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M. H. VOIGT.

ARRANGEMENT FOR THE PRODUCTION OF WATER CIRCULATION IN BOILERS.

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Fig. 1.

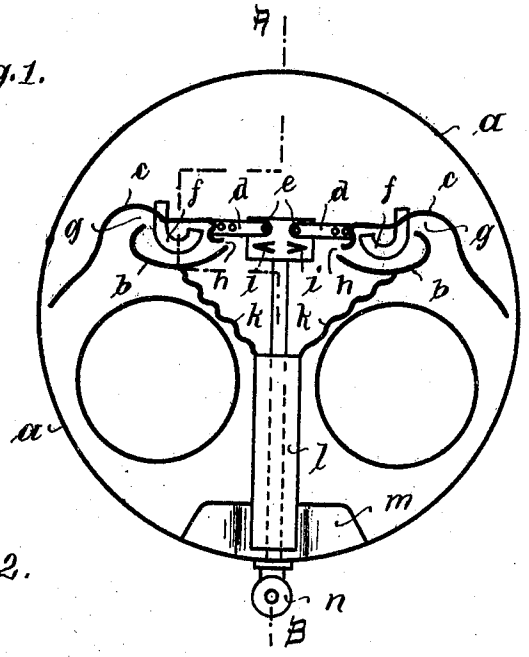
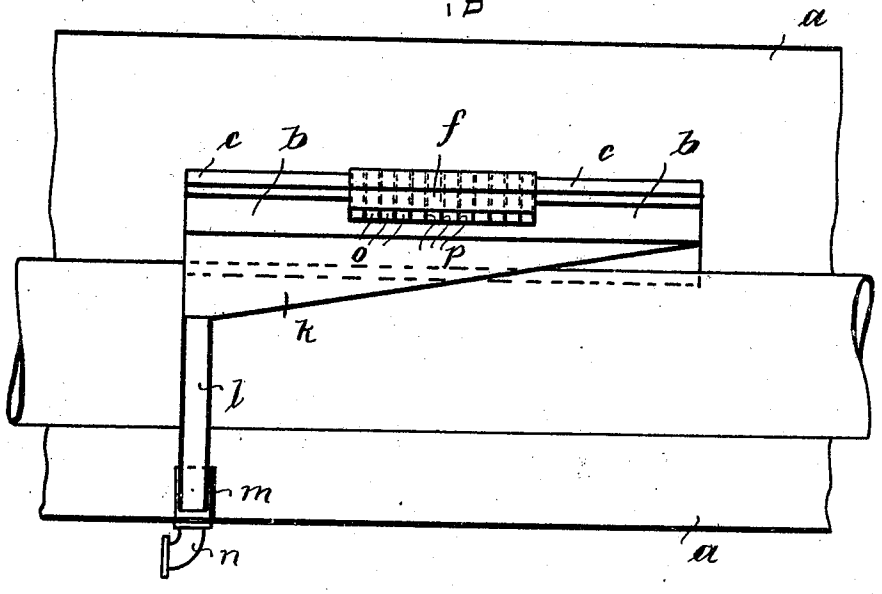


Fig. 2.



Witnesses:

Inventor:
Martin Hermann
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by
attorney

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UNITED STATES PATENT OFFICE.

MARTIN HERMANN VOIGT, OF LEIPZIG-LINDENAU, GERMANY.

ARRANGEMENT FOR THE PRODUCTION OF WATER CIRCULATION IN BOILERS.

Application filed September 17, 1921. Serial No. 501,481.

To all whom it may concern:

Be it known that I, MARTIN HERMANN VOIGT, a citizen of the German Republic, residing at Leipzig-Lindenau, Germany, have invented certain new and useful Improvements in an Arrangement for the Production of Water Circulation in Boilers, of which the following is a specification.

This invention relates to a novel arrangement for the production of a water circulation in boilers which is constructed so that not only a perfect exchange of heat between various parts of the contents of a boiler and an easy separation of the steam from the water is ensured, but also the working of the boiler and the cleaning of the same are not impeded in the least.

The invention consists in arranging in the boiler, below the water level a receptacle open at the upper end and covered by a steam collecting hood which has a lateral opening through which its contents can be emptied by the pressure of the steam which has collected under the hood and which has a conduit for the steam arranged under the hood so that it can be closed after the emptying of the receptacle by the inflowing water only when the receptacle has been filled again for the largest part.

In order that the invention may be clearly understood, I shall proceed to describe the same with reference to the form of construction shown by way of example in the accompanying drawing, wherein:—

Fig. 1 shows in section a boiler fitted with the device.

Fig. 2 is a longitudinal section on line A—B of Fig. 1.

The boiler *a* with two flues has two water receptacles *b* arranged one above each flue, said receptacles being covered each by a steam hood *c*. The two hoods *c* have arms *d* pivotable around pins *e* so that they permit raising the hoods when the receptacles *b* have to be cleaned.

A curved flat tube *f* is inserted in each receptacle *b*. One end of each tube projects through the corresponding hood *c* and terminates in the main steam space of the boiler, the other end of said tube terminating in the receptacle at a certain distance above the bottom of the same.

