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H. E. MOFFAT.
OIL EXTRACTOR.

APPLICATION FILED NOV. 3, 1904.

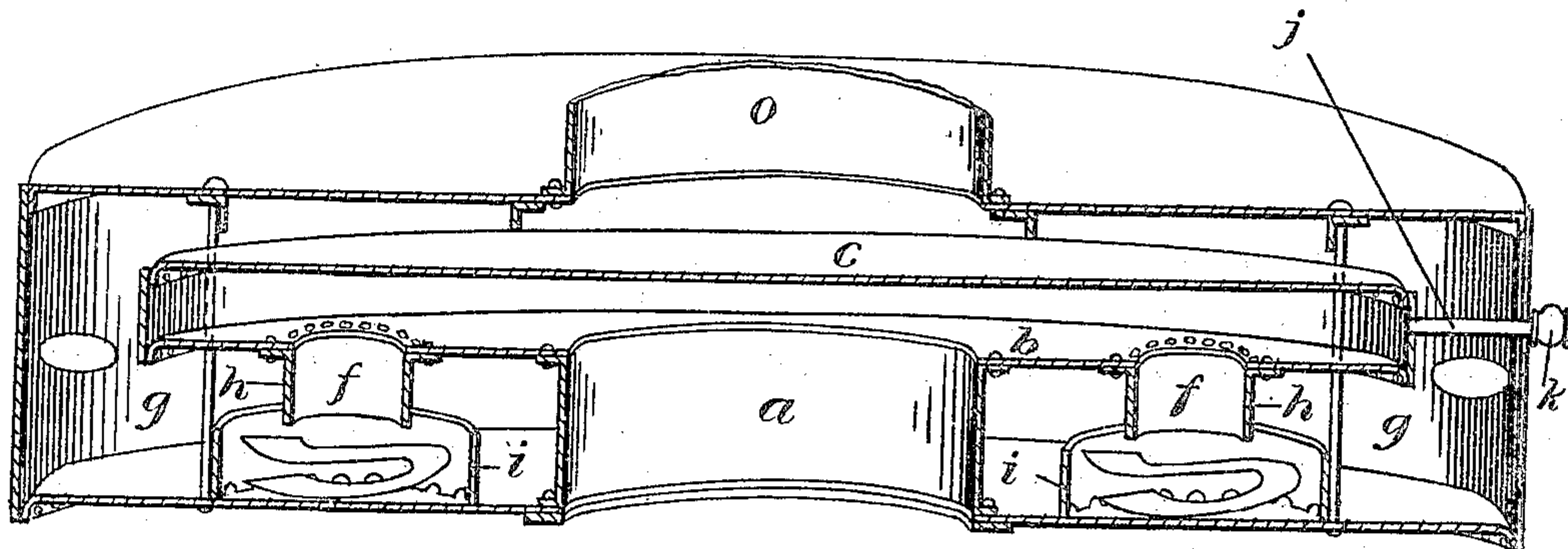


Fig. 1.

