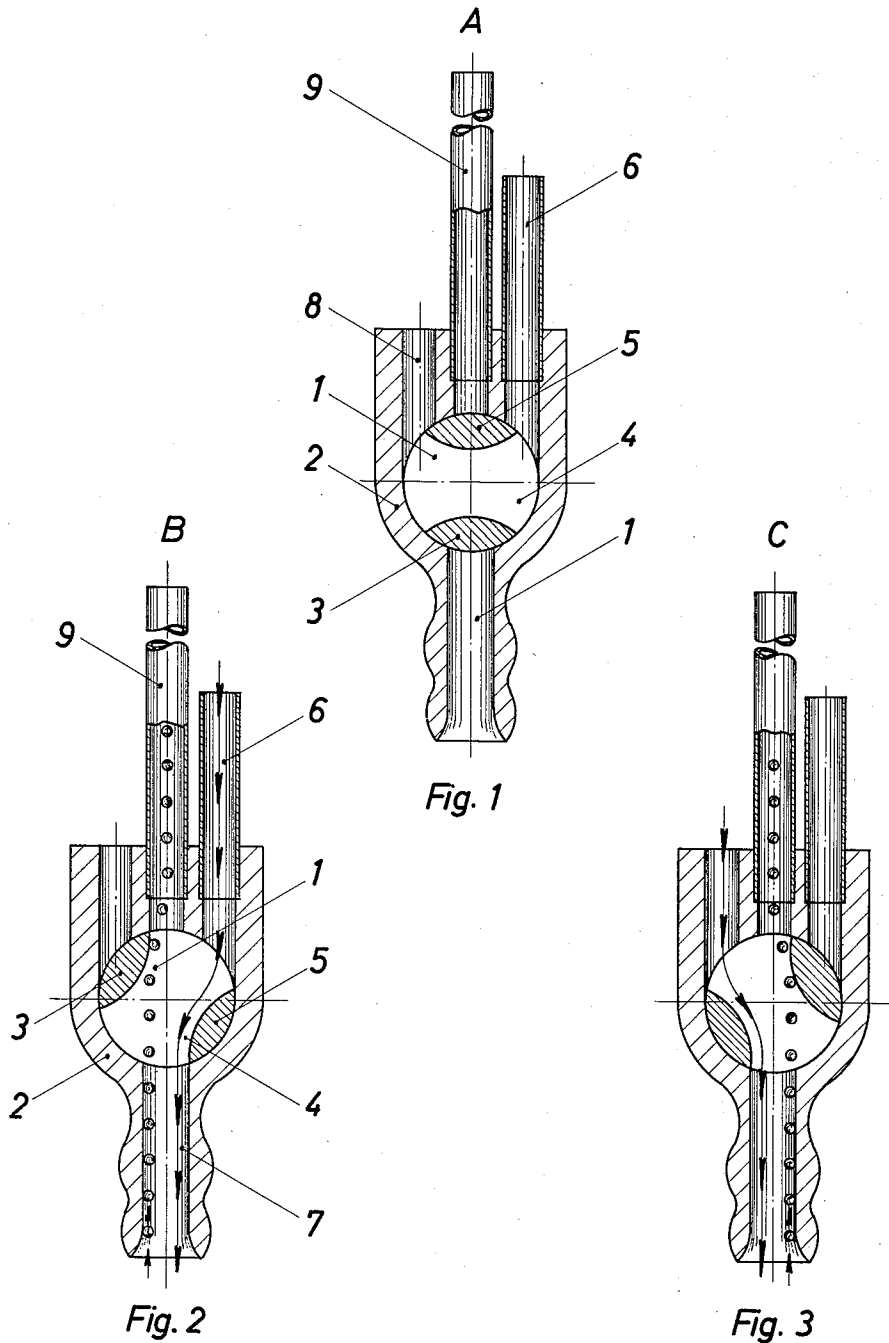


Dec. 13, 1960

H. SPEER
THREE-WAY-DELIVERY COCK WITH AUTOMATIC
VENTILATION, ESPECIALLY FOR FUEL
Filed May 13, 1957

2,964,056



Ernst Heinkel A-G

1

2,964,056

THREE-WAY-DELIVERY COCK WITH AUTOMATIC VENTILATION, ESPECIALLY FOR FUEL

Horst Speer, Stuttgart-Feuerbach, Germany, assignor to Ernst Heinkel Aktiengesellschaft, Stuttgart-Zuffenhausen, Germany

