May 2, 1933. J. C. CURTIS 1,907,045

AIR LINE OILER

Filed May 5, 1930

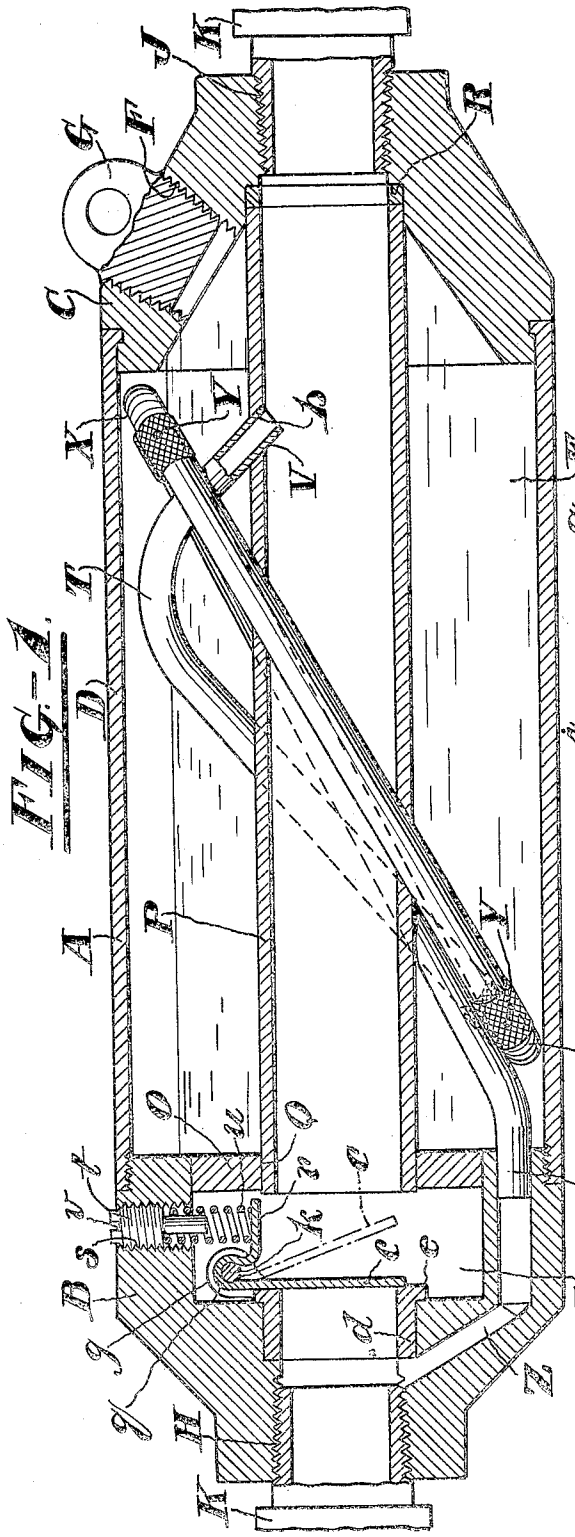


FIG. 1.

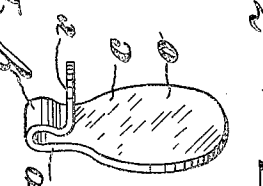


FIG. 3.

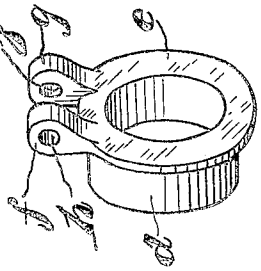


FIG. 2.

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UNITED STATES PATENT OFFICE

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AIR LINE OILER

Application filed May 5, 1930. Serial No. 449,840.

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 or 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 assure 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 the oiler may occupy, and to selectively control the rate of delivery of lubricant into the pressure fluid flowing through the oiler.

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

In the drawing 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

Figures 2 and 3 are perspective views of details of the oiler.

Referring more particularly to the drawing, 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 C and normally sealed by a plug G. The heads B and C may be secured to the tubular portion D in any well known manner which will assure fluid tight joints between the tubular portion D and the heads.

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

The head B in this instance is provided with a cavity L which communicates with the passage H and is sealed from the reservoir E by a plate O mounted in the head B at one end of the cavity L. A conduit or pipe P may be disposed coaxially of the reservoir E with one end extending into an aperture Q of the plate O and with the opposite end abutting a shoulder R in the passage J. The interior of the pipe P forms a passageway through the casing and serves as a continuation of the pressure fluid supply line.

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 pipe P consists in this instance of a tube T which may be similar in all essential respects to the corresponding means disclosed in an application of Fred M. Slater, Serial No. 323,089 now Patent Number 1,788,033. Accordingly, the tube T communicates at its opposite ends U and V with the interior of the pipe P and has a pair of looped portions W and X which are located at the opposite ends of the reservoir and which partly encircle the pipe P, although from opposite sides thereof.