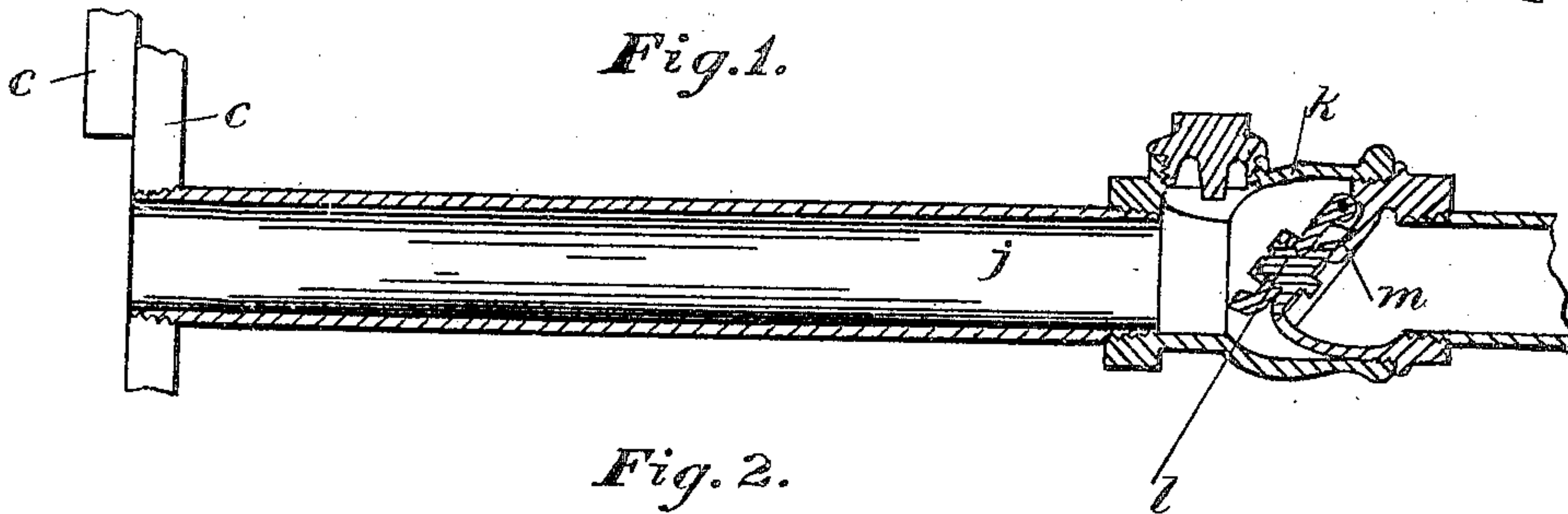


Fig. 2.

Witnesses.

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UNITED STATES PATENT OFFICE.

HENRY E. MOFFAT, OF WOODSTOCK, CANADA.

OIL-EXTRACTOR.

No. 813,314.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed November 3, 1904. Serial No. 231,244.

To all whom it may concern:

Be it known that I, HENRY ESSON MOFFAT, gentleman, of Woodstock, in the county of Oxford and Province of Ontario, Canada, have invented certain new and useful Improvements in Oil-Extractors; and I hereby declare that the following is a full, clear, and exact description of the same.

It has been demonstrated in the field of actual operation that when the exhaust-steam from the engines, pumps, and auxiliaries is not passed directly from the oil-extractor to the atmosphere, but is used for feed-water heating, radiation, or manufacturing purposes, an instantaneous condensation of the steam is frequently effected and a practically complete vacuum is formed, particularly when the engines, &c., are at rest, and when all of the steam comes into contact with a larger cooling-surface than the heat units can counteract and when the engines, &c., are in operation intermittent vacuums are frequently formed. As the result of the subsequent inrush of steam into the vacuums the oil is forced from the oil-extractor into the feed or other water, where its presence is extremely detrimental to the operation of the apparatus, inasmuch as it is carried back to the boilers, where it not only causes the foaming of the water, but also collects or accumulates as a scum all mineral and metallic matter with which the water may be charged. When the oil and accumulated matter become heavier than the water, they sink from the surface and form a scale on the shell or flues within reach of the fire-line. This scale excludes the water from contact with the boiler plates and tubes and enables the fire to burn and destroy them.

The object of the present invention is to provide the oil-extractor with a means for automatically breaking such vacuums when formed, thereby making it practically impossible for the oil to be forced from the oil-extractor into the feed or other water, and to attain this object the oil-extractor has an air-inlet pipe fitted with an automatically-actuated controlling-valve to admit a supply of air to it to break the vacuums formed by the condensation or departure of the steam therefrom, so that by instantaneously breaking the vacuums in the expansion-chamber the oil-extractor can under all conditions of steam changes and variations effectively perform the function of separating the oil from

the steam and prevent it being again intermixed therewith.

For a full understanding of the invention reference is to be had to the following description and to the accompanying drawings, in which—

Figure 1 is a perspective section of the oil-extractor, showing the relative position of the various parts. Fig. 2 is a detail view of the means for breaking the vacuums in the oil-extractor.

Like letters of reference refer to like parts throughout the specification and drawings.

