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(54) Title: AUTOMATIC SOLVENT INJECTION FOR PLURAL COMPONENT SPRAY GUN

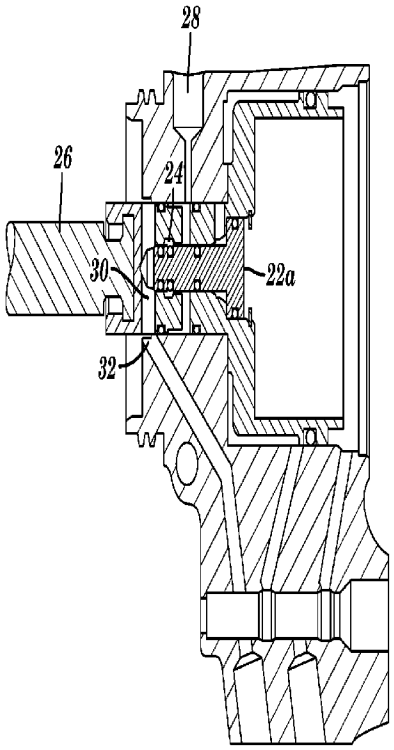

FIG. 2

(57) Abstract: A solvent piston 22 shuttles between first and second positions. In the first position, high pressure air applied to the rear 22a of the solvent piston 22 closes a solvent bore 24 around the solvent piston 22 and prevents passage of solvent into the mix chamber 26. In the second position, high pressure air is applied to the front 22b of the solvent piston 22 causing it to retract slightly thereby uncovering the solvent bore 24, closing off the solvent inlet 28 and allowing a slug of solvent to mix with the purge air 32 and pass from the solvent outlet 30 into the mix chamber 26. The solvent is either self contained in the applicator or plumbed eternally to the gun.

WO 2009/036129 A1

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Published:
— *with international search report*

AUTOMATIC SOLVENT INJECTION FOR PLURAL COMPONENT SPRAY GUN

TECHNICAL FIELD

This application claims the benefit of US Application serial number 60/971,305, filed September 11, 2007, the contents of which are hereby incorporated by reference.

BACKGROUND ART

Spray guns for applying plural component materials such as fast set foams are well known and typically available in both mechanical purge and air purge variants. The previously known means of purging two component material in mechanical purge guns was through a mechanical purge rod sliding through the mixing bore. This arrangement has the issue of the purge rod sticking inside the bore due to buildup of the sprayed material.

In air purge guns, the previous means of purging two component material was through a high pressure air purging (blast of air through mixing chamber). This design lead to buildup on the internal passages of the mixing chamber and spray tip causing the spray pattern to deteriorate, requiring the operator to clean the mixing chamber to restore functionality.

DISCLOSURE OF THE INVENTION

It is an object of this invention to prevent mixed two component polyurethane from curing within the internal passages of the spray applicator, allowing the user to spray longer before spray pattern distortion occurs or gun maintenance is required.

The mechanical purge gun dispenses the solvent by means of an internal pumping mechanism. The purge rod consists of a small diameter rod and a larger one. As the purge rod is pulled back through the mixing chamber the smaller rod section replaces the larger rod and thus creates a vacuum to pull in the solvent. As the rod moves forward to close the gun the solvent is expelled under pressure from the internal pump along the surface of the purge rod into the mixing chamber, from there it is purged from the gun along with the mixed two component material. The solvent is either self contained in the applicator or plumbed eternally to the gun.

The air purge gun automatically dispenses the solvent at de-trigger by means of an internal dosing pump. The dispensed solvent is mixed with the purge air and expelled from the gun through the mixing chamber orifices. Alternatively, the air purge gun automatically dispenses the solvent at de-trigger by means of an internal pumping mechanism. The dispensed solvent is mixed with the purge air and expelled from the gun through the mixing chamber orifices. In another embodiment, the air purge gun automatically dispenses the solvent at de-trigger by means of venturi effect. The solvent is injected into the air stream and expelled from the applicator through the mixing chamber orifices. The solvent is either self contained in the applicator or plumbed eternally to the gun.

