

(No Model.)

H. STOLLWERCK.

STEAM BOILER.

No. 272,347.

Patented Feb. 13, 1883.

Fig. 1.

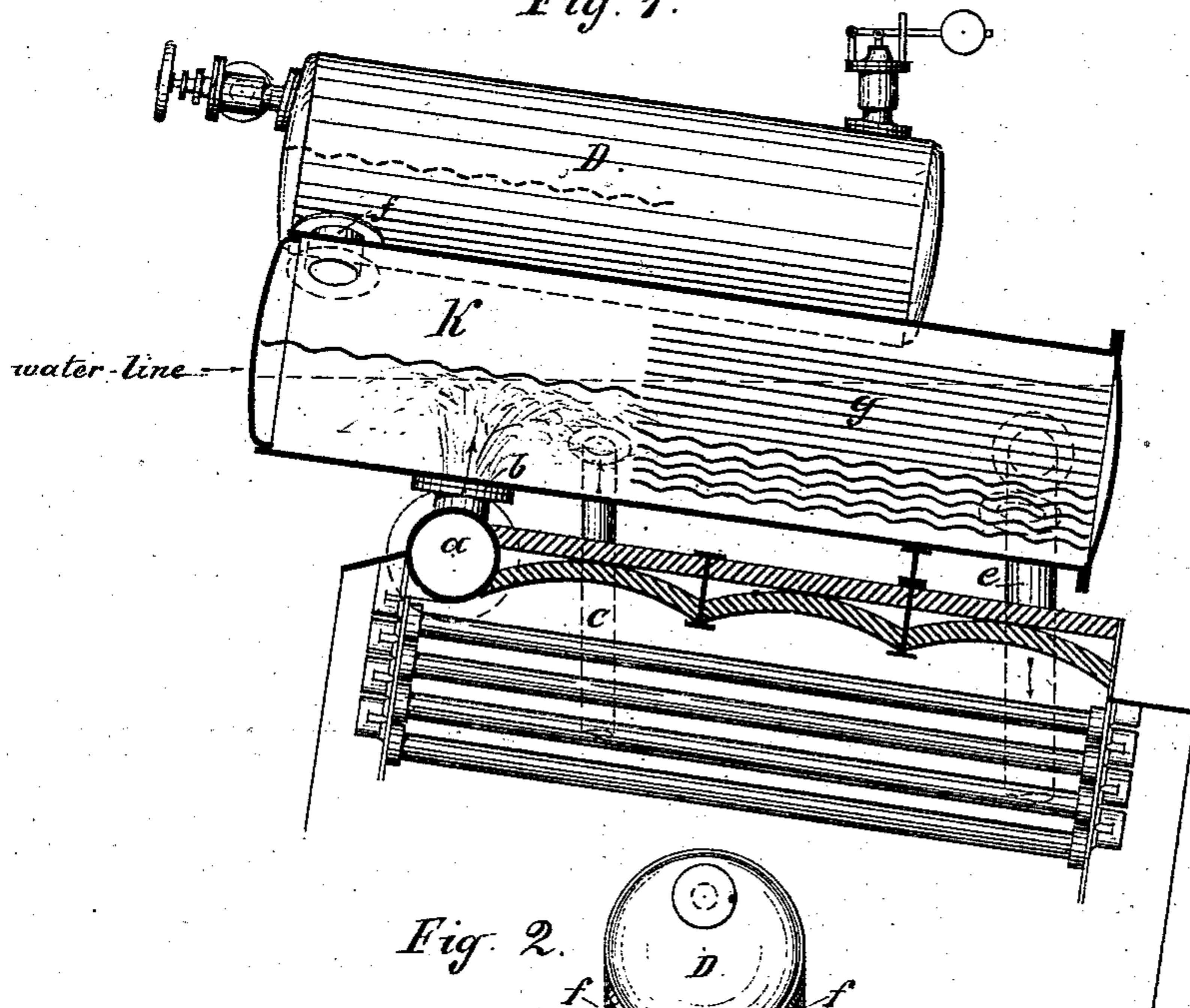


Fig. 2.

