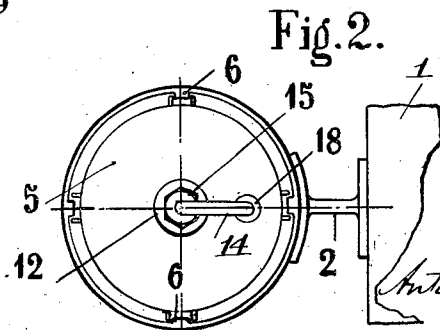
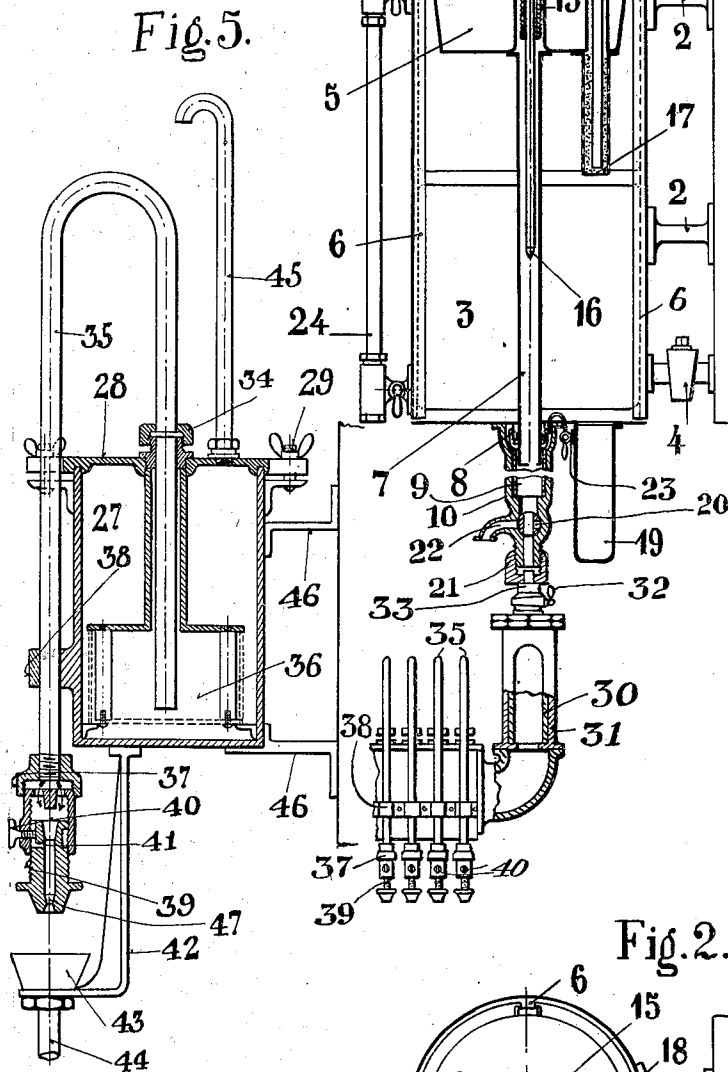
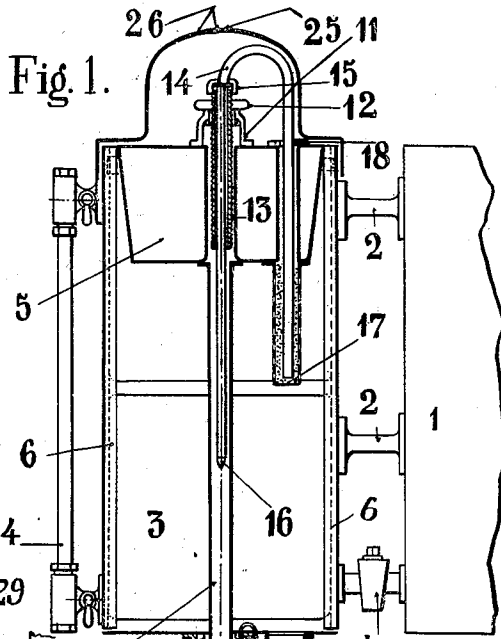


A. M. MILLE.
 APPARATUS FOR LUBRICATION OF STEAM ENGINES.
 APPLICATION FILED JUNE 29, 1907.

992,229.

