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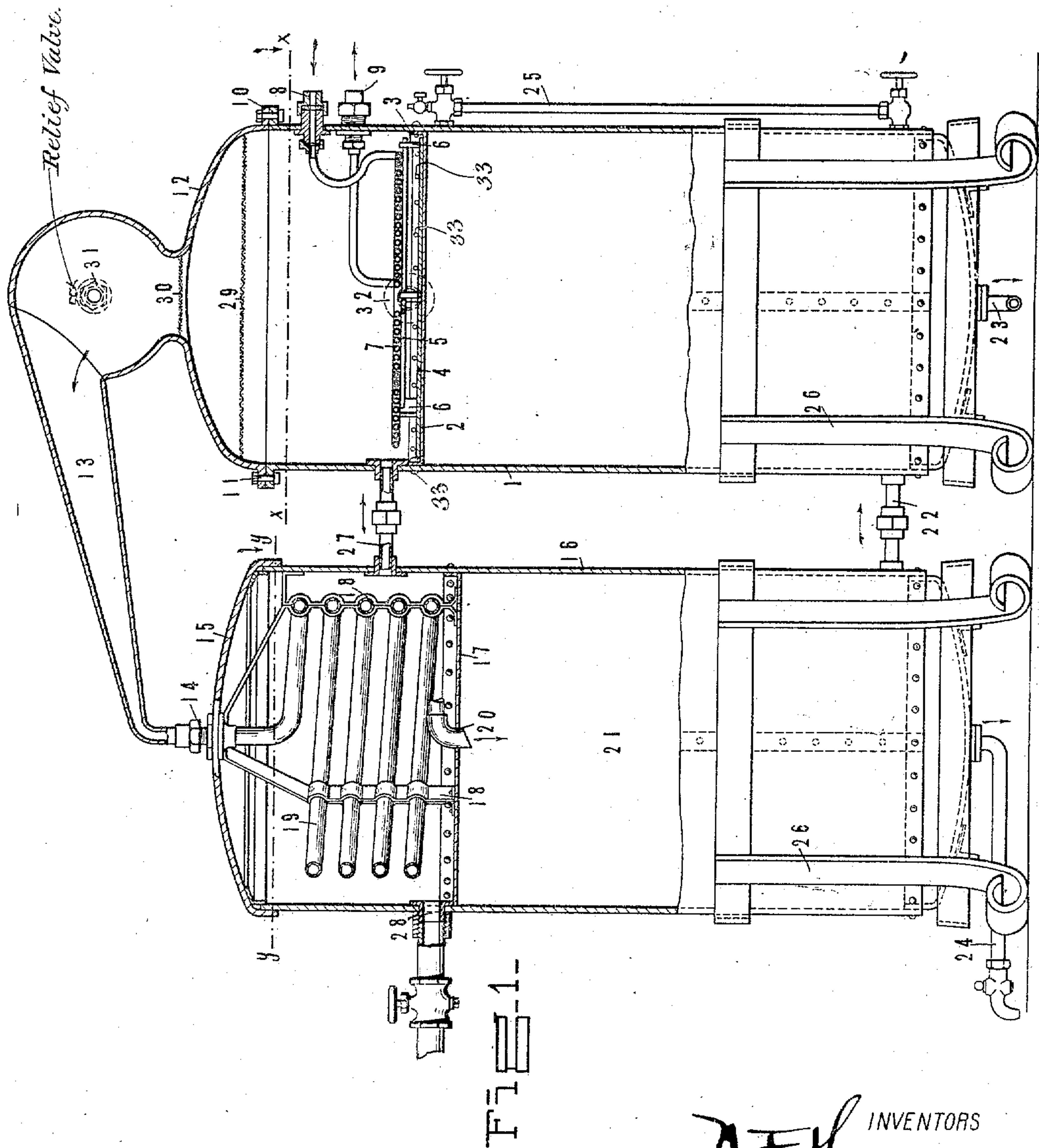
STILL.

APPLICATION FILED JULY 29, 1908.

969,625.

Patented Sept. 6, 1910.

