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G. NEMETZ

2,619,191

LUBRICATING PUMP

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Fig.1

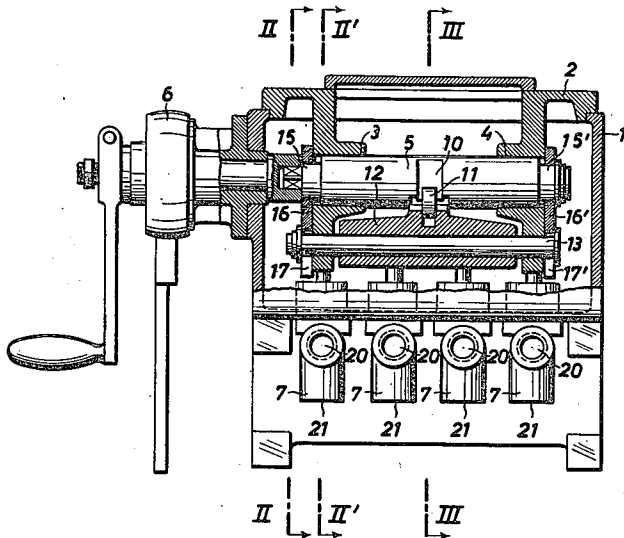


Fig.2.

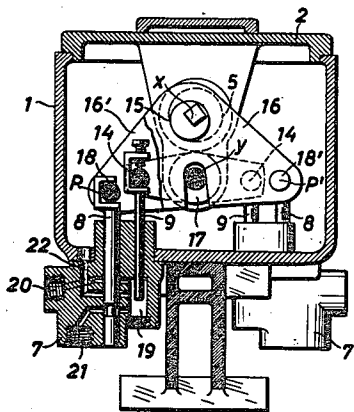
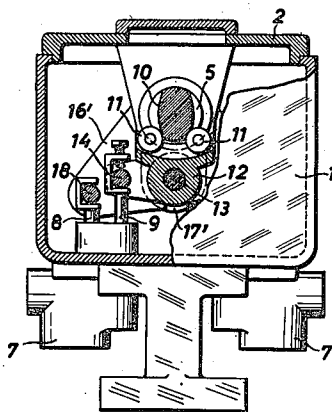


Fig. 3



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UNITED STATES PATENT OFFICE

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LUBRICATING PUMP

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7 Claims. (Cl. 184—27)

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This invention relates to an oscillating drive for the control pistons of lubricating pumps of the kind having the pump units disposed on both sides of the driving shaft of the pump, each pump unit alternately supplying two outlets with lubricant. Such pump units usually consist of an independently acting assemblage which is driven by the pump shaft and comprises at least one delivery piston and one control piston for controlling the suction and delivery of the same. For causing the lubricant conveyed by the delivery piston to flow alternately to two different outlets, the delivery piston is driven with double the number of strokes of the control piston, for instance by a double cam mounted on the pump shaft.

With lubricating pumps of this kind it has hitherto been the practice to provide one oscillator for driving the control pistons of the pump units disposed on one side of the pump and a second oscillator for driving the control pistons of the pump units on the other side of the pump, each oscillator being rockable about a bolt and driven by an eccentric engaging in a jaw of the oscillator. It is then necessary that the two driving eccentrics be set at different angles with respect to the double lift cam operating the oscillator which is employed for driving the delivery pistons of both pump sides.

Now, the invention aims at providing a simplification of this construction and consists substantially in this, that the drive of the control pistons disposed at both sides of the pump shaft is effected by one or more oscillators common to both sides of the pump. By this means not only is the construction of the pump shaft simplified and the manufacturing difficulty in forming it with two eccentrics set at an angle to one another overcome, but two oscillators are replaced by one common oscillator, whereby in each case one part and one supporting bearing done away with.

