

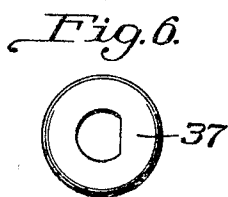
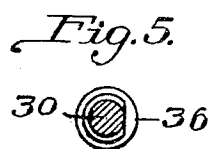
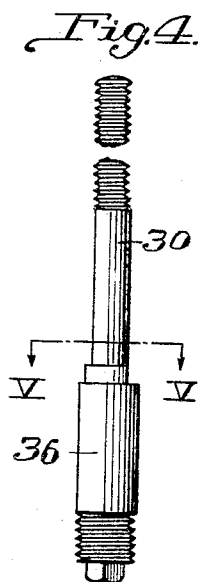
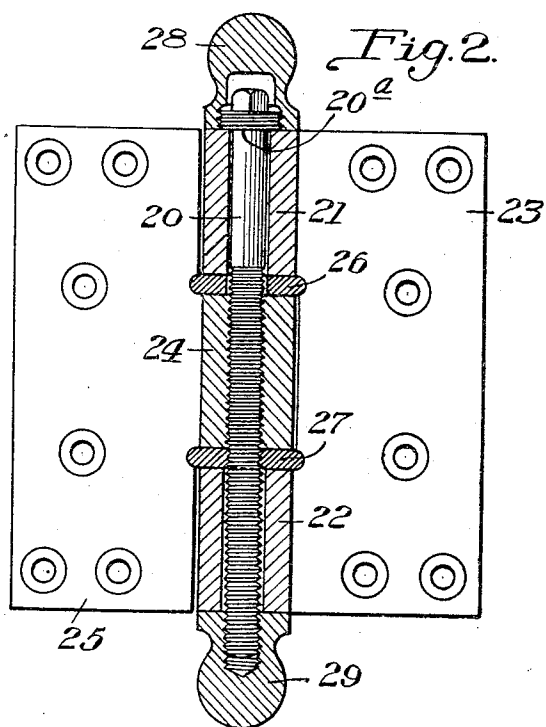
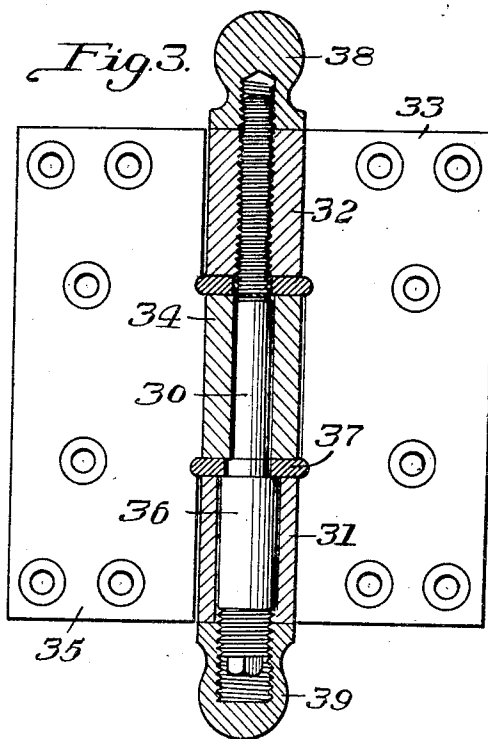
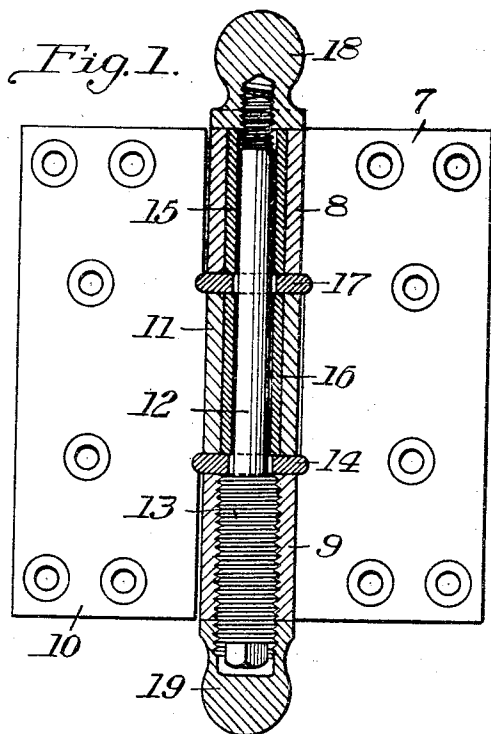
Aug. 11, 1931.

