Nov. 14, 1967 R. E. DOYSCHER 3,352,310

PARTS WASHER

Filed March 15, 1965 2 Sheets-Sheet 1

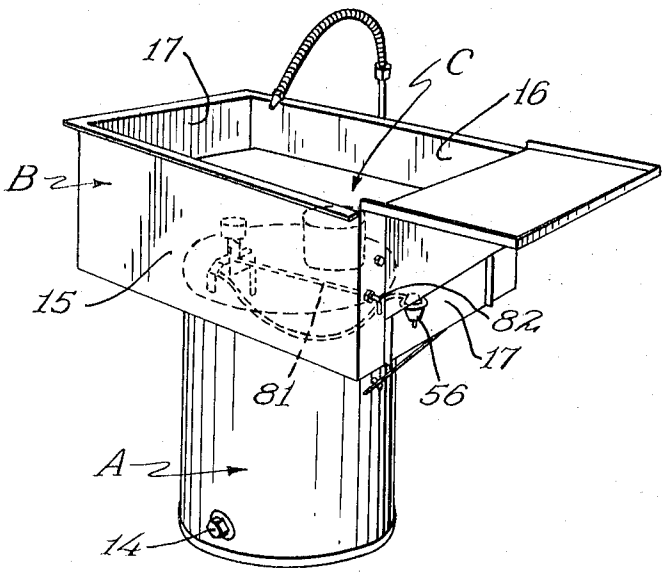


FIG. 1

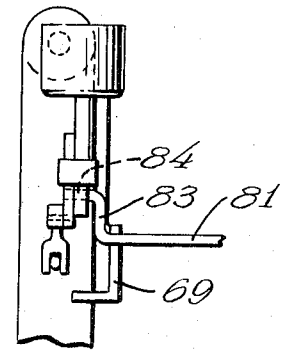


FIG. 5

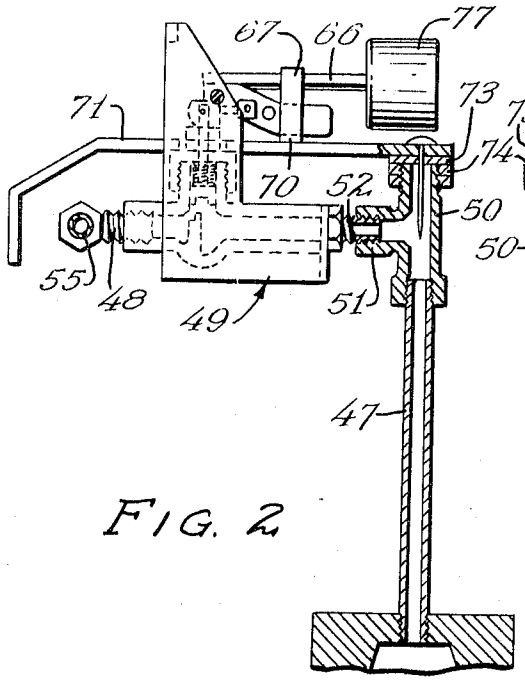


FIG. 2

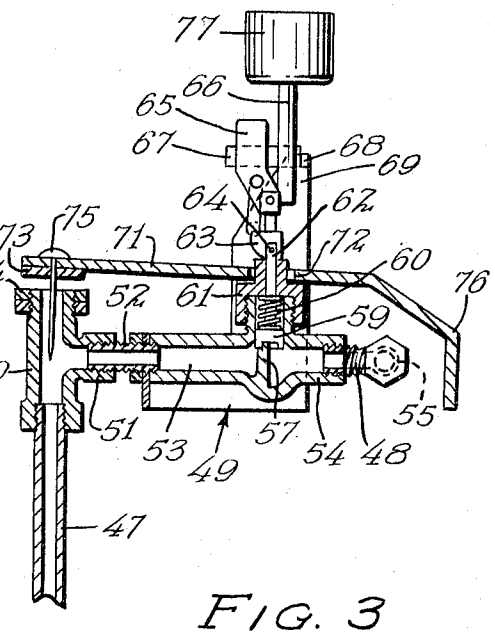


FIG. 3

INVENTOR
ROBERT E. DOYSCHER

BY Robert Dunning

ATTORNEY

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PARTS WASHER

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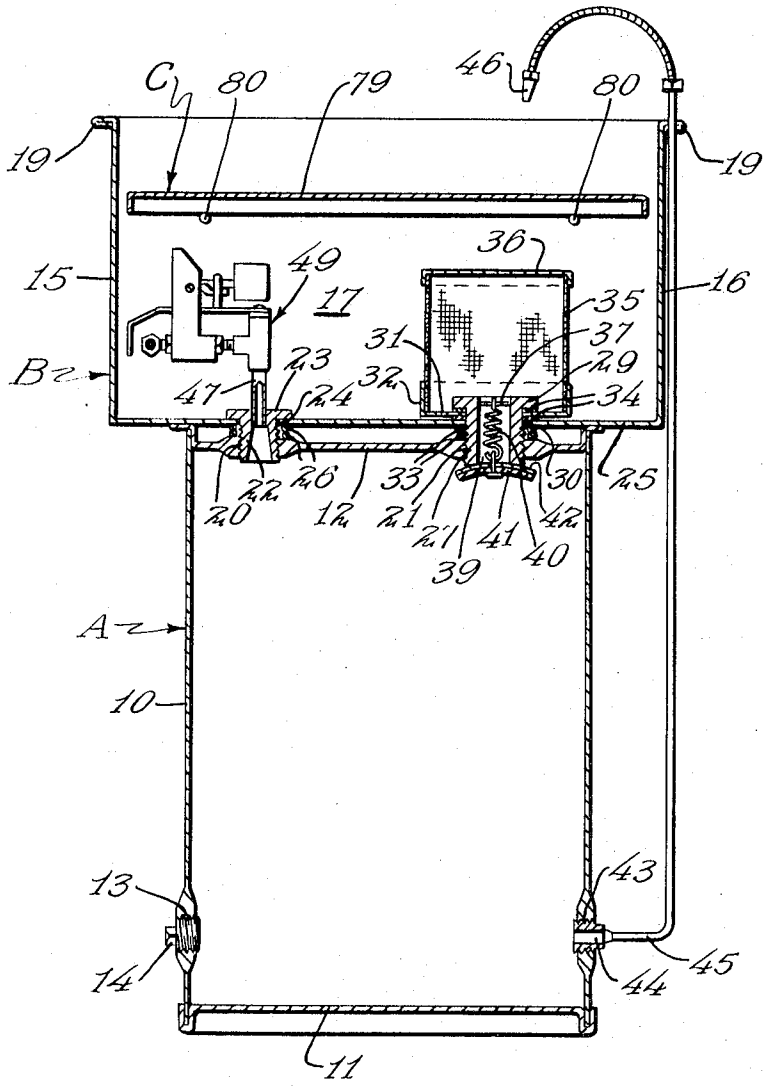


FIG. 4

INVENTOR
ROBERT E. DOYSCHER
BY Robert M. Dunning
ATTORNEY

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PARTS WASHER

Robert E. Doyscher, 1335 Edgerton St.,
St. Paul, Minn. 55104

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4 Claims. (Cl. 134—56)

This invention relates to an improvement in parts washing apparatus and deals particularly with a device useful in the cleaning of automotive parts and the like.

Many machine parts such as parts of vehicles driven by internal combustion engines, often collected dirt and grease during periods of use. When it becomes necessary to replace or repair a part of a device, it is common practice to wash the parts through the use of a suitable solvent before replacing them in the assembly. To facilitate this operation, parts washers have been produced capable of supporting the parts while they are being sprayed with the solvent. These washers usually collect a thick sludge in the solvent reservoir, making it necessary to clean the reservoir at frequent intervals. Furthermore, the solvent is usually pumped from the reservoir to a spray nozzle by an electric motor driven pump. Pumps quickly wear out because of the nature of the material being pumped, and the pump filters get plugged up and must be changed at short intervals. The combination of dirt, grease and solvent, often times has a deleterious effect upon the electric motor and the insulation of the wiring to the motor. As a result, washers of this type have been a frequent cause of fires, which may be of a very serious nature in view of the fact that such establishments often have quantities of high volatile and inflammable materials near at hand.

