Nov. 26, 1929. C. D. BOYNTON 1,736,768

GUN FOR BLOWING ASPHALT AND THE LIKE

Filed July 3, 1926

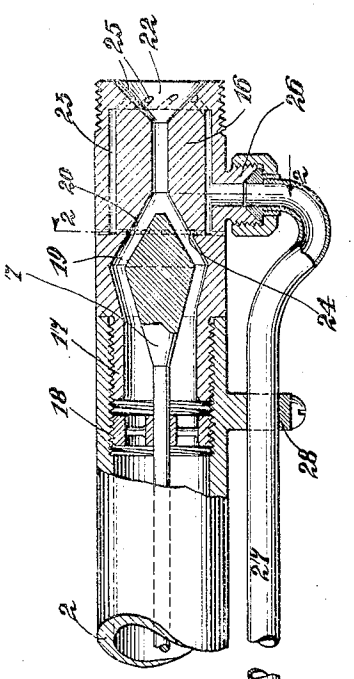

Fig. 3.

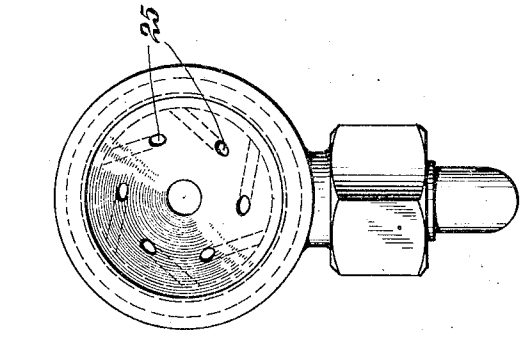

Fig. 2.

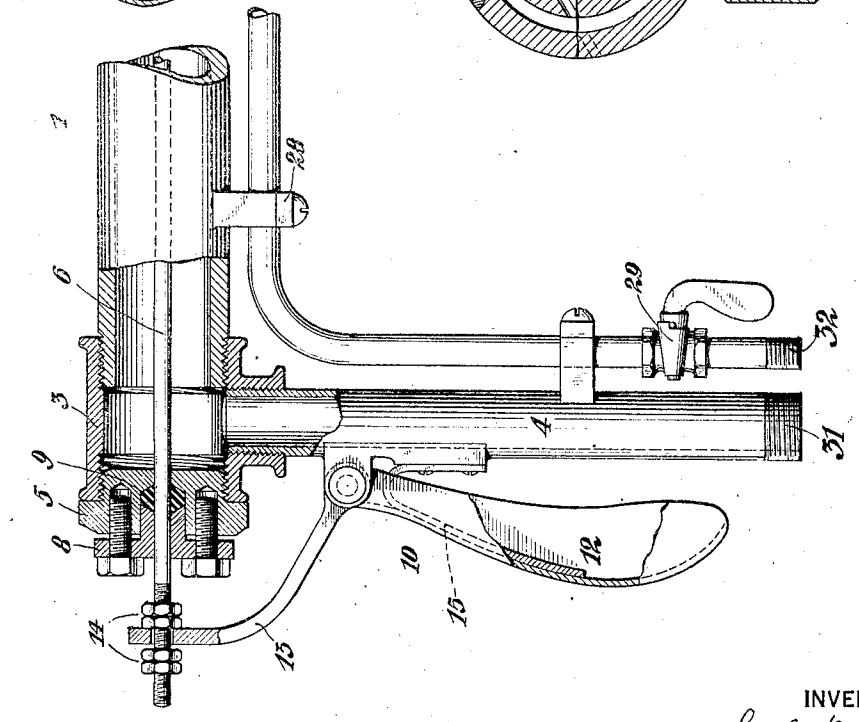

Fig. 1.

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GUN FOR BLOWING ASPHALT AND THE LIKE

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The invention relates to devices for blowing by means of air, liquid substances as, for instance, asphalt, or other material suspended in a liquid, for the purpose of coating a desired surface with such substances, or for any other purpose. These devices are generally known as air guns.

According to the invention an air gun may be provided which may comprise a barrel of suitable length having at its front end a nozzle member. The nozzle member may be provided with a recess having a seat for a needle valve and a nozzle cavity connecting with said recess. An air chamber may surround the recess and cavity, the air chamber having by-pass holes extending to the needle valve recess and multiple holes extending to the nozzle cavity. Suitable connecting devices may be provided for feeding the substance to be blown from the gun into the barrel, and additional devices may be provided for supplying the air chamber with air under suitable pressure.