H. E. WOERNLE

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FRICTION HINGE

Filed May 10, 1927



INVENTOR

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UNITED STATES PATENT OFFICE

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FRICTION HINGE

Application filed May 10, 1927. Serial No. 190,196.

My invention relates to hinges, and particularly to hinges of the friction type wherein provision is made for yieldably resisting relative rotative movement of the hinge butts on their pintle.

One object of my invention is to provide a hinge wherein, with but slight changes in the hinge structure and in the usual pintle and its associated parts, there is provided an efficient means for effecting frictional contact between the hinge butts, which means may also be utilized for taking up lost motion caused by wear between the relatively movable hinge parts.

Still another object of my invention is to simplify and improve generally the structure and operation of hinges.

The improved construction results in a hinge which can be adjusted for frictional control so as to ensure against the accidental movement of the door under drafts of air or small impulses, with consequent disagreeable slamming. Furthermore, the structure and assemblage is such that the improved hinge, by reason of its close adherence to the standard type, can be produced at but slightly increased cost; its assemblage and installation is easy, and in appearance it does not depart from the conventional type.

Some of the forms which my invention may take are shown in the accompanying drawing, wherein Figure 1 is a partial elevational and partial sectional view of one form of hinge; Fig. 2 is a view showing still another modification; Fig. 3 is a similar view of a modified form of hinge; Fig. 4 is a view showing the pintle of Fig. 3; Fig. 5 is a view taken on the line V—V of Fig. 4, and Fig. 6 is a plan view of a washer or thrust collar of Fig. 3.

As shown in Fig. 1, the device includes a hinge butt 7 having knuckles 8 and 9 and a hinge butt 10 which has a knuckle 11 that is disposed between and in axial alinement with the knuckles 8 and 9. It will be understood that while I have shown the invention applied to a three-knuckle hinge of the usual form, it may be applied to hinges having a greater number of knuckles. The example

shown is illustrative, but in no sense restrictive, of the invention.

A pintle 12 has an enlarged portion 13 that has screw-threaded engagement with the knuckle 9 of the butt 7. The upper or shouldered end of the portion 13 of the pintle has thrust engagement with a thrust collar or washer 14 which, when the pintle 12 is screwed into place in the knuckle 9, is thrust against the knuckle 11 of the butt 10, so that frictional contact, varying with the pressure exerted is set up, and resistance is offered to the flexing of the butt 10 relative to the butt 7, to resist movement of the butt 10 about the pintle 12. This arrangement permits leaving of a door ajar without danger of slamming, and is highly desirable for use in hospitals, apartment houses, hotels, etc.

Sleeve-like bushings 15 and 16 are provided in the knuckles 8 and 11 respectively, to fill the space between the reduced portion of the pintle and the walls of said knuckles, but it will be understood that these knuckles may be made of such internal diameter that they will fit the pintle closely and the bushings therefore omitted. Likewise, the washer 17 that is interposed between the knuckles 11 and 8 and the washer 14 may be omitted, but I find it desirable to employ these washers, and particularly the washer 14 by reason of the extended bearing surface afforded thereby, so that, when the parts are set up to bring the frictional resistance to the desired point, such increased contact surface will effect the proper frictional stress without undue setting up of the parts.

Ball tips 18 and 19 are provided on the threaded ends of the pintle 12 both to produce a finished effect to the hinge, and to serve as jam nuts for preventing rotation of the pintle 12 within the knuckles 8 and 9, thereby preventing the threaded portion 13 of the pintle from becoming unscrewed, with consequent loss in friction.