It is an object of the present invention to provide a parts washer for the purpose described, which is safe and relatively fool-proof. Most garages and other places of business where internal combustions are repaired, are equipped with compressed air systems which are used to inflate tires and for other purposes. The present invention resides in the provision of a parts washer which employs compressed air as a means of circulating the solvent used in washing the parts.

A feature of the present invention resides in the provision of a parts washer which includes a tray which may be used to support the parts being washed, a receptacle enclosing the parts supporting tray and into which the liquid used in cleaning the parts may drop, and a reservoir designed to contain the solvent being circulated. An air valve is connected to the air supply line and is pivotally movable from open to closed position. When in open position, air under pressure is directed to the reservoir, this pressure forcing liquid through a suitable outlet pipe to the nozzle or spray used to direct the solvent toward the parts being washed. This valve also includes an air vent which opens the interior of the reservoir to atmosphere when the air supply valve is closed. Thus, as soon as the air supply is turned off, the air pressure within the reservoir is vented off, stopping the further flow of washing liquid.

A further feature of the present invention resides in the provision of an automatically operable dump valve between the liquid catching receptacle and the reservoir. This dump valve, in preferred form, includes a spring supported plate at the bottom of the discharge passage, the spring supporting the plate having just enough resiliency to support the weight of the plate. When air pressure is introduced into the reservoir below the plate, the pressure thus produced acts to move the valve into closed position so that the air pressure may be built up within the reservoir. As soon as the pressure within the reservoir is vented, the weight of the liquid in the receptacle overlying the reservoir, will open the valve allowing the liquid to drain into the reservoir.

A further feature of the present invention resides in the provision of a screen encircling the dump valve and through which the cleaning liquid may flow in order to enter the dump valve. This screen filters the liquid entering the dump valve and prevents the dirt and other impurities from passing through into the reservoir.

A further feature of the present invention resides in the provision of a wall encircling the dump valve, which extends from the bottom of the receptacle to a point spaced from the bottom, the screen extending upwardly from this wall. The imperforated wall prevents all of the liquid in the receptacle from draining back to the reservoir, and as a result provides a sludge collecting area at the bottom of the fluid receiving receptacle. Because of this arrangement, most of the dirt and similar impurities collect as a sludge in the bottom of the fluid receiving receptacle, from which area may be scooped out at a necessary interval.

A further feature of the present invention resides in the provision of a simple device which can be produced at a fraction of the cost of most such parts washers, and which still is fully as effective as most such prior devices.

These and other objects and novel features of the present invention will be more clearly and fully setforth in the following specification and claims.

In the drawings forming a part of the specification;

FIGURE 1 is a perspective view of the parts washer in readiness for use.

FIGURE 2 is an elevational view, partly in section, showing the air vent in closed position.

FIGURE 3 is a vertical sectional view through the air vent showing the construction thereof.

FIGURE 4 is a vertical sectional view through the parts washed shown in FIGURE 1.

FIGURE 5 is a front elevational view of a portion of the air supply valve showing the manner in which it is operated.

In general, the unit includes a reservoir which is indicated in general by the letter A, a fluid receiving tank which is indicated in general by the letter B and a parts tray which is indicated in general by the letter C. The reservoir A forms the stand for the receptacle B and the tray C is supported within the receptacle B to support parts which are to be washed.

The reservoir A is shown as comprising a cylindrical container having a cylindrical wall **10**, a bottom closure **11** and a top closure **12**. An aperture **13** is provided near the lower end of the reservoir which is normally closed by an externally threaded plug **14**. The aperture **13** forms a means of draining the receptacle when sufficient sludge is build up in the reservoir to warrant cleaning.

