

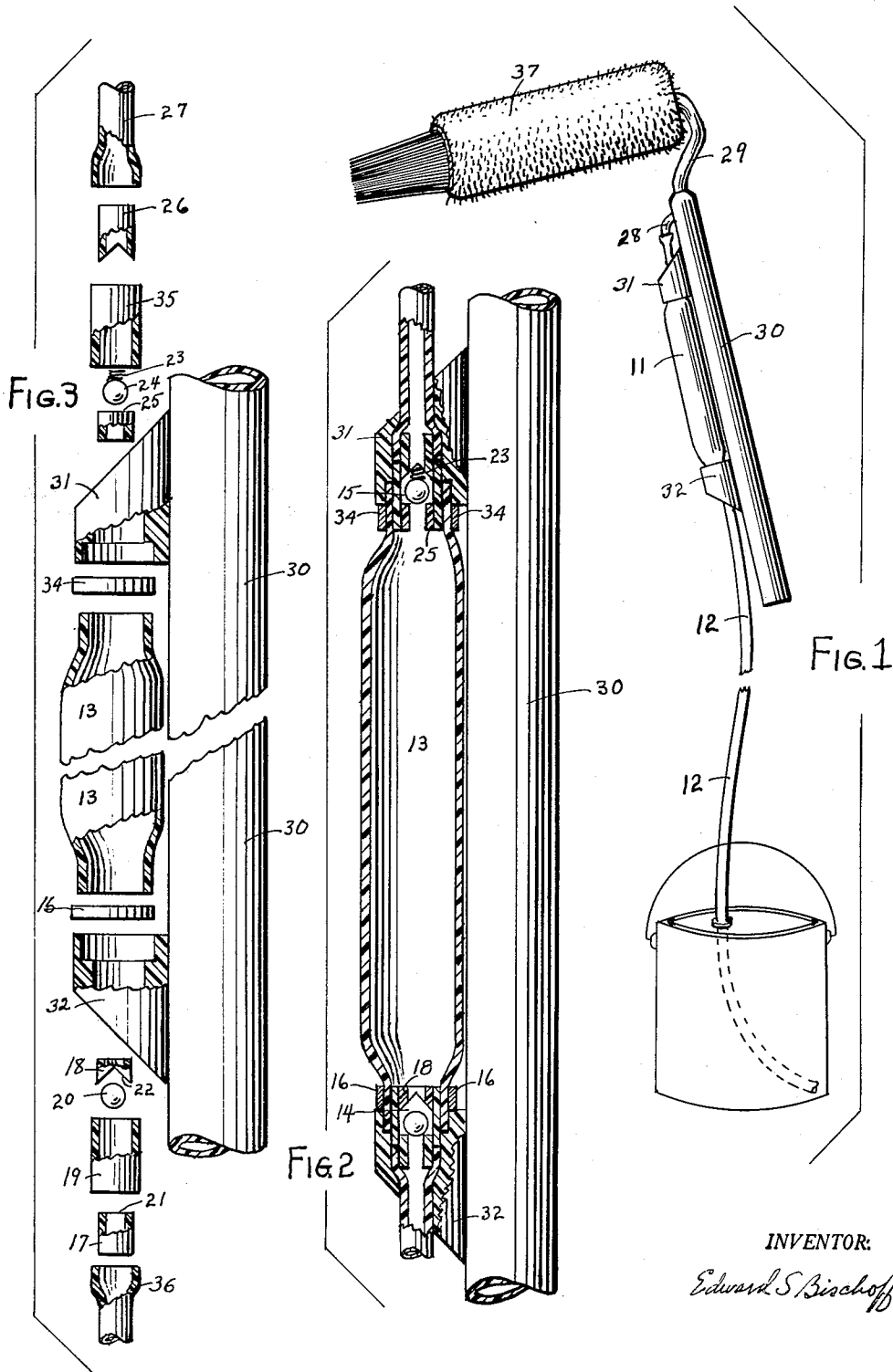
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E. S. BISCHOFF

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PUMP DEVICE

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2,960,040

PUMP DEVICE

Edward S. Bischoff, 94 Buttery Road, New Canaan, Conn.