Patented May 16, 1911.

4 SHEETS—SHEET 1.



Witnesses:
 Ruth C. Fitzhugh.
 Gustave W. Thompson.

Inventor:
 Antoine Melhiade Mille,
 by
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 Attys.

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4 SHEETS—SHEET 2.

Fig. 3.

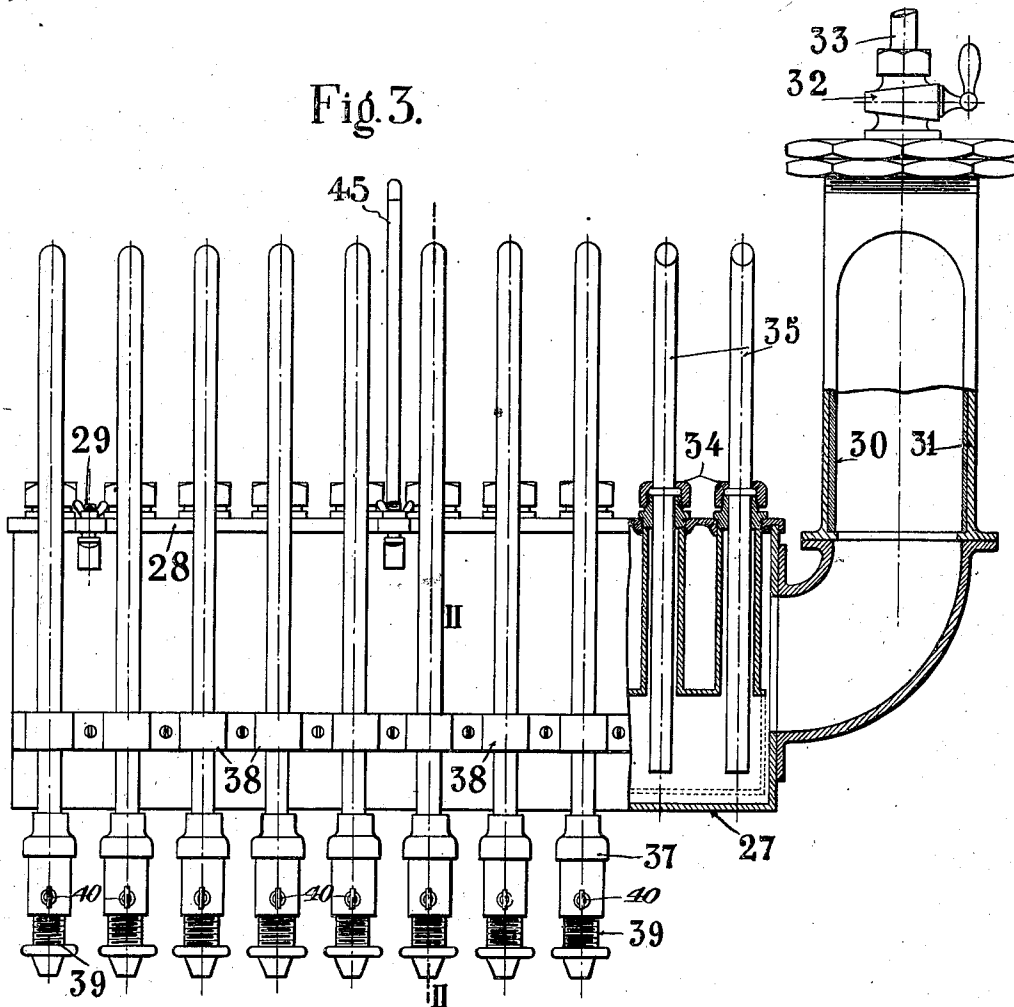
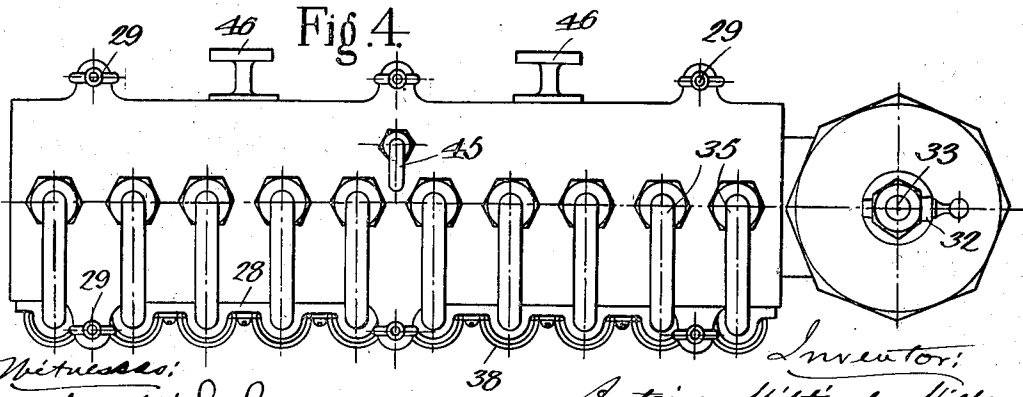


