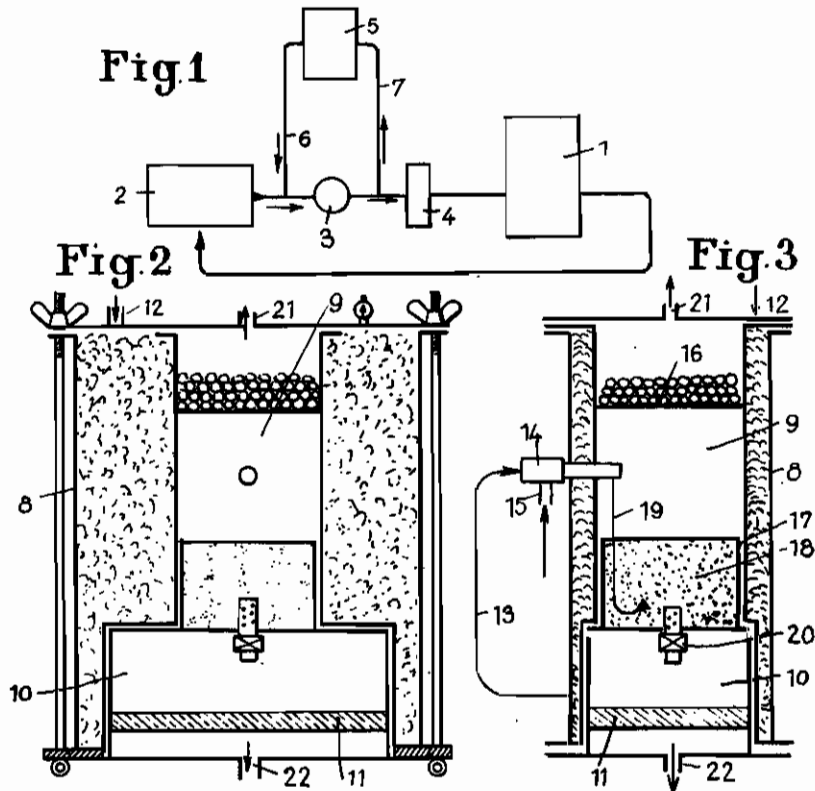


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J. A. LAUTRETTE
REGENERATING DEVICES FOR THE LUBRICATING
OIL FOR MOTORS AND THE LIKE
Filed Sept. 26, 1941

