

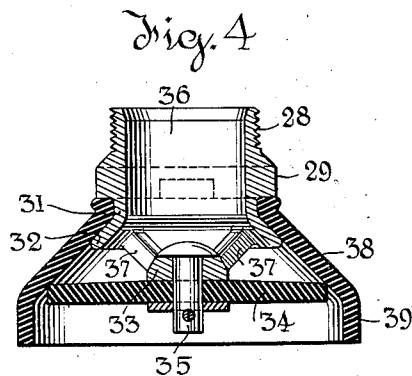
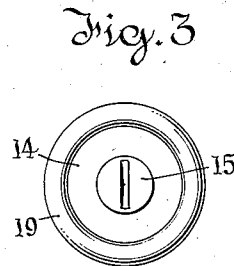
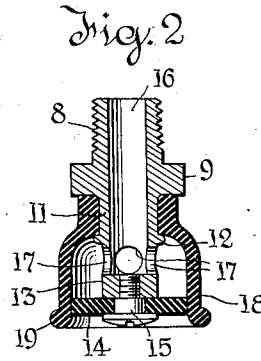
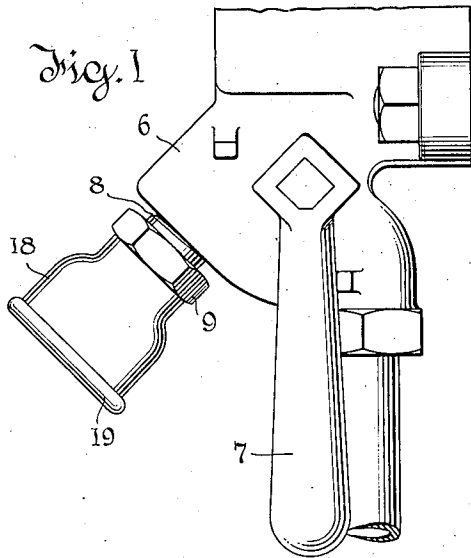
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L. A. SAFFORD

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EXHAUST PORT PROTECTOR FOR AIR BRAKES

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Inventor

Lewis A. Safford

By

Boyer and Son

Attorneys

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EXHAUST PORT PROTECTOR FOR AIR BRAKES

Lewis A. Safford, Watertown, N. Y., assignor to
The New York Air Brake Company, a corporation
of New Jersey

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14 Claims. (Cl. 303—1)

The invention relates to protectors for exhaust valves of air brakes.

The problem of preventing mud daubers, certain species of bees, and wasps, from building nests in the exhaust ports of air brakes has become quite familiar in the art, there having been a marked increase in this difficulty in recent years, either because of an increase in the number of such insects or because of a more favorable formation of the exhaust ports in modern retainer valves and automatic brake valves to the purposes of the insects.

While the protectors are primarily intended for use to protect the exhaust ports of retainer valves they are available for use in protecting exhaust ports generally, and in some cases it is vital that they offer little or no resistance to flow. Any construction which houses the exhaust port and produces a darkened cavity, particularly a relatively small cavity, seems to increase the attractiveness as a nest. For this reason constructions in which the wasp excluder or protector is fully exposed to light seemed to give the best results. This exposure, however, favors the formation of ice and sleet with the result that the exhaust ports are occasionally closed in this way. In other words, prior solutions of the problem have introduced new difficulties.

The present invention provides a type of excluder which is not only effective to exclude the wasp, but which would be self-clearing in the event that the wasp does build a nest on the excluder or in the event that the excluder is coated with ice.

It has already been proposed to construct the exhaust protector as a sort of outward opening check valve. One patented type shows a disk valve which is bodily movable and another shows a butterfly valve which is hinged at one side. Valves of this type are relatively expensive to manufacture. They do not produce a good closure unless an unduly heavy spring is used. They are subject to considerable wear under vibration, and worst of all, when sealed by adherent mud or ice, they cannot open except by rupturing the sealing bond simultaneously throughout the entire sealed area.

According to the present invention use is made of a valve having a seat and an outwardly opening valve member. The valve member is made of flexible resilient material, preferably rubber, and the seat member may be, and preferably is, also made of this material. The form of the parts is such that when the valve is subjected to the pressure of discharge it will be deformed

progressively as the pressure rises. The effect of this is to crack or break away the adherent solids. Because of the flexible character of the valve it can open with a sort of tearing motion so that rupture of the sealing bond will occur at the weakest point and continue progressively until the valve opens completely. Because of this action the flexible valve will open under pressure which would not open a rigid hinged valve.

Tests made by freezing heavy shells of ice over protectors of the type herein disclosed, and then subjecting them to rising pressure, have given surprisingly successful results. Shells of ice far heavier than are likely to be encountered in service were ruptured by exhaust pressures such as would follow moderate service applications.

Several different practical embodiments of the invention will now be described with reference to the accompanying drawing, in which,—

Fig. 1 is a view of a retaining valve showing the exhaust protector in position.

