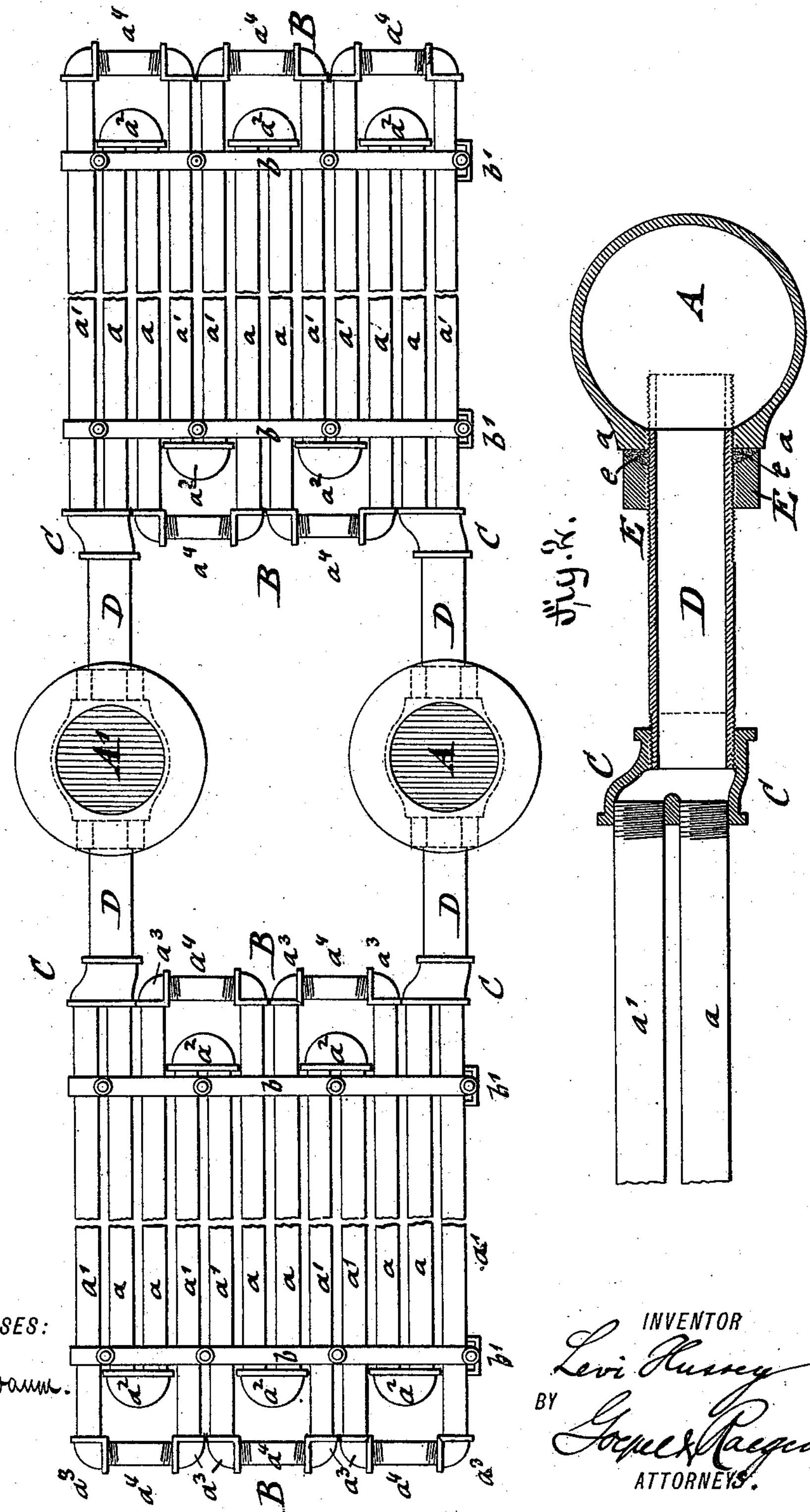
(No Model.)

L. HUSSEY.

HEATING COIL.

No. 418,566. Patented Dec. 31, 1889.

Fig. 1. Fig. 2.



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HEATING-COIL.

SPECIFICATION forming part of Letters Patent No. 418,566, dated December 31, 1889.

Application filed April 6, 1889. Serial No. 306,213. (No model.)

To all whom it may concern:

Be it known that I, LEVI HUSSEY, of the city, county and State of New York, a citizen of the United States, have invented certain new and useful Improvements in Heating-Coils, of which the following is a specification.

This invention relates to an improved heating-coil which is to be used for superheating live steam or reheating exhaust-steam for heating and other purposes, said heating-coil being so arranged that it takes up a comparatively small space in a horizontal direction, but can be extended vertically so as to be adapted to the smoke-flues of a steam-boiler and other furnace-flues for the purpose of utilizing the waste heat passing through the flue after it has left the furnace, on the way to the chimney.

The invention consists of a heating-coil made of a number of vertical sections, each section being composed of a number of groups or sets of four or eight parallel pipes, which are connected at one end by return-bends and by elbows and short pipes having right and left hand screw-threads and at the opposite end with the next group or set of pipes vertically above it, the upper and lowermost set of pipes of the coil being connected, by Y-pieces and coupling-pipes, with headers, by which exhaust-steam or live steam is supplied to the coil. The connection of the coupling-pipes with the headers is made by jam-nuts having concave faces and by a packing interposed between said faces and the bosses on the headers.