2 SHEETS—SHEET 1.



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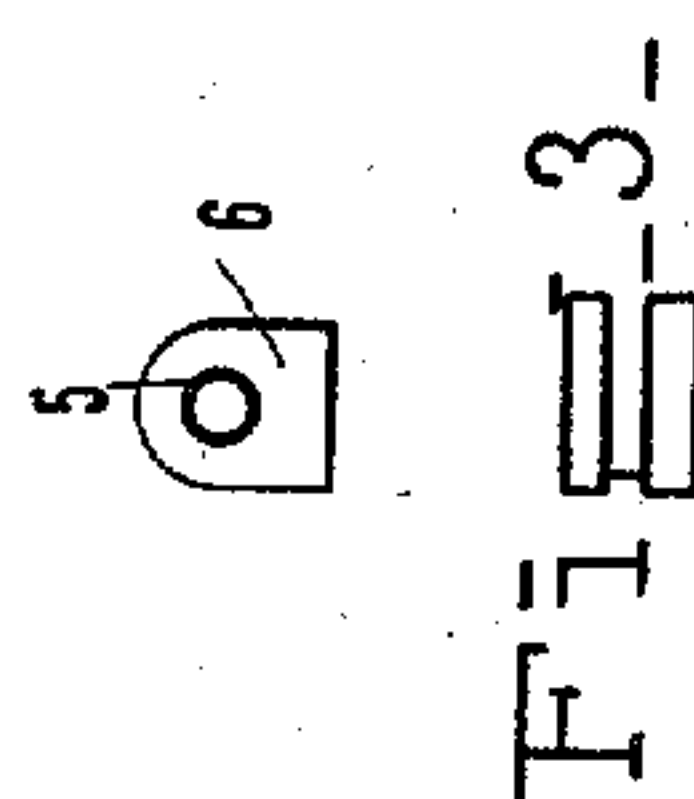
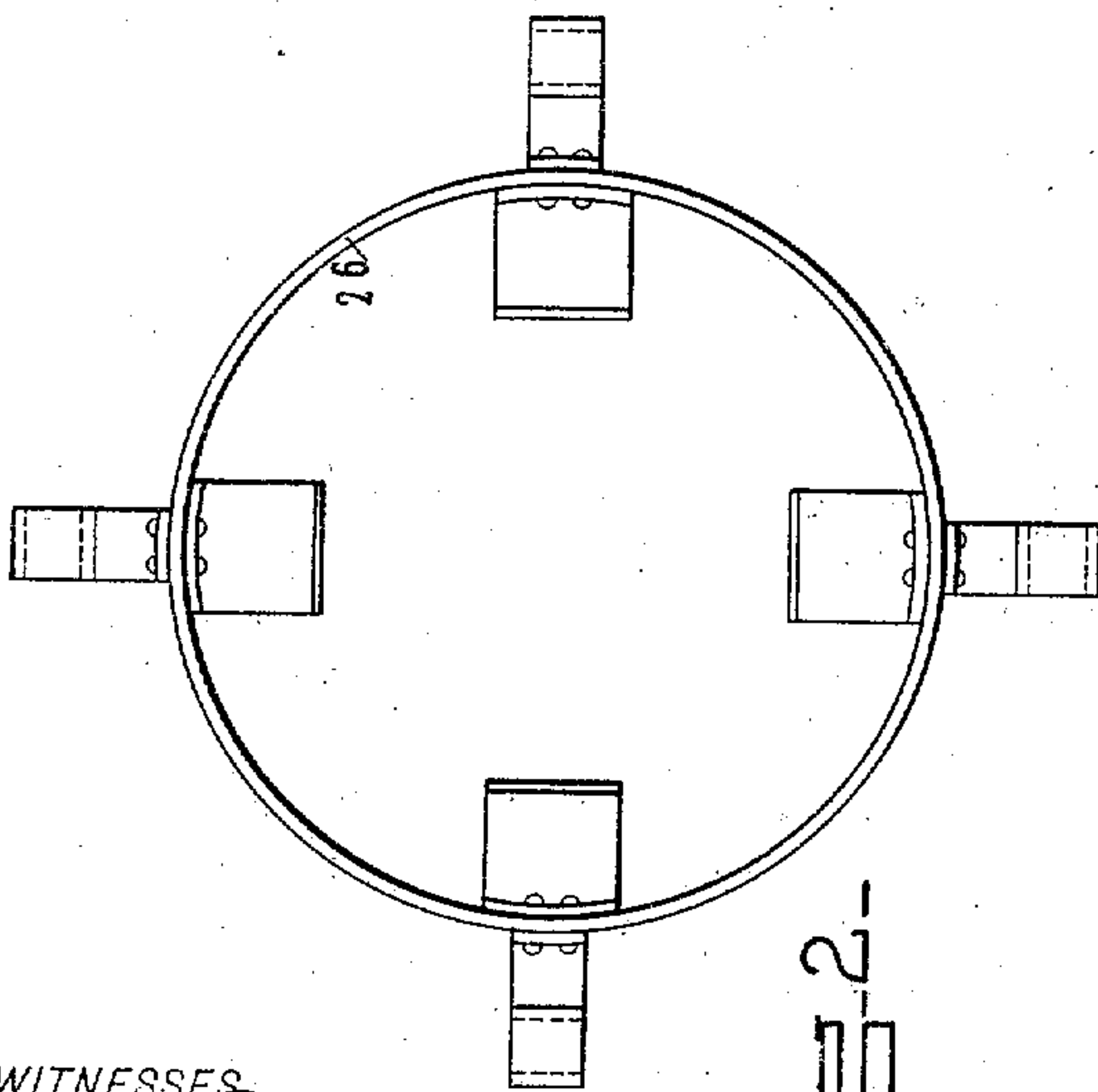
