United States Patent

Warnberg

[15] **3,653,077**

[45] **Apr. 4, 1972**

[54] QUICK DETACHABLE TOILET SEAT HINGE STRUCTURE

[72] Inventor: **Archie E. Warnberg,** 3600 N.W. 43rd Street, Oklahoma City, Okla. 73112

[22] Filed: **July 16, 1970**

[21] Appl. No.: **55,415**

[52] **U.S. Cl.** **4/236,** 16/128

[51] **Int. Cl.** **A47k 13/12**

[58] **Field of Search** 4/240, 236, 234, 237, 239, 4/235; 16/134, 128

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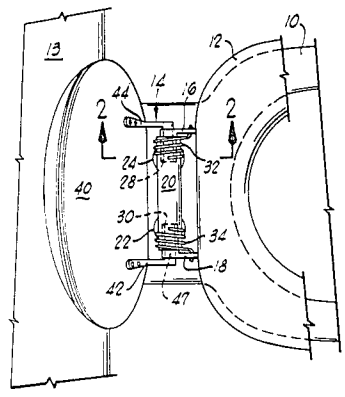
Primary Examiner—Henry K. Artis

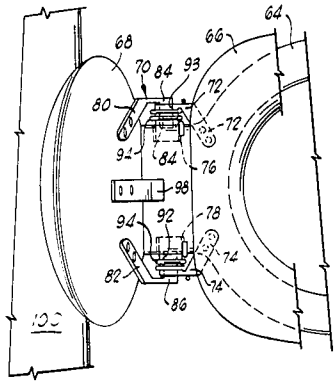
Attorney—Dunlap, Laney, Hessin & Dougherty

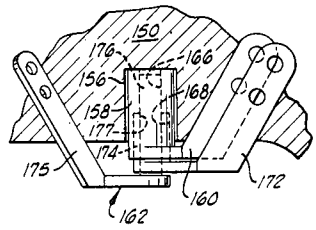
[57] **ABSTRACT**

A water closet construction including a bowl having a seat pivotally mounted thereon by means of a hinge structure which includes one or more socket engaging protuberances, or post receiving apertures or openings. The socket engaging protuberances are adapted to be projected into sockets formed either in a cylindrical sleeve forming another portion of the hinge structure, or one or more sockets formed in the rear portion of the bowl. The water closet structure further includes a tank which is mounted on the rear side of the bowl, and supported on the bowl by a spacing device which spaces the tank upwardly from the horizontal upper surface of the bowl. The water closet structure may further include a lid having at least two arms connected thereto and having either socket engaging protuberances on the arms which fit into hollow sockets which may be formed in another portion of the hinge structure or in the bowl, or having apertures therein which detachably engage posts carried on the bowl.

24 Claims, 13 Drawing Figures







PATENTED APR 4 1972

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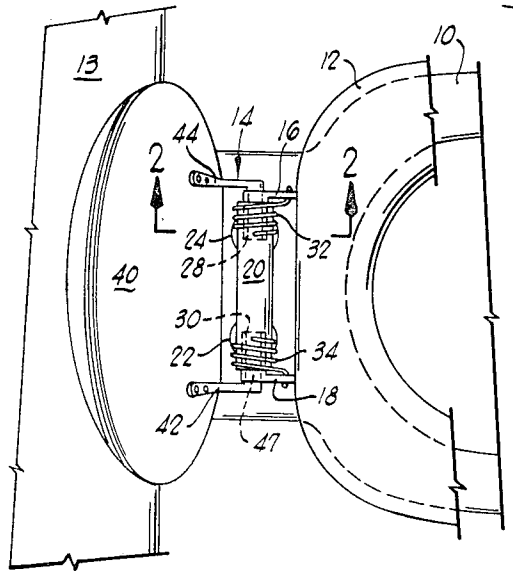


