

C. J. KARNOPP.

WATER HEATER.

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967,523.

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FIG. 1.

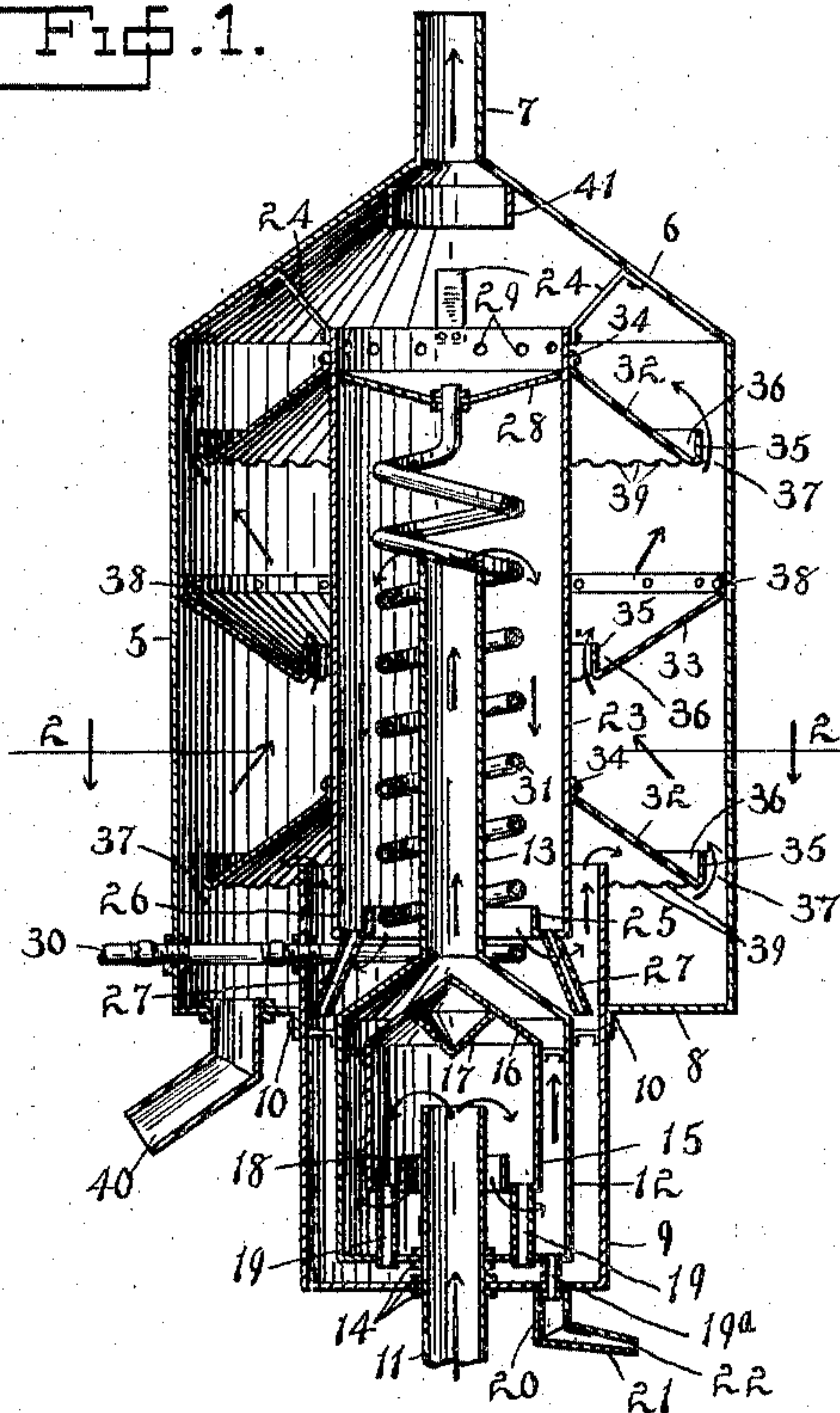
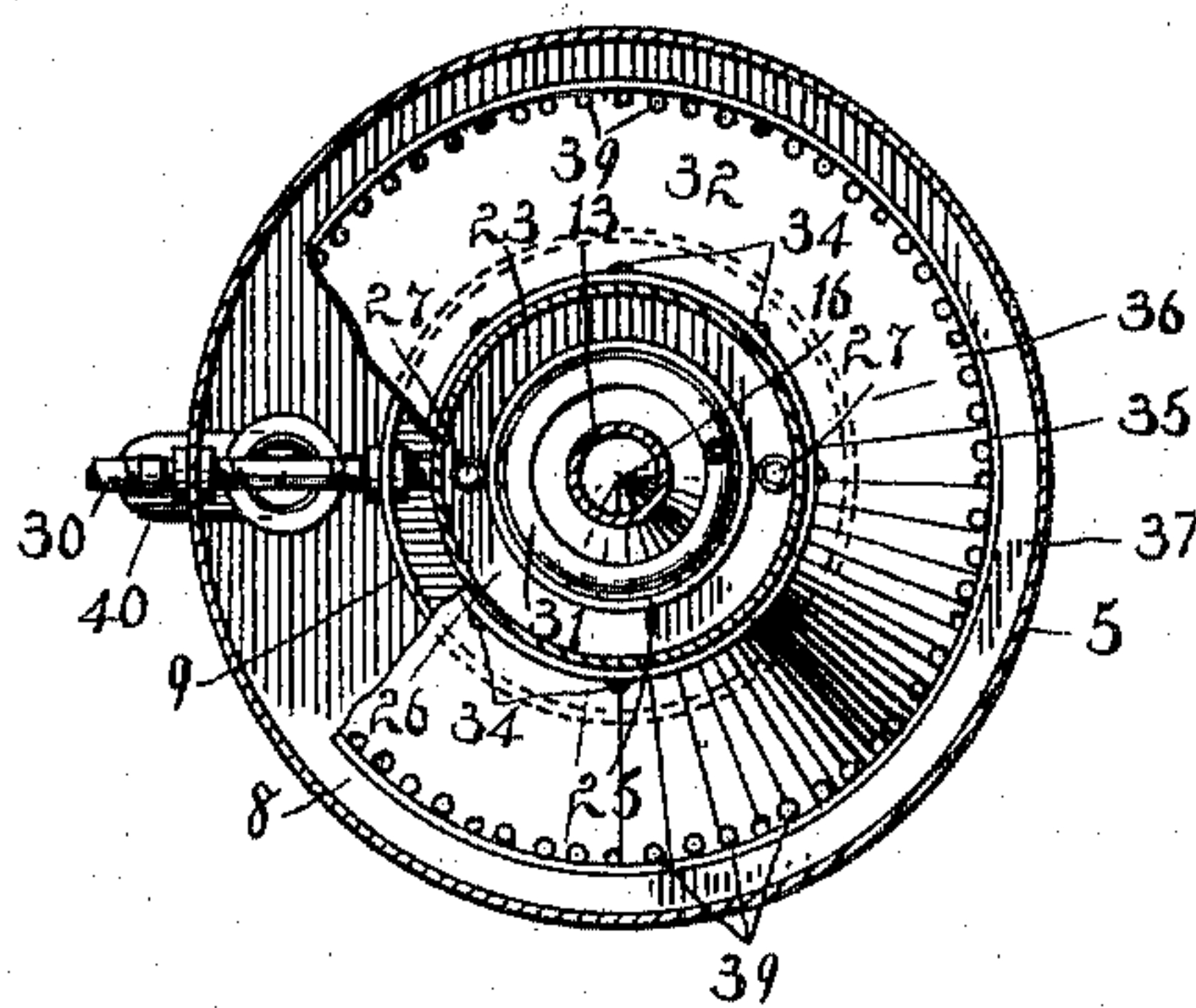


