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Thompson

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[54] **AUTOMATIC VOLUME ADJUSTING FIRE HOSE NOZZLE WITH FLUSHING MECHANISM**

[75] Inventor: **William S. Thompson,** Elkhart, Ind.

[73] Assignee: **Elkhart Brass Manufacturing Co., Inc.,** Elkhart, Ind.

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Related U.S. Patent Documents

Reissue of:

[64] Patent No.: **3,893,624**
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Appl. No.: **508,064**
Filed: **Sep. 23, 1974**

[51] **Int. Cl.**[2] **B05B 1/32;** B05B 15/02

[52] **U.S. Cl.** **239/107;** 239/453; 239/458

[58] **Field of Search** 239/456, 107, 106, 452, 239/453, 458, 459

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,991,016	7/1961	Allenbaugh, Jr.	239/456 X
3,012,733	12/1961	Allenbaugh, Jr.	239/458
3,150,829	9/1964	Specht et al.	239/458 X
3,387,791	6/1968	Allenbaugh, Jr.	239/458
3,539,112	11/1970	Thompson	239/452

Primary Examiner—Joseph F. Peters, Jr.
Assistant Examiner—Michael Mar
Attorney, Agent, or Firm—James D. Hall

[57] **ABSTRACT**

A fire hose nozzle having a tubular body part and a pressure responsive valve assembly shiftable in the body part. A barrel member spacedly encircles parts of the pressure responsive valve assembly and is shiftable toward and away from the valve head of the assembly for the purpose of allowing flushing of the valve.

