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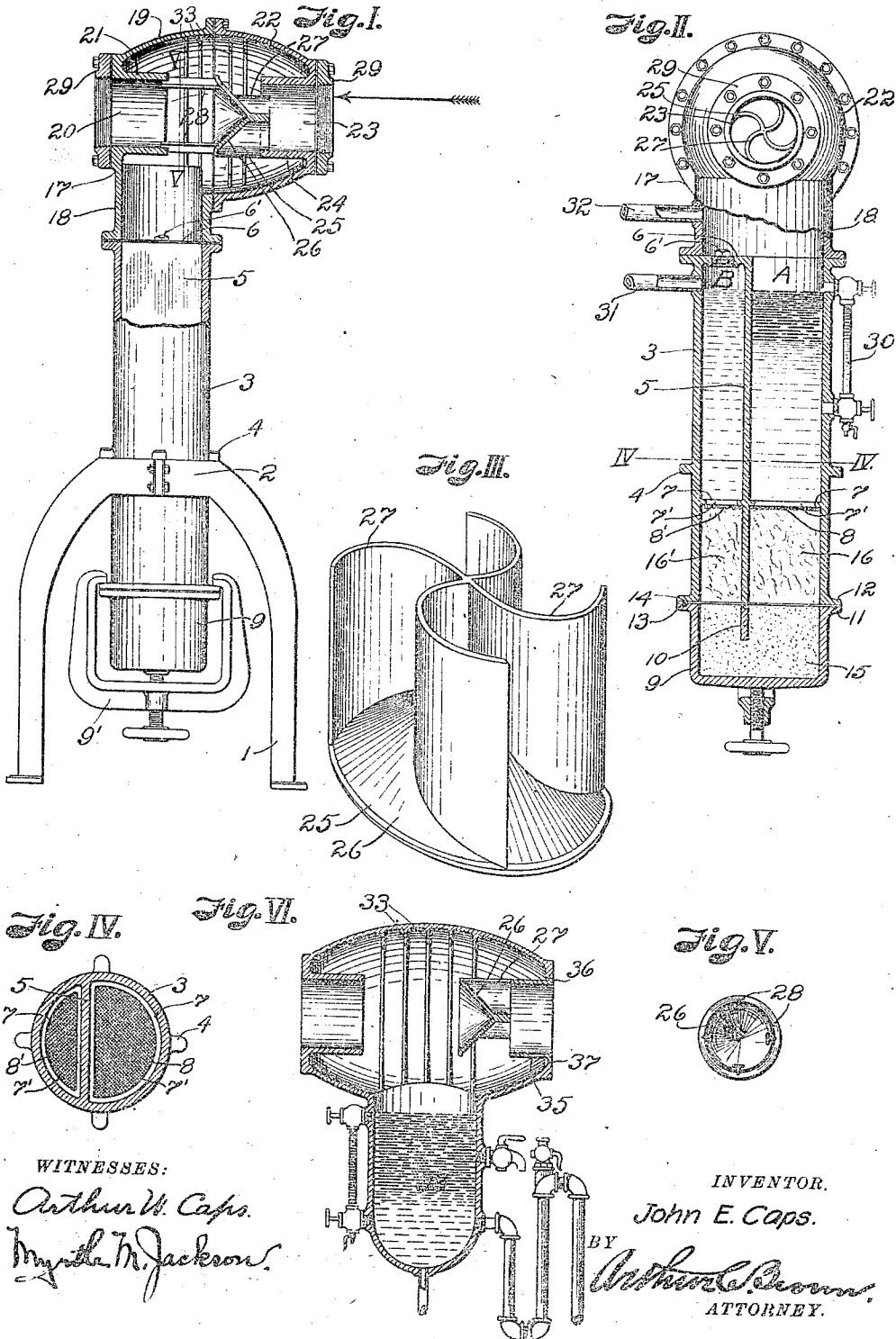


Fig. IV.

Fig. VII.

Fig. V.

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To all whom it may concern:

Be it known that I, JOHN E. CAPS, a citizen of the United States, residing at Wilmette, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Separators; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to oil separators and more particularly to a device of that character for use on steam engines.

It is the principal object of my invention to provide a separator which may be applied to an exhaust steam pipe so that a jet of incoming steam may be broken up in a manner to present a maximum quantity of steam to the condensing surface. In accomplishing this object I provide a cone shaped member, whose vertex lies toward the source of the exhaust and upon whose convex surface are integrally formed blades in the form of a vortex-wheel, which are adapted to impart a whirling motion to the incoming steam and breaking the jet so that the separating process is facilitated.

A further object of the invention is to provide other new and improved details of structure which will hereinafter be fully described and are illustrated in the accompanying drawings, in which:—

Figure I is a side elevation of an oil separator constructed in accordance with my invention, a part being in section for better illustration. Fig. II is an end elevation of same, the body portion being in section. Fig. III is a perspective of the separating device. Fig. IV is a cross section on the line IV—IV, Fig. II. Fig. V is a vertical section on the line V—V, Fig. I. Fig. VI is a longitudinal section of a modified form of oil separator.

