Sept. 14, 1943. H. BENDON ET AL 2,329,240

AUTOMATIC CHECK-STOP

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Fig. 1.

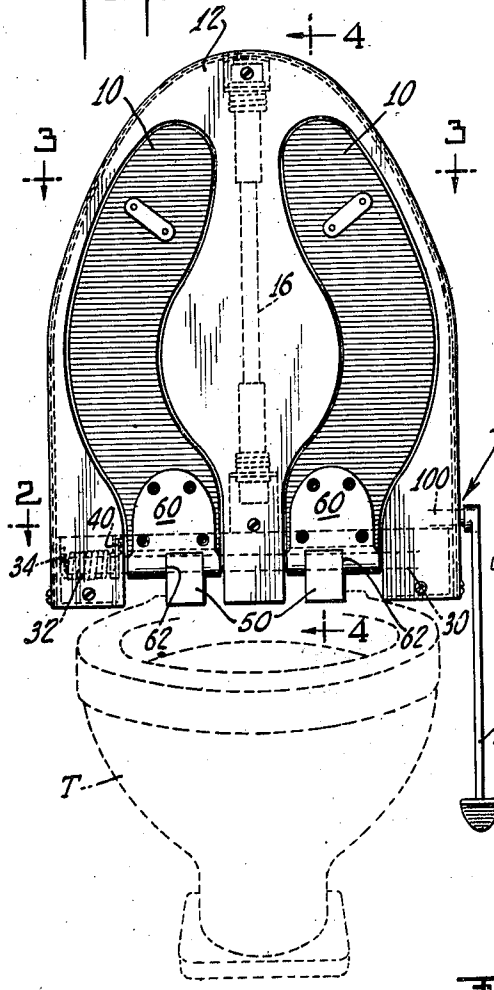


Fig. 2.

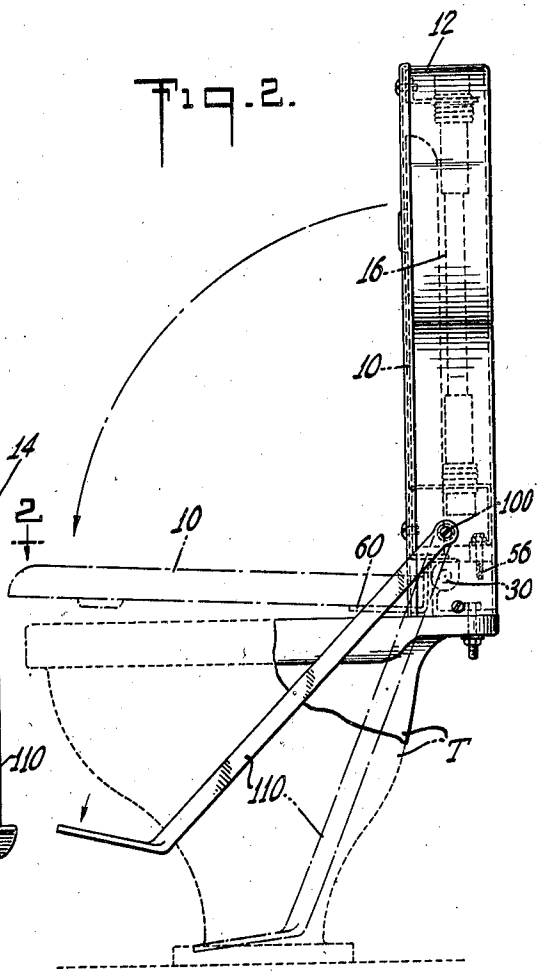
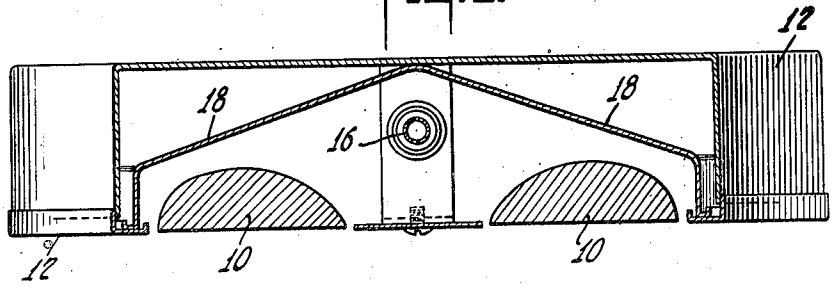


Fig. 3.