9 Claims, 4 Drawing Figures

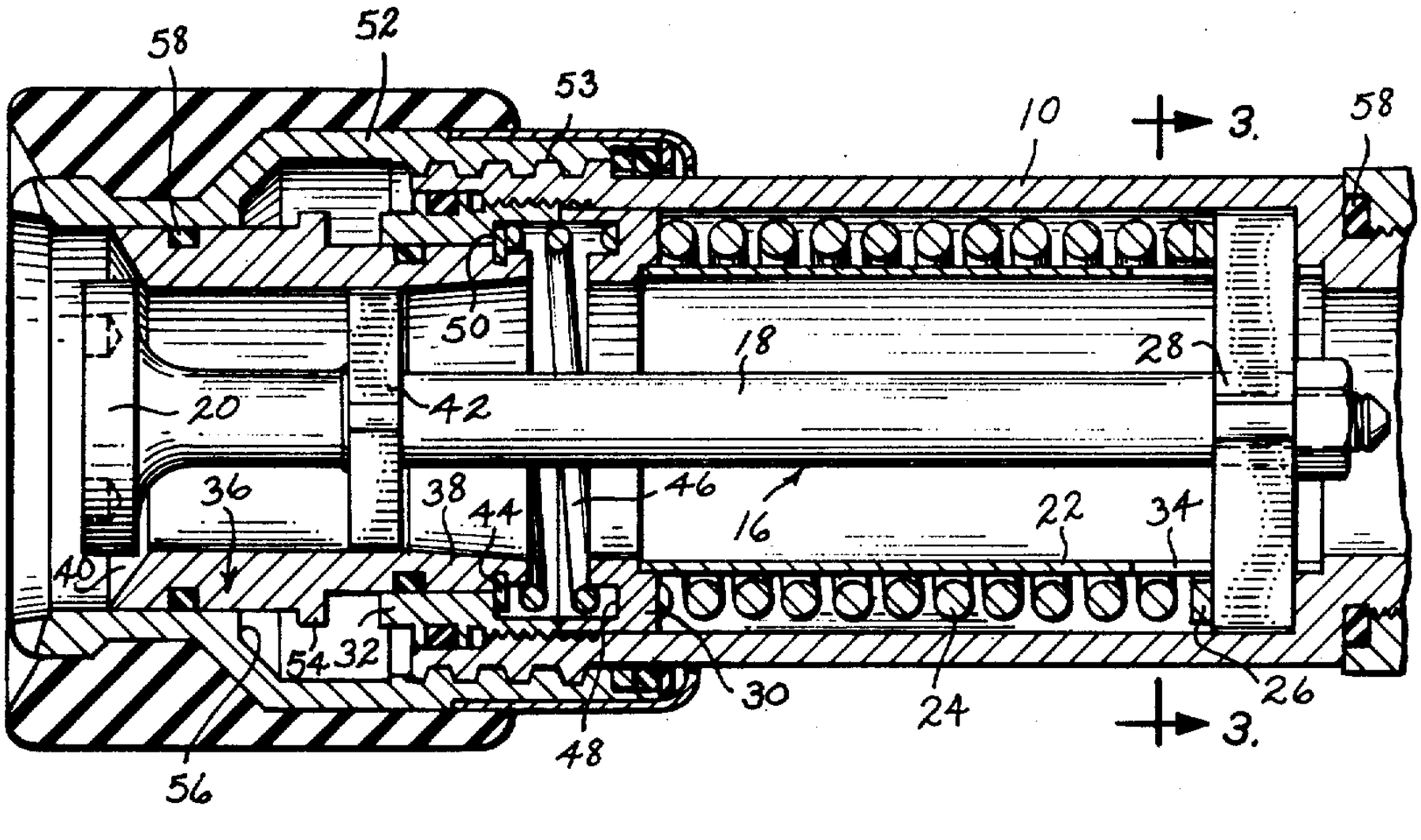


Fig. 3