Fig. 4.



Witnesses:
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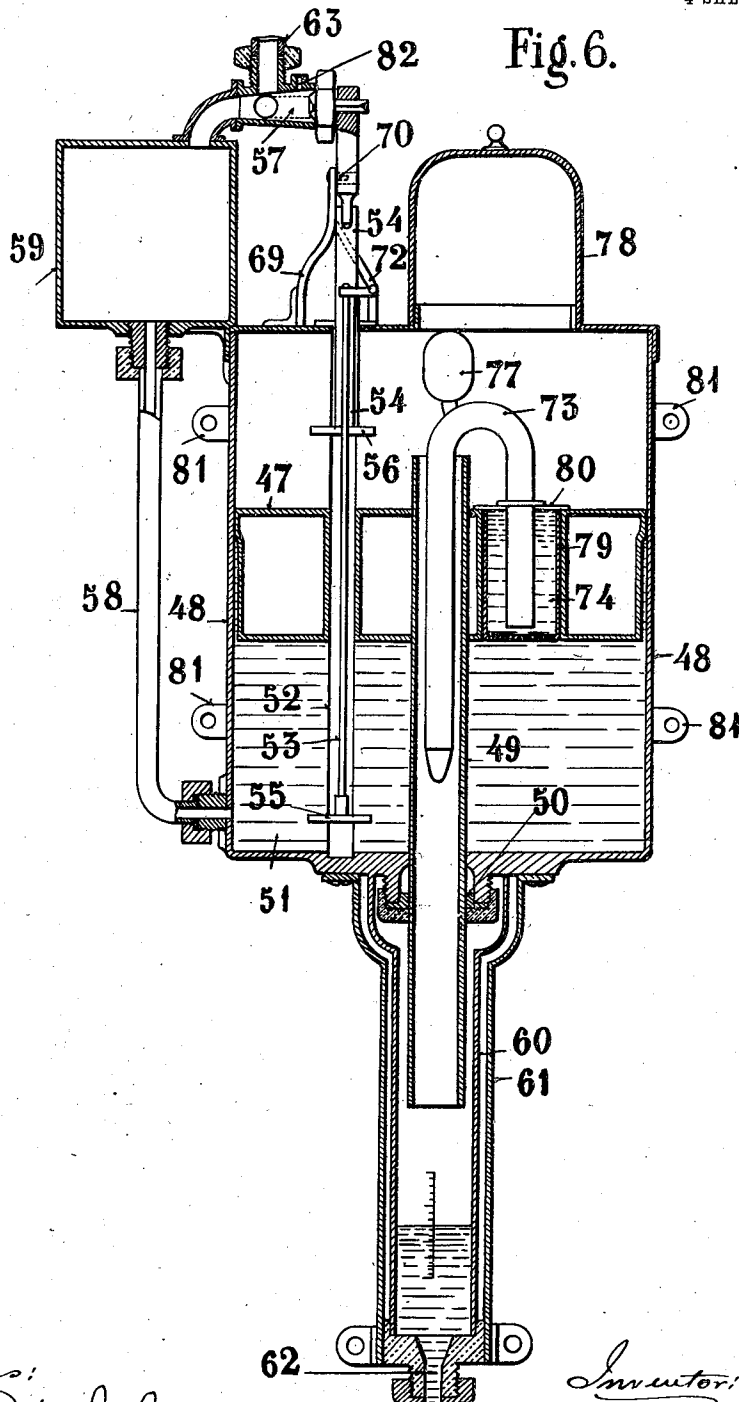
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4 SHEETS—SHEET 3.