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Fig. 4.

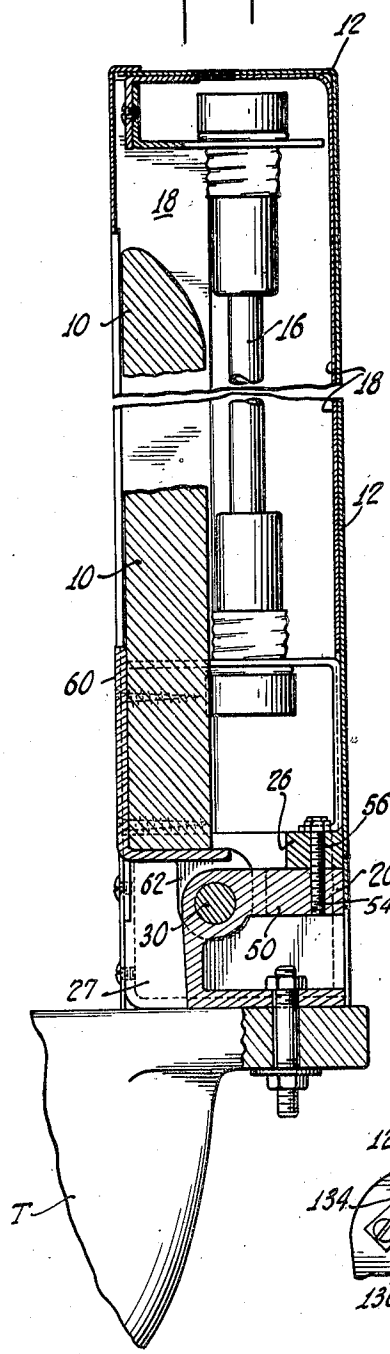


Fig. 5.

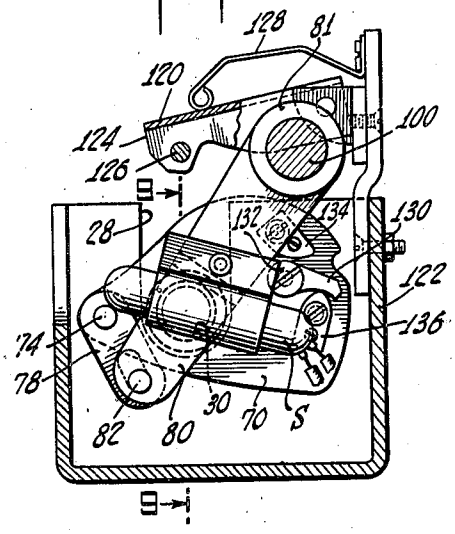


Fig. 6.

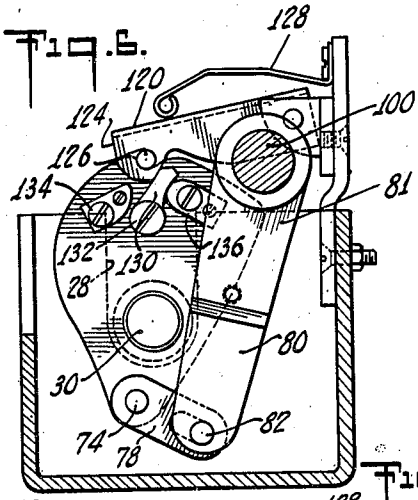


Fig. 7.

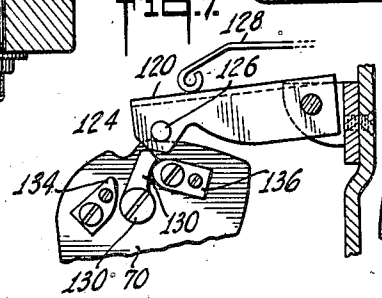
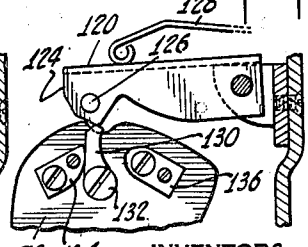


Fig. 8.