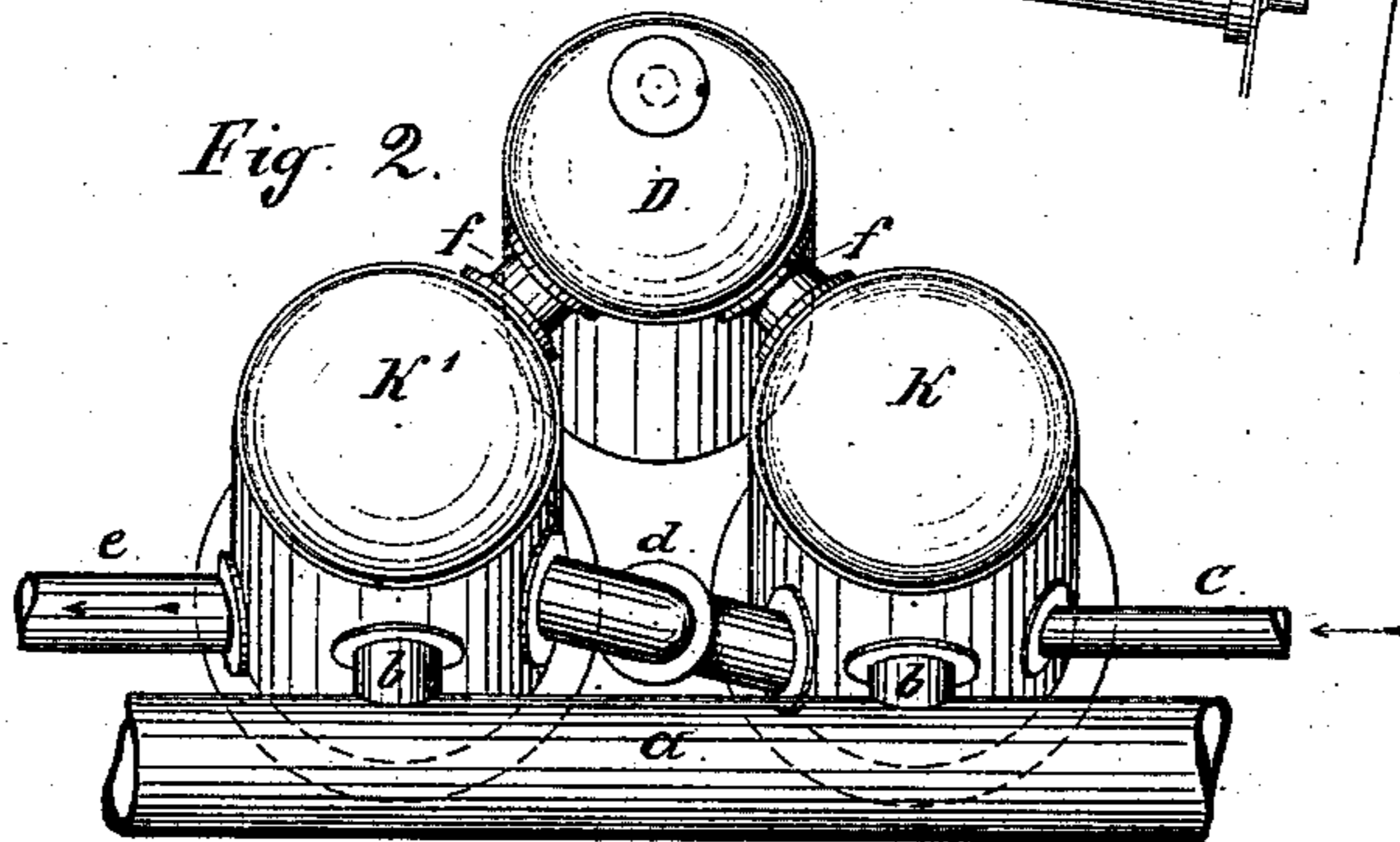


Fig. 4.