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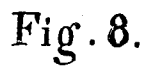
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

ANTOINE MILTIADÉ MILLE, OF LE HAVRE, FRANCE.

APPARATUS FOR LUBRICATION OF STEAM-ENGINES.

992,229.

Specification of Letters Patent.

Patented May 16, 1911.

Application filed June 29, 1907. Serial No. 381,563.

To all whom it may concern:

Be it known that I, ANTOINE MILTIADÉ MILLE, of the city of Le Havre, in the Republic of France, have invented new and useful Improvements in Apparatus for Lubrication of Steam-Engines, which invention is fully set forth in the following specification.

This invention relates to means of lubrication in which the supply is uniform, capable of being regulated as desired, and in which the properties of the siphon are applied for insuring uniform supply. In this arrangement it is not necessary to trouble about insuring uniformity of level in the lubricant feeding receptacle which is the object that most similar lubricant feeding receptacles are intended to effect and which is difficult to realize. It is only necessary to see to the filling of the oil-tank, which is placed in direct communication with the feeding receptacle, in order to insure absolute uniformity of supply throughout the whole installation. Moreover, when necessary, a device can be combined with each receptacle which will automatically feed the quantity of oil that is conveyed from the reservoir by which all the feeding receptacles are supplied.

Figure 1 is a view partly in elevation and partly in vertical section, showing in combination the feed-receptacle, distributing vessel, and the oil reservoir; Fig. 2 is a plan view of the feed receptacle and oil reservoir shown in Fig. 1; Fig. 3 is an enlarged elevational view of the distributing vessel with parts broken away to show the interior construction; Fig. 4 is a plan view of Fig. 3; Fig. 5 is a transverse sectional view on line II-II of Fig. 3; Fig. 6 is a sectional elevation of a modification showing a feeding receptacle furnished with an automatic feed. Fig. 7 shows on a larger scale the details of the mechanism by which the entrance of the oil into the feeding receptacle shown as a modification in Fig. 6 is regulated. Finally Fig. 8 is a sectional view, likewise on an enlarged scale, of the siphon shown in Fig. 6.

As will be seen from the drawings, the lubricant feeding receptacle is connected with a large tank 1 to which it is fixed by brackets 2, 2. On the tank 1, according to the size of the machine, one or more cylindrical feeding receptacles 3 are fixed by means of the brackets. These receptacles communicate with the tank by means of the

cock 4. In the receptacle 3 a float 5 moves on guides 6 6, a tube 7 on the float, running through a stuffing box 8, into a glass tube 9, protected by the incasing tube 10. On the upper part of the float is a bracket 11 supporting the milled nut 12. A screw-threaded tube 13 on which the siphon 14 is fixed by means of the union 15 is screwed into the nut 12, and enables the height of the siphon to be varied, that is to say the difference of level between the orifice in the long leg of the siphon and the surface of the liquid in the receptacle in which the short leg is immersed. The long leg of the siphon 14 terminates in a plug 16 similar to plug 75 of Fig. 8 and the short leg lodges in the rose pipe 17 secured to the bottom of the float. A ring or washer 18 prevents foreign substances from entering pipe 17. In the lower part of the receptacle 3 is a hollow leg 19 for the reception of the tube 17 when the float is in its lowest position.

