

No. 685,418.

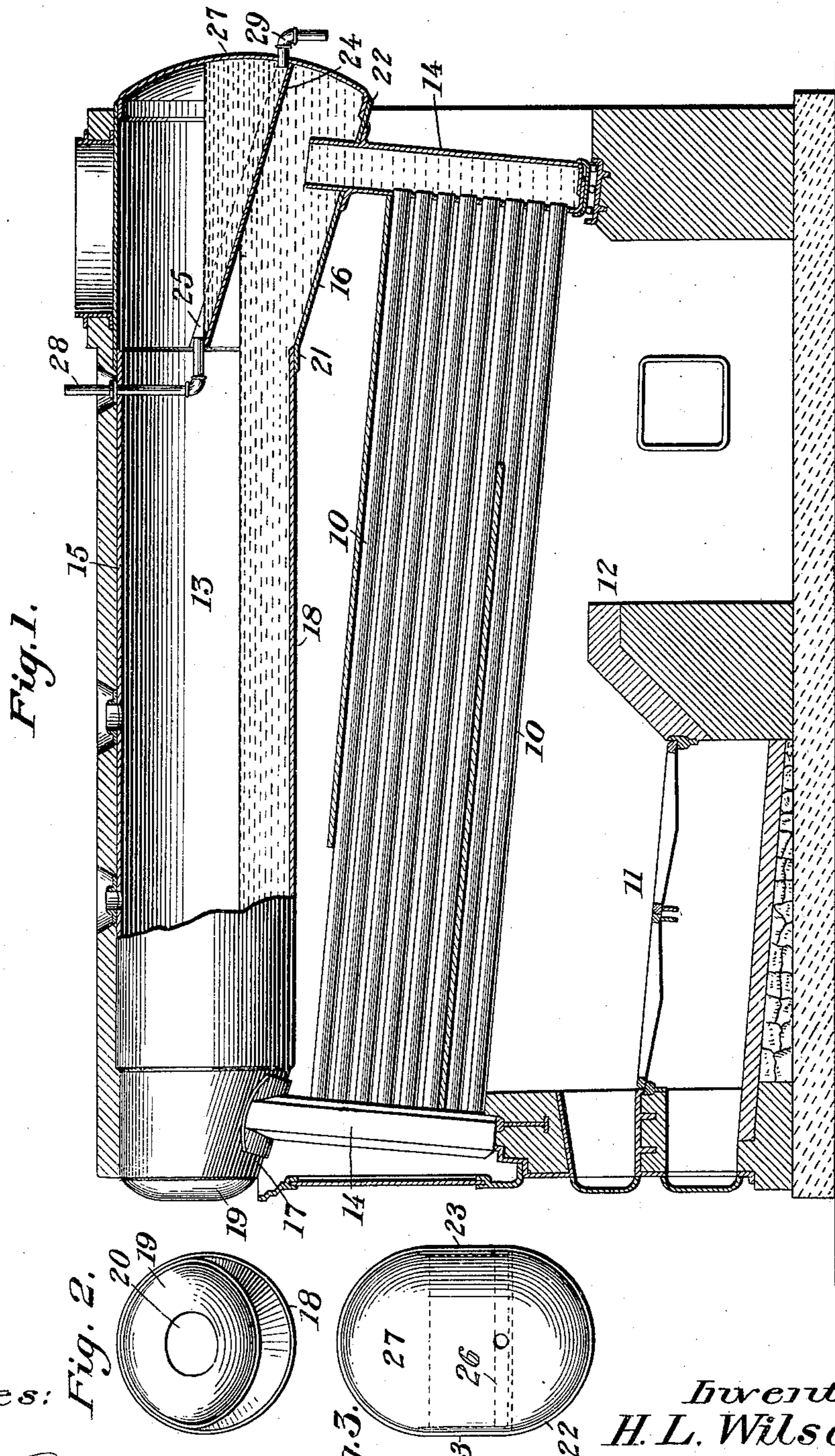
Patented Oct. 29, 1901.

