April 22, 1947 A. S. PITRE ET AL 2,419,228

NOZZLE

Filed Aug. 7, 1943

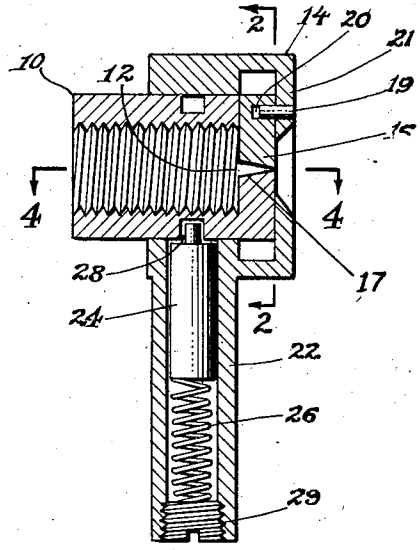


Fig. 1.

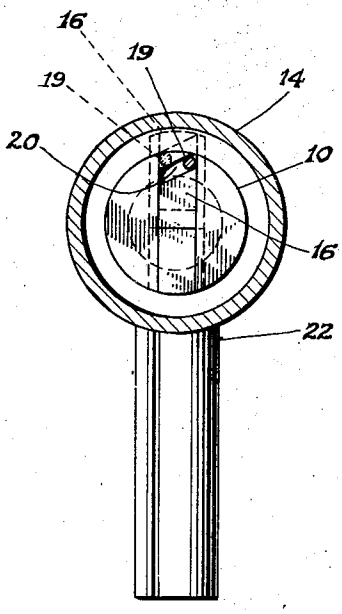


Fig. 2.

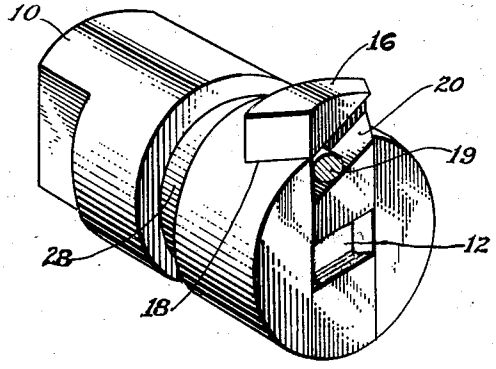


Fig. 3.

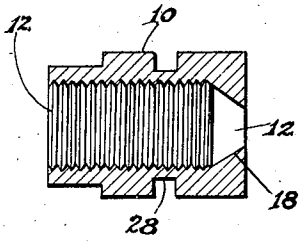


Fig. 4.

Antonio S. Pitre,
Fred G. Cowen &
John N. Pouget
INVENTORS

BY Stone & Bush
ATTORNEY

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UNITED STATES PATENT OFFICE

2,419,228

NOZZLE

Antonio S. Pitre, United States Navy, and Fred G. Cowen, Vallejo, and John N. Pouget, Napa, Calif.

Application August 7, 1943, Serial No. 497,774

2 Claims. (Cl. 299—132)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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This invention relates to a device for controlling fluid flow and more specifically, to a nozzle.

In general, it is an object of the invention to provide a device which is simple of construction, which may be quickly and readily manufactured of inexpensive common materials, which may be repaired by workmen at the place of operation and which may be used with ease, safety and economy.

Another object of the invention is to provide a nozzle through which the size and shape of the stream may be controlled; to provide a nozzle which is adapted for use with heavy and/or viscous fluids; and to provide a nozzle which may be cleared of extraneous blocking objects almost immediately.

Other objects of this invention will, in part, be obvious and will, in part, appear hereinafter.

The invention accordingly comprises articles of manufacture possessing the features, properties and relation of elements that will be exemplified in the articles hereinafter described, the scope of the application of which will be indicated in the claims.

For a better understanding of the invention, reference should be had to the following description taken in connection with the drawing, in which

Fig. 1 is a side view in cross section, in the plane of the axis, of a device embodying one form of the invention;

Fig. 2 is an end view of the device of Fig. 1, taken at a plane, the trace of which is shown at line 2—2 of Fig. 1;

Fig. 3 is an enlarged perspective view of the main block of the device shown in Fig. 1; and

Fig. 4 is a sectional plan view of the block shown in Fig. 3, substantially on the line 4—4 of Fig. 1.

It is beneficial in a nozzle that the size of the delivering aperture be variable in order that the quantity of material may be fixed at different desired amounts at different times, and in order that obstructions lodged in the nozzle may be removed by sending a sudden short spate of material therethrough.

When the nozzle is used with hot, heavy, viscous materials, it is advantageous if not necessary that the operative parts work in the presence of such materials. The nozzle of the present invention has such variability of aperture; it is particularly able in use with materials like hot plastic paints. Also, it gives a spray in a relatively thin sheet, having a rectangular cross section which is longer in one direction than in a direction perpendicular

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thereto. There is more paint in the middle of the long direction than at the ends. When a strip of paint has been laid down on a surface in a direction perpendicular to the long direction of the spray cross section, this concentration of paint permits a second strip to be laid down parallel to, and overlapping the end of the first strip without there being an excess of paint where the strips overlap.