The lower part of the tube 10 terminates in a two-way cock 20 which enables the oil supplied by the siphon to be conveyed either through the union 21 to the distributing vessel or through the gage cock 22.

At 23 is an auxiliary oil-cock, the utility of which will be explained hereinafter. The gage glass 24 always indicates the height of the oil in the receptacle and finally the cover 25, drilled with air holes 26, 26, completes the apparatus.

The distributing vessel illustrated in Figs. 3, 4 and 5-consists of the body 27 which is closed by the cover 28 which is fitted with bolts with winged nuts 29. On one of the sides of the vessel is fixed the sight tube 30 the diameter of which is large, and which is protected by the incasing tube 31. The upper part of the tube 31 terminates in a cock 32 which meets the feed pipe 33, that runs from the junction 21 illustrated in Fig. 1. The siphon tubes 35 pass through cover 28 and are securely held therein by means of packing joints 34.

The short legs of the siphons 35 run through the cover and draw the oil from a common well 36. The long legs of the siphons are screw threaded at their ends to connect with couplings 37 and pass through lugs 38 on which the names of the corresponding parts to be lubricated are inscribed. Into the sockets 37 are screwed interchangeable plugs 39 with bores of suitable diameter for the passage of the desired

quantity of lubricant. At 40 is a "check" screw which, at the same time enables additional lubrication to be effected by means of an orifice 41. The bracket 42 attached to the bottom of the vessel supports funnels 43, from which the pipes 44 run which convey the oil to the various parts to be lubricated.

The air pipe 45 insures the working of the siphons and the brackets 46 serve for fixing the apparatus on suitable supports.

The action of the apparatus is as follows:—It begins with the priming of the siphons of the feed receptacles. For this purpose the tank 1 and the receptacle 3, placed in communication with this tank having been filled, the float 5 is manually forced downward or caused to plunge so as to cover the upper part of the siphon 14, which is previously furnished with a plug 16 corresponding to the quantity of lubricant to be delivered by the distributing vessel which is supplied therefrom. After passing through the rose or perforated pipe 17 the oil enters the siphon 14 and flows into the tube 7, passing through the cock 20 into the distributing vessel. The siphon having thus been primed the float is allowed to ascend again. It is desirable to mention here a phenomenon which contributes to the priming of the siphon. The cock 20 having been closed, the oil fills the glass-tube 9 and the tube 7 of the float. If at this moment the cock 20 be opened the passage or way in the cock being large enough to allow the oil in the tube 9 to flow away quickly, a partial vacuum is created in the tube 7, which forces the oil to rise in the siphon and consequently effects the complete priming of the siphon. It is moreover easy to ascertain whether the quantity delivered by the siphon corresponds to the delivery of the gage or number (the plugs being given different designating numbers according to the size of their delivery openings) of the particular plug 16 in use, by collecting the oil in a measuring vessel for a few minutes through the gage-cock 22. The priming of the siphon having been effected, the question of priming the siphons of the distributing cups has to be considered. This priming is effected automatically. All that is necessary is to cause the oil to rise until it over-flows the air-pipe, 45. The outlet opening in this latter pipe being situated above the siphons 35, the siphons will be charged. However it is advisable, for the purpose of completely forcing out the air contained in the siphons, to unscrew the "check" screw 40 or even to remove the plugs 39 for a short time. When the priming of the siphons has been duly effected, the plugs are fastened tightly, the cock 32 closed and the apparatus is primed ready for working. The charging of the siphons having been thus assured, the means by which the apparatus can be precisely regulated