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Fig. 9.

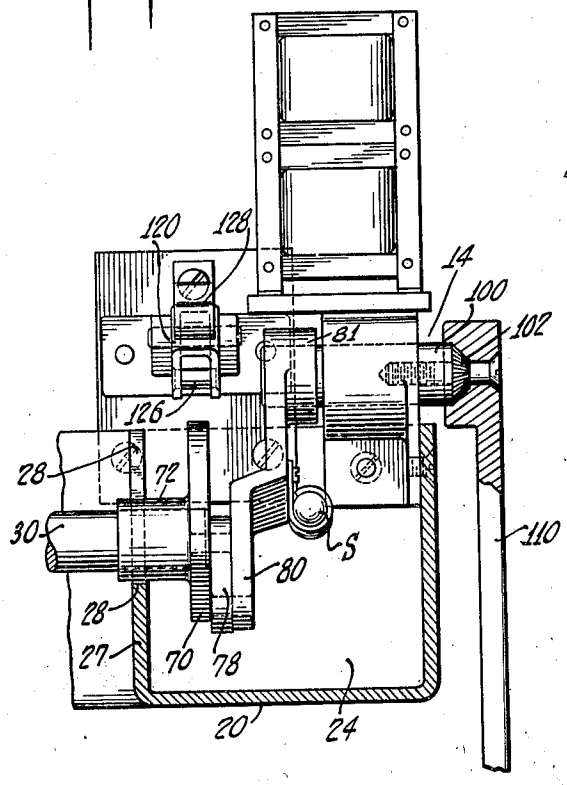


Fig. 10.

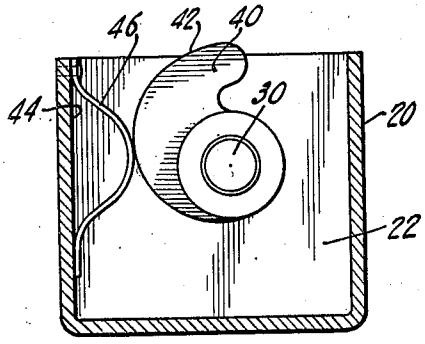


Fig. 11.

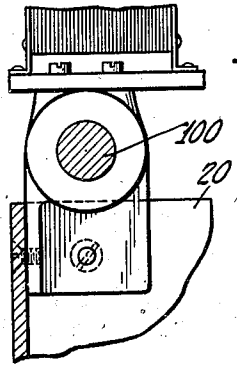
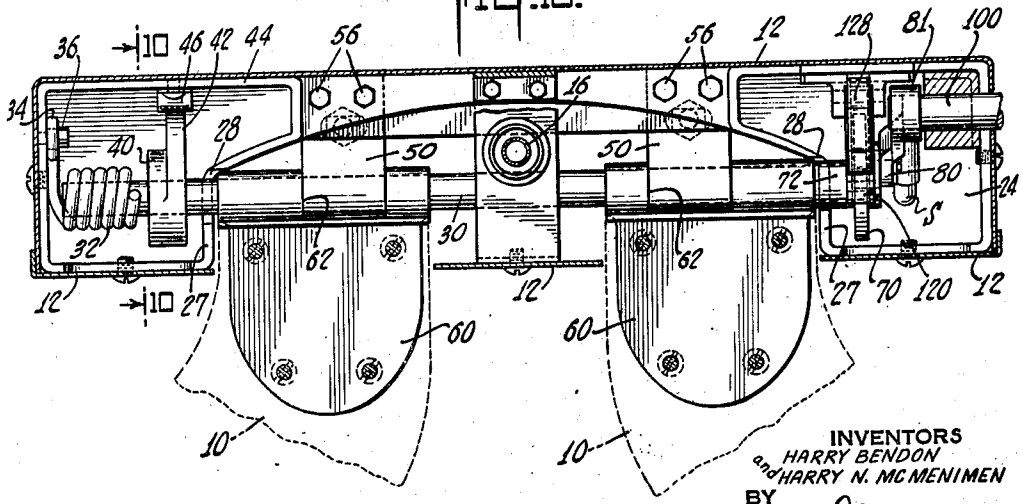


Fig. 12.