In actual practice, the reservoir **10** comprises a small barrel which is of the proper height to support the receptacle B. The reservoir A is air-tight and accordingly is capable of sustaining air under pressure.

The receptacle B comprises a generally rectangular open-topped tank having a front wall **15**, a rear wall **16**, and spaced end walls **17** connecting the ends of the front wall **15** and rear wall **16**. An outwardly directed co-planar flange **19** preferably encircles the upper edge of the receptacle B and is preferably doubled to present a rounded outer edge.

Barrels or steel drums of the type used to form the reservoir A are normally provided with a relatively small diameter opening **20** and a larger diameter opening **21**. These internally threaded apertures **20** and **21** are used in attaching the receptacle B to the upper end of the reservoir A. An internally threaded hollow plug **22** having an enlarged head **23** extends through an aperture **24** in the bottom panel **25** of the receptacle and into the aperture **20** to hold the parts assembled. The sealing ring **26**

is provided between the bottom panel **25** and the top end **12** of the reservoir **8**.

A larger diameter plug **27** having an enlarged end **29** is inserted through an aperture **30** in the receptacle bottom **25** and into the larger diameter opening **21** to assist in hold the reservoir A and receptacle B assembled. The plug **27** also extends through a circular disk **31** overlying the bottom panel **25**, and having a cylindrical upwardly extending peripheral flange **32**. Sealing rings **33** are interposed between the bottom panel **25** and the reservoir top **12** encircling the plug **27** and sealing gaskets **34** are also provided between the plug head **29** and the disk **31**, and the disk **31** and the bottom panel **25** to form an effective seal.

A filter screen **35** is supported within the flange **32**, and an imperforate top closure **36** closes the upper end of the cylindrical screen **35**. A pin **37** extends across the axial passage **39** through the hollow plug **27** and supports a coil spring **40**. The lower end of the spring **40** is attached to the center of a disk **41** having a disk **42** of leather or resilient material which is designed to seal against the lower end of the plug. The arrangement is such that the spring **40** normally supports the valve **41**, **42**, in slightly open position and sufficiently close to the lower end of the plug **27** so that the valve will close when the interior of the reservoir A is subjected to air pressure. Alternatively, the spring **40** may support the disks **41**, **42**, in sealing position but will open when liquid is present within the plug **27** and when the interior of the reservoir A is at substantially atmospheric pressure.

The reservoir A is provided near its lower end with an additional internally threaded opening **43** designed to accommodate a fitting **44** to which is secured a pipe **45**. The pipe **45** extends vertically along the rear panel **16** of the receptacle B through the flange **19**. A flexible tube **48** is connected to the upper end of the pipe **45**, and the tube **48** is provided with a nozzle **46** at its end.

A pipe **47** is threaded into the plug **22** and supports an air valve which is indicated in general by the numeral **49**. A T fitting **50** is secured to the pipe **47**, the pipe **47** being attached to one end of the cross member of the T. The stem **51** of the T is connected by a nipple **52** to the outlet passage **53** of the valve **49**. The inlet **54** of the valve **49** is connected by a nipple **48** to an air-supply pipe **55**, which extends through the wall of the receptacle B and is connected to a pressure regulating valve **56** indicated in FIGURE 1. The pressure regulating valve is supplied with air under pressure by a supply line which usually is connected to an air pressure tank of the type usually found in garages and machine shops, and which may be used for a great number of purposes, such as inflating tires and operating air-operated machine tools.

The valve **49** includes a valve seat **57** and the valve **59** is movable toward and away from the valve seat to open and close the valve. The valve element **59** is normally urged toward closed position by a spring **60** which is interposed between the valve **59** and the removable cap **61** attached to the valve body. A valve plunger **62** is reciprocal through the cap **61** for operating the valve.

