March 19, 1968 E. A. ROMAN ETAL 3,373,942

PLASTIC SHOWER HEAD PLUNGERS

Filed Oct. 5, 1965

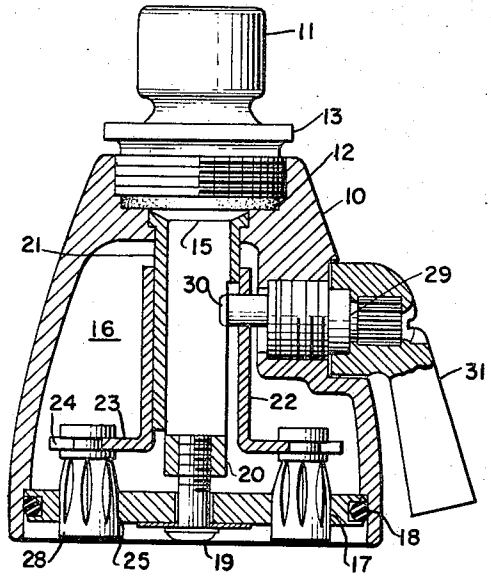


FIG. 1.

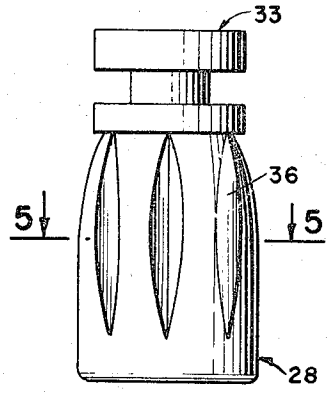


FIG. 2.

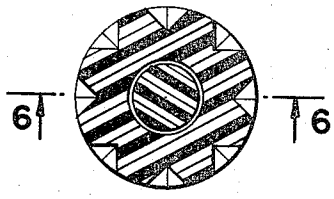


FIG. 5.

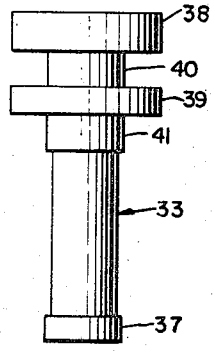


FIG. 3.

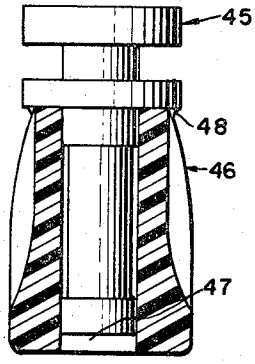


FIG. 7.

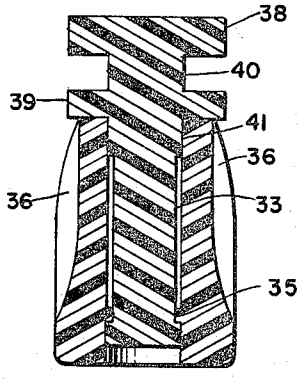


FIG. 6.

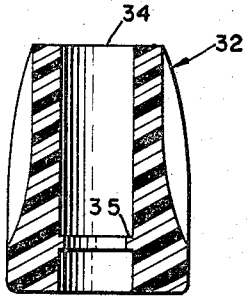


FIG. 4.

INVENTORS
Edward A. Roman &
Arthur Anthony Fiorentino

BY Holcombe, Wetherill & Brisebois
ATTORNEYS

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PLASTIC SHOWER HEAD PLUNGERS

Edward A. Roman, Wilmington, and Arthur Anthony Fiorentino, Newark, Del., assignors to Speakman Company

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4 Claims. (Cl. 239—460)

ABSTRACT OF THE DISCLOSURE

A shower head plunger made from a material having toughness, anti-liming, low water absorptivity and good dimensional stability characteristics is the subject of the instant invention. One of the following resins is used: polycarbonate, phenoxy resin or polyphenylene oxide.

The general object of the present invention is to provide an improved shower head of the type disclosed in Patent No. 2,534,549, issued Dec. 19, 1950. More specifically, the object of the present invention is to provide a shower head of the above mentioned type which possesses the desirable operating characteristics of a shower head disclosed and made under the above mentioned patent, but which is capable of withstanding the deposition of mineral matter from hard water.

It is specifically an object of the present invention to provide a shower head having plungers operating through a face plate in such a manner as to control the type of discharge from the shower head.

It is also an object of the present invention to provide a shower head wherein the plungers are so made as to resist the deposition of mineral matter from water containing the same.

For a better understanding of the invention, however, its objects and advantages obtained by its use, reference should be had to the accompanying drawings and descriptive matter in which have been illustrated and described a preferred embodiment of the invention.

In the drawings:

FIG. 1 is a sectional side view showing the shower head assembled with its plungers in place.

FIG. 2 is an enlarged side view of one of the plungers.

FIG. 3 is a side view of the stem portion of the plunger.

FIG. 4 is a side view in section of the body portion of the plunger.

FIG. 5 is a sectional view on line 5—5 of FIG. 2.

FIG. 6 is a sectional view on line 6—6 of FIG. 5.

FIG. 7 is a view in section of a modification of the plunger shown in FIG. 2.