FIG. 1

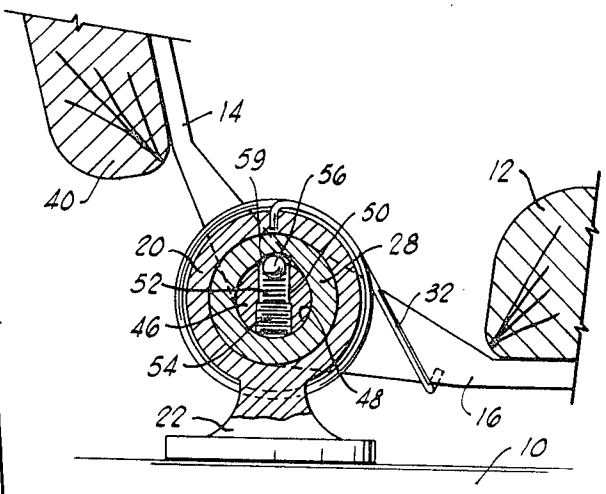


FIG. 2

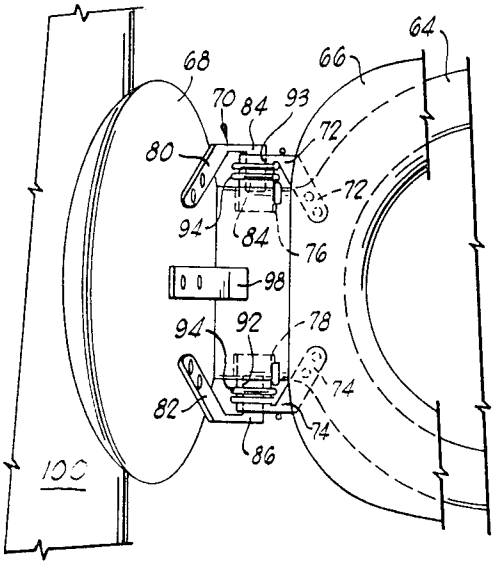


FIG. 4

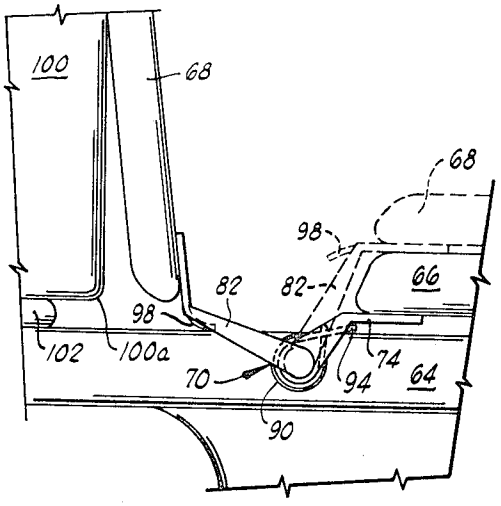


FIG. 5

INVENTOR
ARCHIE E. WARNBERG

BY
Dunlap, Laney, Hessin & Dougherty
ATTORNEYS

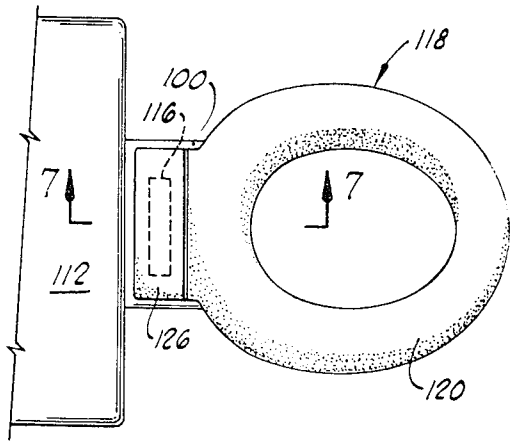


FIG. 6

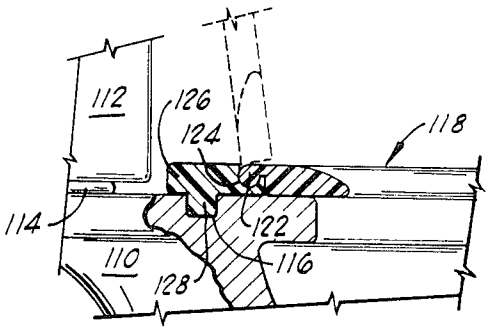


FIG. 7

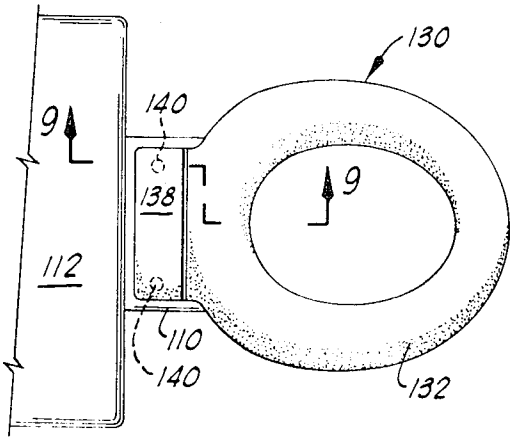


FIG. 8

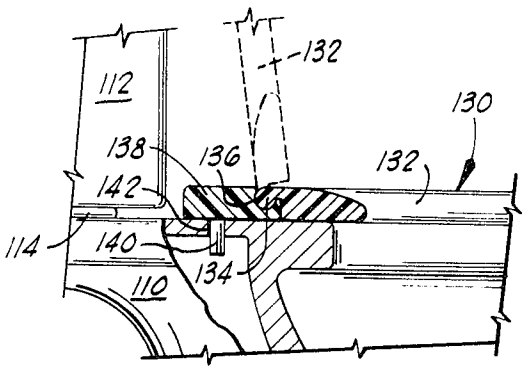


FIG. 9

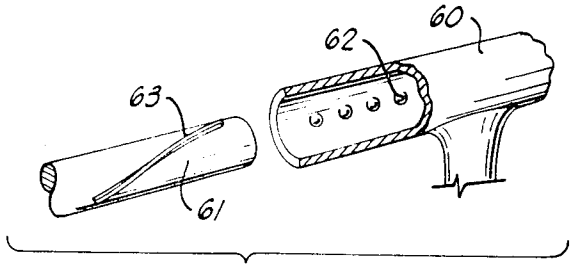


FIG. 3

INVENTOR
ARCHIE E. WARNBERG

BY
Dunlap, Laney, Hessin & Dougherty
ATTORNEYS

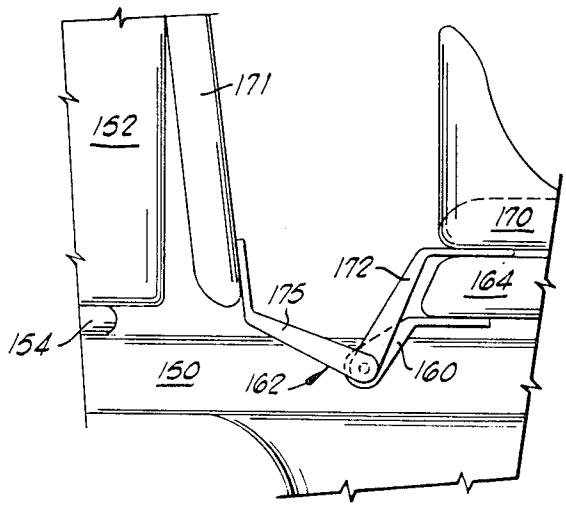


FIG. 10

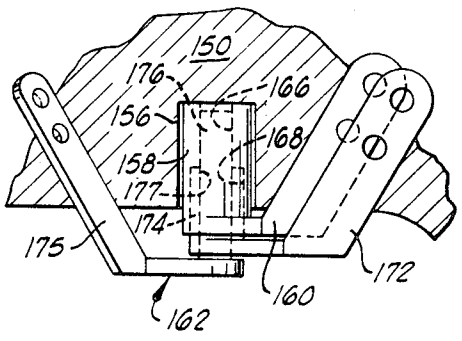


FIG. 11

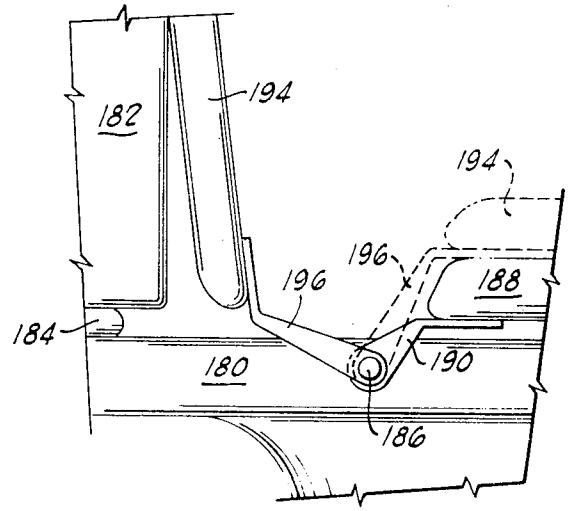


FIG. 12

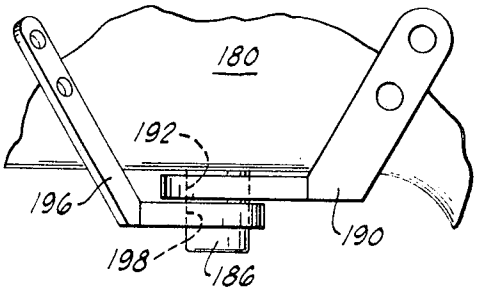


FIG. 13

INVENTOR
ARCHIE E. WARNBERG

BY
Wheeler, Tenney, Hessin & Dougherty
ATTORNEYS

QUICK DETACHABLE TOILET SEAT HINGE STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to water closets, and more particularly, to hinge arrangements for mounting seats and lids upon the bowls of water closets, and to tank structures adapted to be mounted upon the bowls of water closets.

2. Brief Description of the Prior Art

It has previously been customary practice in water closet construction to provide a hinge structure secured to the upper side of the bowl of the water closet for pivotally mounting the seat and lid used in such structures on the bowl. The hinge structure has usually included a rod or bar supported on posts secured to the bowl, with the rod or bar extending transversely and receiving a pair of sleeves or caps which are provided on the ends of hinge legs secured to the lid and seat for pivotally mounting these elements on the rod or bar. In order to replace the seat or lid, either for purposes of renewing these elements when they become damaged or broken, or to change the decor of the bathroom, it has been necessary to remove nuts secured to the lower ends of the mounting posts so that the posts and the entire hinge structure can be removed. This procedure of removing the nuts from the posts is a tedious and difficult task due to their location beneath the upper side of the bowl, and their consequent inaccessibility.

It has further been the practice in water closet construction as heretofore known to provide seats and lids secured to the water closet bowl by a hinge structure which permits these elements to be pivoted from a substantially horizontally extending position to an upstanding position by manual means. The construction of the hinges has been such that no positive force acts to retain either the seat or the lid in an upstanding position with the result that when either or both of these elements are covered with a relatively thick fabric material, as is becoming increasingly the custom in aesthetic design of bathrooms, the lid and/or seat is frequently displaced by the thick covers so far forwardly from a tank located at the rear of the water closet construction that gravity causes them to fall down to the horizontal position rather than remain upstanding.