These and other objects and advantages of the invention will appear more fully from the following description made in conjunction with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views.

BRIEF DESCRIPTION OF DRAWINGS

Figure 1 shows a mechanical purge spray gun showing the device of the instant invention.

Figure 2 shows the preferred embodiment of an air purge gun with the gun not spraying.

Figure 3 shows the preferred embodiment of an air purge gun with the gun spraying.

Figure 4 shows an alternate embodiment of an air purge gun.

Figure 5 shows another alternate embodiment of an air purge gun.

Figure 6 shows yet another alternate embodiment of an air purge gun.

BEST MODE FOR CARRYING OUT THE INVENTION

The mechanical purge gun 10 of Figure 1 dispenses the solvent by means of an internal pumping mechanism. The purge rod 12 consists of a small diameter rod 14 and a

larger one 16. As the purge rod 12 is pulled back through the mixing chamber 18 the smaller rod 14 section replaces the larger rod 16 and thus creates a vacuum to pull in the solvent from the solvent inlet 20. As the rod 12 moves forward to close the gun 10 the solvent is expelled under pressure from the internal pump along the surface of the purge rod 12 into the mixing chamber 18, from there it is purged from the gun 10 along with the mixed two component material. The solvent is either self contained in the applicator or plumbed eternally to the gun.

In the preferred embodiment of Figures 2 and 3, a solvent piston 22 shuttles between first (non-spraying – Figure 2) and second (spraying – Figure 3) positions. In the first position, high pressure air applied to the rear 22a of the solvent piston 22 closes a solvent bore 24 around the solvent piston 22 and prevents passage of solvent into the mix chamber 26. In the second position, high pressure air is applied to the front 22b of the solvent piston 22 causing it to retract slightly thereby uncovering the solvent bore 24, closing off the solvent inlet 28 and allowing a slug of solvent to mix with the purge air 32 and pass from the solvent outlet 30 into the mix chamber 26.

In an alternate embodiment of Figure 4, the air purge gun automatically dispenses the solvent at de-trigger by means of an internal dosing pump 40. The dispensed solvent is mixed with the purge air 42 and expelled from the gun through the mixing chamber orifices 44.

Alternatively in Figure 5, the air purge gun automatically dispenses the solvent at de-trigger by means of an internal pumping mechanism 50. The dispensed solvent is

mixed with the purge air 52 and expelled from the gun through the mixing chamber orifices 54.

In another embodiment of Figure 6, the air purge gun automatically dispenses the solvent at de-trigger by means of venturi effect 60. The solvent is injected into the air stream 62 and expelled from the applicator through the mixing chamber orifices 64. The solvent is either self contained in the applicator or plumbed eternally to the gun.

It is contemplated that various changes and modifications may be made to the solvent purge mechanism without departing from the spirit and scope of the invention as defined by the following claims.

CLAIMS

1. A plural component spray gun having a mix chamber and a purge air passage, the improvement comprising:

a source of solvent; and

a solvent piston having a front and a rear and movable between a first non-spraying position and a second spraying positions such that in said first position, high pressure air is applied to said rear to close a solvent bore connected to said solvent source to prevents passage of solvent into said mix chamber and in said second position, high pressure air is applied to said front on detriggering said gun causing it to retract uncovering said solvent bore, closing off said solvent inlet and allowing a slug of solvent to mix in said purge air passage and pass from said solvent outlet into said mix chamber

