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C. H. MATTHIESSEN, JR

1,979,337

DETACHABLE SPOUT

Filed July 30, 1932

Fig. 2.

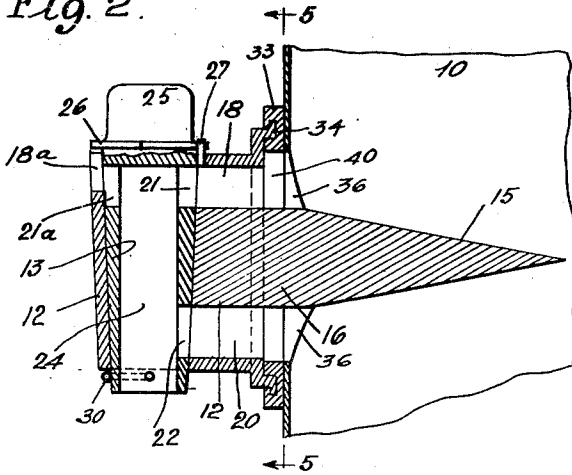


Fig. 4.

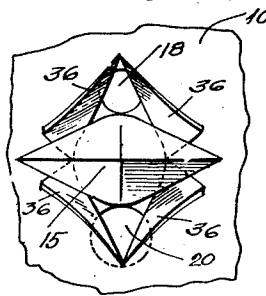


Fig. 3.

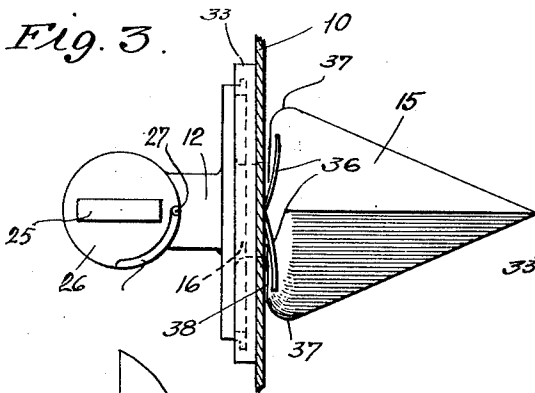


Fig. 5.

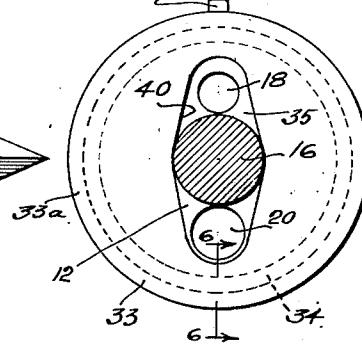


Fig. 1.

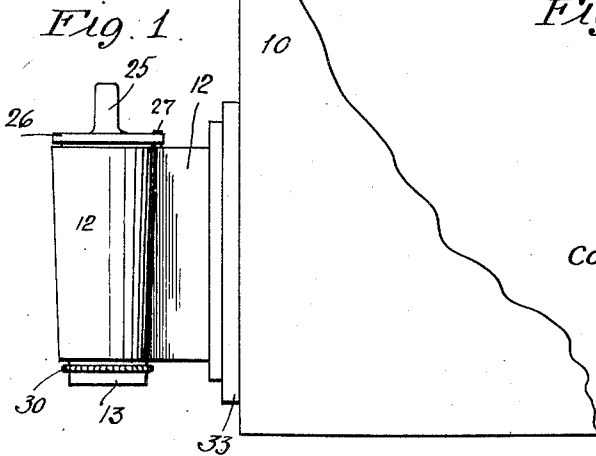
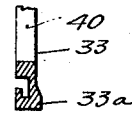


Fig. 6.



Inventor.
Conrad H. Matthiessen, Jr.

Attorney.

UNITED STATES PATENT OFFICE

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DETACHABLE SPOUT

Conrad H. Matthiessen, Jr., Pasadena, Calif.

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11 Claims. (Cl. 221-23)

The present invention relates generally to spouts, and more especially to detachable spouts for withdrawing liquids from sealed containers.