Referring more in detail to the parts:—

1 designates a stand, having a collar 2 at the top in which the vertical body member 3 of the separator is supported by lugs 4. Body member 3 is preferably cylindrical and has its interior divided into separate chambers by the vertical partition 5, one of the chambers being smaller than the other and covered by a horizontal diaphragm 6,

which is preferably formed integral with the partition 5. This diaphragm is provided with an opening which is normally closed by a plug 6'. Dividing the chambers horizontally at a point slightly above the bottom are the diaphragms 7, having large apertures 7'; below which are fixed close mesh screens 8, and 8'. Securely fixed to the bottom of member 3, by a clamp 9', is a cup shaped member 9 having a vertical partition 10 which forms a continuation of the partition 5, in the body member, but which extends only part way into the cup from the top. The upper edge of cup 9 and lower edge of the body members 2 are provided with flanges 11—12, having grooves 13 for packing 14. Filling the cup 9 is a bed of sand 15, and filling the large and small chambers in the lower portions of the member 3 are bodies of cotton waste 16 and mineral wool 16'. Secured to the top of body member 3 is a head member 17, the lower portion 18 of which conforms to the shape of body 3, the upper portion 19 being semi-ellipsoidal in shape and provided with an opening 20 having an inwardly directed flange 21. Secured to the other end of the head is another semi-ellipsoid member 22 having an end opening 23 surrounded by an inwardly projecting flange 24. Clamped between the flange members 21 and 24 is a separating device 25 consisting of a conical shaped baffle 26 having curved blades 27 whose line of direction is parallel to the axis of the cone and which intersect in said axis to form a vortex distributor. The edges of blades 27 are adapted to rest against the flange member 24 so as to bring the lower edge of cone shaped member 26 even with the edge of member 22, while legs 28 rest against flange member 21 and cone shaped member 26 and hold same in position. Flanges 29 provide means for securing the device in the exhaust steam pipe line.

30 designates a gage which connects with the large chamber A in the body member, 31 a feed pipe leading from the filtered water chamber B to a boiler (not shown) and 32 a pipe leading from the large unfiltered fluid chamber to waste.

The operation of the device is as follows:—Steam from the engine exhaust enters the separator head through aperture 23 in the direction indicated by the arrow, Fig. I, strikes blades 27 and is given a whirling motion. Impinging against the

surface of the conical member 26, the steam is deflected outwardly against the inner surface of the semi-ellipsoidal members 19 and 22. It is apparent that the steam thus conveyed impinges with said surfaces 19 and 22 tangentially, thus bringing a maximum volume of steam in contact with the condensing surface, after which it eddies around the projecting flange 21 and finally escapes through the aperture 20. The oil carried into the separator being heavier and more adhesive than the steam, is held by the condensing surface, from which it flows downwardly by gravity, with whatever water has condensed within the head, and is collected in the chamber A. The oil being lighter than the water, remains on top of the water, which flows downwardly through screen 8, through the cotton waste filter, through the sand in cup 9 and beneath the partition 10 and upwardly through the mineral wool filter 10' and screen 8' into chamber B, from which it may be delivered to a boiler feed tank. Should the filter get clogged, in the first chamber, the oil and condensation water may be drawn off through pipe 32 without flowing into the exhaust line.

In Fig. VI I show ribs 33 peripherally formed on the inner surface of ellipsoidal chamber of the separator head, such ribs providing more condensing surface, as well as assisting in more thoroughly breaking up the steam. This construction also shows a slightly modified form of separator mounting, consisting of a cylindrical member 35, integral with blades 27 and provided with an annular flange 36, which is adapted to rest in a groove 37 in the body of the device and be held therein by the pipe flange when in position.

A receiving chamber 38 collects the condensation fluid, which may be drawn off and disposed of as desired.

Having thus described my invention, what I claim as new therein and desire to secure by Letters-Patent is:—

1. A separator comprising a horizontally disposed receiving member having intake and exhaust ports provided with turned flanges and an enlarged center portion provided with ribs, a baffle supported on said flanges, said baffle having a cone shaped

base and curved blades mounted on the convex surface thereof in parallel relation to each other and extending from said surface at a greater distance than the altitude of the cone and parallel to the axis thereof, the said blades intersecting said axis to form a vortex to distribute the fluid against the ribs.

2. A separator comprising a horizontally arranged receiving member formed with inwardly extending inlet and outlet ports, a baffle supported on the said ports, ribs provided on the inner surface of said receiving member, the said baffle provided with a convex base and having parallelly disposed curved blades arranged thereon, and projecting therefrom at a greater distance than the altitude of said convex base for deflecting the fluid against the said ribs and inner surface of the receiving member.

3. A separator comprising a horizontally arranged receiving member formed with inwardly extending inlet and outlet ports, a baffle supported at its opposite ends on said inwardly extending ports, and positioned adjacent the central part of the said receiving member, ribs provided on the inner surface of said receiving members at the central part thereof, in proximity to the baffle, said baffle having a convex base and parallelly arranged curved blades formed thereon and projecting for a greater distance than the altitude of the base, for deflecting the fluid against the ribs.

4. A separator comprising an oval shaped horizontally arranged receiving member, having an inwardly extending intake port at one end and an inwardly extending exhaust port at the opposite end, ribs formed on the inner surface of the receiving member, a conical shaped baffle having parallelly disposed curved blades arranged thereon, said baffle supported on the inwardly extending ports and in alinement with the intake port, for deflecting the fluid against said ribs and interior surface of said receiving member.

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

JOHN E. CAPS.

Witnesses:

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JOHN W. YEAGER.