Filed May 13, 1957, Ser. No. 673,102

1 Claim. (Cl. 137—589)

The invention relates to a three-way delivery cock with automatic air-evacuation, particularly for fuels. Three-way delivery cocks for fuels are already known in many embodiments. The known constructions have in most cases conical or cylindrical plugs and have "off," "on" and "reserve" switching positions. The evacuation or exhaustion of air from such a delivery cock is effected thereby in that a breather pipe from the plug chamber protrudes somewhat above the highest fuel level. The purpose of the breather pipe is to carry off fuel fumes or air-bubbles which form in the discharge pipe situated between cock and carburettor. This ventilation is very important, since a progressive formation of bubbles is capable of hindering and even on occasion of entirely preventing the through-flow of fuel. If, in the case of spark-ignition engines or, alternatively, two-stroke engines, the feed of fuel from the fuel tank to the carburettor is carried out by means of the force of gravity of the fuel, then an imperfect ventilation of the feed pipe produces a fuel-weak combustion, which results in damage to pistons and cylinders. The known, apparently groundless dying of an engine is almost always attributable to the fact that the fuel feed has been temporarily interrupted by the formation of bubbles.

Attempts have already been made to solve the problem of ventilation by special shaping of the delivery cock. The known delivery cocks, however, have too high a rate of flow in the plug, whereby rising of the bubbles was made difficult and hindered. In the cock according to the invention the rate of flow through the plug is kept intentionally lower, it being first and foremost achieved that the downwards-flowing fuel and the rising bubbles separate from one another at the entrance to the plug in such a way that the gas or the air can escape upwards unhindered.

This task of the invention is solved thuswise that the outlet in the plug in the section transverse to the plug axis is limited by two convexly curvilinear contours of which in each of the two open positions one without a kink passes into one contour of the discharge pipe, the other likewise into one contour of the breather pipe, whereby the outlet has at each point a greater sectional area than the inlet pipes.

Tests have shown that a liquid which is led over a convexly cylinder-barrel shaped surface will, on account of the adhesion of this surface, follow on over and above the length of path determined by gravity and flow-reaction. Further, the stream at this point takes on a to a great extent laminar character.

Fig. 1 shows in section a three-way delivery cock according to the invention in the position "off";

2

Fig. 2 shows the same cock in section in the position "on," and

Fig. 3 shows the cock in section in the position "reserve."

In the plug bore 1 of the three-way delivery cock 2 is located the plug 3, the outlet aperture 4 of which is limited by the plug walls 5, the contours of which penetrate convexly into the plug chamber 4. The plug chamber 1 is connected with the fuel tank (not shown in the drawing) by the fuel feed pipe 6. The fuel discharge pipe 7 leads from the plug chamber to the carburettor (not shown in the drawing). Further connected with the plug chamber are the fuel feed pipe 8 (to the spare tank, not shown in the drawing) and the breather pipe 9.

The way in which this arrangement works is represented in Figs. 2 and 3. Fig. 2 shows the three-way delivery cock in the position "on," i.e. with the fuel tank connected to the carburettor. The fuel moves through the fuel feed pipe 6 into the plug chamber 4 and is led here over the curvilinear surface 5. Following this surface, the fuel courses through the fuel discharge pipe 7. The stream is kept by the surface 5 on the right-hand side (in relation to the aspect of the drawing) and is laminar in character when it leaves the plug. The sectional area of the plug aperture is greater than the sum of the sectional areas of the connected pipes 6, 7, so that the rate of flow and thus the pressure of the flow in the plug when the fluid enters the plug is greatly reduced. As a result of this arrangement, the air bubbles can escape unhindered through the plug and upwards, keeping to the left-hand side (when looking at the drawing) by virtue of the there greatly reduced flow pressure.

Since the peripheries of the plug aperture lie exactly on the inlet apertures of the pipe 6, 7, 9, there is no possibility of formation of obstructions or turbulence.

Fig. 3 shows likewise the same process, when the reserve tank is connected to the carburettor.

What I claim is:

In a three-way delivery cock comprising a valve casting, a valve plug chamber, a valve plug with an outlet aperture adaptable to two open positions and one closed position, further two inlet pipes, a breather pipe, and an outlet pipe, with automatic air-evacuation, the plug aperture being of such size that in one open position it interconnects one inlet pipe, the outlet pipe and the breather pipe, and in the other open position it interconnects the other inlet pipe, the outlet pipe and the breather pipe, the aperture walls having a double convex shape which in a section transverse to the axis of the plug are limited by two convexly curvilinear contours, of which in each of the two open positions one without any kink passes into one contour of the breather pipe, the outlet aperture having at every point a greater sectional area than the inlet pipes together.

References Cited in the file of this patent

UNITED STATES PATENTS

933,484	Morris	Sept. 7, 1909
1,498,581	Simanek	June 24, 1924
1,549,474	Feinberg	Aug. 11, 1925