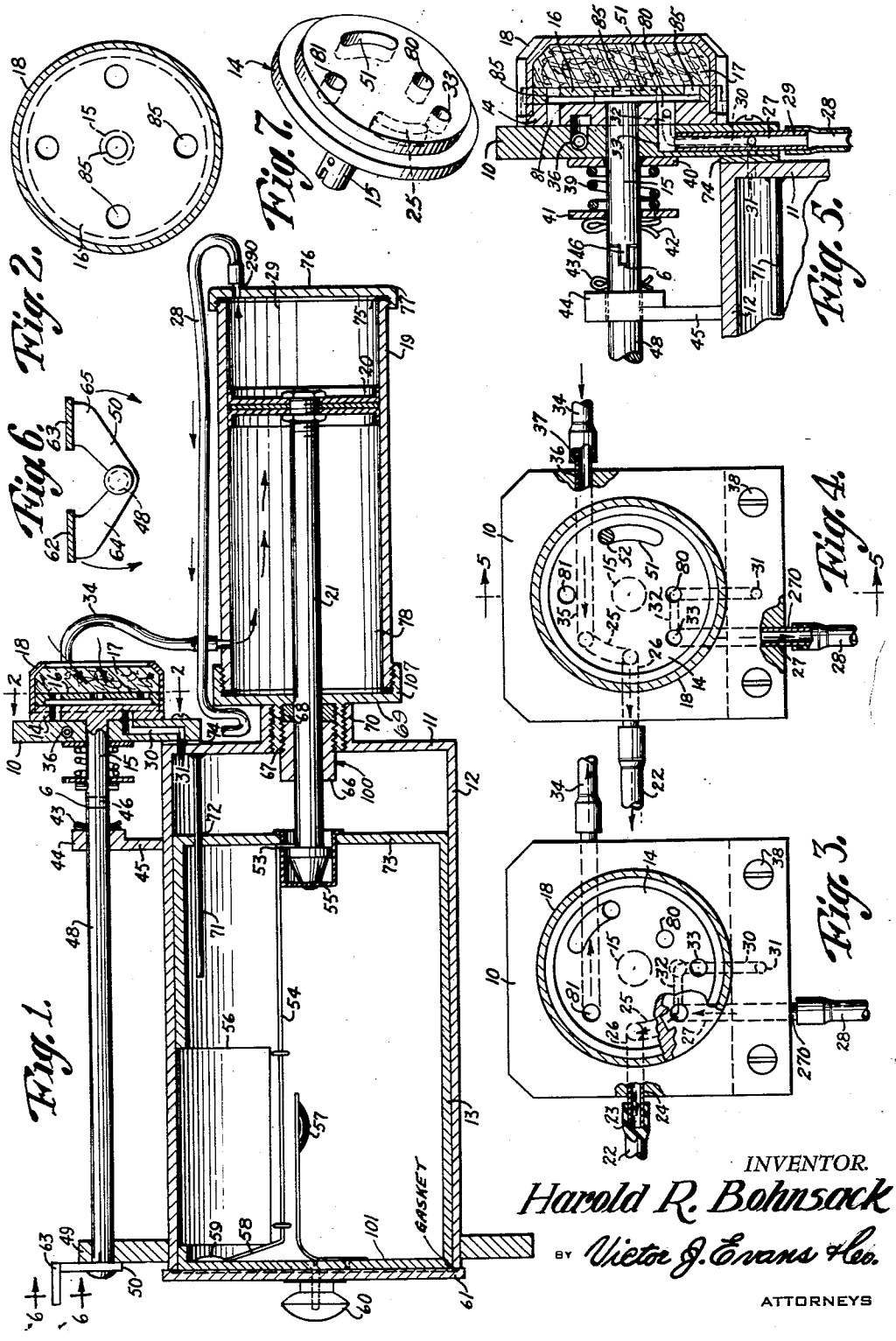
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VALVE FOR CYLINDER ACTUATED ASH TRAY

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VALVE FOR CYLINDER ACTUATED ASH TRAY

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This invention relates to ash trays for motor vehicles, and in particular a tray slidably mounted in a housing that is positioned in and extends rearwardly of the instrument panel of a vehicle or on other types of devices with a cylinder extended from the rear of a housing and having a piston therein connected to the ash tray with a piston rod whereby with suction supplied through a manually actuated valve to the forward end of the cylinder the tray is driven outwardly and when the suction is applied to the opposite end of the cylinder the tray is retracted. At the same time air is exhausted by the suction from the ash tray for snuffing cigarette butts and the like.

The purpose of this invention is to provide means for operating a suction actuated ash tray in a motor vehicle whereby by turning a knob to one side a tray is extended for receiving ashes and by turning the knob to the opposite side the tray is retracted or drawn into the instrument panel.