H. L. WILSON.
STEAM BOILER.

(Application filed June 15, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:

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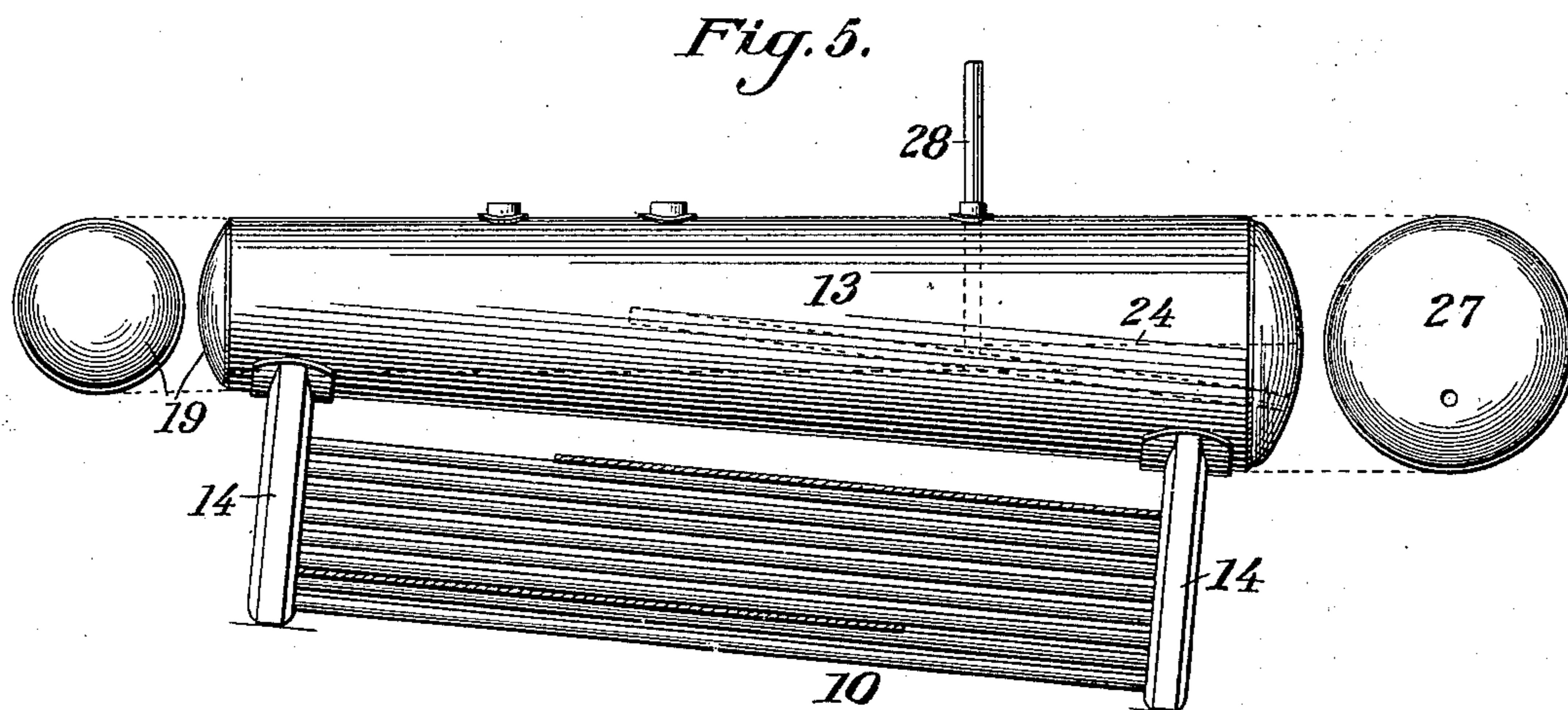
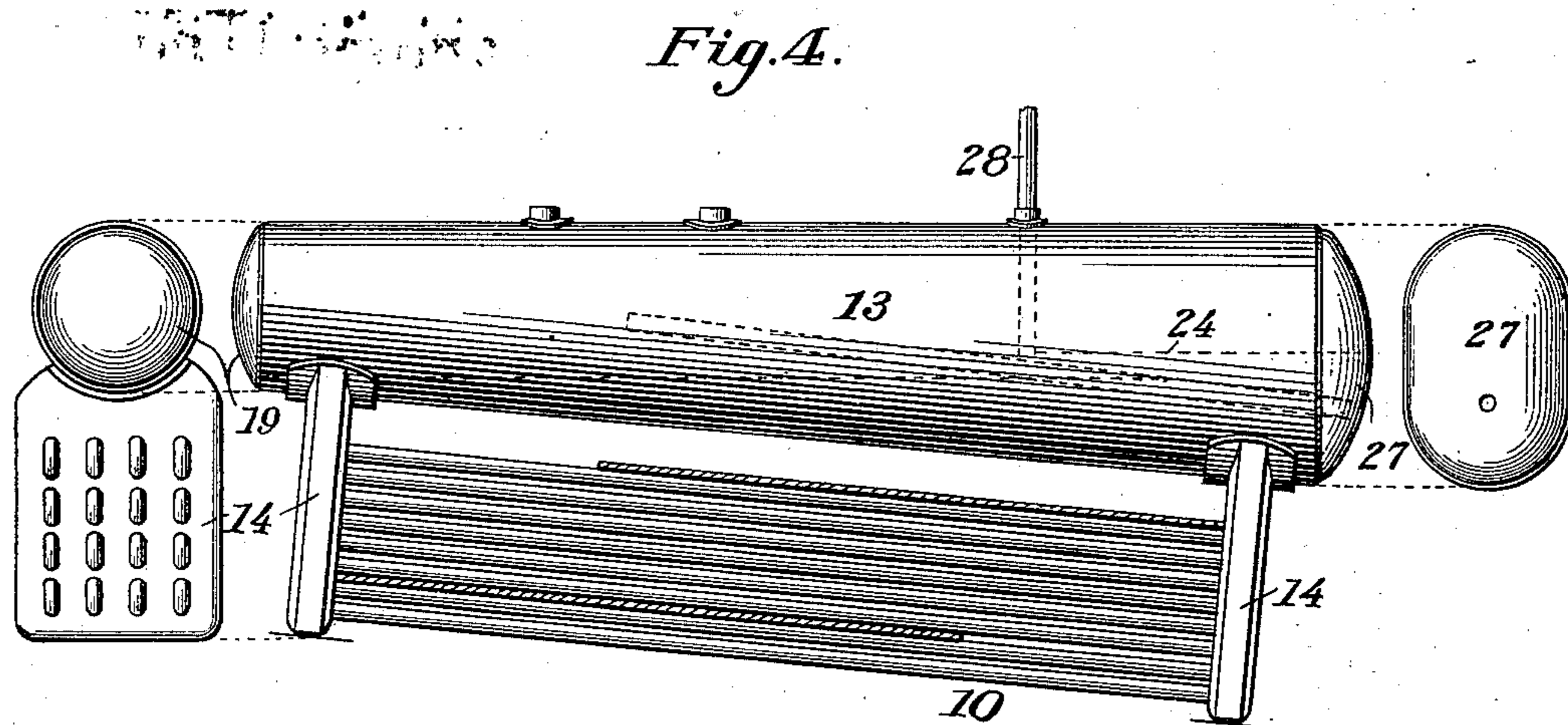
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