Another practice which has been prevalent in the construction of water closets is that of resting the water tank supplying water to the water closet on a horizontal surface at the rear portion of the bowl. When the tank is positioned in this manner, it is difficult to place many types of flexible aesthetic covers on the tank in an attractive manner since the lower front edge of the flexible cover cannot be extended beneath the lower front edge of the tank, and thus a portion of the tank is frequently exposed and unsightly.

BRIEF DESCRIPTION OF THE PRESENT INVENTION

The present invention provides an improved water closet structure in which the hinge structure used to pivotally secure the seat and lid to the bowl can be quickly and easily detached from the bowl without the necessity for employing wrenches or any other tool. The water closet construction of the invention also provides an improved tank construction in respect to the mounting of the water tank upon the bowl of the water closet, which construction facilitates a more aesthetic placement of flexible covers on the tank than has heretofore been possible.

Broadly described, the water closet construction of the invention comprises a bowl and a toilet seat which is pivotally mounted on the bowl for pivotation about a horizontal axis between a horizontally extending position and an upwardly extending position. In one embodiment of the invention, a hinge structure is used for mounting the seat on the bowl which includes a pair of arms projecting generally rearwardly from the seat and carrying at the rear ends thereof a pair of socket engaging protuberances which extend transversely and horizontally with respect to the transverse dimension of the seat and bowl. The socket engaging protuberances engage and mate with a pair of sockets which may be formed either in opposite sides of the bowl, or in a portion of the hinge structure which is secured to the upper side of the bowl. Alternatively, the arms may have apertures formed in the free, outer ends thereof which pivotally receive horizontally projecting posts extending from opposite sides of the toilet bowl.

In a preferred embodiment of the invention, the water closet structure further includes a lid which has a pair of rearwardly extending arms secured thereto and carrying at the rear ends thereof, a pair of socket engaging protuberances which preferably are dimensioned to fit in sockets formed in the rear ends of the arms secured to the seat, and registering with the socket-engaging protuberances carried on the rear ends of the arms secured to the seat. A preferred water closet construction of the invention also includes a water tank which is mounted on a rear portion of the bowl and has its forward edge spaced from the upper surface of the bowl by a suitable spacer element to facilitate the placement on the tank of a flexible cover of aesthetic material.

An important object of the invention is to provide an improved water closet construction in which the seat and lid, where one is provided, may be quickly and easily detached from the bowl of the water closet structure without requiring any type of tools.

Another object of the invention is to provide a water closet construction in which the water tank is mounted on the bowl in a way which facilitates the covering of the tank with a flexible cover so that the entire forward side of the tank is covered and the lower forward edge of the flexible cover can be extended under the lower forward edge of the tank.