This invention is an improvement over the automatic cigarette ash tray of my Patent No. 2,838,354 of June 10, 1958, in that a valve assembly which provides smoother operation of the tray is provided for, selectively, applying suction to opposite ends of the operating cylinder of the ash tray.

In the device of the patent a rod in an outer tube is turned to bring ports in registering relation for directing the suction to different ends of a cylinder, however, for efficient operation of the device something additional is required and, to meet this problem, applicant developed the valve of this application. With this thought in mind this invention contemplates an ash receiver or tray slidably mounted in a housing and actuated by a piston in a cylinder extended from the housing and a valve assembly whereby suction of a tube connected to an intake manifold, or other part of an engine or to a pump is readily applied, by rotating the valve member, to opposite ends of the cylinder and also to the ash tray or housing thereof whereby air for combustion is exhausted from the tray.

The object of this invention is, therefore, to provide a suction valve adapted to be connected to the suction of an internal combustion engine or to other means for supplying suction and a lever for actuating the valve whereby the suction is applied to ends of a cylinder and also to the housing in which an ash receiving tray is mounted.

Another object of the invention is to provide a suction valve for actuating an ash receiving tray in which the device is adapted to be installed in instrument panels of vehicles now in use, or in or on other devices.

A further object of the invention is to provide an improved suction valve for ash receivers in motor vehicles whereby the ash receiver is extended and retracted by suction in which the valve is of a simple and economical construction.

With these and other objects and advantages in view the invention embodies a mounting plate having an offset passage therethrough, a rotor having elongated slots therein positioned against the inner surface of the mounting plate, a rod rotatably mounted in the mounting plate and on which the rotor is positioned, a filter spaced from the rotor, a spacer, a casing positioned over the spacer, washer, and filter, resilient means for retaining the parts in assembled relation, a lever carried by an extended end of the rod, a housing upon which the mounting plate is carried, an ash receiving tray slidably

mounted in the housing, a cylinder extended from the housing, connections from the valve to opposite ends of the cylinder, a piston in the cylinder, and a piston rod connecting the piston to the ash receiving tray of the housing.

Other features and advantages of the invention will appear from the following description taken in connection with the drawing, wherein:

FIGURE 1 is a longitudinal section through the valve, ash receiver and housing thereof and also through the operating cylinder extended from the housing.

FIGURE 2 is a cross section through the valve assembly taken on line 2—2 of FIG. 1 and showing in elevation a spacer member of the invention.

FIGURE 3 is a cross section, taken on a line slightly in advance of the section line 2—2 and showing in elevation one position of a rotor that coacts with the spacer member of FIG. 2 and showing the positions of the ports for applying suction to the operating cylinder and also to the cigarette ash receiving tray housing for snuffing cigarettes, and showing other parts venting to the atmosphere.

FIGURE 4 is a cross section similar to that shown in FIG. 3 with the rotor in another position and also with the parts shown on an enlarged scale illustrating the positions of the ports with the suction applied to one end of the operating cylinder whereby the cigarette ash receiver is actuated to the extended position.

FIGURE 5 is a longitudinal section through the valve assembly taken on line 5—5 of FIG. 4 also showing the suction applied to one end of the operating cylinder.

FIGURE 6 is a cross section taken on line 6—6 of FIG. 1, showing the finger actuated lever for the control valve.

FIGURE 7 is a perspective view illustrating the valve rotor and showing, in particular, the valve passages therethrough.

Referring now to the drawing wherein like reference characters denote corresponding parts the improved suction valve assembly of this invention includes a mounting plate **10** adapted to be mounted on an end wall **11** of a cylindrical housing **12** in which an ash receiving tray **13** is positioned, a rotor **14** carried on the end of a stub shaft **15** rotatably mounted in the plate **10**, a spacer **16**, a disc **17** of filter material, a cover or casing **18** positioned over the disc, spacer, and rotor, and a cylinder **19** having a piston **20** therein, the piston being connected to the ash receiving tray **13** with a piston rod **21**.

As illustrated in FIGS. 3 and 4 suction is applied to the valve assembly through a tube **22** connected to the intake manifold or other part of the motor vehicle with the tube mounted on a nipple **23** extended from an elongated opening **24** in the mounting plate **10** and the opening **24** is positioned to register with an arcuate slot **25** in the rotor **14** whereby with the parts, as illustrated in FIG. 3, the arcuate slot **25** provides communicating means between an end **26** of the opening **24** that is within the mounting plate **10** and a passage **27** extending downwardly through the mounting plate and a nipple **270** extended from the passage **27** is connected by a tube **28** to a nipple **290** on the end **29** of the cylinder **19**; and also connected by a restricted passage **32** in the mounting plate which extends downwardly through passage **30** in the mounting plate to an opening **31** that extends through the end wall **11** of the housing **12**. The upper end of the passage **30** is in communication with the restricted cross connection **32** to provide communicating means between passage **30** and the end of the slot **25**. The rotor **14** is provided with openings **33** and **80** that are positioned to register with the passages **27** and **30**, the opening **80** providing a connection to the opening **31**, and connections thereto.