must be considered. For this purpose there is provided for the distributing vessels of the system a series of plugs, such as 39, to which may be given designating numbers, say from 1 to 22, according to the sizes of their delivery openings and corresponding to the exact delivery of 25, 50, 75, 100, 150, etc., up to 1000 grams per hour. A series of plugs such as 16 for the siphons of the floats 5, may be similarly numbered from 1 to 10 and corresponding to the exact delivery of 1 to 10 kilos per hour. By adding up the designating numbers of the plugs of a distributing vessel the corresponding designating number of plug 16 for the feed-siphon is ascertained. This theoretical method of regulating may be verified experimentally in the following manner:—The level being held at half way of the sight tube 30, the oil delivered by all the siphons of a distributing vessel 27 is collected in a suitable vessel for five minutes. By means of the nozzle 22 it is ascertained whether during the same lapse of time the feed-siphon delivers the same quantity of oil. If these quantities are not exactly equal the delivery of the feed-siphon 14 is regulated by raising or lowering this siphon by means of the milled nut 12, thereby increasing or decreasing the difference of level between the orifice of the long leg of the siphon and the surface of the liquid in the receptacle, and correspondingly varying the quantity of lubricant delivered by the siphon. The delivery of the feed-siphon can thus be varied in the ratio of 1 to 12 by an adjustment of from 1 to 12 centimeters. The apparatus being thus once regulated, all that is necessary for setting it in operation is to unscrew the plugs 39 of the distributing vessels, and to open the cocks 32. The apparatus then works in a perfectly regular manner.

In order to stop the lubrication, the plugs 39 are screwed up tightly, the cocks 32 closed, and the apparatus remains charged ready for working again. The present arrangement moreover enables additional lubricant to be fed to any movement separately or to one or more parts. In fact, the normal working-level of the distributing cups, to which the delivery indicated by the number on the plugs correspond is two centimeters above the cover of the cup and is indicated by a mark seen on the gage pipe 30.

In order to feed additional lubricant to any movement, for example at starting, the milled nut 12 of the feed siphon 14 is not touched but the level in the cups is raised by conveying a certain quantity of additional oil through the cock 23. As soon as the machine is found to work properly, the supplementary cock 23 is closed and the level in the cups will become normal again automatically.

In order to increase the momentary lubri-

nished at the end of its short leg with a well 74, made of wire-gauze and at the end of its long leg with a removable plug 75 which has a central bore and carries in its upper part a small tube 76 likewise made of wire gauze. For each apparatus a series of plugs is provided the openings in which are of different size, corresponding to varied deliveries. The upper part of the siphon is provided with a bell 77 for the priming. In order to enable the siphon to be placed and fixed in the receptacle 48, the receptacle is provided with a flange having a cover 78 which can be easily removed. For the reception of the short leg of the siphon and its well the float is formed with an opening 79 on the edges of which the cover 80 of the said well rests. The apparatus may be fixed on a board by means of four lugs 81.

The action of the lubricating vessel is as follows: In proportion as the level of the oil is lowered in the receptacle 48 the float piston with the siphon 73 is likewise lowered. During this descending movement the valve through which the oil enters is closed as shown in the drawing and allows air to pass from the atmosphere into the small reservoir 59 through an orifice 82. When the float 47 has nearly reached the bottom of the receptacle 48 that is to say, when nearly all the oil contained in this receptacle is used up, the said float presses against the stop 55, consequently lowering the rod 53 and oscillating the bent lever 72. The lever pressing against the spring 69 causes the stud 70 to leave its hole 71 and the sector being no longer retained rotates around its shaft under the action of the spiral spring 68 and the valve is opened, allowing the oil to pass which rapidly fills the pipe 58 and the small reservoir 59. The lower face of the float 47 is subjected at this moment to a pressure corresponding to the difference of level existing between the oil supply tank and the said face. The piston then rises until its upper face presses against the stop 56 fixed on the rod 54. The rod 54 in rising causes the raising of the rod 67 which rotates the sector around its shaft, notwithstanding the reverse action of the spiral spring 68, this movement continuing until the stud 70 of the spring 69 meets the hole 71 and locks the valve which at this movement has reached its fully closed position. In this position the communication between the lubricating cup and the oil supply tank is interrupted, the small reservoir 59 is again put in communication with the atmosphere through the orifice 82 and the float again begins to descend, in the manner already indicated.