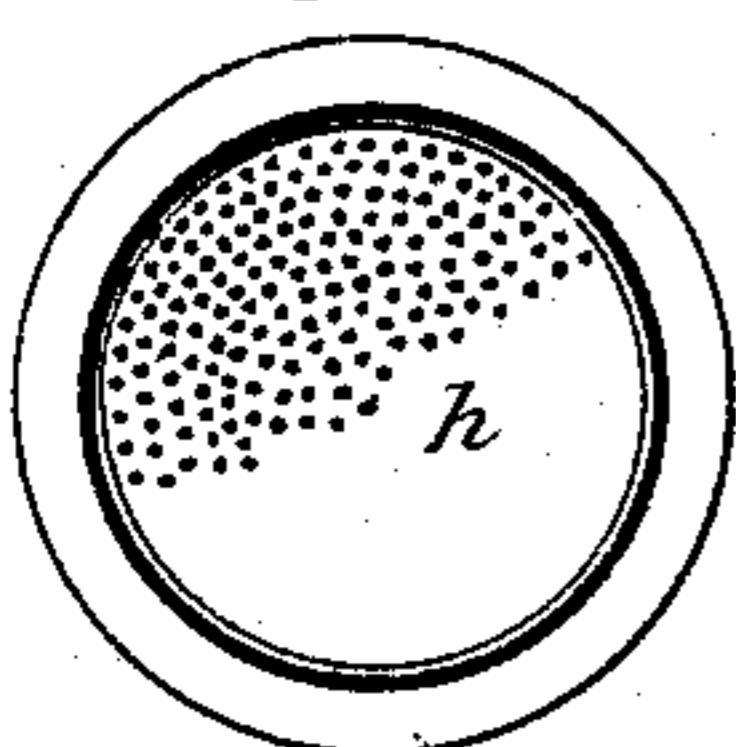


Fig. 5.

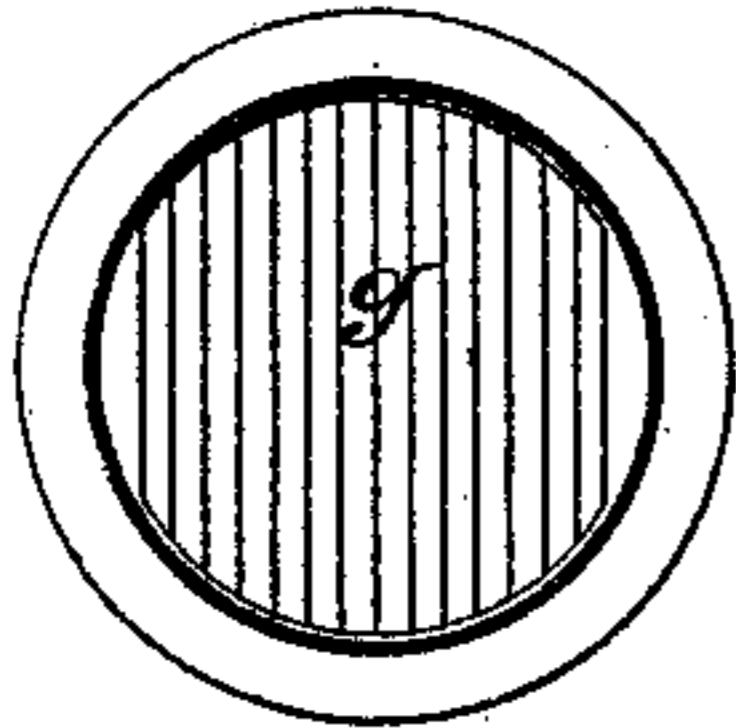
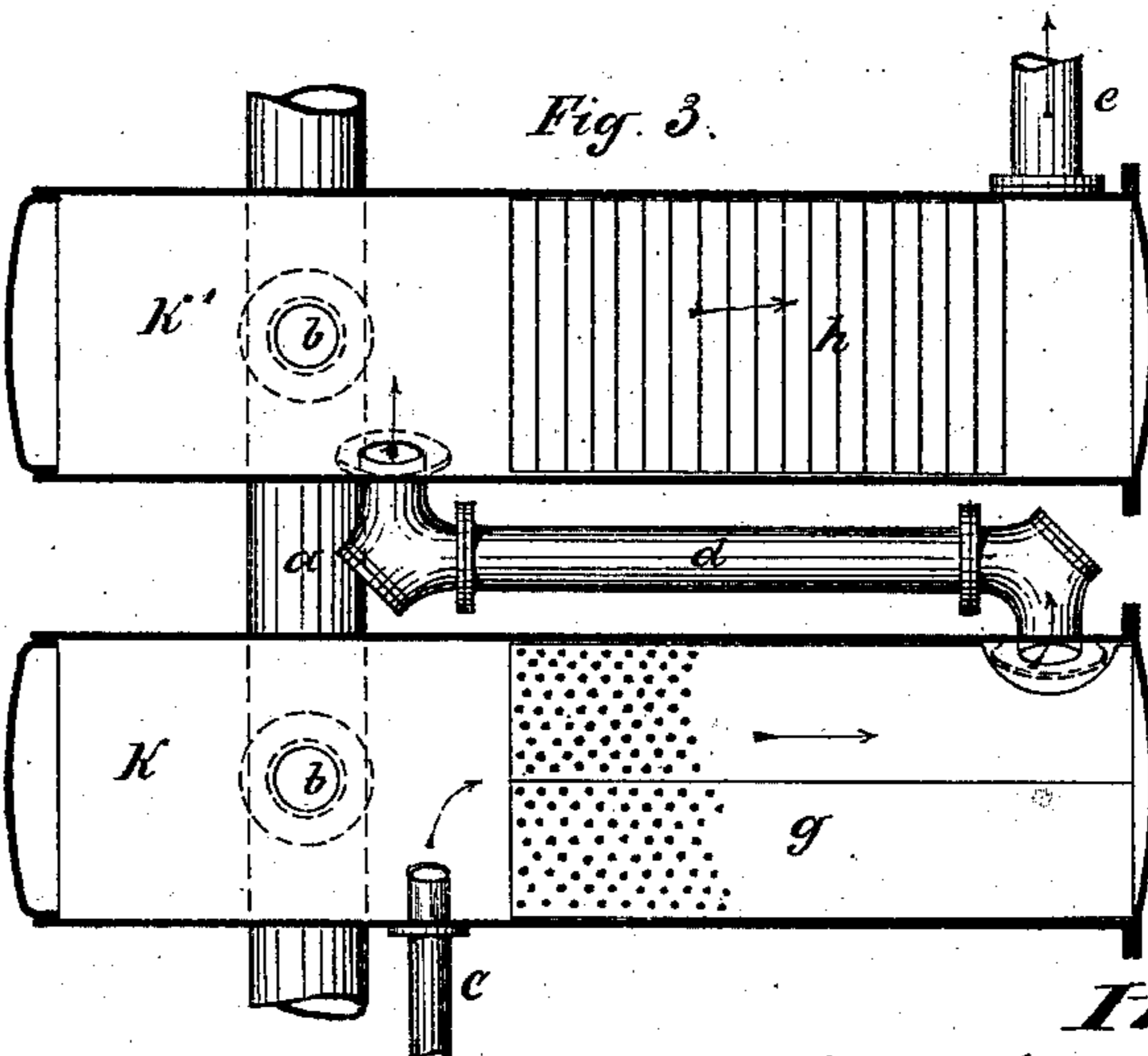


