May 9, 1933. E. F. TERRY 1,907,464

OILING DEVICE

Filed Aug. 13, 1930

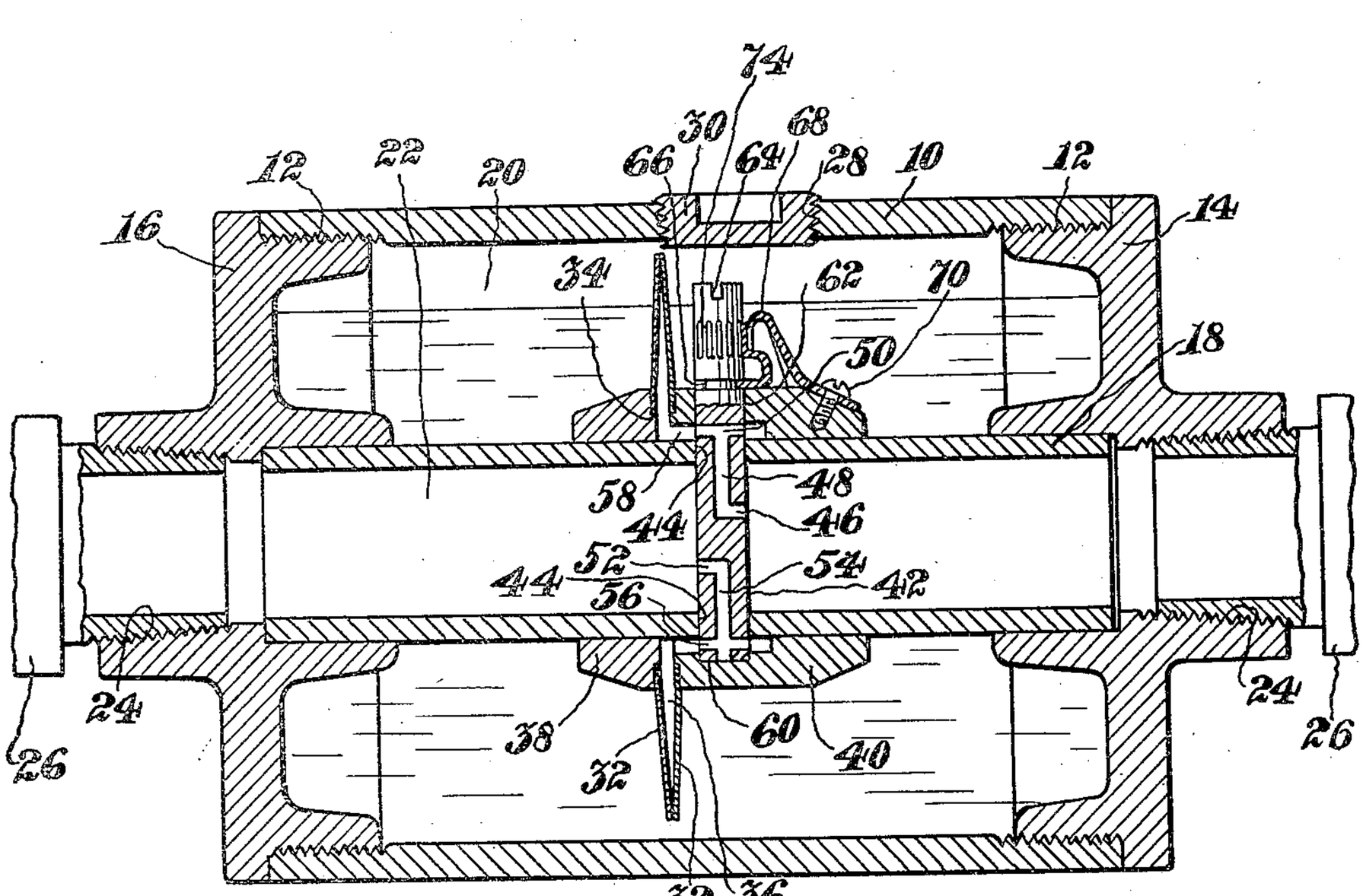

FIG.-1.

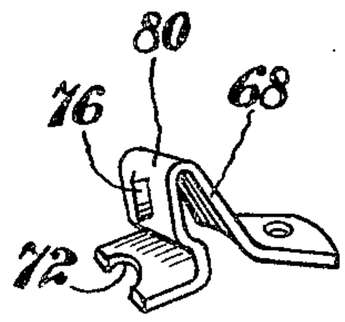

FIG.-2.

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OILING DEVICE

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This invention relates to oiling devices and has particular reference to devices of this character adapted to be located in the pressure fluid supply line of a pressure fluid actuated machine.

During the operation of fluid actuated machines, particularly reciprocatory percussive tools, such as rock drills and the like, the pressure fluid is cut-off and admitted into the machine in rapid succession, thus causing pulsations in the supply line. In consequence the oil in an oiling device attached to the supply line and exposed to the pressure therein is subjected to constantly fluctuating or unbalancing pressures which may serve to deliver oil from the oiling device to the pressure fluid current in quantities commensurate with the requirements of the tool or machine intended to be oiled.

