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LUBRICATING DEVICE

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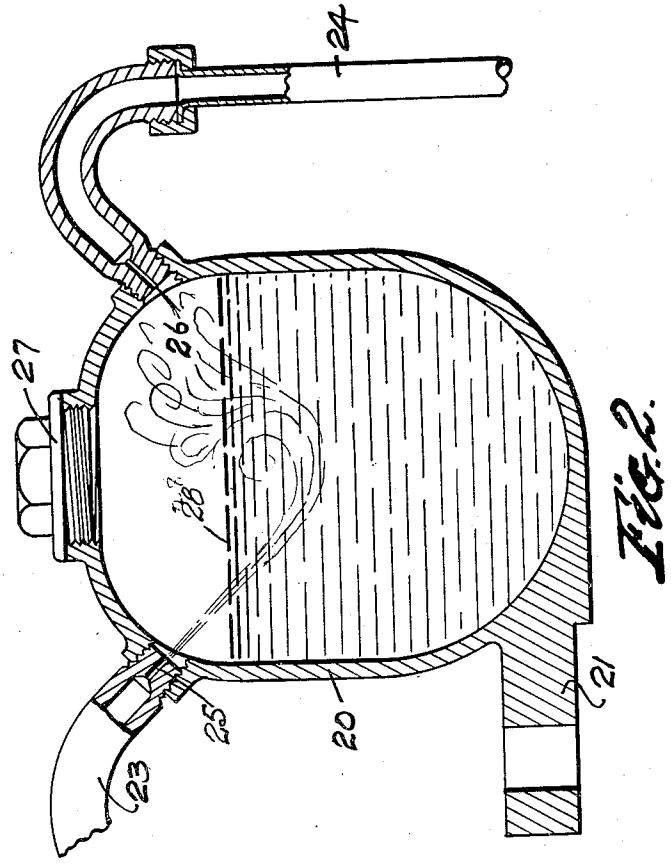


Fig. 2.

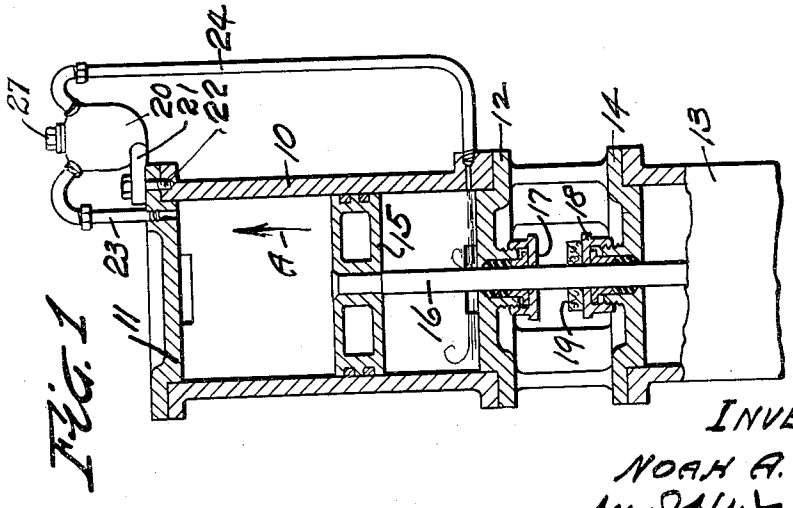


Fig. 1

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LUBRICATING DEVICE

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12 Claims. (Cl. 184—18)

This invention relates to improvements in lubricating devices for cylinders, pistons and piston rods, and particularly to lubricators for such parts of air compressors. It is especially applicable to air compressors such as are used on locomotives.

Air compressors used on locomotives are ordinarily of the double acting type, alternately compressing the air at opposite ends of the cylinder. They are usually also of the vertical type, with the compressor cylinder positioned directly above an actuating steam cylinder. The piston of the compressor is connected directly by a piston rod to the piston of the steam cylinder, the stuffing boxes of the cylinders being spaced short distances apart.

Difficulty has been experienced in lubricating the lower portion of the compressor cylinder and even greater difficulty in lubricating the piston rod, particularly that portion of the rod which lies immediately adjacent the underside of the compressor piston and which therefore does not pass beyond the stuffing box. An oil saturated felt washer is placed around the rod between the stuffing boxes, which washer accomplishes lubrication of the steam end of the rod but fails to reach portions of the compressor end thereof.