In the accompanying drawings, Figure 1 represents a side elevation of my improved heating-coil, showing the same arranged at both sides of the headers; and Fig. 2 is a detail vertical longitudinal section showing the connection of the header with the uppermost and lowermost set of pipes of each section of the heating-coil.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the header by which the live steam or exhaust-steam is conducted to the heating-coils B B, and A′ the header by which the steam is conducted off from the same to the place of use. The heating-coils B B are composed of vertical coil-sections, which are arranged sidewise of each other, according to the space available in the flue through which the products of combustion are conducted from the steam-boiler or other furnace to the chimney.

Each heating-coil B is constructed in such manner that it takes up as little space horizontally as possible, while it is extended vertically to any desired extent. For this purpose each section of the heating-coil is constructed of groups or sets of four or eight parallel pipes $a\,a'$, which are connected alternately at the ends by return-bends a^2 and by elbows a^3 and short pipes a^4, which latter are provided with exterior right and left hand screw-threads, so as to connect with the elbows of the pipes a or a', as shown clearly in Fig. 1.

In the drawings, the four pipes $a\,a'$ are arranged vertically above each other and connect alternately by return-bends a^2 and right and left hand screw-pipes $a^4\,a^4$. To secure the proper support of the pipes vertically above each other, they are connected by straps $b\,b$, which extend at right angles across the pipes $a\,a$, the straps at each side of the coil being connected by fastening-bolts that pass from one side of the coil to the other in the spaces between the two adjoining pipes. The connection of the lowermost and uppermost set of pipes $a\,a'$ with the headers A A′ is made by Y-pieces C and coupling-pipes D, which latter are equal in area to the two pipes $a\,a'$ extending from the Y-pieces C. The coupling-pipes D are provided at both ends with right-hand screw-threads, so as to screw into the Y-pieces C and bosses a on the headers A A′, that end of the coupling-pipe which screws into the header being provided with a longer screw-thread than the opposite end, which screws into the Y-piece C, for the purpose of facilitating the connection between the header and the Y-piece, which is accomplished by first screwing in the coupling-pipe D into the boss of the header, as shown in dotted lines in Fig. 2, and then screwing it partly back again and screwing the opposite end at the same time into the Y-piece C, which can be accomplished without difficulty even when the operation has to be performed in a very contracted space.

On the threaded end of the coupling-pipe

D, connected with the header, is placed a jam-nut E, which is screwed home against the boss *a* on the header when the coupling-pipe is in its proper position in the header and Y-piece C, said jam-nut having a concave face, between which and the face of the boss is interposed an asbestus or other packing *e*, which is tightly compressed by the screwing home of the jam-nut against the boss, so as to produce the reliable steam-tight connection between the coupling-pipes D and the header A or A′.

The advantage of my improved heating-coil is that a number of sections may be arranged closely together and extended vertically to any suitable height by using a corresponding number of pipes *a a′*, return-bends a^2, and connecting-pipes a^4. If desired, four pipes may be grouped parallel to each other and connected to the Y-piece C, which four pipes, however, have to be equal in area to the area of the coupling-pipe D. By this arrangement the horizontal surface taken up by the coil is still more contracted, while its vertical surface is extended to any desired degree.

Another advantage of my construction is that the connection between the headers and the sections of the coil can be readily established by the coupling-pipes and jam-nuts, or disconnected whenever pipes have to be replaced or other repairs to be made. If a single pipe of the coil is to be repaired, this can be readily taken out by unscrewing the right and left hand connecting-pipe a^4 and unscrewing the pipe from the Y-piece at its other end, a new pipe being then reinserted and the right and left hand connecting-pipe a^4 replaced.

Another advantage of my improved heating-coil is that a larger heating-surface area is furnished, by which the steam passed through the coils is subjected more effectively to the heat of the products of combustion passing through the flue in which the coil is located, so that the reheating of the exhaust-steam or the superheating of the live steam is accomplished in a very economical and effective manner without increasing the boiler-surface.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with inlet and outlet headers having bosses, of vertical coil-sections arranged sidewise of each other, Y-pieces at the upper ends of said coil-sections, coupling-pipes having threaded ends for connecting the Y-pieces and headers, and jam-nuts on the coupling-pipes adjoining the bosses on the headers, substantially as set forth.

2. The combination, with inlet and outlet headers having bosses, of vertical coil-sections arranged sidewise of each other, Y-pieces at the lower and upper ends of the coil-sections, coupling-pipes having threaded ends for connecting the Y-pieces and headers, jam-nuts turning on the threaded ends of the coupling-pipes and provided with concave faces, and packings interposed between the faces of the jam-nuts and bosses on the headers, substantially as set forth.

3. A coil-section for superheating live steam or reheating exhaust-steam, composed of groups of parallel pipes arranged vertically above each other, Y-pieces at the upper and lower ends of each coil-section, return-bends connecting the ends of two adjoining pipes of each group, elbows at the opposite ends of said pipes, and pipes having right and left hand screw-threads for connecting said elbows, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

LEVI HUSSEY.

Witnesses:
PAUL GOEPEL,
JOHN A. STRALEY.