Nov. 21, 1939. E. F. HILL 2,181,017

TOILET SEAT HINGE

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FIG. 1

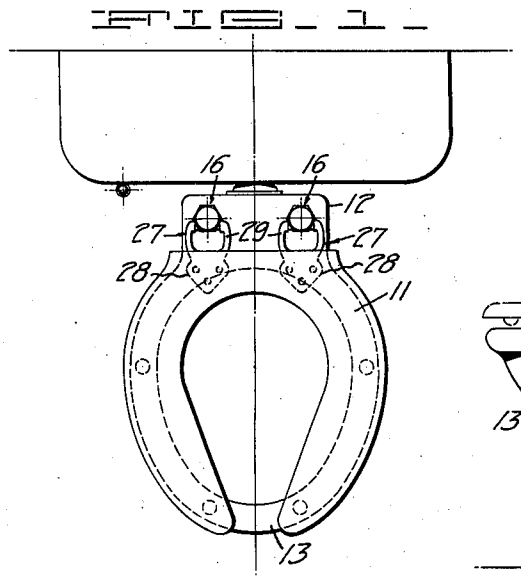


FIG. 2

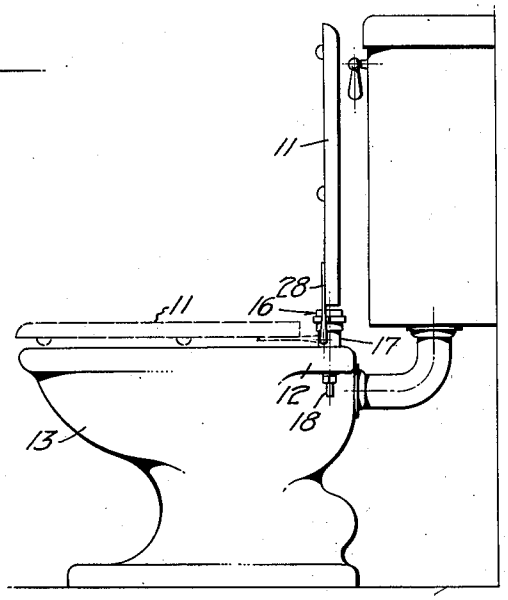


FIG. 3

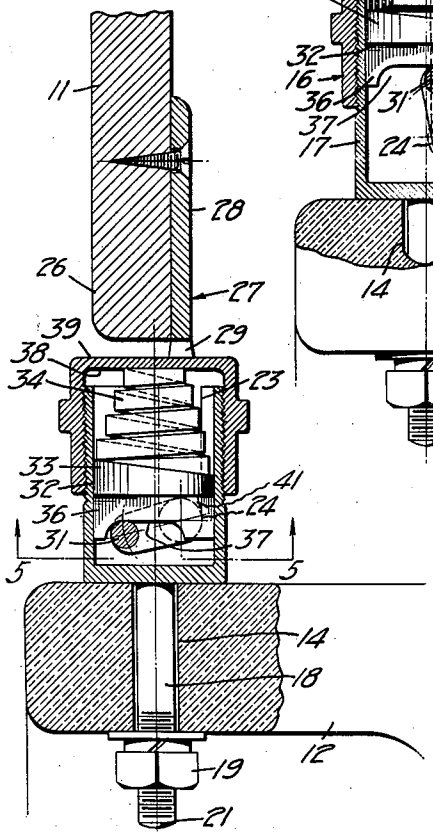


FIG. 4

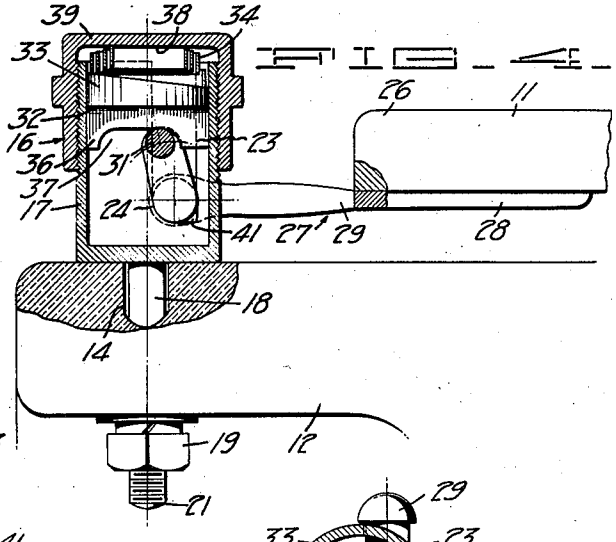
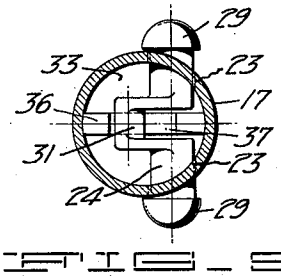