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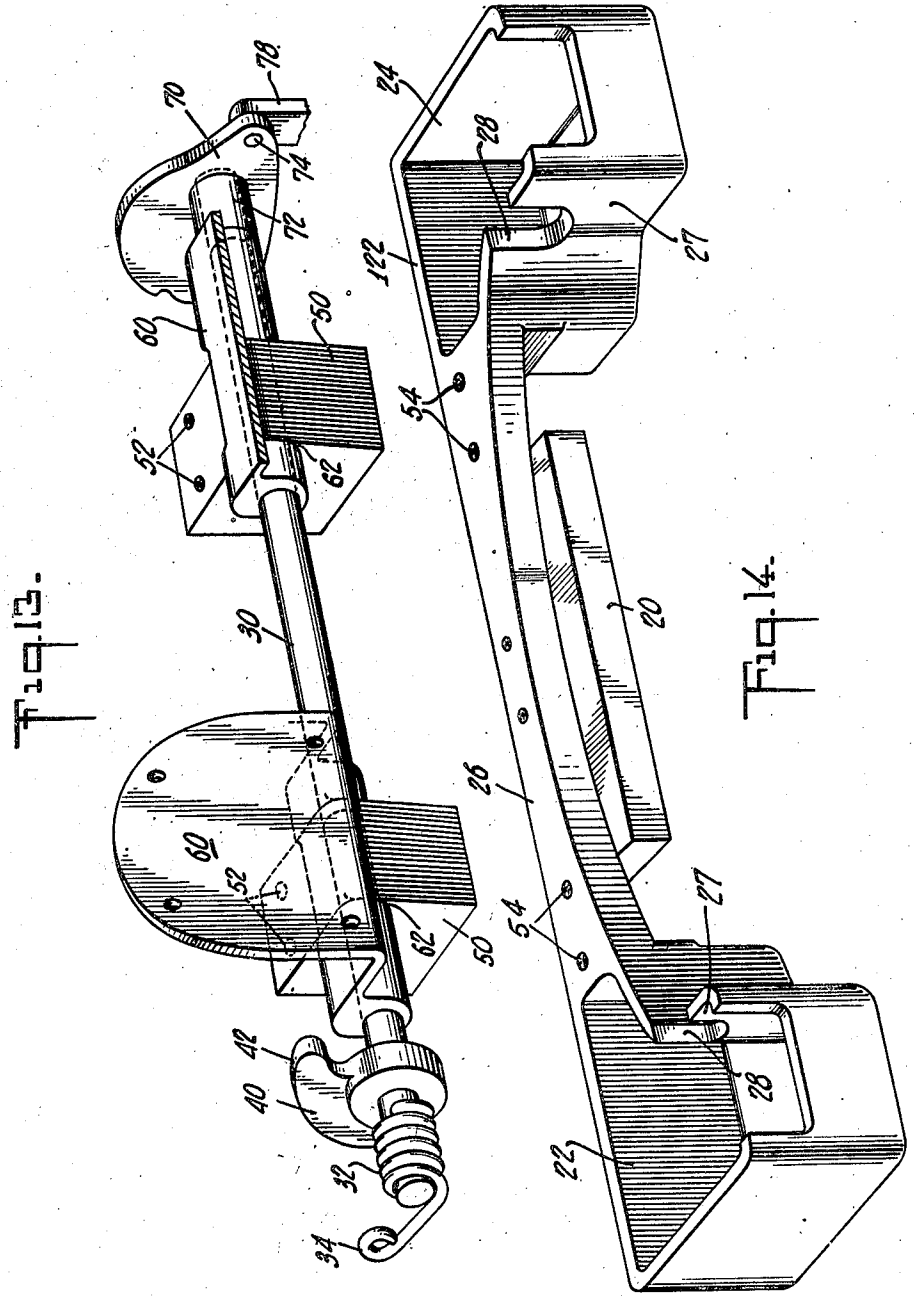


Fig. 13.

Fig. 14.

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Patented Sept. 14, 1943 2,329,240

UNITED STATES PATENT OFFICE

2,329,240

AUTOMATIC CHECK-STOP

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Application April 15, 1942, Serial No. 439,146

5 Claims. (Cl. 4—251)

Our invention relates generally to toilet seats, and in particular, to a toilet seat locking mechanism.