The provision of the by-pass holes allows the air to be mixed with the liquid material before it enters the nozzle, thereby agitating the liquid material at this point and insuring proper and continuous action. The provision of the multiple holes leading to the nozzle cavity tears the material stream up and blows the particles effectively onto the surface to be coated. Both the multiple holes and by-pass holes may be arranged so as to set up a swirling motion in the liquid material.

Various other objects and advantages of the invention will be obvious from the following particular description of one form of device embodying the invention or from an inspection of the accompanying drawings; and the invention also consists in certain new and novel features of construction and combinations of parts hereinafter set forth and claimed.

Referring now to the drawing in which a single modification of the invention is shown for purpose of illustration only:

Fig. 1 is a longitudinal elevation partly in section of the air gun;

Fig. 2 is a transverse section taken on the line 2—2 of Fig. 1; and

Fig. 3 is an end view looking into the front end of the nozzle.

In the following description and in the claims parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

Referring now to the drawing, the air gun may comprise a barrel 1 of suitable length which may be made up of a longitudinal pipe member 2 having a T-fitting 3 at its rear end. Into the lower opening of the T-fitting a handle member 4 may be provided, the handle member being in the form of a pipe and communicating with the interior of the barrel. Threaded into the rear end of the T-fitting 3 may be a stuffing box 5 having an opening through which the spindle 6 of the needle valve 7 may pass, the stuffing box 5 being provided with a gland member 8 and packing 9 for effectively sealing the spindle against the escape of the liquid material. Pivoted to the handle member 4 may be a valve lever 10 having a lower hand engaging portion 12, and an upper portion 13 provided with a hole through which the spindle 6 may pass loosely. Lock nuts 14 may be provided on the spindle on either side of the upper portion. A leaf spring member 15 may be provided between the hand engaging portion 12 and the handle member 4 to normally urge the needle valve 7 against its seat.

At the forward end of the barrel 1 a nozzle member 16 may be provided. The nozzle member 16 may comprise a reduced threaded rear portion 17 which may be threaded into the forward end of the pipe member 2. A suitable guide member 18 may also be threaded into the forward end of the pipe member 2 to act as a guide for the needle valve 7.

The nozzle member 16 may be provided at its rear end with a recess 19 having a conical seat 20 for seating the needle valve 7 and at its front end a conical nozzle cavity 22, there being an opening connecting said recess and cavity. The nozzle member may further be provided with an annular air chamber 23 surrounding the opening, the annular air

chamber having connecting therewith a plurality of by-pass holes 24, the by-pass holes intersecting the recess 19 substantially midway the length thereof and tangentially for a purpose hereinafter described more in detail. These by-pass holes 24 may be formed by drilling holes from the outside of the nozzle member 16, these holes crossing the annular air chamber 23 and intersecting the recess 19 substantially tangentially thereof. The part of the holes between the air chamber 23 and the outside of the nozzle member may be plugged up by the plugs 33. Similarly, a plurality of multiple holes 25 may be provided connecting with the air chamber 23 and intersecting the nozzle cavity 22 substantially midway its length and tangentially for a purpose hereinafter described.

The nozzle member may be provided with a depending tube 26 connecting with the air chamber to which may be suitably secured an air pipe 27 which may extend along the barrel and handle, being secured thereto by means of straps 28. An air valve 29 may be provided in the air line for controlling the air flow. The lower ends of the handle member 4 and air pipe 27 may be provided with suitable connecting devices such as screw threads 31 and 32 for connecting feed pipes (not shown) leading to suitable tanks (not shown) containing the liquid material and air respectively.

The provision of the air chamber and by-pass holes allows air to be mixed with the liquid substance before it enters the nozzle. The air being under a higher pressure than the liquid substance will agitate the liquid substance and the tangential location of the by-pass holes 24 will give it a swirling motion, thereby insuring proper and continuous operation of the gun. Also the tangential multiple holes 25 extending from the air chamber 23 to the nozzle cavity 22 cause the mixture of the air and liquid material to be torn and broken up and the particles to be effectively spread out.

