

Nov. 11, 1930.

F. SCHORI

1,781,603

ATOMIZER FOR MATERIALS IN POWDER FORM

Filed Jan. 6, 1927

2 Sheets-Sheet 1

Fig. 1

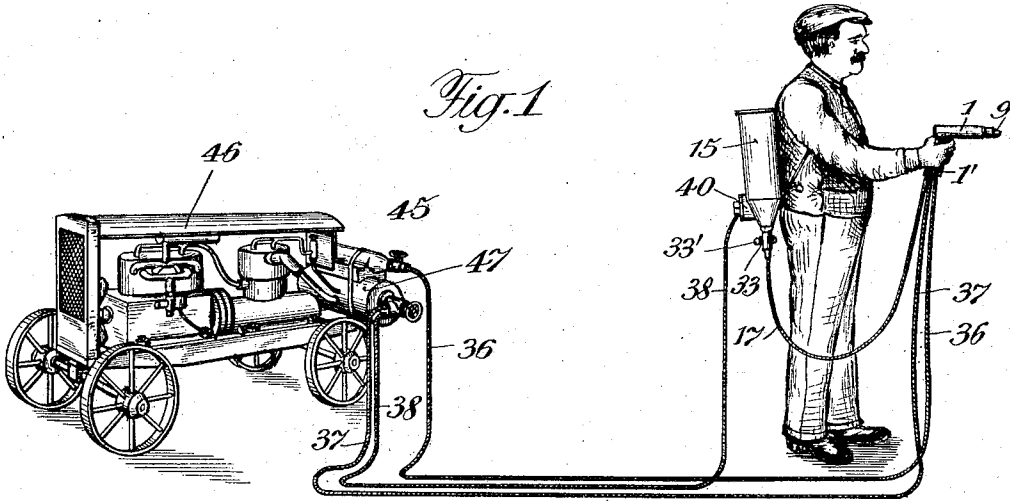


Fig. 2

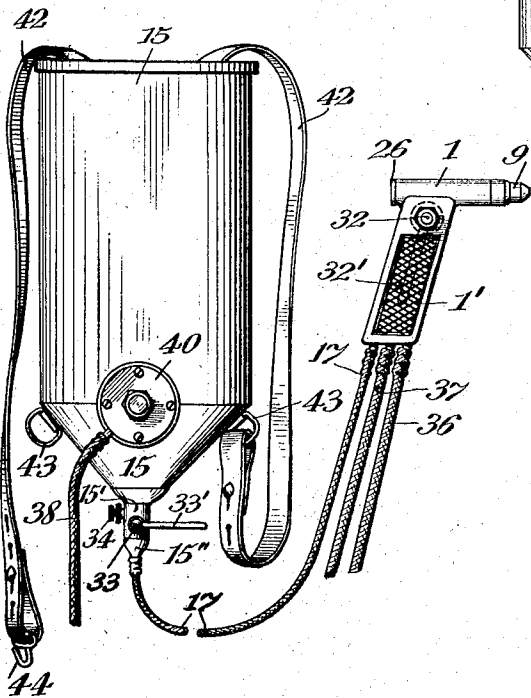
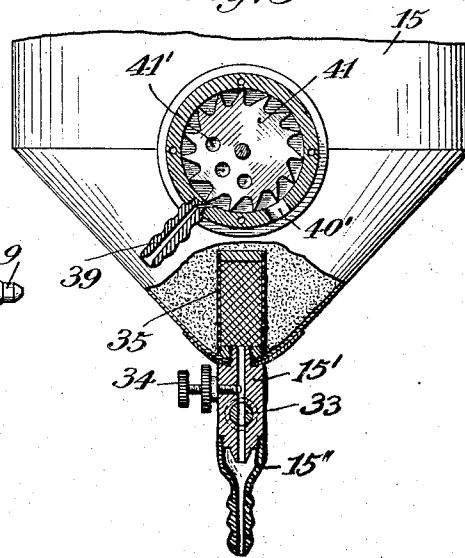


Fig. 3



Inventor:

Fritz Schori,  
By *[Signature]*  
Att'y.