HARRY L. WILSON, OF ERIE, PENNSYLVANIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 685,418, dated October 29, 1901.

Application filed June 15, 1901. Serial No. 64,701. (No model.)

To all whom it may concern:

Be it known that I, HARRY L. WILSON, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented a certain new and useful Steam-Boiler, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to steam-boilers; and the improvements contemplated in the invention are specially designed with reference to water-tube boilers in which a continuous circulation is afforded between a series of water-tubes and a superimposed drum, which tubes and drum are connected at their opposite ends by means of head-sections or water-legs.

The chief aim of the present invention is to promote the circulation of the water in and through the different portions of the boiler, thereby effecting a more rapid and thorough generation of steam and increasing the efficiency of the boiler.

A further object of the invention is to associate with the feed-water pipe a settling-pan, which is arranged partially within the steam-space and partially within the water-space of the drum, the pan being so disposed as to contain a large quantity of water, which is subjected to the action of the steam and brought nearly or quite to the point of ebullition, thereby effecting the deposit of a large amount of solid matter held in suspension, which matter may be afterward readily blown off.

With the above and other objects in view, the nature of which will appear as the description proceeds, the invention consists in the novel construction, combination, and arrangement of parts hereinafter fully described, illustrated, and claimed.

In the accompanying drawings, Figure 1 is a vertical longitudinal section through a water-tube boiler, illustrating the principles of this invention. Fig. 2 is a front end view of the drum. Fig. 3 is a rear end view of the same. Fig. 4 is a side elevation of a modified form of drum, involving, however, the same principle illustrated in Fig. 1, the said Fig. 4 also illustrating end elevations of the different ends of the boiler. Fig. 5 is an elevation similar to Fig. 4 with detached end elevations, showing the shape or formation of the ends of the drum.

Similar numerals of reference designate corresponding parts in all the figures of the drawings.

The boiler for the most part is of the construction now in common use and comprises a series of water-tubes 10, arranged over the fire-pot 11 and bridge-wall 12, a drum 13, superposed above the water-tubes 10, and head-sections 14, which are associated with the extremities of the water-tubes and also with the opposite end portions of the boiler. The drum, water-tubes, and head-sections are designed to be built into and supported upon suitable masonry in the usual manner; but as these details of construction and arrangement of the usual parts of the boiler and settings do not enter into this invention it is not thought necessary to go into any further description of the same.

The present invention resides principally in the drum and its parts and the relation of the drum to the water-tubes and head-sections thereof. In carrying out the present invention the drum is constructed, essentially, with a straight and normally horizontal top 15 and an inclined bottom 16 17. Under the preferred embodiment of this invention a portion of the drum, and preferably the central portion thereof, is in the form of a true cylinder, the lower wall or bottom thereof being parallel with the top 15. The front end portion of the drum is reduced in size or constructed to form the inclined bottom wall 17. This is accomplished without reducing the drum in width, and as a result an ellipsoidal form is imparted to the front end of the drum, as shown in Fig. 2 and designated at 19, 20 representing the usual hand-hole. The rear end portion of the drum is enlarged or expanded from the point 21 rearward. This enlargement of the rear end of the drum is effected by dropping or inclining downward the bottom wall 16, and as a result an ellipsoidal shape is given to the rear end of the drum, as illustrated in Fig. 3 and represented at 22. In thus enlarging the rear end of the drum the opposite sides of such enlarged portion are flat, as indicated at 23, and parallel to each other, and it is within this space that the settling or separating pan 24 is placed. The settling or

separating pan consists of a piece of sheet metal extending horizontally across the enlarged rear end of the drum and inclining longitudinally thereof, the said pan being
 5 provided at opposite sides with flanges 25, secured tightly to the parallel flat sides 23, and also having an end flange, (indicated at 26 by dotted lines in Fig. 3,) which is riveted or otherwise firmly secured to the rear end
 10 27 of the drum. If necessary, the joint between the settling-pan and sides and end of the drum are calked. By reference to Fig. 1 it will be seen that a portion of the settling-pan lies within the steam-space of the boiler,
 15 while the remainder lies within the water-space, the normal level of the water being about one-third the depth of the drum.

28 designates the feed-water pipe, the inner end of which overhangs the settling-pan,
 20 so as to deliver the feed-water thereon, and 29 represents the blow-off pipe, which communicates with the lowest portion of the space above the settling-pan. The blow-off pipe is of course designed to be equipped with a
 25 valve, so that the sediment can be blown off at any time desired.

Figs. 2 and 3 show that the front end of the drum is in the shape of an ellipse the major axis of which extends horizontally and
 30 the rear end of the drum in the form of a flat-sided ellipse the major axis of which extends vertically.

