Jan. 6, 1931. F. M. SLATER 1,788,033

AIR LINE OILER

Filed Dec. 1, 1928

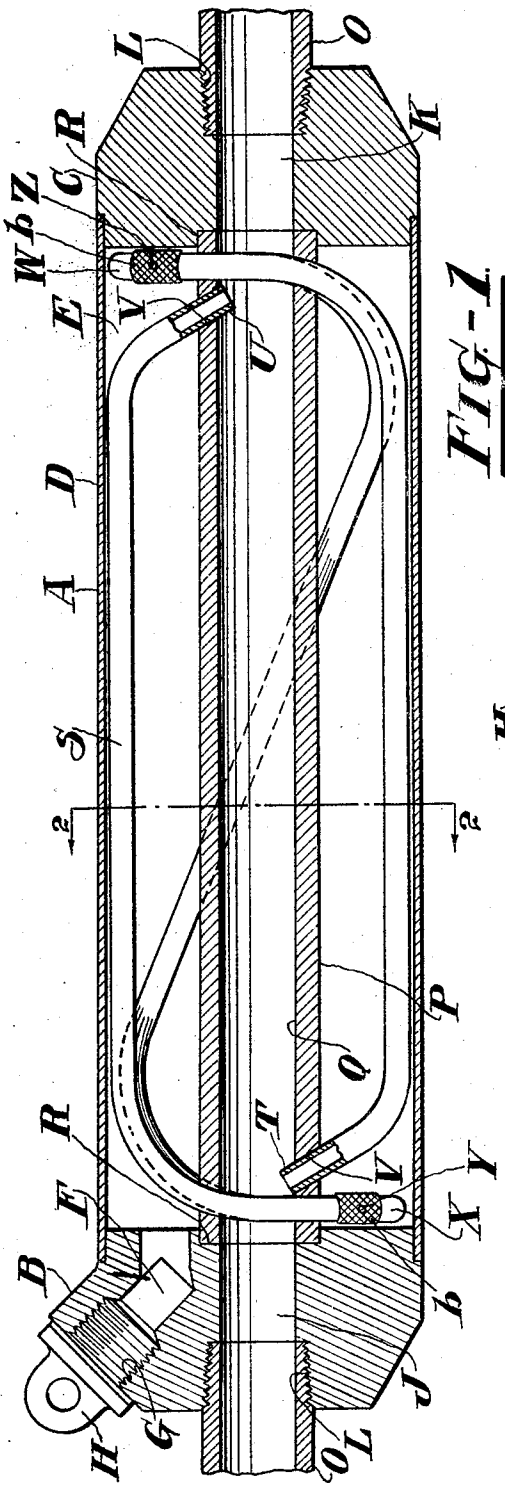

FIG. 1.

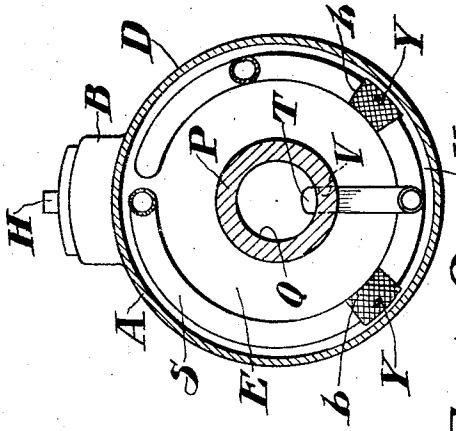

FIG. 2.

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UNITED STATES PATENT OFFICE

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AIR-LINE OILER

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This invention relates to oiling devices, but more particularly to an air line oiler adapted to be attached to a pressure fluid supply line used for conveying pressure fluid to rock drills and other devices intended to be lubricated.

The objects of the invention are to prevent interruptions in drilling operations for the purpose of introducing lubricant to the rock drill, to insure a constant and uniform delivery of oil in a suitable state into the pressure fluid flowing through the oiler in any of the various positions which the oiler may occupy, to eliminate the chances of flooding the main passageway with oil when the machine to which the oil is being supplied is idle, and in general, to simplify the construction and to reduce the cost of manufacturing oilers of this type to a minimum.

Other objects will be in part obvious and in part pointed out hereinafter.

In the drawings illustrating the invention and in which similar reference characters refer to similar parts.

Figure 1 is a longitudinal sectional elevation of an oiler constructed in accordance with the practice of the invention, and

Figure 2 is a transverse view taken through Figure 1 on the line 2—2 looking in the direction indicated by the arrows.

Referring more particularly to the drawings, A designates generally the casing of the oiler comprising in this instance a pair of heads B and C and an intermediate tubular portion D, the interior of which serves as a reservoir E for oil. The oil may be introduced into the reservoir E through a filling opening F in the head B. The outer portion of the filling opening F is threaded as at G to receive a threaded plug H whereby the filling opening F may be sealed. The heads B and C may be secured to the tubular portion D in any suitable manner, such as by welding or other well known method which will assure fluid tight joints between the tubular portion D and the heads.