Original application Mar. 1, 1956, Ser. No. 568,775, now Patent No. 2,932,043, dated Apr. 12, 1960. Divided and this application Oct. 13, 1958, Ser. No. 766,861

9 Claims. (Cl. 103—148)

This invention relates to a pump device and more particularly to a hand operated, transparent, plastic tubular pump element designed especially to transfer paint from a portable container, through tubular means, to feed a paint applicator.

This application is a division of my application No. 568,775 for a Liquid Coating Applicator, filed March 1, 1956, now Patent No. 2,932,043.

An object of this invention is to provide a simple hand operated pump means for readily transferring paint from a portable vessel to a paint applicator of the fountain roller or brush type.

Another object is to provide a pump means manufactured of materials impervious to the solvent chemical properties of the usual commercial paints.

Another object is to provide a pump means made of transparent materials so as to permit inspection as to the thoroughness of internal cleaning after use.

Another object is to provide a pump means the parts of which are held in assembly by the resilience of its structural members to permit ease of disassembly for cleaning.

Yet another object is to provide a pump means readily mounted on the outside of the handle of a fountain roller or brush applicator tool.

In the search for improvements in paint or coating applicators many inventors have worked with systems and devices to eliminate the cumbersome process of dipping the brush or roller in the paint supply. Paint or liquid supplied from a pressure vessel through tubular means with the rate of supply controlled by a valve on the brush or roller handle is an old combination. Likewise a siphon pump with unidirectional valve means in each end, said pump mounted within the handle of an applicator tool, so disposed as to draw paint through a tube from a supply vessel and inject it into the paint applicator is an old combination.

My pump means embodies new and improved elements which are set forth in the following drawings, specification and claims.

In the drawing, Fig. 1 is a schematic view of my improved liquid coating applicator including the pump means.

Fig. 2 is a sectional view of the pump element.

Fig. 3 is an exploded view of the pump element showing the parts disassembled.

Referring now to the drawing for the specific details of the invention, the reference numeral 11 represents the pump member to which is attached a flexible feed tube 12 preferably of transparent plastic material generally impervious to chemical action by paint components. The said tube, approximately 36 inches in length, connects the pump member with a portable reservoir or paint container carried at the belt or otherwise on the operator's person, from which the paint is drawn. Said tube has a minimum inside diameter of $\frac{1}{8}$ inch which is the minimum tube size through which fluid of the viscosity of ordinary paint can be drawn through a distance

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of 36 inches by a vacuum pump of the novel construction more fully described in the following paragraphs. It has been found that polyvinyl chloride tubing is impervious to paint chemicals and has the added advantage of transparency, making it possible to observe the initial progress of the liquid through the tubes as well as observe the internal cleanliness of the tubes when circulating solvent to wash the device after using.

The pump means illustrated in detail in Fig. 2 is comprised of an elongated flexible cylindrical tube element 13 of transparent material and two check valves to control the direction of flow of the liquid, 14 being the intake check valve and 15 being the discharge check valve. I have found that a polyvinyl chloride tube of $\frac{3}{4}$ to $\frac{7}{8}$ inch or larger inside diameter and a $\frac{3}{32}$ inch wall thickness, having its ends constricted by means of inlet band 16 and outlet band 34, to form a bulb or chamber of long cylindrical shape, has the required resiliency and will return to original form with strength sufficient to draw a viscous liquid such as paint from its reservoir at a rate that gives adequate supply to the applicator members when the pump chamber is alternately squeezed and allowed to return to original shape. No bulb of conventional material or design has been found to have the resilience and strength to create the necessary suction to draw a viscous liquid the required tubular distance to supply the applicator members satisfactorily.

Pump intake check valve 14 is comprised of three pieces of plastic tubing, flexible end pieces 17 and 18 being sleeved within short flexible tubular piece 19 in such manner as to enclose a spherical valve ball 20 which, on compression of the pump chamber 13 lodges against the valve seat 21, namely the opening on the intake side of the valve, to prevent back flow of liquid. Said valve ball, when suction action of the pump occurs, moves out of the seat 21 and rests against the notched edge 22 of the valve opening permitting liquid to be drawn through tube 17 past said valve ball 20 and into the pump chamber.