The objects of the present invention are:

To provide a simple and efficient device adapted to be used in connection with compressors, steam engines or the like, whereby piston movement causes transfer of oil from the device to the interior of the cylinder;

To provide means for transferring vaporized oil, or oil in the form of an atomized spray into the cylinder;

To provide means for utilizing highly compressed or high pressure gases at one end of the cylinder for transferring oil to an opposite region of low pressure; and

To provide means for utilizing the high pressures and/or temperatures due to compression at one end of the cylinder of an air compressor for atomizing and/or vaporizing the oil for delivery to the opposite end thereof.

The means by which the foregoing and other objects are accomplished and the manner of their accomplishment will readily be understood from the following specification by reference to the accompanying drawing, in which:

Fig. 1 is a sectional elevation of an air compressor cylinder, and a fragmentary portion of a steam cylinder for actuating the compressor, with the oiler applied to the compressor cylinder.

Fig. 2 is a sectional elevation on a larger scale showing detail of the oil cup and parts.

Referring now to the drawing in which the various parts are indicated by reference numerals, 10 is a compressor cylinder, and 11 and 12 the two heads thereof. 13 is a steam cylinder and 14 a head thereof.

15 is the compressor piston and 16 the piston rod connecting the compressor piston with that (not shown) of the steam cylinder. 17 and 18 are respectively the compressor and steam cylinder stuffing boxes, and 19 a felt washer disposed around the piston rod between these boxes which washer is saturated with oil to lubricate the rod.

Valve and piping details of the cylinders are purposely omitted.

20 is an oil holder, or cup, which is supported on, or otherwise secured in proximity to, the cylinder 10, as by a bracket 21, formed integral with the cup, and secured by a cap screw 22 to the cylinder. Leading from opposite ends of the cylinder, to the cup are oil tubes 23, 24, the latter of which preferably discharges through a side wall of the cylinder, adjacent the bottom head, and is pointed toward the piston rod. Both pipes lead into the top of the cup, preferably at diametrically opposite sides thereof, and discharge diagonally downward thereinto through restricted passageways or nozzles 25, 26, the area of which is determined and preferably fixed with relation to the amount of oil to be fed. 27 is a removable plug, which closes a filling opening in the top of the cup.

The cup is filled with oil approximately to the level 28 shown and is ready for use.

The action of the device is as follows: As the compressor piston 15 moves toward an end of the cylinder, as for illustration in the direction of the arrow A, air is forced, under increasing pressure and temperature, through the pipe 23, and discharged violently downward through the nozzle 25 against and penetrating the surface 28 of the oil. Near the end of the piston stroke the pressure and/or temperature is sufficient to atomize or vaporize the oil and such finely divided oil is carried through the nozzle 26 and pipe 24 and discharged into the opposite end of the cylinder, which is then under low pressure or even vacuum. A similar action is accomplished in the opposite direction on the reverse movement of the piston. It will be noted that discharge at the piston-rod end of the cylinder is preferably partially at least, against the piston rod.

It will particularly be noted that on each re-

versal of piston movement air under pressure is reversely blown through the nozzles and they are thereby automatically cleared of obstruction.

It will also be noted that the feeding of the lubricant to the cylinders is accomplished without the interposition of moving parts or other feeding means.

Having now fully disclosed my invention what I claim is:

1. The combination with a cylinder, having opposed heads, a double acting piston therein, an enclosed lubricant supply, and a pair of passageways in communication with opposite ends of said cylinder leading into the enclosure above said oil supply, and being unobstructed between their connection with said enclosure and said cylinder ends, whereby flow from one end of said cylinder through said enclosure to the opposite end thereof is alternated as said piston is reciprocated and oil charged fluid delivered alternately to said cylinder ends.

2. Lubricating means for a cylinder, having opposed heads and a double acting piston therein, said means comprising a closed oil cup, a pair of tubes leading respectively from opposite end portions of said cylinder to said cup, said tubes being unobstructed from end to end, each of said tubes having a downwardly directed portion terminating in a restricted orifice, connecting such tube into the upper portion of said cup, above the oil supply therein.

3. Lubricating means for a cylinder, having opposed heads and a double acting piston therein; said means comprising a closed oil cup, a pair of tubes unobstructed from end to end, leading respectively from the opposite end portions of said cylinder to said cup, each tube having a portion, terminating in a restricted orifice, directed diagonally downward, connecting such tube into the upper portion of said cup, above the oil supply therein.