Another object of the invention is to provide a disposable seat and lid for a water closet structure, which seat or lid can be quick-detachably mounted on a toilet bowl.

An additional object of the invention is to provide a water closet structure in which a seat is pivotally mounted on the bowl of the structure using a hinge structure which exerts a positive bias against the seat, tending to maintain the seat in an upright position.

Additional objects and advantages of the invention will become apparent as the following detailed description of the invention is read in conjunction with the accompanying drawings which illustrate the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view showing a portion of the water closet construction of the present invention which includes a bowl, a seat, a hinge structure pivotally supporting the seat on the bowl, a lid pivotally connected to the bowl by the hinge structure, and a water tank.

FIG. **2** is a sectional view taken along line **2—2** of FIG. **1**.

FIG. **3** is an exploded view of a structure included in one type of hinge assembly useful in the water closet construction of the present invention.

FIG. **4** is a plan view similar to FIG. **1**, but showing a modified embodiment of the invention.

FIG. **5** is a side elevational view of the water closet structure shown in FIG. **3**.

FIG. **6** is a plan view of a water closet construction constituting yet another embodiment of the invention.

FIG. **7** is a sectional view taken along line **7—7** of FIG. **6**.

FIG. **8** is a plan view of another embodiment of the invention.

FIG. **9** is a sectional view taken along line **9—9** of FIG. **8**.

FIG. **10** is a side elevation view of a portion of a water closet construction illustrating another embodiment of the invention.

FIG. **11** is a plan view of a detail view of the hinge structure shown in FIG. **10** with a portion of an associated toilet bowl broken away for clarity of illustration.

FIG. **12** is a side elevation view of a portion of a water closet construction illustrating another embodiment of the invention.

FIG. 13 is a plan view of the hinge structure utilized in the embodiment of the invention shown in FIG. 12.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

Referring initially to FIGS. 1 and 2 of the drawings, shown therein is one embodiment of a water closet constructed in accordance with the present invention. The water closet includes a bowl 10 of conventional construction having a seat 12 pivotally mounted upon one portion of the upper surface thereof, and a water tank 13 mounted on the upper surface of the rear portion of the bowl. The seat 12 is pivotally mounted on the bowl 10 by means of a hinge structure, designated generally by reference numeral 14, and including a pair of arms 16 and 18 which are secured to and project rearwardly from the seat 12. The hinge structure 14 further includes a sleeve 20 having its opposite ends open to constitute sockets.

The sleeve 20 is secured by welding or other suitable means to the upper ends of a pair of posts 22 and 24 bolted to the rear portion of the bowl 10 in a conventional manner. The rearwardly extending arms 16 and 18 carry at their rear ends, a pair of socket engaging protuberances 28 and 30 which are dimensioned to be receivable within the sockets constituted by the open ends of the sleeve 20. The socket engaging protuberances 28 extend substantially normal to the arms 16 and 18 upon which they are mounted, and these arms are preferably made of spring metal having sufficient resiliency to permit them to be bent outwardly so that the socket engaging protuberances 28 and 30 may be made to clear the ends of the sleeve 20, and then released to permit the protuberances to extend into the open ends of the sleeve. In this way, the seat 12 is pivotally mounted upon the bowl 10, since the seat may pivot about an axis extending centrally through the sleeve 20 when the socket engaging protuberances 28 and 30 have been engaged with the open opposite ends of the sleeve.

For the purpose of exerting a positive force to retain the seat 12 in an upstanding or upright position, a pair of torsion springs 32 and 34 are wrapped around the opposite ends of the sleeve 20, with one end of each torsion spring secured to the sleeve as, for example, by extending the end through an aperture in the sleeve, and hooking the other end of each spring under the respective adjacent arm 16 or 18 of the hinge structure 14. When the seat 12 is mounted upon the bowl 10 in the manner hereinbefore described—that is, by snapping the socket engaging protuberances 28 and 30 into the open ends of the sleeve 20—the torsion springs 32 and 34 are loaded to an extent or degree desired by resiliently deforming them to twist them tightly around the sleeve. This is done before the ends of the torsion springs are hooked under the arms 16 and 18 which project rearwardly from the seat 12.

When the torsion springs 32 and 34 have been engaged with the hinge structure 14 in the manner described, the seat 12 may then be lifted manually upwardly from the bowl 10 so that it extends at an angle to the horizontal. At some point during this upward pivotal movement, the weight of the seat 12 as exerted against the torsion springs 32 and 34 will be equal to the resilient bias exerted by the torsion springs, and the springs will then automatically carry the seat to its upstanding position. The springs 32 and 34 will, moreover, retain the seat 12 in this position until it is manually pulled down past the load equalization point at which the force exerted by the springs is overcome by the downwardly acting weight of the seat.

In the embodiment of the water closet construction shown in FIGS. 1 and 2, a lid 40 is illustrated as forming a part of the total construction. It should be pointed out, however, that it is not essential in the construction of water closets that such lids be included and, in fact, in some arrangements, the lid structures are omitted. The lid 40 depicted in FIGS. 1 and 2 is connected to the hinge structure 14 by means of a pair of rearwardly extending arms 42 and 44. The arms 42 and 44 are secured by screws or other suitable means to the under side of the lid 40 and carry at their rearward ends, a pair of socket engaging protuberances 46 and 47 which project substantially normal to the arms 42 and 44 and toward each other. The protuberances 46 and 47 are preferably solid bars which have a diametric dimension such that they can extend slidingly into recesses or bores 48 and 49 formed axially in the socket engaging protuberances 28 and 30 carried on the ends of the arms 16 and 18 which are attached to the seat 12. The arms 42 and 44 attached to the lid 40 are also preferably constructed of a material which has sufficient resiliency to permit the rear ends of these arms to be sprung outwardly by an adequate distance to permit the socket engaging protuberances 46 and 47 carried thereby to be snapped into the recesses 48 and 49 formed in the socket engaging protuberances 28 and 30 formed on the rear ends of the arms 16 and 18. It will be seen that by this mounting arrangement, the lid 40 can be pivotally mounted on the bowl 10, and that it can be quickly and easily disconnected at any time desired by reason of the snap-in feature constituted by the socket engaging protuberances 46 and 47 carried on the rear ends of the arms 42 and 44.