According to the invention the arrangement is made such that the oscillator is provided at both ends with members engaging with the control pistons at both sides of the pump and is guided in the middle between these members at a stationary point of the pump casing, about which point it is rocked by an eccentric of the pump shaft. The oscillator is suitably supported on the eccentric of the pump shaft and slidably guided at a stationary point of the casing, which is displaced parallel to the axes of the control pistons with respect to the axis of the pump shaft, such that it performs a motion after the manner of a connecting rod. Through this con-

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necting-rod-like motion the stroke of the control piston is increased, as the stroke of the oscillator ends is made up of the rocking motion of the oscillator and of the upward and downward motion of the whole oscillator. Through the greater stroke of the control pistons the control is improved.

While the control pistons under the action of the double lift cam perform their operative motion twice during one revolution of the pump shaft, the control pistons are thus moved to and fro only once by the oscillator, so that with a suitable angular offset of the eccentric the control piston in its middle position uncovers the inlet to the working space of the corresponding delivery piston and in its two dead centre positions conveys the lubricant to the different outlets.

A constructional example of the invention is illustrated diagrammatically in the accompanying drawings, in which

Fig. 1 shows a vertical longitudinal section through the middle of the pump;

Fig. 2 a cross section on line II—II of Fig. 1, in the left hand lower part the section being taken through one pump unit along line II'—II' of Fig. 1, and

Fig. 3 a partial cross section on line III—III of Fig. 1.

The pump casing 1 serving as a storage tank for the lubricant is closed at the top by a cover 2 which is provided with bearings 3 and 4 for the pump shaft 5. The pump shaft has a rotary motion imparted to it by an oscillating lever drive 6. The pump units 7 are arranged, as shown in Figs. 2 and 3, in rows at both sides of the pump shaft, being screwed from below to the bottom of the pump casing 1 in such a manner that the control pistons 8 and the delivery pistons 9 extend upwards through openings in the pump casing.

For driving the delivery pistons 9 a double lift cam 10 (Fig. 3) is formed in the pump shaft 5 which cam rolls on rollers 11 of an oscillator 12 supported on a bolt 13, such that at each revolution of the pump shaft the oscillator rocks twice to and fro. At both sides there are provided on the oscillator 12 lifting bolts 14 which actuate the delivery pistons 9, so that the latter perform their working motion twice at each revolution of the pump shaft 5.

At the ends of the pump shaft 5, which extend beyond the bearings 3 and 4, are mounted two eccentrics 15 and 15', on which are supported two driving oscillators 16 and 16' for the control pistons 8. Each of these oscillators

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is slidably guided by means of a fork 17 and 17' respectively at the corresponding end of the bolt 13, so that, on the pump shaft 5 rotating, the oscillators 16 and 16' have a motion in the manner of a connecting rod imparted to them, the connecting rod axis being always determined by the line connecting the centre x of the eccentrics 15 and 15' respectively with the centre y of the bolt 13. The two oscillators 16 and 16' are connected to the right and left of the driving shaft 5 of the pump at the points P and P' by lifting rods 18 and 18' which are embraced by jaws of the control pistons 8.

During the connecting-rod-like motion of the oscillators 16 and 16' the control pistons 8 perform in the course of each revolution of the pump driving shaft 5 one upward and one downward motion. With an appropriate selection of the angular position of the eccentrics 15 and 15' with respect to the double lift cam 10 on the shaft 5, the driving motion for the control pistons 8 on one side of the pump and on the other side of the pump will be such as to cause these control pistons to control the working spaces 19 of the delivery pistons 9 in such a manner that each delivery piston will alternately force the lubricant during its pressure stroke into the outlet 20 and into the outlet 21, whilst, on the corresponding control piston 8 passing through the centre position, the delivery piston will each time draw in lubricant by way of a suction duct 22 out of the storage tank into the operative space 19 of the pump.