Referring now to Fig. 2, I show a structure wherein a pintle 20 extends through knuckles 21 and 22 of a hinge butt 23, and through a knuckle 24 of a butt 25. The pintle has screw-threaded engagement with the last-named butt and has a shouldered portion 20^a

which abuts against the upper end of the knuckle 21. A washer 26 is interposed between the knuckles 21 and 24.

As the pintle 20 is screwed into position, it will draw the knuckle 24 into frictional engagement with the washer 26 and, indirectly, with the lower end of the knuckle 21, thereby taking up wear at the contacting surfaces of the knuckles and creating frictional resistance to turning movement of the hinge 25, as in the case of the knuckles 9 and 11 of Fig. 1.

A nut 27 has threaded engagement with the pintle, so that it can be screwed up tightly against the knuckle 24 and thereby serve as a lock nut to prevent turning of the pintle within the knuckle, thus maintaining the frictional contact between the knuckles 21 and 24. Ball tips 28 and 29 are provided for decorative effect and are not screwed so tightly into position as to hold the pintle 20 rigid with respect to the hinge butt 23.

Referring now to Figs. 3 to 6, I show a structure wherein a pintle 30 extends through knuckles 31 and 32 of a hinge butt 33 and a knuckle 34 of a butt 35. The pintle 30 has a reduced upper end in threaded engagement with the knuckle 32 and has its enlarged or shoulder portion 36 in thrust engagement with a washer 37 that seats against the lower end of the knuckle 34. The washer 37 and the pintle 30 have co-operating flattened surfaces as shown more clearly in Figs. 4, 5 and 6 which prevent rotative movement of the washer relative to the pintle, so that there is no frictional wear upon the upper end of the shoulder 36, which is of small area compared to the bearing surface of the washer 37.

As the pintle 30 is screwed into position in the knuckle 32, the washer 37 is forced into contact with the lower end of the knuckle 34, thereby setting up frictional resistance to turning of the hinge butt 35 relative to the butt 33. Ball tips 38 and 39 serve as lock nuts to prevent turning of the pintle 30 in the knuckles 31 and 32, thereby maintaining the pintle in the position to which it has been set to create the desired degree of friction.

It will be seen that in the several embodiments of the invention shown there is found the idea of providing a plurality of inter-engaged knuckles on opposed butts, with a pintle traversing the aligned knuckles. Such pintle has adjustable engagement with one knuckle of a plurality on one butt, and thrust engagement with a knuckle on the other butt, so that, upon adjustment of the pintle, friction, due to thrust, is set up, without any distortion or squeezing together of the parts, all of which, except for the thrust friction thereon, remain in the same relative positions, and are not thrown out of alignment.

This is due in part to the rigid character of the relatively long knuckles, but principally to the interposed friction members or washers, which take the thrust of the pintle, or thrust member, and transmit it, converted into friction, to the parts. These friction members, by reason of their increased area, give a very high coefficient of friction upon a relatively small adjustment.

It will be noticed that in each of the forms of the invention herein disclosed, there is the thrust member (pintle) in adjustable (screw-threaded) engagement with a knuckle of one hinge butt, and that said thrust member (pintle) has an abutment, the shoulders of the parts 13 and 36 in Figures 1 and 3, and the shoulder 20^a in Figure 2, which is axially rigid with relation to the other knuckle. With this arrangement, when the adjustment is made the knuckles of the opposed butts are put under the necessary frictional engagement to ensure their holding against accidental movement of the supported door under slight impulses.

I claim as my invention:—

A friction hinge comprising a butt having a pair of knuckles, an opposed butt having a knuckle interengaged between the pair of knuckles and having substantially smooth longitudinal extremities, and a pintle traversing said knuckles and having an enlarged section in threaded engagement with one of the pair of knuckles with said enlarged portion in thrust-exerting relation to one of the smooth longitudinal extremities of the inter-engaged knuckle.

In testimony whereof I, the said HARRY E. WOERNLE, have hereunto set my hand.

HARRY E. WOERNLE.