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6 Sheets—Sheet 1



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Fig. 5

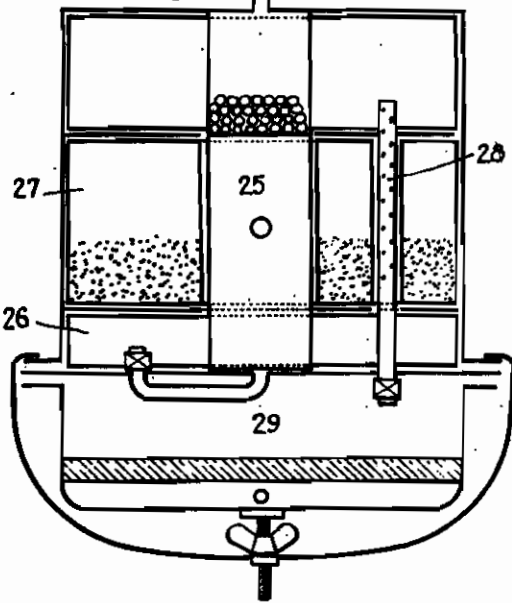


Fig. 4

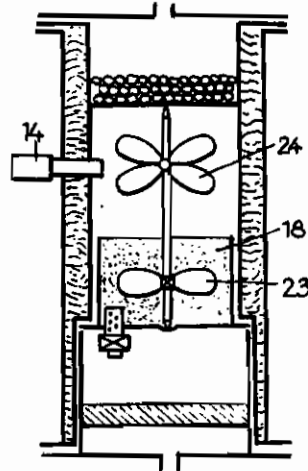


Fig. 6

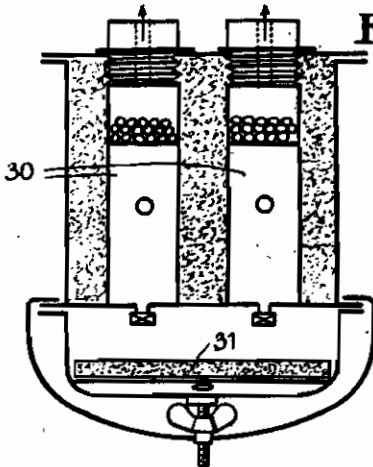
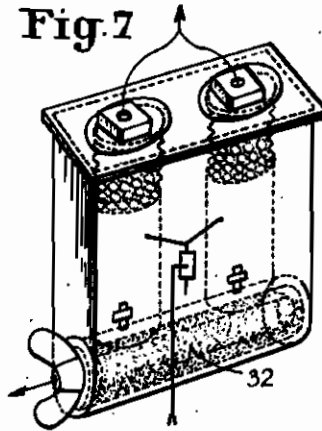


Fig. 7



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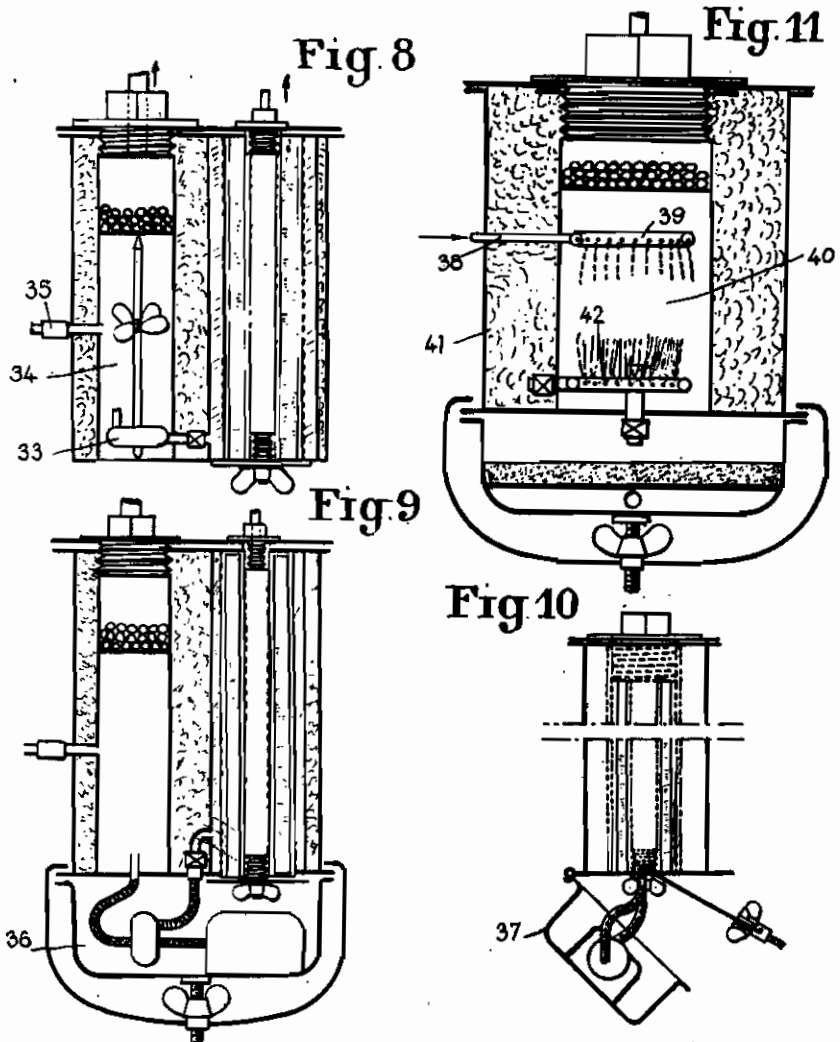
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Fig. 12