Detachables spouts of this type generally comprise a piercing head for making an incision in the container wall, usually of tin, through which the liquid may be withdrawn, and means for attaching the spout to the container until such time as the container is emptied. Outside the container wall, the spout has a valve for opening and closing the passage or passages through which liquid is withdrawn from the container and air is admitted thereto.

When, as has generally been the case, air and liquid flow through a single passage, the liquid flow is quite irregular for it issues forth in spurts between periods of complete cessation while air enters the container. Such periodic emission of the liquid is hard to control and makes it very difficult to withdraw an exact quantity. It has been proposed to remedy this condition by providing separate passages for the air and liquid; but mere provision of separate passages is not sufficient since, unless the passages are properly placed, the liquid flow is not confined alone to the proper passage.

It is a general object of my invention to provide a spout from which the liquid issues in a steady, continuous stream at a suitable rate.

It is also an object of my invention to provide a piercing head of such size and shape as to aid in securing satisfactory liquid flow, and to securely anchor the spout in place on the container wall.

In a spout characteristic of my invention, I accomplish these objects by providing properly separated air and liquid passages in the spout body on opposite sides of the piercing head and connecting shank, the upper passage opening to the air and providing an air inlet and the lower passage opening downwardly to form a liquid outlet. The vertical spacing between these two passages is preferably the maximum permitted by the size of the spout body, since the hydraulic head effective in causing liquid flow is determined by the mean vertical distance between the two passages. A rotating valve is provided to open and close the two passages, and the valve is formed with a drain conduit to drain any liquid from the air passage down into the liquid outlet.

The piercing head is of elongated cross-section so that when inserted within the container it may be turned crosswise of the incision in the container wall to anchor the spout firmly in place. The dimensions of the piercing head are such that unimpeded fluid flow is had, through

those parts of the incision not filled by the head, to the air and liquid passages which have been brought into registration with the incision by the turning of the head. A washer of special shape is provided to seal the passages from communication with each other in the space between the container wall and the spout body, so as to keep separated the flow through the two passages.

How these and other objects and advantages of my invention are attained may be more readily understood by reference to the following description and the accompanying drawing, in which:

Fig. 1 is a side elevation of a spout attached to a container, the valve being turned to the closed position;

Fig. 2 is a vertical median section through the entire spout, the valve being shown in the open position;

Fig. 3 is a plan view of Fig. 2;

Fig. 4 is an elevation from the inside of the container as from the right of Fig. 2;

Fig. 5 is an elevation on line 5-5 of Fig. 2; and

Fig. 6 is a cross section of the washer on line 6-6 of Fig. 5.

The drawing shows the spout attached to a container 10. The spout comprises generally a body portion 12 containing a valve 13, and piercing head 15 having a rounded shank 16 connecting the head and body. The head, shank, and body are preferably in one piece.

Body 12 has an air passage 18 which is vented to the atmosphere through opening 18a, while located at the bottom of the body is a liquid passage 20. Valve 13 is a tapered, cylindrical member formed with a central, longitudinally extending bore 24, and fits in a suitable tapered seat within the spout body. The valve is provided with ports 21 and 21a which may be brought into registration with openings 18 and 18a, respectively, to form a continuous air inlet passage through the valve and spout body. Port 22 is brought by the same turning movement into registration with fluid passage 20 so that liquid may flow through the passage into the central valve bore 24 and thence downwardly and out through the open end of the valve. The top end of the valve is provided with handle 25, which may be grasped between the fingers to turn the valve, and with flange 26, one quadrant of which is cut away along the rim to receive pin 27 which contacts the shoulders at the end of the cut-away portion to limit the amount which the valve may be turned. To prevent the valve from being inadvertently removed from the body, semi-circular spring clip 30 passes around the lower end of the valve, the

ends of the clip being bent inwardly and entering diametrically spaced holes located in the valve just beneath body 12.

In order to prevent leakage from the spout around the incision made in wall 10, there is provided washer 33. Annular flange 34 runs around the inside face 35 of body 12 and fits within an angular groove in washer 33 to press the washer tightly against the container wall. The rim of the washer is preferably raised as at 33a to insure an especially tight fit against the container around the washer edge. This washer may be of any suitable material such as rubber or cork that will form a fluid-tight joint against the wall and will not be attacked by the contents of the container.