With the parts in the positions as illustrated in FIG. 3, the suction is applied to the end **29** of the cylinder **19** drawing the cigarette ash receiving tray **13** into the housing **12** and at the same time, evacuating tray **13** and housing **12** by drawing air through the restricted passage **32**, around the peripheral portions of the tray **13**, through passage **30** and opening **31** whereby cigarette butts or the like positioned in the tray are extinguished. Air also passes through filter **17**, being cleaned thereby, thence into port **81**, and through passage **36** to end of cylinder **78**.

With the parts positioned as illustrated in FIG. 4 a suction connection formed with the tube **22**, from the intake manifold of the engine or connected to suction from other sources connects a tube **34** to the end of the cylinder **19** adjacent the housing **12** with the arcuate slot **25** providing communicating means between the inner end **26** of the tube **22** and an inner end **35** of a connection **36** from which a nipple **37** on which the tube **34** is mounted is positioned thus permitting air to be withdrawn from end **78** of cylinder **19** causing the piston to actuate the tray to an extended position.

Thus with the parts in the position as shown in FIG. 4 as the air is withdrawn from the end **78** of the cylinder **19** air cleaned by filter **17** is admitted to the end **29** of the cylinder **19** through port hole **33**, passage **27**, and tube **28**, simultaneously the air passes into port hole **80** downwardly through passage **30**, and from the opening **31**, into the tray housing **12** to actuate the tray to an extended position.

The mounting plate **10** is secured to the end wall **11** of tray housing **12** with screws **38** and the rotor **14** that is integral with the shaft **15** is urged against the mounting plate **10** with a spring **39** extended around the shaft **15** and positioned between a washer **40**, positioned against the mounting plate **10** and a washer **41** that is retained on the rod with a cotter pin **42**. The end of the shaft **15** extended through the bearing in the mounting plate **10** is provided with a slot **6** that is positioned to receive a flat key **46** extended from the end of rod **48**. The opposite end of the rod **48** is rotatably mounted in a bearing **49** extended upwardly from the housing **12** and the end of the rod is provided with a lever **50** by which the rod may be turned to shift the position of the rotor **14** whereby suction is applied to the forward end of the cylinder **19** for retracting the ash receiver and to the opposite end for extending the ash receiver. The rotor **14** is also provided with an arcuate slot **51** through which a pin **52** extends, the slot providing a port selector travel limiting means with the pin limiting rotary movement of the rotor or valve elements. Spacer **16** separates filter disc **17** from rotor ports.

The ash receiving tray **13** is connected by a latch **53** on the end of a rod **54** to a collar **55** on the inner end of the piston rod **21**, which extends through a packing gland **100** and the tray is provided with a receiving opening **56** and a snuffer **57**. Snuffer **57** is provided for use when the motor is not running and the tray is manually operated. The rod **54** is provided with an arm **58** having a button **59** at the upper end by which the rod may be rotated to release the latch **53** for detaching tray **13** from piston rod **21** for emptying contents thereof. The outer end of the ash receiving tray **13** is provided with a knob **60** to facilitate manual operation of the receiver when motor is not running.

The outer end of the tray **13** is provided with a head **61** that seats against tray housing **12** forming an air tight combustion proof container. The finger operating lever **50** is provided with platforms **62** and **63** on the ends of arms **64** and **65** respectively. The packing gland **100** in the opposite end of the housing **12** is provided with a nut **66** that is threaded into a nipple **67** extended from a head **69** of the cylinder **19** whereby packing **68** is retained in sealing relation with the shaft and the nipple **67** is threaded into a hub **70** extended from the end wall **11** of the housing **12**.

The end **11** is also provided with a positioning bar **71** that extends through an opening **72** in the end **73** of the tray **13** for retaining the opening **56** of the tray **13** in an upwardly disposed position. A gasket **74** is provided between the end **11** of the housing **12** and the mounting plate **10** and gaskets **75** are positioned between the end caps **76** and **69** and the ends of the cylinder **19**. The caps are provided with flanges which are threaded on the ends of the cylinder, the cap **76** having a flange **77** and the cap **69** having a similar flange **107**.

