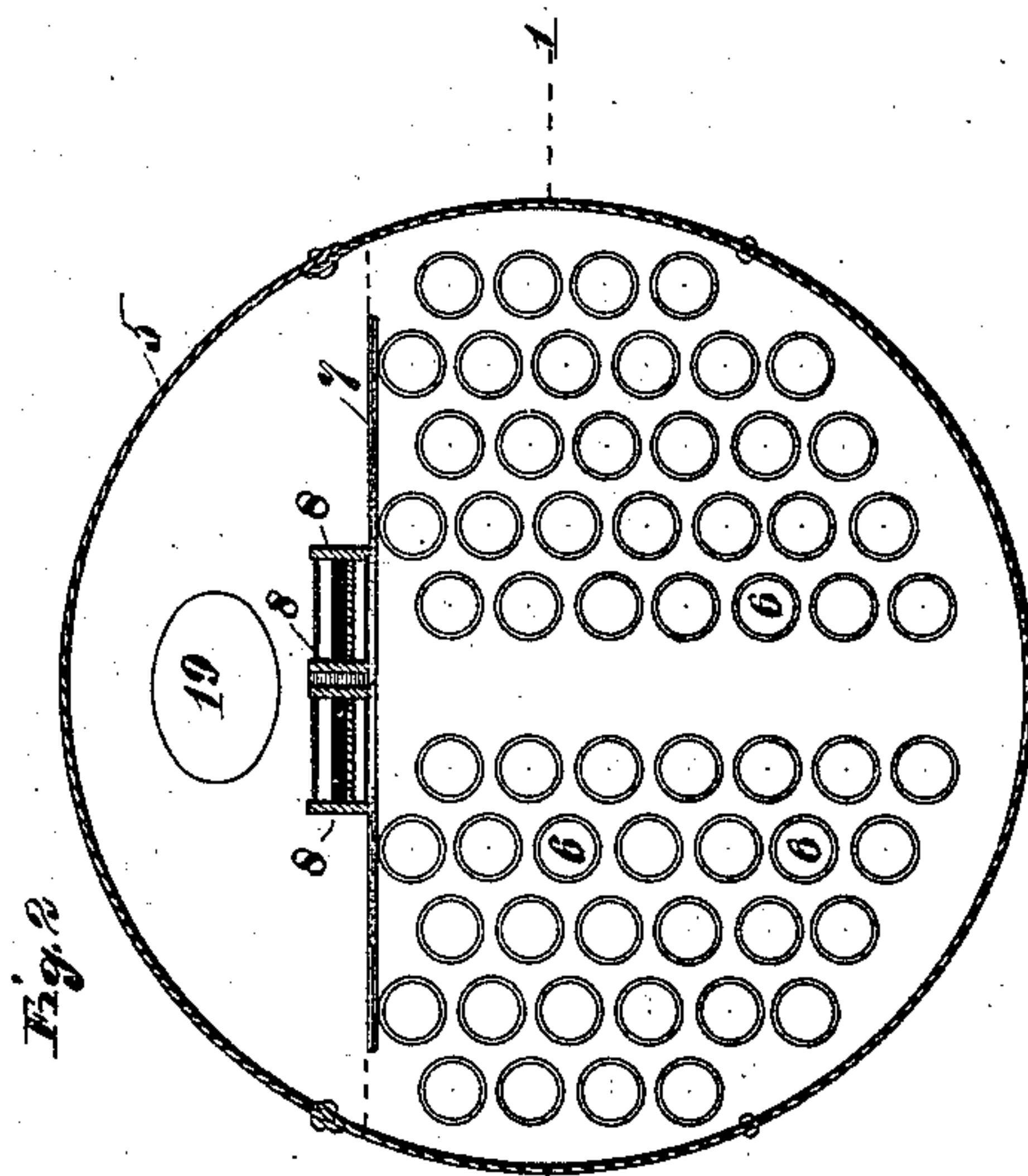
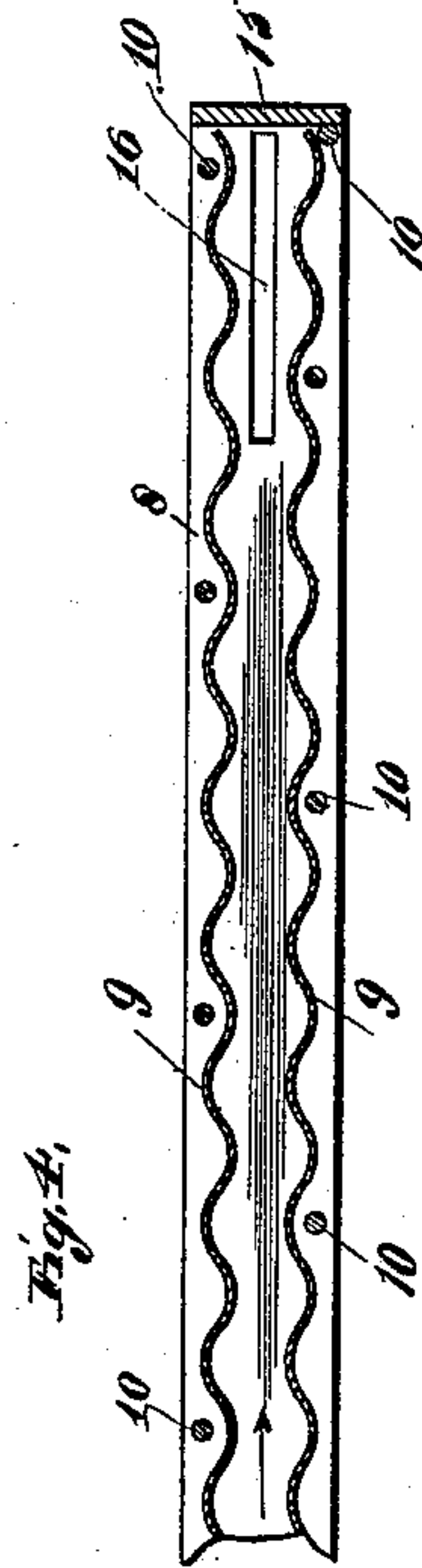