A cam segment **63** is pivotally connected at **64** to the valve stem **62** and is engageable with the upper end of the valve cap **61**. The segment **63** is pivotal through an angle of substantially 90 degrees, and when in the position shown in FIGURE 2 of the drawing, holds the valve **59** in open position while in the position shown in FIGURE 3 holds the valve **59** in closed position under pressure of the spring **60**. The cam **63** is attached to an operating arm **65**, which in turn is connected to a parallel weight arm **66**. A generally U-shaped yoke **67** connects the operating arm **65** and the weight arm **66** at a point spaced from the ends thereof, and this yoke **67** provides a means of limiting the pivotal movement of the arms. An L-shaped plate **69** is secured to the body of the valve **49** to extend upwardly therefrom, and the yoke **67** engages a cross-arm **68** at the upper end of the plate **69** when the valve is in closed position as indicated in FIGURE 3 of the drawings. The other end **70** of the yoke **67** is engageable with the upper surface of a lever arm **71** in the open position of the valve as indicated in FIGURE 2 of the drawings.

The lever **71** is provided intermediate its ends with an aperture **72** which freely accommodates the upper portion of the valve cap **61**, allowing the lever **71** to pivot to some extent using a portion of the cap **61** as a fulcrum. A valve disk of leather or resilient material is indicated at **73** overlying the upper end of the cross member of the T fitting **50** which is indicated by the numeral **74**. A locating pin **75** extends through the arm **71** and the valve disk **73** and extends into the cross-member of the T fitting **50**, the pin **75** holding the lever arm **71** with the valve disk **73** aligned with the upper end of the T. The end **76** of the lever arm **71** is bent downwardly and is designed to act as a counter balance for the valve disk **73** and pin **75**. The purpose of this arrangement is to provide a vent for the reservoir A when the valve **49** is in the closed position illustrated in FIGURE 3. A weight **77** is provided on the weight arm **66**. The purpose of the weight **77** is to cause the lower end **70** of the yoke **67** to bear against the lever **71** in order to urge the valve disk **73** against the upper end of the T.

A tray or pan **79** is freely supported in the upper portion of the receptacle B by supporting pins **80** extending through the end walls **17** of the receptacle. The tray **79** may be lifted from the receptacle for cleaning or for emptying. The tray **79** is of somewhat smaller dimensions than the receptacle B so that the cleaning liquid may flow about the edges of the tray and into the bottom portion of the receptacle.

The valve **49** is moved from open to closed position by means of a crank arm **81** which projects through one of the end walls **17** and is provided with an angularly turned end **82** which may be grasped to turn the rod **81** through an angularly distance of 90 degrees. The rod **81** extends through an aperture in the plate **69** which serves as a bearing for the rod and then extends at right angles as indicated in FIGURE 5 of the drawings at **83** and is then again bent at right angles to provide an offset end **84** which extends through the operating arm **65** of the valve **49**. The offset end portions of the rod act as a crank to swing the operating arm **65** and the attached weight arm **66** from one extreme position to the other.

In operation, the reservoir A is filled to a desired level with a cleaning fluid useful in cleaning dirt and grease and oil from machine parts. The pressure valve **56** is connected to a source of compressed air. When it is desired to use the device, the crank arm **81** is pivoted through 90 degrees to swing the valve **49** from the position shown in FIGURE 3 to the open position shown in FIGURE 2.

This operation permits air from the source of supply to pass into the valve body through the intake **54**, past the valve **59** and through the outlet nipple **52**. The air passes through the T connection **50** and down through the pipe **47** to the interior of the reservoir A. Air under pressure within the reservoir A acts to force the cleaning liquid up through the pipe **45** and the nozzle **46** permitting the parts to be cleaned.

It will be noted that during this operation, the weight **77** is acting through the yoke **67** to exert a force upon the lever **71** holding the valve disk **73** against the upper end of the T connection **50** thus closing the T from atmosphere.

The lever **71** and weight **77** actually serve as a safety valve, for if abnormal pressures built up within the reservoir A, this pressure may force the valve disk **73** away from the T fitting and allow the escape of some of the air.