Instead of constructing the drum with a cylindrical intermediate portion said drum may
 35 be made of a regular taper from one end to the other, as shown in Figs. 4 and 5, and, if desired, the front end of the drum may be circular, as shown in said figures, while the rear end of the drum may be in the form of
 40 a vertical flat-sided ellipse, as shown in Fig. 4, or of circular formation, as shown in Fig. 5. Under either arrangement or construction it will be seen that it is practicable to construct the water-legs or head-sections 14 of
 45 equal length vertically, and by thus making the rear head-section shorter and, if possible, of the same length as the forward head-section the cost of manufacture is materially reduced and a considerable saving in material also effected. By providing the drum
 50 with an inclined bottom and a horizontal top the thorough circulation of the water is aided and at the same time the steam-space within the drum is materially increased, the water-space of the drum occupying only about one-third of the internal area thereof. The construction and arrangement of the inclined settling or separating pan accomplishes two important results. First, the pan is adapted to
 60 hold a large amount of water and the latter becomes heated almost to the steam temperature, causing it to deposit a large amount of the solid matter held in suspension and rendering it impossible for such solid matter to
 65 enter into the circulation, this sediment be-

ing easily blown off periodically through the blow-off pipe above mentioned, and, second, the pan by being riveted or securely fastened to the sides of the drum strengthens the oppositely-located flat sides of such drum and
 70 renders the shell of the drum as strong as if it were in the form of a true cylinder.

I am aware that prior to this invention boilers have been devised embodying cylindrical drums arranged at an inclination; but these
 75 boilers were open to serious and almost fatal objection in that on account of the inclination of the cylindrical drum the water-space occupied fully three-fifths of the internal area of the drum, thus leaving but a comparatively small steam-space and causing the
 80 steam to give off water. Such boilers have demonstrated the fact that the circulation is materially increased. By my invention I obtain the advantage of the increased circulation without sacrificing any of the steam-space.

It will of course be understood that the pitch of the bottom of the drum may be varied, that the cylindrical intermediate portion
 90 of the drum may be made of any desired length according to the size of the boiler, and that the end portions of the drum may be enlarged or contracted and fashioned into various cross-sectional shapes. Such changes as
 95 these, together with other modifications in the form, proportion, and minor details of construction, may be resorted to without departing from the principles of this invention.

Having thus described the invention, what
 100 is claimed as new, and desired to be secured by Letters Patent, is—

1. In steam-boilers, a drum having a circular shape in cross-section intermediate its ends, and an ellipsoidal end portion, substantially as described.

2. In steam-boilers, a drum having a circular cross-sectional shape intermediate its ends and expanded or enlarged at one end into the form of an ellipsoid with flat opposite
 110 sides, and a settling-pan having its side portions rigidly connected with said flat sides, substantially as described.

3. In steam-boilers, a drum having an enlarged rear end embodying a downwardly-inclined bottom, in combination with an inclined settling-pan arranged partly in the steam-space and partly in the water-space of the drum and secured rigidly to the opposite sides and adjacent end wall of the drum, substantially as described.

4. In steam-boilers, a drum having one end thereof enlarged and embodying an inclined bottom, in combination with an inclined settling-pan having a portion thereof arranged
 125 in the steam-space and another portion in the water-space of the drum and secured rigidly to the opposite sides and end of the drum, a feed-water pipe arranged to discharge over the upper end of the settling-pan, and a blow-
 130

off pipe communicating with the space above the lower end of the settling-pan, substantially as described.

5 In steam-boilers, a drum of uniform width having the upper portion arranged in a horizontal plane and the lower portion in an inclined plane, substantially as described.

10 6. In steam-boilers, a drum having the lower portion thereof arranged at an inclination to the upper portion, one end of the drum being circular and the opposite end elliptical.

15 7. In steam-boilers, a drum circular at one end and elliptical at the other end with flat opposite sides, the drum having its lower side arranged at an inclination to the upper side, in combination with an inclined settling-pan

arranged in the elliptical end of the drum and secured to the flat sides of the same, substantially as described.

8. In steam-boilers, the combination with 20 inclined head-sections, and water-tubes connecting the same, of a drum connected with the head-sections, said drum having a circular shape in cross-section intermediate its ends, and an ellipsoidal end portion, sub- 25 stantially as described.

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

HARRY L. WILSON.

Witnesses:

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F. C. BURTON.