

KARL PRINZ ZU LÖWENSTEIN.
CASING FOR DOWN DRAFT FURNACES.
APPLICATION FILED JULY 18, 1913.

1,140,908.

Patented May 25, 1915.

Fig. 1.

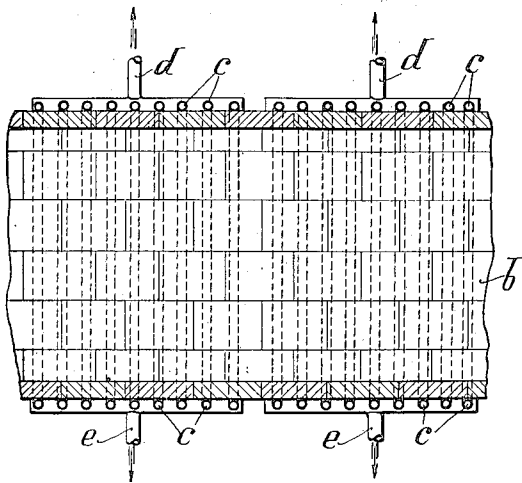


Fig. 2.

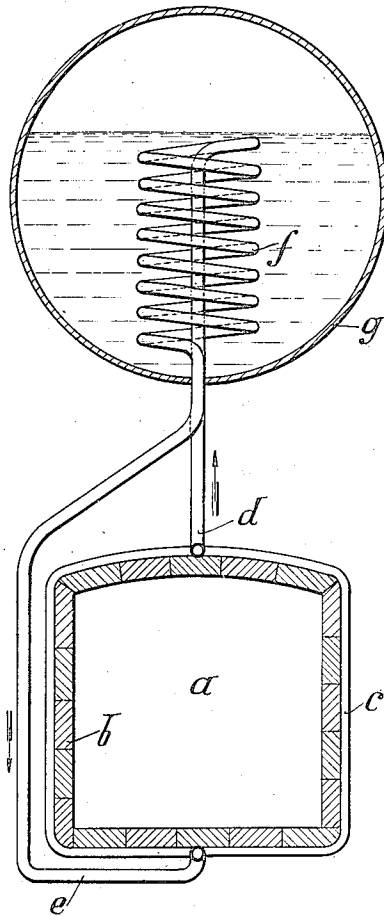
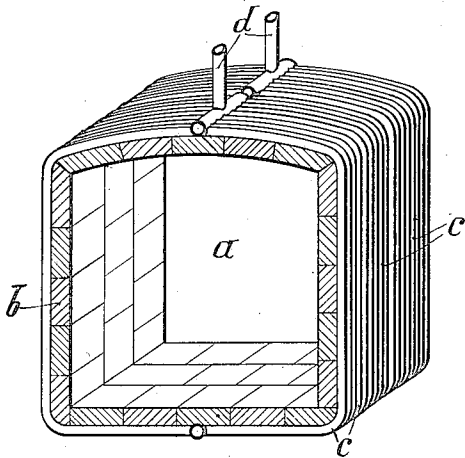


Fig. 3.



WITNESSES
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CASING FOR DOWNDRAFT-FURNACES.

1,140,908.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, KARL PRINZ zu LÖWENSTEIN, a citizen of the German Empire, residing at Neckargemünd, in the Grand Dukedom of Baden, Germany, have invented certain new and useful Improvements in Casings for Downdraft-Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has for its object a frame or casing for the firebrick masonry of the combustion chambers of furnaces with a bottom flue. The casing enables very thin masonry to be employed in order to reduce as far as possible the weight of the apparatus.

The furnace shell must, in order to avoid too rapid a destruction of the thin firebrick lining, prevent the masonry becoming too highly heated, that is to say, must cool it, utilizing the heat withdrawn. Further, the casing must also be able to absorb the heat flowing through the masonry, in order that loss of heat may not take place. The casing itself must also be of rigid construction, and afford the masonry built in it a secure hold and a good anchorage, and it must also be simple in construction, cheaply made, and quite safe, so that on any portion of the casing becoming defective no danger is involved in working the apparatus. Finally, the casing must be durable in working, that is to say it must not become stopped with boiler scale in a short time, which would prevent a circulation of the cooling fluid.

The tubular frame or casing according to this invention entirely fulfils the above-mentioned requirements, and for this purpose consists of a number of continuous pipes arranged close together, in which pipes the same liquid constantly circulates.

The pipes may be combined into groups composed of any suitable number of pipes, each tubular element being connected by an up and down pipe with a cooling coil or the like which is located in a steam-boiler or other cooling vessel and by means of which the heat absorbed from the pipes of the casing or frame is transmitted to the cooling vessel and made available in the latter.

The invention will now be more particularly described with reference to the accom-

panying drawings in which one form of construction is illustrated as an example.

Figure 1 is a longitudinal section of a furnace flue provided with the improved casing or shell, a number of the pipes being combined into one tubular element; Fig. 2 is a cross section of the furnace flue; while Fig. 3 is a perspective view of the arrangement of the shell.

The furnace flue *a* is lined with a thin layer of fire brick masonry *b*, and this masonry, according to this invention, is surrounded by a casing or frame consisting of a number of continuous pipes *c* lying closely together. The separate pipes may be combined in any suitable number to form tubular elements in which the same cooling liquid constantly circulates. This absorbs the heat passing through the masonry *b* and thus cools the latter. The heated liquid rises through the pipe *d* and flows through a cooling coil *f* placed in a steam boiler *g* or the like, to the water of which it imparts its heat.

The cooled liquid flows back again to the same tubular element through the down pipe *e* in order to re-commence the same circulation. The combination of a number of pipes into a tubular element has the advantage of a considerable saving of weight and a cheaper construction of the cooling portion of the tubular element, and further a considerable stiffening of the element itself is obtained, whereby the firebrick masonry built therein obtains a secure hold.

The way in which the pipes are combined with one another to form tubular elements and also the particular construction of the cooling arrangement is immaterial as regards the essential feature of the invention.

I declare that what I claim is:—

1. In a water-cooled furnace, the combination of a thin lining of refractory brick masonry; a plurality of closely spaced pipes surrounding said lining in contact therewith; upper and lower conduits above and below said lining and connecting the pipes in groups; a circulation pipe connecting each upper conduit with the corresponding lower conduit; and a heat exchange device associated with the circulation pipe.

2. In a water-cooled casing for refractory masonry for furnaces, the combination of a plurality of groups of pipes lying close together; conduits connecting one group of

pipes with another; and a heat exchange device in the conduits.

3. In a water-cooled furnace, the combination of a thin lining of refractory material; a plurality of closely spaced water
5 conducting pipes surrounding said lining in contact therewith and a heat exchange device connected with said pipes.

4. In a water-cooled furnace, the combination of a thin lining of refractory material; and a plurality of closely spaced
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water conducting pipes surrounding said lining in contact therewith, said pipes and device forming a closed system through which the same water circulates repeatedly. 15

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

KARL PRINZ zu LÖWENSTEIN.

Witnesses:

WALTER SCHWARBACH,
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