

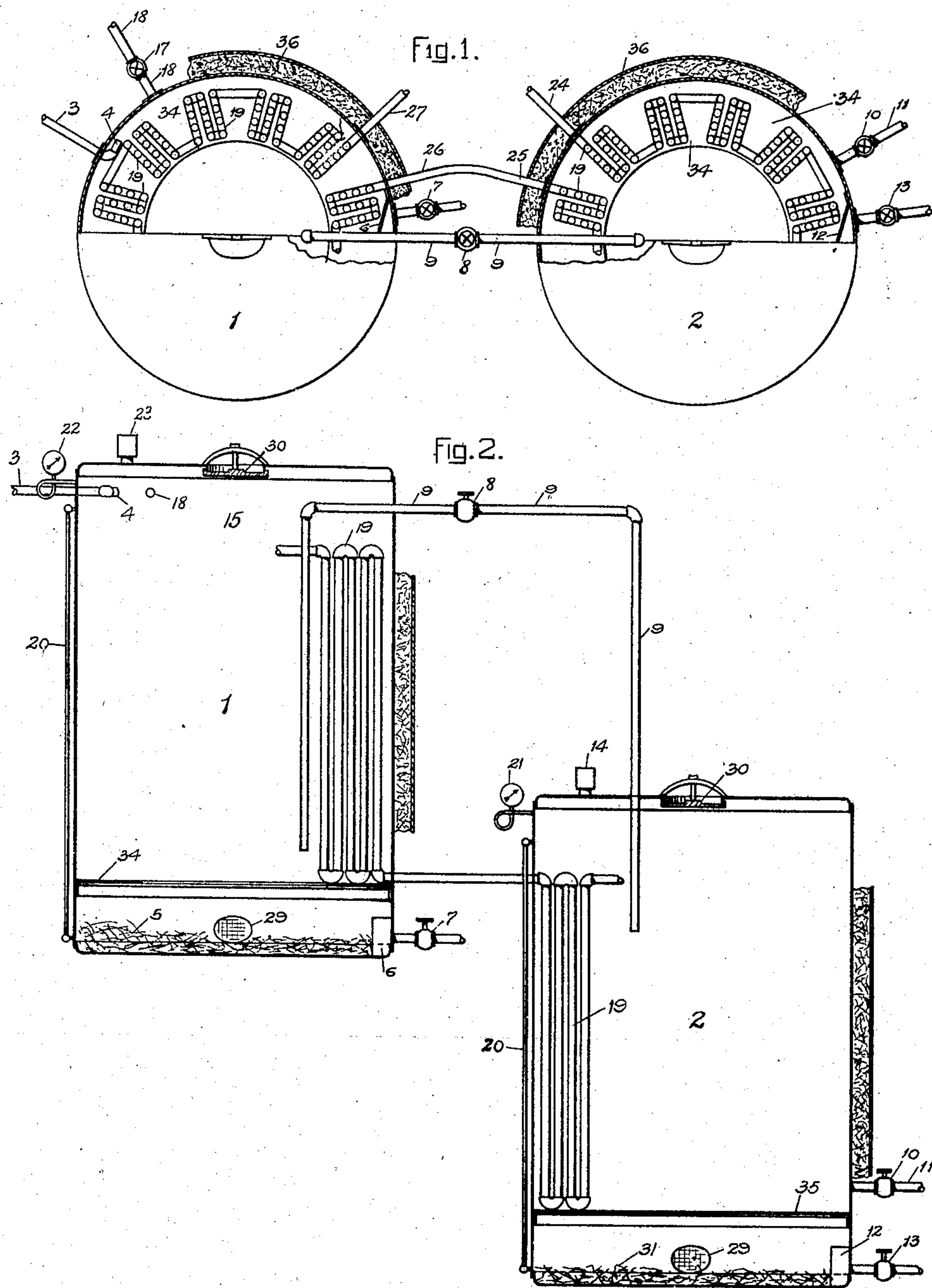
No. 791,358.

PATENTED MAY 30, 1905.

W. R. McKEEN, JR.
BOILER BLOW-OFF MECHANISM.

APPLICATION FILED FEB. 17, 1904.

2 SHEETS—SHEET 1.



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No. 791,358.