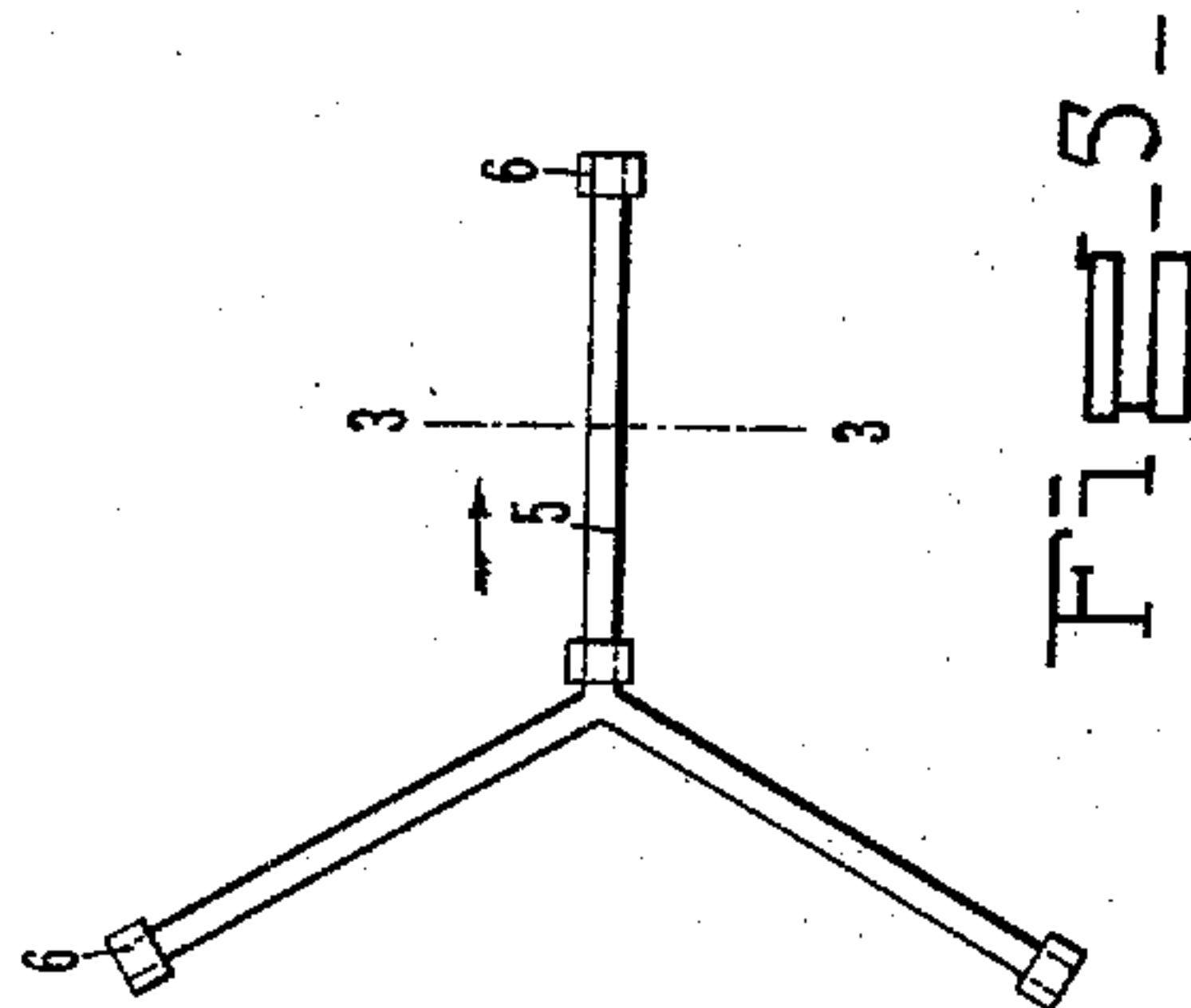
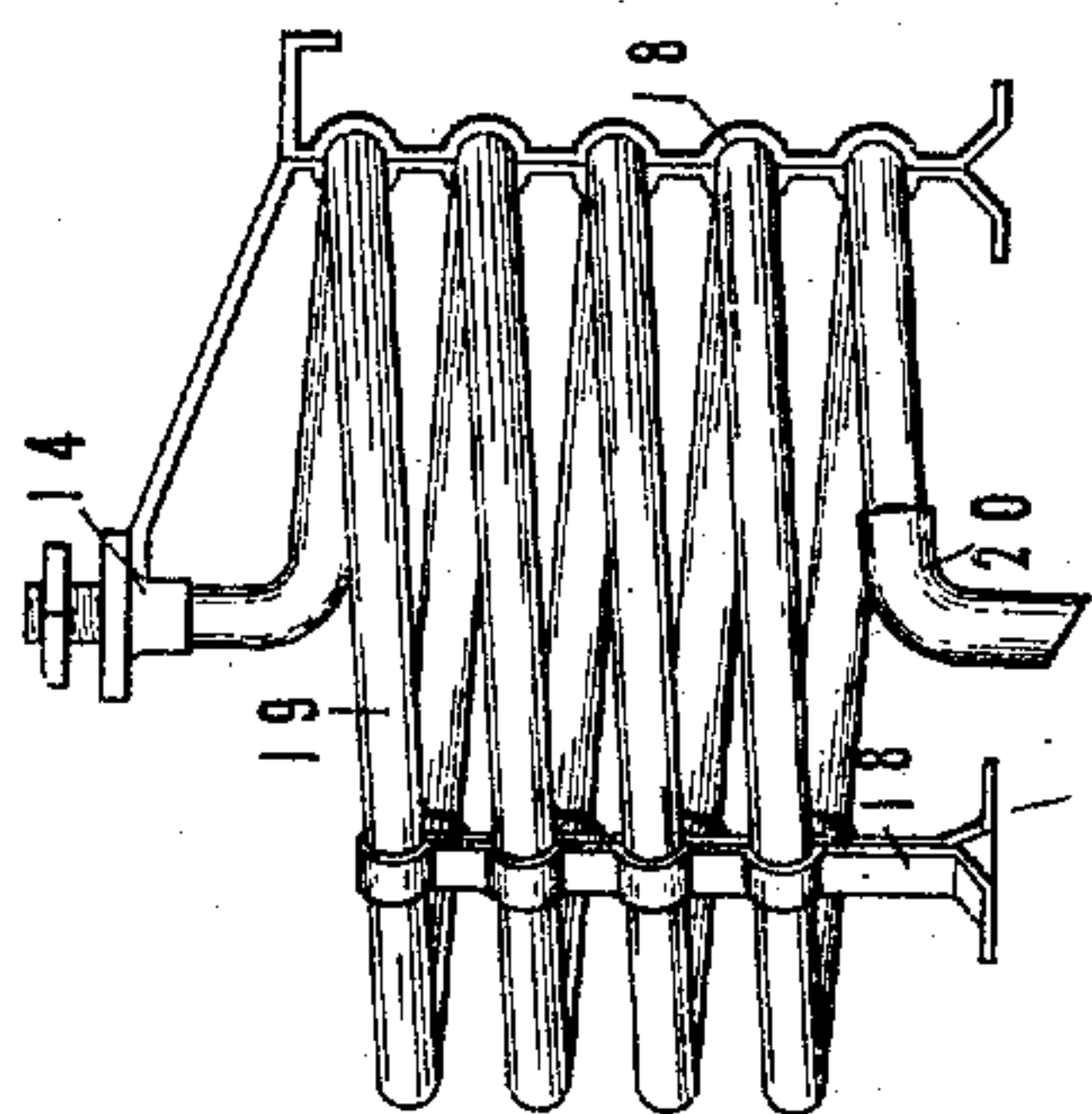
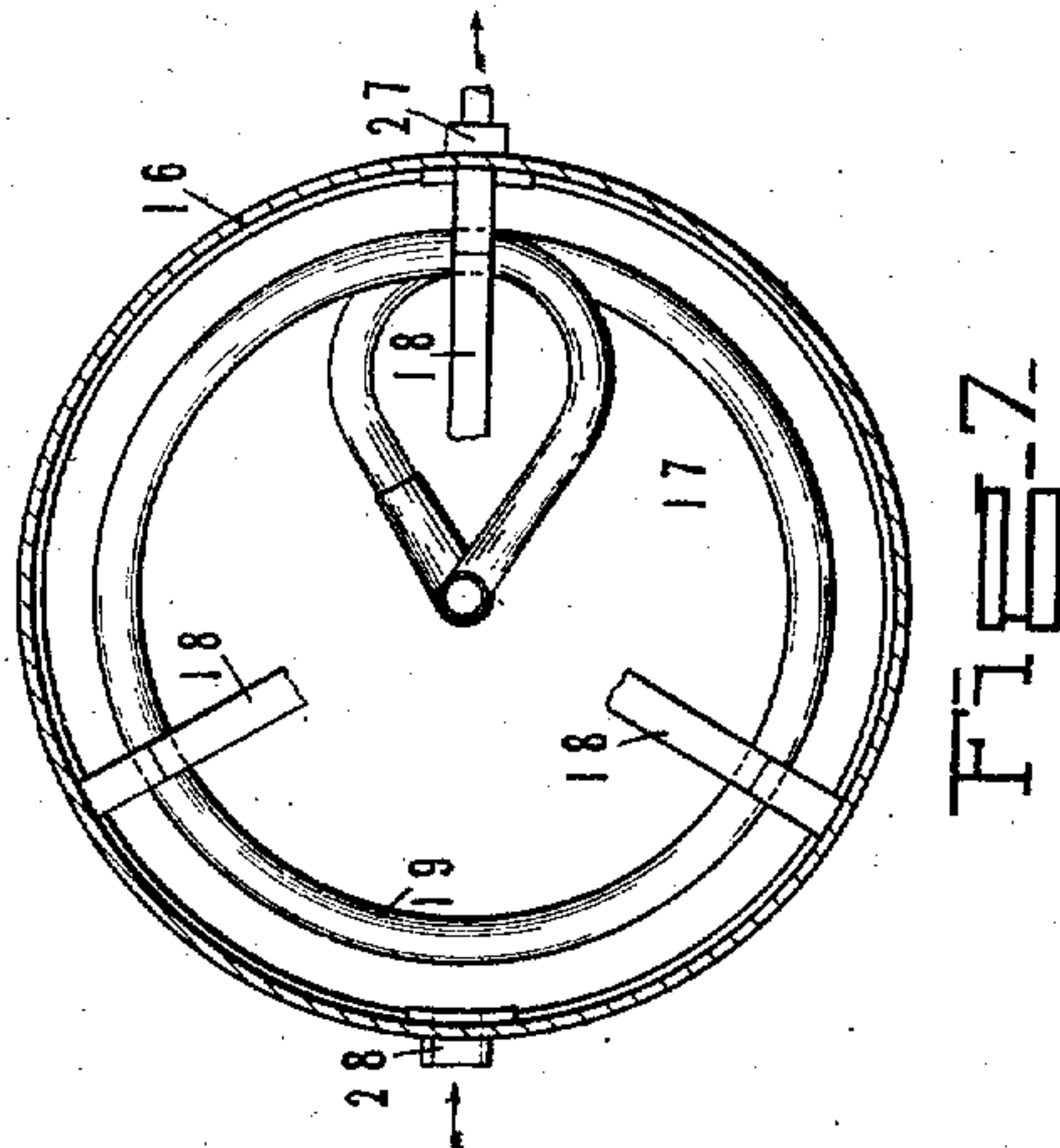