The objects of the invention are to supply oil in suitable quantities and form to rock drills and the like, through the medium of the pressure fluid whereby such machines are actuated and to enable such lubricant to be introduced into the pressure fluid supply in any of the various positions which the oiler may assume in practice.

In the drawing accompanying this specification and forming a part thereof,

Figure 1 is a longitudinal section through the oiling device, and

Figure 2 is a perspective view of a detail.

Referring more particularly to the drawing wherein similar reference numerals denote corresponding parts throughout, the oiling device constructed in accordance with the practice of the invention comprises an outer casing 10, preferably of tubular shape to enable the casing to roll readily about its axis and having at each end internal threads 12 which are used to secure in position heads 14 and 16. Extending through the casing 10 and supported in the heads 14 and 16 is a tubular member 18 which divides the casing 10 into a reservoir 20 for oil and a passageway 22 for pressure fluid. The heads 14 and 16 are threaded as at 24 to engage sections of a hose line 26 through which pressure fluid from a suitable source is conveyed to the machine intended to be actuated. Oil may be admitted into the reservoir 20 through a hole 28 which is normally sealed by a plug 30.

As previously stated, the pressure fluid flowing along the passageway 22 causes pulsations in the passageway due to the admission and cut off of pressure fluid during the operation of the pressure fluid actuated machine and, in accordance with this invention, these pulsations are to be utilized to transfer oil from the reservoir 20 into the passageway 22 where the oil will be carried by the pressure fluid stream to the machine intended to be lubricated. The means whereby this is accomplished comprises in this instance a pair of flexible, preferably metallic, diaphragm members 32 having outer imperforate portions and central holes of sufficient size so that the internal edge 34 formed thereby will be of larger diameter than the external surface of the tubular member 18 which the diaphragms 32 encircle. The diaphragm members 32 are also preferably dished so that when in position, as shown in Figure 1, there will be a space or chamber 36 between the intermediate portions of these members and the outer edges thereof will be adapted to contact with each other. One of the diaphragms 32 may be secured to a collar 38 which is preferably located in fixed position on the tubular member 18 in any suitable manner and is adapted to support the diaphragm in the described position with its inner edge 34 spaced from the tubular member 18.

A sleeve 40, which may be arranged in fixed position upon the tubular member 18, as by press fitting, forms a support for the other diaphragm 32 and is suitably spaced with respect to the collar 38 to form a continuation of the space 36.

In order that a regulated quantity of pressure fluid may be admitted into the space 36 from the passageway 22 there is provided a plug member 42 which may extend through diametrically opposed apertures 44 in the tubular member 18. On one side of the plug member 42 is a port 46 of a longitudinally extending passage 48 in the plug and which passage opens into a transverse passageway 50 also in the plug 42 and lying on one side

of the tubular member 18. In the opposite side of the plug 42 is a port 52 of a longitudinally extending passage 54 which communicates with a transverse passage 56 extending entirely through the plug in a manner similar to the passage 50, but at the other end of said plug 42. The passages 50 and 56 communicate with a recess 58 in the sleeve 40 which recess 58 affords communication between the space 36 in the diaphragm members 32 and the passages and ports in the plug 42.

The plug 42 is adapted to be rotated within the tubular member 18 and the sleeve 40 and, to this end, the sleeve 40 is provided with a seat 60 in which one end of the plug 42 may rest and thus be held against longitudinal movement in one direction. The other end of the plug 42 extends through a bore 62 in the sleeve 40 and is provided with a slot 64 into which may be inserted a suitable tool with which to rotate the plug.

In order to retain the plug 42 against longitudinal movement in the other direction an external annular groove 66 is formed in the plug, as for instance, at a point adjacent the periphery of the sleeve 40. Entering this groove 66 is one end of a resilient member 68 which is secured at its other end to the sleeve 40 by means of the screw 70. The end of the resilient member 68 extends into the groove 66 in the plug member 42 and has a notch 72 (Figure 2) to conform approximately to the curvature of the bottom of the groove 66. In this manner the retention of the plug 42 against longitudinal movement in both directions will be accomplished.

The plug 42 is also adapted to be maintained against undesired rotation by engagement with the resilient member 68. The plug 42 is accordingly provided with a series of depressions 74 with which a projection 76 on the resilient member 68 is adapted to interlock. As shown in Figure 2 the resilient member 68 is so shaped and bent as at 80 that the projection 76 will always be held in interlocking engagement with the depressions 74 due to the inherent resiliency of this member.

