

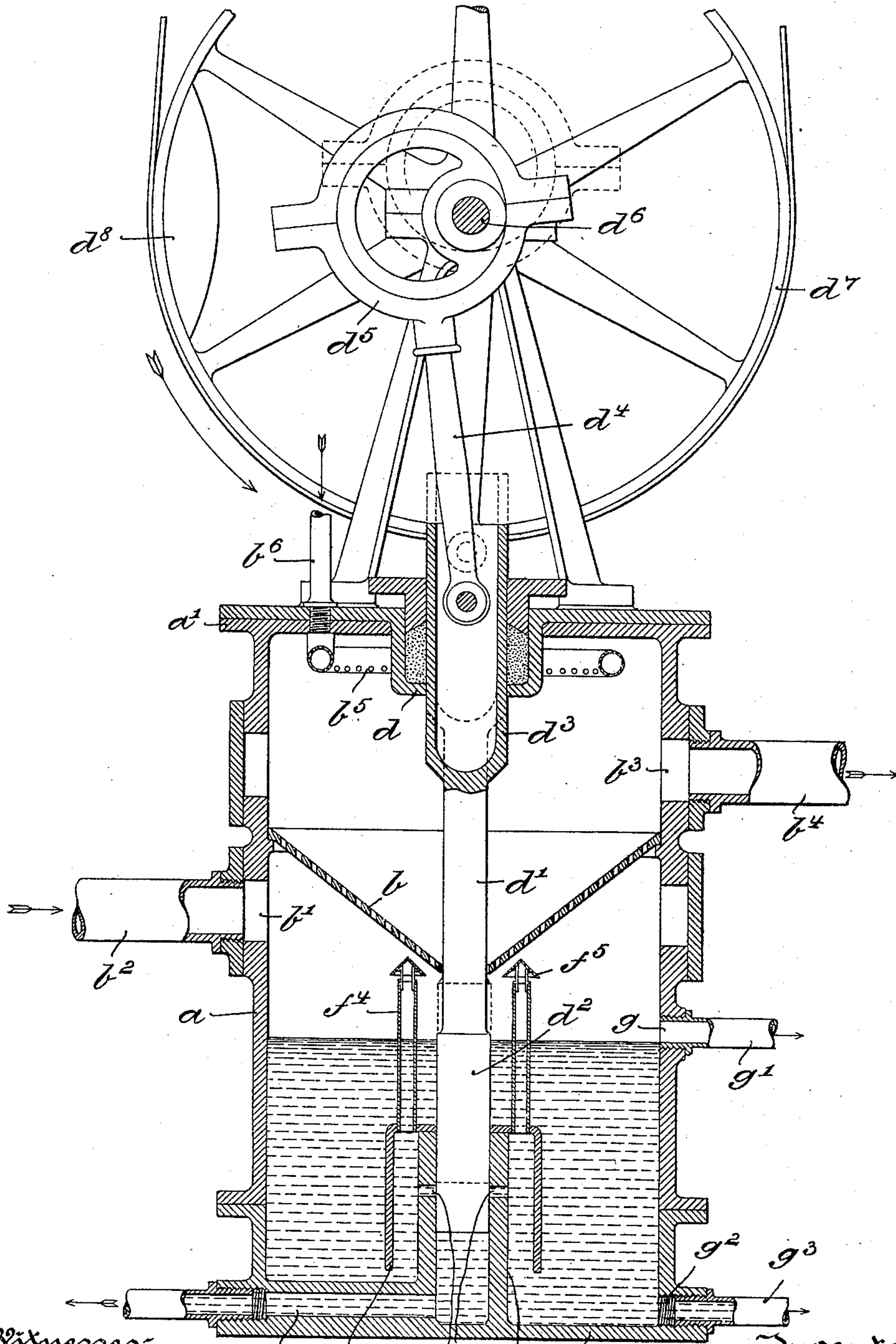
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Patented Oct. 17, 1899.

H. FELLEBAUM.
FEED WATER HEATER.

(Application filed Feb. 24, 1899.)

(No Model.)



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FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 634,884, dated October 17, 1899.

Application filed February 24, 1899. Serial No. 706,641. (No model.)

To all whom it may concern:

Be it known that I, HARRY FELLENBAUM, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Feed-Water Heaters for Steam-Engines, of which the following is a specification.

My invention has relation to a feed-water heater; and in such connection it relates more particularly to the construction and arrangement of such an apparatus.

The principal object of my invention is to provide a feed-water heater wherein the feed-water and exhaust-steam are intimately commingled at the point of condensation and thereafter collected below the point of condensation, and wherein the surface-impurities, such as oil or scum, are removed and sedimentation drained off at points respectively above and below that at which the water is pumped or forced from the feed-water heater.

To this end my invention consists of a feed-water heater constructed and arranged in substantially the manner hereinafter described and claimed.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawing, forming part hereof, which illustrates, in a vertical section, a feed-water heater embodying the main features of my present invention.