Although the piercing head may have any of several shapes, for reasons that will later appear, the head shown here is preferably diamond-shaped in cross-section, the diagonals of the diamond being referred to as the lateral dimensions of the piercing head in contrast to the longitudinal dimension along the axis of rotation. The plane sides of the piercing head come to a sharp point and intersect at sharp angles so as to more easily cut through the container wall which is generally of tin or other soft sheet metal. One lateral dimension of the piercing head, that is the vertical dimension as seen in Fig. 2, does not exceed the diameter of shank 16 by which the piercing head is connected to the spout body. The other lateral dimension is considerably greater, being substantially equal to the distance from the top of passage 18 to the bottom of passage 20, for reasons which will be explained.

As the piercing head is punched through the container wall, the wall material is folded back away from the edge of the incision in a plurality of flaps 36. After the piercing head is completely within the container, the head is turned through to 90° until it occupies a position crosswise of the incision, as in Fig. 4, to lock the spout in place. Corners 37 of the head are rounded to form cam faces so that as the head is rotated these faces will smoothly engage flaps 36 and press them back against wall 10. The inner end surfaces 38 of the head are preferably flat and approximately parallel to the container wall so that they will press firmly against flaps 36 and hold the spout in place.

The two fluid passages 18 and 20 are disposed on opposite sides of shank 16; and, an incision in the container wall having been made with its longer dimension vertical and the head turned crosswise of the incision, these two passages are brought into registration with the ends of the incision which are thus uncovered to permit flow of either liquid or air through the container wall and the fluid passages in the spout. Shank 16 is round so that it turns in the incision and keeps in contact with wall 10; thus the shank divides the incision into what are in effect separate upper and lower openings in the container wall. The interposition of the head and shank between the passages 18 and 20 so isolates the passages that local pressure variations at one passage do not disturb flow at the other.

Washer 33 has an oval central opening 40 that fits tightly against the sides of shank 16, as may be seen in Fig. 5. The ends of opening 40 are placed opposite passages 18 and 20. The washer thus fits between wall 10 and face 35 of the spout to seal the incision against leakage around the spout; and the washer at the same time fits against shank 16 to seal the passages 18 and 20 from any communication with each

other around the shank. This separation of the air and liquid passages may also be accomplished in other ways, as by the use of ribs on face 35 or other special shaping of the spout body.

The hydraulic head effective in causing liquid flow through passage 20 is determined by the vertical distance between the air inlet and liquid outlet, and consequently the greater the distance between passage 18 and passage 20, the greater the rate of flow through passage 20. The distance between these passages is naturally limited by the size of body 12. In order not to reduce the effective head, it is desirable that the incision in the container wall extend from approximately the top of passage 18 to the bottom of passage 20 and for that reason the piercing is made of such dimensions as to accomplish this. With an incision of this size, the openings in wall 10 for air and liquid streams do not establish a minimum effective head less than the head determined by the position of passages 18 and 20. Furthermore, the open areas at each end of the incision through which fluid may pass are thus made of substantially the same areas as the two passages in the body so that fluids may pass therethrough freely and unimpeded.

By cutting, in effect, two holes in the container wall and bringing into registry with those holes the fluid passages at the top and bottom of the body, I am enabled to keep the incoming air stream and outgoing liquid stream separated. The greater the distance between the fluid passages, the greater the rate of air intake to displace the liquid. Thus with passages 18 and 20 properly proportioned in area for the distance between them and the viscosity of the liquid in the container, a sufficiently high velocity of air passing through passage 18 may be maintained that little or no liquid enters this passage. This separation of the air and liquid streams is aided by the position of the piercing head and shank between the two passages since the head then acts as a directional baffle to keep the air and liquid streams from intermingling.

Should any liquid by chance enter passage 18 it will drain downwardly through bore 24 and issue at the regular outlet. In this manner liquid is prevented from leaking out around the valve or the air inlet, and wastage is prevented. It is not necessary that such a liquid drain conduit be placed within valve 13, or indeed that any such conduit be provided at all; but the presence of such conduit makes for a more successful operation over a greater range of conditions.

