

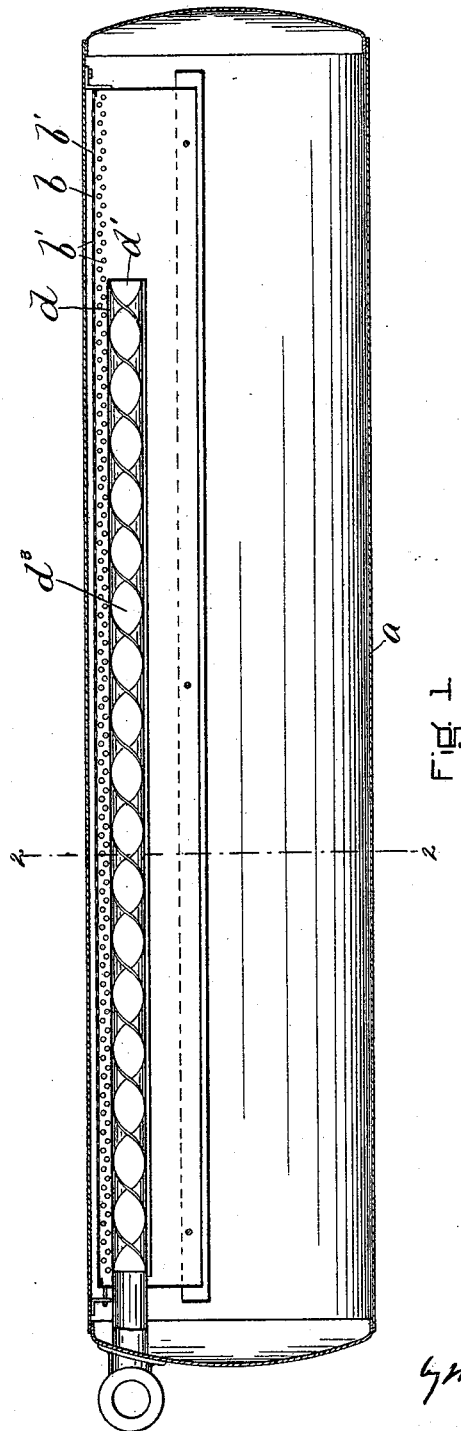
(No Model.)

2 Sheets—Sheet 1.

C. D. MOSHER.
SEPARATOR FOR STEAM BOILERS.

No. 454,984.

Patented June 30, 1891.



WITNESSES.

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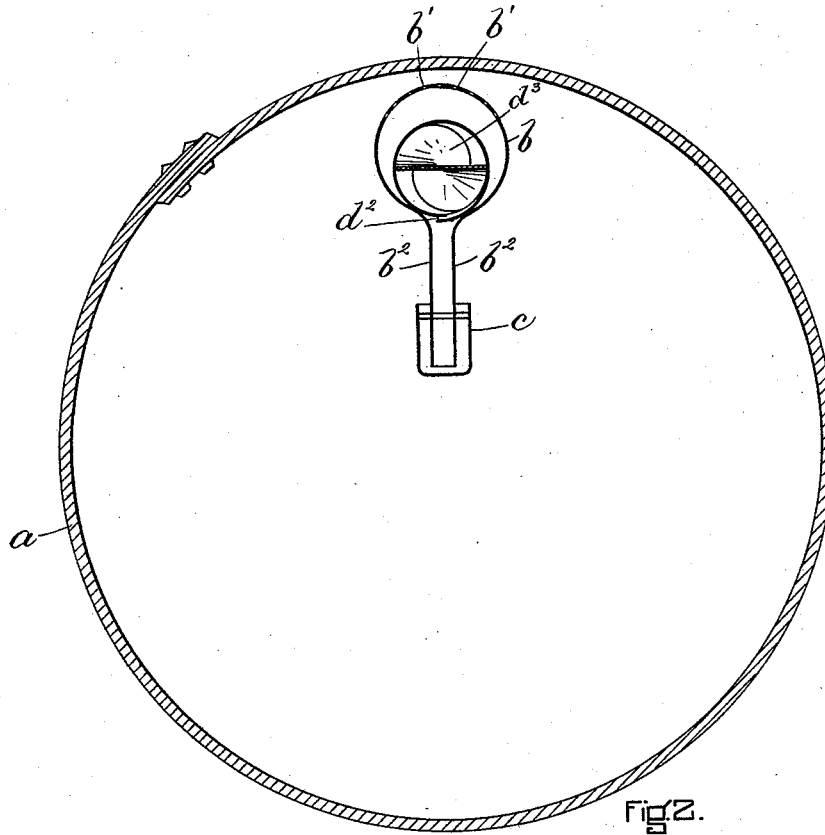


Fig. 2.

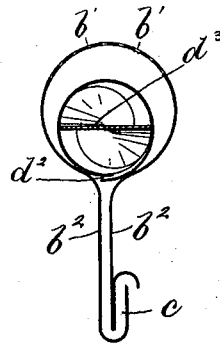


Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES D. MOSHER, OF AMESBURY, MASSACHUSETTS.

SEPARATOR FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 454,984, dated June 30, 1891.

Application filed February 27, 1891. Serial No. 383,114. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. MOSHER, of Amesbury, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Separators for Steam Boilers or Generators, of which the following is a specification.

This invention has for its object to provide efficient and practical means for separating all particles of water from the steam generated in a boiler or steam-drum, so that the steam will pass from said boiler or drum to the engine in a perfectly dry condition and without carrying any water with it.