The apparatus working normally, the level of the oil in the graduated glass 60 must be invariable. If through any cause whatever this level be lowered or raised from the normal height the siphon 73 is re-

moved from the receptacle through the opening formed in the cover of this part, and the plug 75 is replaced by another the opening in which has a diameter better suited to the consumption of oil of the part on which the lubricating cup is placed.

What I claim is:

1. In a lubricating apparatus, the combination of a receptacle from which lubricating liquid is to be fed, a float movable up and down in said receptacle to follow changes in the level of the liquid, and a siphon for feeding oil from said receptacle, said siphon being supported by and movable with said float, the short leg of said siphon opening into said receptacle and provided with a filter, the long leg arranged to deliver through the bottom of the receptacle.

2. In a lubricating apparatus, the combination of a receptacle from which lubricating liquid is to be fed, a float movable up and down in said receptacle to follow changes in the level of the liquid, a siphon for feeding oil from said receptacle said siphon being supported by and movable with said float with the open end of its short leg in position to be immersed in the liquid, and a tube depending from the float and movable in an opening through the bottom of the receptacle and into which tube the long leg of the siphon discharges.

3. In a lubricating apparatus, the combination of a receptacle from which lubricating liquid is to be fed, a float movable up and down in said receptacle to follow changes in the level of the liquid, a siphon for feeding oil from said receptacle said siphon being supported by and movable with said float with the open end of its short leg in position to be immersed in the liquid, and means for adjusting the siphon on the float to vary the difference of level between the open end of the long leg of the siphon and the surface of the lubricant in the receptacle.

4. In a lubricating apparatus, the combination of a receptacle from which lubricating liquid is to be fed, a float movable up and down in said receptacle to follow changes in the level of the liquid, a siphon for feeding oil from said receptacle said siphon being supported by and movable with said float with the open end of its short leg in position to be immersed in the liquid, and its long leg discharging into a passage for conducting the lubricant away from the apparatus, and a supplementary feed consisting of a valve-controlled passage leading from the bottom of the receptacle into said first-named passage.

5. The combination with lubricant feeding apparatus such as herein described, of a distributing vessel supplied from said feeding apparatus, said distributing vessel being provided with a plurality of siphons for conducting oil therefrom, the delivery end

cation of a part, the screw 40 is removed from the coupling 37 and an additional quantity of oil passes through the orifice 41.

If the supplementary lubrication through one of the siphons 35 is only to last a very short time, it is unnecessary to supply additional oil by means of the cock 23. The level lowers a few millimeters in the vessel 28, this additional quantity of oil being taken at the expense of the other siphons which during this space of time deliver a little less without any inconvenience. If the supplementary lubrication is to continue the plug of the particular siphon 35 is replaced by another of larger feeding capacity, the operation requiring a few seconds at the utmost, and the siphon 14 of the float is lowered slightly by means of the milled nut 12.

From the foregoing the advantages of this system and apparatus will be easily understood.

As the distributing vessel always receives the same quantity of oil, and the temperature increases, the siphons deliver a larger quantity of oil, and the level in the vessel sinks, but in sinking this level diminishes the delivery of the siphons and a moment comes when the delivery of the distributing vessel is equal to the quantity of oil that it receives from the feed-receptacle; the level then remains stationary at a few centimeters below the normal level. The contrary occurs if the temperature falls. After a certain time, the level is reestablished at a few centimeters above the normal level. It is the same as regards the viscosity of the oil. If the oil used is heavy, the level will be above the normal mark; if the oil is light the contrary will take place. The quantity delivered by the plugs is regulated for oil having movements of ordinary viscosity and at the temperature of 25 degrees.