The heads B and C are provided with passages J and K the outer portions L of which are threaded to enable the oiler to be threadedly connected to a pressure fluid supply line O through which pressure fluid from a suitable source of supply is conveyed to the machine intended to be actuated.

Interposed between the heads B and C and extending in this instance coaxially through the reservoir E is a hollow member or pipe P which may have a bore substantially equal in cross sectional area to the passages J and K. The interior of the pipe P forms a passageway Q and serves as a continuation of the pressure fluid supply line. The pipe P is preferably clamped fixedly between the heads B and C and extends in this instance with its ends into recesses R in the heads.

The means whereby pressure fluid is introduced into the reservoir E to exert a pressure on the oil therein and by which oil is conveyed from the reservoir to be delivered into the passageway Q consists in this instance of a tube S which may be secured to the pipe P only at its ends T and U. The ends T and U project into apertures V in the pipe P and may, if desired, extend a slight distance into the passageway Q so that a portion of the pressure fluid flowing through the passageway Q may be readily diverted into the tube S. The apertures V in the pipe P are preferably located in the ends of the reservoir E so that advantage may be had of any slight variations in pressure between the points at which the ends of the tube S communicate with the passageway Q.

From the end T of the tube S the tube extends in a forwardly, or right hand direction, as Figure 1 is viewed, and generally longitudinally through the reservoir E and is developed into a looped portion W which partly encircles the pipe P and preferably lies near the forward end of the reservoir E. From the looped portion W the tube extends rearwardly through the reservoir E and is developed into a looped portion X which also partly encircles the pipe P and lies near the rearward end of the reservoir E, although on the opposite side of the pipe to that on which the looped portion W lies. From the looped portion X the tube S again extends in a generally longitudinal direction through the reservoir E to the point at which the end U is secured to the pipe P. Due to this arrange-

ment a portion of the pressure fluid flowing through the main passageway Q will be diverted into the tube S by either the end T or U, depending upon the direction in which the main stream of pressure fluid flows, and will again issue from the other end of the tube into the main passageway.

In the looped portion X are formed in this instance a pair of ports Y which afford communication between the reservoir E and the interior of the tube at this point. The ports Y are preferably of small cross sectional area so that oil in only minute quantities may pass therethrough. These ports Y also serve to admit pressure fluid from the tube into the reservoir to act on the oil therein for forcing it into the tube S. Similarly, in the looped portion W are formed a pair of ports Z, only one of which is shown, for admitting pressure fluid from the tube S into the reservoir and for admitting oil from the reservoir E into the tube.

If desired screens *b* may be disposed over the ports Y and Z in order to insure against the admission of solid matter from the reservoir E, such as may be entrained by the lubricant.

The operation of the device is as follows: With the oiler connected to the pressure fluid supply line O in such manner that the pressure fluid will enter the oiler at the passage J and will flow in the direction of the passage K, a portion of the presure fluid will enter the tube S at the end T and will flow through the entire length of the tube and will again issue at the end U of the tube into the main passageway Q.

Immediately after the pressure fluid has been thus supplied to the main supply line, pressure flowing through the tube S will enter the reservoir E and will create a pressure therein equal to that in the main supply line. If then the machine, such as a rock drill, which is intended to be lubricated is set in operation, the fluctuations in pressure due to the cut off and admission of pressure fluid into the rock drill will result in a corresponding fluctuation in the reservoir E. These pulsations will have the effect of emulsifying the oil in the reservoir E and such oil will then enter the ports Y and will be carried by the pressure fluid flowing through the tube S to the end U of the tube where it will be injected into the main pressure fluid stream and will be carried thereby to the drill.

With the oiler in the position illustrated, the ports Z may of course lie above the body of oil in the reservoir E. These ports Z will then only serve to admit pressure fluid into the reservoir. By properly arranging the ports Y and Z with respect to each other one of these ports is certain to be submerged in the oil in the reservoir irrespective of any position which the oiler may assume and an adequate supply of oil to the passageway Q will therefore be assured.

The present invention has been found to be exceptionaly well adapted for the purpose intended, particularly for use in connection with drilling operations where the oiler is attached to the supply line and will therefore constantly be shifted about from one position to another. One of its principal advantages is that irrespective of any position in which the oiler may lie it will be impossible for the oil in the reservoir E to drain into the main passageway Q after the supply of pressure fluid to the oiler has been shut off. This is partly due to the fact that one of the ports Y or Z will at all times lie above the level of the oil in the reservoir. Therefore, any pressure fluid which may exist in the reservoir after the supply thereto has been cut off will at once escape to the main passageway through the uncovered port in the tube without forcing the oil into the passageway as is frequently the case in oilers of this type. For the same reason it is impossible for any considerable amount of oil to drain from the reservoir into the passageway in the absence of pressure fluid in the supply line as a portion or portions of the tube will always lie at a higher level than the surface of the oil. As a consequence only a small portion of the tube may be filled with oil which may, upon the resumption of drilling, be forced into the passageway Q, but the amount of oil thus stored in the tube will not be of sufficient quantity to result in the undesirable flooding of the drilling mechanism or other machine to which the lubricant is being supplied.