Referring to said drawing, *a* represents the casing or shell of the feed-water heater divided into upper and lower compartments by a conical downwardly-arranged perforated condenser-plate *b*. Below this plate *b* and adjacent to its inclined wall is located the opening *b'* for the entrance of exhaust-steam from a pipe *b²*, leading from the cylinder of an engine or from any suitable source of supply. The steam as it enters through the opening *b'* is directed against the conical or inclined surface of the plate *b*. Above the plate *b*, and preferably diametrically opposite to the opening *b'*, is arranged in the casing *a* a second opening *b³*, leading to an exhaust or outlet pipe *b⁴*, designed to lead off the steam not condensed below the plate *b* and which

escapes through the perforations in said plate. From the roof-plate *a'* of the casing *a* is suspended a rose or sprayer *b⁵* or annular pipe, having perforations arranged to throw water entering the rose from the water-pipe *b⁶* downward upon the inner face of the plate *b*. The water from the rose or sprayer *b⁵* cools the plate *b*, and also is heated thereby before it trickles through its perforations and mingles with the exhaust-steam. This arrangement of the condenser-plate will be found very efficacious in heating the feed-water, and said water when it reaches the lower compartment or well of the casing *a* will be heated to approximately 212° Fahrenheit.

In the roof *a'* of the casing *a* is located a stuffing box or gland *d*, through which extends the rod or stem *d'* of a piston or plunger *d²*. The stem *d'* has a head *d³* working in the gland or box *d*, and to this head is pivoted the arm *d⁴*, extending from an eccentric *d⁵* on the shaft *d⁶*, which shaft is adapted to be rotated by a pulley *d⁷*, having a counterweight *d⁸* located on its periphery, so that during the downthrust of the piston *d²* it will serve as a counterbalance for the column of water to be forced from the cylinder *f* of said piston, and upon the upthrust of the piston the counterweight *d⁸* must be lifted to thus equal on both strokes the pressure of the piston. The piston *d²* operates in the cylinder *f*, preferably supported upon the floor *a²* within the casing *a*. It has one or more inlet-ports *f'* and is surrounded by a drum or hood *f²*, projecting downwardly from the top of the cylinder some distance below the inlet-ports *f'*. The cylinder has at its base an outlet-port *f³*, leading to the boiler. The casing *a* has an outlet-opening *g*, communicating with an overflow-pipe *g'*, and an outlet-opening *g²* near the floor *a²*, connected with a drainage-pipe *g³*. The inlet-ports *f'* for the cylinder *f* are preferably arranged about midway between the openings *g* and *g²*. From the top of the hood *f²* extends one or more tubes or pipes *f⁴*, having suitable caps *f⁵*, arranged so as to prevent the accidental entrance of water, while permitting, however, the outlet from the tubes *f⁴* of steam or vapor, as well as the overflowing of water from the hood, to the main portion of the lower compartment or

well of the casing *a*. The upper ends of the tubes *f*⁴ extend some distance above the outlet-opening *g*.

From the above description it will be understood that heated water will accumulate in the well of the casing *a* until it reaches a height corresponding to the height of the overflow-opening *g*. It will then pass out through said overflow opening and pipe to a sewer or other receptacle for waste water. The piston *d*² when raised will cause water to flow from the space between the drum *f*² and cylinder *f* into said cylinder, and inasmuch as the body of water in this space is approximately at the center of the well it will be free of oil and scum which collect on the surface of the water, as well as the heavy sediment, dirt, &c., which collect on the floor *a*² of the casing. The water will thus be practically pure and will come from practically the hottest part of the well. On the downstroke of piston *d*² the water is forced through the outlet *f*³ to the boiler. The overflow-opening *g* and drainage-opening *g*² are arranged on that side of the casing *a* diametrically opposite to the inlet *b*¹ for the steam. Hence the steam as it enters will blow or force the surface oil or scum through the overflow-opening *g* and the sediment or heavy dirt through the drainage-opening *g*² to the waste-water receptacle. The body of water in the drum *f*² is freed from steam or vapor by reason of the fact that it has the ventilating-tubes *f*⁴, and these tubes *f*⁴ on the downthrust of the piston *d*² serve also as overflow-pipes to relieve the pressure within the drum or hood *f*² when some of the water is forced back from the cylinder through the inlet-ports *f*¹ to the drum. The drum thus serves to prevent the agitation of the central portion of the well from which the feed-water is delivered to the boiler.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a feed-water heater, a casing, the lower portion of which serves as the well, a pump-cylinder located within the casing and provided with an inlet-opening, a drum surrounding the cylinder and separating the same from the interior of the casing, said drum having its open end extending below the inlet-open-

ings to the cylinder, a piston traversing said cylinder and an outlet-pipe leading directly from the cylinder to the boiler, substantially as and for the purposes described.

2. In a feed-water heater, a casing, a condenser-plate separating the casing into two compartments, of which the lower constitutes the well, a pump-cylinder located in said well and communicating directly with the boiler, and provided with inlet-openings, a piston traversing said cylinder, a drum surrounding said cylinder and separating the same from the interior of the well, said drum having its open end extending below said inlet-openings, an overflow-opening, and pipe and a drainage opening and pipe leading from the casing, the inlets of the cylinder being arranged approximately midway between the overflow and drainage openings, and an exhaust-steam pipe entering the casing below the condenser-plate and opposite the overflow and drainage openings, substantially as and for the purposes described.

3. In a feed-water heater, a casing, a cylinder and its piston located within said casing, in combination with a hood or drum depending from the top of said cylinder surrounding the same and extending below the inlet to said cylinder, substantially as and for the purposes described.

4. In a feed-water heater, a drum, one or more tubes leading from the roof of said drum, a casing surrounding the drum and constituting a well for the feed-water, an overflow opening and pipe leading from the casing and located above the roof of the drum and below the upper end of the tubes of said drum, a drainage opening and pipe located below the lower open end of the drum, a cylinder located within the drum and having inlet-openings above the lower end of said drum and a piston traversing said cylinder, said cylinder discharging directly to the boiler and outside the well, substantially as and for the purposes described.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

HARRY FELLENBAUM.

Witnesses:

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