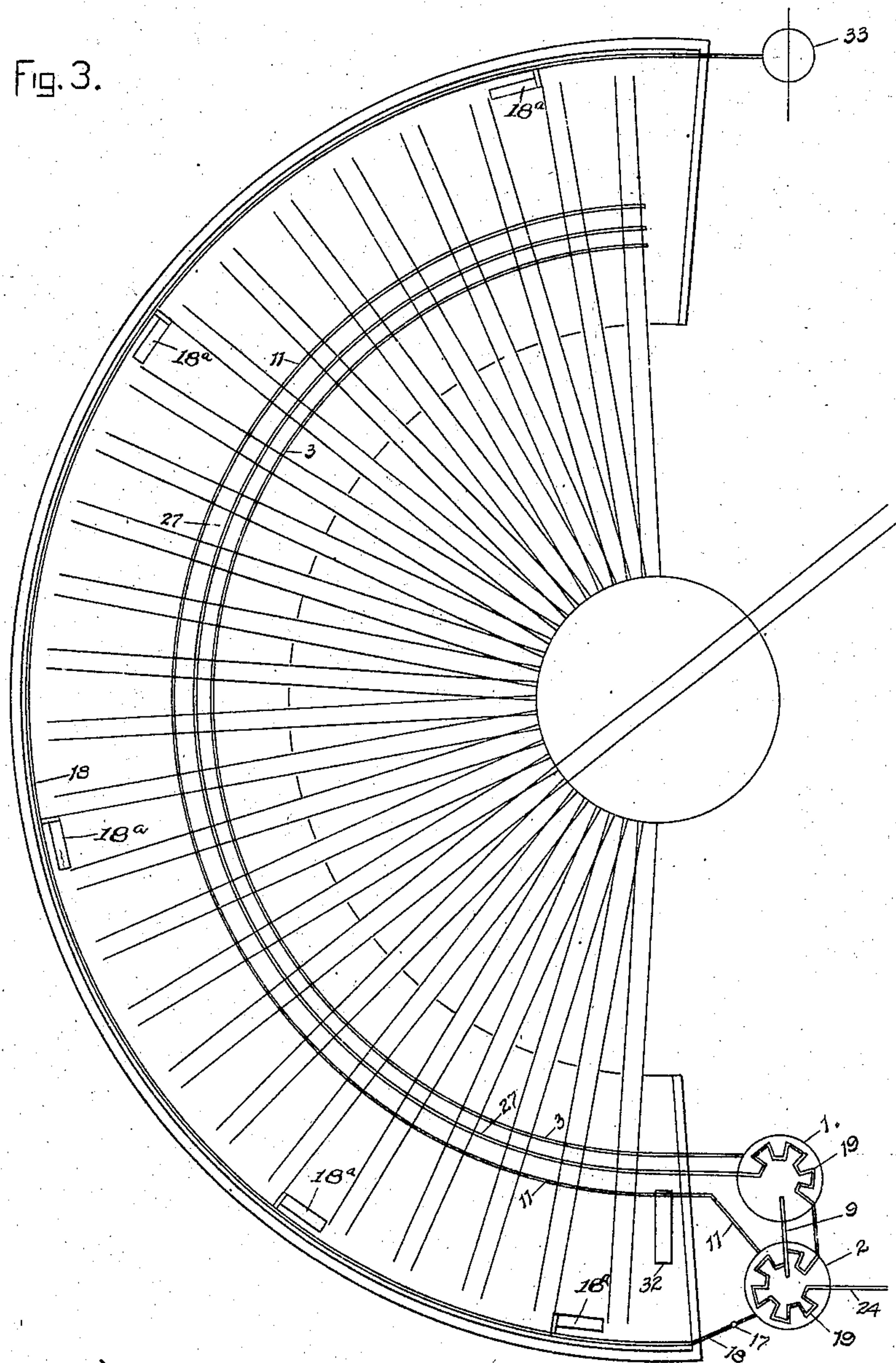
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2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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BOILER BLOW-OFF MECHANISM.

SPECIFICATION forming part of Letters Patent No. 791,358, dated May 30, 1905.

Application filed February 17, 1904. Serial No. 194,040.