In each of the looped portions W and X there may be formed a pair of ports Y (only one of each pair being shown) which afford communication between the reservoir E and the interior of the tube at these points. The ports Y are preferably of small cross sectional area so that oil in only minute quantities may pass therethrough. These ports also serve to admit pressure fluid from the tube T into the reservoir to act upon the oil therein for forcing it into the tube. By properly arranging the ports Y with respect to each other one of these ports is certain to be submerged in the oil in the reservoir and another port is certain to lie above the level of the oil in any position which the oiler may assume.

The operation of the device so far described is as follows: With the oiler connected to the pressure fluid supply line K in such manner that the pressure fluid enters the oiler at the passage H and flows in the direction of the passage J, a portion of the pressure fluid will enter one end of the tube T, as for instance the end U, and will flow through the entire length of the tube and will again issue at the

end V of the tube into the pressure fluid stream.

Pressure fluid flowing through the tube T will enter the reservoir through the ports Y and mostly through those ports which lie above the level of the oil in the reservoir to act upon the oil. Fluctuations of pressure fluid, due to the cut-off and admission of pressure fluid into the rock drill or other machine intended to be lubricated, will result in corresponding fluctuations in the pressure of the fluid in the reservoir E. These pulsations will have the effect of emulsifying the oil in the reservoir E. Such oil will enter the submerged ports Y and will be carried through the tube T by the pressure fluid flowing therethrough and will be ejected at the end V into the pipe P.

The rate of delivery of lubricant from the reservoir E to the main pressure fluid stream is dependent upon a number of contributory factors, one of which is the velocity of the pressure fluid stream through the tube T. In the present instance means are provided to permit the selective control of the velocity of the fluid through the tube T and hence to permit control of the rate of delivery of lubricant from the oiler.

To this end a passage Z is formed in the head B which communicates with the passage H between the threaded portion thereof and the cavity L and which leads around the cavity L to the inner face of the head B. The passage Z serves to establish communication between the passage H and the tube T, the end U of which may be inserted into the passage Z. The end V of the tube T may be inserted into an aperture *b* in the pipe P and preferably projects a slight distance therein.

To restrict the volume of pressure fluid issuing from the passage H into the cavity L a valve *c* which may be of the flap type is employed, as for instance, in the cavity L in such manner as to permit its oscillation in the direction of the fluid pressure flow. In this instance the valve *c* is supported by a bushing *d* secured in the passage H in any suitable manner as by being press fitted therein and having an end flange *e* which is adapted to seat against the wall of the cavity L. The flange *e* is shown provided with a pair of parallel spaced lugs *f* and *g* which project from one side of the periphery of the flange. Aligned holes *h* and *j* formed in the lugs *f* and *g* are adapted to receive a pin *k* which serves as the bearing for the valve *c*.

The valve *c* may be formed from a single piece of sheet metal and consists of a body portion *o* and an elongated portion or strip *p* extending from the periphery of the body portion *o*. The strip *p* is preferably of sufficient breadth to be slidably received laterally between the lugs *f* and *g* and has a looped portion *q* adapted to partly encircle the pin *k*. The free end *r* of the strip *p* may extend at a right angle to the body portion *o* and serves as a lever for applying pressure to the valve *c* to urge the valve toward the flange *e* whereupon it is adapted to seat.

In the present instance a threaded aperture *s* in the head *b* opens into the cavity L. A closure plug *t* threaded into the aperture *s* serves as an abutment for one end of a spring *u* which is adapted to exert a force against the free end *r* of the strip *p* in the direction for seating the valve *c*. A slot *v* may be formed in the outer end of the plug *t* for the reception of a suitable tool whereby the plug *t* may be screwed to any desired depth into the aperture *s*, thus placing the spring *u* under tension.

Pressure fluid entering the oiler through the passage H will raise the valve *c* from its seat and cross the cavity L to the pipe P from whence it again enters the supply conduit K. The valve *c* however effects a pressure differential between the fluid in the passage H and the fluid in the pipe P which is substantially equal to the tension in the spring *u*. A like preponderance of pressure in the fluid entering the end U of the tube T over the fluid issuing from the end V will be assured so that the flow of fluid through the tube T at a substantially high velocity is assured. By adjusting the plug *t* any desired velocity of flow in the tube T may be effected, so that, a decrease in the value of other contributory factors to the delivery of oil from the reservoir may be offset.

I claim:

1. An air line oiler comprising a casing forming a reservoir for oil, a main conduit for pressure fluid, a fixed member in the reservoir communicating at its ends with the main conduit and adapted to convey oil to said conduit irrespective of the position of said oiler, and pressure fluid actuated valve means in the conduit to effect a pressure differential between the fluid in the conduit and the fluid in said member.