Intake check valve 14 and discharge check valve 15 fit snugly, but removably for cleaning if required, into the ends of the bulbular pump body formed by constricting ends of said pump body tube 13. The circular bands 16 and 34, which have inside diameter measurably smaller than the outside diameter of the body tube 13, form the polyvinyl chloride tube into a pump bulb chamber.

Discharge check valve 15 is identical with intake check valve 14 except for reversal of its parts to check the direction of liquid flow and the addition of a spring member 23, a coil spring within the valve space to hold the discharge check valve ball 24 in a position pressed lightly against its valve seat 25. This prevents the pump becoming air or vapor bound and prevents surging when the pump is worked with its discharge end held lower than the intake end. The tubular discharge valve end 26 is inserted into transparent plastic tube 27, in turn communicating with the tubular metal piece 28 of the tube assembly 29.

The pump member is mounted on the side of the handle 30 by means of intake tubular retaining socket 31 and discharge tubular retaining socket 32. Retaining sockets are of similar tubular shape, reversibly mounted, and having inside diameter sufficient to receive loosely the tubular valves 14 and 15 which constitute the two ends of the pump member. The intake tubular retaining and discharge tubular retaining socket have three sections of stepwise increasing diameter, the smallest diameter section being adapted to pass either the feed conduit or the discharge conduit, the intermediate diameter section being adapted to receive the cylindrical intake or discharge

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check valves, and the largest diameter section being adapted to receive and retain the ends of the flexible tubular pump element. The retaining sockets are fused on the handle at such distance from each other that there is an outward pressure towards each end exerted by the flexible tubular pump body. Removal of the pump member from the handle sockets or replacement is accomplished by bending the flexible tube body at its center or midportion in a direction lateral to its normal axis or in a direction away from the handle then slipping first one end and then the other out of the retaining sockets respectively. The intake check valve 14 and discharge check valve 15 are assembled with tubular end pieces 17 and 26 projected from the end of the short flexible tubular pieces 19 and 35. The ends of the feed conduit 36 and discharge conduit 27 are passed through the tubular retaining sockets 31 and 32 and enlarged to pass over and frictionally engage the projected ends of tubular end pieces 17 and 26 and the intake and discharge check valves are then drawn into position in the intake and discharge retaining sockets 32 and 31. The retaining sockets are located on the handle to hold the flexible tubular pump element 13 under compression in assembly and to hold the flexible tubular pump element in close proximity to the handle 30 so as to permit simultaneous compression of the pump and manual manipulation of the paint applicator 37.

The tubular pump member 11 and retaining sockets 31 and 32 are so placed on the handle 30 as to serve as a hand grip when manipulating the applicator. Hand leverage around the pump and handle is achieved when compressing the pump by squeezing.

While I have shown and described a preferred embodiment of my invention, other apparent uses and modifications may be made which would be within the scope of my claims.

I now claim:

1. A hand-operated pump for transferring paint from a portable container through a feed conduit to the pump and from the pump through a discharge conduit to a paint applicator which is attached to and operated by an elongated handle which in turn provides support for said hand-operated pump, the combination comprising: an elongated handle, an elongated tubular pump element of flexible plastic, having a thickness, diameter and length adapted to draw paint from said paint container through the feed conduit into the tubular pump element by natural expansion of the compressed tubular element, means defining a unidirectional intake valve located between the feed conduit and the tubular pump element, adapted to prevent back flow of paint through the feed conduit on compression of the flexible tubular pump element, an intake retaining socket attached to said handle and adapted to retain the intake end of said tubular pump element, means defining a unidirectional discharge valve located between the tubular pump element and the discharge conduit, adapted to prevent back flow of paint through the discharge conduit on natural expansion of the flexible tubular pump element, a discharge retaining socket attached to said handle and adapted to retain the discharge end of said tubular pump element, said sockets being adapted to firmly retain the flexible tubular pump element in close proximity to said handle permitting simultaneous hand compression of the pump and manual manipulation of the paint applicator.