To all whom it may concern:

Be it known that I, WILLIAM R. McKEEN, Jr., a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Boiler Blow-Off Receiving and Handling Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in mechanism for handling and disposing of the blow-off products of boilers, and particularly for utilizing the hot water and steam of locomotive-boilers when it is necessary to blow off the contents of such boilers.

The invention consists in an apparatus provided with settling or purifying tanks for receiving the steam and hot water blown off from boilers and mechanism for leading the heated water to proper places for use, as well as mechanism for conducting the steam to other places for heating.

The invention further consists in an apparatus made of a series of clarifying-tanks, means mounted within the tanks for modifying the temperature of the blow-off products after they are received in the tanks, and means for leading portions of the said products to various points for heating.

The invention also consists in certain other novel features of construction and arrangement of parts, as will be hereinafter more fully described and claimed.

In the accompanying drawings, Figure 1 is a plan view, partially in section, of a portion of the mechanism forming the subject-matter of the present invention. Fig. 2 is a central vertical section through the clarifying-tanks of the blow-off-receiving mechanism, showing the internal structure thereof. Fig. 3 is a diagrammatical plan view showing the system for receiving and handling the blow-off products or boilers as installed in a locomotive-roundhouse.

In using certain steam-boilers, especially locomotive-boilers, there is a gradual accumulation of impurities and foaming compounds in the water contained therein, and it frequently becomes necessary to relieve or drain the boilers of all their water and the impurities therein and refill them with fresh and comparatively pure water. It is usual to discharge such impure water from the boilers under the pressure of their own steam and while the temperature of the contained water is comparatively high directly or indirectly into the atmosphere, thus losing for useful purposes the large quantities of heat contained by the water and steam.

It is the object of the present invention to supply mechanism which can handle and dispose of the heated water and steam blown off from boilers, particularly locomotive-boilers, for certain useful purposes, such as heating the roundhouse or other buildings.

By the present invention the water blown off from the boilers can be clarified and more or less purified and be used for washing out the locomotive-boilers while the water is still warm. The invention also contemplates the separating of steam from the water and utilizing the same for heating the roundhouse of the locomotives or any other building, the same being possible through any usual or ordinary steam-heating system.

In the drawings accompanying this application is illustrated an apparatus which is suitable for carrying out the purpose above set forth, and the invention will now be more particularly described, reference being had to the said drawings.

The invention, while applicable to all boilers, is especially well adapted for use in connection with locomotive-boilers, and it is therefore illustrated in the drawings in proper relation to a roundhouse. One or more tanks or receptacles, as 1 and 2, are provided, which are connected with a main or pipe 3. The main or pipe 3 is so extended and arranged as to be in suitable position for receiving the blow-off products from any one of a number of locomotives which may be placed in the roundhouse (indicated in Fig. 3) and for this reason extends to all of the tracks in the roundhouse upon which it is customary to place locomotives. The main or pipe 3 preferably extends into the tank 1, and its inner end is turned at such an angle within the walls of the

tank as to direct the hot water and steam tangentially into said tank near the outer edge thereof, as clearly shown in Fig. 1. Where more than one tank is employed, as 2, it is preferably located upon a lower level than tank 1, as illustrated in Fig. 2, and the tanks are connected by piping 9, arranged so as to be capable of siphoning the contents of tank 1 into tank 2. The siphon-piping 9 is provided with a controlling cock or valve 8. The discharge of the water and steam from the main 3 into the tank 1 in a tangential manner, as above described, tends to throw the impurities toward the side walls of the tank by the rotary motion of the water thus set up, and the impurities will gradually settle around the outside circumference of the bottom of the reservoir or tank, as indicated at 5, Fig. 2. The tank 1 is provided with a blow-off cock 7, as shown in Figs. 1 and 2. A deflecting-plate is also employed which is arranged in such a manner and at such an angle with respect to the walls of the tank as to direct the sediment toward the blow-off cock with a centrifugal motion. It is only necessary to blow off the sediment from the bottom of the tank or reservoir 1 at stated intervals. Some sediment will also collect in tank 2, as indicated at 31, and the said tank 2 is therefore provided with blow-off cock 13. A deflecting-plate 12 is also provided in tank 2 and arranged in the same manner with respect to the blow-off 13, as described with respect to the deflecting-plate 6 in tank 1.