Fig. 2 is an axial section through the protector shown in Fig. 1.

Fig. 3 is an end elevation thereof.

Fig. 4 is a modification functionally quite similar to the form shown in Figs. 1 to 3, but modified to open under very low discharge pressures and to be capable of accommodating heavy discharge flows at high pressures.

Referring first to Figs. 1 to 3 inclusive, the retaining valve is indicated at 6 and has the usual handle 7 by which it is set. Screwed into the exhaust port of the retainer valve is a metallic nipple 8 having a wrench grip 9. There is an extension of the nipple beyond the wrench grip 9 which is provided in the order stated with a seat 11, a retaining bead 12 and an extension 13 which terminates in a flat seat for a disk valve 14. The valve 14 is made of resilient flexible material, preferably rubber or rubber compound, and is retained by a screw 15, as clearly shown in the drawing. A longitudinal passage 16 extends through the nipple and communicates through lateral ports 17 with a cup-like valve element 18 which is mounted on the seat 11 behind the bead 12 and embraces the periphery of the disk 14 more or less closely. A reinforcing bead 19 slightly stiffens the edge of the cup-shaped member 18 and projecting beyond the disk 14, serves as a drip ring.

The preferred arrangement is one in which the engagement between the periphery of the disk 14 and the cup-shaped member 18 is as light as is consistent with the formation of a

proper seal. When exhaust occurs the disk 14 flexes downwardly and the cup-like member 18 is slightly distended so that free exhaust flow occurs. If the members 14 and 18 should be sealed together by ice or by the nests of insects (the latter being considered a very remote possibility because the formation of the device is unattractive to insects) the distention of the bell 18 and the flexure of the disk 14 will rupture the adherent solids, after which the valve will open quite freely.

The protector just described is well suited for use on retainer valves to control the main exhaust port. If a retainer valve is not used the protector may be mounted directly in the exhaust passage of the triple valve itself.

In certain cases, however, it is desirable to have a protector which will open at very low pressures to permit a slow discharging flow and which will open under high discharging pressure to permit very rapid discharging flows. As an example of this arrangement reference may be made to the emergency portion of the AB brake valve now standard on American railways. The emergency portion of this valve functions during service applications to vent air from the quick action chamber at a slow rate. In emergency applications the emergency portion causes a very rapid venting of brake pipe air. Both these flows pass through the same discharge connection and a protector for this connection must be capable of handling the large emergency flow and must not materially impede the relatively insignificant service flow. A protector suited for this class of service is shown in Fig. 4.

Referring to this figure a threaded metallic nipple 28 provided with a conventional wrench grip 29 serves as the mount for the protector. Beyond the wrench grip 29 is a seat 31, defined by a flange or bead 32. A hub 33 supported by three narrow arms 37 serves as a central support for the valve disk 34. This is tapered radially, i. e., the disk is thicker at its center than it is at its periphery. The center of the disk is held on the hub 33 by the pin 35 which is provided with a washer and cotter pin, as clearly shown in the drawing. An axial passage 36 extends through the nipple and through the intervals between the arms 37. The parts are so arranged that the area of the ports between the arms 37 is at least equal to the total area of the passage 36. Mounted on the seat 31 and retained by the flange 32 is a valve element made up of a flaring conical portion 38 and a cylindrical rim or flange 39. The part 38, 39 is preferably made of flexible rubber-like material, but is not necessarily so. Better results are secured by the use of rubber because of the possibility of deformation of this member. It should be observed, however, that the periphery of the disk 34 is not embraced, but enters merely into edge contact with the interior of the flaring or conical portion 38. Consequently it may open freely by simple downward flexure and it will open under very low internal pressures.

The large size of the disk valve 34 and the fact that it is merely in edge contact with the interior of conical portion 38 are both favorable to free opening under moderate pressure. The size and arrangement of the parts are such that a wide opening is afforded where discharge occurs rapidly at pressures of the order of 50 pound gauge, or more, 70 pound gauge being a normal freight brake pipe pressure under running conditions.

The rubber parts may be vulcanized or cemented to the seats 11 or 31, as the case may be, or other known means of attachment may be adopted.

What is claimed is,—

1. A protector for the exhaust ports of air brakes, comprising in combination, two coacting members forming a normally closed, outwardly opening annular valve, one of said members encircling the other, both said members being of resilient deformable material, and so shaped as to be deformed when subject to internal pressure.

2. A protector for the exhaust ports of air brakes, comprising in combination, two coacting members forming a normally closed annular valve, one of said members being a flexible disk supported centrally, and the other of said members being a flaring truncated flexible and distensible cone supported at its smaller end with its larger free margin encircling and extending beyond the periphery of said disk.