The main object of our invention is to provide a toilet seat, and a housing therefor within which housing the seat is disposed and subjected to germicidal rays while not in use, and pedally actuated means to swing the seat out of the housing into position for use, and means to stop-lock the seat in its outswung position.

Another object of our invention is to provide means, after the seat has been used, to automatically return the seat into its casing.

Further objects of our invention will in part be obvious and in part pointed out specifically in connection with the following description of an illustrative embodiment of our invention.

In the drawings annexed hereto, forming a part hereof:

Figure 1 is a front elevational view of one form of device constructed according to and embodying our invention;

Fig. 2 is a side elevational view thereof;

Fig. 3 is a horizontal cross section along the line 3—3 of Fig. 1;

Fig. 4 is a vertical cross section along the line 4—4 of Fig. 1;

Fig. 5 is an end elevational view of the toilet seat stop-lock mechanism (as seen in plan in Fig. 12), showing the position of the various parts when the seat is in raised or "closed" position;

Fig. 6 is a similar view showing the position of the various parts of the stop-lock mechanism when the seat is in partially depressed or "open" position;

Fig. 7 is a view similar to Figs. 5 and 6 showing the position of the parts of the locking mechanism when the seat is in its final depressed position;

Fig. 8 is a similar view showing the position of the parts of the locking mechanism when the seat starts its pivoting movement back into the casing.

Fig. 9 is a part sectional view along the line 9—9 of Fig. 5, and part front elevational view of the stop-lock mechanism;

Fig. 10 is a vertical cross section along the line 10—10 of Fig. 12 showing the return buffer mechanism;

Fig. 11 is a detail showing the mount of the sub-shaft component of the locking device on the base bracket;

Fig. 12 is a part plan and part horizontal section along the line 12—12 of Fig. 1;

Fig. 13 is an isometric view of the main shaft and the attachments thereon; and

Fig. 14 is an isometric view of the base bracket component of the assembly.

Our device, as a whole, comprises a toilet seat 10, an enclosing casing 12 open at the front to receive the seat within the casing, and a seat stop-lock mechanism indicated generally by the reference numeral 14. The seat, casing and locking mechanism are assembled into a single unit for mounting on toilet bowl T.

Casing 12 may be of any desired size and shape, stamped or otherwise formed of light gauge metal or other suitable material. Within casing 12, we mount an ultra violet ray cylindrical tube 16, which is so wired as to be energized via a mercury switch S when seat 10 is pivoted to vertical position inside casing 12. The ultra violet rays have been found to exercise a germicidal action, and the play of the rays over the seat will be effective to sanitize the same. As seen in Fig. 3, a reflector plate 18 is disposed within the rear of casing 12, to reflect the ultra violet rays emanating from tube 16 over the entire surface of the seat 10. Seat 10 and switch S are both mounted for pivotal movement with the shaft on which the seat is mounted. Thus, when the seat is swung down out of the casing, the mercury within the switch is slid away from the contact points and the circuit is broken and the tube 16 deenergized. When seat 10 is swung back into casing 12, the mercury flows down over the contacts, the circuit is remade and the tube 16 energized again.

We provide a base bracket member 20, formed as by casting, stamping or otherwise of suitable material, having a pair of deep end recesses 22, 24, connected by a heavy bridge member 26. Recesses 22, 24 extend downwardly and forwardly of the bridge 26, and the inner opposing walls 27, 27 thereof are semi-circularly notched, as at 28, 28 to receive therewithin the shaft 30 on which seat 10 is pivotally mounted.

Shaft 30, circular in cross-section, is formed of heavy material, and is of such length as to be received inside bracket 20, the ends of the shaft fitting within the end recesses 22, 24. At the 22-end of shaft 30, a heavy coil spring 32 is secured about shaft 30. The inner end of this spring 32 is secured to shaft 30, and the free end of said spring extends out from the shaft and is fastened to a pin 36 mounted on and projecting out from a side wall of recess 22. The normal biasing of said spring is such as to retard pivotal move-

ment of shaft 30 away from casing 12, and any pivotal movement of shaft 30 (with seat 12 thereon) is effected against the normal tensioning of coil spring 32. Thus, as seat 10 is swung out of the casing, tension is built up in spring 32.