A main or pipe 11 is also provided, which leads from either of the tanks 1 or 2 to any suitable point, preferably to the various tracks of the locomotives, in such a manner that the hot water of the tanks may be led to any one of the locomotives for assisting in washing out and purifying the interior of boilers after they have been blown off and before a fresh supply of pure water is placed in the boilers. Before leading the water to the locomotives it may be passed through a pump, as 32, in order to deliver the water with suitable force for washing out the impurities, scale, &c., which commonly collect in a steam-boiler. The pipe 11 is provided with suitable stop-cock 10 for controlling the flow of warm water through the same. The pipe or main 11 leaves the tank at a suitable height from the bottom thereof to prevent the sediment which collects in the bottom of the tank from being drawn off with the said water.

A main or pipe 18 extends from the blow-off-receiving mechanism to such points in the roundhouse or other buildings as it may be desired to heat. The pipe 18 preferably leaves one of the tanks, as 1, at a point near the upper end thereof, so as to be supplied with the steam which collects in the steam-space 15. The exit of the steam is controlled by a cut-off cock 17, located in the pipe 18, adjacent to the said tank. The steam pass-

ing out through the pipe 18 may be passed through any steam-radiators or like devices 18^a 18^a for heating a roundhouse or other buildings. The said pipe or main 18 is finally connected with a collecting-tank or hot-well 33, into which the water of condensation from the heating system may drain and be collected, and thus form a supply of pure water for filling the stationary or other boilers or for any other purpose in connection with roundhouse economy.

As the steam and hot water blown off from the locomotive-boilers is frequently of a very high temperature, the apparatus is supplied with means for moderating the temperature of the blow-off products which are collected in the tanks 1 and 2. The means shown in the drawings consists in a series of coils of piping 19, arranged about the circumference of the tanks within the same. The coils 19 are supported a short distance above the bottom of each tank in order to keep them out of the sediment, and an annular shelf 34 and 35 is provided in each tank for supporting said coils. The coils are so connected, by means of a pipe 24, with a cold-water supply that the cooling-water may be caused to pass through the coils 19 of one tank, and thus be conducted by the piping 25 and 26 to the coils 19 of the other tank, finally passing out through a discharge-pipe 27. This cooling-water may be further utilized for other purposes, if desired. If the temperature of blow-off products in the tanks exceeds a desired point, it may be modified at any time by introducing cold water into the said coils 19. Each of the tanks 1 and 2 is provided with a water-gage 20 for indicating the height of the water in said tank, and pressure-gages 21 and 22 are also supplied for the said tanks. As a steam-pressure of twenty-five pounds is ample for operating the heating system, tank 1, from which the heating supply of steam is drawn, is provided with a safety-valve 23, set at a determined pressure—say at about twenty-five pounds. The second tank 2 is also provided with a safety-valve, as 14, set at a predetermined pressure, preferably about five pounds, in order to prevent the accumulation of an undue pressure in said tank. Each of the tanks 1 and 2 is provided with a lower manhole 29 and a top manhole 30, the said manholes affording means for the inspection and cleansing of the interior of the tanks from time to time and for the insertion, removal, or replacing and arranging of the coils or piping 19. The tanks 1 and 2 are also provided with suitable jackets or lagging, as 36, for insulating them and preventing the escape of heat units from said tanks.

In using the system above described the blow-off from the locomotive-boilers is introduced into the main 3 and led thereby into the tank 1. As the water and steam collect in the said tank the impurities of the water will

gradually settle to the bottom and the live steam will collect at the top of the tank. After the tank 1 has become filled with water to a suitable height and the said water has become partially or wholly clarified the siphon-cock 8 is opened and the water is permitted to pass into the second tank 2, where it will further settle and be separated from its impurities. The hot water collected in the tanks can then be drawn from the main 11 and forced into the boilers of the locomotives for thoroughly cleansing them. The steam collecting in the upper portion of tank 1 is at the same time permitted to pass through heating-coils or similar apparatus located within the round-house or other buildings, and the purified water of condensation resulting therefrom is collected in the hot-well or tank 33 and may be used for supplying boilers with pure water. The temperature of the contents in the tanks 1 and 2 is under thorough control and may be modified, if desired, by the use of the cooling-coils 19.

