

(No Model.)

J. A. SVEDBERG.
BOILER.

No. 368,739.

Patented Aug. 23, 1887.

Fig. 1.

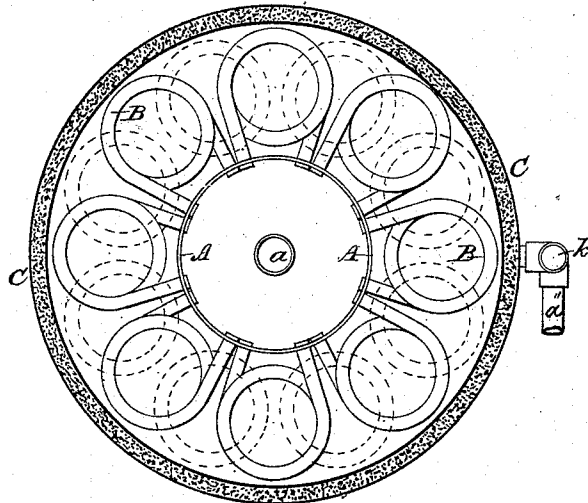


Fig. 2.

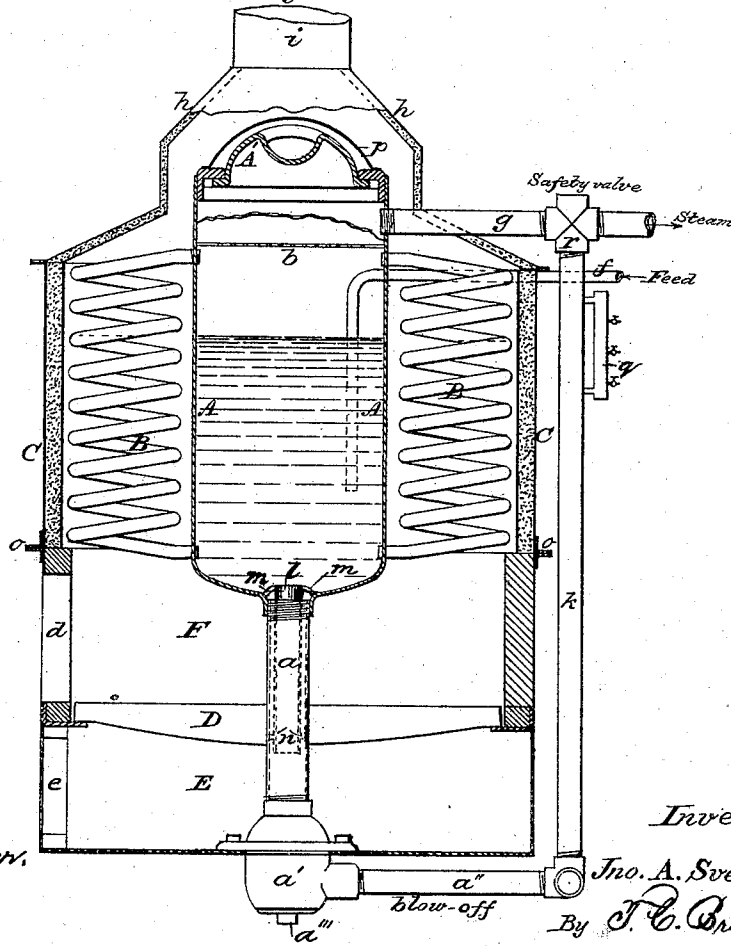
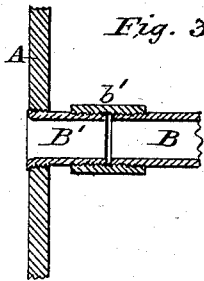


Fig. 3.



Witnesses:
A. M. P. Maschmeyer.
Louis Beyer.

Inventor:
Jno. A. Svedberg
By J. C. Wright
Attorney

UNITED STATES PATENT OFFICE.

JOHN A. SVEDBERG, OF LOUDOUN, VIRGINIA.

BOILER.