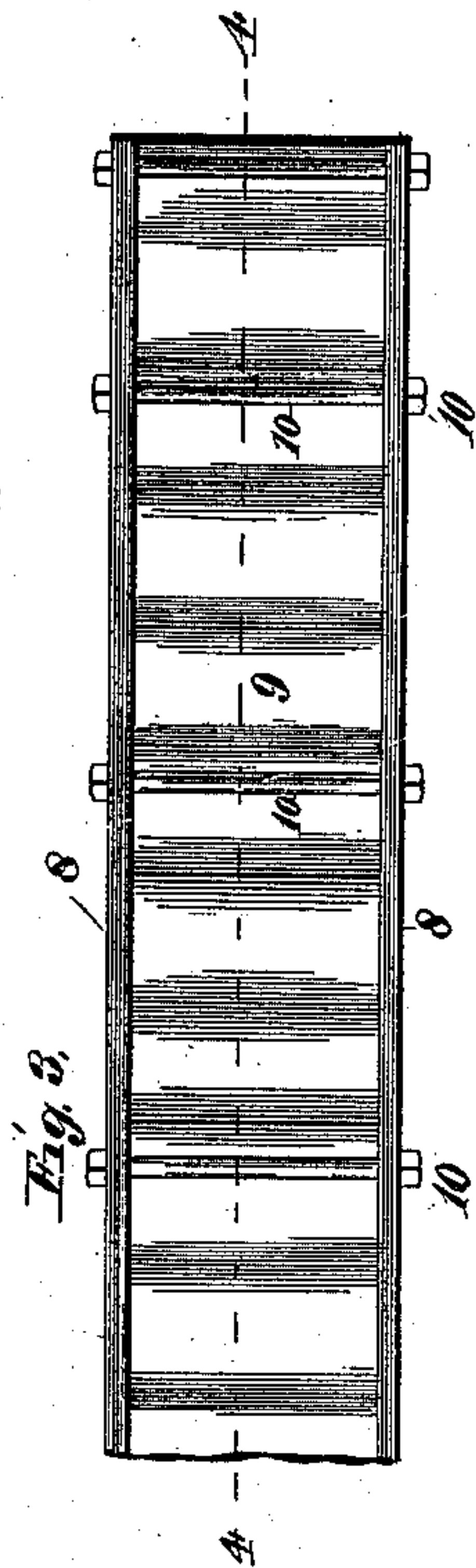
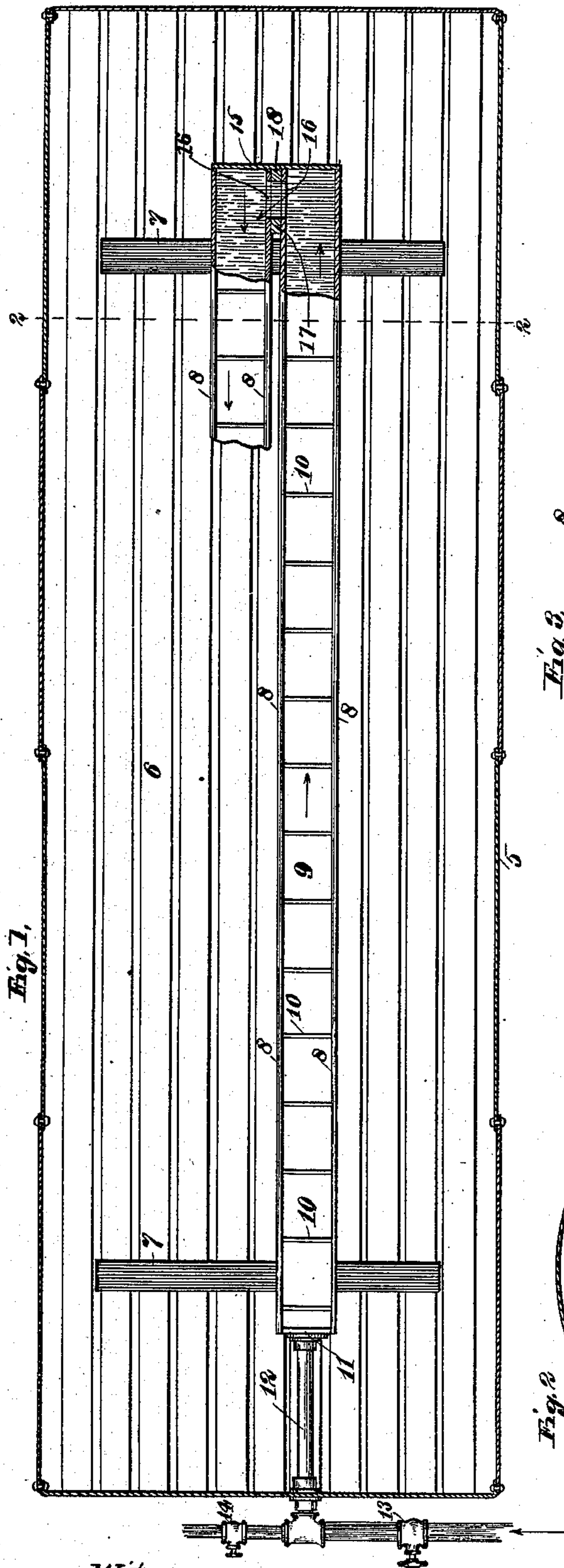