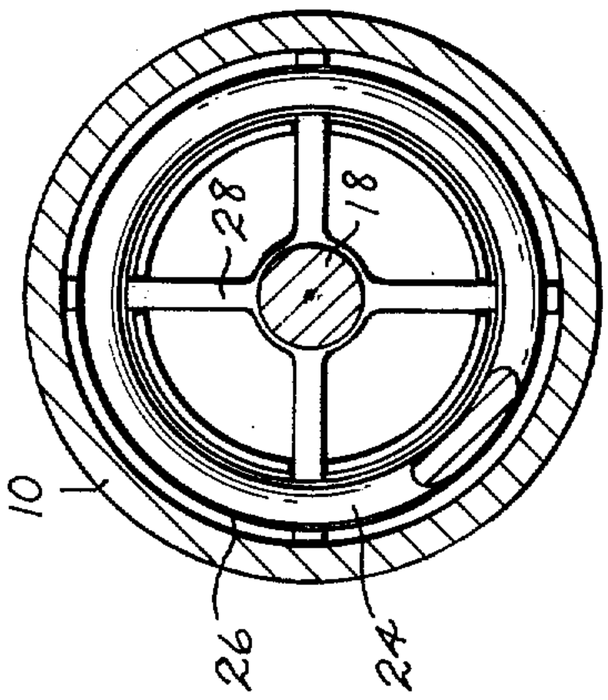


Fig. 4

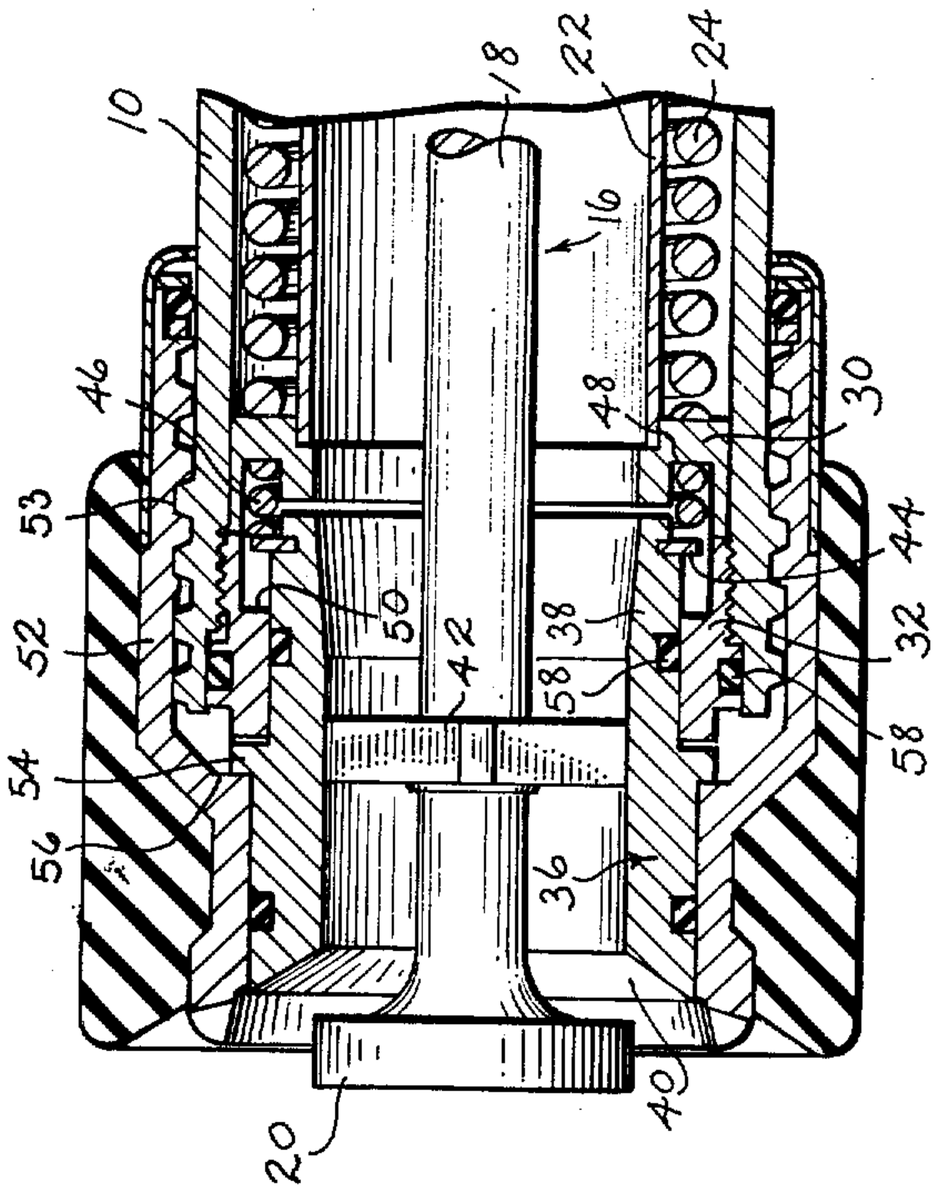


