No. 664,180.

Patented Dec. 18, 1900.

L. SERPOLLET.

LUBRICATING APPARATUS.

(Application filed Sept. 7, 1899.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1

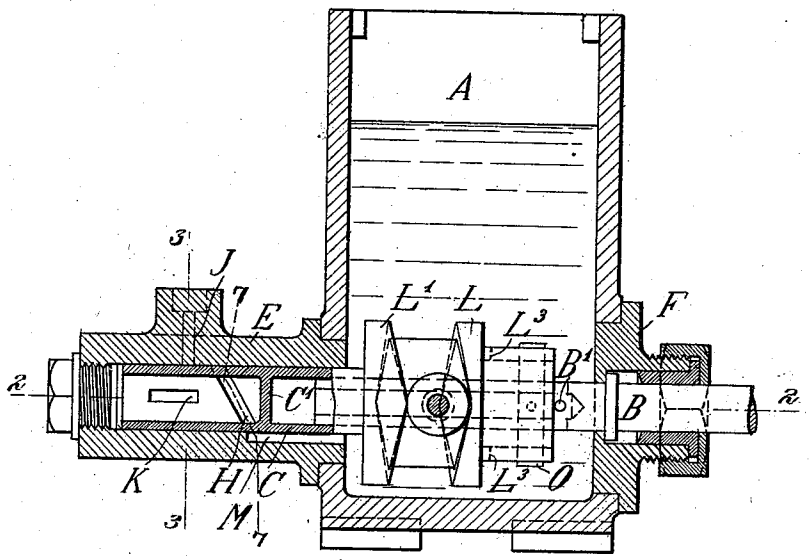
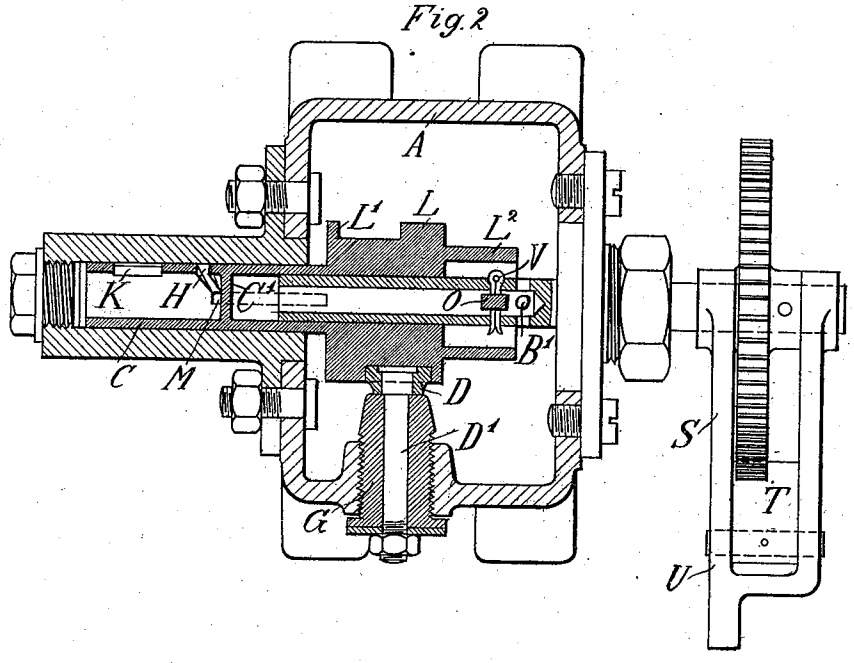


Fig. 2



WITNESSES:

William P. Goebel,

Rud. J. Hosted

INVENTOR

L. Serpollet

BY Munn & Co

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 3

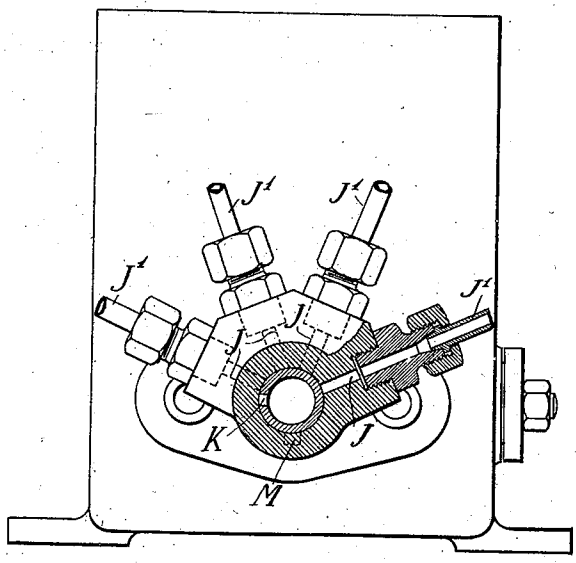
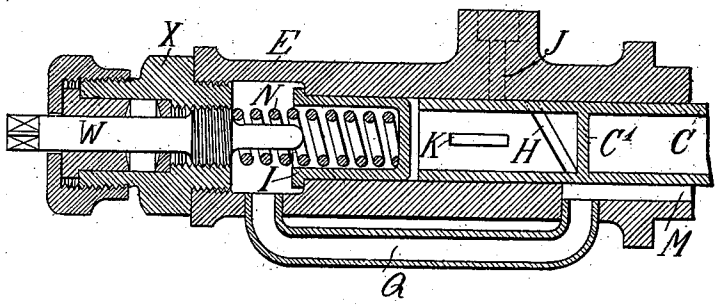


Fig. 4



WITNESSES:

William P. Gaebel

Rev. J. Hoskins

INVENTOR.

L. Serpollet

BY Munn & Co.

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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L. SERPOLLET.

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Fig. 5

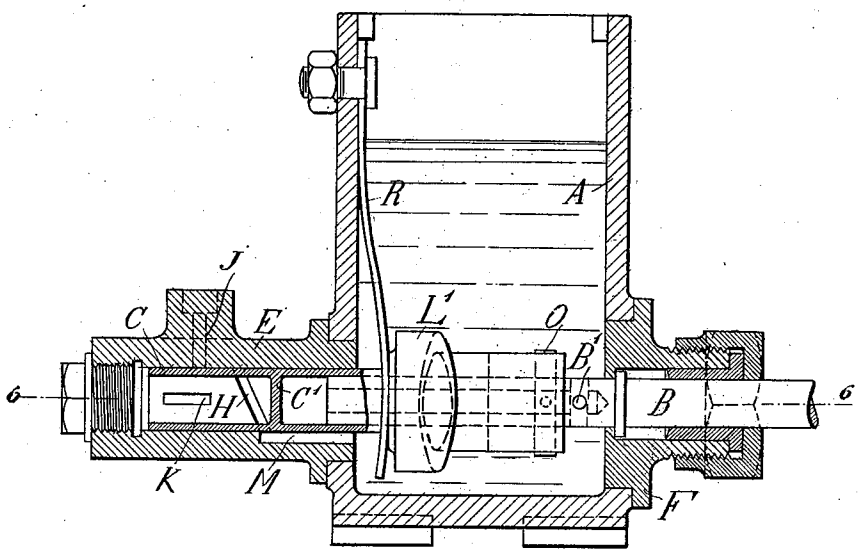
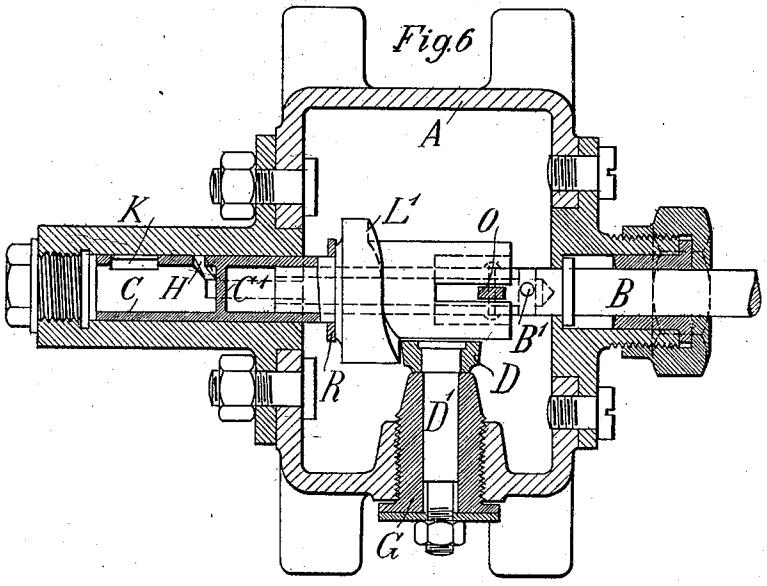


Fig. 6



WITNESSES:

William P. Goebel.

Henry J. Hoskins

INVENTOR

L. Serpollet

BY Munn & Co

ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 664,180.