FIG. 2.



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WATER-HEATER.

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To all whom it may concern:

Be it known that I, CHARLES J. KARNOPP, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification.

My invention relates to appliances for heating water, and refers particularly to apparatus designed to utilize exhaust steam from an ordinary engine for that purpose.

The paramount objects of the improvements forming the subject matter of this application are:—to provide a simple and efficient apparatus for accomplishing the purpose stated; to furnish an economical device for heating water, and at the same time make provision for separating the oil and other foreign matters from the exhaust steam, and to produce a practical device that will subserve the end sought and that will incidentally condense practically the whole amount of the steam used for raising the temperature of the water.

Further objects of this invention are to provide an apparatus that can be constructed by any one of ordinary skill and with tools and materials in common use; to furnish a device for the purpose specified that will be rapid in its action and that will be practically silent in operation, avoiding the noises commonly produced in appliances of this class.

I accomplish the above and other minor results by the use of an apparatus which may be described in a general way as consisting of a number of cylindrical chambers concentrically arranged, the exhaust steam entering at the base and finding its way by devious passages to the top, the water to be heated being first carried by an extensive coiled pipe through one steam passage to the upper part of the device and then allowed to fall in divided streams through another passage where it comes in direct contact with the steam, provision being made for draining off all accumulations of oil from the steam chambers.

I have illustrated the preferred form of apparatus in the accompanying drawings, forming a part of this application, the various details of the construction being shown in the following views:—

Figure 1 is a vertical section through the axis of the apparatus, and Fig. 2 is a sectional view on the line 2—2 of Fig. 1, a por-

tion being broken away to disclose parts beneath.

Referring to the details of the drawing, the numeral 5 indicates an outer cylindrical shell, having a conical top plate 6 terminating in a centrally located outlet pipe 7. The bottom plate 8 has a comparatively large central opening to receive the upper end of a casing 9, secured to the outer shell by rivets 10. The upper end of said casing extends somewhat above the plate 8, and the lower end has an opening through which is passed a pipe 11, extending a considerable distance within said casing, to form an inlet for the exhaust steam used to supply the heat. I prefer to employ galvanized iron for the shell and casing, and wherever available throughout the entire apparatus since this material is in many ways adapted for such an appliance, resisting oxidizing influences and being economical in cost. Supported upon the pipe 11 within the said casing 9 is an inner chamber 12, which extends above the upper end of said pipe and is then contracted to terminate in a tube or pipe 13, which extends upwardly to a suitable height in the axis of the shell 5. The openings through the bottom plates of the casing 9 and chamber 12 are made steam tight by suitable couplings comprising jam nuts 14. Within the said casing is arranged a third concentric chamber 15, having a conical top 16 and forming a cap or covering surrounding the upper end of the steam inlet pipe 11. Immediately over the mouth of said pipe is a conical deflector 17, and the lower margin of the said chamber or cap 15 is inturned and then bent upwardly into a flange 18, thus forming an annular channel or gutter extending entirely around the foot of the wall of said cap. In the bottom of this gutter are located drain pipes 19 which extend through the bottom plate of the inner chamber 12. A similar tube or drain pipe 19^a leads from the cavity of the said chamber 12, and extends into a drain pipe 20 inserted into the bottom of said casing 9. This pipe 20 has an extension or nozzle 21, terminating in a comparatively small aperture 22. The pipes 19, 19^a, and 20 serve to drain off any accumulations of oil which will be deposited in more or less quantities as the steam becomes condensed.

Surrounding the pipe 13 is a concentric inner shell 23, cylindrical in form and supported upon the outer shell by any suitable

means, bracket straps or hangers 24 for that purpose being shown in Fig. 1. The lower margin of said inner shell 23 has a flange 25 to form an annular gutter 26 from which oil drain pipes 27 lead into the cavity of the casing 9. The upper end of the inner shell 23 is closed by a concaved plate or diaphragm 28 and that portion of the said inner shell extending above such plate is perforated as shown at 29.

Extending laterally through the outer casing 5 near its bottom is a cold water pipe 30 which penetrates the wall of the casing 9 and upon reaching the interior is carried upward in a coil 31, surrounding the said steam pipe, the top of the pipe penetrating the diaphragm 28. The cavity between the inner and outer shells is occupied by a series of concentric annular conical baffle plates 32, 33. Three such plates are shown although the number may be varied if found desirable. The alternate plates are attached to the inner and outer casing in the manner shown. In the case of the upper and lower plates 32 the inner margins are furnished with flanges 34 which are riveted to the inner casing. The plates then slope downwardly and outwardly and have their outer margins 35 turned upwardly to form channels or gutters 36, leaving a space 37 between the outer margins of said plates and the inner surface of the shell 5. The middle baffle plate 33 has its outer margin flanged and attached to the inner face of the outer shell at 38, its inner margin having a flange 35 and gutter 36 as in the case of the plates 32. The bottoms of said gutters are furnished with series of small perforations 39 which thus extend in rings about the inner shell. In the bottom of the outer casing is inserted an outlet pipe 40, and surrounding the inner mouth of the outlet pipe 7 is a collar 41 attached in any convenient manner.