4. Lubricating means for a cylinder, having a double acting piston therein; said means comprising a closed lubricant receptacle, and independent passageways each originating at the top of said receptacle and respectively leading therefrom to opposite ends of said cylinder, each of said passageways being open to flow to and from said cylinder and said receptacle, whereby to permit alternation of such flow on actuation of said piston.

5. Lubricating means for a compressor cylinder, having a double acting piston therein; said means comprising a closed receptacle for oil, and a pair of complementary passageways connecting the top of said receptacle and respectively, each an opposite end portion of said cylinder, the receptacle end of each of said passageways having an end portion with a restricted orifice and being downwardly directed toward oil in said receptacle, said passageways each being open to flow both to and from said receptacle and said cylinder, whereby to alternate complementary compressive and exhaust flows through said passageways to and from said receptacle on actuation of said piston.

6. Lubricating means for a cylinder having opposed heads and a double acting piston therein; comprising a closed oil cup and a pair of tubes leading respectively from the opposite end portions of said cylinder, and each terminating in a downwardly directed portion leading into the top of said cup, said tubes being unobstructed from end to end, whereby to establish communicating means permitting alternation of flow between opposite ends of said cylinder and transfer of oil vapor thereby to said cylinder ends.

7. Lubricating means for a cylinder, having opposed heads and a double-acting piston therein; comprising a closed oil cup and a pair of unobstructed tubes leading respectively from the opposite end portions of said cylinder, and each terminating in a downwardly directed portion leading into the top of said cup above the level of oil therein, said tubes having restricted orifices at their cup ends, whereby to increase velocity of flow against the surface of the oil therein.

8. The combination with a cylinder having opposed heads, and a double acting piston therein, of lubricating means comprising a passageway exterior to said cylinder and in communication with both ends of said cylinder, said passageway comprising a closed oil cup and two unobstructed tubes each having one end connected into an end of said cylinder and its opposite end connected into said oil cup above the oil level therein, and downwardly directed toward said oil level.

9. The combination with a cylinder having opposed heads, and a double acting piston therein; of lubricating means including a passageway exterior to said cylinder extending from one end of said cylinder to the opposite end thereof, said passageway being open from end to end for flow in either direction, and comprising a closed oil cup and two complementary tubes, one of said tubes having one end connected into one end of said cylinder and the other into the opposite end thereof, and each having its opposite end extending downwardly toward, and terminating in the top of said oil cup.

10. Lubricating means for a double ended air compressor, having a piston reciprocable therein; said means comprising a closed lubricant receptacle and independent means, respectively establishing communication between the top of said receptacle and opposite ends of said cylinder, both of said means being open for flow to and from said cylinder, from and to said receptacle, and each having its connecting portion at said receptacle downwardly directed toward lubricant therein, whereby said means establish communication through said receptacle between opposite ends of said cylinder and permit discharge of air, compressed alternately at each end of said cylinder, against the surface of said lubricant and the transfer of such lubricant laden air to the respective opposite end of said cylinder.

11. Lubricating means for a double ended air compressor, having a piston reciprocable therein; said means comprising a closed lubricant receptacle and a pair of tubes, respectively establishing communication between the top of said receptacle and opposite ends of said cylinder, both of said tubes being open for flow to and from said cylinder, from and to said receptacle and each of said tubes having its connecting portion at said receptacle downwardly directed toward lubricant therein, whereby said tubes establish communication through said receptacle between opposite ends of said cylinder and permit discharge of air, compressed alternately at each end of said cylinder, against the surface of said lubricant and the transfer of such lubricant laden air to the respective opposite end of said cylinder.

12. Lubricating means for a double ended air compressor, having a piston reciprocable therein; said means comprising a closed lubricant re-

ceptacle and a pair of tubes, respectively establishing communication between the top of said receptacle and opposite ends of said cylinder, both of said tubes being open for flow to and from said cylinder, from and to said receptacle and each of said tubes having its connecting portion at said receptacle downwardly directed toward lubricant therein, said tubes having each a restricted orifice at its end, whereby said tubes establish communication through said receptacle between opposite ends of said cylinder and permit discharge of air, compressed alternately at each end of said cylinder, violently against the surface of said lubricant and the transfer of such lubricant laden air to the respective opposite ends of said cylinder.

NOAH A. SELLERS.