows by gravity into the well 5, whence it is lifted by the pressure of steam behind it; as soon as the water in the well 5 has lifted the float valve to open the full orifice, the water in the well 5 is driven up into the tank 8, rises in the tank 8 and in the parallel pipe 81 until it rises above the end of the pipe 9, then some part of the water passes through the pipe 9 past the now open valve 12, drops into and fills the receptacle 10, into which the water runs faster than it can run out through the discharge pipe 16. As soon as the receptacle 10 has been filled, it drops by gravity, closes the valve 12, and opens the valve 13, which now admits steam from the pipe 3 into the tank 8 above the water that is contained therein. The water in the tank 8 is now under an equalized pressure, and drops by gravity through the pipe 2, into the boiler. The water no longer runs into the receptacle 10, and that soon empties, and is lifted by the counter weight W, opening the valve 12, and closing the valve 13. By this action the air has been driven out from the tank 8, which is filled with steam, and this steam condenses, producing a partial vacuum in the tank; the water immediately begins to flow into the tank 8 from the well. After the system has become warmed up, so that the condensation therein is comparatively slow, the small amount of water which gathers in the well 5 during the time that the tank 8 is discharging, rises almost immediately into the tank 8, and immediately after the water in the well 5 sinks below the lower end of the pipe 7, steam follows into the tank, and the force of this steam is sufficient to equalize pressure on the water now in the tank 8, and the actuating receptacle 10 ceases to have an active part in the return of the water to the boiler, though it is present, and in condition to act whenever for any reason the water which gathers in the tank 8 is sufficient to overflow into the receptacle 10. This is especially the case if the pressure in the system is very low, as is frequently the case, so low that the pressure is not sufficient to overcome the atmosphere, and force open the check valve in the pipe 9 which is held to its seat by gravity, and at

mospheric pressure. This boiler feeder will act efficiently when the pressure of the steam in the system falls as low as a half pound.

In the original construction of the apparatus, the pipe 9 is so located along the parallel pipe 81, that it determines the amount of fluid to be collected in said tank before the fluid begins to overflow through the pipe 9 into the receptacle 10. This is done by placing on the parallel pipe 81 a number of couplings, *a, b, c, d,* and *e,* and connecting the pipe 9 to that one of the couplings which is at the proper height to determine the desired amount of water to be collected before it is emptied into the boiler. The place of this connection depends on the size of the plant with which the apparatus is used. With a large plant more water is to be collected than with a small plant.

When high pressure steam is employed, an additional apparatus may be employed, that is, when the pressure of steam is so high that the overflow water in the receptacle 10 is unable to pass the check valve 18. This additional device consists of a tank 20 into which water from the tank 19 empties, passing as it does so a float check valve 21. The tank 20 is supplied with an outlet pipe 22, in which there is a check valve 23, and with a steam inlet pipe 24, which communicates with the main steam pipe 3, and through which steam is admitted into the tank 20 whenever the valve 13 is opened. The water will readily drop from the tank 19 into the tank 20, and when in the tank 20 is in position to be equalized between the back pressure from the tank 5 and steam substantially taken directly from the boiler through the pipe 24. The system

may be changed at will by hand manipulation of valves 25, 26 and 27.

What I claim is:—

1. In a boiler feeder, in combination with a steam boiler and a system of steam heating pipes supplied thereby, a well into which said pipes drain, a tank located above the boiler and adapted to empty therein by gravity, a pipe connecting said well and said tank, an overflow pipe from said tank, a receptacle into which said overflow drains, a valve in said overflow pipe controlled by said receptacle as a weight, a valve in the steam pipe adapted to control the admission of steam into said tank and itself controlled by said receptacle as a weight, substantially as described.

2. In a boiler feeder, in combination with a steam boiler and a system of heating pipes supplied thereby, a collecting well, a collecting tank, a pipe through which water may be forced from the well to the tank, a valve therein adapted to prevent a return flow therethrough, an overflow pipe from said tank, a receptacle adapted to catch the overflow therefrom, pipes connecting said tank and said receptacle with the boiler, whereby water may be returned therein from either, and valves actuated by said receptacle, whereby steam may be admitted to equalize the pressure on the water contained in the tank, substantially as described.

In testimony whereof, I sign this specification in the presence of two witnesses.

NORMAN ENGLISH.

Witnesses:

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