May 14, 1968 R. W. PFEIFFER 3,382,986

PIPE RACK

Filed Oct. 21, 1965

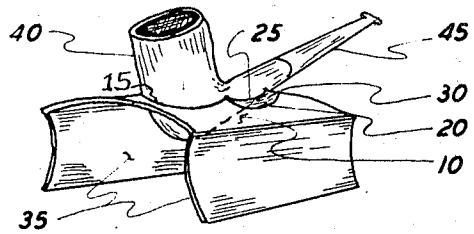


FIG. #1

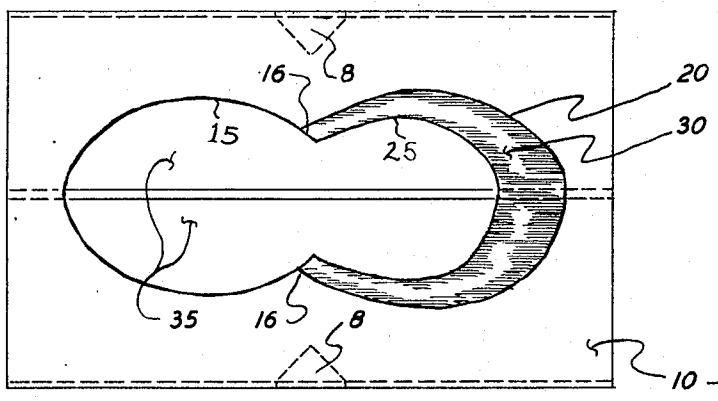


FIG. #2

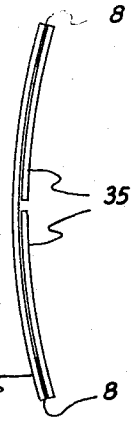


FIG. #3

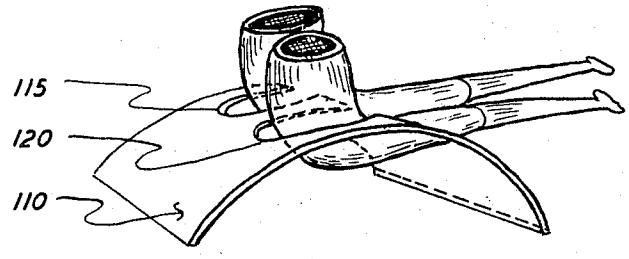


FIG. #4

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United States Patent Office 3,382,986 Patented May 14, 1968

3,382,986

PIPE RACK

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Filed Oct. 21, 1965, Ser. No. 499,590
4 Claims. (Cl. 211—60)

ABSTRACT OF THE DISCLOSURE

A collapsible pocket-sized pipe rack comprising in combination: a relatively thin sheet forming a table, an elongated aperture cut in the table, the edges of said aperture providing support ledges for a smoker's pipe, leg means in hinged connection with said table for supporting said table while in use, said leg means being foldable and shaped so as to closely embrace said table to form a compact configuration suitable for pocket insertion. Elongated blanks having relatively smaller elongated apertures cut therein, which are insertable within the elongated aperture to provide means for adapting the pipe rack to support relatively smaller pipes.

The present invention relates to novel means for supporting one or more smoker's pipes, and more specifically, in one aspect, relates to a novel collapsible pipe rack, and in another aspect to a novel rigid pipe rack.

It is the principal object of the present invention to provide a novel pipe rack which is capable of retaining one or more pipes having a wide range of bowl sizes in a stable position with the axis of the bowl disposed in a vertical plane and the stem tilted at a proper angle for drainage.

Another object is to provide a relatively small, collapsible pipe rack which is capable of being rapidly compacted into a configuration suitable for being inserted into the breast pocket, for example, of a man's suit or shirt for carriage to the point of use.

Another object is to provide a novel and versatile, rigid pipe rack which is decorative and attractive as well as functional.

Further objects and advantages inherent in the present invention will become apparent from the following detailed description of the invention with reference to the drawings.

FIGURE 1 is a perspective view of one preferred embodiment of the pocket-sized pipe rack of the present invention shown in its opened position and illustrating actual support of a pipe by the edges of a pair of elliptical shaped apertures cut through table **10**.

