Jan. 1, 1957 F. G. SCHWEISTHAL 2,776,025

VARIABLE CAPACITY OIL MIST GENERATOR

Filed Oct. 13, 1953

FIG. 1.

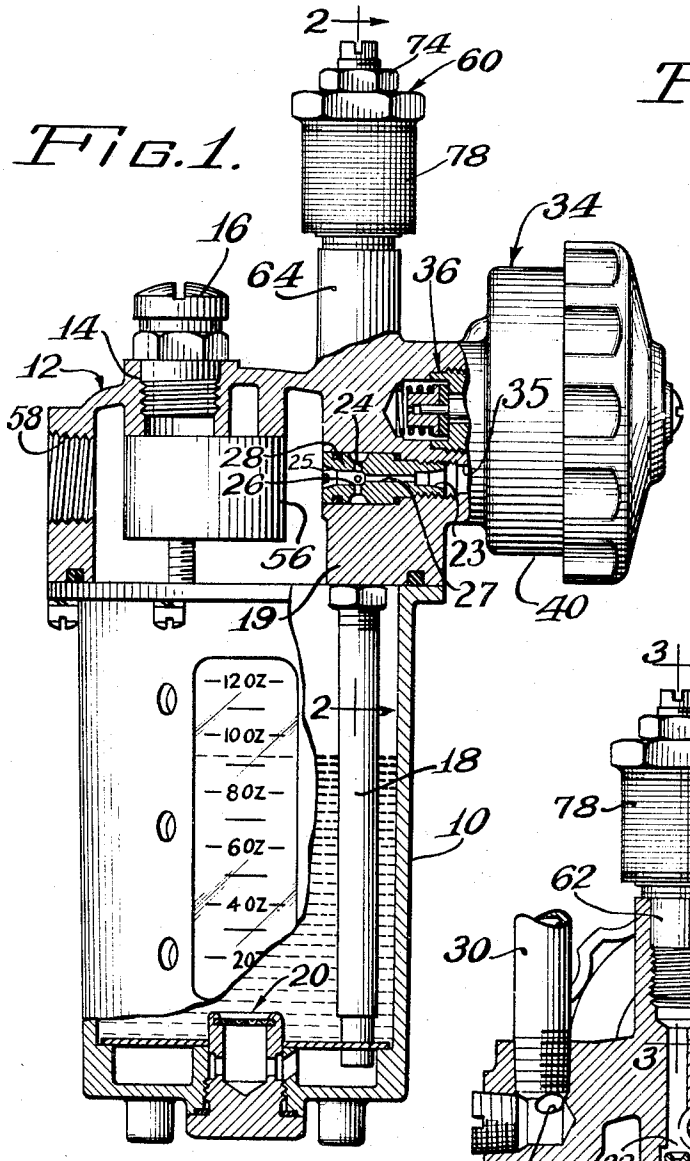


FIG. 3.

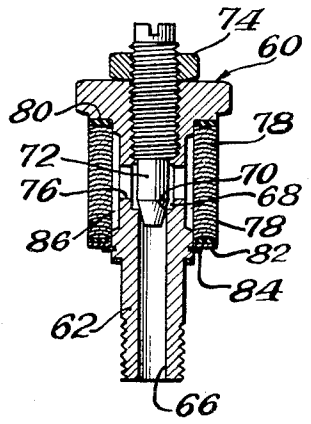
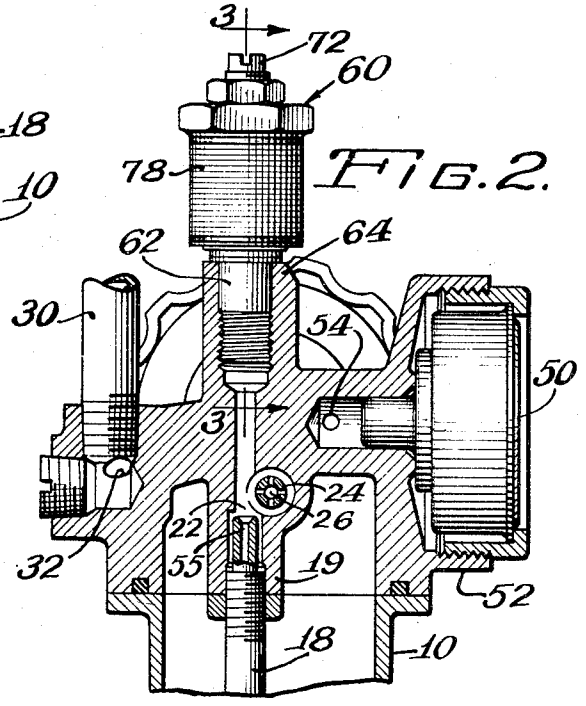


FIG. 2.



INVENTOR.

Frederick G. Schweisthal

BY

Ahlberg, Wupper & Gradolph

Attys.