The improved shower head shown in the drawings comprises a hollow body or shell **10** of bell form, provided at its upper end with a connecting means **11** of conventional form for attaching to a source of water (not shown). This connecting means is of the usual ball and socket type and is connected to the body **10** by means of the packing nut **13** and a water tight joint formed by packing **12**. This allows the adjustment of the body **10** with respect to the connecting means **11**, so as to direct a stream of water delivered by the shower head. The connecting means has a port **15** in the bottom thereof which discharges water into the central body portion **16** of the shower head. A face plate **17** is fitted across the open bell end of the body portion **10** and is held in watertight engagement therewith by means of the O-ring **18**. This face plate is held in position by means of the screw bolt **19**, which is received in and held by the lower threaded portion **20** of the depending open sleeve **21**. Around the outer circumference of the sleeve **21** is mounted the tubular element **22** having the spider **23** integrally formed on the lower end thereof. This spider

has open slots **24** thereon. Directly below each of these slots in the face plate **17** is an opening **25**. Mounted on the spider **23** and received in the slot **24** and protruding through the opening **25** are plungers **28**. The tubular element **22** is adjustable on the sleeve **21** by means of the shaft **29** having the eccentric pin **30** on the end thereof. This pin is received in and holds the tubular element **22** with its connected spider in spaced relationship to the face plate **17**. The handle portion **31** is connected to the shaft **29** and rotates the shaft when the handle is rotated and thereby adjusts the relationship between the face plate and the spider.

The plastic plunger **28** is composed of the body portion **32** and the shaft portion **33**.

The body portion **32** has a central opening **34** therethrough. This opening has a ledge portion **35** near the bottom end thereof and has the grooves **36** in the sides thereof.

The shaft portion **33** has a small collar **37** on the bottom end thereof and has the plate **38** on the upper end thereof with the plate **39** therebelow, and the intermediate shaft portion **40** therebetween. Below the plate **39** is the boss **41** on the shaft **33**. The diameter of the boss portion **41** is exactly the diameter of the opening **34** in the body portion. The collar **37** is of the same diameter as the boss portion **41**.

When assembling the plungers the shaft portion **33** is inserted into the central opening **34** of the body portion **32** and forced therein so that the collar **37** is forced beyond the ledge portion **35**, as shown in FIG. 6, thereby holding the body portion **32** and the shaft portion **33** as one assembled unit.

As pointed out above the plungers **28** are held on the spider **23** by means of the open slots **24** therein, which slots receive the portion **40** of each plunger and the portions **38** and **39** ride over and below the spider, thereby controlling the position within the face plate of the plunger, in accordance with the position of the spider in the body portion **10** of the shower head.

A modification of the plunger is shown in FIG. 7, wherein the shaft portion **45** is like the shaft portion **33**. The body portion **46** has the central opening **47** therethrough. This opening is made without a ledge portion therein. After the shaft **45** is assembled into the body portion **46** it is permanently ultrasonically welded at the point of contact **48** so as to hold the body portion and the shaft portion in rigid assembly.

The plungers **28** are molded from a thermoplastic polycarbonate. This material is non-corrosive and solves the long standing problem of metallic corrosion where either brass or chrome plated brass plungers contact the face plate, as well as the area between the spider and the plungers themselves. The outstanding and unexpected resistance of these plungers to the deposition of mineral deposits commonly found in certain sections of this country, where limestone water causes such deposits, particularly in the flow from hot water heaters, overcomes this difficulty. The thermoplastic polycarbonate has dimensional stability that permits its molding and its retention of the molded shape when immersed in water. Other materials that could be used besides the polycarbonate referred to above, are phenoxy resins and polyphenylene oxide. Materials that have not proven satisfactory are brass plungers with or without nickel or chrome plating, which are corrosion resistant, but which acquire mineral deposits resulting from water flowing therethrough. Nylon has a high water absorption, which results in dimensional changes and is not suitable for use in these plungers. Acetal has a high and indefinite mold shrinkage which makes it difficult to consistently mold accurate parts. Polyethylene and polypropylene have low

tensile strength which limits their ability to withstand the forces imposed by high water pressure.

While in accordance with the provision of the statutes there has been described and illustrated the best form of embodiment of this invention, now known, it will be apparent to those skilled in the art that changes may be made in the form of the apparatus disclosed without departing from the spirit of this invention, as set forth in the appended claims, and that in some cases certain features may be used to advantage without a corresponding use of other features.

What is claimed is:

1. In a spray head having a hollow body with a face plate at one end thereof with an opening therein, a plunger variably positioned in the opening comprising:

(a) a generally cylindrical shaft portion having an upper end with means for attaching said shaft portion to a means for adjusting the plunger within the opening, a boss of greater diameter below said means, and a lower end having a collar thereon whose diameter corresponds to that of the boss; and

(b) a body portion having a cross section different from the cross-section of the opening at a given position to permit fluid to pass thru the opening in a controlled spray pattern and a central bore there-

through with a ledge portion near the bottom thereof whereby the collar of the shaft is retained by the ledge to form an integral, unitary plunger.

2. The spray head as recited in claim 1 wherein the plunger is made of polycarbonate.

3. The spray head as recited in claim 1 wherein the plunger is made of phenoxy resin.

4. The spray head as recited in claim 1 wherein the plunger is made of polyphenylene oxide.

References Cited

UNITED STATES PATENTS

2,348,776	5/1944	Bentley	239—460
2,534,549	12/1950	Fraser	239—460
2,936,958	5/1960	Shames et al.	239—460
3,065,917	11/1962	Fraser	239—460
3,134,753	5/1964	Kiviotek	260—47
3,221,080	11/1965	Fox	260—47
3,268,478	8/1966	Brown	260—47

OTHER REFERENCES

"Polycarbonates," by W. F. Christopher and D. W. Fox, pages 6, 7, 8, 9, 52, 53.

EVERETT W. KIRBY, *Primary Examiner.*