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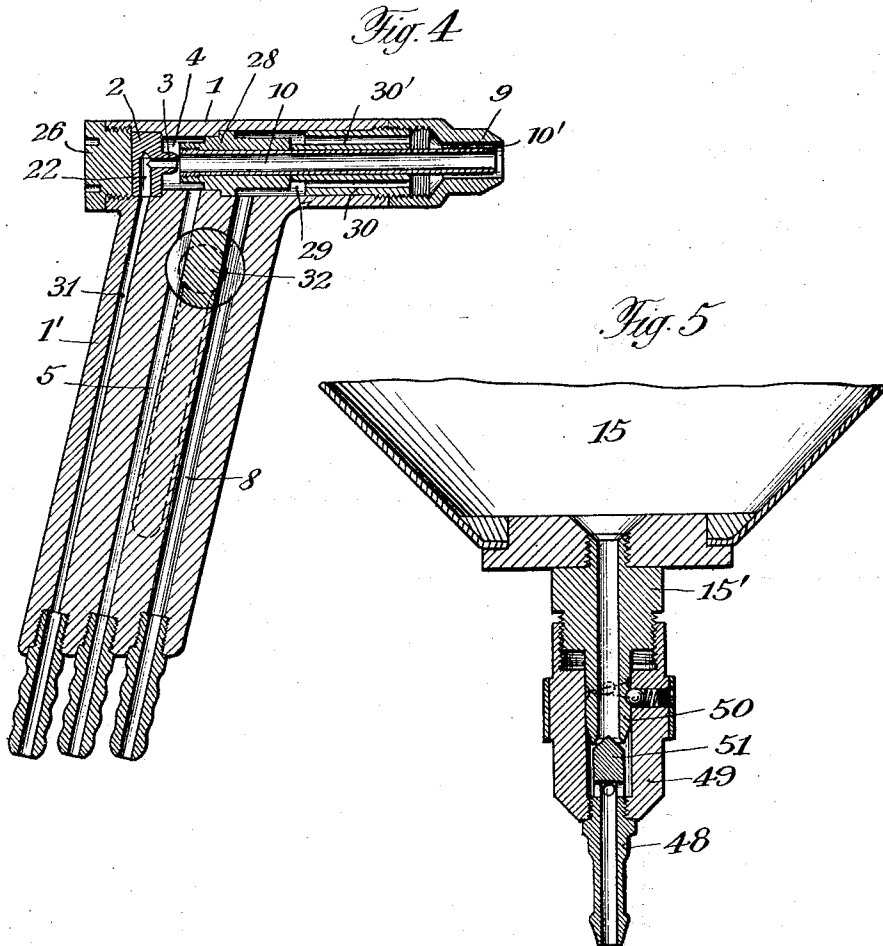
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2 Sheets-Sheet 2



*Inventor:*

*Fritz Schori*  
*By Henry [Signature]*

*Att'y.*

# UNITED STATES PATENT OFFICE

FRITZ SCHORI, OF WETZIKON, SWITZERLAND

## REISSUED

### ATOMIZER FOR MATERIALS IN POWDER FORM

Application filed January 6, 1927, Serial No. 159,490, and in Switzerland October 5, 1926.

The present invention relates to atomizers, particularly for materials in powder form.

It is not known to utilize exclusively suction action caused by a medium under pressure at the lower end of a receptacle containing the material to be atomized in order to convey the latter to a point where atomization is to take place by the action of the same medium under pressure.

In this manner a contact between the material to be atomized and the expanding pressure gas is avoided for instance a contact between a metal powder and expanding compressed air, which cools and releases moisture whereby the formation of lumps of material owing to the exchange of moisture and its disadvantageous consequences are done away with.

The subject matter of the present invention is an arrangement for achieving these effects which comprises a portable receptacle containing the material to be atomized, a suction pipe connected with its one end to the lower portion of said receptacle and with its other end to an atomizing nozzle constructed as a hand-apparatus or pistol.

Thereby it is possible to have a considerable stock of material to be atomized at the working place without increasing the load on the hand of the operator holding the hand-apparatus.