For the purposes of retaining the lid 40 in an upright position at times when this is desired, one or both of the rods constituting the socket engaging protuberances 46 and 47 is drilled radially to provide a spring accommodating bore 50 in which is located a spring 52 as shown in FIG. 2. The bore 50 is preferably formed diametrically completely through the rod constituting one of the socket engaging protuberances 46 and 47, and is threaded to receive a small threaded plug 54, such as that shown in FIG. 2. The purpose of this construction will hereinafter become apparent. A ball 56 of smaller diameter than the bore 50 is mounted within the bore and is biased outwardly in the bore by the spring 52. When the socket engaging protuberances 46 and 47 are disposed within the recesses 48 and 49 formed in the socket engaging protuberances 28 and 30 at the rear ends of the arms 16 and 18 in the manner shown in FIGS. 1 and 2, the ball 56 is caused to bear against the inner periphery of the respective cylindrical recess 48 or 49 in one or the other of the protuberances 28 or 30 in which the respective protuberance 46 or 47 is located. This recess is formed with a cam depression 59 at one point around the cylindrical periphery thereof so that when the seat 40 is raised to an upright position, as shown in FIG. 2, the ball 56 is forced by the spring 52 into the cam depression 59. With the ball 56 in this position relative to the cam depression 59, the seat 40 is retained in an upright position as shown in FIGS. 1 and 2, and will not fall downwardly unless positively pivoted manually downwardly so that the ball 56 is cammed out of the cam depression 59.

It will be apparent from the foregoing discussion that in order to provide the described construction in which the ball is contained within the cylindrical recess 48 or 49 in one of the socket engaging protuberances 28 or 30, it is desirable to be able to load the ball after the socket engaging protuberances 46 and 47 have been snapped into their respective recesses. This can be accomplished by forming the bore 50 completely through the rod along a diameter thereof, then forming an aperture through the socket engaging protuberances 28 and 30 from the outer side to the inner side thereof (into the respective recesses 48 and 49) so as to permit the plug 54 to be threaded into the threaded bore 50 by passing the plug and an end of a screw driver or other setting instrument through the aperture formed for this purpose through the protuberances 28 and 30.

In FIG. 3 of the drawings, another structure for retaining the lid or seat in an upright position is illustrated. Here there is illustrated a cylindrical sleeve 60 forming a socket or recess for receiving a protuberance 61 similar to the protuberances 28 or 30 or 46 or 47. The role of this socket and protuberance cooperation in pivotally mounting either a seat or a lid on the toilet bowl will be understood from the foregoing discussion. For the purpose of retaining either structural member in a raised or elevated position relative to the bowl, the sleeve, which is stationarily supported on the bowl as a portion of the hinge structure, carries a plurality of radially inwardly projecting dimples 62. The dimples 62 extend parallel to the axis of

the sleeve 60. The protuberance 61 carries a radially outwardly extending rib 63 which is angled circumferentially on the outer periphery of the protuberance. When a seat or lid connected to the protuberance 61 is in the lowered, horizontally extending position, the rib 63 is spaced circumferentially from the dimples 62, and there is no interference or frictional engagement between the rib and dimples. When the seat or lid is raised, however, the angled rib successively comes into contact with the dimples, and the result is that after a certain point in the upward pivotal movement of seat or lid, this frictional engagement will retain the raised structure in its upwardly projecting status against the force of gravity. It may be pointed out that the same result can be attained if the protuberance 61 carries a series of short ridges, and the elongated rib projects radially inwardly within the sleeve 60.

It will be perceived from the foregoing description that the water closet structure of the present invention permits the seat 12 and lid 40 of the water closet to be quickly and easily mounted on the bowl 10 without the need of loosening nuts which are disposed in a virtually inaccessible location. The arms 16 and 18 which are attached to the lid 40 and/or the seat 12 are simply snapped outwardly to disengage them from the respective sockets into which the socket engaging protuberances located at the free ends of the arms are extended. It will also be apparent that structure has been provided to maintain either, or both, the seat 12 and lid 40 in an upstanding or upright position, and prevent them from falling downwardly at undesirable times as a result of the placement thereon of relatively thick fabric covers, or slight misalignment of the seat or lid with respect to the tank 13.

Another embodiment of the invention is depicted in FIGS. 4 and 5 of the drawings. Here the water closet structure includes a bowl 64 having pivotally supported thereon, a seat 66 and a lid 68. The seat 66 and lid 68 are mounted on the bowl 64 by means of a hinge structure designated generally by reference numeral 70. The hinge structure 70 includes a pair of arms 72 and 74 each having one end secured to the under side of the seat 66, and having socket engaging protuberances 76 and 78 of the type hereinbefore described secured to the opposite ends of each arm and projecting normal thereto. The lid 68 is mounted on the bowl 64 by means of arms 80 and 82 constituting portions of the hinge structure 70, and having one end secured to the under side of the lid 68. At their free ends which project rearwardly from the lid 68, the arms 80 and 82 carry aligned socket engaging protuberances 84 and 86 which project toward each other and normal to the respective arms to which they are secured.

In the embodiment of the invention depicted in FIGS. 4 and 5, the rear portion of the bowl 64 has formed therein, a pair of generally cylindrical sockets disposed on opposite sides of the bowl (one of these sockets 90 is shown in FIG. 5) for receiving the socket engaging protuberances 76 and 78 formed on the ends of the arms 72 and 74. The socket engaging protuberances 76 and 78 are snapped into the sockets formed in the bowl similarly to the manner in which the socket engaging protuberances 28 and 30 provided in the embodiment of the invention illustrated in FIGS. 1 and 2 are snapped into the open opposite ends of the sleeve 20. Thus, the seat 66 is pivotally mounted on the bowl 64 in the embodiment shown in FIGS. 4 and 5. The socket engaging protuberances 76 and 78 are preferably either tubular members, or are provided with inwardly extending cylindrical recesses 92 and 93 so that these protuberances can receive the smaller diameter protuberances 84 and 86 provided on the rear ends of the arms 80 and 82 which carry the lid 68. When the arms 80 and 82 are sprung outwardly, the protuberances 84 and 86 may then be aligned with the cylindrical recesses 92 and 93 formed inwardly in the socket engaging protuberances 76 and 78 on the arms 72 and 74, and the mounting of the lid 68 on the bowl 64 thus completed.