FIGURE 2 is a plan view of the rack of FIGURE 1 shown in the closed position with support legs **35** folded under table **10**, and showing the elliptical apertures defined by edges **15** and **25**.

FIGURE 3 is a side elevation view of the folded rack shown in FIGURE 2 which illustrates the curvature of table **10** and matching curvature of legs **35** preferred for reasons of comfort and appearance when carrying the folded rack in the breast pocket.

FIGURE 4 is a perspective view of a rigid pipe rack which illustrates support of two pipes by the edges of elliptical apertures **115** and **120** cut through an arched, self-supporting table **110**.

Referring now to FIGURE 1, table **10** is supported by foldable support legs **35**, which are joined to table **10** by suitable hinging means **8** shown in FIGURE 2. An elongated aperture in table **10** is defined by edges **15** and **25**. Bowl **40** is supported by contact with edge **15** at one point on each side of the bowl and stem **45** is supported by contact with edge **25**. In this embodiment, table **10** comprises a portion of a right circular cylinder having a radius of 8 inches, length along the longitudinal axis of 4½ inches,

and arc length of 2¾ inches as defined by a subtended angle of 19.7 degrees. The use of a curved surface conforms to the curvature of the male body in the region of the breast pocket, and also provides beam strength permitting thinner and lighter construction fo the rack. A rack having table dimensions of about 2¾ by 4½ inches is readily insertable in the breast pocket of most shirts and jackets. While table **10** is preferably formed in the shape of a cylindrical arch any suitable curvature as well as a flat surface can be utilized. Foldable legs **35** are formed having a curvature corresponding to the curvature of table **10** in order to closely embrace the table and thereby provide maximum compactness in the closed position. Each leg **35** preferably has an arc length of slightly less than about one-half that of table **10**. In this embodiment, hinges **8** are restricted such that legs **35** preferably form about a 90-degree angle with table **10** in the open position.

FIGURE 2 illustrates the preferred shape of apertures defined by edges **15** and **25** which is elliptical. The elliptical shape is preferable since an ellipse is the curve formed when a right circular cylinder is cut by a plane not perpendicular to the base; and inspection of FIGURE 1 reveals that when a circular pipe bowl is extended downwardly in a vertical plane with its longitudinal axis held at an angle to the vertical such that surface **10** is intersected, a curve of approximately elliptical shape is formed by the locus of intersecting points. It has been discovered that when the apertures are made at least approximately elliptical a wide size range of pipe bowls are accommodated within a single aperture. The support provided is a three-point support, where one point on each side of the bowl is maintained in contact with the edges of the aperture, and the stem forms the third support point. It has likewise been found that a circular opening is not desirable for use in the present invention since the support provided thereby is an unstable two-point support. In general, any elongated aperture which provides three-point support is useful in connection with the present invention.

An ellipse is defined as the locus of a point such that the sum of its distances from two fixed points is constant. The two fixed points are called the foci and the distance between them along the major axis is $2c$. The equation of an ellipse is $(x^2/a^2)+(y^2/b^2)=1$, where: $2a$=overall length of ellipse on the major, x-axis; $2b$=overall width of ellipse on the minor, y-axis; and $c^2=a^2-b^2$ where $\pm c$ are the foci on the x-axis. The chord through either focus perpendicular to the major axis is called the latus rectum located at $x=\pm c$; at the latus rectum $y=\pm b^2a$. Hence the length of the latus rectum is $2b^2/a$.

For use with table **10** as previously defined in the specific embodiment for the collapsible rack, the optimum elliptical apertures are obtained by setting $2b=2c$.

While the collapsible pipe rack is intended to hold only one pipe at any given time, it is advantageous that it be adaptable to hold pipe bowls of many different sizes. It has been determined that the bowl is adequately supported even if the width of the elliptical opening is only about 1/32-inch smaller than the maximum diameter of the bowl. Examination of conventional bowls reveals that when viewed longitudinally along the stem, such bowls taper to a smaller width at the bottom and that one ellipse of given width is therefore capable of accommodating pipe bowls over a wide range of sizes with adequate stability.

