

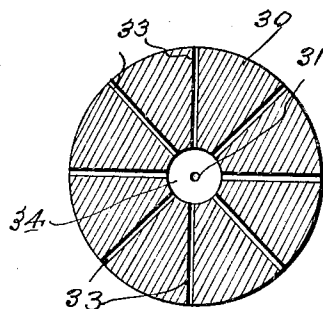
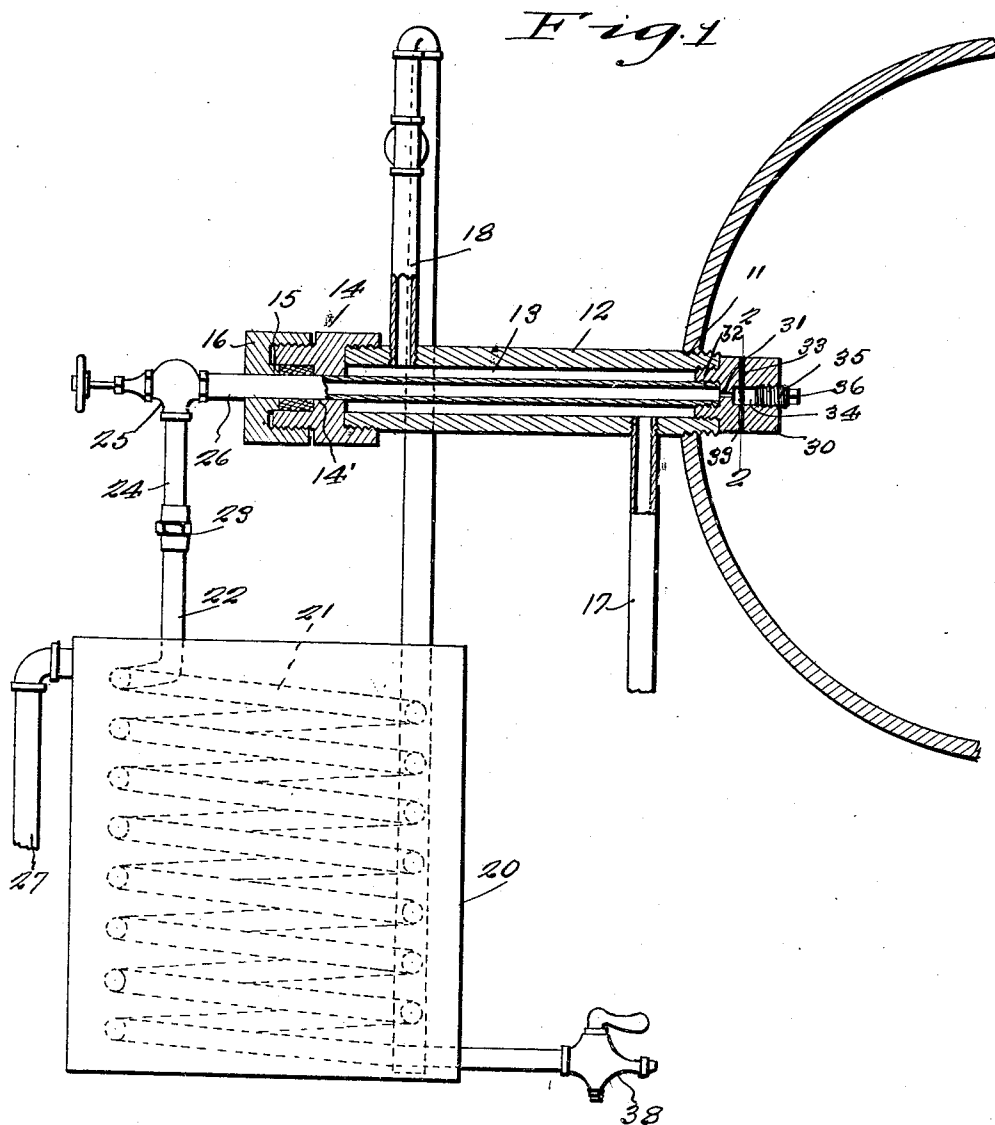
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WATER COOLED NOZZLE

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WITNESS:

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WATER-COOLED NOZZLE

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The object of this invention is to remove superheat from steam and to entrain and dissolve with a sample of steam from a superheater or boiler a representative quantity of the salts which lift with the steam, and which are dried and become powder within the superheater, and are carried in suspension in the superheated steam.