United States Patent Office 2,776,025 Patented Jan. 1, 1957

2,776,025

VARIABLE CAPACITY OIL MIST GENERATOR

Frederick G. Schweisthal, Skokie, Ill., assignor to Stewart-Warner Corporation, Chicago, Ill., a corporation of Virginia

Application October 13, 1953, Serial No. 385,745

4 Claims. (Cl. 184—55)

The present invention relates to variable capacity aerosol generators, and more particularly to generators for supplying oil mist for distribution to the bearings and other lubrication points of a machine. In general the lubricating mist or aerosol is formed from oil atomized in a venturi which is supplied with air under a pressure that ordinarily can be regulated to vary the rate at which the mist is produced.

One object of the invention is to provide an improved oil mist generator of the above character in which the proportion of oil to air in the mist generated can be regulated in a highly satisfactory and efficient manner.

A more specific object is to provide in such a mist generator for improved regulation of the oil flow into the mist generating air stream through a controlled inlet of air to modify the effective suction of the generator venturi.

In conjunction with the previous objects, a further object is to provide for the premixing of clean air with the oil entering the mist generating venturi.

Other objects and advantages will be apparent from the following description of the form of the invention shown in the drawings, in which:

Figure 1 is a vertical view, largely in section, of an oil mist generator incorporating the invention;

Fig. 2 is a fragmentary sectional view taken along the line 2—2 of Fig. 1; and

Fig. 3 is a fragmentary sectional view taken along line 3—3 of Fig. 2 and showing a control assembly for the generator.

The variable capacity mist generator shown comprises a reservoir **10** bolted to the lower end of a downwardly open casting **12** and supplied with oil through an opening **14** in the upper end of the casting normally closed by a cap **16**. A vertical pipe **18** threaded at its upper end into an internal boss **19** on one side of the casting forms a suction passageway from a strainer **20** in the lower end of the reservoir to a reduced pressure space **22** within the boss.

The space **22** adjoins the medial portion only of an elongated venturi plug member **28** threaded into a horizontal bore in the boss **19** and extending in opposite directions substantially beyond the space **22**. An atomizing air inlet **23** formed in the outer end of the venturi member **28** and a mist outlet **25** formed in the inner end of the member are connected by a venturi passageway **27** extending axially through the member and shaped to form in one section **26** of the passageway a space in which the pressure is reduced as an incident to the flow of a stream of air therethrough from the inlet to the outlet. Communication between the reduced pressure space **26** in the venturi passageway **27** and the previously mentioned space **22** is established independently of the atomizing air inlet **23** and the mist outlet **25** by fluid supply bores **24** extending from the venturi passage space **26** radially through the member **28** to connect with the space **22**.

Air from a pressure line **30** connected to the casting **12** is supplied to the atomizing air inlet **23** of the passageway **27** through a series of interconnecting bores **32** and a pressure regulator **34** capable of maintaining a predetermined constant pressure in a passageway **35** in the casting **12** suitably connected with the outlet of the pressure regulator and communicating with the inlet **23** of the venturi (the right end as shown in Fig. 1).

As shown, the adjustable regulator **34** comprises a valve **36** threaded into the casting **12** and controlled by suitable regulator structure mounted in an enlarged boss **40**.

The pressure of the air supplied to the venturi inlet **23** is indicated by a suitable air gauge **50** mounted in a boss **52** and connected by bores **54** to the outlet from the regulator **34**.

The fast moving air stream in the venturi passageway **27** reduces the pressure in venturi space **26** and in the connected space **22**, thus drawing oil up through an outlet orifice **55** in the pipe **18** to flow into the venturi air stream through the radial bores **24**. The stream of air and atomized oil issuing from the venturi outlet **25** flows around a baffle **56** and out through a mist discharge opening **58** in the casting for distribution to bearings through a conduit system such as that shown in the patent to Gothberg et al., No. 2,642,156.

The volumetric rate at which oil mist is generated is determined by regulating the air pressure applied to the venturi inlet **23** thus varying the rate of air flow through the venturi.

A highly effective regulation of the oil flow up through the pipe **18** and into the venturi space **26** is provided by a controlled admission of outside air into the reduced pressure space **22** to modify the effective suction of the venturi. Structurally, the means used for this purpose comprises a vertically elongated body **60** including a stem **62** threaded into a boss **64** on the top of the casting **12**. An axial bore in the body **60** forms a passageway **66** opening downwardly into the reduced pressure space **22**. The upper end of the passageway **66** merges with the lower end of a downwardly extending counterbore **68** defining with the passageway a valve seat **70** medially located within the body **60**.

The effective flow area of the orifice formed by the valve seat **70** is controlled by a needle valve member **72** threaded into the upper end of the counterbore **68** and secured in adjusted position by a locknut **74**. Two inlet passages to the throttling valve thus formed are provided by a bore **76** extending transversely through the body **60** just above the valve seat **70**.

An edge type paper filter **78** having a hollow, cylindrical shape encircles the body **60** between an annular shoulder **80** on the upper end of the body and a washer **82** held in place by a snap ring **84** disposed a substantial distance below the transverse bore **76**. The section of the body **60** between opposite ends of the filter **78** is turned down to a reduced diameter to form an annular passageway **86** between the outer ends of the bore **76** and the inside of the filter.

