July 7, 1964 D. C. KRAHE ETAL 3,140,078

MIXING AND DISPENSING DEVICE

Filed June 15, 1961

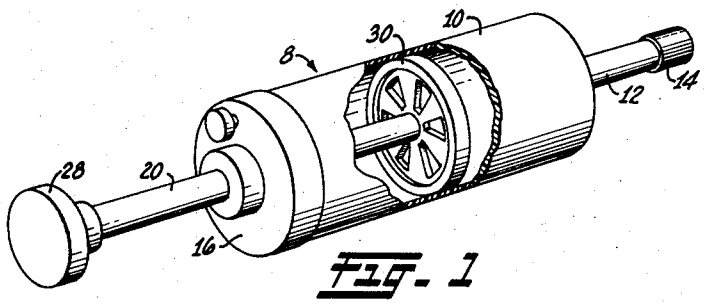

Fig. 1

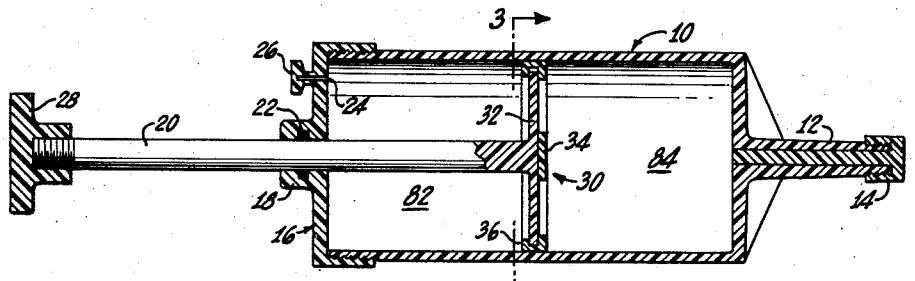

Fig. 2

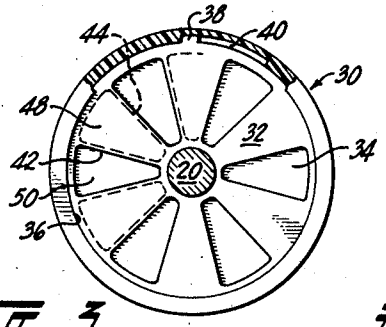

Fig. 3

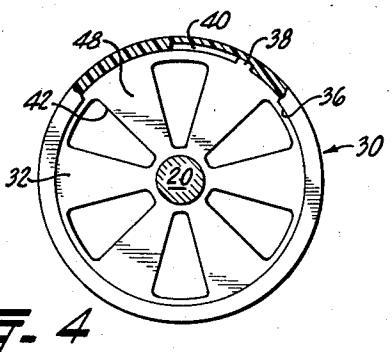

Fig. 4

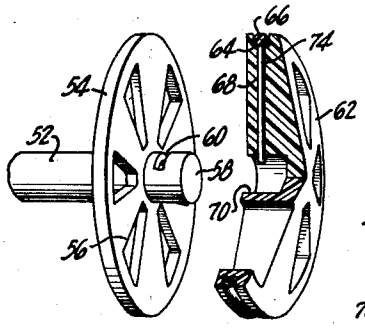

Fig. 5

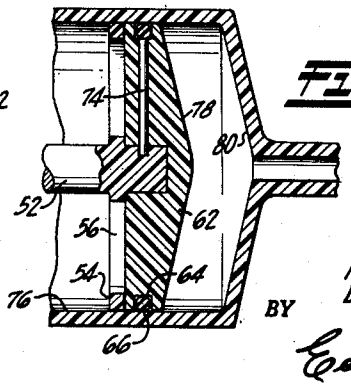

Fig. 6

INVENTORS:
HERBERT E. GRUBB
DONALD C. KRAHE

BY Cushman Darby & Cushman

ATTORNEYS

United States Patent Office 3,140,078 Patented July 7, 1964

3,140,078

MIXING AND DISPENSING DEVICE

Donald C. Krahe and Herbert E. Grubb, San Carlos, Calif., assignors, by mesne assignments, to Adhesive Engineering Company, a corporation of California