A further object is to entrain these suspended salts to a maximum extent by reducing the pressure within a nozzle by providing a cooling chamber, the reduced pressure permitting a high steam velocity thru an intake port in that part of the device projecting into the superheater, steam pipe, duct or container, whereby the suspended matter contained in the steam at the point of sampling is taken up and carried along, for the purpose indicated.

A further and important object is to permit of the cooling of the steam to less than the saturation point, causing the salts to be redissolved, so that the resulting condensate will be more representative of the quality of the steam than would otherwise be the case.

With the foregoing and other objects in view, the invention consists in the novel construction and arrangement of elements described, illustrated and claimed, it being understood that modifications may be made within the scope of the claims without departing from the spirit of the invention.

In the accompanying drawing forming part of this specification,

Figure 1 shows the device in vertical section, and connected with a duct or the like and with a condenser.

Figure 2 is a section on line 2—2 of Figure 1.

The sample to be tested is to be taken from the superheater and at about the point illustrated, and threaded into an opening 11 in the side wall is a tubular element 12 providing a water jacket, the water chamber of which is designated 13.

In addition to the external threads provided for the connection with the superheater the element 12 is also provided with external threads on the outer end for engagement by internal threads on the element 14 providing

a stuffing box or packing box, the latter being formed with an inner annular reduced portion 14' thru which the steam duct passes.

A gland is provided at 15, and is retained by cap 16 threaded onto the element 14,—the packing preventing the leakage of water from the jacket 12, or the chamber 13 thereof. Water is introduced thru supply pipe 17, and passes out thru pipe 18 to a steam condenser shown more or less conventionally and designated 20.

This condenser 20 includes the coil 21 having an upper end 22 connected by coupling 23 with pipe 24. The casing of valve 25 is connected with pipe 24, and with the tube or pipe 26 thru which steam is withdrawn from the superheater. An upper pipe connection for the housing of the condenser is designated 27.

The element 12 forming the water jacket projects into the superheater or boiler, and the steam pipe or tube 26 may be of substantially the same length. A plug 30 is provided with a central port 31 and with a centrally located annular extension designated 32 having internal and external threads for engagement respectively with threads on the tube 26 and on the element 12. The port 31 communicates with the bore of said element 26.

The plug 30 is further provided with openings or ports 33 leading to a central chamber 34 with which port 31 has communication,—this chamber 34 being closed by a plug 35 having an angular end portion 36.

As the ports in plug 30 are subject to considerable wear on account of the high velocity of the steam, the material of which the plug is made is highly resistant to wear, but may be readily and promptly replaced when necessary.

The lower end of the coil 21 of the condenser is supplied with a valved discharge connection 38, the upper portion of the coil having the connections previously referred to. The steam to be withdrawn from the point indicated, for the purpose of determining the character of the condensate, enters ports 33, passes into chamber 34, and thru port 31 to the steam cooling chamber

formed by duct, pipe, or tube 26,—and passes thence thru valve 25 and thru the connections illustrated, to the coil 21 of condenser 20, and is withdrawn at 38, for the purpose specified.

Having described the invention what is claimed is:—

1. In a nozzle for removing superheat from steam, an element providing a water jacket, an element confining superheated steam and having an opening receiving the water jacket, means for closing the outer end of the jacket, a pipe extending thru said means and thru the jacket, and a device retaining the inner end of the pipe in spaced relation with the jacket, this device including inlet ports, and acting to close adjacent ends of the pipe and jacket in one assembling operation, the ends thus closed entering the second named element and the inlet ports communicating with the interior of this element and with the bore of the pipe.

2. In a nozzle for removing superheat from steam, an element providing a water jacket, an element confining superheated steam and having an opening receiving the water jacket, means for closing the outer end of the jacket, a pipe extending thru said means and thru the jacket, and a device retaining the inner end of the pipe in spaced relation with the jacket, this device including a chamber and a port between the chamber and pipe, and including other ports thru which steam is admitted to the chamber from the interior of the second named element.

3. The method of testing herein described, which consists in withdrawing superheated steam from a high pressure zone for testing its suspended material content, raising the steam to high velocity at a point of discharge from said zone for entraining material in suspension, the entraining operation taking place within the high pressure zone and at the original high temperature thereof; in conveying the steam through a cooling medium for producing a zone of low pressure slightly remote from the point where the material is entrained as the result of the afore-said high velocity at that point; then reducing the temperature of the steam to a point effecting condensation thereof; and testing the condensate.

In testimony whereof I affix my signature.
CYRUS WM. RICE.

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