While I have shown and described a present preferred form of my invention, such disclosure is intended to be illustrative of rather than limitative upon the broader claim appended hereto, for various changes in construction and arrangement of parts may be made without departing from the spirit and scope of my invention.

I claim:

1. In a detachable spout for a liquid container, a body portion, a solid piercing head of horizontally elongate cross section rigidly attached to said body, the head being adapted to make an elongate incision in the container wall, and vertically spaced fluid passages in the body terminating exteriorly of the container and adapted to be moved into registry with the extremities of the incision.

2. In a detachable spout for a liquid container, a valve body portion, an air passage and a liquid passage within the body, a piercing head of elong-

gate cross section attached to said body, the head being adapted to make an elongate incision in the container wall and to secure the spout to the container wall when turned crosswise of the incision, the air and liquid passages being registered with the open fluid-passing extremities of the incision by said turning.

3. In a detachable spout for a liquid container having a body and a piercing head of elongate cross-section attached to the body, the head being adapted to make an incision in a container wall and to secure the spout in place when turned crosswise of the incision, thus opening portions of the incision to pass fluid, the combination of a pair of spaced fluid passages adapted to be moved by said turning of the head into registry with fluid-passing portions of the incision, and the head having its greatest lateral dimension such that the incision extends substantially to the outer edge of each passage.

4. In a detachable spout for a liquid container having a body and a piercing head of elongate cross-section attached to the body, the head being adapted to make an incision in a container wall and to secure the spout in place when turned crosswise of the incision, thus opening portions of the incision to pass fluid, the combination of a pair of spaced fluid passages adapted to be moved by said turning of the head into registry with fluid-passing portions of the incision and the head having its greatest lateral dimension such that the fluid-passing portions of the incision have areas at least substantially equal to the areas of the associated fluid passages.

5. In a detachable spout of the character described, a body portion, a rotatable valve in the body, an air passage and a liquid passage in the body, ports in the valve registerable with said passages by rotation of the valve to place the passages in communication with the atmosphere, and a liquid drain conduit from the air passage to the liquid outlet.

6. In a detachable spout of the character described, a body portion, a rotatable valve in the body, an air passage and a liquid passage in the body, ports in the valve registerable with said passages by rotation of the valve to place the passages in communication with the atmosphere, and a liquid drain conduit extending longitudi-

nally of the valve and connecting the air passage to the liquid outlet.

7. In a detachable spout for a liquid container, a body portion, a piercing head adapted to pierce a container wall, a shank on the head connecting it to the body, an air passage and a liquid passage in the body, said passages being spaced apart by the shank and head, and means to form a fluid tight seal about the shank between the air and liquid passages.

8. In a detachable spout for a liquid container, a body portion, a piercing head adapted to pierce a container wall, a shank on the head connecting it to the body, an air passage and a liquid passage in the body, said passages being spaced apart by the shank and head, and sealing means adapted to form a fluid-tight joint between the spout and container wall and also adapted to seal the air and liquid passages from communication with each other.

9. In a detachable spout for a liquid container, a body portion, a piercing head adapted to pierce a container wall, a shank on the head connecting it to the body, an air passage and a liquid passage in the body, said passages being spaced apart by the shank and head, and a resilient washer surrounding the shank to form a fluid-tight joint between the spout and container wall and to form a fluid-tight seal about the shank between the air and liquid passages.

10. In a detachable spout of the character described for a liquid container, spaced air and liquid passages within the spout, means for forming an opening in the container wall associated with each of said passages, and sealing means for sealing the air and liquid passages from communication with an opening in the wall other than said associated opening.

11. In a detachable spout for a liquid container, a body portion, air and liquid passages extending horizontally within the body and vertically spaced from each other, a valve adapted to place the air and liquid passages in communication with the atmosphere, and a piercing head of horizontally elongate cross section rigidly attached to the body portion and having a rounded shank lying between the vertically spaced passages.

CONRAD H. MATTHIESSEN, Jr.