Filed June 15, 1961, Ser. No. 117,305
2 Claims. (Cl. 259—47)

This invention relates to a device for storing, mixing and dispensing a two part composition. Such compositions must be kept separate until just prior to the dispensing operation and they must be mixed thoroughly before they can be used. Although the invention is primarily applicable to an inexpensive "throw-away" mixer and dispenser, the device can be cleaned and reused. The device of the present invention is particularly useful with an epoxy resin wherein a catalyst must be mixed with the resin and the mixture used almost immediately but it can be used in any situation wherein two components must be mixed just prior to use.

It is therefore an object of the present invention to provide a simple yet effective device wherein a two-component mixture may be stored with the components separated until just prior to use whereupon the two components can be thoroughly mixed and then dispensed.

Other objects and features of the invention will be apparent from the specification which follows.

In the drawings forming part of this application:

FIGURE 1 is a perspective view, with certain parts cut away, of a device embodying the present invention;

FIGURE 2 is an enlarged side view, partially in section, of a device embodying the present invention;

FIGURE 3 is a section on the line 3—3 of FIGURE 2 showing the piston;

FIGURE 4 is a section on the same line as FIGURE 3 but showing the piston in open position;

FIGURE 5 is an exploded view of an alternate form of piston and

FIGURE 6 is a partial view of a device embodying the invention utilizing the piston of FIGURE 6.

Referring now to the drawing by reference characters, there is shown in FIGURES 1 through 4 a storage, mixing and dispensing device generally designated **8** having a cylindrical chamber **10** one end of which is provided with a dispensing nozzle **12** which is closed by a removable cap **14**. At the opposite end of cylinder **10** is an end plate **16** having a central boss **18** adapted to receive a piston rod **20**. The boss **18** may be provided with an O ring **22** to insure a tight seal. Further, the end **16** is provided with a small vent opening **24** which is normally closed with a snap-off fitting **26**. The piston rod **20** is provided at one end with a knob **28** so that it can be easily manipulated while the opposite end is provided with the composite piston generally designated **30**.

The composite piston **30** is composed of two parts, namely a first disc **32** of a relatively hard plastic which may be formed as part of or rigidly affixed to piston rod **20** and the second disc **34** of a relatively soft plastic, such as polyethylene, which has a lip **36** on its periphery so that the discs **32** and **34** are held by the lip **36** in face-to-face engagement yet are free to turn relative to each other. The disc **32**, of hard plastic, has at least one projection **38** on its periphery while the disc **34** has at least one slot **40** located within the lip **36**. Thus, the projection and slot limit the rotational movement possible between the discs. The disc **32** has a series of openings **42** therein while the disc **34** has corresponding openings **44**. It will be understood that the openings **42** and **44** correspond with each other while the solid portions between the openings, respectively **48** and **50**, are slightly larger than the openings so that when the piston is in the closed position, as is illustrated in FIGURE 3, there will be a slight overlapping of the solid portions **48** and **50** of the two discs.

The openings are made as large as possible, while retaining the sealing possibility, so that when the discs are in the open position shown in FIGURE 4, the openings through the piston will be as large as possible. It will also be understood that the length of the slot **40** will determine the amount of movement possible between the two pistons and that the length of this slot, minus the width of a projection **38** will determine the relative motion. Further, although six openings have been shown in each of the pistons, the number of openings might be decreased in which the slot **30** would become larger or the number of openings might be increased in which case the slot would be made shorter. Further, instead of using a single projection **38** and single slot **40**, the entire periphery of two pistons can be provided with mating projections and slots.