Patented Dec. 18, 1900.

L. SERPOLLET.

LUBRICATING APPARATUS.

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(No Model.)

4 Sheets—Sheet 4.

Fig. 7

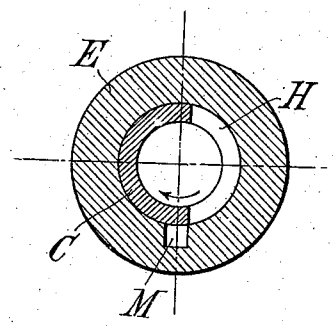


Fig. 8

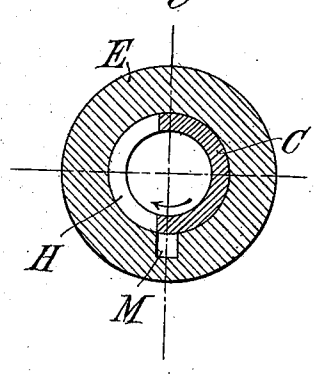


Fig. 9

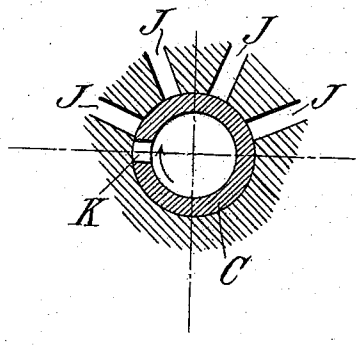


Fig. 10

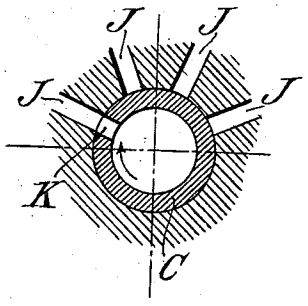
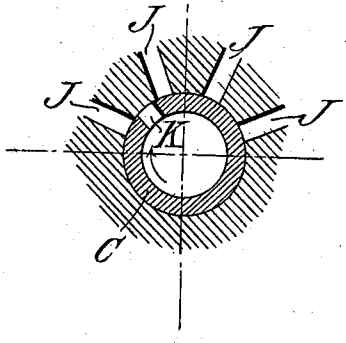


Fig. 11



Witnesses.
Julius Lutz.
C. H. Davis

Inventor.
Leon Serpollet.

By Munn & Co.
Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LEON SERPOLLET, OF PARIS, FRANCE, ASSIGNOR TO SCHÄFFER & BUDENBERG, OF MAGDEBURG-BUCKAU, GERMANY.

LUBRICATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 664,180, dated December 18, 1900.

Application filed September 7, 1899. Serial No. 729,707. (No model.)

To all whom it may concern:

Be it known that I, LEON SERPOLLET, a citizen of the Republic of France, residing at Paris, France, have invented a new and useful Lubricating Apparatus, (for which I made application for Letters Patent in France on the 30th day of March, 1899, and in Germany on the 31st day of May, 1899,) of which the following is a specification.

My invention relates to a mechanically-operated lubricating apparatus of the kind in which the oil is drawn from a reservoir by means of a piston or plunger and then delivered to the parts to be lubricated through one or more distributing-pipes, either under pressure or not, as may be desired; and the objects of my invention are, first, to provide a piston adapted to be simultaneously rotated and reciprocated in a cylinder attached to the reservoir, so as to effect the lubrication in an absolutely effective manner and without the intervention of suction or pressure valves, which never operate satisfactorily with thick and viscid lubricating materials—such, for example, as "volvoline-oil"—and often give rise to the defect of steam entering the oil-reservoir and to other disturbances; second, to provide means for reciprocating the said piston while it is being revolved, and, third, to provide a device whereby overpressure is avoided if the apparatus is used for lubricating surfaces under pressure. I attain these objects by the apparatus illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of an apparatus serving for lubricating surfaces under no pressure. Fig. 2 is a horizontal section of the same on the line 2 2 in Fig. 1. Fig. 3 is a cross-section of the same on the line 3 3 in Fig. 1. Fig. 4 is a vertical longitudinal section, on an enlarged scale, of a device for avoiding overpressure, which device is attached to the lubricating apparatus if the latter is used for lubricating surfaces under pressure. Fig. 5 is a longitudinal sectional elevation of a modified form of the improvement, and Fig. 6 is a sectional plan view of the same on the line 6 6 in Fig. 5. Figs. 7 and 8 are vertical cross-sections, on an enlarged scale, on the line 7 7 in Fig. 1, the suction-port H being represented as set at right angles to the axis of the cylinder E and the piston C being shown in different positions in the respective figures; and Figs. 9, 10, and 11 are vertical cross-sections, on an enlarged scale, on the line 3 3 in Fig. 1, the piston C being shown in different positions in the respective figures.