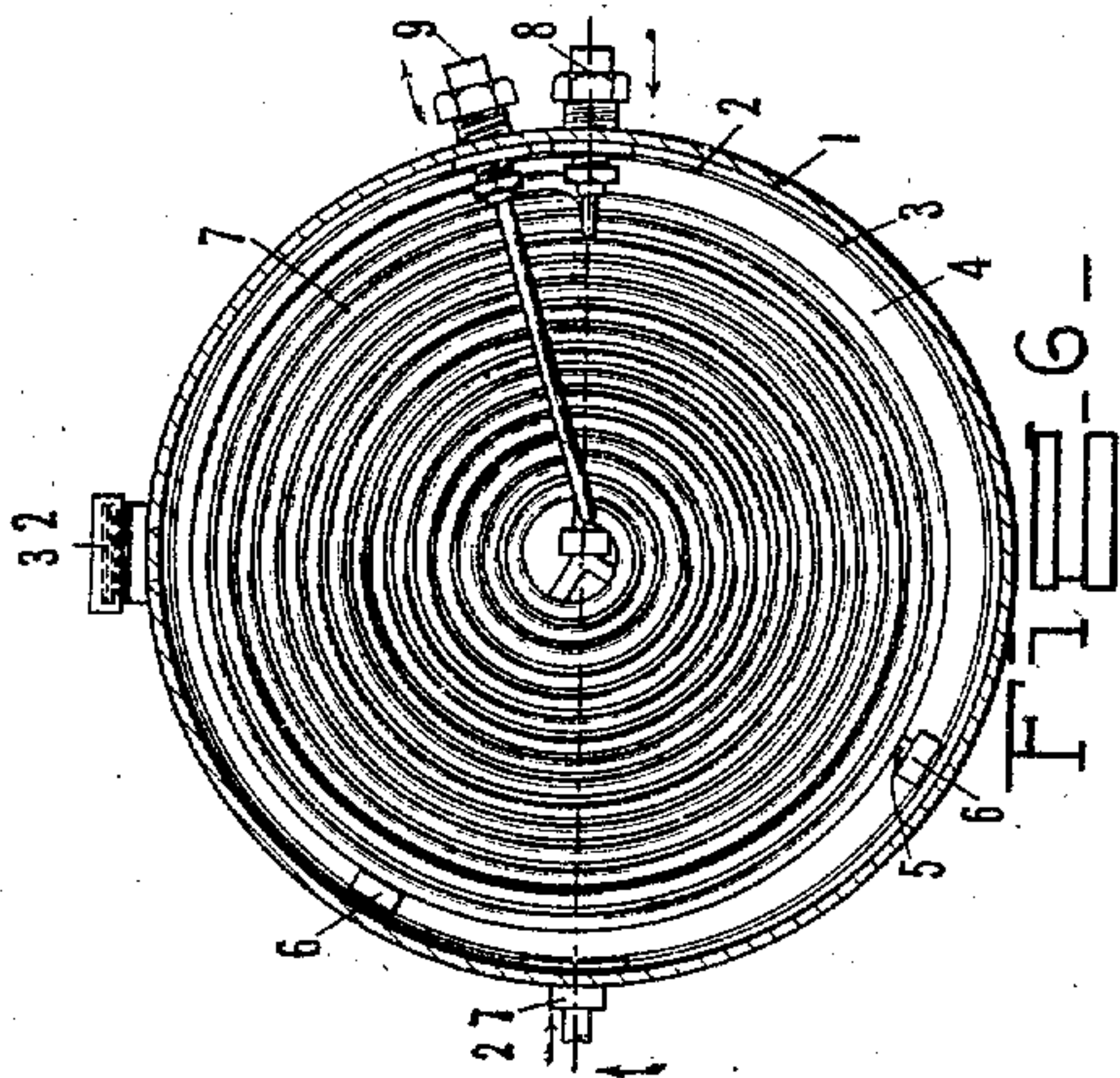
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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STILL.