Fig. 1

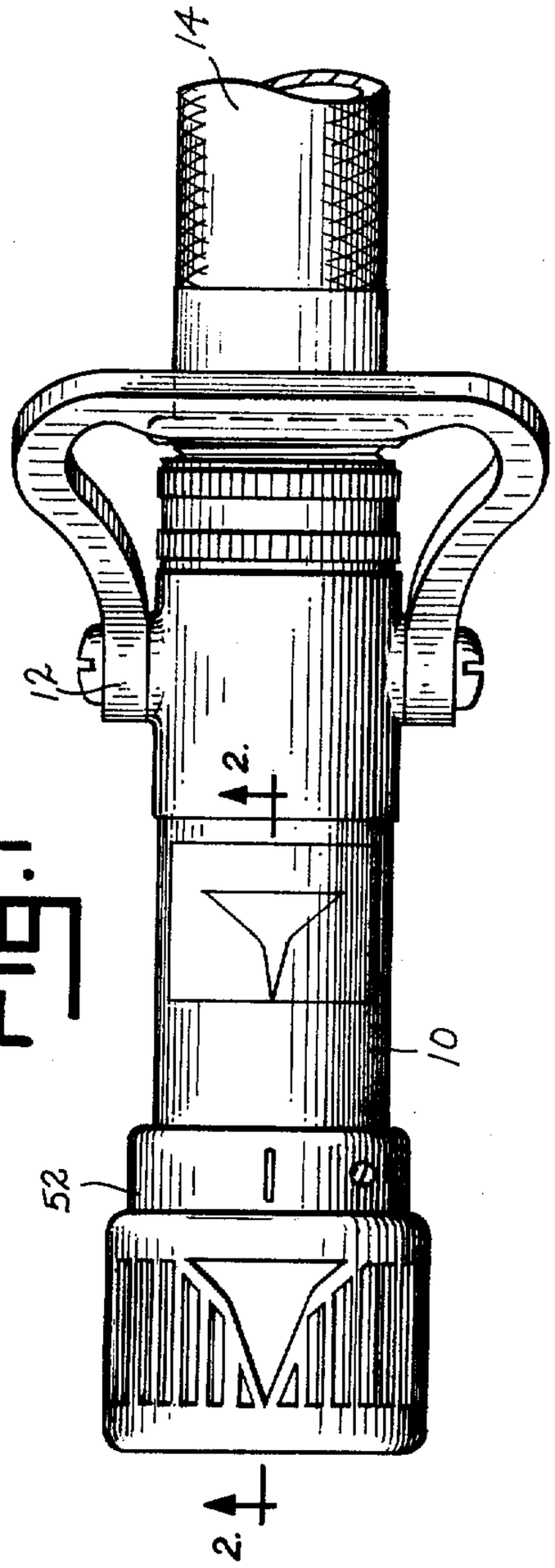
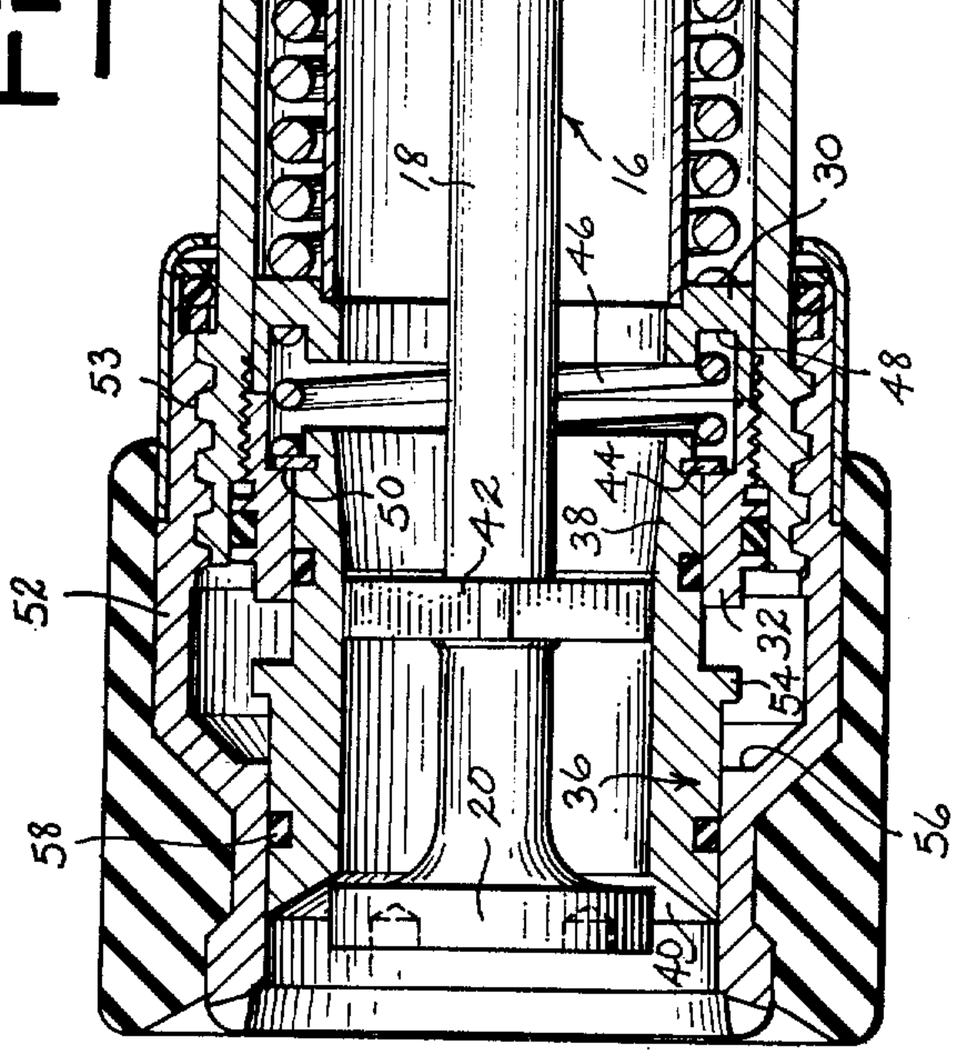