Similar letters refer to similar parts throughout the several views.

In Fig. 1, A is the oil-reservoir, and E the cylinder attached thereto and communicating therewith through the suction-channel M. The cylinder E is provided with a number of channels J J for conducting the oil to the distribution-pipes J′ J′. In the cylinder E the hollow piston C is fitted to rotate and to reciprocate simultaneously. It has a partition-wall C′, and on the one side of this a slanting suction-port H and a discharge-port K in the direction of the axis. On the other side of the partition-wall C′ the piston C is provided with a cam-drum L—*i. e.*, a cylinder having a groove L′ of the shape shown in Fig. 1. In the stuffing-box F, attached to the oil-reservoir A, the shaft B is journaled and prevented from shifting endwise. It carries the ratchet-wheel S and is thereby revolved intermittently when the lever U, mounted loosely on the shaft B and connected with some suitable part of the engine or other moving part, is reciprocated and the pawl T engages the ratchet-wheel S. Inside the oil-reservoir A the shaft B reaches into the cavity of the piston C to some distance from the partition-wall C′. This part of the shaft is made hollow and provided with several holes B′ B′ to allow of the oil circulating freely. The shaft B is provided with a cross-piece O, which is secured by a pin V or otherwise and engages in the slots L^3 L^3, provided in the annular projection L^2 of the cam-drum L. The piston C is thus coupled with the shaft B, while retaining its liberty to reciprocate. On the bolt D′ in the nut G a stationary guide-roller D is mounted, which engages with the groove L′ of the cam-drum L in such a manner that the piston C during its revolution is caused to reciprocate in the cylinder E.

The operation of the apparatus is as follows: The reservoir A is filled with oil and the ratchet-wheel S is revolved intermittently

by means of the lever U in the manner described above, thereby revolving the operating-shaft B, which communicates a rotary motion to the cam-disk L and piston C. During the suction period at the first half-revolution—that is to say, during the time the piston C moves in the direction from the cylinder E into the reservoir A—the suction-port H opens into the inlet-channel M and then establishes communication between the oil-reservoir A and the cylinder E, allowing a certain quantity of oil to enter. This is illustrated by Figs. 7 and 8, the piston C being assumed to revolve in the direction of the arrow and the suction-port H being for the sake of clearness assumed to be at right angles to the axis of the cylinder E. In Fig. 7 the suction-port H commences to open into the inlet-channel M, while in Fig. 8 it closes the channel M. During the period of discharge or while the second half of the revolution of the piston C is taking place this latter reënters the cylinder E. At the same time the discharge-port K opens into the several channels J J in succession and enables the oil to pass thereinto and through the distribution-pipes J′ J′ to the parts to be lubricated.

In the arrangement described so far the oil in the lubricated surfaces is not under pressure, and for this reason the cylindrical portion situated between two discharge-openings J J (see Fig. 3) is smaller than the width of the discharge-port K, thus enabling any two such discharge-openings to be brought into intercommunication and simultaneously receive lubricating material. In this manner no compression of the oil takes place, which, however, would occur by the sudden closing of the oil-discharge.

For lubricating surfaces under pressure, either all under a uniform pressure or under different pressures, the apparatus requires to be provided with an additional device, as follows: The cylinder E is furnished with a tightly-fitting piston I, (see Fig. 4,) adapted to be acted upon by means of a spring N, the tension of which may be adjusted from the outside by means of a screw W, passing through a suitable stuffing-box X. The discharge-port K is made narrower than the distance between two successive discharge-openings J J in the cylinder. (See Fig. 11.) Therefore communication between two distribution-pipes J′ J′ cannot take place, because the closing of any one of the discharge-openings J J is completed before another is opened. As the cylinder thus closes for a short period the spring-controlled piston I is forced slightly outward against the pressure of the spring N, and compression of the oil is thus avoided. Upon the piston C now uncovering the next discharge-opening J the spring-controlled piston I returns into the cylinder E and oil flows into the lubricating-pipe J′. If some of the oil should find its way around the spring-controlled piston I in case of it becoming somewhat leaky, the oil will return through a passage Q into the oil-reservoir A. During the suction period the passage Q is in communication with the hollow piston C through the suction-port H, but not so during the discharge period.