As in the case of the embodiment of the invention depicted in FIGS. 1 and 2, a torsion spring 94 has been provided for retaining the seat 66 in an upstanding position when it has been manually moved upwardly from the horizontally extending position depicted in FIGS. 4 and 5. The torsion spring 94, in this case, has been wrapped around the outer periphery of the socket engaging protuberance 78 carried at the rear end of the arm 72, and one of its ends has been hooked over the upper surface of the exposed portion of the bowl 64, while its opposite end has been hooked under that portion of the arm 72 between its point of attachment to the seat 66 and the socket engaging protuberance 78. The spring thus functions to exert a resilient bias tending to pivot the seat upwardly from the bowl 64.

It may be further pointed out that a simple leaf spring 98 is shown as provided in the embodiment of FIGS. 4 and 5 for the purpose of retaining the lid 68 in an upstanding position. Here the leaf spring 98 is of a spring metal or other resilient material, and is pivoted out of contact with the bowl 64 at such time as the lid 68 is pivoted downwardly to a horizontally extending position such as that shown in dashed lines in FIG. 5. When the lid 68 is pivoted upwardly, however, the upward movement is aided or promoted by the relaxation of the leaf spring 98, and the leaf spring, which has its lower end bearing against the upper surface of the bowl 64, maintains the lid 68 in an upwardly extending position as shown in full lines in FIG. 5.

The water closet construction shown in FIGS. 4 and 5 includes, as does that shown in FIGS. 1 and 2, a water tank 100. The water tank 100 is located to the rear of the seat 66 and lid 68 as is conventional in water closet construction. Moreover, it is supported, also in conventional manner, on the upper side of the bowl 64. In constructions according to the present invention, however, the water tank 100 is supported on the bowl 64 by a spacer element 102 which may conveniently be disposed around the pipe which conducts water from the water tank 100 to the interior of the bowl 64. The spacer element 102 is spaced rearwardly from the forward, lower edge of the water tank 100 so that this edge, denominated by reference numeral 100*a* in FIG. 4, is exposed, and a space exists between the front lower side of the tank adjacent this edge and the upper surface of the bowl 64. When the water tank 100 is mounted in this manner, it is then possible to place a flexible aesthetic cover, which may suitably be made of a fabric or other suitable material, on the water tank for aesthetic purposes, and the front lower edge of this cover may be extended downwardly past the front lower edge 100*a* of the tank, and under the lower side of the tank to provide a neat and aesthetic appearance.

In FIGS. 6 and 7 of the drawings, another embodiment of the water closet construction of the invention is illustrated. Here there is illustrated a bowl 110 which has a tank 112 mounted on the rear side thereof and spaced therefrom by means of a spacer 114. The bowl 110 has an elongated, rectangular shaped slot or socket 116 formed at the rear, upper side thereof between the opening in the bowl and the tank 112. The seat assembly used in the embodiment of the invention illustrated in FIGS. 6 and 7 is designated generally by reference numeral 118. In this form, the seat assembly includes a seat proper 120 which, in one position, rests or is supported on the upper surface of the bowl 110, and which, in a preferred embodiment of the invention, is constructed of a relatively rigid, foamed polystyrene material which can withstand the forces which are imposed upon the seat during utilization.

The seat 120 has formed transversely across the rear edge thereof, a hinge bead 122 of generally cylindrical configuration. The hinge bead 122 fits into a cylindrically shaped socket 124 which is formed in an attachment plate 126. The attachment plate 126 may also suitably be formed of a foamed polystyrene synthetic resin material, and carries a downwardly projecting or protuberant socket engaging portion 128. The protuberant socket engaging portion 128 is of generally rectangular configuration, and is dimensioned so that it may be pressed into, and firmly retained in, the socket 116. With the illustrated construction, the seat assembly 118 can be constructed of a relatively low-cost material so that it can be

disposed of without great loss. The seat assembly **118** can be quickly attached to the bowl **110** of the water closet, and quickly detached therefrom at any time that it may be desirable to remove the seat structure for purposes of cleaning, or simply to discard it and replace it with a new low-cost synthetic resin seat structure. It will be perceived that the water closet structure thus provided in the embodiment of the invention shown in FIGS. **6** and **7** is well adapted for use in hospitals in which it may be desirable frequently to dispose of the seat structure, and to replace it with a new sterilized seat structure as patients move in and out of a particular room, and it becomes desirable to sterilize and thoroughly clean all facilities. The protuberant socket engaging portion **128** fits sufficiently snugly in the socket **116** to prevent the seat from moving undesirably upon the bowl **110** during use, yet facilitates rapid removal of the seat from the bowl following a period of usage.

Another embodiment of the invention, similar to the embodiment depicted in FIGS. **6** and **7**, is illustrated in FIGS. **8** and **9** of the drawings. Here, the bowl **110**, tank **112**, and spacer **114** are provided as depicted in FIGS. **6** and **7**. The seat assembly provided in the embodiment of the invention illustrated in FIGS. **8** and **9** differs slightly from that shown in FIGS. **6** and **7**, however, and is designated generally by reference numeral **130**. The seat assembly **130** includes a seat proper **132** which can be pivoted about a horizontal axis between the full line position shown in FIG. **8** and the dashed line position shown therein. The seat **132** carries a cylindrical bead **134** which extends transversely across the rear edge thereof, and is adapted to be snapped into a semicylindrical socket **136** formed in a plate **138** of resilient material, such as foamed polystyrene or the like. The plate **138** has a pair of downwardly projecting studs or spikes **140** disposed on opposite sides thereof in horizontally spaced relation, and forming protuberant, socket engaging portions. The spikes **140** are dimensioned to permit them to be pressed through the openings **142** provided on opposite sides of the toilet bowl **110** in accordance with conventional construction. The openings or sockets **142** which have conventionally been provided in the bowl **110** have been used to accommodate the threaded metal bolts carried on conventional seat structures, and conventionally passed through these openings to receive nuts on the ends of the bolts which are extended through, and positioned below, the openings.