Fig. 2



AUTOMATIC VOLUME ADJUSTING FIRE HOSE NOZZLE WITH FLUSHING MECHANISM

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

BACKGROUND OF THE INVENTION

This invention relates to a fire hose nozzle of the automatic volume adjustment type.

In the fire hose nozzle described and illustrated in U.S. Pat. No. 3,539,112 means are provided for automatically adjusting its water discharge rate upon variation of water pressure so as to maintain an effective fire fighting water stream range. It has been found that during use of this type nozzle, small stones and other foreign water carried obstructions tend to lodge in the outlet of the nozzle at the head of its shiftable valve assembly. To clear the nozzle of these obstructions the nozzle must be turned off and partly diassembled. This necessity for shutting off the water flow through the nozzle during its fire fighting use not only reduces the extinguishing qualities of the fire fighting equipment but is also may subject the fire fighter or nozzle operator to danger from the fire by interrupting the water curtain produced by the nozzle.

In this invention means are provided in which a nozzle of the automatic volume adjustment type may be flushed without interrupting the nozzle's use.

SUMMARY OF THE INVENTION

This invention relates to a fire hose nozzle having a valve assembly therein which is shiftable in response to variations in liquid or water pressure for the purpose of maintaining generally the same operative trajectory or reach of the liquid stream for fire fighting purposes. The fire hose nozzle construction is improved upon by incorporating means by which the nozzle may be flushed for the purpose of ridding pebbles and other foreign matter which is clogging the nozzle without having to turn off the nozzle.

A barrel member which forms a part of the nozzle construction surrounds parts of the pressure responsive valve assembly of the nozzle and in conjunction with the head of the valve assembly serves to regulate the discharge pattern of the liquid flowing through the nozzle. Means are provided by which the barrel member can be shifted longitudinally of the nozzle so as to increase the spacing between the barrel member and head of the valve assembly while liquid is flowing through the nozzle for the purpose of dislodging the matter which was previously wedged between the valve assembly head and barrel member and which was obstructing flow through the valve.

Accordingly, it is an object of this invention to provide a fire hose nozzle having means for flushing the nozzle of obstructing matter without shutting off liquid flow through the nozzle.

Another object of this invention is to provide a fire hose nozzle which includes means for automatically adjusting the discharge or volume rate of the nozzle in response to variations in liquid pressure to the nozzle, and which additionally includes means for flushing the nozzle while maintaining liquid flow therethrough.

Still another object of this invention is to provide a fire hose nozzle with automatic volume adjustment which may be flushed while maintaining a protective water curtain for the operator of the nozzle.

Other objects of this invention will become apparent upon a reading of the invention's description.

BRIEF DESCRIPTION OF THE DRAWING

A preferred embodiment of this invention has been chosen for purposes of illustration and description wherein:

FIG. **1** is a top plan view of the nozzle.

FIG. **2** is a fragmentary sectional view taken along line **2—2** of FIG. **1** showing the component parts of the nozzle in operative fire fighting position.

FIG. **3** is a cross sectional view taken along line **3—3** of FIG. **2.**

FIG. **4** is a fragmentary sectional view like FIG. **2** showing component parts of the nozzle positioned to enable the nozzle to be flushed of flow obstructing matter.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred embodiment illustrated is not intended to be exhaustive or to limit the invention to the precise form disclosed. It is chosen and described in order to best explain the principles of the invention and its application and practical use to thereby enable others skilled in the art to best utilize the invention.

The valve illustrated in FIGS. **1–4** includes a tubular body part **10** which is cylindrical in configuration and which has an "on/off" valve assembly **12** connected at one end. Valve assembly **12**, which is not shown in detail, may be of the handle actuated ball valve type commonly used as a shut off valve in fire nozzles. In other constructions of this invention, the nozzle may not have its own shut off valve. The manner in which fire hose **14** is connected to body part **10** and the manner in which water flow through the nozzle is turned on and shut off are matters of design and convenience and need not constitute a part of this invention.