FIG. 5



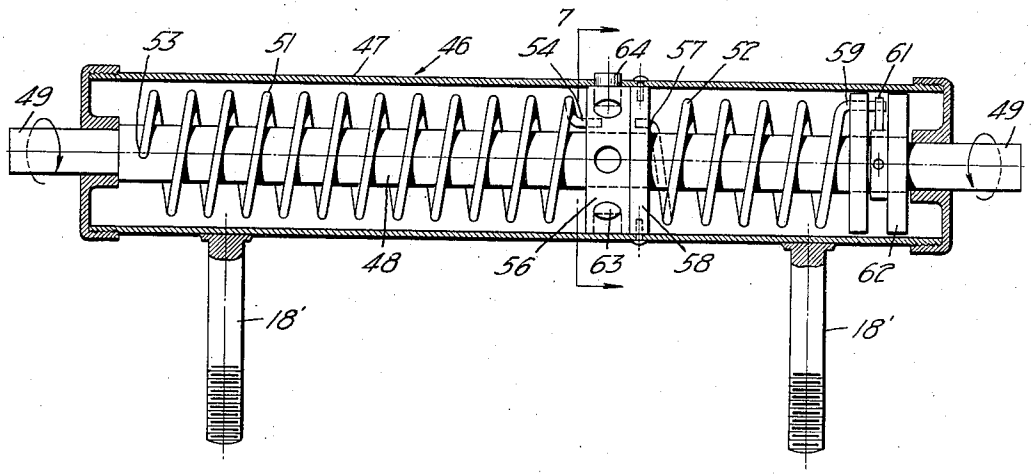
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FIG. 6.



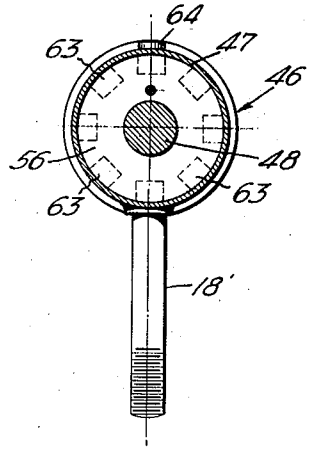


FIG. 7.

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TOILET SEAT HINGE

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Application February 1, 1937, Serial No. 123,366

1 Claim. (Cl. 4—240)

The invention relates to hinges used for fastening covers or seats or the like to toilet bowls and the like, and more particularly to spring type hinges effective to maintain the seat or cover when not in use in a raised or vertical position relative to the bowl.

Toilet seat hinges of the class described which have been heretofore available are relatively large and cumbersome and in many instances by reason of their size will not properly support a standard toilet seat in proper relation on a standard toilet bowl. An object of the present invention is to provide for a general improvement in the construction of a toilet seat spring hinge so as to produce a hinge which is considerably smaller and more compact, and yet will provide a more powerful resilient action than hinges heretofore, and at the same time will be interchangeable with, and may be used in replacing, substantially all existing types of toilet seat hinges without requiring any change of the toilet bowl or seat, and will support a standard type seat in proper fitted relation over a standard type toilet bowl.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claim.

Referring to said drawings:

Figure 1 is a plan view of a toilet with a hinge constructed in accordance with the present invention applied thereto.

Figure 2 is a side elevation of the toilet illustrated in Figure 1 and showing the seat in normal upright position.

Figure 3 is a vertical sectional view of hinges in the position illustrated in Figure 2.

Figure 4 is a vertical sectional view similar to Figure 3, but showing the seat in lowered horizontal position.

Figure 5 is a horizontal bottom sectional view of the hinge taken substantially on the plane of line 5—5 of Figure 3.

Figure 6 is a longitudinal sectional view of a modified form of the invention.

Figure 7 is a transverse sectional view of the hinge illustrated in Figure 6 and is taken substantially on the plane of line 7—7 of Figure 6.

The toilet seat hinge of the present invention and as illustrated in the accompanying drawings is adapted for pivotal mounting of a toilet seat 11 to the rear seat mounting portion 12 of a toilet bowl 13, the portion 12 being provided in a standard form of toilet construction with a pair of spaced openings 14 for mounting of the hinges. In the embodiment of the invention illustrated in Figures 1 to 5 inclusive, a pair of hinges 16 are used and each comprises an elongated hollow cylindrical casing 17 which is adapted for mounting in upright position at the portion 12 of the toilet bowl. The casing 17 is formed with, or is otherwise secured to, a longitudinally extending threaded stud 18 which is arranged for mounting through one of the openings 14 and is secured to the portion 12 of the toilet bowl by means of a nut 19 which is threaded on the lower free end 21 of the stud and cinched against the under-side of the toilet bowl portion 21.