969,625.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed July 29, 1908. Serial No. 445,967.

To all whom it may concern:

Be it known that we, JOHN HOFFHINE and NORMAN F. HARRIMAN, citizens of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Stills, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to stills.

One of the objects thereof is to provide a device of the above type of simple, cheap, and strong construction and having all parts so compactly disposed as to consume small space and yet be of large capacity.

Another object is to provide a device of the above type which shall be substantially automatic in action.

Another object is to provide a device of the type first mentioned characterized by efficient and economical running qualities.

Another object is to provide a still so formed as to be readily cleaned and in which the chance of contamination of the distillate is reduced to a minimum.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claim.

In the accompanying drawings, wherein is shown one of various possible embodiments of this invention, Figure 1 is a side elevation thereof, partially in section in order to show the construction more clearly; Fig. 2 is a plan view of a supporting frame or holder; Fig. 3 is a detail view of a supporting block; Fig. 4 is a side elevation of a condensing coil and associated parts; Fig. 5 is a detail view of a coil support; Fig. 6 is a sectional view taken substantially along the line $x-x$ of Fig. 1; Fig. 7 is a sectional view taken substantially along the line $y-y$ of Fig. 1.

Similar reference characters refer to similar parts throughout the several views of the drawings.

In order to render certain features of this

invention more readily and fully understood, it may here be noted that in the use of many stills there is a tendency to contamination by the carrying over from the boiler of small particles of the fluid acted upon in a liquid instead of vaporous form. This is especially the case when the boiling is violent and is especially annoying when a high degree of purity is desired in the distillate. It may also be noted that if a large output is desired in apparatus of the general nature dealt with in this invention, a large outlay of heat is required, which, unless the distillate is immediately used in warm condition, is largely thrown away, being taken up in the latent heat of vaporization and carried off by the cooling water as the distillate condenses.

Another feature which may be noted is the fact that in distilling a liquid which leaves a residue or scale upon the heating surface, unless means are provided whereby ready access can be had to all parts of the device this deposit or scale will gradually reduce the efficiency of the apparatus.

The above and other defects are done away with in constructions of the nature of that hereinafter described.

Referring now to the accompanying drawings, there is shown in Fig. 1 a shell or casing 1 having fitted therein a head 2, flanged as at 3, and riveted in place, as shown at 33 in said figure. Upon this head is laid a plate 4 which has mounted thereon a supporting spider or bracket 5, best shown in Fig. 5 of the drawings, the ends of which rest in the several blocks 6. Upon this spider is a flat heating coil 7, preferably of copper, one end of which leads to a nipple 8 and the other end to a nipple 9, both mounted in the wall of the casing and forming a tight joint therewith.

Removably secured to the upper end of the casing 1, as by flanges 10 and bolts 11, is a cap or head 12 forming a passage 13 leading to a nipple 14 in the head 15 of a second casing or receptacle 16. In casing 16 is riveted a flanged head 17 on which is supported, as by the brackets 18, a cooling or condensing coil 19 which leads from the nipple or fitting 14. These brackets 18 are preferably formed, as shown, of sheet metal and serve to hold the coil in proper relation

with respect to the walls of the casing, as well as to hold the several turns of the coil properly spaced one from another.

