(No Model.)

M. W. ILES.

STEAM SEPARATOR.

No. 522,416. Patented July 3, 1894.

Fig. 1.

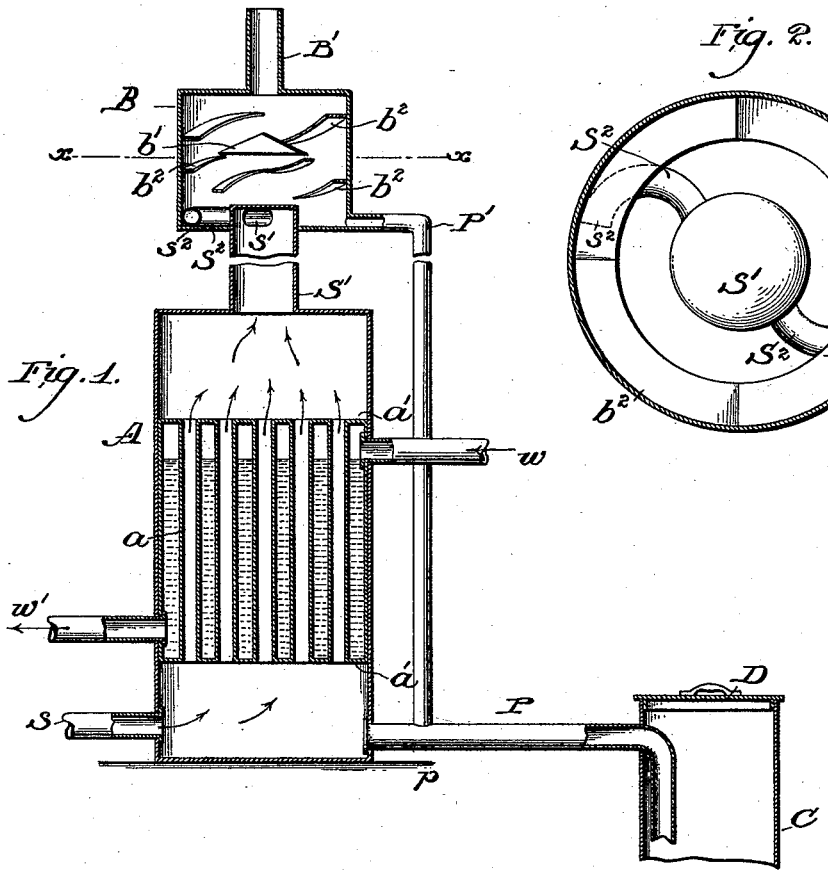


Fig. 2.

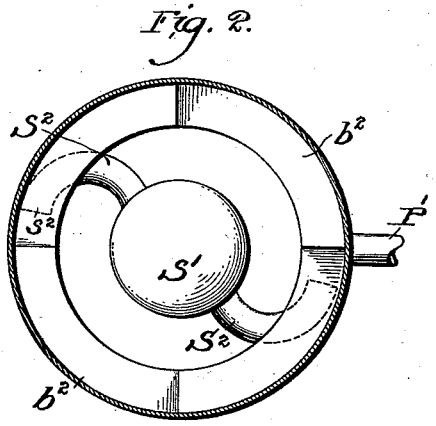
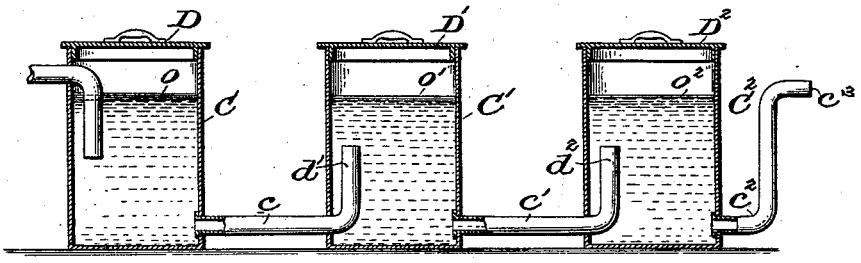


Fig. 3.



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To all whom it may concern:

Be it known that I, MALVERN W. ILES, a citizen of the United States, residing at Denver, in the county of Arapahoe, in the State of Colorado, have invented a certain new and useful Improvement in Condensing Apparatus, of which the following is a true and accurate description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to condensing apparatus and has for its object the arrangement of an apparatus in which the exhaust steam can be condensed and its heat utilized and which will also collect and save the oil carried from the cylinders by the steam, which oil generally passes off to waste with the water of condensation.

My improvements can best be understood as explained in connection with the accompanying drawings, in which—

Figure 1 is a sectional elevation of a condensing apparatus constructed according to my invention. Fig. 2 is a sectional view on the line *x*—*x* of Fig. 1 of the condenser head, and Fig. 3 is a sectional elevation of my oil collector into which the water laden with oil flows from the condensing system.