During the operation of the tool by the flow of pressure fluid through the passageway 22, which may be from the head 14 in the direction of the head 16, pulsations will be caused in the passageway and may be utilized to transfer oil from the reservoir to the passageway as will now be apparent. The plug 42 may be positioned as shown in Figure 1 with the port 46 facing counter to the direction of flow of the pressure fluid. Due to this arrangement some of the pressure fluid will be diverted through the port 46 to enter the passages 48 and 50 in the plug and pass to the space 36 between the diaphragm members 32. This pressure fluid will separate the contacting edges of the diaphragms sufficiently to escape into the reservoir 20 where it will build up a pressure on the oil therein equal to the pressure in the passageway 22. Thereafter, operation of the tool will cause the said pulsations in the passageway 22 and these pulsations will be transmitted to the diaphragms 32 causing intermittent displacement of these members and periodically admitting pressure fluid into the reservoir. At the same time, the pulsations occurring in the pressure fluid will cause it to withdraw some of the oil into the space 36 between the diaphragms. Owing to the port 52 in the plug 42 being disposed in a direction opposite to that of the port 46, an area of relatively low pressure will be formed adjacent this port 52, causing the oil in the space 36 to be removed by way of the passages 56 and 54 where it will be carried by the pressure fluid stream to the machine intended to be lubricated.

The maximum amount of oil will be removed from the reservoir 20 into the passageway 22 when the plug 42 is positioned as described with the port 46 facing the pressure fluid stream from the head 14. Rotation of the plug 42 to bring the port 46 substantially transverse to the direction of flow of the pressure fluid will reduce the quantity of oil removed from the reservoir to a minimum, as the pressure at the ports 46 and 52 will then be equal. It will be apparent that the plug 42 may be rotated to any intermediate position so that any quantity of oil between the maximum and minimum may thus be withdrawn from the reservoir 20.

This intermittent admission of pressure fluid into the reservoir and oil into the passageway 22 will continue as long as the machine is being operated as the pulsations in the passageway 22 will be constantly caused thereby. It will be noted that the diaphragms have been symmetrically arranged with respect to the tubular member 18 and the casing 10, so that the oiler will function equally well whether it is positioned with the filler plug 30 uppermost or lowermost or in any position therebetween.

I claim:

1. An air line oiler comprising a casing having a passageway for pressure fluid and a reservoir for oil, and a pair of diaphragm members in the reservoir having their outer edges only in contact to normally prevent communication between the reservoir and the passageway and being adapted to be intermittently separated by the pulsations occurring in the pressure fluid to provide a path therebetween for oil from the reservoir to pass to the passageway.

2. An air line oiler comprising a casing having a passageway for pressure fluid and a reservoir for oil, an adjusting plug in the passageway having passages therein affording communication between the passageway

and the reservoir, said plug being movable to vary the position of the passages relative to the direction of the flow of pressure fluid, and a pair of members in the reservoir arranged in contacting relationship to separate the passageway from the reservoir, said members being adapted to be intermittently separated by the pulsations occurring in the pressure fluid and transmitted through one of the passages in the plug to provide a path between said members for oil from the reservoir to pass to the passageway.

3. An air line oiler comprising a casing having a passageway for pressure fluid and a reservoir for oil, an adjusting plug in the passageway having passages therein affording communication between the passageway and the reservoir, said plug being movable to vary the position of the passages relative to the direction of flow of the pressure fluid, and a pair of dished diaphragm members in the reservoir having their outer edges only in contact and adapted to be intermittently separated by the pulsations occurring in the pressure fluid and transmitted through one of the passages in the plug to provide a path between said members for oil from the reservoir to pass to the passageway.

4. An air line oiler comprising a casing having a passageway for pressure fluid and a reservoir for oil, an adjusting plug in the passageway having passages therein affording communication between the passageway and the reservoir, said plug being movable to vary the position of the passages relative to the direction of the flow of pressure fluid, a support for the plug having a seat therefor preventing longitudinal movement in one direction, a resilient member on the support engaging the plug and preventing longitudinal movement thereof in the other direction, said resilient member also having a portion engaging the plug and adapted to prevent undesired rotation thereof, and a pair of members in the reservoir arranged in contacting relationship to separate the passageway from the reservoir, said members being adapted to be intermittently separated by the pulsations occurring in the pressure fluid and transmitted through one of the passages in the plug to provide a path between said members for oil from the reservoir to pass to the passageway.

5. An air line oiler comprising a casing having a reservoir for oil and a passageway for pressure fluid, an adjusting plug in the passageway having passages therein affording communication between the passageway and the reservoir, said plug being rotatable to vary the position of the passages relative to the pressure fluid stream, a support for the plug having a seat therefor preventing longitudinal movement in one direction, a resilient member on the support engaging the plug and preventing longitudinal movement thereof in the other direction, said resilient member also having a portion engaging the plug and adapted to prevent undesired rotation thereof, a collar spaced from said support, and a pair of dished diaphragm members in the reservoir, one secured to the support and the other to the collar spaced therefrom with their outer edges only in contact, and adapted to be intermittently separated by the pulsations occuring in the pressure fluid and transmitted through one of the passages in said adjusting plug to provide a path between said members for oil from the reservoir to pass to the passageway.

In testimony whereof I have signed this specification.

EDWARD F. TERRY.