As will be seen from the drawing, in this case only similarly formed oscillators 16 and 16' pushed over similar eccentrics 15 and 15' are required for driving the control pistons 8 disposed on both sides of the pump shaft 5, whereas it has hitherto been necessary to provide at each bearing point 3 and 4 two oscillators on two eccentrics offset with respect to one another. Owing to the fact that according to the invention only a single oscillator is provided for each bearing point 3 and 4 and that these oscillators are pushed on to the eccentrics 15 and 15' at the outside closed to the bearing points 3 and 4, it becomes possible to build a very compact pump of simple design.

What is claimed is:

1. A lubricating pump comprising a pump housing, a rotary pump shaft within said housing, a plurality of delivery pistons on one side of said rotary pump shaft, a plurality of delivery pistons on the other side of said rotary pump shaft, piston chambers in said housing in which said delivery pistons reciprocate, a cam drive from said rotary pump shaft to said delivery pistons, a plurality of control pistons on one side of said rotary pump shaft, a plurality of control pistons on the other side of said rotary pump shaft, bores in said housing in which said control pistons reciprocate, at least one eccentric on said rotary pump shaft, an eccentric strap surrounding said eccentric extending transversely of said rotary pump shaft and drivably connected to the control pistons on each side of the latter for reciprocating the control pistons in one to two ratio with respect to the delivery pistons, a lubricant supply channel in said housing to each piston chamber and intersecting the bore with the corresponding control piston therein, dual lubricant outlets in said pump housing, and dual channels in said pump housing from each piston chamber to the respective

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outlets and also intersecting the bore with the corresponding control piston therein.

2. A lubricating pump comprising a pump housing forming a lubricant reservoir, a rotary pump shaft in said pump housing, series of pumping units on each side of said rotary shaft, a piston chamber for each pumping unit formed in said pump housing, a delivery piston reciprocable in each piston chamber, a bore in said pump housing for each pumping unit, a control piston reciprocable in said bore, a pair of lubricant outlets from said pump housing, a supply channel from the lubricant reservoir to the piston chamber and intersecting said bore, outlet channels from said piston chamber to said outlets also intersecting said bore, and operating means for driving both the delivery pistons and the control pistons from said rotary shaft, said operating means consisting in part of a pair of spaced eccentrics on said rotary pump shaft, eccentric straps surrounding said eccentrics extending transversely of said rotary pump shaft and parallel rods carried by the outer ends of said eccentric straps on each side of the rotary pump shaft and each drivably connected with the control pistons on the respective side of the rotary pump shaft for reciprocating the control pistons in two to one ratio with respect to the delivery pistons.

3. A lubricating pump comprising a pump housing forming a lubricant reservoir, a rotary pump shaft, a pair of bearings within said housing mounting said rotary pump shaft, a series of pumping units on each side of said rotary shaft, a piston chamber for each pumping unit formed in said pump housing, a delivery piston reciprocable in each piston chamber, a bore in said pump housing for each pumping unit, a control piston reciprocable in said bore, a pair of lubricant outlets from said pump housing, a supply channel from the lubricant reservoir to the piston chamber and intersecting said bore, outlet channels from said piston chamber to said outlets and also intersecting said bore, eccentrics on said rotary shaft adjacent said bearings, an eccentric strap mounted on each eccentric and extending transversely of the rotary pump shaft, guide means comprised by aligned slots in the eccentric straps and a rod mounted in said pump housing and extending through said slots constraining in part the motion of said eccentric straps, and parallel rods carried by the outer ends of said eccentric straps and each drivably connected with the control pistons on the respective side of the rotary pump shaft for reciprocating the control pistons in two to one ratio with respect to the delivery pistons.