2. An air line oiler comprising a casing forming a reservoir for oil, a main conduit for pressure fluid, a tube in the reservoir communicating at its ends with the main conduit, 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, and pressure fluid actuated valve means in the conduit to effect a pressure differential between the fluid in the conduit and the fluid in the tube.

3. An air line oiler comprising a casing forming a reservoir for oil, a main conduit for pressure fluid, a tube in the casing communicating at its ends with the conduit to deliver oil from the reservoir into the conduit, valve means actuated by pressure fluid in the conduit and located between the ends of the tube, and means opposing the pressure

of the fluid acting against the valve means to effect a pressure differential between the fluid in the conduit and the fluid in the tube.

4. An air line oiler comprising a casing forming a reservoir for oil, a main conduit for pressure fluid, a tube in the casing communicating at its ends with the conduit to deliver oil from the reservoir into the conduit, a reducing valve actuated by pressure fluid in the conduit and located between the ends of the tube to effect a pressure differential between the fluid in the conduit and the fluid in the tube and thereby assure the flow of pressure fluid through the oil conveying tube from one end to the other thereof, and adjusting means for the reducing valve to vary the velocity of the flow through said tube.

5. An air line oiler comprising a casing forming a reservoir for oil, a main conduit for pressure fluid, a tube in the casing communicating at its ends with the conduit to deliver oil from the reservoir into the conduit, a reducing valve actuated by pressure fluid in the conduit and located between the ends of the tube to effect a pressure differential between the fluid in the conduit and the fluid in the tube and thereby assure the flow of pressure fluid through the oil conveying tube from one end to the other thereof, and means adjustable from the exterior of the casing and opposing the pressure acting against the reducing valve to vary the velocity of the flow through said tube.

6. An air line oiler comprising a casing forming a reservoir for oil, a main conduit for pressure fluid, a tube in the casing communicating at its ends with the conduit to deliver oil from the reservoir into the conduit, said main conduit having an enlarged portion located between the ends of the oil conveying tube, a bearing supported by the casing within the enlarged portion, a flap valve pivoted on the bearing and adapted to close the main conduit, and a spring acting against the valve to urge the valve to the closed position to effect a pressure differential between the fluid in the conduit and the fluid in the tube and thereby assure the flow of pressure fluid through the tube from one end to the other thereof.

7. An air line oiler comprising a casing forming a reservoir for oil, a main conduit for pressure fluid, a tube in the casing communicating at its ends with the conduit to deliver oil from the reservoir into the conduit, said main conduit having an enlarged portion located between the ends of the oil conveying tube, a bushing in the main conduit extending with one end into the enlarged portion, a bearing carried by the bushing within the enlarged portion, a flap valve pivoted on the bearing and adapted to close the main conduit, and a spring acting against the valve to urge the valve to the closed position to effect a pressure differential between the fluid in the conduit and the fluid in the tube and thereby assure the flow of pressure fluid through the tube from one end to the other thereof.

8. An air line oiler comprising a casing forming a reservoir for oil, a main conduit for pressure fluid, a tube in the casing communicating at its ends with the conduit to deliver oil from the reservoir into the conduit, said main conduit having an enlarged portion located between the ends of the oil conveying tube, a bearing supported by the casing within the enlarged portion, a flap valve pivoted on the bearing and adapted to close the main conduit, a lever carried by the valve, a spring acting against the lever to urge the valve to the closed position to effect a pressure differential between the fluid in the main conduit and the fluid in the tube and thereby assure the flow of pressure fluid through the tube from one end to the other thereof, and a plug threaded into the casing and forming an abutment for the spring, said plug being adjustable to vary the tension of the spring and thereby vary the velocity of the flow of pressure fluid through the oil conveying tube.

9. An air line oiler comprising a reservoir for oil, a conduit for pressure fluid leading therethrough, a valve in said conduit and being actuated by pressure fluid flowing through the conduit, means for by-passing pressure fluid around the valve, and means to entrain oil from the reservoir in the stream of pressure fluid flowing through said by-pass means.

10. An air line oiler comprising a reservoir for oil, a conduit for pressure fluid leading therethrough, a pressure fluid actuated valve in said conduit, a tube for by-passing pressure fluid around the valve, and means to entrain oil from the reservoir in the stream of pressure fluid flowing through said by-pass tube.

11. An air line oiler comprising a reservoir for oil, a conduit for pressure fluid leading therethrough, a pressure fluid actuated valve in said conduit, a tube in the reservoir for by-passing pressure fluid around the valve, said by-pass tube having holes therein to permit oil from the reservoir to become entrained in the stream of pressure fluid therein.

In testimony whereof I have signed this specification.

JOHN C. CURTIS.