Fig. 9 shows the piston C to be in the same position as in Fig. 8, so that it is about to uncover the first discharge-opening J. In Fig. 10 the communication between the piston C and this discharge-opening is established by the discharge-port K. In Fig. 11 this communication is broken, so that the spring-controlled piston I (shown in Fig. 4) will be forced slightly outward.

The parts of the apparatus described above may be modified slightly without deviating essentially from the invention. For example, the cam-drum L may have a single cam-face L′, as shown in Figs. 5 and 6, which, with the aid of the stud or roller D, effects the forward movement of the piston C, while a spring R is employed to effect the return movement of the piston C.

Having described my invention, I declare that what I claim, and desire to secure by Letters Patent, is—

1. The combination with an oil-reservoir, of a cylinder attached thereto and provided with a discharge-opening leading into a distribution-pipe, a piston adapted to revolve and reciprocate simultaneously in said cylinder and provided with a suction-port adapted to communicate with an inlet-channel leading from the reservoir, during the suction period, and a discharge-port, adapted to communicate with the discharge-opening of the cylinder during the discharge period, and means for revolving and reciprocating said piston, substantially as set forth.

2. The combination with an oil-reservoir, of a cylinder attached thereto and provided with a discharge-opening leading into a distributing-pipe, a hollow piston adapted to revolve and to reciprocate simultaneously in said cylinder, and provided with a transverse partition-wall, the piston having a slanting suction-port and a longitudinal discharge-port on one side of the partition, and means for revolving and reciprocating said piston, as set forth.

3. The combination with an oil-reservoir, of a cylinder attached thereto at one side thereof, and provided with a plurality of discharge-openings leading into distributing-pipes, a piston adapted to revolve and reciprocate simultaneously in said cylinder, and provided with a suction-port for drawing in oil from said reservoir during the first half-revolution, when the piston moves into the reservoir and with a discharge-port for discharging the oil during the second half-revolution when the piston moves into the cylinder, the turning of the said piston as it moves into the cylinder causing the oil to be discharged successively into said discharge-openings and the distributing-pipes, and means

for revolving and reciprocating said piston, as set forth.

4. The combination with an oil-reservoir, of a cylinder attached thereto and provided with a plurality of discharge-openings leading into distributing-pipes, a hollow piston adapted to revolve and reciprocate simultaneously in said cylinder and having a transverse partition, the said piston being provided at one side of the partition with a slanting suction-port for drawing in oil from said reservoir during the first half-revolution and with a discharge-port for discharging the oil during the second half-revolution successively into said discharge-openings and distributing-pipes, means for revolving and reciprocating said piston, and means for preventing overpressure, substantially as set forth.

5. The combination with an oil-reservoir, of a cylinder attached thereto and communicating therewith by means of an inlet-channel and with a distributing-pipe by means of a discharge-opening, a hollow piston revolving and reciprocating in said cylinder and having a partition-wall and provided with a slanting suction-port opening into said inlet-channel during the first half-revolution for drawing in oil and with a discharge-port opening into said discharge-opening during the second half-revolution for discharging the oil, means for revolving and reciprocating said piston, and means for preventing overpressure, substantially as set forth.

6. In a lubricating apparatus, the combination with a reservoir, of a cylinder communicating therewith, a plurality of distributing-pipes communicating with said cylinder, a hollow piston revolving and reciprocating in said cylinder and provided with a suction-port and a discharge-port for drawing in oil from the reservoir during the first half-revolution and for discharging it into said distributing-pipes in succession during the second half-revolution, a cam-drum attached to said piston, a stationary guide-roller engaging therewith for reciprocating said piston during each revolution, a revolving shaft mounted in the wall of said reservoir and held from endwise movement and extending into said cam-drum, a cross-piece attached to said shaft and engaging slots in said cam-drum, and means for revolving said shaft, substantially as set forth.

7. In a lubricating apparatus, the combination with a reservoir, of a cylinder communicating therewith by an inlet-channel, a plurality of distributing-pipes communicating with said cylinder through discharge-openings arranged on half the periphery, a hollow piston revolving and reciprocating in said cylinder and having a partition-wall, the said piston being provided on one side of the partition-wall with a slanting suction-port opening into said inlet-channel during the first half-revolution and with a discharge-port opening successively into said discharge-openings during the second half-revolution, a cam-drum attached to said piston on the other side of the partition, a stationary guide engaging with said cam-drum for reciprocating the piston during each revolution, a revolving shaft engaging with said piston to revolve same, while leaving it full liberty to reciprocate, means for preventing overpressure, substantially as set forth.