An eccentric cam 40 is fixedly mounted on shaft 30 and projecting upwardly therefrom (see Figs. 10 and 13), which cam has formed thereon a curved edge 42 on the side thereof facing the rear wall 44 of recess 22, and on said wall 44 and in line with cam 40, we mount an outwardly bowed spring leaf 46. Cam 40 is so mounted on shaft 30 that the cammed edge 42 bears directly against spring 46 when seat 10 is vertically disposed inside the casing. When the seat is pivoted down out of casing 12, the curved cam edge 42 is borne away from and out of contact with spring leaf 46. However, as seat 10 is swung upwardly back into the casing pivoting shaft 30 and turning cam 40 along with it, the cammed edge 42 bears against spring leaf 46 with constantly increasing pressure due to the curvature of cam edge 42, slowing up the rate of pivoting movement, and exercising a damping or buffer action against too quick a return of seat 10 into casing 12. Thus, we provide coil spring 32 to prevent too fast outward pivotal movement of seat 10, and cam 40 and spring leaf 46 to prevent too fast return movement of the seat back into the casing.

A pair of laterally apertured spaced bearing blocks 50, 50 are provided, and slid onto shaft 30 (see Fig. 13) which may pivot freely therewithin. These bearing blocks 50, 50 are also vertically apertured, as at 52, 52 and the vertical apertures 52, 52 register with vertical apertures 54, 54 formed through the bridge member 26. Thus, when shaft 30 with blocks 50, 50 thereon is slid in under the bracket bridge 26, bolts 56, 56 may be passed through the registering apertures 52, 54 to secure the shaft (and its assembly) onto the base bracket 20. The dimensioning is such that the ends of shaft 30 are received within the end receses 22, 24 passing through notches 28, 28, while the center portion of shaft 30, with the bearing blocks thereon, is in front of the bridge 26.

Seat 10 is fixed onto shaft 30 so as to pivot therewith, by means of a pair of notched hinge wing members 60, 60 laterally apertured, which straddle blocks 50 and are fixed onto the shaft so as to turn therewith. Seat 10 is secured onto the hinge wings as by means of suitable screws, bolts or otherwise.

Shaft 30, at the 24-end thereof, has a cam 70 mounted thereon. Cam 70 is roughly heart shaped in outline, notched at the upper portion thereof as at 71, and shaft 30 is keyed thereinto near the bottom thereof to turn therewith, the cam being provided with an outwardly extending sleeve 72 which fits over and about the 24-end of shaft 30, so that as cam 70 is turned, it will turn shaft 30 along with it. We provide for the turning of cam 70 and shaft 30 by a linkage system operated by a foot treadle 110. An operating pin 74 is mounted on cam 70 below the shaft mounting sleeve 72, said pin 74 projecting out from the cam into recess 24. A short strap link 78 is secured to pin 74, and one end of a long link 80 is secured to the other end of link 78 by means of a pin 82. The other end 81 of link 80 is apertured to receive stub shaft 100 therein for rotation therewith. The free end of stub shaft 100 projects upwardly and out of the end of base bracket 20 and the foot treadle 110 is secured thereonto.

When seat 10 is disposed and secured within casing 12, treadle 110 is up off the ground (see Figs. 1 and 2). As treadle 110 is pedally depressed, movement downwardly thereof rotates stub shaft 100 counterclockwisely, carrying link 80 downwardly, and via link 78 imparts counterclockwise rotation to cam 70 about the axis of shaft 30, rotating shaft 30 along with it to swing seat 10 out of the housing. A check stop member 120 is mounted upwards of the rear wall 122 of recess 24, the front end 124 of which projecting out from the wall is provided with a roller 126 on the underside thereof in line with cam 70. A bent spring leaf 128 is also mounted upwardly of wall 122, bearing against the top of stop 120, normally biasing or urging stop 120 towards cam 70. When the treadle is in the "up" position, cam 70 is in its "down" position (see Fig. 5) and there is no contact between the cam and the stop.