The cigarette butt receiving tray **13** is substantially cylindrical, having a cylindrical wall to which the numeral **13** refers with an inner end wall **73** at one end and an outer cover or wall **61** on the opposite end. The upper side of the cylindrical tray is provided with a cigarette butt receiving opening **56** and the edges of the cover **61** extend slightly over the outer surface of the cylindrical housing **12** in which the tray **13** is slidably mounted. The cover or end wall **61** of the tray is also provided with a knob **60** by which the tray may withdrawn manually. The inner surface of the outer end wall or cover **61** is provided with a liner **101** upon which the snuffer **57** is mounted. The tray is retained in the closed position by the latch **53** that snaps over the large inner end or collar **55** for locking the tray in the housing and that is actuated by the button **59** through the rod **54** for releasing the latch to permit outward movement of the tray.

The rod **48** is retained in position between the bearings **44** and **49** by the lever **50** on the outer end and the cotter pin **43** extended through the opposite end.

The rod **48** is rotated by the lever **50** and with the rod turned in one direction wherein the arcuate slot **25** in the rotor connects the suction tube **22** to the tube **28**, suction is provided in one end of the cylinder **19**, as indicated by the arrows in FIGURE 1, wherein the piston moves toward the end of the cylinder to which the tube **28** is connected and with the space behind the piston relieved by air through the tube **34** which opens through ports **81** into the air space between the rotor and disc **16** whereby air is drawn through the opening **85** in the disc or spacer **16**, through the filter **17** and into the portion **78** of the cylinder. Upon rotation of the rod **48** by the lever **50** in the opposite direction, the parts assume the positions shown in FIGURE 4, wherein suction from the tube **22** is applied through the connection **25** to the tube **34**, causing suction in the chamber **78** of the cylinder **19** and drawing the piston inwardly toward the ash tray chamber. In this movement air passes through opening **80** through the cross connection **32** and then through the passage **30** and opening **31** into the cylinder **12** whereby the ash tray cylinder is extended.

With the parts assembled as illustrated and described the cigarette ash receiver is installed in the instrument panel of a motor vehicle with a cover or head **61** of the sliding tray **13** flush with the surface of the panel or attached in other manners. When it is desired to use the ash tray, platform of lever **50** is depressed so that the suction is applied to the end **78** of the cylinder **19** whereby the piston is drawn outwardly sliding the tray **13** to an extended position. After use platform on lever **50** is depressed in the position whereby, the suction is applied to the end **29** of the cylinder **19** whereby the suction draws the piston **20** toward the end **29** with the tray **13** sliding into the housing **12**. In this movement suction is also applied to the interior of the housing and the tray **13** through the opening **56** therein, thus the burning cigarette butt is, consequently, extinguished. Although the housing is shown as being cylindrical it may be of any suitable shape.

It will be understood that modifications, within the scope of the appended claim, may be made in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

In an ash receiver, the combination which comprises a cylindrical housing having an open end and a closed end,

a cylindrical ash receiving tray slidably mounted in the open end of the housing, said tray having a cigarette butt receiving opening in the upper surface and having a knob on the outer end, a cylinder extended from and connected to the closed end of the housing and aligned therewith, a piston in the cylinder, a piston rod extended from the piston through the end of the cylinder connected to the closed end of the housing, releasable means for connecting the piston rod to the ash receiving tray, a mounting plate secured to and extended upwardly from the cylindrical housing, a bearing extended upwardly from one end of the housing and aligned with a bearing in the mounting plate, a rod rotatably mounted in the bearing of the housing and mounting plates, platforms extended upwardly from the rod and rotatably mounted in the bearings, a rotor secured to the rod and positioned against the mounting plate, a casing providing a closure for the rotor, resilient means for urging the rotor against the surface of the mounting plate, a suction connection extended from the mounting plate, suction connections

extended from the closure of the rotor to opposite ends of said cylinder, a suction connection from the mounting plate to the inner end of the cylindrical housing in which the ash receiving tray is positioned, and a filter in the closure enclosing the rotor, said suction connections being positioned to apply suction, selectively, to opposite ends of the cylinder and to the interior of the ash receiving tray.

References Cited in the file of this patent

UNITED STATES PATENTS

2,108,182	Searle	Feb. 15, 1938
2,185,763	De Lisle	Jan. 2, 1940
2,382,354	Wales	Aug. 14, 1945
2,447,364	Renshaw	Aug. 17, 1948
2,650,455	Jacobsson et al.	Sept. 1, 1953
2,656,039	Leland	Oct. 20, 1953
2,718,237	Matasovic	Sept. 20, 1955
2,769,447	Moberg et al.	Nov. 6, 1956