United States Patent

Tell

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[54] NOZZLE FOR ALTERNATIVE BLOWING OR SUCTION

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[51] **Int. Cl.** **A47l 9/08**

[58] **Field of Search** 15/330, 345–346, 15/405–409, 416; 251/65; 417/178, 182, 187

[56] **References Cited**

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[57] **ABSTRACT**

A nozzle device for connection to a source of pressure air is intended for removing of accumulated particles either by blowing or suction. The nozzle at its muzzle has two passages which by a valve alternatively are connectable to said source. When the one of said passages is connected to said source of pressure air a blowing is obtained at said muzzle and when the other passage is connected to said source a suction is obtained at the muzzle of the nozzle. The valve has a magnetically influenced valve member and the nozzle carries in vicinity of the valve a magnet, preferably a permanent magnet, for regulating the valve.

3 Claims, 2 Drawing Figures

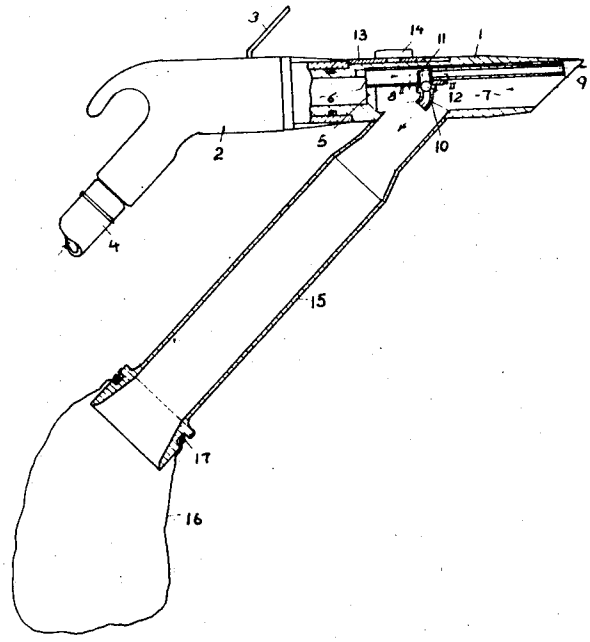


Fig. 1

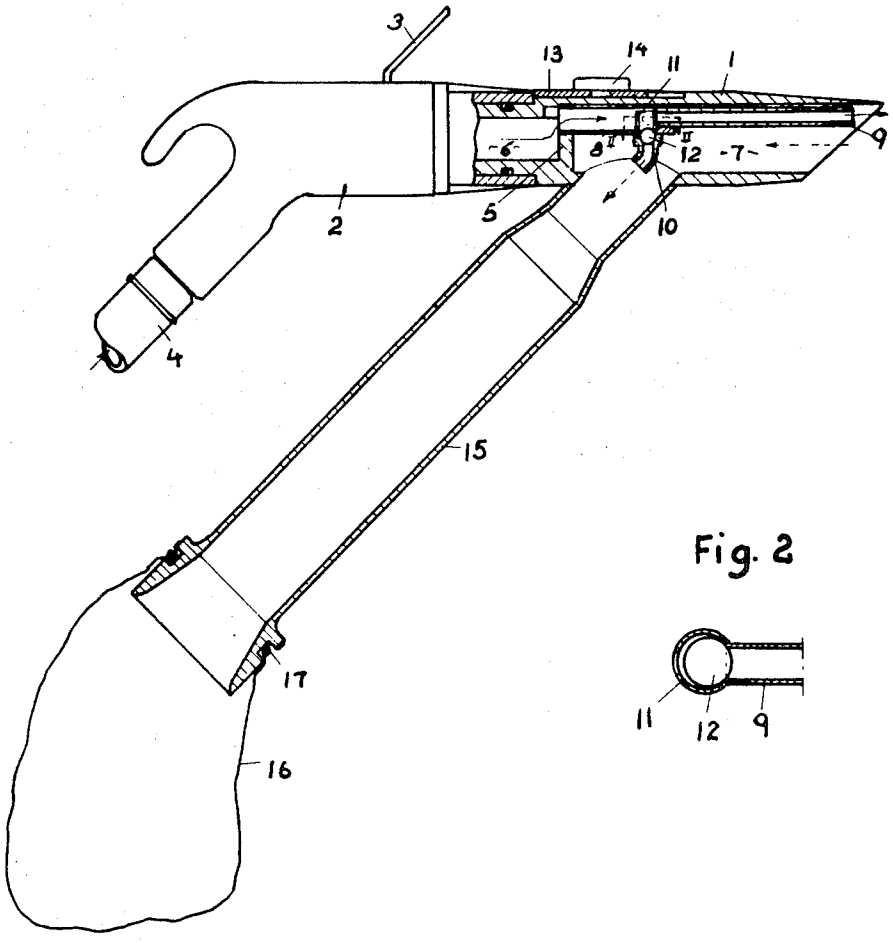


Fig. 2

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NOZZLE FOR ALTERNATIVE BLOWING OR SUCTION

BACKGROUND

This invention relates to a nozzle for connection to a source of pressure air and for removing accumulated particles either by blowing or suction.

In general metal particles and other particles are removed from machined work pieces by using an air gun that blows away the particles. Further, it is usual to provide the nozzle of the air gun with a protective shield of solid material or of an air stream in order to turn aside the particles blown up from for instance a hole so that the particles are not able to injure the worker carrying out the cleaning. However, air guns yet are used to a great extent without such shield and then the particles flung out by the pressure air stream often hit the worker and especially his arm or hand holding the gun and will be accumulated there. Thereafter, the worker frequently uses the air gun for cleaning himself which is directly dangerous if the air stream of the gun has high pressure when it hits the worker and the air can be pressed into some organ or under the skin. In order to avoid that process the worker refrains from using the air gun and instead uses a suction apparatus, a vacuum cleaner, for removing the particles accumulated on him. Consequently, it will be necessary that the worker has two different apparatus available. Moreover, at certain working places, for instance in instrument manufacture, blowing with pressure air is not allowed as the flying particles and pressure air streams may damage instruments. Further, air blowing is not allowed at machines having easily damaged bearings. Accordingly, there exists a continuing need for an improved pressure air gun for more careful removing of accumulated particles by a suction operation.