Mounted transversely through the casing 17 and at the base of a pair of longitudinally extending slots 23 is a crank shaft 24 which is secured to the rear portion 26 of the toilet seat 11 by means of a yoke member 27, the latter as here shown being formed of a flat plate 28 which may be secured directly to the under-side of the seat portion 26 and is provided with a pair of spaced arms 29 which extend to the ends of the crank shaft at the opposite sides of the casing 17, it being noted that the arms 29 are spaced by a width greater than that of the casing 17 and also are of a length as to enable the movement of the yoke member from a horizontal position transversely extended from the casing 17, to a vertical position with the plate portion 28 spaced over the top of the casing. It will thus be seen that the heighth of the casing 17 above the crank shaft 24 determines the length of the yoke arms 29 and therefore the relative forward position of the toilet seat when in lowered horizontal position for use. The construction of similar spring hinges heretofore used has required the use of relatively large casings and accordingly in many types of toilets, the spring hinge could not be used for the reason that the toilet seat was necessarily moved too far forward over the bowl when in horizontal position. In accordance with the present invention, and as a principal object thereof, the spring mechanism contained within the casing 17 has been so arranged as to very substantially reduce the required heighth of the casing and consequently permit of a much closer positioning of the seat to the hinges.

The mechanism for resiliently elevating the toilet seat when not in use comprises an offset crank pin 31 provided by the crank shaft 24 within the casing 17 and on which is mounted, for longitudinal reciprocation within the casing, a spring rest 32 having a disc shaped flange 33 at its upper end for supporting an end of a helical spring 34 and at the under-side of the flange is a depending bracket 36 which is formed at its lower end with a transverse slotted guideway 37 which is engageable on the crank pin 31. The spring 34 is confined between the top 33 of the spring rest and under side 38 of a cap 39 threaded on the upper end of the casing so as to normally urge the crank shaft to a rotative position with the yoke and seat vertically disposed. The threaded engagement of the cap on the casing enables a considerable movement of the cap and an appreciable adjustment thereby of the spring tension. As an important feature of the invention, the spring is of multiple coil conical type formed preferably of a flat stock and is arranged on compression so as to cause at least a partial inter-nesting of the coils whereby the over-all width of the spring will be of a minimum dimension when compressed. Another feature enabling a reduction in spring size and weight is the arrangement of the crankshaft 24 which, in the present embodiment is offset from the central axis of the casing so as to enable a substantial increase of leverage at the crank pin 31. The combination of the eccentric mounting of the crank shaft to the upper end of the cap 39, by a very substantial amount and accordingly enables a much closer positioning of the seat to the hinges.

As another important feature of the present invention, the spring operating mechanism is so arranged as to produce a vertical reciprocation of the spring rest 33 and a vertical compression of the spring. This is here effected by forming the guide slot 37 of a width equal to the transverse travel of the crank pin and forming the top surface of the rest portion 33 on an incline so as to counter-balance the tendency of the rest to pivot around the crank pin under the stress of the spring during reciprocation of the rest.

The seat may be resiliently maintained in a vertical position by the use of a lug or stop member 41 on the crank which is so positioned as to engage the base of the rest flange 33 upon elevation of the seat to a vertical position.

A modified form of the invention is illustrated in Figure 6 wherein a single spring hinge unit 46 may be used instead of the double spring unit illustrated in the first embodiment. In this form of the invention the operating mechanism is confined within the cylindrical housing 47 which may be secured to the toilet bowl openings 14 by means of spaced studs 18' whereby the housing will be disposed in a horizontal position across the back of the toilet bowl. Extending longitudinally through the housing is a shaft 48 which is adapted for connection at its opposite ends 49 to the back side of a toilet seat and secured about this shaft within the housing are a pair of helical springs 51 and 52 which serve to resiliently move the seat from horizontal to a vertical position and to resiliently resist the backward movement of the seat from a vertical position. As will be seen from the drawings one end 53 of the spring 51 is secured directly to the shaft 48 while the opposite end 54 of the spring is secured in an annular disc member 56 adjustably carried by the housing 47. As will be clear the direction of winding of the spring 51 is such that on rotating the shaft 48 to position the seat in a horizontal position the spring 51 will be tensioned and act to return the seat to vertical position when released. On the other hand, the spring 52 serves to resiliently resist movement of the seat rearwardly from a vertical position and has one end 57 thereof secured in an annular disc 58 carried by the housing 48 and an opposite end 59 positioned for engagement with a lug 61 carried by a collar 62 fixed to the shaft 48. Preferably the resilient force set up by the spring 51 may be adjusted and, as here shown, the disc member 56 is provided with a plurality of circumferentially spaced openings 63 which may be selectively engaged by a pin 64 carried by the housing.

I claim:

A toilet seat hinge comprising, a hollow elongated casing adapted for securing in upright position to the back of a toilet bowl, a crank shaft extending transversely through and journaled in said casing along an axis spaced from the center axis of said casing, said crank shaft having forward extending portions adapted for securing to the rear of a toilet seat for pivoting said seat to said casing for movement from a substantially horizontal position to a substantially vertical position of said seat, a spring rest mounted for vertical reciprocation in said casing and having an elongated bearing for engagement with said crank shaft, said bearing having a substantially horizontal dimension approximately equal to the horizontal throw of said crank, a helical spring compressed between the top of said spring rest and the top of said casing, the engaging top and bottom surfaces of said rest and spring being inclined to horizontal in a manner causing said rest to remain in substantially horizontal position during reciprocation under varying compressive forces of said spring and changing angularity of said crank shaft.

ERNEST F. HILL.