A water discharge valve assembly **16** is located within body part **10** and includes a stem **18** and a head **20**. A tube **22** is located coaxially within body part **10**. A helical spring **24** surrounds tube **22** and is positioned between the tube and the inner surface of body part **10**. One end of spring **24** abuts a washer **26** which in turn abuts a four-flanged spider **28**. Spider **28** is connected to valve stem **18** and forms a part of discharge valve assembly **16**. The opposite end of spring **24** abuts a spacer ring **30** which in turn is retained within body part **10** in contact with tube **22** by means of a retainer ring **32**. Retainer ring **32** is externally threaded and is turned into body part **10** which has engaging internal threads formed therein. Tube **22** is slotted at **34** to accommodate the flanges of spider **28** with clearance as valve stem **18** and valve head **20** shift longitudinally with respect to body part **10**, causing the compression of spring **24**, during water flow through the nozzle.

A barrel member **36**, formed by an annular side wall, has its aft end **38** fitted slidably into retainer ring **32**. Barrel member **36** spacedly surrounds stem **18** of the discharge valve assembly **16** and preferably has an inner diametrical dimension similar in size to the inner diameter of tube **22** so as to define a water flow path through the nozzle. The forward end **40** of barrel member **36** is beveled and is positioned adjacent head **20** of the dis-

charge valve assembly **16**. Valve stem **18** carries a spider **42** whose flanges contact the inner surface of barrel member **36** and serve with spider **28** to coaxially position the valve relative to the barrel member and tube **22**.

Aft end **38** of barrel member **36** includes a stop ring **44**. A helical spring **46** surrounds valve assembly stem **18** and is located between shouldered components of spacer ring **30** and retainer ring **32**. One end of spring **46** abuts shoulder **48** of spacer ring **30** and the opposite end of the spring abuts stop ring **44** of barrel member **36**, causing the barrel member to be urged into a normal forward position with the stop ring contacting shoulder **50** of retainer ring **32**, as seen in FIG. **2**. When stop ring **44** abuts shoulder **50** of retainer ring **32**, the forward end **40** of barrel member **36** spacedly surrounds valve head **20** so as to produce a desired water flow trajectory through the nozzle for a given amount of water pressure. As the water flows through tube **22** and barrel member **36** and around the valve head **20**, the contact of the water with the head will cause a shifting of the head and valve stem and a resulting compression of spring **24**. Thus as the water pressure within nozzle **10** varies, so will the spacing between valve head **20** and forward end **40** of barrel member **36** vary. This provides a means, as described in greater detail in U.S. Pat. No. 3,539,112, for adjusting the discharge rate of the nozzle without substantial sacrifice of the reach or trajectory of the water being emitted from the nozzle.

A sleeve **52** surrounds barrel member **36** and is threadably connected at **53** to body part **10**. Sleeve **52** is a common component of fire nozzles and is utilized upon rotation relative to body part **10** to vary the discharge pattern of the water flowing through the nozzle. In this invention, sleeve **52** serves the important additional purpose of shifting barrel member **36** rearwardly when it becomes necessary to flush the nozzle. This sleeve induced movement of barrel member **36** is effected by providing the barrel member with an annular flange **54**. As sleeve **52** is turned onto body part **10** of the nozzle, an internal shoulder **56** of the sleeve is caused to abut flange **54** of the barrel member with the barrel member being urged rearwardly relative to discharge valve assembly **16**, as shown in FIG. **4**, causing compression of helical spring **46**. As barrel member **36** is urged rearwardly by sleeve **52**, its fore end **40** is moved to a rearwardly spaced position from head **20** of the valve assembly to permit obstructing matter, such as pebbles and dirt, and to be flushed from the nozzle with water flow through the nozzle being maintained in the form of a protective curtain or screen. Once the nozzle has been flushed, sleeve **52** is rotated so as to be located in its extended position, allowing spring **46** to urge barrel member **36** into its normal operating position, as seen in FIG. **2**. O-rings **58** are provided between selected components of the nozzle to provide water sealing fixed or sliding fits.