In order to provide further variation in the sizes of the pipe bowls which can be accommodated table **10** should contain as many elliptical openings as possible. However, the overall dimensions of the collapsible rack limit the permissible number of openings to two intersecting base ellipses. FIGURE 2 shows a first base ellipse **15** where $2b=1\frac{17}{32}$ inches, which accommodates most conventional

pipe bowls. In order to reduce overall length, ellipse **15** is truncated at its latus rectum **16**. In general, the intersecting ellipses are truncated at a chord in each ellipse which is located between the latus rectum and the end of the ellipse.

The second base ellipse **20**, where $2b=1\frac{1}{32}$ inches, is provided in table **10** to accommodate pipe bowls of very large diameters. In ellipse **20** the width of the truncating chord matches the width of the latus rectum **16**. It has been found that the two base ellipses, in general, accommodate pipe bowls ranging in maximum width from about $1\frac{3}{32}$ to about $1\frac{2}{32}$ inches.

To provide still further flexibility, an approximately elliptical blank **30**, which is truncated at one end thereof, and which has a smaller elliptical aperture **25** cut therein, is removably inserted within the edges of aperture **20** in table **10**. Elliptical aperture **25** is $\frac{1}{32}$ inches wide. For maximum attractiveness, the open end of ellipse **25** is extended past its latus rectum to intersect with the hypothetical projection of ellipse **15** past its latus rectum. The outer edge of insert **30** is designed to be contiguous with the edges of aperture **20** such that the insert is held in place by frictional forces alone. If desired, the outside edge of that portion of insert **30** which is adjacent to its open end can be made slightly larger than aperture **20** to increase the frictional forces which hold insert **30** in place in aperture **20**.

FIGURE 4 illustrates a rigid pipe rack in which table **110** comprises an arch formed by a portion of a right circular cylinder having a radius of about four-inches, an arc length of about 7.15 inches as defined by a subtended arc 103.2 degrees, and longitudinal axis of about 4½ inches. In general table **110** can be formed from a suitable portion of any surface of revolution such as, e.g., a cylinder, ellipse, parabola, hyperbola, or sphere. In FIGURE 4 elongated apertures **115** and **120** are provided, such apertures being preferably full ellipses defined by $2a=4b$. Inserts such as insert **30** shown in FIGURE 2 can be employed to adapt apertures **115** and **120** to hold pipe bowls of varying sizes. In the embodiment shown in FIGURE 4 the apertures are preferably disposed to include the line of elevation in aperture **110**.

Having thus described the present invention with reference to specific embodiments thereof, many modifications and alterations thereof will become apparent to those skilled in the art without departing from the scope of the present invention which is limited only by the claims.

What is claimed is:

1. A collapsible pocket-sized pipe rack comprising in combination: relatively thin sheet forming a table having the shape of a section of the surface of revolution of a right circular cylinder, an elongated aperture cut in said table, the edges of said elongated aperture defining a pair of at least approximately elliptical apertures the major axis of said ellipses being substantially parallel to the longitudinal axis of said cylinder and said edges providing support ledges for a smoker's pipe, leg means in hinged connection with said table for supporting said table while in use, said leg means being attached to alternate sides of said table and being foldable and shaped so as to closely embrace said table to form a compact configuration suitable for pocket insertion.

2. The rack of claim **1** in which an approximately elliptical blank truncated at one end thereof and having a smaller truncated elliptical aperture cut therein is removably inserted within one of said pair of intersecting elliptical apertures to provide means for adapting the pipe rack to support relatively smaller pipes.

3. In a pipe rack having a relatively thin sheet forming a table, an elongated aperture cut in said table, the edges of said elongated aperture defining a pair of at least approximately elliptical apertures and providing support ledges for a smoker's pipe the improvement which comprises: an approximately elliptical blank having a smaller elliptical aperture cut therein which is removably inserted within one of said pair of intersecting elliptical apertures to provide means for adapting the pipe rack to support relatively smaller pipes.

4. A collapsible pocket-sized pipe rack which comprises in combination: a relatively thin sheet forming a table, an elongated aperture cut in said table, the edges of said aperture providing support ledges for a smoker's pipe, leg means in hinged connection with said table for supporting said table while in use; said table is formed in the shape of a permanent elongated arch, and said leg means are correspondingly curved so as to closely embrace the arch of said table to be insertable in a pocket in the compact configuration.

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