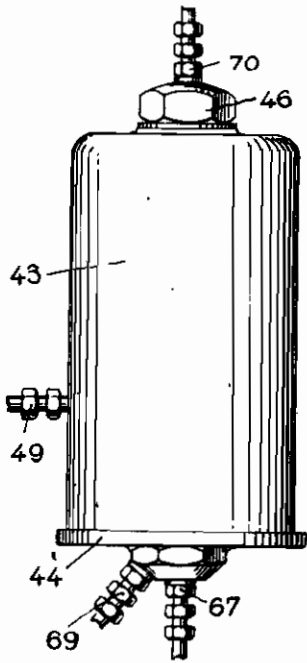


Fig. 14

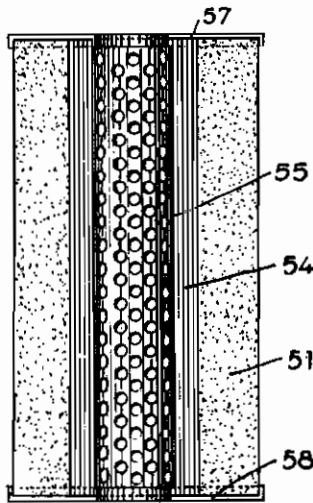


Fig. 15

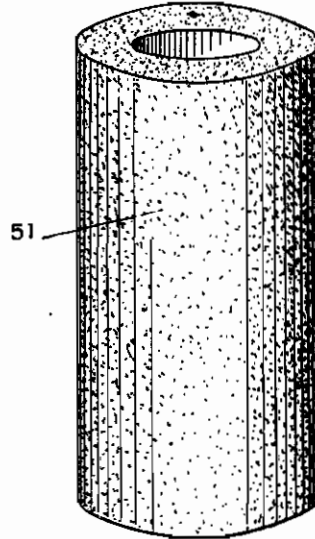


Fig. 16

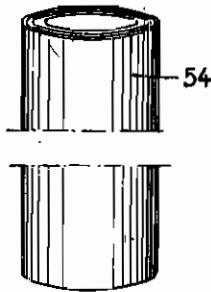
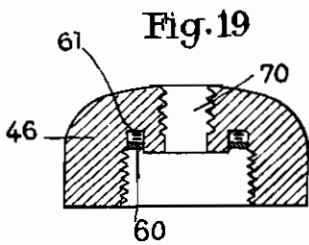
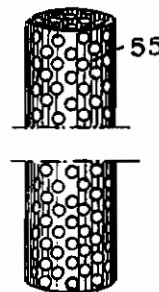


