Dec. 8, 1931. H. E. WOERNLE 1,835,129

FRICTION HINGE

Original Filed April 17, 1926

FIG. 1

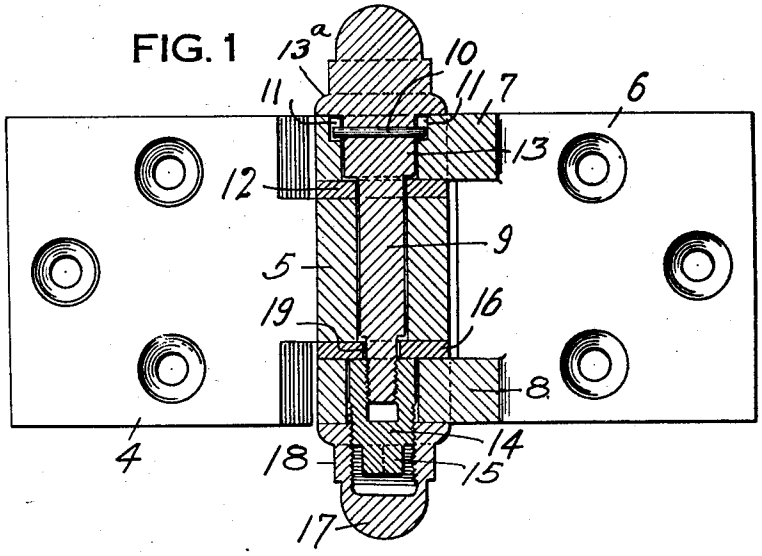


FIG. 2

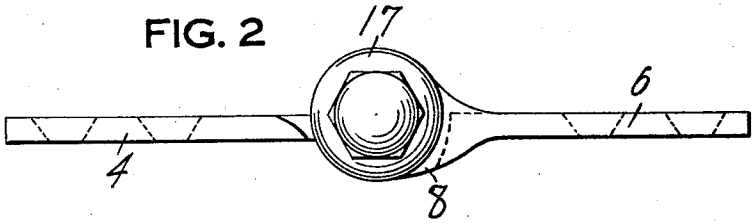


FIG. 4

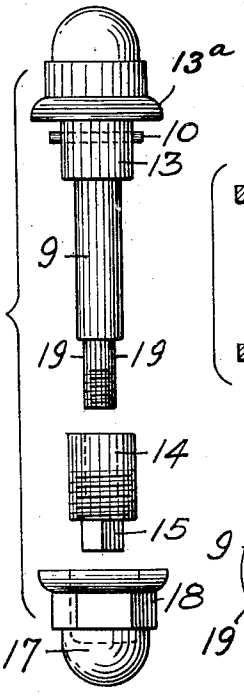


FIG. 5

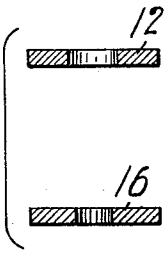


FIG. 3

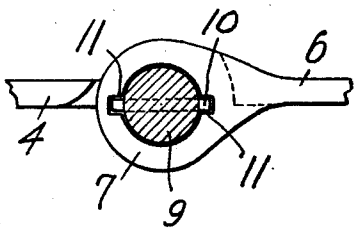
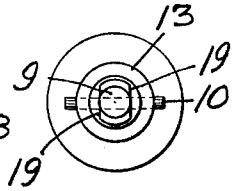


FIG. 6



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Patented Dec. 8, 1931

1,835,129

UNITED STATES PATENT OFFICE

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FRICTION HINGE

Application filed April 17, 1926, Serial No. 102,672. Renewed May 14, 1928.

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 the means for effecting frictional contact between the hinge butts 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.

One form which my invention may take is shown in the accompanying drawings, wherein Fig. 1 is partial front elevational and partial sectional view of a hinge embodying my invention; Fig. 2 is a bottom plan view thereof; Fig. 3 is a sectional plan view of the device of Fig. 1; Figs. 4 and 5 are views showing certain of the hinge parts in disassembled position, and Fig. 6 is an inverted plan view of the pintle of Fig. 4.

The structure includes a hinge butt 4 that has a knuckle or eye portion 5 formed in one end thereof, and a hinge butt 6 that is provided with knuckle or eye portions 7 and 8. A pintle 9 extends into the eye portions 5, 7 and 8 and is provided with a pin 10 at its upper end, which fits within vertical slots 11 that are formed in the eye 7, thus preventing relative rotative movement of the pintle 9 and the hinge butt 6.

A washer 12 is interposed between the eyes 7 and 5. The upper end of the pintle 9 has a shoulder 13ª that has thrust engagement with the eye 7. A shoulder 13 on the pintle can be made of sufficient length to abut against the washer 12, to take the thrust of the said pulling force, if desired, when a downward pulling force is exerted on the pintle 9, in a manner to be hereinafter described.

An interiorly and exteriorly threaded bushing 14 is located within the eye 8 and has its interior thread engaged by the lower threaded end of the pintle 9. The lower end of the sleeve 14 is provided with a squared shank 15 by means of which it may be screwed upon the pintle 9. A washer 16, preferably of metallic material, is interposed between the eye 5 and the upper edges of the bushing 14 and the eye 8. When the sleeve 15 is rotated it causes the washers 12 and 16 to be forced against the upper and lower edges, respectively, of the eye 5 so that resistance will be offered to relative movement of the butts 4 and 6 about the pintle 9, and the door (not shown) to which the hinge is connected will remain in the position to which it has been moved.