(No Model.)

G. B. FIELD.
FEED WATER PURIFIER.

No. 412,738.

Patented Oct. 15, 1889.



Witnesses;
G. A. Hinchman Jr.,
Charles Pickles,

Inventor;
Geo. B. Field
By Fowler & Fowler
Attorneys.

UNITED STATES PATENT OFFICE.

GEORGE B. FIELD, OF NEW YORK, N. Y.

FEED-WATER PURIFIER.

SPECIFICATION forming part of Letters Patent No. 412,738, dated October 15, 1889.

Application filed November 28, 1888. Serial No. 292,081. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. FIELD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Feed-Water Purifiers, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to feed-water purifiers that are located wholly within the boiler. The object of my invention is to lessen the cost and increase the efficiency of feed-water purifiers.

Feed-water purifiers of the character described as now constructed are made of heavy castings, seemingly for the purpose of resisting the high pressure in the boiler. I construct my feed-water purifier of thin sheet metal and wood and dispense with all heavy metal, for the pressure is nearly the same on all sides of the purifier, and therefore feed-water purifiers are called upon to withstand only the difference between the pressure inside of the purifier and the pressure in the boiler. I also corrugate the sheet metal to increase the heating-surface of the same and arrest the inward flow of the sediment in the feed-water.

Figure 1 is a plan view of a feed-water purifier made in accordance with my invention, and partly sectioned on the line 1 1 of Fig. 2, showing the top half of the boiler removed. Fig. 2 is a section on the line 2 2 of Fig. 1. Fig. 3 is a plan of a portion of my feed-water purifier on an enlarged scale. Fig. 4 is a section of the latter on the line 4 4 of Fig. 3.

The same figures of reference indicate the same parts throughout the various views.

5 is the ordinary shell of a boiler, and 6 represents the fire-tubes of the boiler.

I will here remark that while I have shown my invention as applied to a tubular boiler, I do not wish to limit the same specifically to a tubular boiler, for the invention may be applied to a non-tubular boiler. Where said

invention is used with a non-tubular boiler some means would have to be devised to support the purifier from the boiler.

7 7 are boards, which are preferably placed upon the tubes 6, by which boards the purifier may be supported.

My purifier is constructed of side pieces 8 8, preferably of wood and corrugated metal 9 9, the latter constituting preferably the top and bottom thereof. The side pieces 8 8 are firmly secured together by bolts 10, which force the corrugated sheet metal into intimate contact with the wood, making a feed-water purifier rectangular in cross-section. The corrugations of the purifier should be preferably about two inches apart. The sheet metal should be about eight inches across, so that an unobstructed passage of about two by eight inches is left for the feed-water to circulate through. At the forward end of the purifier is a casting 11, through which the feed-water pipe 12 passes after perforating the boiler-shell.