Having thus set forth in detail the construction of my improved water heater I will now describe the manner of its operation.

The pipe 11 having been connected with the exhaust of an engine or any other desired source of steam supply, the steam will enter the cavity of the cap 15 and being deflected downward will pass through the cavity of the casing 12. It will then pass upward through the pipe 13 into the interior of the inner shell 23 surrounding the coil 31, and then be deflected downward and pass around the lower margin of the inner shell and will then be made to take a devious course as shown by the arrows by reason of the deflecting action of the baffle plates 32, 33. The cold water entering through the pipe 30 will pass through the coil 31, the steam here acting to raise the temperature of the water within said

coil to a certain extent. When the water reaches the end of the coil it will fill the basin formed in the upper part of the inner shell 23 and find its way through the apertures 29 to fall upon the first baffle plate 32, and be collected in the gutter 36 passing in fine streams through the orifices 39 upon the next plate 33 and so continuing to fall in divided streams from plate to plate, meeting the free steam and causing the latter to be nearly or completely condensed, giving up its heat to the water, the hot water and condensed steam passing out through the pipe 40. The oil will usually be completely separated from the steam in the cavities of the cap 15 and chamber 12, but should any of the oil be carried beyond these chambers, the water pipe being in coil form will present a comparatively large surface to the steam, so as to rapidly reduce its temperature and thus act as an additional factor to complete the process of freeing the oil from the steam. The function of the collar 41 is to prevent water from being carried out with the steam when no water is passing through the coil 31.

Having thus described my invention what I claim as new, is:—

1. In a water heater, the combination of inner and outer casings, steam inlet and outlet pipes for the said casings, water inlet and outlet pipes for said casings, a water coil arranged within the inner casing and having inlet and outlet openings, and baffle plates located between the inner and the outer casing.

2. In a water heater, the combination of an inner and an outer casing, a steam pipe communicating with the inner casing, a basin arranged in the upper part of said inner casing, a water coil surrounding said steam pipe and having an outlet communicating with said basin, an inlet for said water-coil and a water outlet for the outer casing.

3. In a water heater, the combination of an inner and an outer casing, steam and water inlet and outlet pipes for said casings, a series of peripherally flanged baffle plates between the inner and outer casings and said plates having perforations therein.

4. In a water heater, the combination of an inner and an outer casing, a steam pipe communicating with the inner casing, a basin arranged in said inner casing, a water coil communicating with said basin, baffle plates arranged between the inner and outer casings, oil drain pipes for said inner casing, and steam and water outlets for said outer casing.

5. In a water heater, the combination of an inner and an outer casing, a chamber arranged below said casings and communicating therewith, an extension from said chamber projecting into the inner casing,

a steam inlet pipe for said chamber, oil drains for said chamber, a basin in said inner shell, a water coil connected with said basin, and an outlet for said outer casing.

6. In a water heater, the combination of an inner and an outer casing, a chamber arranged below said casings, and communicating therewith, a steam inlet pipe for said chamber, a deflector for the pipe, oil drains for said deflector and chamber, and for the inner casing, a water coil in the inner casing, inclined baffle plates arranged in the outer shell, said plates having marginal perforated gutters, a steam outlet and a water outlet for said outer casing.

7. A water heater comprising an outer and an inner casing, a plurality of communicating chambers below the casings, steam inlet pipe communicating with the inner chamber, a cap for said inlet pipe, a deflecting member arranged in said cap, drain passages for said cap, an extension from the said inner chamber, a water coil surrounding said extension, inclined baffle plates surrounding the inner casing, and a water outlet for the outer casing.

8. In a water heater, the combination with

an outer and an inner casing, steam inlet and outlet pipes communicating with the casings, and water inlet and outlet pipes communicating with said casings, of a deflector for the steam inlet pipe, and a drainage gutter for said deflector. 30

9. In a water heater, the combination with outer and inner casings, steam inlet and outlet pipes communicating with said casings, and water inlet and outlet pipes communicating with said casings, of oppositely inclined baffle plates and deflecting members for said steam inlet and outlet pipes. 35 40

10. In a water heater, the combination with outer and inner casings, and steam and water inlet and outlet pipes therefor, of a deflecting cap for the steam inlet pipe, a deflecting sleeve for the steam outlet pipe, and deflecting plates arranged between the inner and outer casings. 45

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

CHARLES J. KARNOPP.

Witnesses:

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