

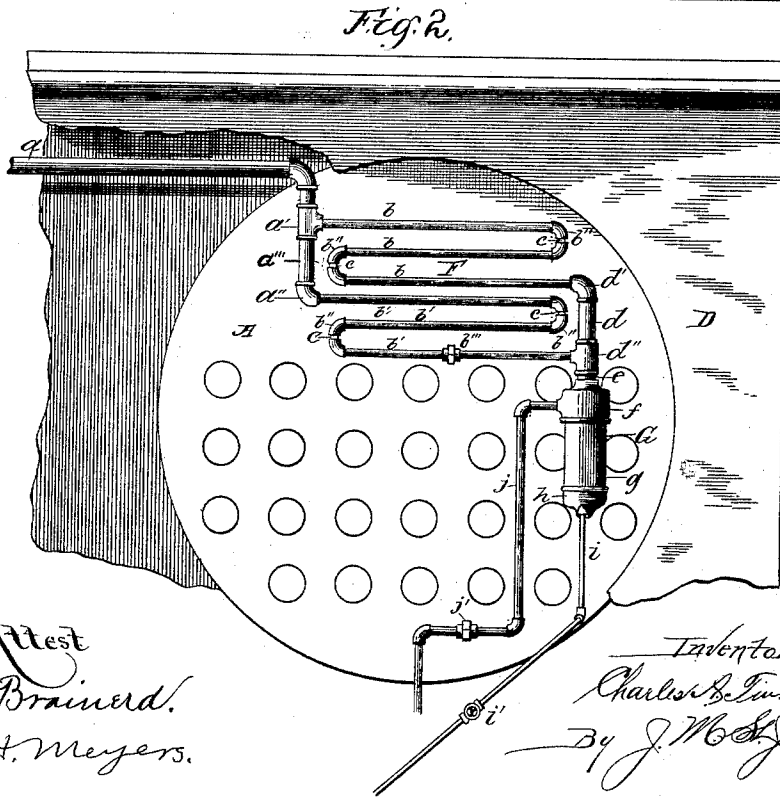
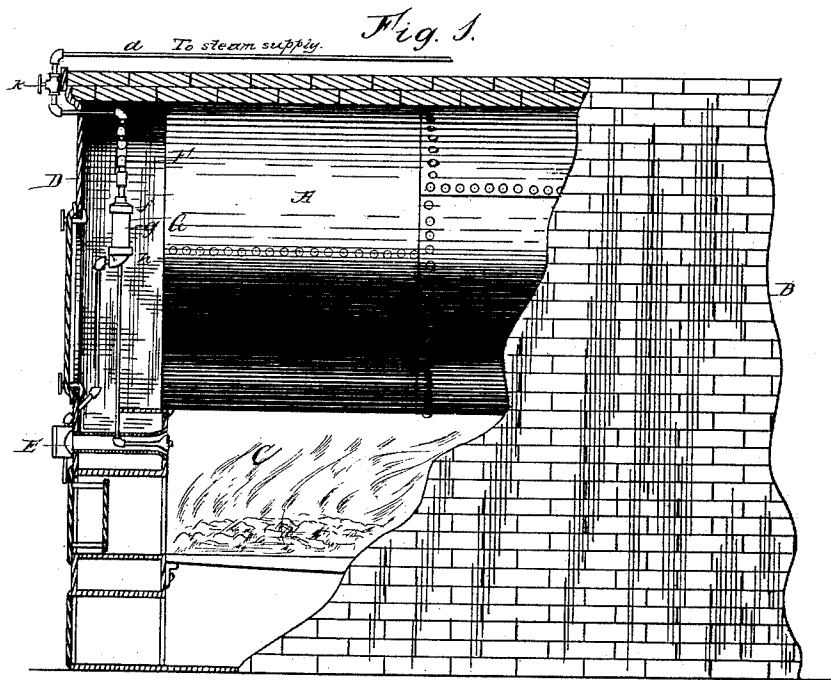
(No Model.)

C. A. TINKHAM.

SUPERHEATING STEAM COIL FOR SMOKE CONSUMING FURNACES.

No. 468,313.

Patented Feb. 2, 1892.



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SUPERHEATING STEAM-COIL FOR SMOKE-CONSUMING FURNACES.

SPECIFICATION forming part of Letters Patent No. 468,313, dated February 2, 1892.

Application filed April 20, 1891. Serial No. 389,561. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. TINKHAM, a citizen of the United States, residing at Campello, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Superheating Steam-Coils for Smoke-Consuming 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 relates to smoke-consuming furnaces; and the object is to provide a furnace, and particularly a furnace in connection with a steam-generator, with an improved device for superheating the steam taken from the common steam-supply before delivering it in jets to the combustion-chamber.

The invention consists, essentially, in a steam-coil of peculiar construction adapted to be set at some suitable place to receive some of the heat of the furnace, whereby the steam passing through it is superheated.