However, as treadle 110 is depressed, cam 70 is rotated in a counter-clockwise direction, and the upper marginal edge of the cam 70 bears against roller 126, and due to the curved outline of the cam edge, stop 120 is forced upwardly against the biasing of spring 128. Cam 70 has mounted thereon, on the side out of which operating pin 74 projects, a pawl or trigger 130, pivotally secured by pin 132, and a pair of adjusting cam blocks 134, 136 of each side of pawl or trigger 130. Cam block 134 is fixed counter-clockwise of trigger 130, and cam block 136 is mounted clockwise of the trigger. Both blocks have opposed cammed edges presented towards the trigger, and they may be shifted back and forth to increase or decrease the arc through which the trigger may pivot about its pin 132. As seen in Fig. 5, when cam 70 is in its "at rest" position, when seat 10 is within casing 12, trigger 130 drops by gravity and rests against block 136. When treadle 110 is depressed, as above stated, cam 70 turns about its axis at 30 and is engaged and stopped by the stop 120. As roller 126 rides along curved cam margin, it dips down into the notched portion 71 of the heart shaped cam, and is held between the tension of spring 128 and trigger 130. When the cam is so locked, treadle 110 is in the dotted line position of Fig. 2, and seat 10 is in the "down" dotted line position of said figure, spaced away slightly from seat T. When the seat is in this position, it can freely be returned back into casing 12, there being no opposition against a clockwise rotation of shaft 30 and cam 70. However, if any weight is applied to seat 10, and it is further depressed, cam 70 is shifted further counter-clockwisely and trigger 130 raises stop 120 which rides over and past the trigger (see Fig. 7) further unwinding spring 32 and further tensioning the same.

As soon as the depressing weight is removed from seat 10, the tension of spring 32 rotates shaft 30 clockwisely. Trigger 130 is borne against block 134, and bears against the advancing front 124 of stop 120 raising same to carry coin roller 126 over the notched portion of the cam and out of engagement therewith permitting shaft 30 to turn freely until seat 10 pivots back into casing 12 under the retarding action of spring 46 and cam 40, and raising treadle 110 to the full line position in Figs. 1 and 2.

By this arrangement, we provide means for locking the toilet seat in position ready for use after withdrawal from the casing. We eliminate the necessity for manual holding of the seat

against the bowl, and ready the seat for use merely by depressing the treadle until the seat is locked. Putting any weight on the seat disengages the lock and permits the seat to swing back into the casing where it is subjected to the beneficial ultra violet light rays from tube 16.

As shown in Fig. 9, the end of stub shaft 100 is notched or ridged, as at 102, and treadle 110 is similarly notched or ridged, so that adjustment can be made of the height of the treadle for any particular installation. The tensionings of springs 32, 46 and 128 may be similarly adjusted to compensate for local installations.

Having now described our invention, what we desire to secure by Letters Patent and claim is the following:

1. In a device of the character described, a housing, a main shaft disposed therein for pivotal movement, a seat on said shaft pivotal therewith, a spring on said shaft to retard pivotal movement of the seat out of the housing, and to accelerate return of the seat into the housing and cooperating means on the shaft and housing to decelerate the rate of seat return into the housing, said cooperating means comprising a spring on said casing and a cam on the main shaft, pivotal with said shaft, and bearing against the spring with increasing pressure as the seat returns into the casing.

2. In a device of the character described, a housing, a main shaft rotatably journalled therewithin, a seat on said main shaft pivotal therewith, a sub-shaft rotatably secured within the casing, a connection between the shafts, means to rotate the sub-shaft from without the casing and to thereby rotate the main shaft and partially swing the seat out of the casing into short-of-use position, a notched cam on said main shaft rotatable therewith, a stop on said housing projecting inwardly of the casing in line with the cam and engageable by the notch in the cam to secure the seat in the outswung position, a trigger on said cam responsive to pivotal movement of the cam to disengage the stop upon further movement of the seat out of the casing into position for use.

3. A device as in claim 2, in which the trigger is pivotally mounted on the cam and means are provided on the cam to limit the extent of movement of the trigger.

4. A device as in claim 2 in which the trigger is mounted on the cam for swinging movement from a position rearward of the notch to one in advance thereof, and means are provided on the cam to fix the limits of the trigger movement.

5. A device as in claim 2, in which means are provided to urge the stop into engagement with the cam, and the trigger on the cam disengages the stop upon pivotal movement of the shaft and seat from the short-of-use position into position for use.

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