

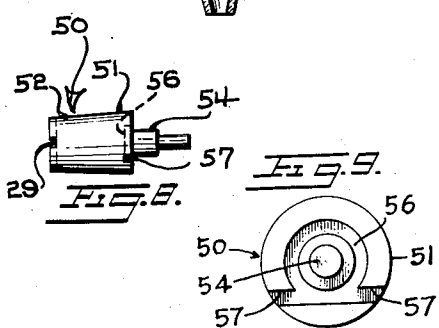
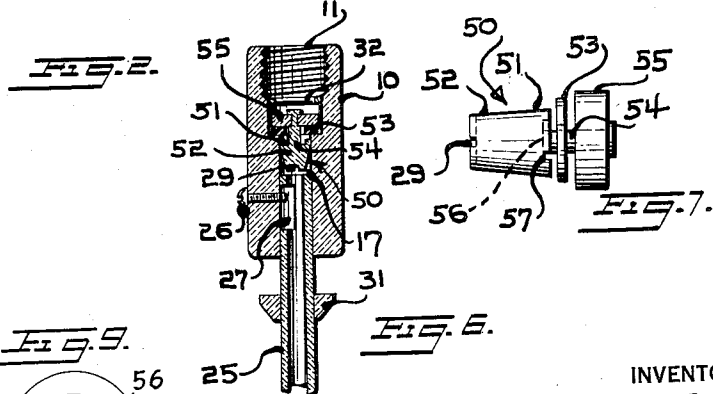
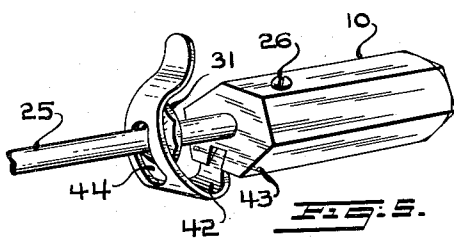
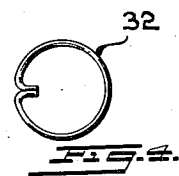
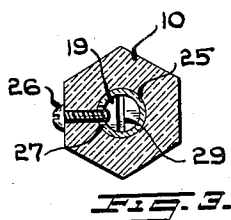
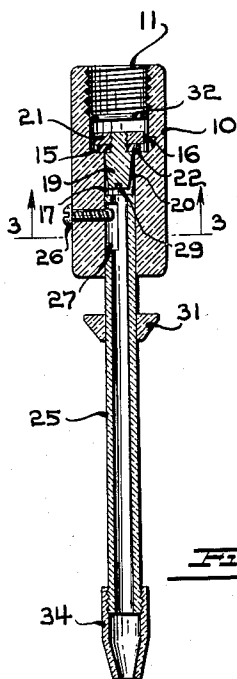
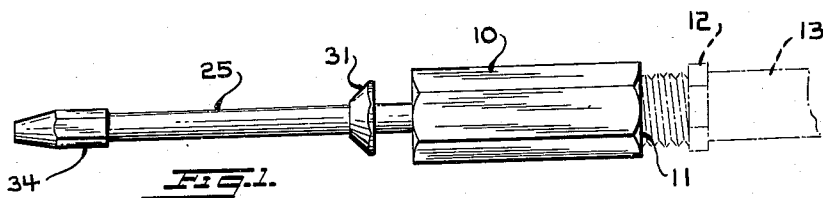
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2,579,408

AIR BLOW GUN VALVE

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AIR BLOW GUN VALVE

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2 Claims. (Cl. 277—36)

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This invention relates to new and useful improvements in an air blow gun.

The new and improved air blow gun is particularly intended to be connected with the end of a hose of compressed air and is for the purpose of dispensing compressed air to blow away dirt, chips, etc., from machine parts, castings, bench tops, etc., and which may also be used for many other purposes. It is conceded by all users of blow guns and those concerned with industrial hazards and safety promotion that the uncontrolled blast of air delivered by the average blow gun, blows dirt into many places where it is harmful and is particularly the cause of a large percentage of eye injuries.

It is proposed to so construct the new and improved air blow gun that the stream of air may be better controlled. With the better control of the air flow, the use of the gun will be safer because the operator may deliver just a sufficient quantity of air to meet the requirements. The improved blow gun meters out only the amount of air necessary for the job at hand and excess air that would cause dirt to be blown into places where it could cause injury to man or machine is kept under control. Controlled airflow is a saving in the use of compressed air and therefore reduces air compressor running time with a saving in power and maintenance cost.