Fig. 17



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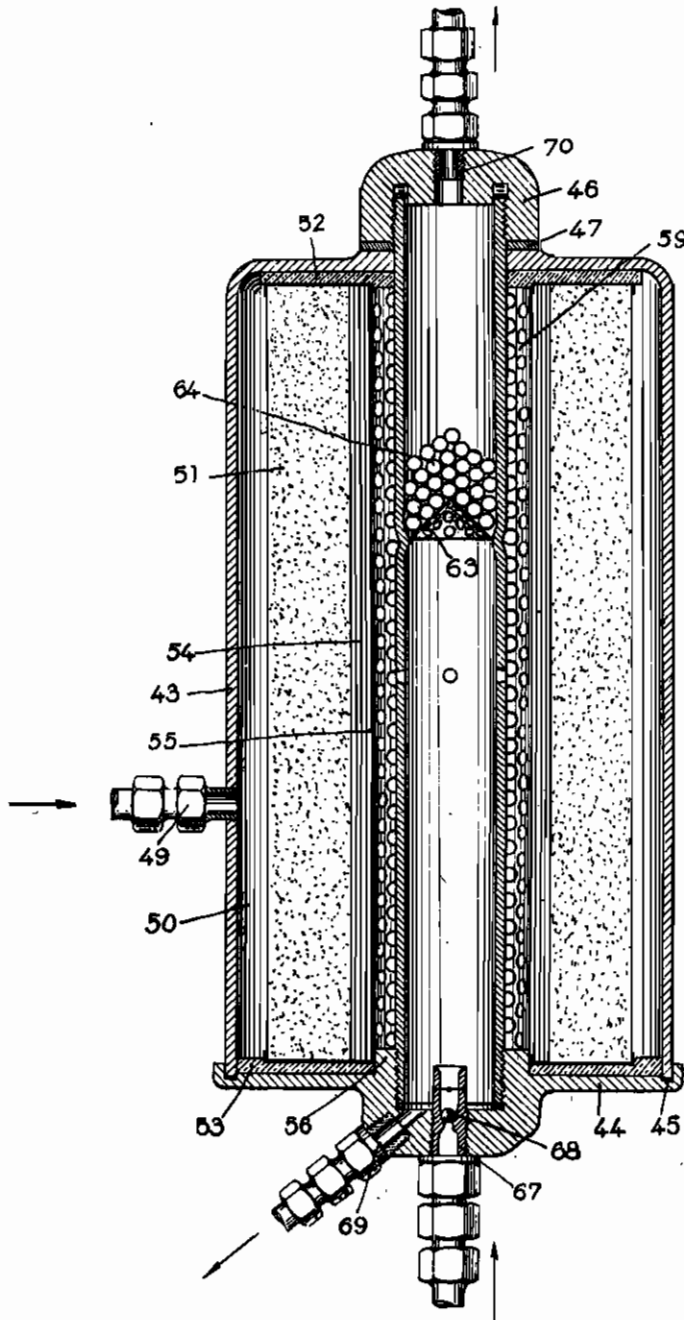
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Serial No.
412,524

6 Sheets-Sheet 5

Fig. 13



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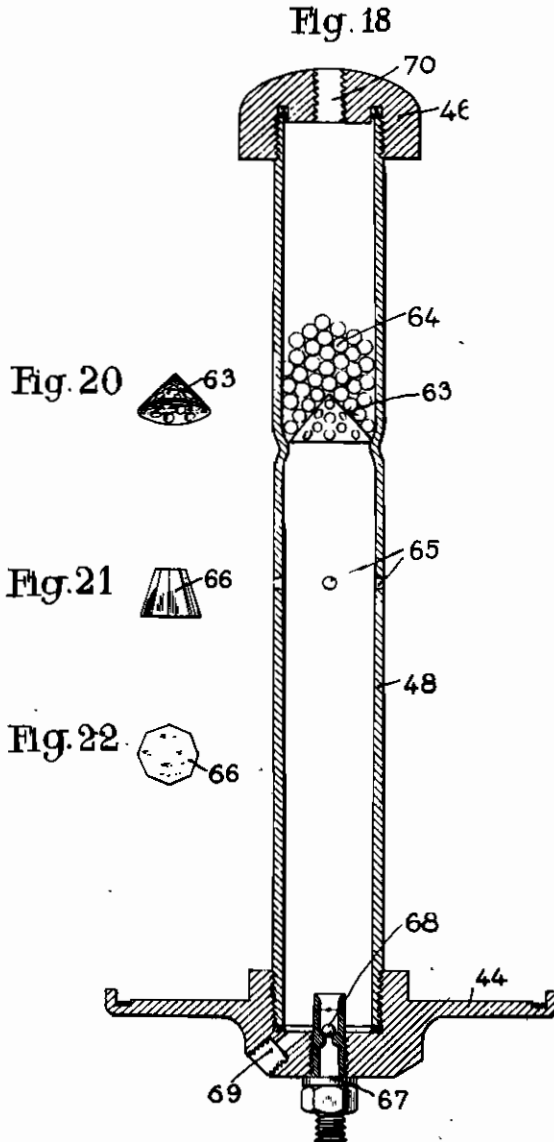
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6 Sheets-Sheet 6



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ALIEN PROPERTY CUSTODIAN

REGENERATING DEVICES FOR THE LUBRICATING OIL FOR MOTORS AND THE LIKE

Jean André Lautrette, Paris, France; vested in the Alien Property Custodian

Application filed September 26, 1941

This invention relates to a device for continuously regenerating lubricating oil for motors and like applications.