In reviewing the operation of the generator thus provided, it will be appreciated that for any given rate of air flow through the venturi passageway **27**, the venturi will tend to produce a definite pressure drop in its throat **26** and a corresponding diminution of the pressure within the space **22**. The rate of oil flow through the pipe **18** and into the venturi varies with the degree of this pressure drop.

Accurate regulation of the rate of oil flow into the venturi is achieved by a controlled admission of outside air into the space **22** to modify the pressure drop in this space. Thus by adjusting the position of the needle valve **72** in relation to the valve seat **70** the pressure drop within the space **22** can be varied from the maximum suction of the venturi (when the valve is fully closed) to a very minor

value (when the valve is fully open, allowing for the free inflow of air).

The incoming air cleaned by the filter **78** is premixed with the oil as it flows through the venturi passages **24** into the atomizing air stream.

While I have shown and described a preferred embodiment of my invention, it will be apparent that numerous variations and modifications thereof may be made without departing from the underlying principles and scope of the invention. I therefore desire by the following claims to include all such variations and modifications by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

I claim:

1. In a variable capacity oil mist generator, the combination of means defining a source of oil, a mist generating venturi, means for supplying air under pressure to said venturi for passage therethrough, means defining a passageway between said oil source and a reduced pressure section of said venturi, and means for accurately controlling the rate of oil flow into said venturi comprising, an elongated body defining an air inlet orifice and an air inlet passageway between said orifice and said first mentioned passageway, a valve member mounted in said body for regulating the effective flow area of said orifice, a cylindrical air filter surrounding the outer end of said body, and means including a transverse bore in said body connecting said filter with the inlet side of said orifice.

2. A variable capacity oil mist generator, comprising, in combination, an oil reservoir, venturi means located above said reservoir and defining an atomizing air inlet and a mist outlet spaced from each other, said venturi means defining a venturi passageway connecting said inlet and said outlet and shaped to define within one section of the passageway a space in which the pressure is reduced by the venturi effect of a stream of air flowing through the passageway from said inlet to said outlet, air supply means connected to said inlet for supplying air under pressure thereto, said venturi means defining a fluid supply bore communicating with said reduced pressure section of said venturi passageway independently of said inlet and said outlet, means defining a suction passage connecting said oil reservoir to said fluid supply bore, means defining a regulating orifice, means interconnecting one side of said orifice to said fluid supply bore independently of said venturi passageway, means providing independently of said passageway communication between the opposite side of said orifice and the atmosphere ambient to the generator, regulating means coacting with said orifice to vary the effective flow area therethrough, and means including mist discharge means for collecting and discharging oil mist from said mist outlet of said venturi means.

3. A variable capacity oil mist generator comprising, in combination, an oil reservoir, venturi means located above said oil reservoir and defining an atomizing air inlet and a mist outlet spaced from each other, said venturi means defining a venturi passage way connecting said inlet and said outlet and shaped to define within one section of the passageway a space in which the pressure is reduced as an incident to the flow of a stream of air therethrough from said inlet to said outlet, air supply means connected to said venturi inlet for supplying air under pressure thereto, said venturi means defining a fluid supply bore communicating with said reduced pressure section of said venturi passageway independently of said inlet and said outlet, means defining a suction passage connecting said oil reservoir to said fluid supply bore, means defining a regulating orifice, means establishing communication between one side of said orifice and the reduced pressure section of said venturi passageway independently of said inlet and said outlet, the other side of said orifice being exposed to receive air independently of said venturi passageway and of said suction passage, means coacting with said orifice to vary the effective flow area therethrough, and means including mist discharge means for collecting and discharging oil mist issuing from said venturi mist outlet.

4. A variable capacity oil mist generator comprising, in combination, an oil reservoir, venturi means located above said reservoir and defining an atomizing air inlet and a mist outlet spaced from each other, said venturi means defining a venturi passageway connecting said inlet and said outlet and shaped to define within one section of the passageway a space in which the pressure is reduced as an incident to the flow of a stream of air through the passageway from said inlet to said outlet, air supply means connected to said venturi inlet for supplying air under pressure thereto, said venturi means defining a fluid supply bore communicating with said reduced pressure section of said venturi passageway independently of said inlet and said outlet, means defining a suction passage connecting said oil reservoir to said fluid supply bore, means defining a regulating orifice, means establishing communication between one side of said orifice and the reduced pressure section of said venturi passageway independently of said inlet and said outlet, means connecting the opposite side of said orifice to the atmosphere ambient to said generator, an air filter interposed in said last mentioned connecting means to filter the air passing therethrough to the orifice, adjustable throttling means coacting with said orifice to regulate the effective flow area thereof, and means including mist discharge means for collecting and discharging oil mist emitted from said venturi outlet.

References Cited in the file of this patent

UNITED STATES PATENTS

875,657	Durant	Dec. 31, 1907
1,990,524	Bystricky	Feb. 12, 1935
2,610,700	Gothberg	Sept. 16, 1952
2,613,067	Goodyer	Oct. 7, 1952
2,672,136	Farrell	Mar. 16, 1954