The only condition necessary for the proper working of the device is the arrangement of the tank in a place in the machine which is not exposed to too frequent changes of temperature. This condition can be easily complied with in modern machines in which the upper part of the cylinder floor is free. Nevertheless a thermometer indicating at every instant the temperature of the oil in the tank is placed well in view, so as to enable the delivery of the feed-cylinders to be regulated if the change be appreciable. Moreover when the quantity of oil necessary for the proper working of the machine is once regulated, it is easy to ascertain every day if this quantity is duly delivered by collecting the oil for a few minutes by means of a gage cock 22.

In the modification illustrated in Figs. 6-8 the principle is absolutely the same; with the exception of a few constructional details and the device for automatically fill-

ing the cup. In regard to its action the lubricating vessel consists of three principal parts.

First. A cylindrical receptacle, with a float, intended to contain a certain quantity of oil in reserve, the level of this latter falling in proportion as the oil is consumed.

Secondly. A regulating device which automatically effects the filling of the receptacle mentioned by acting on the oil inlet. This device consists substantially of a valve the opening and the closing of which are effected by the float of the receptacle, accordingly as the level of the oil in the said receptacle has reached its highest or lowest limit.

Thirdly. An apparatus for regulating the delivery of the oil from the receptacle mentioned through a siphon furnished with a removable plug having an orifice the diameter of which corresponds to the delivery desired, into a gage tube, and then into the tube that supplies the lubricating cup of the part to be lubricated.

The float 47 which is movable in the cylindrical receptacle 48, is fixed to a tube 49, guided by the stuffing box 50 and follows the variations of level of the oil 51. It is provided with an opening for the passage of a tube 52 in which are located the rods 53 and 54 furnished with stops 55 and 56 and controlling the opening and the closing of the cock 57 through which the oil enters. The cylindrical receptacle 48 communicates through the tube 58 with a small reservoir 59 fixed on the top of the tube. Attached to the bottom of the receptacle 48 is a graduated glass tube or gage tube 60, protected by a "lantern" tube 61 which terminates at its lower end in a junction or union 62 which is joined to the tube that leads to the distributing cup of the part to be lubricated. The valve 57 of the regulating device is in communication on the one hand with the small reservoir 59 and on the other hand with the pipe 63 containing the oil under pressure coming from the tank which is common to several machines or at least to several parts of machines to be lubricated. The lever of the said valve consists of a sector 64 extended on one side by a rod 65 with equilibrating counter-weights, and on the other side by a lug 66. On this lug is a pivotally connected rod 67 which is likewise pivotally connected with the rod 54 and a recoil spring 68. Another spring 69 fixed by one of its ends to the cover of the receptacle 48, that bears against the sector 64, carries a stud 70 arranged on the other end. When the cock is in the closed position the said stud, entering a hole 71 locks the sector and consequently the movable part of the cock. The raising of the spring 69 is effected by means of the bent lever 72 actuated by the rod 53. The siphon 73 is fur-

of the long leg of each siphon being provided with a removable plug having a delivery opening the size of which determines the quantity of lubricant passing from the vessel through that particular siphon.

6. The combination with lubricant feeding apparatus such as herein described, of a distributing vessel supplied from said feeding apparatus, said distributing vessel being provided with a plurality of siphons for conducting oil therefrom, the delivery end of the long leg of each siphon being provided with a removable plug having a delivery opening the size of which determines the quantity of lubricant passing from the vessel through that particular siphon, and means for increasing the delivery of lubri-

cant through each plug comprising a lateral feed orifice in the plug and check-screw.

7. In a lubricating apparatus, the combination of an oil receptacle having a pocket in its bottom wall, a float in said receptacle, a siphon supported by said float the short leg of which opens into said receptacle and is adapted to be received by said pocket, the long leg of said siphon delivering through the bottom of said receptacle.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ANTOINE MILTIADE MILLE.

Witnesses:

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DEAN B. MASON.