4. A lubricating pump comprising a pump housing forming a lubricant reservoir, a rotary pump shaft, a pair of bearing members within said housing mounting said rotary pump shaft, a series of pumping units on each side of said rotary pump shaft, a piston chamber for each pumping unit formed in said pump housing, a channel from said reservoir to each piston chamber, a delivery piston reciprocable in each piston chamber, a bore in said pump housing for each pumping unit, a control piston reciprocable in said bore, a pair of outlet channels from each piston chamber and intersecting the bore with the control piston therein, eccentrics on said rotary pump shaft adjacent said bearing members, an eccentric strap mounted on each eccentric and extending transversely on both sides of the rotary pump shaft, lifting rods between the ends

of said eccentric straps and connected to the control pistons, a pivot member between said bearing members and parallel to said rotary pump shaft, a double lift cam on said rotary pump shaft, and an oscillatory member on said pivot member drivably engaged by said double lift cam and connected to the delivery pistons whereby the latter are driven at double the number of strokes of the control pistons.

5. A lubricating pump comprising a pump housing forming a lubricant reservoir, a rotary pump shaft, a series of identical pump units on each side of said rotary pump shaft, a piston chamber for each pump unit formed in said pump housing, a channel from said reservoir to each piston chamber, a delivery piston reciprocable in each piston chamber, a bore in said pump housing corresponding to each pump unit and a control piston reciprocable in said bore, a pair of outlet channels from each piston chamber and intersecting said bore with the control piston therein, oscillatory means driven by said rotary pump shaft and engaging the delivery pistons of the pump units on both sides of the rotary pump shaft, additional oscillatory means engaging the control pistons of the said pump units on both sides of the pump shaft and driving the control pistons with half the number of strokes of said delivery pistons, eccentrics on said rotary pump shaft, stationary guide means mounted in the pump housing, said second oscillatory means being mounted on said eccentrics on the rotary pump shaft, and constrained by the said stationary guiding means so as to operate as a connecting rod between the rotary pump shaft and the control pistons.

6. A lubricating pump comprising a pump housing forming a lubricant reservoir, aligned bearings formed in said pump housing, a rotary pump shaft parallel to said bearings, said pump shaft having eccentrics thereon positioned to lie on the outside of the respective bearings, eccentric straps mounted respectively on said eccentrics and extending transversely of said rotary pump shaft on both sides thereof, means for constraining the longitudinal movements of said eccentric straps, rods connecting the outer ends of said eccentric straps on both sides of the rotary pump shaft, a series of identical pump units on each side of said rotary pump shaft, a piston chamber for each pump unit formed in said pump housing, a channel from said reservoir to each piston chamber, a delivery piston reciprocable in each piston chamber, means connecting the delivery pistons to the rods between the eccentric straps, a pair of outlet channels from each piston chamber and intersecting said bore with the control piston therein, oscillatory means driven by

said rotary pump shaft and engaging the delivery pistons of the pump units on both sides of the rotary pump shaft and driving the latter with double the number of strokes of the control pistons, means connecting the delivery pistons to the rods between the eccentric straps, a pair of outlet channels from each piston chamber and intersecting said bore with the control piston therein, a rod mounted between the aligned bearings in said pump housings and receiving the aligned slots in the eccentric straps, an oscillatory member mounted on said rod, means connecting said oscillatory member to the delivery pistons on both sides of the rotary pump shaft and a double lobe cam mounted on said rotary pump shaft and drivably engaged with said oscillatory member for driving the delivery pistons at double the number of strokes of the control pistons.

7. A lubricating pump comprising a pump housing forming a lubricant reservoir, aligned bearings formed in said pump housing, a rotary pump shaft journaled in said bearings, said pump shaft having eccentrics therein positioned to lie on the outside of the respective bearings, eccentric straps mounted respectively on said eccentrics and extending transversely of said rotary pump shaft on both sides thereof, said eccentric straps having aligned slots therein comprising in part means for constraining the longitudinal movements of said eccentric straps, rods connecting the outer ends of said eccentric straps on both sides of the rotary pump shaft, a series of identical pump units on each side of said rotary pump shaft, a piston chamber for each pump unit formed in said pump housing, a channel from said reservoir to each piston chamber, a delivery piston reciprocable in each piston chamber.

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