Cooling coil 19 discharges, as at 20, into the lower portion of the casing 16 which forms a storage tank 21 communicating, as at 22, with the lower portion of the casing 1 which also is adapted for storage purposes. At the lowest points of these storage tanks, there are provided outlet conduits 23 and 24 by which the distillate may be drawn off as desired, and a water gage 25 serves to indicate the amount on hand. The entire apparatus is held in position, as by the supports or holders 26, which may be formed of strap iron, as shown in Fig. 2 of the drawings.

The upper portion of the casing 16, which forms a condenser and the upper portion of the casing 1, which forms a boiler, are connected one with another, as at 27, and there is provided to the condenser an inlet connection 28.

The head 12 is provided with screens 29 and 30 serially disposed, as shown, in the passage of the vapor passing from the boiler and adapted, even with the most violent ebullition in the latter to prevent any particles of liquid passing to the cooling coil. There is also provided in head 12, or at any other suitable point, a check valve 31 adapted to admit air from without, in the event of a vacuum forming at any point in the apparatus, and thus relieve the same from strain. There is also provided at 32 an outlet port normally held closed, as by a cap, but adapted to be opened if it is desired to wash out the interior of the boiler.

It may here be noted that the term "vapor" is used throughout in a broad sense to denote any fluid passing over from the boiler to the condenser.

The operation of the above described embodiment of this invention is substantially as follows: The nipple 8 is connected to any desired source of steam supply, and the inlet 28 connected with the source of supply of the liquid which is to be distilled, in the present case assumed to be water. These two inlets are so adjusted as to admit water through the condenser and connection 27 at just such rate as to maintain the level in the boiler just above the heating coil 7 and as to substantially condense all of the steam passing into the latter member. In Fig. 1 we have shown an ordinary valve controlling the inlet-pipe, so that the quantity of water or other liquid admitted may be regulated with reference to the rate of evaporation, as affording one simple means of effecting the adjustment stated. In this manner, a large heating surface relative to the volume of water acted upon is maintained and substantially all of the heat of

the steam economically used. The water in the boiler thus passes in the form of steam through the screens 29 and 30 and to the condensing coil 19 in which it again assumes a liquid form and passes to the storage tanks, as above set forth. The latent heat given up by the water in condensing in coil 19, moreover, is largely absorbed by the cooling water, which is thus preheated in passing to the boiler and more readily reaches the boiling point therein. This water, as above noted, may be fed by any suitable means at just such a rate as to compensate for that boiled away, and the steam supplied to the coil 7 may be so regulated as to avoid waste at this point, whereupon the entire apparatus may be left to itself and carries on its functions automatically.

If it be desired to clean the interior of the boiler, as on account of the deposit of scale, the outlet 32 is opened and the boiler flushed out therethrough, or, if desired, the head may be taken from the casing 1 and the heating coil removed and cleaned and ready access gained to the inner walls of the casing.

It will thus be seen that there is provided a piece of apparatus in which the several objects of this invention are achieved and the above enumerated advantages are, among others, present. The construction is simple and inexpensive and the action not only automatic but highly efficient in that it utilizes the heating agent in an economical manner and gives an output of a high degree of purity under all conditions of running.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:—

A still, comprising a pair of vertical drums; a partition dividing the first drum into an upper boiler portion and a lower storage portion; a partition dividing the second drum into an upper condensing portion and a lower storage portion; connections between said storage portions of the two drums; a heating coil in the boiler portion of the first drum; a condensing coil in

the condensing portion of the second drum
and communicating with the lower storage
portions; connections between said boiler
portion and said condensing coil; an in-
5 ward opening relief valve adapted to admit
atmospheric air to said connections; screens
in the path of vapor leaving the boiler por-
tion; a connection adapted to admit water
to the condensing portion of the second
10 drum; and a connection adapted to conduct

water from the condensing portion to the
boiler portion.

In testimony whereof we affix our signa-
tures, in the presence of two witnesses.

JOHN HOFFHINE.
NORMAN F. HARRIMAN.

Witnesses:

RALPH A. NEWELL,
HENRY KOSMAN.