In the accompanying drawings, forming a part of this specification, Figure 1 is a sectional view showing the front end of a common steam boiler and furnace with the steam-coil in position, as seen from the side. Fig. 2 is a front view of the same on a larger scale.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A is an ordinary horizontal boiler, and, as represented in the drawings, is supposed to be one of a pair or series inclosed in the brick-work B, the combustion-chambers C of which communicate with a common stack.

D is the front of the furnace of a conventional form, and E represents an air-conduit to supply oxygen in connection with the constituent gases of the superheated steam escaping from the nozzle *l*. As no novelty is claimed for this air-pipe in this application, except as the same and the nozzle are combined with the steam-coil, I do not deem a particular description of it necessary in this application. Briefly, it is a pipe or tube open at both ends, the outer end taking air from outside and the inner end discharging it into the combustion-chamber. Within this pipe is mounted a nozzle *l*, through which the superheated steam

escapes to the combustion-chamber, commingled with the air.

The essential characteristics of the superheating device are the coil F and the reservoir or well G. These, with their inlet and discharge pipes, will now be particularly described. From the steam-dome of the boiler (not shown) extends a pipe *a*, provided with a suitable valve *k* and connecting with the coil F. This coil may be considered to begin with the T *a'* and terminate with the T *d''*. It thus includes the following elements: The two T's mentioned, a pair of elbows *a''* and *d'*, two short pieces of pipe *a'''* and *d*, the double series of small pipes *b b b* and *b' b' b'*, and their connecting-elbows and close nipples *b''* and *c*, respectively. The large T's and elbows are reducing ones, the pipes *b* and *b'* connecting with them being half or less than half the capacity of the larger pipes *a* and *d*. One of these pipes should be provided with a suitable union *b'''*. It will be seen that the coil is a double one, the two series of pipes *b* and *b'* being entirely independent of each other. By this means I divide the current of steam from the supply-pipe *a* and subject each half to the separate action of the heat from the combustion-chamber of the furnace. The diameter and capacity of the pipes being correspondingly reduced in each series I am able to secure an even and regular flow of steam through them, and it is evident that the heating-surface of the pipes as compared with the contents is considerably increased, so that a much better result is obtained than if the coil were a single one. Furthermore, in the event of the accidental stoppage of one of the series the other would continue to supply the furnace with superheated steam, thus limiting the liability of a complete stoppage in the operation of the apparatus. It is further to be noted that the construction is such as to separate the pipes *b* and *b'* sufficiently so that there is no liability of the interspaces becoming clogged with soot or the like to prevent the free and perfect action of the heat around them.

To the lower end of the coil is connected, by a suitable nipple *e*, a reservoir or well G, the purpose of which is to hold, as does the steam-dome of the boiler, a quantity of dry steam.

In this case, however, the steam has been so superheated as to be in an extremely tenuous form, so as the more readily to separate into its constituent gases when brought into contact with the high heat of the combustion-chamber. The reservoir consists of a short piece of large gas-pipe—say three-inch—with reducer-couplings *f* and *h* at the upper and lower ends, respectively. At the side of one of them, preferably the upper one, is connected a small pipe *j*, leading to the discharge-nozzle above mentioned. To the lower head *h* is connected a small blow-off pipe *i*, having a suitable valve *v*. By means of this pipe the reservoir is cleared of any sediment, dirt, lime, or other impurities that might tend to accumulate in and fill up the reservoir.

The device is of such a nature that it may be composed entirely of steam-fittings, and its manufacture is therefore comparatively simple and inexpensive, while at the same time its construction is such as to secure the desired end in a practical and efficient manner.

The location of the coil will depend in large measure upon the nature of the furnace and boiler to which it is applied. Its construction is such as to admit of application to practically any steam-generating furnace. One of the simplest modes of application is that shown herein, the coil being set in the "uptake" slightly higher than the flues. In the application of George F. Tinkham, No. 366,614, filed September 30, 1890, the coil is represented as partially embedded in the arch

at the rear end of the boiler. This I regard as a very desirable arrangement, but of course the setting must vary with the exigencies of the particular case.

Having thus described my invention, I claim—

1. A coil for superheating steam in smoke-consuming furnaces, consisting, essentially, of terminal pipes *a'''* and *d*, with their reducing T's and elbows *a' d' a'' d''*, and intermediate pipes *b b b* and *b' b' b'* in two independent series, having elbows *b''* and nipples *c*, substantially as and for the purpose set forth.

2. The combination, with the steam-coil, substantially as described, of a reservoir or well for dry steam, composed of the reducer-head *f*, connected to said coil by a nipple *e* and having an outlet-pipe *j*, the body *g*, and a lower head *h*, provided with the blow-off pipe *i*, substantially as and for the purpose set forth.

3. The combination, with a steam-supply source, of the pipe *a* and its connections *a' a'' a'''*, the double coil *b b b b' b'*, with their couplings *b'' c*, the pipe *d* and its connections *d' d''*, the nipple *e*, and the reservoir *G*, composed of the parts *f g h*, provided with outlet-pipe *j* and blow-off pipe *i*, all substantially as and for the purpose set forth.

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

CHARLES A. TINKHAM.

Witnesses:

GEORGE F. TINKHAM,
HENRY SIEBEN.