In the drawing, 10 denotes a nozzle block which is preferably a portion of a right circular cylinder. A passage 12 extends therethrough and may be axial. A casing 14, co-axial with said block, rotates upon it. A movable gate element 16 is adapted to block and unblock the passage. Guides are provided to determine its path. They may be the walls of a dove-tail slot 18 in the forward end of the block 10 and in that event the gate 16 has a dove-tail cross section. There are suitable means for moving the gate 16. As shown, these take the form of a pin 19 which is slidable in a channel 20, which may be straight or arcuate, and disposed in the forward face of the gate 16, and which is attached to a radially inward flange 21 on the casing 14. The flange 21 may be in 360° contact with the face of the block.

The casing has welded thereto gripping means, such as the handle 22. A locking element 24 in the handle is pressed by spring 26 into the circumferential groove 28 on the block 10, and prevents the casing from moving axially with respect to the block, and tends to hold the casing in any position at which it is set. The spring 26 may be retained by a screw 29. A set screw may take the place of element 24.

The receiving end of the block 10 may be threaded for attachment to a hose.

It will be seen that a motion transmitted from handle 22 to the casing causes the pin 19 to force the gate 16 to or from a position closing the passage 12. The gate may have a straight edge which, as it approaches a straight edge on the block, gives a dispensing slit which becomes progressively narrower. Spray from that slit is in the form of a narrow sheet, the length of which is perpendicular to the length of the slit. The sheet may be so sharp that no hand work is necessary to define any boundary of a paint area—on the hull of a vessel, for example.

The side walls of the dovetail slot 18, which are exposed by the sliding of the gate 16, act as guiding dams to the paint being delivered. The opening at the forward edges of those dams is smaller than the passage 12. The angle that these outwardly converging guiding surfaces

made with the forward face of the block is approximately 60°, see Fig. 4. The gate element 16 has a face almost in contact with face 17 of the block. When the gate moves to open position, these faces separate. They are never in contact except at the forward edge, as each of these faces is cut back about 3° away from a perpendicular to the front face of the block, as indicated in Fig. 1. Normally, when the nozzle is in use, it is held so that the gate moves horizontally to give a vertical slot. With the angles specified above, the material delivered comes to a focus at a distance in front of the block about equal to the width of the flange of the casing indicated in Fig. 1. The material forward of the focus fans out into a shallow horizontal band twelve inches wide at a plane eighteen inches ahead of the nozzle. More material is delivered in the center of the fan than at the ends. This permits successive vertical strips to overlap without an excess of paint along the overlaps. The shape of the material delivered varies with angles mentioned above. As the gate is opened wider, the band of spray contracts horizontally and enlarges vertically until it becomes substantially a cylindrical stream.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

What we claim as new and desire to secure by Letters Patent is:

1. A nozzle comprising a block having a passage therethrough and a pair of opposite outwardly converging surfaces constricting said passage, means providing a second pair of opposite outwardly converging surfaces constricting said passage and including a slidable gate member providing one of said second pair of surfaces, said gate member having angular side surfaces complementary to and engaging said first mentioned pair of outwardly converging surfaces and slidably guided thereby, said converging guide surfaces having linear outer edges in a plane perpendicular to the direction of flow and constricting the flow through said passage when said gate member is in other than closed position, said gate member being slidable in substantially flush relationship with the face of the block and having a straight edge cooperating with a straight edge of the block to provide a variable dispensing slit or opening, and means for sliding said slidable gate member in said block to adjust said dispensing slit to form a fan-shaped spray and to provide positive control of the length, breadth, and shape of said spray.

2. A nozzle comprising a block having a passage therethrough, and providing a pair of opposite outwardly converging surfaces constricting said passage and each being at an angle of about thirty degrees with the axis of said passage, means providing a second pair of opposite outwardly converging surfaces constricting said passage and each being at an angle of about three degrees with the axis of said passage, said means including a gate member slidably mounted in said block and providing one of said second pair of surfaces, said slidable gate member having angular side surfaces complementary to and engaging said first mentioned pair of outwardly converging surfaces and slidably guided thereby, and means for sliding said gate member along said converging guide surfaces for separating said second pair of surfaces, said converging surfaces constricting the flow through said passage when said gate member is in other than closed position.

ANTONIO S. PITRE.
FRED G. COWEN.
JOHN N. POUGET.

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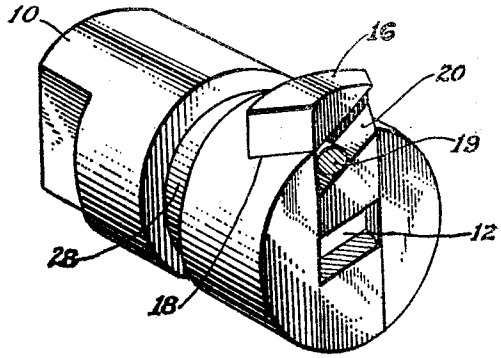
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Certificate of Correction

Patent No. 2,419,228. April 22, 1947.

ANTONIO S. PITRE ET AL.

It is hereby certified that error appears in the above numbered patent requiring correction as follows: In the drawing, Figure 3 should appear as shown below instead of as in the patent—



and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of August, A. D. 1947.

[SEAL]

LESLIE FRAZER,
First Assistant Commissioner of Patents.