In FIGURES 5 and 6 there is shown an alternate embodiment wherein a piston rod **52** has attached thereto a first disc **54** having a series of slots **56** therein. The rod **52** extends beyond the disc **54** as at **58** and has a small slot **60** therein. A second disc **62** is provided with an annular slot **64** which is adapted to receive an O-ring **66**. A small radial hole **68** leads from the slot **64** to the bearing hole **70** in the center of the disc. The bearing hole **70** is of such size that the disc can turn freely on the rod extension **58**. The device is assembled as is shown in the FIGURE 6. The disc **62** is placed on the end of the shaft **58** and a pin **74** is placed in the hole **68**. The O ring **66** is then placed in the slot **64**, the O-ring serving the dual purpose of holding the pin **74** in place and providing a substantially fluid-tight seal with the piston wall **76**. It will be noted that in this case the leading face **78** of the second disc **62** is made convex to conform with the configuration of the front wall **80** of the injection device so that there will be no dead space, insuring a complete mixing of the contents as well as complete ejection.

Turning now to a description of the operation of the device it will be noted in FIGURE 2 that the cylindrical portion is divided by the piston into two chambers **82** and **84**. In dealing with many compositions it will be desirable to have the two chambers of equal size although the size relationship can be altered by moving the piston. The device will be assembled and filled as is shown in FIGURE 2 with the composite piston in its closed position with one of the components in the chamber **82** and the other of the components in the chamber **84**. For instance, the chamber **84** might be filled with a setting catalyst for an epoxy resin while the chamber **82** is filled with the resin itself. The device would be stored and sold in this condition. When the user wished to utilize the composition he would rotate the handle **28** slightly to move one disc relative to the other. There is sufficient friction between the forward disc and the cylinder so that when the rear disc rotates the forward disc will tend to remain stationary. The piston would then be worked back and forth a number of times thoroughly mixing the contents of the compartments **82** and **84**. After mixing is complete, the handle **28** would be retracted to its extreme rear position and given a slight rotational movement to close the piston. The cap **14** would then be taken off and the air vent **24** opened by breaking off the small projection **26**. The contents would then be expelled by pushing on the handle **28**. The contents might be expelled at one time or might be expelled a small amount at a time over a considerable period, the period being determined by the setting rate of the particular plastic employed.

It is believed apparent from the foregoing that we have provided a simple yet effective device which serves as a storage chamber, a mixing chamber and dispensing device for a two-component plastic. Although after expelling the contents the device might be cleaned and refilled, normally the device is so inexpensive that it would be discarded after a single usage.

We claim:

1. A storage, mixing and dispensing device for a two-component mixture comprising:

(*a*) a cylinder having a discharge opening at one end thereof and a normally sealed air inlet at the opposite end with a snap-off fitting for opening said vent; and

(*b*) a normally closed piston dividing the cylinder into two chambers, said piston being formed of a first and a second disc each having holes therein, said holes being in registration when said discs are in a first position and forming a solid piston when the first of said discs is rotated to a second position relative to the second of said discs, the first of said discs being of a diameter slightly less than the interior diameter of the said cylinder and the second of said discs having a cylindrical collar secured at right angles thereto at the extreme outer edge thereof, said collar passing between said first disc and the internal wall of the said cylinder, said collar having an integral lip parallel to the said second disc extending from the said collar inwardly toward the center of said disc whereby said lip and said collar together with said second disc form a channel for the receipt of said first disc, said first disc being loosely secured in the said channel for rotation relative to said second disc, said first and second discs being held in a unitary relationship solely by means of said channel, said second disc having an integral rod at the center thereof extending through the end of the cylinder opposite the discharge opening, said rod having a handle on the exposed end thereof.

2. The structure of claim 1 wherein the said collar has an internal groove and the first of said discs has a tongue along the periphery thereof adapted to register with the said groove, the size of the said groove being such as to permit the discs to be rotated relative to one another sufficiently far that in a first position said holes are in registration and in a second position said holes are not in registration, thus forming a solid piston.

References Cited in the file of this patent

UNITED STATES PATENTS

1,296,341	Towle	Mar. 4, 1919
1,998,692	Van Rossem et al.	Apr. 23, 1935
2,571,542	Collins	Oct. 16, 1951