Constructional examples of the subject matter of the present invention are illustrated on the accompanying drawings, in which:

Fig. 1 shows the complete arrangement used by an operator for metal coating,

Fig. 2 shows the two prominent parts of the apparatus, i. e. the receptacle and the hand apparatus in elevation,

Fig. 3 shows the lower portion of receptacle in elevation and with parts shown in section,

Fig. 4 shows the pistol in a vertical section and

Fig. 5 is a modification of the lower part of the receptacle.

In the casing 1 of the hand-apparatus (Fig. 4) having a handle 1' a piece 2 is inserted provided with a channel 22 and an extension, the latter together with the wall of the casing forms a nozzle and is secured in position

by a screw plug 26. The nozzle is provided with an annular space 4 which, by an annular gap at the free end of the extension 3, is in connection with an atomizing chamber 10 formed by the interior of a tube 10'. The latter is screwed into a sleeve 28, which serves for partly defining the annular space 4 as well as a space 29 present in the casing 1. Further a sleeve 30 is screwed into the casing, said sleeve secures in its position by means of an extension the sleeve 28 and is provided with concentric channels 30'. To the inserted sleeve 30 and nozzle 9 of the burner is screwed. A channel 8 is provided in the handle 1' and leads to the space 29 of the casing 1, a channel 5 in the handle is in communication with the space 4 and a channel 31 communicates with the channel 22 of the insertion piece 2. A cock 32 controls the flow through the channels 5 and 8 of the handle and an arm 32' serves for adjusting the cock.

The channel 31 of the handle 1' is connected by means of a hose 17 forming the suction conduit to a receptacle 15 containing the metal in powder form, the lower end of the receptacle tapers and is provided with a connecting branch 15'. The latter is provided with a cock 33 and with an adjusting screw 34 adapted to control the cross-sectional area of the channel provided in the branch 15'. Inside the receptacle 15 a cylindrical sieve 35 is placed above the bore of the branch 15', the perforations of the sieve permitting the metallic powder to pass through them. To the channel 8 of the handle 1' a hose 36 is connected serving to supply a combustible gas for instance from a gas bottle 45 carried on a portable air compressor plant 46 (Fig. 1). A hose 37 connected to the channel 5 of the handle 1' serves to supply a pressure medium, for instance compressed air supplied from a container 47 of the compressor plant 46 (Fig. 1). By means of a further hose designated 38 compressed air (for instance from the container 47 Fig. 1), is led by a branch 39 into a casing 40 provided on the receptacle 15, in which casing a wheel 41 provided with recesses on its circumference to act as blades is arranged. To the cover, which is fixed to the

receptacle 15 and provided with a closable opening for filling in the metallic powder, two shoulder straps 42 are connected with their ends. Rings 43 provided on the receptacle serve for fixing the straps 42 the length of which is adjustable (by means of a button and slots); one of the straps is threaded through one of the rings and the other is provided with a hook 44 adapted to cooperate with the second ring. The receptacle 15 may be conveniently carried on the back of the operator, the two straps 42 passing over his shoulders. Openings 49' are provided to admit atmospheric air to the suction conduit below the valve formed by 50 and 51, as in Fig. 3.

In using the atomizer the current of compressed air from the hose 37 flows through the channel 5 of the handle 1' of the hand-apparatus to the annular space 4 and through the gap between the extensions 3 and the parts 10' and 28 into the chamber 10 and then into the open. The passage of the current of compressed air through the gap causes a continuous suction action which is transmitted by the channels 22 and 31, the hose 17 and the branch 15' to the lower end of the receptacle 15, whereby metallic powder is continuously conveyed by suction action through 15', 17, 31, 22; holes 15'' provided on the branch 15' permit the access of atmospheric air into the suction conduit. The jet of powderous material issuing from the channel 22 is very finely atomized inside the chamber 10 by the annular current of compressed air intersecting the former jet at an acute angle. The atomized powder gets then into the melting flame issuing from the burner nozzle 9 and is projected against the facing to be coated. The melting flame is fed with the gas supplied to the nozzle by the hose 36 and flowing through the channel 8, the space 29 and the channels 30' of the inserted sleeve 30. By means of the compressed air flowing through the hose 38 into the casing 40 on the receptacle 15 and out of the casing by the exit opening 40' the turbine wheel 41 is caused to rotate whereby a certain vibration of the receptacle is effected; the vibrating or shaking action on the receptacle 15 is further increased in that the mass of the turbine wheel 41 is not balanced, holes 41' being provided in one half of the wheel. On account of this shaking effect on the receptacle 15 the formation of a compact column of powder, which is apt to take place when very fine and somewhat moist powder is contained in larger quantities in the receptacle, is prevented. By means of the cock 32 arranged in the handle 1' of the hand-apparatus the current of the compressed air and of the combustible gas may be throttled or completely cut off. By turning the handle 33' of the cock 33 provided in the branch 15' of