In some constructions of this invention it may not be necessary to include helical spring **46** as a means to normally urge barrel member **42** into its forward position with stop ring **44** engaging retainer ring **32**. Water flow through the nozzle may be sufficient when contacting the inner walls of the barrel member to normally urge the member into its forward retainer ring engaging position.

It is to be understood that the invention is not to be limited to the details above given but may be modified within the scope of the appended claims.

What I claim is:

1. In a fire hose nozzle including a tubular body part having an inlet end and an outlet end, a pressure responsive valve assembly shiftable in said body part and including a valve head and a valve stem, said valve head being shiftable toward and away from said body part outlet in response to variations in pressure of liquid supplied to said nozzle, the improvement comprising a barrel member having fore and aft ends surrounding said valve stem, the aft end of the said barrel member fitting slidably within the outlet end of said body part, said barrel member being shiftable longitudinally relative to said body part between a forward position in which the barrel member fore end spacedly encircles said valve head to define a liquid flow path from the nozzle and a rearward position in which the barrel member fore end is shifted rearwardly of the valve head to increase the spacing between the barrel member and valve head, a sleeve member encircling the fore end of said body part and surrounding said barrel member, means rotatably connecting said sleeve member to said body part wherein rotation of the sleeve member upon the body part causes the sleeve member to shift longitudinally of the body part between extended and retracted positions, said sleeve member including abutment part means for contacting said barrel member to shift the barrel member from its forward position into its rearward position as said sleeve member is shifted from its extended position into its retracted position.

2. The fire hose nozzle of claim **1** and biasing means yieldably urging said barrel member into its forward position.

3. The fire hose nozzle of claim **2** wherein said biasing means is a helical spring encircling said valve stem and abutting each of said barrel member and body part.

4. The fire hose nozzle of claim **2** wherein said sleeve means extends beyond said valve head in an annular spaced relationship to define in conjunction with said valve head and barrel member a liquid flow outlet for the nozzle having variable flow pattern characteristics depending upon the shiftable position of the sleeve member relative to the body part.

5. The fire hose nozzle of claim 1 wherein said barrel member includes a wall part defining reaction surface means which liquid when flowing through said barrel member contacts for urging said barrel member from its said rearward position into its said forward position.

6. In a fire hose nozzle including a tubular body part having an inlet end and an outlet end, a valve assembly in said body part and including a valve head and a valve stem, the improvement comprising a barrel member having fore and aft ends surrounding said valve stem, the aft end of said barrel member fitting slidably within the outlet end of said body part, said barrel member being shiftable longitudinally relative to said body part between a forward position in which the barrel member fore end spacedly encircles said valve head and a rearward position in which the barrel member fore end is shifted rearwardly of the valve head to increase the spacing between the barrel member and valve head, said barrel member including a wall part defining a liquid flow path from a location internally of said body part to adjacent said valve head, said wall part including reaction surface means which liquid when flowing through said barrel member contacts for urging said barrel member from its rearward position into its forward position, a sleeve member encircling the fore end of said body part and surrounding said barrel member, means rotatably connecting said sleeve member to said body part wherein rotation of the sleeve member upon the body part causes the sleeve

member to shift longitudinally of the body part between extended and retracted positions, said sleeve member including abutment part means for contacting said barrel member to shift the barrel member from its forward position into its rearward position as said sleeve member is shifted from its extended position into its retracted position.

7. The fire hose nozzle of claim 6 and biasing means yieldably urging said barrel member into its forward position.

8. The fire hose nozzle of claim 7 wherein said biasing means is a helical spring encircling said valve stem and abutting each of said barrel member and body part.

9. The fire hose nozzle of claim 7 wherein said sleeve means extends beyond said valve head in an annular spaced relationship to define in conjunction with said valve head and barrel member a liquid flow outlet for the nozzle having variable flow pattern characteristics depending upon the shiftable position of the sleeve member relative to the body part.

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