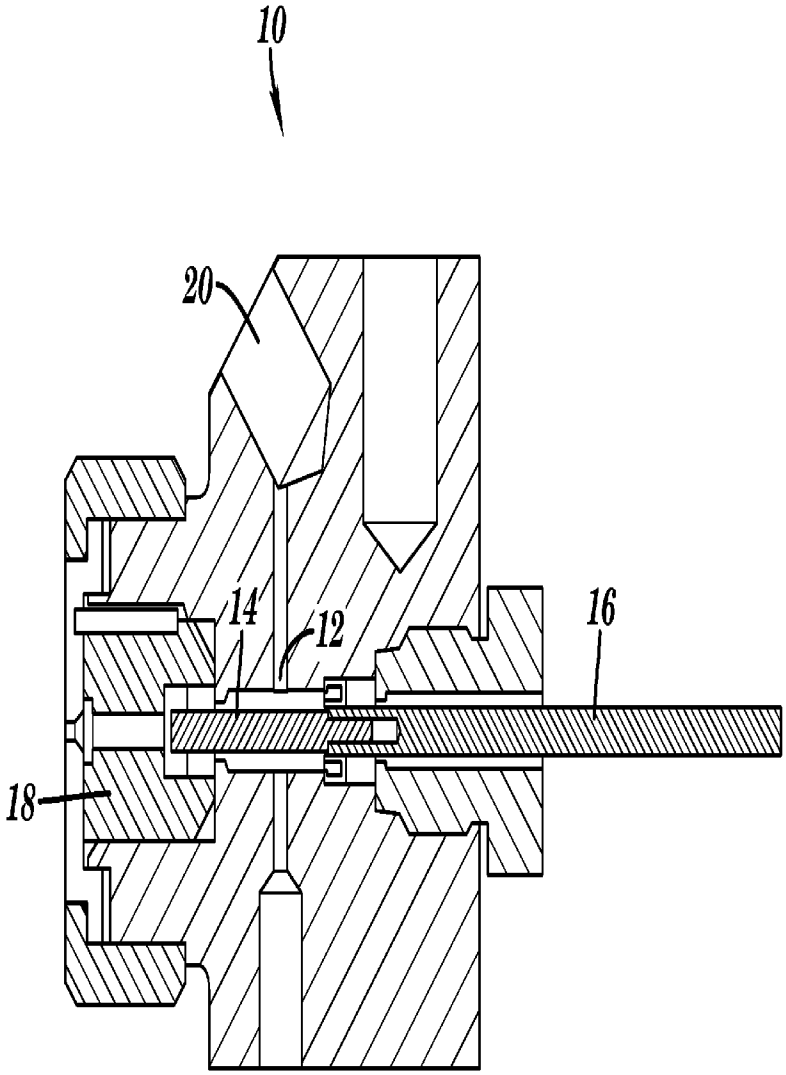

FIG. 1

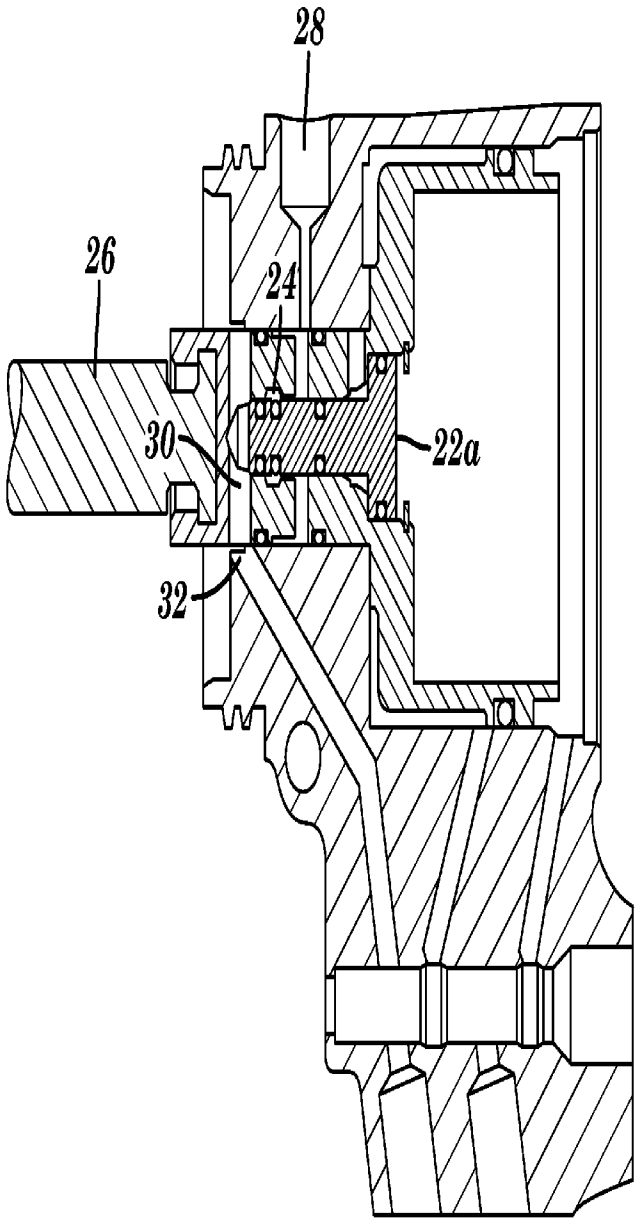

FIG. 2

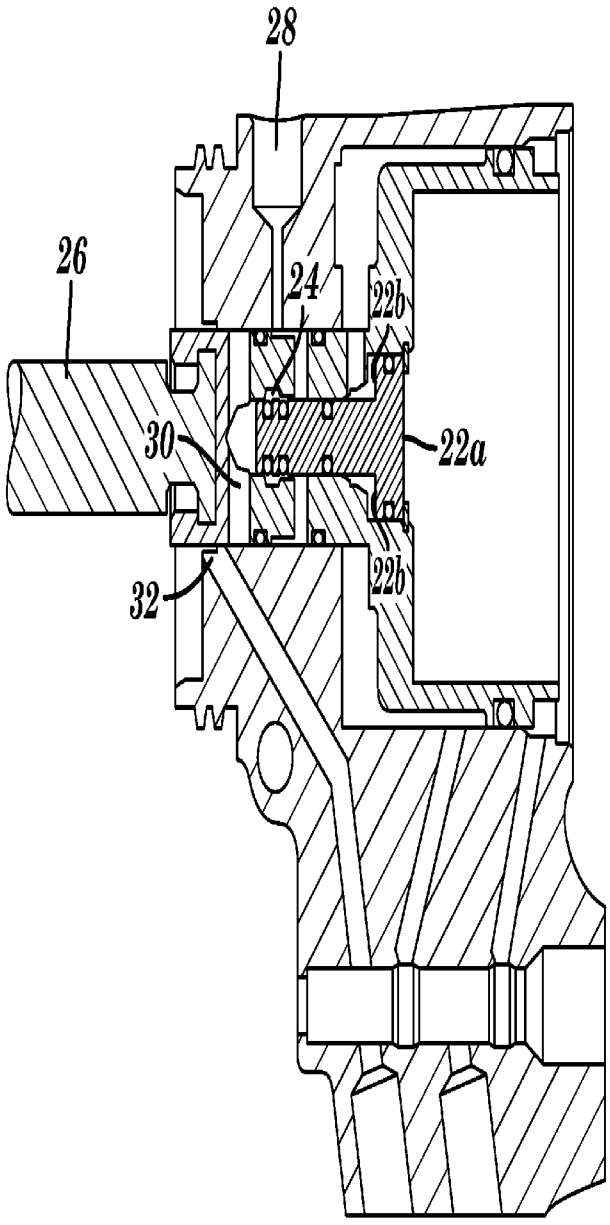

FIG. 3

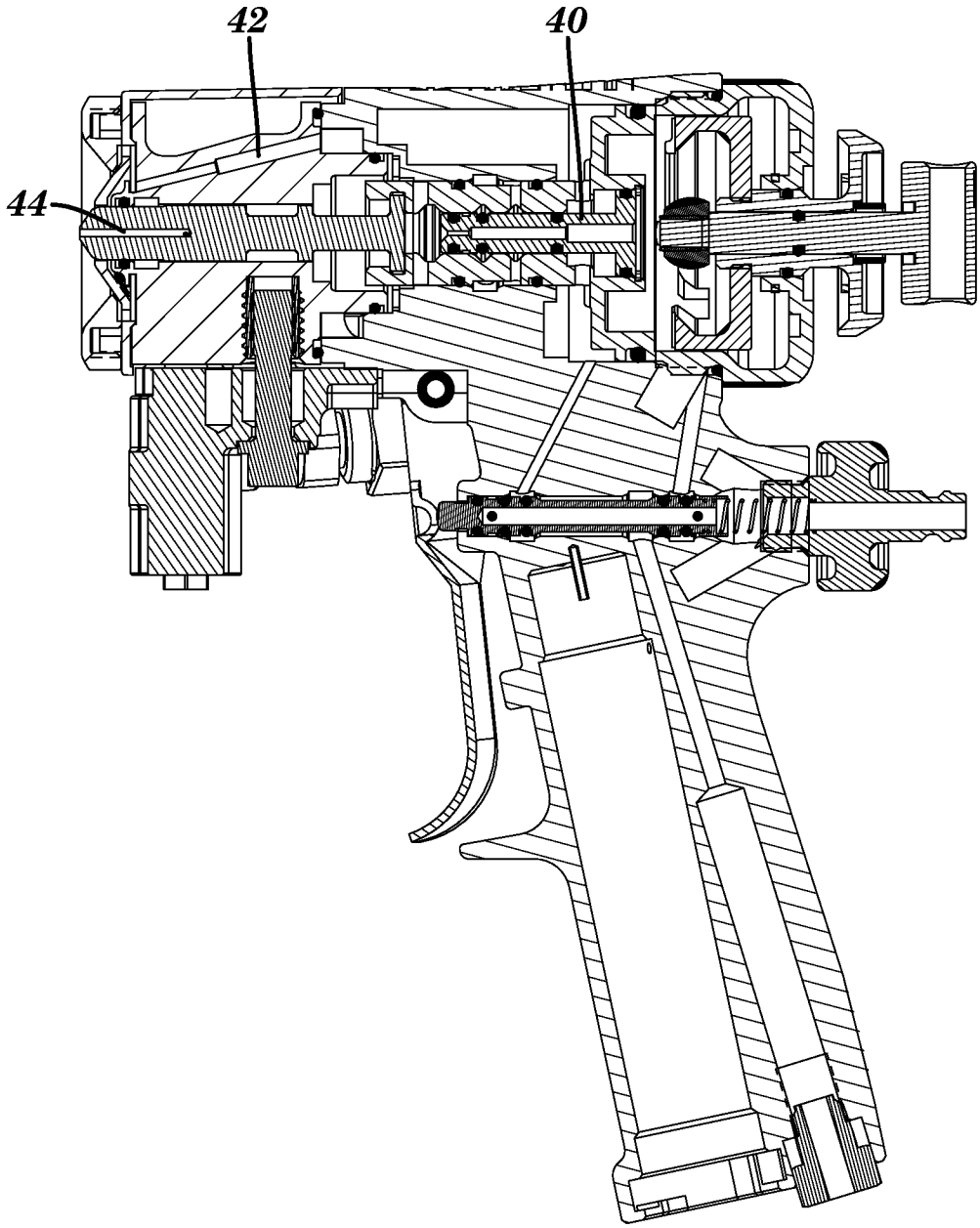

FIG. 4

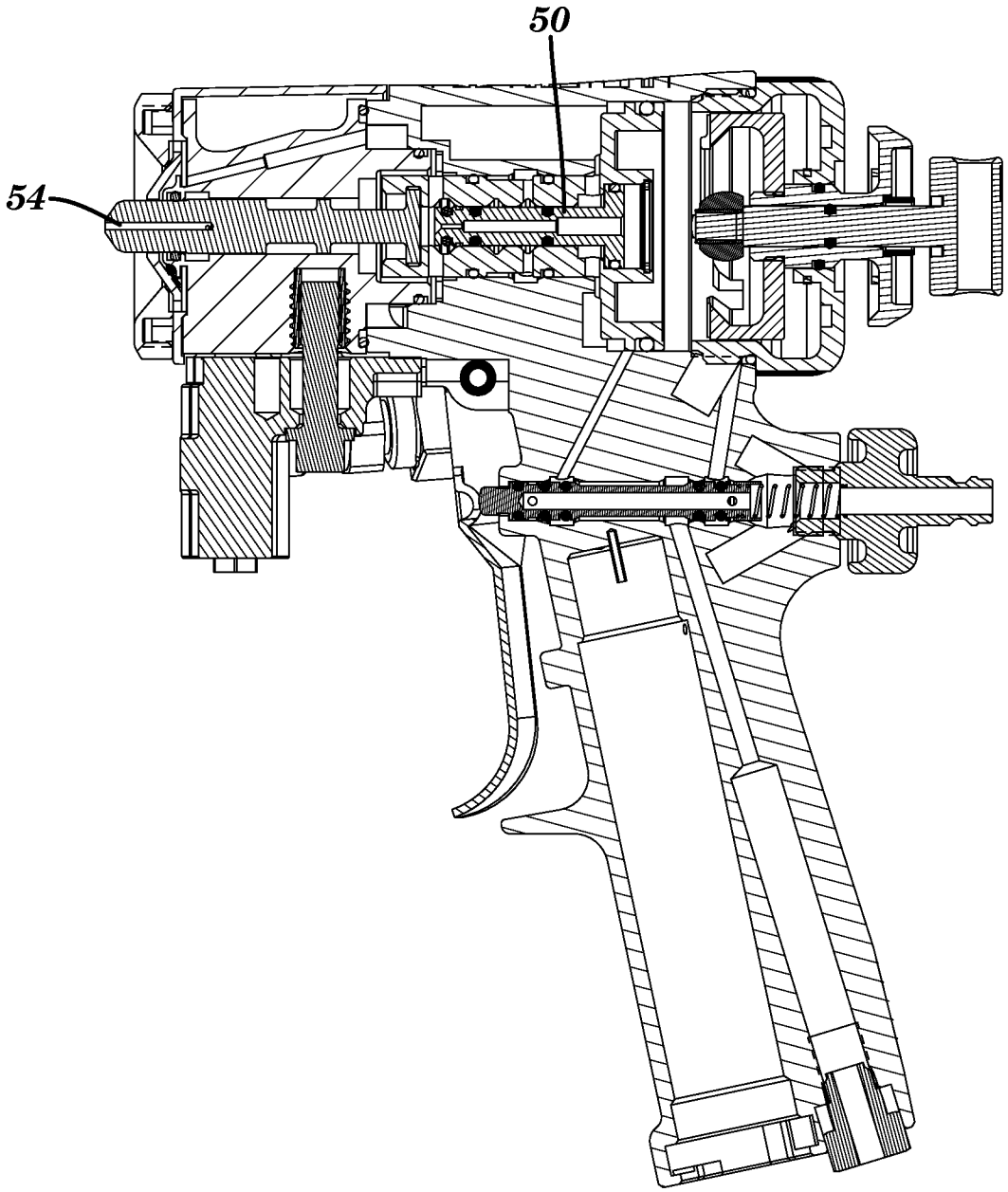

FIG. 5

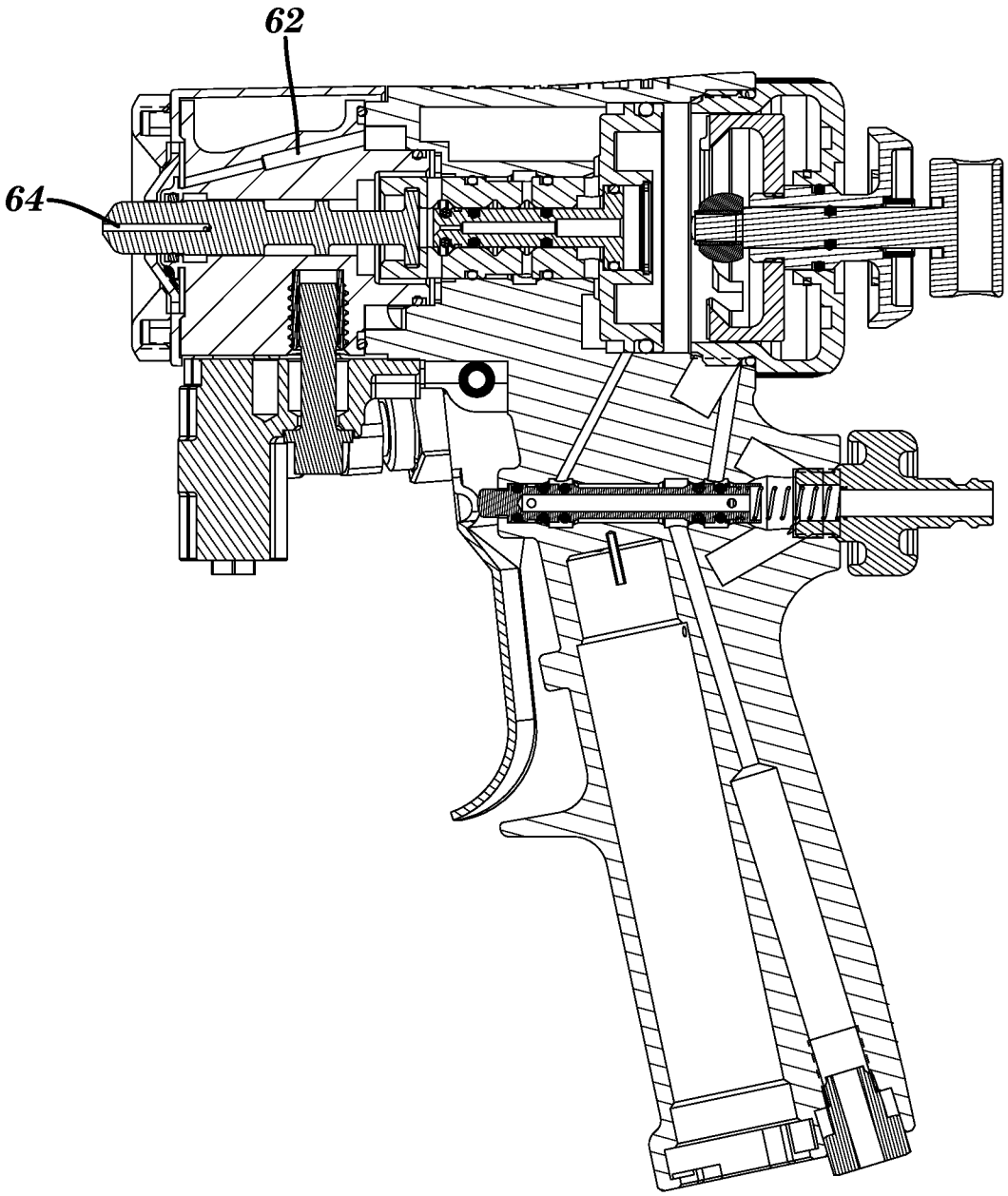

FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 08/75963

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - B05B 7/12 (2008.04)
USPC - 239/413
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8): B05B 7/12 (2008.04)
USPC: 239/413

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 239/415, 398, 407; 239/

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST (USPT, PGPB, EPAB, JPAB); Google/Patents; Google/Scholar
Search Terms: spray, gun, applicator, airbrush, atomizer, solvent, solution, liquid, fluid, water, valve, plunger, piston, plug, foam, purge, dissolve, clean, clear, flush, rinse, obstruct, block, interfere, close, mix, combine, merge

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,945,569 A (SPERRY) 23 March 1976 (23.03.1976) col 2, lns 39-41; col 5, lns 1-4, 18-24; 30-40, 45-59; col 6, lns 3-22; Figs. 2, 3, and 10	1
Y	US 2005/0218556 A1 (DONATTI et al.) 06 October 2005 (06.10.2005), para [0002], [0020]; Figs. 2 and 3	1

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
07 November 2008 (07.11.2008)	21 NOV 2008
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

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