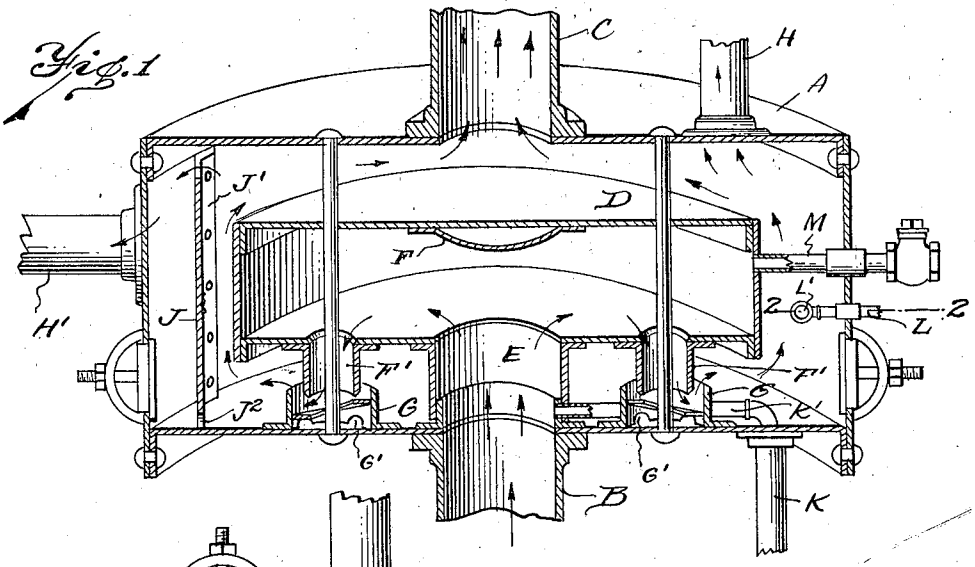
May 15, 1923. 1,455,348

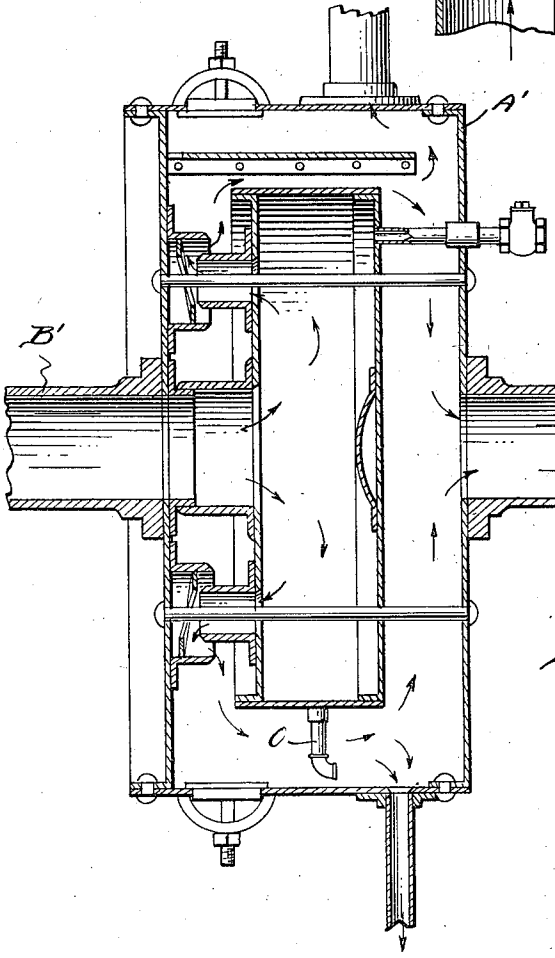
H. E. MOFFAT

OIL SEPARATOR

Filed Oct. 31, 1921

Fig. 1





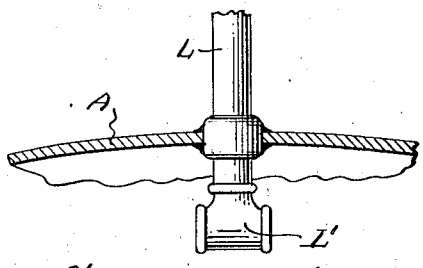


Fig. 2

Fig. 3

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Patented May 15, 1923. 1,455,348

UNITED STATES PATENT OFFICE.

HENRY E. MOFFAT, OF HIGHLAND PARK, MICHIGAN, ASSIGNOR OF ONE-SIXTH TO GEORGE W. MARSHALL, ONE-SIXTH TO GEORGE L. MARSHALL, AND ONE-SIXTH TO GAYLORD L. MARSHALL, ALL OF DAYTON, OHIO.

OIL SEPARATOR.

Application filed October 31, 1921. Serial No. 511,658.

To all whom it may concern:

Be it known that I, HENRY E. MOFFAT, a subject of the King of Great Britain and Ireland, residing at Highland Park, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Oil Separators, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to oil separators such as are used in connection with steam driven machinery to remove lubricating oil from the exhaust steam for the purpose both of saving the oil and of purifying the steam so that when condensed it may be suitable for use again in the boiler or for other purposes. The invention consists in the structural features and arrangement of parts hereinafter described and fully illustrated in the accompanying drawings herein:—

Fig. 1 is a sectional perspective view of one form of the invention to be employed when the exhaust steam pipe extends vertically.