It has already been proposed to regenerate and purify the lubricating oils which have been used for the lubrication of motors and more particularly of internal combustion engines by submitting said oils to a convenient treatment in a stationary plant. This process requires a periodical "emptying" or discharge of the wasted oil of the motor and the filling up with new oil so that for a given motor the lubricating oil has its maximum of efficiency at the time of its introduction in the motor while arriving to a minimum at the time of emptying of the motor.

The device according to this invention which remedies above drawbacks comprises in combination with a motor and the lubricating plant of same a regenerating device of the oil arranged either in series or preferably in derivation on the circuit of lubricating oil, and comprising a distillation plant which eliminates the gas oil, the benzol as well as the soluble impurities contained in said oil with an atomizing or pulverizing device actuated by the exhaust gases of the motor conveniently purified and brought to a nearly constant pressure, a convenient filter being located in the outlet of the regenerator with a view to secure the oil to be constantly maintained in a convenient state of purity and considerably reducing and even suppressing the necessity of "emptying" the motor.

According to a preferred embodiment of the invention, the device when applied to a motor such as for instance an internal combustion engine for motor car or other applications comprises inside a common casing a convenient filtering cartridge located between the oil inlet and a distilling device provided on the one hand with a device for the adduction of hot exhaust gases and with a communication with the admission of the motor, an emptying arrangement being provided for the regenerated oil, thus securing not only the constant regeneration of the lubricating oil of the motor but also the recovering of the fuel which may have been mixed with lubricating oil, and the sending back of said fuel to the admission of the motor.

In the accompanying drawings which show constructional forms of the device according to this invention:

Fig. 1 is a diagrammatic view showing the circuit of lubrication of the motor and the regenerator.

Figs. 2 and 3 are two vertical sections made along plans at right angles of a first constructional form of the device.

Fig. 4 is a modification of Fig. 3.

Figs. 5 to 11 show other constructional forms of the device.

Fig. 12 is an external view of another constructional form of the device.

Fig. 13 is an axial vertical section on a larger scale.

Fig. 14 is a section of the filtering device.

Figs. 15, 16, 17 show in perspective the element of filtering device which are constituted by a filtering cartridge, by a rolled membrane and by a foraminated tube.

Fig. 18 shows a distilling device.

Fig. 19 shows on a larger scale the obturator of the distilling member forming at the same time, an assembling device.

Figs. 20, 21 and 22 show details of the distilling device.

The lubrication circuit of a motor for instance of an internal combustion engine (Fig. 1) generally speaking comprises an oil tank 2 constituted by the carter of the motor and a lubricating pump 3 which draws oil from said carter and forces same into the motor 1 preferably through a filter 4.

According to this invention, I arrange in said circuit in derivation a regenerator 5 which is derived on said lubricating circuit by an inlet pipe 6 and an outlet pipe 7 connected with the lubricating circuit preferably after the lubricating pump 3.

The regenerator comprises a tank 8 (Figs. 2 and 3) containing in its central part a distilling column 9 followed by a collecting tank 10 having a filter 11.

The tank 8 contains in the space comprised between external wall and the wall of column 9 a filtering purifying packing and said tank is provided with a feeding in tubulure 12 which brings exhaust gases coming from the exhaust pipe of the motor. A pipe 13 connects the lower part of tank 8 with a pulverizer 14 which opens inside column 9. A tubulure 15 feeds the pulverizer 14 with the oil coming from the lubricating circuit and brought for instance by a pipe such as 6 (Fig. 1).

The column 9 comprises on its upper part a plate 16 on which are piled up cooling bodies such as for instance as balls and in its lower part a receptacle 17 containing a convenient substance such as for instance activated earth in-

side which arrives a derivation 19 (Fig. 3) coming from the pulverizer 14.