The dominating feature of the new and improved air gun resides in the fact that I have provided it with a poppet valve having a surface parallel to a small bore in the valve body and I have arranged the clearance between this surface and the small bore sufficiently small so that a very small breath of compressed air will pass through the gun when the valve is slightly opened. This means that the valve may be moved away from its seat with such a small reduction in air pressure that the operator does not get a sudden muscular reaction generally experienced with present air guns.

In many air guns of metal construction it is necessary for the operator to exert a great effort to overcome the air pressure and dislodge the valve from its seat. At the instant the valve is dislodged from its seat, allowing air to flow, there is a great reduction of air pressure in the back of the valve, and a corresponding sudden reduction in the effort necessary to hold the valve in a slightly opened position. The operator cannot control his muscular action at the instant of this reduction and further pressure exerted unintentionally causes the valve to be

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thrown wide open and it discharges an uncontrolled violent blast of air.

Another important object of this invention is to construct a new and improved air blow gun of a very simple design. It is proposed that the new gun have three major parts, namely: a nozzle assembly, a poppet valve assembly and a body. These are easily disassembled for cleaning, by the removal of a screw and a snap ring. The poppet assembly is disassembled by unscrewing two metal parts, and then the washer of the poppet valve may easily be replaced. It is proposed to so design and construct the air blow gun that the metal parts may be made either from simple castings or standard sizes of bar stock and tubes, with simple machining.

The new and simple streamlined design of the new air blow gun makes available a self-closing blow gun of all metal construction and with a controllable air flow which can be manufactured and sold at a lower cost than other blow guns, offering controlled air flow achieved by different and costlier methods.

It is proposed to so construct the new air blow gun that the operator may grasp and operate the gun in any position. In other words, the operator does not have to hold the gun in a certain position to bring his finger into contact with a trigger or button, etc. Nor does the gun have to be juggled around in the hand to get such a mechanism in position. However, for those who do prefer a trigger, a modified form of the invention proposes to equip it with a trigger. It is proposed that the trigger work against a certain actuating disc to transfer the operator's finger movements to the actuating disc.

The invention also contemplates a modification in which another kind of poppet valve is used. This modified form of valve is characterized by including a floating washer.

For further compression of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a side elevational view of an air blow gun constructed in accordance with this invention.

Fig. 2 is a longitudinal sectional view of the gun shown in Fig. 1, but turned 90° for ease in illustrating the same.

Fig. 3 is an enlarged transverse sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a view of the split ring used in the gun.

Fig. 5 is a fragmentary perspective view of an air blow gun constructed in accordance with a modification of the present invention.

Fig. 6 is a view similar to a portion of Fig. 2, but illustrating still another modification of the present invention.

Fig. 7 is an elevational view of the poppet valve with a floating washer as used in the form of the invention shown in Fig. 6.

Fig. 8 is a side elevational view of the stud portion of the valve shown in Fig. 7.

Fig. 9 is an enlarged end view of the stud portion looking from the right-hand side of Fig. 8.

The air blow gun in accordance with that form of the invention disclosed in Figs. 1 to 4 inclusive, includes a tubular valve body 10 having an inlet back end opening 11 preferably threaded so as to receive the coupling 12 of a compressed air hose 13. The latter two parts are schematically illustrated in Fig. 1 since they form no part of the invention. The back end opening 11 of the tubular valve body 10 extends forwards and connects with a shoulder 15 forming a valve seat for a poppet valve 16. The valve seat 15 is provided with a bore 17 extending to the front end of the body 10.

The poppet valve 16 has a stud portion 19 extending into the bore 17. This stud portion 19 is of cylindrical shape and fits closely in the bore 17 except for a small predetermined tolerance. The front end of the stud portion 19 is formed with a tapered section 20. The stud portion 19 threadedly engages upon a back section 21 of the valve. A washer 22 of resilient material is clamped in between the stud portion 19 and the back section 21. The washer 22 rests upon the valve seat 15. Normally the washer 22 engages the seat 15 and closes the valve.