Figure 2 is a sectional detail showing a live steam inlet to the separator, the section being taken on line 2—2 of Figure 1.

Figure 3 is a similar view showing the construction preferred in conjunction with a horizontal exhaust steam pipe.

In these views the reference character A designates the cylindrical main casing of the oil separator and B and C are respectively exhaust steam inlet and outlet pipes axially communicating with the casing A at the bottom and top thereof. Centrally within the casing A there is disposed a cylindrical shell D within which is formed a steam expansion chamber, said shell being in communication with the inlet pipe B through a short extension E of the latter. To the top of said shell there is interiorly secured a dome shaped water shield F in opposed relation to the steam inlet, said shield forming a deflector for any drops of water carried in suspension by the exhaust steam and preventing the impact of said drops under high velocity with the top of the shell D which would tend to rapidly deteriorate the shell. The exhaust steam in expanding and condensing within the shell D precipitates substantially all oil that may be carried in suspension and such oil together with any condensation of the steam that may occur within the shell D escapes downwardly through short pipes F′ opening into the shell through the bottom thereof. Said pipes project slightly at their lower end into concentric cups G of a larger diameter which are secured by any suitable means to the floor of the casing A. Adjacent said floor the cups G are each formed with a plurality of outlets G′ for the oil and condensation. The pipes F form also outlets from the shell D for the purified exhaust steam which flows through said pipes into the cups G and reverse its direction of travel within said cups, rising into the main casing A between said cups and the pipes F. This reversal in the direction of the flow of steam exerts a further tendency to remove from said steam any oil that may still be carried in suspension and spiral baffle members H respectively interiorly secured to the cups G contribute to the same result. A further expansion of the steam occuring within the space between the shell D and main casing A exercises a still further tendency to precipitate any suspended oil. In addition to the main exhaust steam outlet C there are provided auxiliary outlets which may lead to any apparatus in which it is desired to utilize a portion of the purified steam. Thus Figure 1 shows outlets H and H′ opening into the casing A respectively through the top and side of the latter.

It is preferred to arrange a vertical baffle plate J in opposed relation to the horizontal outlet H′, said plate having at its vertical edges flanges J′ whereby the plate is adapted to be riveted or otherwise secured to the side wall of the casing A in spaced relation to the shell D and outlet H′. Thus any steam reaching said outlet is compelled to undergo a number of reversals in its direction of travel which tends to throw out any oil still in suspension. Ports J^2 formed in said plate at its lower edge prevents any trapping of condensation by said plate. K indicates a pipe having a discharge connection with the casing A through the bottom thereof and serving to carry off the separated oil together with any water resulting from steam condensation. There may occur within the extension E a small condensation of steam or deposit of oil and provision is made for discharge of the same by way of a horizontal pipe K′ extending within the casing A adjacent the floor thereof from the

said extension to the discharge pipe K. L is a pipe laterally entering the casing A and having a T-head L′ for discharging live steam at low velocity within said casing exteriorly of the shell D. The live steam thus introduced will serve to maintain the steam pressure necessary for such apparatus as may be served by the auxiliary outlets H and H′. The head L′ directing the live steam laterally against the curved side face of the casing secures a deflection of the steam from the surface impinged upon without detrimental result to said surface. M is a vacuum breaker communicating through the casing A with the shell D.

In the form of the invention illustrated in Figure 3, the exhaust steam inlet and outlet pipes B′ and C′ are in horizontal communication with the casing A^s, the latter being arranged coaxially with said pipes and having all of the interior parts correspondingly arranged. Otherwise the construction substantially duplicates that first described except that a drain pipe O is connected with the bottom of the shell D′ to prevent any accumulation of oil or water of condensation in said shell.

It is to be understood that the described oil separator may be used either independently, as illustrated, or may be combined with a feed water heater or with a water heater or steam purifier of any sort.

What I claim as my invention is:—

1. In an oil separator, a casing having an exhaust steam inlet and outlet, and oil separating means within said casing, said casing having a cylindrical wall and a live steam pipe entering said casing and having a head within the casing discharging at an acute angle against said wall whereby the curved surface of said wall deflects the steam without detrimental effect upon said wall.

2. In an oil separator, the combination with the casing thereof, said casing having an inlet and outlet for exhaust steam, of an oil separating chamber within said casing between said inlet and outlet, steam and oil discharge passages from said chamber into said casing, an oil drain pipe opening into the bottom of said casing, a passage connecting the exhaust steam inlet with said chamber and a drain pipe connecting said passage with the drain opening into the bottom of the casing.

3. An oil separator comprising a casing having a plurality of exhaust steam outlets, a shell arranged centrally within and having an outlet to said casing, means for delivering exhaust steam to said shell, baffles encountered by the steam in discharging from the shell to the casing, and means for delivering live steam to said casing.

4. In an oil separator, the combination with the casing thereof, said casing having an inlet and main and auxiliary outlets for exhaust steam, of an oil separating chamber within said casing between said inlet and the main outlet, and a baffle plate disposed within said casing between the oil separating chamber and the auxiliary outlet in proximity to the latter.

In testimony whereof I affix my signature.

HENRY E. MOFFAT.