A tubulure 20 with a non-return valve connects the column 9 with the pipe 10. The exhaust gases are heated in the tubulure 12 to the convenient temperature and they are filtered and maintained at a constant pressure eventually by means of a regulating valve. Said gases are filtered and the oxygen which they are still containing is kept by the filtering substances of the tank 8. The hot exhaust gases which are thus constituted for the greater part if not wholly of inert gases such as nitrogen and carbon dioxide are sent by pipes 13 into the pulverizer 14 in which arrives also under pressure the oil forced by the pump 3 and the pipe 6. Said oil is pulverized and brought to the desired temperature without having the time to be cracked. It arrives into the column 9 in which owing to its extreme division and to the thermic and mechanic action, it is deprived from the gas oil or benzin which it contains as well as of the soluble impurities which are distilled in said conditions. The exhaust gas which escapes through the pulverizer 14 into the column 9 escapes from the latter by crossing the plate 16 and the cooling bodies for being sent to the open air through the tubulure 21.

The oil deprived from gas oil falls down upon the powdered activated earth 18 which is kept in a convenient divided state by being agitated by means of the exhaust gases coming from the derivation 19 and the pressure existing in the column forces the oil mixed with earth through the tubulure 20 into the pipe 10 in which said oil is submitted to an ultra filtration on the filter 11. The purified oil may also be sent back to the lubricating circuit through the tubulure 22 and pipe 7.

A non-return valve is preferably arranged in the tubulure 20 for avoiding any coming back of oil in the column at the time of stopping of the motor.

The agitation of the earth 18 could as shown in Fig. 4, be effected by means of a screw propeller 23 actuated by a mill 24 which receives the jet of oil coming from pulverizer 14.

The previous filtration of the exhaust gases may be dispensed with by using for instance the constructional form of Fig. 5 which directly receives the gases in a determined place of the exhaust pipe. The oil which has been deprived from gas oil in the column 25 arrives into a compartment 26 from which under the pressure it falls down into the compartment 27 containing the activated earth; said oil mixed with earth leaves said compartment through pipe 28 which sends same to the filtering pipe 29. In that arrangement, the heating may be effected by hot air brought by a heating pipe connected with the exhaust pipe.

Non return valves prevent any coming back of oil.

In the constructional form of Fig. 6 which shows an arrangement similar to that of Figs. 2 and 3 for the distillation of oil and the filtration of exhaust gases, the column being however divided into two parts 30, the filtration is effected by means of elements 31 constituted for instance by conveniently solidified activated earth and which however may be substituted, as seen in Fig. 7, by a cartridge 32. Of course, the distillation column may receive a division still more important than that of Figs. 6 and 7.

In the modification of Figs. 8 and 9 the oil to

be regenerated may be forced to the apparatus by a pump 33 which could either as in Fig. 8, be located at the lower part of the column 34 in which arrives the injector 35 of the exhaust gases, or as in Fig. 9, be arranged in the compartment 36 located on the lower part of the apparatus for the oil which has been collected. Said pump could be actuated by an electric motor or by any other means.

In the constructional form of Fig. 9, the bottom 37 could be made swivelling as shown in Fig. 10.

In the constructional form of Fig. 11 the oil is not pulverised by the exhaust gases but said hot oil is brought from the carter under pressure through the pipe 38 for instance to a foraminated crown 39 located in the distillation column 40, the purified and conveniently heated exhaust gases arriving at a convenient pressure from the chamber 42 enter the column 40 through a crown 41, the arrangement being, for the other parts, similar with any other preceding constructional form.

In the constructional form of Figs. 12 to 22, the regenerating apparatus comprises an external casing 43 made for instance of thin sheet iron resting through its lower end upon a plate 44 with interposition of a tightening packing 45 upon which it is applied by a nut 46 which tightens the casing 43 through a tightening packing 47. The plate 44 and the nut 46 are screwed on the ends of an internal tube 48 which constitute a distillator. A tubulure 49 bringing the oil to be purified crosses the lateral wall of the casing 43 and communicates with an annular chamber 50 provided between the internal face of the casing 43 and a filtering cartridge 51 located between the ends of the casing 43 with interposition of tightening packings 52—53.