While for explanatory purposes I have shown the means for breaking the vacuums in conjunction with the oil-extractor for exhaust-steam described in Letters Patent of the United States No. 539,073, granted to me on the 14th day of May, 1895, I do not desire to confine this means for breaking the vacuums exclusively to that form of oil-extractor, as I may employ it in conjunction with any style of oil-extractor in which the steam is discharged from the exhaust-pipe into a suitable separating-space.

The exhaust-steam is admitted from the exhaust-pipe *a* into the separating-chamber *b*, where it comes into contact with the inner surface of the shell *c*. The shell being of a lower temperature than that of the steam chills and liquefies the vaporized oil, so that it will be temporarily detained within the separating-chamber, while the steam escapes through the outlet-ports *f* to the expansion-cylinder *g*, inclosing the separating-chamber. The outlet-ports *f* are each fitted with downwardly-projecting pipes *h*, extending slightly within the oil-cups *i*, secured to the bottom of the expansion-cylinder *g* opposite the outlet-ports for the purpose of directing the oil into the cups as the accumulation upon the bottom of the separating-chamber drains through the outlet-ports. Extending through the expansion-cylinder into the separating-chamber *b* is an air-inlet pipe *j*, fitted with a valve-body, in which is contained an automatic valve *l* to control the passage of the air from the atmosphere through the air-inlet pipe *j*. The valve *l* normally engages the valve-seat *m* and is so positioned within the valve-body that the pressure within the separating-chamber will hold it against its seat; but when a vacuum occurs within the separating-chamber or when the pressure within the separating-chamber is less than that

of the atmosphere the atmospheric pressure upon the outer side of the valve will open it and permit the air to rush into the separating-chamber and relieve the vacuum formed therein caused by the instantaneous condensation of the steam or the stoppage of the steam-supply or by any other natural or unnatural causes. The steam passes from the exhaust-pipe *a* into the separating-chamber *b*, where the oil is extracted from it by coming into contact with the shell of the same.

From the separating-chamber *b* the exhaust-steam passes through the outlet-ports *f* into the expansion-cylinder *g*, from which it escapes through the exhaust outlet-pipe *o* to the radiating-coils, feed-water heater, or other apparatus in which it is to be employed as a heating agent. The sudden condensation of the steam after passing through the outlet-pipe *o* to the apparatus where it is to be used as a heating agent will cause the formation of a vacuum or a partial vacuum in the separating-chamber and expansion-cylinder, and unless such vacuum can be broken before the next discharge of exhaust-steam into the separating-chamber the pressure of the steam on the next discharge will drive the accumulated oil from the separating-chamber and oil-cups into the expansion-cylinder and through the outlet-pipe into the feed-water heater, radiating-coils, or other apparatus with which such outlet-pipe *o* is connected and from which it will return to the boiler and not only cause the water therein to foam, but will also collect as a scum the mineral and metallic precipitates until they have attained a greater specific gravity than the water, when they will sink and settle upon the plates and tubes of the boiler below the fire-line and exclude the water within the boiler from contact therewith. The natural result of the exclusion of the water from contact with the shell

is the burning of the boiler plates or tubes and the destruction of the boiler, the possibility of which is overcome by providing the oil-extractor with a means for instantaneously breaking the vacuums.

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

1. An oil-extractor comprising a separating-chamber having inlet and outlet ports for the exhaust-steam, an expansion-chamber inclosing the separating-chamber and in circulation with the outlet-port of the separating-chamber and having an outlet-port for the exhaust-steam and a vacuum-breaking means for the expansion and separating chambers.
2. An oil-extractor for exhaust-steam comprising a separating-chamber having inlet and outlet ports for the exhaust-steam, an expansion-chamber inclosing the separating-chamber, oil-cups within the expansion-chamber opposed to the outlet-ports for the separating-chamber and means for breaking the vacuums in the separating and expansion chambers.
3. An oil-extractor for exhaust-steam comprising a separating-chamber having inlet and outlet ports for the exhaust-steam, an expansion-chamber inclosing the separating-chamber, oil-cups within the expansion-chamber opposed to the outlet-ports for the separating-chamber, means for breaking the vacuums in the separating and expansion chambers, and an automatically-operated controlling-valve for the vacuum-breaking means.

Toronto, October 12, A. D. 1904.

H. E. MOFFAT.

In presence of—

C. H. RICHES,
L. F. BROCK.