In operation the pressure on the liquid substance in the tank may be from 15 to 30 pounds depending upon the lift, the material and the distance between the gun and the tank. The air pressure may be from 75 to 100 pounds to give proper operation. The by-pass holes 24 are sufficiently small so that the relatively higher air pressure does not cause a back pressure to be built up against the entering liquid substance which will interfere with the proper operation. If desired, instead of having the auxiliary valve on the air line a valve may be provided which will control both the air and the flow of the liquid substance simultaneously. A valve on the air line is preferable, however, because at times it is desirable to blow the liquid material straight through without the use of air at the nozzle. It is obvious that the nozzle member is detachable and may be replaced by nozzles of different dimensions, if desirable, for different purposes.

Thus it will be seen that an air gun is provided which is simple in construction, inexpensive to manufacture, and efficient in operation. The liquid material is mixed with the air by by-passing part of the air before it is fed to the nozzle cavity. This by-passing of the air effectively agitates and mixes with the liquid material before it enters the nozzle, thereby insuring proper and continuous operation. The provision of the tangential multiple holes causes the liquid substance to be broken up into particles and to be properly spread throughout the desired area.

While I have shown and described and have pointed out in the annexed claims certain novel features of the invention, it will be understood that various omissions, substitutions and changes in the forms and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention.

Having thus described my invention, I claim:

1. An article of the class described comprising a hollow barrel adapted to have supplied thereto a fluid substances it is desired to discharge, a nozzle member connected to said barrel at the front end thereof, said nozzle member having a nozzle opening, said nozzle member also having an auxiliary fluid chamber, an auxiliary fluid conduit communicating with said chamber, a by-pass hole connecting with said chamber and the back end of said opening, a second hole connecting with said chamber and the front end of said opening, and a valve for simultaneously blocking said nozzle opening and one of said holes.

2. An article of the class described comprising a hollow barrel adapted to have supplied thereto a fluid substance it is desired to discharge, a nozzle member connected to said barrel, said nozzle member having a cavity in its front, a recess with a seat in its back end and an opening connecting said recess and cavity, said nozzle member also having an auxiliary chamber, an auxiliary conduit communicating with said chamber, a by-pass hole connecting with said chamber and said recess, a multiple hole connecting with said chamber and said cavity, a needle valve to seat in said seat, and means for controlling the position of said valve, said valve being adapted to simultaneously block said opening and by-pass hole.

3. An air gun comprising a hollow barrel having at the rear end thereof a handle and adapted to have supplied thereto a fluid substance it is desired to discharge, a nozzle member connected to said barrel at the front end thereof, said nozzle member having a

conical cavity in its front, a recess with a conical seat in its back end and an opening connecting said recess and cavity, said nozzle member also having an annular chamber surrounding said opening, an air pipe communicating with said chamber and an air valve, a plurality of by-pass holes connecting with said chamber and intersecting said recess tangentially, a plurality of multiple holes connecting with said chamber and intersecting said cavity tangentially thereof, a needle valve having a conical portion to seat in said seat and a spindle extending through the rear end of said barrel, and a lever pivoted to said handle and spindle.

4. An air gun comprising a hollow barrel having at the rear end thereof a hollow handle communicating therewith, said hollow handle being adapted to have supplied thereto a fluid substance it is desired to discharge, a nozzle member having threaded connection with said barrel at the front end thereof, said nozzle member having a conical cavity in its front, a recess with a conical seat in its back end and an opening connecting said recess and cavity, said nozzle member also having an annular air chamber surrounding said opening, an air pipe communicating with said chamber and an air valve at said handle, a plurality of by-pass holes connecting with said chamber and intersecting said recess tangentially midway the length of said seat, a plurality of multiple holes connecting with said chamber and intersecting said cavity tangentially thereof midway its length, a needle valve having a conical portion to seat in said seat and a spindle extending through the rear end of said barrel, and a lever pivotally connected to said handle and spindle.

5. A coating gun comprising a nozzle member having a restricted nozzle opening with a front enlarged cavity and a back enlarged cavity, a source of fluid coating substance connected to said back cavity, a source of auxiliary carrier fluid connected to said front cavity by first passages and to said back cavity by small second passages so that no appreciable back pressure can be built up against said coating substance, said first and second passages being arranged to impart a whirling motion to said coating substance.

In testimony whereof I have hereunto set my hand.

CARLE D. BOYNTON.