I claim:

1. An air line oiler, comprising a casing forming a reservoir for oil, a main passageway for pressure fluid, a passage in the casing communicating at its ends with the main passageway at points near the ends of the reservoir to by-pass a portion of pressure fluid from one point to another in the main passageway, and ports affording communication between the passage and the reservoir to convey oil into the passage and pressure fluid into the reservoir.

2. An air line oiler, comprising a casing forming a reservoir for oil, means forming a passageway for pressure fluid, and a tube in the casing bent to form a plurality of portions extending longitudinally of the casing and communicating at its ends with the passageway at points spaced along the length of said passageway to deliver oil into the passageway and pressure fluid into the reservoir, said tube having a port to admit oil from the reservoir into the tube and pressure fluid from the tube into the reservoir.

3. An air line oiler, comprising a casing forming a reservoir for oil, means forming a passageway for pressure fluid through the

casing, and a tube in the casing having a plurality of longitudinally extending portions and comunicating at its ends with the passageway at points spaced along the length of said passageway to deliver oil into the passageway and pressure fluid into the reservoir, said tube having a port to admit oil from the reservoir into the tube and pressure fluid from the tube into the reservoir.

4. An air line oiler, comprising a casing forming a reservoir for oil, a main passageway for pressure fluid, a tube in the reservoir communicating at its ends with the main passageway at points near the ends of the reservoir to by-pass a portion of pressure fluid from one point to another in the main passageway, and ports in the tube located so that at least one port is submerged in the oil and at least one port lies above the surface of the oil.

5. An air line oiler, comprising a casing forming a reservoir for oil, means forming a passageway for pressure fluid through the casing, a tube opening with its ends into the passageway to deliver oil from the reservoir into the passageway and pressure fluid from the passageway into the reservoir, and looped portions in the tube lying in the ends of the reservoir and having ports to afford communication between the reservoir and the interior of the tube.

6. An air line oiler, comprising a casing forming a reservoir for oil, means forming a passageway for pressure fluid through the casing, a tube opening with its ends into the passageway and through which pressure fluid flows to deliver oil from the reservoir into the passageway, looped portions in the tube lying in opposite sides and in opposite ends of the reservoir, and a port in each looped portion affording communication between the reservoir and the interior of the tube.

7. An air line oiler, comprising a casing forming a reservoir for oil, means forming a passageway for pressure fluid through the casing, a tube opening with its ends into the passageway and through which pressure fluid flows for conveying oil from the reservoir into the passageway, looped portions in the tube lying in opposite sides of and near the ends of the reservoir, and a port in each looped portion for admitting pressure fluid into the reservoir and oil from the reservoir into the tube.

8. An air line oiler, comprising a casing forming a reservoir for oil, a hollow member extending through the casing to form a passageway for pressure fluid, a tube coiled through the reservoir and opening with its ends into the passageway adjacent the ends of the reservoir for conveying pressure fluid from the passageway into the reservoir and oil from the reservoir into the passageway, and a port in the tube for admitting oil from the reservoir into the tube and pressure fluid from the tube into the reservoir.

9. An air line oiler, comprising a casing forming a reservoir for oil, a hollow member extending through the casing to form a passageway for pressure fluid, a tube opening with its ends into the passageway at points near the ends of the reservoir and having looped portions lying adjacent the casing, and a port in each looped portion to afford communication between the reservoir and the interior of the tube.

10. An air line oiler, comprising a casing forming a reservoir for oil, a hollow member extending through the casing to form a passageway for pressure fluid, a tube in the reservoir opening at its ends into the passageway and through which pressure fluid flows, said tube comprising a pair of looped portions lying in the ends of the reservoir and a plurality of portions extending longitudinally of the reservoir, and a port in each looped portion for admitting oil from the reservoir into the tube and pressure fluid from the tube into the reservoir.

11. An air line oiler, comprising a casing forming a reservoir for oil, a hollow member extending through the casing to form a passageway for pressure fluid, a tube in the reservoir communicating at its ends with the passageway at points near the ends of the reservoir and through which pressure fluid flows, a pair of looped portions in the tube lying in the ends of the reservoir and on opposite sides of the hollow member, a plurality of portions in the tube extending longitudinally of the reservoir and connecting the looped portions, and ports in the looped portions for admitting oil from the reservoir into the tube and pressure fluid from the tube into the reservoir.

In testimony whereof I have signed this specification.

FRED M. SLATER.