When the valve 16 is slightly opened, the washer 22 will be moved off of the seat 15 but because of the small tolerance between the tapered section 20 and the wall of bore 17 only a small breath of compressed air may pass through the blow gun. For this reason there will not be a sudden drop of air pressure in behind the poppet valve which would cause a muscular reaction in the person attempting to use the blow gun, which reaction would throw the poppet valve wide open and cause a violent and uncontrolled blast of compressed air to be discharged from the gun.

A nozzle tube 25 is slidably mounted in and projects from the front portion of the bore 17 in the valve body 10. A nozzle tube retaining screw 26 is engaged through the side of the valve body 10 and engages a slot 27 formed in the nozzle tube 25 which restricts the sliding movement of the nozzle tube to a small distance. The nozzle tube 25 is illustrated in its extended position. It may be moved inward to engage against the poppet valve 16 forcing the poppet valve open. The front end of the stud portion 19 is formed with a slot 29, see particularly Fig. 3, through which the compressed air may pass from around the stud portion 19 and then pass to and through the nozzle tube 25. An actuating disc 31 is fixedly mounted upon the nozzle tube 25 by which the nozzle tube may be easily and conveniently moved inward. A poppet valve retaining snap ring 32 is mounted within the back end opening 11 right behind the threads and serves to prevent the poppet valve 16 from mov-

ing too far backwards in the valve body 10. An air discharge tip 34 is removably mounted upon the front end of the nozzle tube 25.

The operation of the new and improved air blow gun may be understood from the following:

The air blow gun fits comfortably into the palm of the operator's hand. The hand may be closed around it in a normal position with the thumb, or forefinger resting upon the actuating disc 31. A squeezing action by the thumb, or forefinger on the actuating disc 31 causes the nozzle tube 25 to move backward into the valve body 10. The compressed air normally holds the poppet valve 16 closed. When the nozzle tube 25 strikes the stud portion 19 of the poppet valve 16, the poppet valve will be moved slightly backward. This action lifts the resilient washer 22 from the valve seat 15 and allows air to blow past the poppet valve and through the slot 29 and into the end of the nozzle tube 25. This air travels the length of the nozzle tube and discharges through the tip 34. Since the diameter of the stud portion 19 is held to a small tolerance in relation to the bore 17 of the valve body 10 in which it fits, the poppet valve 16 may be moved a small distance without dispensing a sudden gust of compressed air. As the poppet valve moves further off its seat, the flow of air is increased by the tapered portion 20. Because of this action the operator will at all times have full control of his squeezing action.

Because of the better control of the new and improved air blow gun the operator can use just the right amount of air desired, thereby saving compressed air. It is a safety factor when the nozzle is used to remove chips and dirt inasmuch as sufficient air can be dispensed for the purpose desired without using the full blast of air which often causes dirt to be blown into eyes and into equipment where it may cause injury. With the exception of the resilient washer the air blow gun is of all metal construction.

In Fig. 5 a modified form of the invention has been disclosed which is very similar to the prior form distinguishing merely in the fact that the air blow gun has been provided with a trigger 42. This trigger 42 is pivotally mounted by a pintle 43 on the valve body 10. The trigger 42 has a slot 44 through which the nozzle tube 25 passes. The trigger 42 rests against the front of the actuating disc 31. When the valve body 10 is gripped in the hand it is possible to operate the trigger 42 with the thumb, or forefinger.

In other respects this form of the invention is identical to the prior form and like parts may be recognized by the same reference numerals.

The operation is also identical, distinguishing merely in the fact that the trigger 42 is used to operate the actuating disc 31.

In Figs. 6 to 9 inclusive, a modified form of air blow gun, is shown, which distinguishes from the prior form in the construction of the poppet valve. More specifically the new and improved poppet valve includes a poppet 50 extending into the bore 17. This poppet has a short cylindrical stud portion 51 which fits closely into the bore 17 except for a small predetermined tolerance. The front end of the stud portion 51 is formed with a tapered section 52 which controls the increase of air flowing through the bore 17 when the valve head is moved to an open position.