SUMMARY OF THE INVENTION

Thus, it is a purpose of the present invention to provide a simple but strong device fed with pressure air to remove particles from work pieces or workers, which device is capable of being used more carefully, more simply, and in a more convenient manner.

In accordance with the present invention a nozzle for connection to a source of pressure air comprises at its muzzle two separate passages alternatively connectable to said source. One of said passages serves to give of an air stream and the other passage serves to produce a suction.

In accordance with another feature of the invention the one of said passages is formed by a exhaust tube and the other passage is formed by an ejector nozzle and the inlets to said exhaust tube and ejector nozzle alternatively are closeable by a valve.

In accordance with yet another feature of the invention the valve has a magnetically influenced valve member and the nozzle in the vicinity of the valve carries a magnet, preferably a permanent magnet, with regulatable influence on the valve member.

Other features and advantages of the present invention will be described in or apparent from the detailed description of the preferred embodiment found hereinbelow.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal section through a nozzle according to the invention;

FIG. 2 is a section along line II—II of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A nozzle **1** is screwed to a usual air gun **2** that has a valve arm **3** and a hose **4** for supply of pressure air. The main passage through the nozzle **1** by means of a transverse wall **5** is divided into an inner and an outer chamber **6** and **7** constituting a pressure chamber and a suction chamber, respectively. A tube piece **8** with its one end is inserted through the transverse wall **5** and in communication with the chamber **6**. The other end of the tube piece **8** is connected with a front exhaust tube **9** and an ejector nozzle **10**. The front tube **9** and nozzle **10** could be alternatively closed by a valve formed of a suitably shaped, slotted valve casing **11** and valve ball **12** of magnetically influenced material. Outside the nozzle **1** and over the tube piece **8** there is a slide **13** with a permanent magnet **14** displaceably arranged so that the magnet can be moved to a position over the valve **11**, **12** or away therefrom.

The ejector nozzle **10** is situated in the outer chamber **7** and bent in direction from the mouth of the chamber and into an expansion tube **15** projecting from the chamber. A collecting sack **16** is detachably connected to lastmentioned tube **15** by means of an O-ring **17**.

The nozzle is used and functions as follows. It is presumed that the slide **14** is in its left limit position, FIG. **1**, and the valve ball **12** consequently has the position as shown in said figure. When one acts upon the valve arm **3** the pressure air is allowed to pass through the gun **2** and flows into the tube piece **8** and through the exhaust tube **9** and flows out of the nozzle **1** for blowing away particles. The way of the described air stream is shown by continuous arrows. When the slide **13** thereafter has been displaced to its right limit position the permanent magnet **14** is able to pull up the valve ball **12** and the ball will rest against the inlet of the exhaust tube **9** and will be held tight to said inlet by means of the air pressure in the tube piece **8** as shown in FIG. **2**. Simultaneously the inlet of the nozzle **10** has been opened and the pressure air flows through the nozzle **10** and into the expansion tube **15** at which air is sucked out of the chamber **7** and a suction effect is obtained at the mouth of the nozzle **1**. In this case the air flows according to the continuous arrow in the tube **8** but for the rest according to the dashed arrows in FIG. **1**.

The advantage of the invention is that one does not need one apparatus for blowing and one apparatus for suction as the nozzle according to the invention alternatively is able to perform both these functions. Further, the nozzle is simple to manufacture and easy to handle.

Although the invention has been described with reference to a preferred embodiment thereof it will be understood that other variations and modifications can be effected within the scope and spirit of the invention as described hereinabove and as defined in the appended claims. For example the slide with magnet may

have another way of movement or be replaced by a fixed electromagnet with regulatable influence on the valve member. The valve may be of any other type. A protective shield may be arranged on the nozzle or on the exhaust tube.

I claim:

1. A nozzle adapted to be connected to a source of pressurized air for alternatively blowing air out of or sucking air in from the mouth of the nozzle at the forward end thereof comprising:

means defining a main passage through the nozzle,

a transverse wall extending across the main passage dividing the same into a pressure chamber which is adapted to be connected to a source of pressurized air and a suction chamber which extends from the transverse wall to the said mouth of the nozzle,

a tube piece mounted in the transverse wall in communication with the pressure chamber and extending forward into the suction chamber,

an injector nozzle connected to the tube piece in fluid communication with the interior thereof and extending in a direction such that its outer opening is directed away from the nozzle mouth,

an opening in the side of the main passage in the path of the injector nozzle and in fluid communication through the suction chamber with the nozzle mouth,

a front tube connected to the forward end of the said tube piece, said front tube being in fluid communication with the interior of the said tube piece, and said front tube forming an extension of the tube piece through the suction chamber towards the nozzle mouth, and

a valve positioned at the forward end of the said tube piece and positioned to block the opening from the tube piece to either the ejector nozzle or the front tube for blowing air through or sucking air in the nozzle mouth, respectively.

2. A nozzle according to claim 1, said valve comprising a magnetically influenced valve member positioned at the forward end of the tube piece and movable to block off the opening from the tube piece to either the ejection nozzle or the front tube, and a magnet mounted on the nozzle for selectively operating the magnetically influenced valve member.

3. A nozzle according to claim 2, said magnet being located on the exterior of the nozzle and slidable thereon to control the position of the said valve member.

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