SPECIFICATION forming part of Letters Patent No. 368,739, dated August 23, 1887.

Application filed August 28, 1886. Serial No. 212,058. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. SVEDBERG, having declared my intention of becoming a citizen of the United States, residing at Loudoun, in the county of Loudoun and State of Virginia, have invented certain new and useful Improvements in Boilers, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in what are usually termed "coil-boilers;" and the object is to produce a boiler having a large amount of heating-surface in proportion to grate-surface, contained in a very small and compact space; also, that all the joints, as well as the tubes, are easily accessible; also, that any of the coils can be readily repaired, removed, and replaced when necessary. Furthermore, that a free and regular circulation of water can be obtained; sediment is not liable to collect in the coils, but deposited in a mud-drum formed in the lower part of the boiler, and can be easily blown out, when desired; and, finally, that it can be produced at a very small expense.

The invention consists of a central steam-and-water chamber, to which a series of coils are connected at their upper and lower ends, and communicate with the steam-and-water space. They are surrounded by a casing and placed over the furnace and grate bars in such manner that they are entirely surrounded by the gases and products of combustion.

It also consists in providing means to afford access into the drum and to the ends of the coils to expand them in place, as well as to facilitate the removing and replacing thereof, when necessary.

It further consists in providing means to facilitate the blowing out or cleaning of the coils or mud-chamber from sediment, whenever desired; and it finally consists in the construction of certain details and arrangement of parts, as will be more fully described hereinafter, and specifically pointed out in the claims, reference being had to the accompanying drawings and the letters of reference marked thereon.

Like letters indicate similar parts in the different figures of the drawings, in which—

Figure 1 represents a horizontal section of

my improved boiler or steam-generator. Fig. 2 is a vertical cross-section of the same, showing one series of coils. Fig. 3 is an enlarged detail view.

In the drawings, A represents a steam-and-water chamber, of cylindrical, conical, or other suitable shape, to which a series of tubular coils, B, are secured at their upper and lower ends, communicating with the steam-and-water space, and said coils may be usually secured in place by expanding their ends. The coils are arranged around the periphery of the central chamber, A. The upper end of this chamber is closed by a removable man-hole plate, A', to gain access to the interior, and the lower end of said chamber is attached to a pipe or tube, *a*, which in turn is secured to a casting, *a'*, forming a mud-drum or sediment-chamber, and bolted or riveted to the bottom of the boiler. In the upper part of the pipe *a* is inserted a tube, *l*, of smaller diameter, supported on two or more lugs or brackets, *m*, and provided with short pins or studs *n* at its lower end, by which the tube is held in a central position, so that the annular space formed around the tube *l* is of uniform size. This tube permits the water from the chamber A to freely descend through it, while the annular space permits a free circulation of water upward. It also prevents filling up of the pipe *a* with sediment and mud. Said casting *a'* has a nozzle, to which the blow-off pipe *a''* is attached, and a removable plug or cap, *a'''*, for cleaning. The feed-pipe *f* for the feed-water enters the chamber A near its upper part and descends toward the bottom.

The chamber A and coils B are surrounded by a casing, C, which is provided with a jacket containing asbestos, ashes, or other non-conducting material to prevent radiation, and it forms at its upper part the uptake *h*, to which the smoke-stack *i* is attached.

The coils B are preferably secured in place in the following manner: A short piece of tube, B', is first screwed into the shell of chamber A and expanded, its end is screw-threaded, as seen in Fig. 3, suitable couplings, *b'*, are then attached to said piece B', and the coil B secured to the other end of the coupling, which is provided with a right-and-left-hand thread. This facilitates the ready re-

moval and replacing of the coils. The coils may, however, be secured in any other manner, if desired.

The furnace F is placed immediately below the chamber A and coils B, and is provided with the grate or grate-bars D and furnace-door *d*, and below the grate is arranged the ash-pit E, having a suitable ash-pit door, *e*.