8. In a lubricating apparatus, the combination with a reservoir, of a cylinder communicating therewith, a plurality of distibuting-pipes communicating with said cylinder, a hollow piston revolving and reciprocating in said cylinder and provided with a suction-port and a discharge-port for drawing in oil from the reservoir during the first half-revolution and for discharging it into said distributing-pipes in succession during the second half-revolution, means for preventing overpressure, a cam-drum attached to said piston, a stationary guide-roller engaging therewith for reciprocating said piston during each revolution, a revolving shaft journaled in the wall of said reservoir and prevented from shifting endwise and reaching into said cam-drum, a cross-piece attached to said shaft and engaging in slots provided in said cam-drum, and means for revolving said shaft, substantially as set forth.

9. In a lubricating apparatus, the combination with a reservoir, of a cylinder communicating therewith, a plurality of distributing-pipes communicating with said cylinder, a hollow piston revolving and reciprocating therein and provided with a suction-port and a discharge-port for drawing in oil from the reservoir during the first half-revolution and for discharging it into said distributing-pipes in succession during the second half-revolution, means for preventing overpressure, a cam-drum attached to said piston, a stationary guide-roller engaging therewith for reciprocating said piston during each revolution, a revolving shaft engaging with said piston to revolve same while leaving it full liberty to reciprocate, a ratchet-wheel arranged on said shaft, and a lever mounted loosely on the shaft and carrying a pawl for engaging said ratchet-wheel, the said lever being connected with some moving part to be thereby reciprocated, substantially as set forth.

10. In a lubricating apparatus, the combination with a reservoir, of a cylinder communicating therewith and provided with a plurality of discharge-openings on half the periphery leading into distributing-pipes, a hollow piston revolving and reciprocating in said cylinder and provided with a suction-port opening into said reservoir during the first half-revolution and with a discharge-port opening in succession into said discharge-openings during the second half-revolution, the width of said discharge-port being smaller than the distance between successive discharge-openings to prevent intercommunication, means for revolving and reciprocating said piston, a spring-controlled piston fitted

in said cylinder in opposition to said revolving and reciprocating piston to prevent overpressure, substantially as set forth.

11. In a lubricating apparatus, the combination with a reservoir, of a cylinder communicating therewith and provided with a plurality of discharge openings on half the periphery leading into distributing-pipes, a hollow piston adapted to revolve and reciprocate in said cylinder and provided with a suction-port opening into said reservoir during the first half-revolution and with a discharge-port opening in succession into said discharge-openings during the second half-revolution, means for revolving and reciprocating said piston, a relief-piston fitted in said cylinder in opposition to said revolving and reciprocating piston, a spring bearing against said relief-piston and being adjustable from the outside by means of a screw, the relief-piston serving for preventing overpressure by receding during the interruption of the communication between said cylinder and one of said distributing-pipes, and a channel for returning the oil finding its way around said relief-piston to said reservoir, substantially as set forth.

12. In a lubricating apparatus, the combination with a reservoir, of a cylinder communicating therewith and provided with a discharge-opening leading into a distribution-pipe, a hollow piston revolving and reciprocating in said cylinder and provided with a suction-port and a discharge-port, a cam-drum attached to said piston, a stationary guide-roller engaging therewith for reciprocating said piston during each revolution, a revolving shaft engaging with said piston to revolve the same, while the said piston is free to reciprocate, a ratchet-wheel arranged on said shaft and a lever mounted loosely on the shaft and carrying a pawl for engaging said ratchet-wheel.

13. The combination with an oil-reservoir, of a cylinder attached thereto and provided with discharge-openings leading into distributing-pipes, a hollow piston adapted to revolve intermittently in one direction, and to reciprocate during its revolution, the said piston being provided with a suction-port adapted during the first half-revolution of the piston to draw in oil from the reservoir and with a discharge-port through which the oil is discharged successively into the discharge-openings of the cylinder, during the second half-revolution of the piston, means for revolving said piston intermittently, means for reciprocating said piston during its revolution, and a spring-pressed piston fitting in the outer part of said cylinder and adapted to yield to prevent overpressure, as set forth.

LEON SERPOLLET.

Witnesses:
OTTO SPUKE,
EDWARD P. MACLEAN.