3. A protector for the exhaust ports of air brakes, comprising in combination a nipple adapted to connect with an exhaust port, said nipple including an annular mount and a center mount with an intervening passage for discharging air; a distensible cup-like valve member mounted on said annular mount; and a flexible disk-like valve member mounted on said center mount, a portion of the cup-like member encircling and extending beyond the periphery of said disk to form therewith a freely opening closure.

4. A protector for the exhaust ports of air brakes, comprising in combination a nipple adapted to connect with an exhaust port, said nipple including an annular mount and a center mount with an intervening passage for discharging air; a distensible cup-like valve member mounted on said annular mount; and a flexible disk-like valve member, tapered from its center to its periphery, mounted on said center mount and encircled by a portion of said cup-like member to form therewith a freely opening closure.

5. A protector for the exhaust ports of air brakes, comprising in combination, two coacting members forming a normally closed, outwardly opening annular valve, one of said members encircling the other, that other being of resilient deformable material, and so shaped as to separate from the encircling member when subjected to the pressure of exhaust.

6. A protector for the exhaust ports of air brakes, comprising in combination, two coacting members forming a normally closed, outwardly opening annular valve, one of said members being cup-shaped and terminating in a deep rim, and the other of said members being a disk of rubber-like material supported at its center within the other member and normally sealing at a peripheral edge therewith.

7. A vent protector for the exhaust passage of a fluid pressure brake device or the like comprising an element having a chamber open at one end to said exhaust passage and at the opposite end to atmosphere, means for securing said element to said device, and a flexible diaphragm secured to said element normally closing communication through said chamber and adapted to be deflected by fluid under pressure supplied from said exhaust passage to open said communication.

8. A vent protector for the exhaust passage of a fluid pressure brake device or the like comprising an element having a chamber open at

one end to said exhaust passage and at the opposite end to atmosphere, means for securing said element to said device, and a flexible diaphragm secured to said element with the periphery of the diaphragm normally pressed against said element closing communication through said chamber, and adapted to be deflected by fluid under pressure supplied from said exhaust passage to open said communication.

9. A vent protector for the exhaust passage of a fluid pressure brake device or the like comprising an element having a chamber open at one end to said exhaust passage and at the opposite end to atmosphere, means for securing said element to said device, and a flexible diaphragm secured within said chamber with its peripheral portion engaging the inner wall of said chamber and adapted to be deflected out of engagement with said inner wall by fluid under pressure supplied from said exhaust passage for opening communication through said chamber from said exhaust passage to the atmosphere.

10. A vent protector for the exhaust passage of a fluid pressure brake device or the like comprising an element having a chamber open at one end to said exhaust passage and at the opposite end to atmosphere, means for securing said element to said device, and a flexible disc-like diaphragm secured to said element within said chamber with its peripheral edge normally flexed against the inner wall of said chamber and adapted to be flexed out of engagement with said inner wall by fluid under pressure supplied through said exhaust passage to said chamber for establishing venting communication from said passage to the atmosphere.

11. A vent protector for the exhaust passage of a fluid pressure brake device or the like comprising an element having a chamber open at one end to said exhaust passage and at the opposite end to atmosphere, means for securing said element to said device, and a flexible diaphragm secured to said element normally closing communication through said chamber and adapted to be deflected by fluid under pressure supplied from said exhaust passage to open said communication, said element including means surrounding and extending beyond the atmospheric face of the diaphragm for protecting same.

12. A vent protector for the exhaust passage of a fluid pressure brake device or the like comprising an element having a chamber open at one end to the atmosphere, a screw-threaded portion carrying said element and screw-threaded to said device, said device and element having means which coact when said vent protector is screwed into position in said device for holding said vent protector against screwing out of said device, and a flexible diaphragm carried by said element and normally closing communication through said chamber from said exhaust port to atmosphere and adapted to be deflected by fluid under pressure supplied from said exhaust port to open said communication.

13. As an article of manufacture, a vent protector comprising a circular body having an outwardly flaring inner side wall bounding a chamber the larger end of which is open, a screw-threaded portion projecting from the smaller end of the body and having a passageway extending through said portion and opening into the smaller end of said chamber, a member disposed within said chamber and secured to said body, a flexible disc-like diaphragm disposed in said chamber with its periphery engaging said inner side wall of said chamber, and means securing said diaphragm at its center to said member.

14. As an article of manufacture, a vent protector comprising a circular body having an outwardly flaring inner side wall bounding a chamber the larger end of which is open, a screw-threaded portion projecting from the smaller end of the body and having a passageway extending through said portion and opening into the smaller end of said chamber, a member disposed within said chamber and secured to said body, a flexible disc-like diaphragm arranged axially of said chamber and secured at its center to said member with the peripheral portion of said diaphragm engaging said body thereby normally closing communication through said chamber, said peripheral portion of the diaphragm being adapted to be flexed out of engagement with said body to open said communication, said body having a portion surrounding said diaphragm and extending over the diaphragm in a direction away from the screw-threaded portion.

LEWIS A. SAFFORD.