Above the upper end of the coils B is placed a perforated diaphragm, *b*, to prevent foaming, and the steam pipe *g* is attached to the chamber A above said diaphragm. A vertical pipe, *k*, forming a communication with the steam-pipe *g* and blow-off pipe *a''*, is provided with a gage, *q*, for indicating the height of water in boiler. All the pipes are necessarily provided with suitable valves, (not shown,) and a safety-valve can be attached to the T-piece *r* on the steam-pipe *g*.

The casing C is preferably made in two parts, and is bolted together by bolts passing through the angle-irons *o*, or suitable flanges for the purpose. The uptake *h* may also be made detachable, if desired, and a shield, *p*, is placed over the man-hole plate A' to protect it and its packing from the action of the heat.

The height of the steam-and-water chamber can be varied as desired, and the upper part serve for drying or superheating the steam, and the general dimensions of the boiler can be varied to suit different circumstances and purposes. If desired, additional coils may be employed by interlacing them between the coils shown, and they may be arranged in a staggering manner, or several series of coils may be arranged above each other, and they may be then placed in the manner shown in dotted lines in Fig. 1.

If desired, the tubes B' may be of larger diameter than the coils B, and couplings *b'*, having different sizes of screw-threads to suit the diameters of the tubes B' and coils B, may be then employed. The tubes B' may be made a permanent fixture of the shell by expanding them after they have been screwed in place, and this also prevents them from turning. In very large boilers the tubes B' may be dispensed with and the shell flanged out and screw-threaded to receive the couplings *b'*.

It will be readily perceived by engineers and others skilled in the art that the advantages obtained in this boiler are numerous, and among them may be cited that a large heating-surface in proportion to grate-surface is obtained, the parts are readily accessible, the water has a free circulation and is unobstructed by joints, and the liability of forming scale is thereby obviated, and the sediment which forms the scale can be easily removed by blowing out, and the entire boiler is very compact and inexpensive. By the reduction of pipe *a* the fire on the grate is readily accessible and can be easily reached.

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

1. A boiler having a central chamber, A, connected by a pipe, *a*, of reduced diameter, to a mud-drum, *a'*, in combination with a series of coils and a casing, arranged substantially as specified.

2. In a boiler having a central chamber, A, and a series of coils connected thereto, the pipe *a*, of reduced diameter, containing a circulating-tube, *l*, arranged as and for the purpose set forth.

3. In a boiler having a central chamber provided with a pipe, *a*, of reduced diameter, containing a circulating-tube, *l*, arranged as shown, and for the purpose set forth.

4. In a boiler, a central chamber and a series of coils connected to the upper and lower ends of said chamber, which communicates with a mud-drum by a central pipe provided with a circulating-tube, all arranged substantially as set forth.

5. A boiler consisting of a central chamber and a series of coils connected thereto, and inclosed in a casing, a mud-drum connected to said chamber by a pipe of reduced diameter, provided with a suspended circulating-tube, and the feed and steam pipe, all substantially as specified.

6. A boiler having a central chamber and a series of coils supported on a pipe of reduced diameter passing through the grate and secured to a point below said grate, so that the upper part can freely expand and contract, substantially as set forth.

7. In a boiler having central chamber, A, coils B, furnace F, ash-pit E, and inclosing-casing C, in combination with a pipe, *a*, mud-drum *a'*, blow-off pipe *a''*, steam-pipe *g*, and communicating-pipe *k*, provided with a water-gage, all substantially as set forth.

8. A boiler consisting of central chamber, A, series of coils B, inclosing-casing C, forming furnace F, and ash-pit E, with grate-bars D, in combination with a mud-drum, *a'*, pipes *a* *a''*, and vertical pipe *k*, connected to steam-pipe *g*, and a feed-pipe, *f*, all arranged as shown and specified.

9. In a boiler having a central chamber provided with a man-hole plate protected by a shield, *p*, a series of coils arranged circumferentially, a mud-drum, communicating-pipes, as shown, and an inclosing-casing, all as set forth.

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

JOHN A. SVEDBERG.

Witnesses:

FRANCIS C. BAKER,
A. M. P. MASCHMEYER.