With the water closet construction illustrated in FIGS. **8** and **9**, the advantages which have been described as characterizing the embodiment of the invention illustrated in FIGS. **6** and **7** also appertain, but the seat assembly **130** depicted in FIGS. **8** and **9** can be quickly attached to bowl structures as now manufactured after the conventional seats have been removed, and after the metal bolts normally used to attach such seats to the bowl have been removed from the openings or sockets **142**.

Another embodiment of the invention is illustrated in FIGS. **10** and **11** of the drawings. In this embodiment, the quick-detachability of the seat and lid as hereinbefore described are retained as a feature of the invention. The seat and lid structures are fabricated, however, to permit the inclusion in the assembly, if desired, of an infant's toilet seat which can be quickly secured to the regular seat, and can be pivoted upwardly or downwardly if desired. As shown in FIGS. **10** and **11**, the water closet construction includes a bowl **150**, a tank **152**, and a spacer element **154** used to support the tank **152** on the bowl **150** in spaced relation thereto.

The bowl **150** is provided with inwardly extending sockets **156** on opposite sides thereof, these sockets being cylindrical in configuration and aligned on opposite sides of the bowl. The sockets **156** formed in the bowl **150** receive a protuberant socket engaging portion **158** secured to, and projecting inwardly, from each of a pair of arms **160** forming a portion of a hinge structure designated generally by reference numeral **162**. The arms **160** are secured to the under side of the toilet seat **164** in the manner depicted in FIG. **10** and extend rearwardly therefrom to permit the protuberant, socket engaging portions **158** to be snapped into the cylindrical sockets **156**. The socket engaging protuberances **158** have a cylindrical bore **166** which is extended therethrough from the outside of the respective arm **160** which carries the protuberance. There is also formed within each of the socket engaging protuberances **158**, a counterbore **168** which is of larger diameter than the bore **166** and is axially aligned with the bore. Each counterbore **168** opens through the outer face of the respective arm **160**.

With the construction described, either a lid or an infant's seat, or both, may be snapped into the bores **166** and/or counterbores **168** through the socket engaging protuberances **158** forming a part of the hinge structure, and can be mounted in this manner for pivotation about a horizontal axis. FIGS. **10** and **11** illustrate the appearance of the entire water closet construction when the conventional seat **164**, an infant's seat **170**, and a lid **171** are all mounted on the bowl **150** for pivotation about a common horizontal axis. In such construction, the infant's seat **170** has secured to the under side thereof, a pair of hinge arms **172** which project rearwardly and downwardly and carry at their free outer ends, protuberant socket engaging portions **174**. Each protuberant socket engaging portion **174** is of a length such that it will extend into the respective counterbore **168** by a distance sufficient to reach the shoulder formed at the intersection between this counterbore and the respective bore **166** through the respective socket engaging protuberance **158**. Thus, when the infant's seat **170** is pivotally mounted in the illustrated position, the protuberant socket engaging portions **174** carried on the arms **172** snap into the counterbores **168** in the socket engaging protuberances **158** of the hinge assembly **162**. The infant's seat **170** can then pivot about a horizontal axis from the full line position illustrated in FIG. **10** to an upwardly extending position to permit either the infant's seat or the regular seat **164** to be utilized.

The lid **171** is snapped into its mounted position in a similar fashion. The lid **171** carries arms **175** secured to, and projecting from, the lid. At the free ends of the arms **175**, a pair of socket engaging protuberances **176** project inwardly toward each other, and can be snapped into bores **177** formed in the socket engaging portions **174** of the infant's seat arms **172**. The socket engaging protuberances **176** are preferably of a length such as to extend into the bores **166** in the inner ends of the socket engaging protuberances **158** secured to the ends of the arms **160** carried by the seat **164**. This permits the lid **171** to be pivotally supported on the bowl **150** even when the infant's seat is dismantled and removed from the water closet structure.

Another embodiment of the invention is depicted in FIGS. **12** and **13** of the drawings. Here, a water closet bowl **180** is depicted and carries a tank **182** at the rear side thereof supported on the bowl and spaced therefrom by a suitable spacer ring **184** of the type hereinbefore described. The bowl **180** has projecting from the opposite sides thereof a pair of horizontally extending generally cylindrical posts **186**, only one of which is visible in the figures of the drawings. It will be appreciated that an identically shaped post is located directly opposite the illustrated post **186** on the opposite side of the bowl **180** and projects in a horizontal direction therefrom. As shown in FIGS. **12** and **13**, the posts **186** projecting from opposite sides of the bowl **180** function to provide support elements for the pivotal mounting of a seat and lid on the toilet bowl **180**. Thus, a seat **188** having secured to the opposite sides thereof a pair of arms **190** is pivotally supported on the posts **186** by springing the outer free ends of the arms **190** over the posts so that apertures formed in the arms **190** pass over the posts as shown in FIG. **13**. In like manner, after the seat **188** has been pivotally attached to the bowl **180** in the manner described, a lid **194**, shown in the raised position in FIG. **12**, is pivotally mounted on the bowl **180** by means of arms **196** which have one of their ends secured to the under side of the lid, and which carry openings or apertures at their

other ends which may be snapped over the posts **186**. The lid **194** may thus be pivoted downwardly to the dashed line position shown in FIG. **12**.