the receptacle 15 the stream of metallic powder may be cut off.

Fig. 5 shows a modified construction of the discharge branch 15' provided on the receptacle 15 which differs from that shown in Fig. 3 in that instead of the cock 33 and the regulating screw 34 an adjustable nozzle is provided for influencing the discharge of the metallic powder. The nipple 48, to which the hose 17 is to be connected is screwed to a member 49 which in its turn is connected by screw thread to the branch 15'. The latter is provided with a tubular extension 50 the end of which forms in cooperation with the conical end face of an extension 51 of the nipple 48 a nozzle. By turning the member 49 against the branch 15' the extension 51 is axially displaced against the end of the extension 50 whereby the cross-sectional area of the nozzle may be regulated or cut off if desired. A spring loaded ball 52 mounted in the member 49 is adapted to cooperate with recesses arranged in the extension 50 to secure the elements 49 and 15' in their adjusted positions.

Obviously the above described examples of the atomizers make it possible to have a good stock of the material to be atomized at the working place without increasing the load on the hand of the operator handling the pistol so that the free movability of the operator is ensured.

The above described atomizer may also be used for atomizing and producing a coat of nonmetallic materials in powder form or of liquids.

I claim:

1. An arrangement for atomizing materials and particularly materials in powder form, comprising in combination, a portable receptacle adapted to take up a stock of the material to be atomized, a hand-apparatus containing a nozzle, means to supply a medium under pressure to said nozzle of the hand-apparatus whereby a suction action is generated, and gravity supplied depending conduit means downwardly discharging and a hose connecting the lower end of said receptacle to said hand-apparatus and having atmospheric air admission means to admit air after the material has left the receptacle for conveying the material to be atomized from said receptacle to said hand-apparatus by the suction action of said nozzle by which it is atomized by the same pressure medium which generates the suction.

2. An arrangement for atomizing materials and particularly materials in powder form, comprising in combination, a portable receptacle adapted to take up a stock of the material to be atomized, a hand-apparatus containing a nozzle, means to supply a medium under pressure to said nozzle of the hand-apparatus whereby a suction action is generated, depending conduit downwardly

discharging means connecting the lower end of said receptacle to said hand-apparatus and having openings to admit atmospheric air after the material has left the receptacle for conveying the material to be atomized from said receptacle to said hand-apparatus by the suction action of said nozzle by which it is atomized by the same pressure medium which generates the suction, and a device attached to the receptacle and adapted to impart vibrations to said receptacle in order to prevent clogging of the material to be atomized.

3. An arrangement for atomizing materials and particularly materials in powder form, comprising in combination, a portable receptacle adapted to take up a stock of the material to be atomized, a hand-apparatus containing a nozzle, means to supply a medium under pressure to said nozzle of the hand-apparatus whereby a suction action is generated, conduit means connecting the lower end of said receptacle to said hand-apparatus for conveying the material to be atomized from said receptacle to said hand-apparatus by the suction action of said nozzle by which it is atomized by the same pressure medium which generates the suction, a casing attached to said receptacle, a turbine wheel enclosed in and rotatably mounted in said casing, and means to supply a pressure medium to said casing for causing a rotation of said turbine wheel and to impart thereby vibrations to said receptacle in order to prevent clogging of the material to be atomized.