The invention consists in the improvements which I will now proceed to describe and claim.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a longitudinal section of a boiler or steam-drum provided with a separator embodying my invention. Fig. 2 represents a section on line 2 2, Fig. 1, on a larger scale; and Fig. 3 is a section representing a modification hereinafter referred to.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents a steam drum or boiler, which may be one of the drums shown in Letters Patent No. 432,760, granted to me July 22, 1890, or a drum or boiler of any other suitable construction.

b represents a hood or casing located in the upper portion of the drum or boiler *a*, said casing being above the water-line of said boiler. The upper portion of the casing *b* is provided with a large number of orifices *b'*, which serve to admit steam from the steam-space of the boiler to the interior of the casing *b*. The perforated portion of the casing includes only the extreme upper part of the same, the lower portion being imperforate, as shown in Fig. 2, and provided with downwardly-projecting flanges *b²*, which are separated by a conduit or passage for the downward passage of water from the interior of the casing, the lower edges of said flanges being contained in a horizontal trough *c*, which when filled with water co-operates with the flanges *b²* in forming a seal, preventing the passage of steam from the steam-space of the boiler upwardly through said conduit into the casing, the object of said conduit being simply

to permit the downward passage of water from the casing *b* into the main body of water in the drum or boiler *a*, the water flowing downwardly through said conduit displacing the surrounding water in the trough *c*, and causing the same to overflow.

Within the casing *b* is a tube or flue *d*, which is closed at its upper portion and is open at the end *d'*, its other end extending through the exterior of the drum or boiler, and being connected outside of the same with a pipe or conduit which conveys steam from the boiler to the engine. The lower portion of the tube or flue *d* is provided with a longitudinal slot or opening *d²*, Fig. 2, which is preferably formed by making the tube of a sheet of metal curved into tubular form, but having one edge overlapping the other, the two edges being separated by the slot *d²*. Said slot is located directly over the conduit between the flanges *b² b²*, so that any water that may find its way into the tube or flue *d*, as hereinafter described, will pass out of the said tube or flue through the slot *d²* into the conduit between the flanges *b² b²*.

Within the tube or flue *d*, and extending preferably the entire length thereof, is a spiral blade or diaphragm *d³*, which is a strip of sheet metal bent into a spiral form like an auger-blade. Said diaphragm causes the steam that enters the end *d'* of the flue *d* to pass spirally through said flue, the spiral motion of the steam causing any particles of water that may be carried by it to be thrown outward centrifugally against the inner surface of the tube or flue *d*, and thus find its way inevitably to the slot or outlet *d²*.

The operation of the described separator is as follows: Steam generated in the drum or boiler *a* enters the upper portion of the casing *b* through the perforations *b'* in the top thereof and passes to the end *d'* of the flue or tube *d*, said end *d'* being the only opening through which the steam can pass from the casing *b*. The steam entering the end *d'* passes with great rapidity along the tube or flue *d*, and is caused by the spiral diaphragm to gyrate or move in a spiral course, and thus throw any particles of water that may be carried with it outwardly against the walls of the tube or flue, said water escaping through the slot *d²*, as already described. In this way the

steam is entirely freed from water during its passage through the tube or flue d , so that it passes in a dry condition to the engine.

My invention is not limited to the precise details of construction here shown, and may be modified in various respects without departing from the spirit of the invention, the essential feature of which is the longitudinal passage or flue arranged to conduct the steam longitudinally through the upper portion of the boiler and provided with means for imparting a gyrating or spiral movement to the steam, and an outlet for the water thrown outwardly by the described motion.

If desired, the casing b and the trap or check accompanying the same may be dispensed with, and the flue or tube d with its spiral diaphragm used without a casing.

It will be observed that the flue or tube d is of spiral form in cross-section, the outer edge being farther from the center of the tube than the inner. I consider this form highly advantageous, the inner edge being arranged to arrest or deflect the water that is being carried around the tube by the gyrating steam, and thus insuring the escape of said water through the slot d^2 .

Fig. 3 shows a slightly-modified form of check or trap, in which the trough that contains the accumulation of water that seals the water-outlet against the entrance of steam therethrough is formed as a part of the casing b .

I claim—

1. The combination, with a steam drum or boiler, of a cylindrical steam-conduit located within the steam-space and provided with a continuous strip of metal bent into a spiral form, extending its entire length, said spiral

being of a width equal to the internal diameter of the conduit, whereby two spiral passages are formed in said conduit.

2. The combination of a steam drum or boiler, a flue or conduit extending through the steam-space of the boiler and provided with an internal spiral diaphragm or partition and with a water-outlet, and a hood or casing containing said flue and perforated at its upper portion, said casing having in its lower portion a water-outlet and a seal or check adapted to permit the escape of water from said outlet into the boiler and prevent the entrance of steam into said outlet, as set forth.

3. The combination of the boiler or drum, the casing having the perforated top or crown and the downwardly-projecting flanges forming a water-outlet, a trough receiving said flanges and sealing the water-outlet against the admission of steam, and the steam-flue within said casing and communicating at one end therewith, said flue having a spiral diaphragm or partition and an outer slot or opening communicating with the outlet of the casing, as set forth.

4. The steam-flue made of spiral form in cross-section, one edge overlapping the other, said edges being separated by a slot or outlet-opening, combined with a spiral diaphragm or partition in said flue, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 18th day of February, A. D. 1891.

CHARLES D. MOSHER.

Witnesses:

C. F. BROWN,
A. D. HARRISON.