From the foregoing description of the invention, it will be seen that the invention provides an improved water closet construction which permits the seat and/or lid to be quickly and easily removed from the bowl **10** at any time desired and replaced with seats and lids of different colors or shapes. No tools are required to effect such removal and replacement. The water closet construction of the invention also assures that the seat and lid will remain in an upstanding or upright position once they have been pivoted to this status, and will not fall down until actually manually pivoted downwardly to assume a horizontal position. Finally, the water closet construction of the invention provides for an arrangement of the water tank in relation to the bowl of the water closet so that the tank may be aesthetically covered with a flexible cover of a suitable fabric or other material.

Although certain preferred embodiments of the invention have been herein described in order to provide an example of the manner in which the invention is to be practiced, it is to be understood that various changes and modifications in the described structure can be effected without departure from the basic principles which underlie the invention. Changes and innovations of this type are therefore deemed to be circumscribed by the spirit and scope of the invention except as the same may be necessarily limited by the appended claims or reasonable equivalents thereof.

What is claimed is:

1. A water closet structure comprising:
- a bowl;
- a seat; and
- a hinge structure mounted on said bowl and including flexible arms connected to, and extending from, said seat, said arms being manually variable in their spacing from each other to facilitate rapid manual detachment of the seat and said arms from said bowl by disengagement of said arms from telescoping engagement with mating means carried on said bowl.

2. A water closet as defined in claim **1** wherein said hinge structure further includes:
- socket means mounted on said bowl; and
- socket engaging protuberances secured to the ends of each of said arms and extending into, and engaging, said socket means.

3. A water closet structure as defined in claim **1** wherein the bowl of said water closet structure is further characterized in including sockets formed in said bowl on the opposite sides thereof;
- and wherein said hinge structure further includes socket engaging protuberances secured to the ends of each of said arms and extending into, and engaging, the sockets in said bowl.

4. A water closet structure ad defined in claim **2** wherein said hinge structure further includes:
- posts mounted on said bowl and projecting upwardly therefrom;
- socket engaging protuberances secured to the free ends of said arms; and
- an open ended sleeve mounted on said posts and pivotally receiving said socket engaging protuberances.

5. A water closet structure as defined in claim **1** wherein said hinge structure further includes:
- additional arms pivoted about a horizontal axis; and
- a lid connected to said additional arms and pivotable from a horizontally extending position above said seat to an upstanding position.

6. A water closet structure as defined in claim **1** and further characterized as including a lid pivotally connected to said arms for pivotation about a horizontal axis.

7. A water closet structure as defined in claim **1** wherein said hinge structure is further characterized to include socket means mounted on said bowl and including a pair of sockets; and means carried by said arms for pivotally and detachably connecting said arms to said pair of sockets.

8. A water closet structure as defined in claim **1** and further characterized to include means for resiliently biasing said seat from a horizontally extending position toward and upwardly extending position.

9. A water closet structure as defined in claim **1** and further characterized to include
- a water tank of generally right parallelepiped configuration mounted on said bowl; and
- spacer means for spacing the front lower edge of said tank from said bowl.

10. A water closet structure as defined in claim **1** wherein said hinge structure is further characterized to include
- a socket engaging protuberance secured to the free end of each of said arms; and
- socket means mounted on said bowl and having a pair of sockets therein pivotally receiving said socket engaging protuberances.

11. A water closet structure as defined in claim **2** wherein each of said socket engaging protuberances has a recess formed therein; and
- wherein said water closet structure is further characterized in including:
  - a lid;
  - a pair of additional arms having one end secured to said lid and each having a second end; and
  - protuberances secured to the second ends of said additional arms and projecting into the recesses in said socket engaging protuberances.

12. A water closet structure as defined in claim **3** and further characterized to include:
- a lid; and
- additional arms each having one end connected to said lid and a second end pivotally connected to the socket engaging protuberance on the end of one of said first mentioned arms.

13. A water closet structure as defined in claim **4** wherein each of said socket engaging protuberances has a cylindrical recess formed therein coaxially with said open ended sleeve; and
- wherein said water closet structure is further characterized to include:
  - a lid;
  - additional arms connected to said lid; and
  - means on said additional arms projecting into said cylindrical recesses for pivotally connecting said lid to said first mentioned arms.

14. A water closet structure as defined in claim **13** and further characterized to include means for resiliently biasing said seat from a horizontally extending position toward and upwardly extending position.

15. A water closet structure as defined in claim **14** wherein said biasing means comprises a torsion spring surrounding said sleeve and engaging one of said first mentioned arms.

16. A water closet structure as defined in claim **13** and further characterized to include means for resiliently resisting pivotation of said lid from an upwardly extending position toward a horizontally extending position.

17. A water closet structure as defined in claim **3** wherein said first-mentioned arms and said additional arms are of spring metal construction.

18. A water closet structure as defined in claim **13** and further characterized as including:
- a water tank of generally right parallepiped configuration mounted on said bowl; and
- spacer means for spacing the front lower edge of said tank from the bowl.

19. A water closet structure as defined in claim **18** and further characterized as including means for resiliently biasing said seat toward an upwardly extending position.

20. A water closet construction as defined in claim **4** and further characterized as including:

an infant's seat pivotally and detachably engaging said socket engaging protuberances for pivotation about a horizontal axis to a raised position from a horizontal position over, and resting upon, said seat.

21. A water closet construction as defined in claim 4 and further characterized as including a lid pivotally and detachably engaging said socket engaging protuberances for pivotation about a horizontal axis to a raised position from a horizontal position over, and resting upon, said seat.

22. A water closet construction as defined in claim 20 and further characterized as including a lid pivotally and detachably engaging said socket engaging protuberances, for pivotation about a horizontal axis to a raised position from a horizontal position over, and resting upon, said infant's seat.

23. A water closet construction as defined in claim 1 and further characterized as including posts extending from said bowl and projecting through apertures formed in said arms to pivotally support said seat on said bowl for pivotation about a horizontal axis.

24. A water closet construction as defined in claim 23 and further characterized as including

a lid; and

arms extending from said lid and having apertures therethrough receiving said posts for pivotally supporting said lid for pivotation about a horizontal axis.

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