Fig. 3.



Witnesses,

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By James L. Norris Atty.

UNITED STATES PATENT OFFICE.

HEINRICH STOLLWERCK, OF COLOGNE-ON-THE-RHINE, PRUSSIA, GERMANY,
ASSIGNOR TO GEBR. STOLLWERCK, OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 272,347, dated February 13, 1883.

Application filed December 15, 1882. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH STOLLWERCK, of the city of Cologne-on-the-Rhine, in the Kingdom of Prussia and German Empire, have invented a new and useful Improvement in Steam-Boilers, of which the following is a specification, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

10 This invention relates to steam-boilers combined with other boilers through which the feed-water passes previous to its entrance into the boiler proper.

15 The object of my said invention is to provide means for preventing the formation of incrustation in such parts of steam-boilers as are generally in contact with the fire, and consequently not easily accessible; and it consists in providing such means by which the feed-water, before entering the boiler proper, is caused to pass through one, two, or more smaller boilers, and there to be brought into contact with a jet of steam and a series of sieve-like or perforated plates, by which said feed-water is freed from its incrustation before leaving the smaller boiler or boilers.

20 To enable others skilled in the art to better understand the nature of my invention, I will now proceed to describe the same when applied to a tubular boiler; through the heating-pipes of which a constant circulation of water is maintained, the annexed drawings illustrating such boiler in combination with my improved apparatus by which the feed-water is freed from its incrustation before entering the tubes of the said tubular boiler.

25 In the accompanying drawings, forming part of my specification, Figure 1 is a longitudinal vertical section through boiler K, containing my improvement. Fig. 2 is a front view of those parts of the boiler embodying my improvement. Fig. 3 is a plan view of the same in section. Figs. 4 and 5 are transverse vertical sections of the boilers K' K, respectively.