2. A hand-operated pump for transferring paint from a portable container through a feed conduit to the pump and from the pump through a discharge conduit to a paint applicator which is attached to and operated by an elongated handle which in turn provides support for said hand-operated pump, the combination comprising: an elongated handle, an elongated tubular pump element of flexible plastic, having a thickness, diameter and length adapted to draw paint from said paint container through the feed conduit into the tubular pump element by

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natural expansion of the compressed tubular element, means of cylindrical form defining a unidirectional intake valve adapted to make removable frictional engagement between the feed conduit and flexible tubular pump element, an intake tubular retaining socket attached to said handle, providing a passageway with three sections of step-wise increasing diameter, said smallest diameter section adapted to pass the feed conduit, said intermediate diameter section adapted to receive said means of cylindrical form defining a unidirectional intake valve and said largest diameter section adapted to receive and retain in compressed form the intake end of said flexible tubular pump element, means of cylindrical form defining a unidirectional discharge valve adapted to make removable frictional engagement between the discharge conduit and the flexible tubular pump element, a discharge tubular retaining socket attached to said handle, providing a passageway with three sections of step-wise decreasing diameter, said largest diameter section adapted to receive and retain in compressed form the discharge end of said flexible tubular pump element said intermediate diameter section adapted to receive said means of cylindrical form defining a unidirectional discharge valve and said smallest diameter section adapted to pass the discharge conduit, said sockets being located to hold the flexible tubular pump element under compression in assembly and to permit the tubular pump element to be withdrawn and separated from the means defining unidirectional valves by bending the element at its midportion in a direction lateral to its normal axis, thereby permitting easy assembly and disassembly of the pump, said sockets being further arranged to hold said flexible tubular pump element in close proximity to said handle permitting simultaneous hand compression of the pump and manual manipulation of the paint applicator.

3. Claim 2 further characterized in that the means of cylindrical form defining unidirectional intake and discharge valves comprises the following combination: a spherical check valve, a short flexible tubular piece adapted to pass said spherical check valve, a first and second tubular end piece adapted to fit snugly and concentrically in the ends of said flexible tubular piece, so as to retain said check valve while permitting movement of the check valve between said end pieces, one of said end pieces of each valve being notched to provide unidirectional flow of paint through said valves the other of said end pieces on the intake valve being extended to penetrate and frictionally engage the end of the feed conduit, the notched piece of the discharge valve being extended to penetrate and frictionally engage the end of the discharge conduit, and the more adjacent ends of said short flexible tubular pieces being adapted to penetrate and frictionally engage the ends of the flexible tubular pump element in its compressed form during assembly.

4. Claim 2 further characterized in that the elongated tubular pump element, the feed conduit and the discharge conduit are transparent, permitting examination of paint flow and effectiveness of cleaning solution.

5. Claim 2 further characterized in that the elongated tubular pump element, the feed conduit and the discharge conduit are formed from solid polyvinyl chloride.

6. Claim 2 further characterized in that a first band is located near the inlet end of said tubular pump element, having an inside diameter substantially equal to the diameter of the section of largest inside diameter of said inlet tubular retaining socket, whereby the inlet end of said tubular pump element is retained in compression and a second band is located near the outlet end of said tubular pump element, having an inside diameter substantially equal to the diameter of the section of largest inside diameter of said outlet tubular retaining socket, whereby the outlet end of said tubular pump element is retained in compression.

7. Claim 3 further characterized in that a compres-

sion spring is located within the short flexible tubular piece biased to maintain the spherical check valve against the end of the tubular end piece which is unnotched.

8. Claim 3 further characterized in that the flexible tubular pieces making up the pump combination are transparent, permitting examination of paint flow and effectiveness of cleaning solution.

9. Claim 3 further characterized in that the flexible tubular pieces making up the pump combination are formed from solid polyvinyl chloride.

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