A is a condenser formed with tube sheets *a'* and tubes *a* in a well known manner and having inlet S for steam and inlet W and outlet W' for water preferably arranged in the manner shown.

S' is a steam outlet and B is a condenser head into which the steam outlet pipe discharges; this condenser head consists preferably of a cylindrical drum *b* as shown, and in order that the steam may be given a whirling motion against the side of the drum, I prefer to arrange the conduit or conduits which lead the steam to the condenser head so that they will discharge the steam substantially parallel to the walls of the drum, in the construction shown the steam outlet pipe S' from the condenser A extends somewhat into the drum *b* and one or more bent pipes S^2 extend from openings *s'* in the pipe S' and discharge the steam at s^2 close to the walls of the drum. In order to keep the steam in the drum as long as possible so as to condense it and throw down the oil and water of condensation baffles B^2 are secured around the outer shell of the drum and are inclined downwardly in the direction of the path of the steam; a shield *b'* can also advantageously be arranged below the outlet B' to further retard the outflow of the steam.

An outlet pipe P' leads from the condenser head B to conduct the water of condensation therefrom, and a pipe P leads from the lower part of the condenser A for the same purpose; these two pipes may advantageously be united at *p'*.

C C' C^2 are coolers into which the water of condensation is conducted from the condensers A and B and which serve to separate and collect the oil carried by the steam from the engine cylinders and separated therefrom in the condensers. Each cooler is connected to the next one by means of a pipe as *c*, which leads from near the bottom of the cooler, and the last cooler has a water discharge pipe c^2 which also preferably leads from the bottom of the cooler but extends upward as at c^3 to maintain the desired water level, lids as D, D' are preferably arranged to cover the coolers to exclude dirt.

The exhaust steam from the engines enters the condenser A at S and ascends through the tubes *a* heating the water which surrounds the tubes and is partly condensed thereby; from the condenser A it passes up into the condenser head B, which may if desired be situated on the roof of a building, where it is further condensed and where the oil carried from the engine cylinders and the water of condensation are effectually separated from the steam by the action of the baffle plates. The water and oil flow into the cooler C where the oil rises and forms a film on top of the water as at *o*. The water from the bottom of the first cooler which is comparatively free from oil is led into the second cooler C' by the pipe *c*, which is preferably turned up as at *d'*, and whatever oil remains in the water will rise and form a film on the top of the water on the second cooler C' at *o'*; as many coolers as may be necessary can be used and the water which finally issues from the last cooler will be free from oil and being condensed steam will be found to be in a very pure condition for use in steam boilers or wherever else desired. The oil can be collected by any suitable skimmer and may be

used again for lubricating purposes either immediately or after filtering.

The water flowing from the condenser at W′ being heated by the steam can be used for heating purposes or as hot feed water for the boilers, indeed if desired, the clean water from the last of the series of coolers can be pumped through the condenser A, where it will be heated, back to the boilers whence it came as steam.

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

1. A condenser head consisting of a cylindrical drum, a steam conduit or conduits opening into the lower part of the drum substantially parallel to the sides thereof whereby a whirling motion may be given to the steam in the drum, baffle plates arranged around the side of the drum and inclined downwardly in the path of the steam so as to direct the steam and water toward the bottom of the drum and outlets for water and steam.

2. A condenser head consisting of a drum having cylindrical sides, a steam conduit or conduits opening into the drum substantially parallel to the cylindrical sides thereof whereby a whirling motion may be given to the steam in the drum, baffle plates arranged around the side of the drum inclined downwardly in the path of the steam so as to direct the steam and water toward the bottom of the drum, and outlets for water and steam.

3. The combination with a condenser as A having inlets and outlets for steam and water, a condenser head into which the steam outlet leads, a pipe P′ leading therefrom and an oil separator into which the pipe P′ discharges for collecting the oil carried by the water of condensation, all substantially as specified.

4. The combination with a condenser A having inlet and outlet pipes W W′ for water to be heated, inlet S and outlet S′ for steam and a pipe P for carrying away the condensed steam, of a condenser head into which the steam outlet pipe S′ leads, a pipe P′ adapted to conduct the water of condensation from the condenser head and an oil separator into which the pipes P and P′ discharge for collecting the oil carried by the water of condensation all substantially as specified.

5. The combination with a condenser A having inlets W and S and outlets W′ and S′ for water and steam respectively and an outlet pipe P for the water of condensation, a condenser head into which the steam outlet pipe S′ leads, a pipe P′ adapted to conduct the water of condensation from the condenser head, a series of coolers C C′ &c. into the first of which the pipes P P′ discharge, a pipe leading from the bottom of each cooler into the next in order and a water outlet pipe leading from the last cooler of the series.

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