A floating washer 53 is associated with the poppet 50 of the valve head for assisting in controlling the dispensing of compressed air from the air blow gun. The floating washer 53 is

slidably mounted on a shank portion 54 projecting coaxially from the back end of the stud portion 51. This washer 53 has a central opening through which the shank portion 54 passes. This opening is larger than the shank portion 54 so that the washer 53 is free to move, or float. The washer 53 is limited in its movement in one direction by the adjacent end of the stud portion 51. In the other direction, it is limited by a disc-like head 55 which is fixedly mounted on the back end of the shank portion 54. The shank portion 54 is slightly turned down, to form a shoulder against which the head 55 engages. The outer end of the shank portion 54 is riveted over so as to hold the head 55 in position. The back end of the stud portion 51, facing the washer 53 and, around the shank portion 54, is formed with a circular groove 56 which connects with straight slots 57 which have their ends terminating at the sides of the stud portion 51.

In other respects this form of the invention is identical to the first form and like parts have been indicated by like reference numerals.

The operation of this form of the invention is identical to the first form, distinguishing merely in the operation of the poppet valve. When the poppet 50 is in its closed position, the air pressure will engage against the head 55 and force the washer 53 on to the seat 15. During initial opening, the tube 25 engages against the poppet 50 moving it rearward, so that the head 55 is lifted off of the washer 53. This allows air to pass under the head 55 and through the central opening in the washer 53 which maintains its position on the seat 15 due to the air pressure.

The air passing through the opening in the washer 53 enters the circular groove 56 then through the slots 57, and passes through the tolerance between the stud portion 51 of the poppet 50 and the bore 17. When the poppet 50 is moved further to the rear, the back or large end of the stud portion 51 will lift the washer 53 off its seat 15 and then the air may pass under the washer 53 and through the gun. When the poppet 50 is moved rearward so that the stud portion 51 comes out from the bore 17, the tapered portion 52 of the poppet 50 will allow more and more air to pass through the gun as the poppet is moved further rearward.

In other respects the operation of this form of the invention is identical to the prior form.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. An air blow gun, comprising a tubular valve body, having an inlet back end opening for connection with an air hose and connecting with a shoulder forming a valve seat which is provided with a bore extending to the front end of said body, a nozzle tube slidably mounted in and projecting from the front portion of said bore, means

for limiting sliding of said nozzle tube from a front to a rear position, and a poppet valve engaging upon said valve seat and having a stud portion extending into said bore and formed with a tapered front end portion continuing into a cylindrical back portion slightly smaller than said bore forming a small passage for a very small breath of compressed air to pass when said valve is slightly opened, said poppet valve having a rear shank portion, a head fixedly mounted upon said shank portion, and a washer floating on said shank portion between said head and the back of said stud portion, said washer being provided with an opening slightly larger than said shank portion through which air may pass and said washer normally engaging upon said valve seat.

2. An air blow gun, comprising a tubular valve body, having an inlet back end opening for connection with an air hose and connecting with a shoulder forming a valve seat which is provided with a bore extending to the front end of said body, a nozzle tube slidably mounted in and projecting from the front portion of said bore, means for limiting sliding of said nozzle tube from a front to a rear position, and a poppet valve engaging upon said valve seat and having a stud portion extending into said bore and formed with a tapered front end portion continuing into a cylindrical back portion slightly smaller than said bore forming a small passage for a very small breath of compressed air to pass when said valve is slightly opened, said poppet valve having a rear shank portion, a head fixedly mounted upon said shank portion, and a washer floating on said shank portion between said head and the back of said stud portion, said washer being provided with an opening slightly larger than said shank portion through which air may pass and said washer normally engaging upon said valve seat, said stud portion being provided with a circular groove around said shank portion which connects with slots terminating on the edge of said stud portion.

CORNELIUS D. VREELAND, JR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
733,881	Smith	July 14, 1903
1,326,938	Knudsen	Jan. 6, 1920
1,558,680	Kraft	Oct. 27, 1925
1,577,042	Lutsky	Mar. 16, 1926
1,655,729	Jones	Jan. 10, 1928
1,723,936	Hifner	Aug. 6, 1929
1,794,286	Fulk	Feb. 24, 1931
1,839,413	Sage	Jan. 5, 1932
1,992,490	Lewis	Feb. 26, 1935
2,001,487	Doherty	May 14, 1935
2,327,574	Zinkil	Aug. 24, 1943

FOREIGN PATENTS

Number	Country	Date
438,467	Great Britain	of 1935