30 Reference being had to the accompanying drawings, K K' represent two boilers mounted in an inclined position above the main boiler, and communicating therewith by means of the short pipes b b and the receiving-chamber a. 35 The boiler K' also communicates with the boiler proper by means of the feed-water-dis-

charge pipe e, while the feed-water inlet consists of the pipe c, entering boiler K. The boilers K K' are in connection with each other through the pipe d, and are surmounted by a steam-reservoir, communicating with the same by means of the short pipes f f. The boilers K K' are provided inside with a number of sieve-like or perforated plates, preferably made of corrugated sheet metal, and intended for receiving and collecting the deposits of incrustation from the feed-water, and arranged either in horizontal layers, as at g in Fig. 3, or set in a vertical position and extending across the inside of the boiler, as at h in the same figure.

40 Having thus described the apparatus for freeing feed-water from its incrustation before entering the main boiler, I will now proceed to describe its operation.

45 The steam generated in the boiler proper, carrying some of the water in the said boiler along with it, passes into the receiving-chamber a, and from there, through the short pipes b b, into the boilers K K', partly filled with water. The feed-water, preferably in a heated condition, enters the boiler K through the feed-water pipe c, here meeting the steam-bubbles from the short pipe b, either in a rectangular or opposite direction, and, yielding to the circulating current of water and steam, is carried along by the latter and driven through the sieve-like or perforated plates g in the boiler K, depositing thereon the greater part of its incrustation. Subsequently passing through the bent pipe d, it enters the other boiler, K', again meeting a jet of steam entering through the short pipe b in a direction rectangular or opposite to the said stream of feed-water, and with the same result as in the other boiler, the incrustation having remained in the feed-water again being deposited during its passage through the sieve-like or perforated plates h, arranged in this boiler K'. The feed-water, now having been thoroughly freed from its incrustation, escapes from the boiler K' through the pipe e and enters the main boiler, there to be evaporated and transformed into steam. The mouths of the pipes d and e are provided with fine sieves, in order to prevent the passage of any remaining small particles of incrustation with the feed-water. The steam admitted into the boilers K K' through the short pipes

b b, after having been utilized, as described, for freeing the feed-water from its incrustation, passes through the short pipes *ff*, and is collected in the steam-reservoir mounted above the two boilers *K K'*. Here, coming in contact with one or more plates of sheet metal, it is freed from its water by condensation, and can be taken from the reservoir in a practically dry state, to be used for any desired purpose.

In cleaning the boilers *K K'* from the incrustation deposited therein it is only necessary to take out the sieve-like or perforated plates, when they may be readily scraped off and the incrustation removed therefrom, after which they may be reinserted in the boilers.

Though the use of two such boilers *K K'* may be found sufficient in most instances, I wish it distinctly understood that I do not confine myself to this number, but that an additional number may be added without deviating from the nature of my invention.

The advantages derived from the apparatus, as above described, are self-evident, and in a general way may be summed up as follows, viz:

First, a feed of water is obtained which is practically free from any particles producing incrustation, whereby the burning of the fire-plates and pipes is prevented and the quality of the heating-surface is greatly improved.

Second, a thorough utilization of the heating-surfaces is obtained, the pipes being free from incrustation, and therefore better absorbing the fire-gases.

Third, the incrustation is collected in such parts of the boiler as are easy of access and not in contact with the heating-gases.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In a feed-water purifier for steam-boilers, the combination of a cylinder or boiler having perforated plates or diaphragms, a water-inlet pipe located at one end of said diaphragms, a water-outlet pipe arranged at the other end thereof, and a steam-inlet pipe arranged at the end of the boiler at right angles to the water-inlet pipe, substantially as and for the purpose set forth.

2. The combination of the steam-receiver *D* with a subjacent cylinder or boiler having perforated diaphragms or plates, water inlet and outlet openings, and steam inlet and discharge pipes, substantially as and for the purpose set forth.

3. In an apparatus for freeing feed-water from incrustation, the combination, with two or more boilers, *K K'*, mounted above the main boiler in an inclined position, and entered by the short water and steam ejecting pipes *b b* and opposite to the latter by the feed-water inlet *c* and circulation-pipe *d*, respectively, of a series of sieve-like or perforated plates, arranged as described, the feed-water to be freed from its incrustation being so conducted as to be repeatedly met by a jet of steam before passing through all the series of perforated plates and entering the boiler proper, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HEINRICH STOLLWERCK.

Witnesses:

TH. GETTMANN,
SAMUEL SPACKMAN.