As soon as air under pressure is introduced to the interior of the reservoir A, the dump valve disk **40**, **41** is closed against the lower end of the hollow plug **21** holding this valve closed. As long as the liquid is flowing into the receptacle B, the dump valve remains closed.

Devices of this type are used intermittently rather than continuously, and obviously the flow of liquid must be stopped after the level of liquid in the receptacle B raises to a predetermined extent. At the end of the cleaning operation, the crank rod **81** is rotated to its original position, swinging the valve **49** into closed position and raising the operating arm and weight arm into the position shown in FIGURE 3 of the drawings.

As soon as the valve **49** is closed, and the weight is lifted from the lever **71**, the lever **71** is free to swing upwardly to the extent necessary to vent the air pressure from the interior of the reservoir A. As the pressure within the reservoir is vented, the dump valve **40**, **41** opens to permit the cleaning liquid in the receptacle B to drain back into the reservoir A. The draining of the receptacle B requires but little time due to the dimensions of the dump valve.

It will be noted that, due to the upwardly extending flange **32** on the disk **31**, not all of the cleaning fluid will drain back through the filter screen **35** into the reservoir A. The purpose of this arrangement is to permit the dirt and sludge to separate by gravity from the cleaning fluid. After a period of use, depending upon the nature of the cleaning operations, the tray **79** is removed and the sludge collected in the bottom of the receptacle B removed through the use of a suitable scoop or similar instrument.

When it is desired to completely clean the apparatus and change the cleaning fluid, the air valve is turned to the "on" position shown in FIGURE 2, and the fluid is forced from the reservoir A through the pipe **45**, the flexible tube **48** and the nozzle **46** into a pail or bucket not shown in the drawings. This procedure is followed until the reservoir A is substantially emptied. The plug **14** and the fitting **44** are then removed, and the reservoir A is flushed out with a suitable cleaning material. The plug and fitting are then replaced, and the reservoir is refilled with the necessary cleaning fluid. While empty, the filter screen **35** and the receptacle B are also thoroughly cleaned so that when new cleaning fluid is added, the apparatus functions as though it were a new unit.

In accordance with the patent statutes, I have described the principles of construction and operation of my improvement in parts washer, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A parts washing apparatus including a fluid reservoir, a receptacle, a drain passage connecting said receptacle to said reservoir, and a fluid conduit connected to said reservoir and terminating above said receptacle, a source of air under pressure, a conduit connecting said air supply to said reservoir, an air valve in said conduit a pivotal arm supported by said valve for moving said valve between open and closed positions, a vent in said conduit between said valve and said reservoir, a normally open vent valve pivotal between a normally open position in which said vent is open, to a closed position in which said vent is closed, said pivotal arm being engageable with said vent valve when said air valve is open to hold said vent valve closed.

2. The structure of claim **1** and in which said pivotal arm is weighted to rest upon said vent valve.

3. A parts washer including a fluid reservoir, a washing receptacle, a source of air under pressure, a conduit leading from said reservoir to a point above said receptacle, and an air line extending from said air source to said reservoir, an air valve in said air line including a valve seat, a valve element supported for movement toward and away from said valve seat, an arm pivotally supported by said valve and connected to said valve element to reciprocate the same, said arm including a weighted free end and said arm being pivotal from an upright position in which said valve is closed to a generally horizontal position in which said valve is open, a vent opening in said air line between said valve and said reservoir spaced laterally from said valve, a pivotally supported vent valve operable in one pivotal position to close said vent valve and in another pivotal position to open said vent valve, said vent valve being in the path of movement of said pivotal arm, said arm, when in generally horizontal position, engaging said vent valve to hold said vent valve closed.

4. The structure of claim **3** and in which said vent valve is supported by a generally horizontal lever pivoted intermediate its ends, said lever having said vent valve near one end thereof and a counterweight on its other end.

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CHARLES A. WILLMUTH, *Primary Examiner.*

R. L. BLEUTGE, *Examiner.*