13 is a cock that controls the feed-water, and 14 is a blow-off cock, both of the same opening into the feed-water pipe 12, that perforates the boiler-shell.

The feed-water purifier may be of one straight piece, having the remote end open; or it may consist of one or more sections or lengths returning upon itself, as shown in Fig. 1, in which case the remote end of the purifier is closed by a board 15 and communicates with another length of the purifier similarly constructed, communication between the two being made by slots 16, cut in the adjacent sides of the two adjoining lengths. The two lengths should preferably be separated slightly in order to allow the water of the boiler to circulate around each length, so as to heat the feed-water, and this may be done by cleats 17 and 18.

19 is the ordinary man-hole of the boiler, through which the lengths of the purifier may be introduced into the boiler. The lengths can be made in sections, if desired, so as to be introduced into the boiler with greater facility.

The purifier should preferably be entirely submerged in the water in the boiler.

The circulation of feed-water in the purifier will be in the direction indicated by the arrows.

By the means described I secure a feed-water purifier that answers all practical purposes and can be constructed at very little expense. The joints between the side pieces 8 and the corrugated sheet metal, while not absolutely water-tight at first will gradually become so with use by the sediment deposited along the joints. On the other hand, it may be said that feed-water purifiers do not require to be absolutely water-tight. In order to cause the feed-water to pass into the boiler there must be, of course, a slight preponderance of pressure inside of the purifier; but this preponderance of pressure is very slight, and the devices set forth will be more than adequate to withstand such difference of pressure. The water, as it passes through the purifier, will become gradually heated until it reaches the boiler-temperature, and in becoming heated the foreign particles in the water will be rendered flocculent and be caused to precipitate along the bottom of the purifier in the depressions of the corrugations, and the water will finally emerge from the purifier at boiler-temperature free from all impurities. By closing the cock 13 and opening the cock 14 the current will be reversed in the purifier and the foreign matter deposited along the corrugations will be blown out.

By means of a corrugated purifier I expose more surface, and thus raise the temperature of the feed-water to a higher temperature than can be done otherwise, the advantage of this being that the higher the temperature of the feed-water the purer the water delivered to the boiler, for with the high temperatures more foreign particles will be separated from the water and deposited in the purifier.

In practice I design to have the metal corrugated in a more pronounced manner than that shown in Fig. 4, so as to get much more heating-surface and more effectually prevent the sediment from being carried in the boiler by the inward flow of the feed-water. It is not absolutely essential in my device to blow off, as the sediment may be allowed to accumulate along the depressions of the lower corrugations and the feed-water purifier taken out of the boiler and replaced by a new one when filled up, as they cost but a trifle.

With ordinary usage a feed-water purifier such as I have described may be used one year without blowing off or substituting a new one

for it. It will be noted that the upper corrugations are always more or less free from deposit, and even should the depressions of the lower corrugations become filled with sediment and scale, I, notwithstanding this, have greater heating-surface exposed than any ordinary feed-water purifier now in use. The scale is thus deposited in the feed-water purifier, where it does no harm, instead of in the boiler, and about once a year the boiler is provided with a new purifier, the cost of which is so slight that it is not to be compared with the trouble of blowing off.

Having fully set forth my invention and described its advantages, what I desire to claim, and secure by Letters Patent of the United States as my invention, is—

1. A feed-water purifier horizontally arranged within a boiler and made up of corrugated sheet-metal top and bottom, whereby an increased heating-surface is presented and the corrugations in the bottom serve as catch-basins for the sediment.

2. The combination, to form a feed-water purifier adapted to be inserted in a boiler, of the corrugated metal 9 9, the wooden pieces 8 8, bolts 10, securing the latter together and forming a close joint with the corrugated metal parts 9 9 and a feed-water pipe 12.

3. A feed-water purifier adapted to be inserted in a boiler, having two or more lengths composed of side pieces 8 8, of wood, a corrugated sheet-metal top and bottom 9 9, bolts 10, for securing the sides together and holding them in contact with the sheet-metal top and bottom, the end board 15, and slots, as 16, in the adjacent parts of the adjoining lengths, whereby the feed-water can circulate from one length to another.

4. A feed-water purifier composed of two or more lengths, each length made up of side pieces 8 8, of wood, a top and bottom of corrugated sheet metal, bolts 10, securing said side pieces together and holding them in intimate contact with the sheet-metal top and bottom, the end board 15, slots 16 in the two adjacent lengths of the purifier, a feed-water connection, and a blow-off, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal, this 26th day of November, 1888, in the presence of two subscribing witnesses.

GEO. B. FIELD. [L. S.]

Witnesses:

A. C. FOWLER,
M. S. REEDER.