4. An arrangement for atomizing materials and particularly materials in powder form, comprising in combination, a portable receptacle adapted to take up a stock of the material to be atomized and provided with shoulder straps for being conveniently carried by the operator, a hand-apparatus whereby a suction action is generated, and gravity supplied depending conduit means discharging downwardly, and a hose connecting the lower end of said means to said hand-apparatus and having air inlet openings beyond the receptacle for conveying the material to be atomized from said receptacle to said hand-apparatus by the suction action of said nozzle by which it is atomized by the same pressure medium which generates the suction.

5. An arrangement for atomizing materials and particularly materials in powder form, comprising in combination, a portable receptacle adapted to take up a stock of the material to be atomized and having a downward discharge, a hand-apparatus containing a nozzle, means to supply a medium under pressure to said nozzle of the hand-apparatus whereby a suction action is generated, conduit connecting the lower end of said receptacle to said hand-apparatus for

conveying the material to be atomized from said receptacle to said hand-apparatus by the suction action of said nozzle by which it is atomized by the same pressure medium which generates the suction, said conduit having air admission openings at its entrance end beyond the receptacle and a sieve provided in the lower part of the receptacle above the one end of said suction conduit means.

6. Spraying apparatus for pulverulent material comprising a gravity discharging receptacle, a hand spraying device having a suction chamber therein wherein suction is produced by the spraying operation, a conduit depending from the bottom of the receptacle connecting the receptacle with such chamber, said conduit having downward discharge atmospheric air admission thereto at the entrance of the material from said receptacle into said conduit and outside the receptacle, whereby the atmospheric air will conduct the pulverulent material through said conduit to said chamber by the suction therein to be sprayed by said device without the transporting air passing through or coming into contact with the body of material in said receptacle, to the end that said body of material will remain dry and unaffected by the constant passage of conveying air therethrough, thus avoiding the formation of lumps in the body of pulverulent material in the receptacle, or oxidation thereof, by coming into contact with the pulverulent material only after it has been discharged from the receptacle into the conduit, to insure non-clogging discharge, uniform operation and a better coating.

7. Spraying apparatus for pulverulent material, comprising a portable, downwardly discharging receptacle, means to produce suction, a flexible conduit connecting the receptacle suction means, said conduit having openings to admit atmospheric air thereto at the entrance thereof, and means to shake said receptacle.

8. Spraying apparatus for pulverulent material, comprising a portable, gravity-discharging receptacle, a hand spraying device having a suction chamber therein, a conduit connecting the bottom of the receptacle with said chamber, said conduit having openings at its entrance end to admit atmospheric air thereto, an unbalanced turbine wheel mounted on said receptacle to shake the same, and means to supply driving fluid to said turbine.

9. Spraying apparatus for pulverulent material, comprising a portable, gravity-discharging receptacle, a hand spraying device having a suction chamber therein, a conduit connecting the bottom of the receptacle and said chamber, said conduit having openings at its entrance end for the admission of propelling air after the material has left the re-

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ceptacle at atmospheric pressure, an unbalanced turbine wheel on the receptacle, means to supply propelling fluid to said wheel, and a screen within the receptacle over the discharge thereof and through which the material is sifted by gravity during the discharge to said conduit.

10. Spraying apparatus for pulverulent material, comprising a portable, gravity-discharging receptacle, a hand spraying device having a suction chamber therein, a conduit connecting said receptacle and chamber, said conduit having an air admission at its entrance and a valve for closing the discharge of said receptacle arranged below the same and above said air admission.

11. In a spraying apparatus, a spraying device comprising a casing, a nozzle therein, means to supply suspended metal to said casing, a tube in alinement with and spaced from said nozzle to form a suction chamber therebetween, said tube extending substantially to the outer end of said casing, means to supply atomizing air to the chamber and tube for combustion, a sleeve surrounding said tube and having longitudinal passages therein concentric with said tube, means to supply a combustible gas to said passages, said gas being discharged between the tube and casing and being burnt at the outer end of the casing in contact with the atomizing air. A dust feeding receptacle connected to and supplying dust under suction to said spraying device, and means to continually shake the receptacle during operation.

In testimony whereof, I have signed my name to this specification.

FRITZ SCHORI.

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