The filtering cartridge 51 constituted by a convenient substance such as for instance a mass of fuller's earth or any convenient filtering substance such as a cloth either rolled or piled up with or without the impregnation of a convenient solution receives an internal lining constituted by a membrane 54 conveniently rolled and constituted by any convenient substance such as cloth or the like applied against the wall of the internal chamber of the cartridge 51 by means of a foraminated tube 55 for instance of metal. Said tube is centered on a projection 56 of plate 44 thus keeping the filtering cartridge 51 conveniently centered inside the casing 43.

The several parts of the filtering cartridge are preferably kept together by means of plates 57—58 (Fig. 14) which may be connected together in any convenient manner or which may also be screwed in the internal tube 55.

The distilling pipe 46 which leaves between itself and the foraminated pipe 55 of the filtering device an annular chamber 59 and which is screwed by its lower end into the plate 44 receives on its upper screw threaded end the connecting nut 46 with interposition of a tightening packing 60 (Fig. 19) compressed by a spring 61 in order to secure the tightening of said screw 46 at the same time on the tube 46 and on the external casing 43. Said tube which in some way constitutes a distillation column is provided in a convenient place of its height a foraminated cone 63 in which are piled up contacting members such as for instance spheres 64 in any convenient number which may be constituted for instance by glass pearls. Under said cone 63 are provided in the wall of tube 48 small orifices 65

the desired dimension of which is obtained by providing in the tube foraminations cylindrical or conical in shape and provided with polygonal obturator 66. (Figs. 21 and 22) thus obtaining in the wall of tube 46 orifices in the shape of splits having a very small dimension.

The plate 44 comprises a tubulure 67 connected with a derivation of the exhaust gases of the motor and comprises a non return valve having the shape of a ball 68. An outlet tubulure 69 is provided in the same plate for the exhaust of purified oil while the upper stopper 46 is provided with a tubulure 70 for the escape of the volatile components said tubulure being connected by means of a pipe not shown in the drawing with the admission side of the motor not shown in the drawing.

The operation is as follows:

The apparatus being located for instance in derivation in the circuit of lubricating oil of the motor and coming from the carter arrives to the tubulure 49 passes the filtering cartridge 51 and the membrane 54 for arriving into the annular chamber 59 and from there passes through orifices 65 inside the distillating tube 48. Such passage of oil takes place under pressure so that the oil enters tube 48 either under a pulverized form or under the shape of thin jets. Said oil flows along the walls of said tube and it is swept by the exhaust gases of the motor which arrive through the tubulure 87. Said oil thus simultaneously supports a mechanical shock owing to its passage through the thin orifices 65 and an increase of temperature owing to its contact with the exhaust gases. Said exhaust gases escape at the upper part of tube 48 through tubulure 70 and carry with them the light components (benzin, gas oil, etc. . . .) contained in the oil coming from the carter. The light particles of oil which are also taken with the exhaust gases

are condensed in contact with pearls 64 and fall down to the lower part of tube 48 which constitutes a distillation column. The exhaust gases loaded with benzin vapours or gas oil and passing through the tubulure 70 are sent to the admission of the motor while the purified oil which is collected in the bottom of tube 48 constituting distillation column is sent back to the lubricating circuit through tubulure 89.

When the motor is working the exhaust gases arrive into the column while raising the ball 88 which constitutes non return valve but when the motor is idle the pressure of exhaust gases being nul, said gases cannot arrive into the column 48 and at that time, the distillation of oil is effected under the vacuum created in the column 48 by the suction of the motor.

The described arrangement allows an easy quick dismantling of the apparatus each of the parts being practically instantaneously accessible, and said parts being in a position of being quickly replaced.

The device described hereabove were given only as examples and it is obvious that their shape and volume may vary according to the needs in every particularly instance. They may be adapted for apparatus not located on motors but which would be used for instance in stationary places for the regeneration of wasted lubricating oils of motors. The gas used for the pulverization of oil could be the exhaust gas of a motor or any other gas preferably inert relatively to the oil such as for instance nitrogen with a convenient temperature and pressure.

The invention applies for the regeneration and purification of lubricating oils for motors of any type and more particularly for internal combustion motors and the like.

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