Between each receptacle *b* and its hood *c* a gap *g* for the inflow of water is left free at the outer end, an orifice *h* being arranged at the inner end for the outflow of the water. A small deflecting body *i* is arranged in each of said outflow openings *h* for separating the steam from the water and for conducting the steam upward and the water downward.

From the bottom of each receptacle *b* starting inwardly directed, downwardly directed corrugated plates of sheet metal *k* whose lower edges are obliquely directed as shown on Fig. 2. At the deepest point the plates *k* are connected the one with the other by a tubular sleeve *l* which is designed to collect the sediment. A plate *m* arranged behind the tubular sleeve *l* serves to agitate the sediment which is removed through the blow off pipe *n*.

When the boiler is at work steam collects under the hoods *c*, said steam forcing, as soon as its pressure has become sufficiently high, the water contained in the receptacles *b* through the openings *h*. The steam collected under the hoods *c* escapes partly through the outlet openings *l*, partly through the tubes *f*. When the pressure under the hoods *c* has become low enough, water flows again into the receptacles *b*. The spaces under the hoods *c* remain however in communication with the main steam space of the boiler until water has flowed in again into the tubes *f* which can be the case only when the receptacles *b* have been filled for the largest part. Up to this moment no steam can collect under the hoods *c* so that the inflowing water will not be forced out from the receptacles. The forcing out of the water begins only after a sufficiently high steam pressure has been produced again under the hoods *c*. In this manner a strong circulation of the water is ensured.

As can be seen from the drawing the inner orifice of the steam outlet tube *f* and the inner outlet opening of receptacle *b* are situated approximately in the same plane whereby an almost complete emptying of the receptacle is ensured.

The corrugated plates *k* accelerate the movement of the water in the corrugations and produce also transverse movements of the water which flows along the plates.

In order to ensure a thorough emptying of the steam tubes *f* so that the water is forced upward by the steam collected under the hoods *c* not only at one end of the same

to fall back again and to keep the steam tubes closed, the steam pipes are divided by cross partitions *p* into channels *o*.

I claim:—

1. An improved arrangement for the production of a water circulation in boilers, comprising in combination with the boiler, a receptacle arranged under the water level, a steam collecting hood above said receptacle arranged so that an outer inflow opening for the water and a lateral outflow opening for the water forced out by the pressure of the steam collected under the hood are formed, a curved steam tube in said receptacle arranged so that its outer end is closed after the emptying of the receptacle by the inflowing water only when the receptacle has been filled again for the largest part, the inner end of said tube projecting through said hood.

2. An improved arrangement for the production of a water circulation in boilers, comprising in combination with the boiler, a receptacle arranged under the water level, a steam collecting hood above said receptacle arranged so that an outer inflow opening for the water and a lateral outflow opening for the water forced out by the pressure of the steam collected under the hood are formed, a curved steam tube in said receptacle arranged so that its outer end is closed after the emptying of the receptacle by the inflowing water only when the receptacle has been filled again for the largest part, the inner end of said tube projecting through said hood, the inner orifice of said steam tube and the outflow opening of said receptacle being situated approximately in the same plane.

3. An improved arrangement for the production of a water circulation in boilers, comprising in combination with the boiler, a receptacle arranged under the water level, a steam collecting hood above said receptacle arranged so that an outer inflow opening for the water and a lateral outflow opening for the water forced out by the pressure of the steam collected under the hood are formed, a curved steam tube in said receptacle arranged so that its outer end is closed after the emptying of the receptacle by the inflowing water only when the receptacle has been filled again for the largest part, the inner end of said tube projecting through said hood, and partitions in said curved steam tube dividing the same into a number of small channels.

4. An improved arrangement for the production of a water circulation in boilers, comprising in combination with the boiler, a receptacle arranged under the water level, a steam collecting hood above said receptacle arranged so that an outer inflow opening for the water and a lateral outflow opening for the water forced out by the pressure of the steam collected under the hood are formed, a curved steam tube in said receptacle arranged so that its outer end is closed after the emptying of the receptacle by the inflowing water only when the receptacle has been filled again for the largest part, the inner end of said tube projecting through said hood, and a wedge-shaped deflector in said outflow opening for separating the steam from the water.

5. An improved arrangement for the production of a water circulation in boilers, comprising in combination with the boiler, a receptacle arranged under the water level, a steam collecting hood above said receptacle arranged so that an outer inflow opening for the water and a lateral outflow opening for the water forced out by the pressure of the steam collected under the hood are formed, a curved steam tube in said receptacle arranged so that its outer end is closed after the emptying of the receptacle by the inflowing water only when the receptacle has been filled again for the largest part, the inner end of said tube projecting through said hood, and a plate of undulated sheet metal downwardly projecting from said receptacle and a collector for sediments under said undulated plate.

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

MARTIN HERMANN VOIGT.

Witnesses:

RUD. E. FRICKE,

MARIE HAMMER.