It will thus be observed that the mechanism above set forth makes it possible to save and use the hot water which is blown off from boilers as well as the live steam, the waste of large quantities of heat units being thus saved and put to use. The apparatus can be easily adapted to various localities and buildings and can of course be employed in connection with other boilers aside from locomotive-boilers, although the system is especially well adapted for locomotive-boilers, which have to be blown off frequently.

No claim is made herein for method of or apparatus for heating feed-water for boilers by means of the blow-off of the boilers, as the same forms no part of my invention set forth herein.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A mechanism for handling the blow-off products of boilers comprising receptacles for collecting the said products and distributing them to different places for use in heating under the pressure generated by said products within the said receptacles.

2. A mechanism for handling and utilizing the products of boilers comprising receptacles for collecting and separating such products and again distributing them in their separated condition for use in heating at different points.

3. A mechanism for receiving and utilizing the blow-off products of steam-boilers comprising closed tanks for receiving and permitting of the separation of the hot water and steam, and means comprising lines of piping, and other connections for leading the separated products to various points for use in heating under the pressure of the steam received in said receptacles.

4. A mechanism for handling and utilizing

the products of boilers comprising tanks for collecting the blow-off products of steam-boilers, the said tanks permitting of the settling of sediment and the separation of steam from the hot water, and means connected with the tanks for conducting the separated products to various points for use in heating under the pressure of the steam received in the said tanks.

5. An apparatus for collecting and utilizing the blow-off products of boilers comprising one or more tanks, means for leading the blow-off products to said tanks, a siphon connection interposed between the tanks, and means for leading clarified water from the tanks to suitable points for use.

6. An apparatus for collecting and handling the blow-off products of locomotive-boilers comprising tanks, a main capable of connection with various locomotive-boilers, means for delivering the blow-off products tangentially within one of said tanks, and means for removing clarified water at a suitable point above the sediment-collecting portion of the tank, and delivering it at proper points for use.

7. An apparatus for utilizing the blow-off products of boilers comprising heat-radiating means for a building, clarifying and separating tanks, and means for delivering the steam from said tanks into said radiating means.

8. An apparatus for saving and utilizing the blow-off products of steam-boilers comprising collecting and settling tanks, means for delivering the products into said tanks, blow-off outlets at the lower ends of said tanks, and deflectors arranged adjacent to said blow-offs for directing the sediment in a centrifugal manner as it leaves the tank.

9. An apparatus for handling the blow-off products of boilers comprising collecting and settling tanks, safety-valves provided upon each tank for maintaining the pressure therein at a certain predetermined point, and means for introducing cooling fluids into said tanks for reducing the temperature when required for rendering the blow-off products susceptible to use for heating purposes.

10. An apparatus for handling the blow-off products of boilers comprising a series of tanks, means for delivering the blow-off products therein, means for separating the said products and delivering them at various points, means for introducing a cooling agent into each of said tanks for reducing their temperature to a proper degree, and heat-radiating means for a building supplied from said tanks.

11. An apparatus for handling the blow-off products of boilers comprising a series of tanks, means for introducing the products into said tanks, a series of coils arranged within the tanks, means for supporting said coils at a proper height therein, means for supplying

a cooling agent to said coils, and heat-radiating means for a building supplied from said tanks.

12. An apparatus for handling the blow-off
5 products of boilers comprising a series of tanks, means for introducing the steam and water from boilers into said tanks, means mounted within the tanks for reducing the temperature thereof, a jacketing or lagging
10 inclosing the tanks for preventing escape of heat units, and heat-radiating means for a building supplied from said tanks.

13. An apparatus for handling the blow-off products of boilers comprising a tank for the

separation of the elements of the blow-off of 15
boilers, means for delivering the blow-off into said tank, a coil arranged in said tank and connected to a water-supply, means for independently removing the elements of the blow-off, and heat-radiating means for a building 20
receiving one of the elements of the blow-off.

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

WILLIAM R. McKEEN, JR.

Witnesses:

CHAS. A. COONS,

CHARLES L. DUNDEY.