The pintle 9 is held by the pin 10 against rotative movement both when screwing the sleeve 14 into place and when operating the hinge, thus permitting the sleeve to be readily screwed into place, and reducing the tendency of the same to be rotated through movement of the hinge butts.

It will of course be understood that the washer 12 could be dispensed with if desired, but is provided for the purpose of securing a widened bearing surface for the upper end of the eye 5.

The structure above described not only permits of securing a desired degree of friction between the hinge butts, but can be adjusted to compensate for wear upon the ends of the eyes, and relative vertical positions of the butts 4 and 6 can be still further varied or adjusted by varying the thickness or number of the washers 12 and 16, so that the hinge can be made to match up with the hinge seats and screw holes formed in a door frame and its door, should they be in misaligned horizontal positions.

In order to lock the sleeve 14 against rotation and to provide a finished appearance to the lower end of the hinge, I provide a tip 17 that is threaded interiorly and is provided with a hexagonal wrench-engaging surface 18. Upon screwing of the tip 17 to position its upper edge will be brought against the lower edge of the eye 8 and thereby serve as a jam nut.

The pin 10 can be dispensed with, if desired, since, when the parts are in assembled relation, the extended frictional contact between the shoulder 13ª and the upper end of the knuckle 7, together with the threaded en-

gagement of the pintle with the nut 14, will hold the pintle against rotative movement relative to the knuckles 7 and 8.

It will be observed that the pintle-receiving members are in stable supporting relation with one another, due to the close assembly and contact of the parts, so that there will be no tilting of the hinge members relative to one another, resulting in transverse strains upon the pintle. In the ordinary type of door hinge, where pintles are vertically disposed, this is of importance, for any unstable relation of the pintle receiving portions relative to one another would result in sagging of the door, with a tendency to distort the relations of the hinge members and impose a transverse strain upon the pintles.

The pintle 9 is flattened at 19, and the washer 16 correspondingly shaped, so that the washer will not rotate relative to the pintle or the butt 6, and there will therefore be no tendency for the sleeve 14 to become unscrewed when the butt 4 is swung about the pintle.

I claim as my invention:

1. Hinge structure, comprising a pair of butts having aligned knuckles, a pintle for rotatably supporting said knuckles in alignment, a nut adjustable axially of the pintle, for normally holding a knuckle of one butt in frictional engagement with a knuckle of the other butt, a cap member engaging said nut and partially enclosing the same, and means for holding said cap member and nut against rotation relative to the pintle.

2. Hinge structure, comprising a hinge butt having top and bottom knuckles, a hinge butt having a knuckle disposed intermediate the first named knuckles, a pintle extending through the top and intermediate knuckles and into the bottom knuckle, the lower end of the pintle being of small diameter relative to the diameter of the bottom knuckle, a shoulder on the pintle in position to abut against the upper edge of the top knuckle, an internally and externally threaded nut having threaded engagement with the lower portion of the pintle and extending into the bottom knuckle, the said nut abutting the lower end of the intermediate knuckle and being adjustable to move said knuckle into frictional engagement with the top knuckle, and a lock nut engaging the external thread of the first named nut and movable into abutting engagement with the lower end of the bottom knuckle.

3. Hinge structure, comprising a hinge butt having two axially spaced knuckles, a second butt having a knuckle disposed between the first named knuckles, a pintle disposed within said knuckles, and having a threaded end portion that is of small diameter relative to the diameter of the knuckle surrounding the same, means for holding the pintle against axial movement in one direction, a nut extending into the last named knuckle and having screw-threaded engagement with said reduced end of the pintle and abutting engagement with the adjacent knuckle, whereby the said nut may be adjusted to effect a desired degree of frictional contact between the last named knuckle and one of the other knuckles, and a locking member having engagement with said nut and its surrounding knuckle to hold the nut against rotative movement.

4. Hinge structure comprising a butt having an intermediate knuckle, a second butt having a knuckle disposed at one end of the intermediate knuckle and having another knuckle disposed at the other end of the intermediate knuckle, a pintle extending through said knuckles, a shoulder formed on the pintle adjacent to one end thereof and having engagement with one of the two latter-named knuckles, to hold it against axial movement in one direction, screw-threaded holding means within the other of the two latter-named knuckles for holding the pintle against movement in the other axial direction and for maintaining the intermediate knuckle in frictional engagement with the inner end of the second-named knuckle, and a cap member having threaded connection with the other end of the pintle and abutting against the outer end of the third-named knuckle.

5. A hinge structure comprising, in combination, butt portions having as parts thereof registering pintle-receiving members in stable supporting relation with one another to relieve the pintle of transverse strains, a pintle traversing and engaging said members to effect relative axial movement of and create a frictional condition between such members, and means associated with said pintle to control and vary its friction-creating action.

6. A friction hinge comprising butt members having pintle-receiving portions in stable supporting relation with one another to relieve the pintle of transverse strains, a pintle traversing said pintle-receiving portions and having friction exerting means, and means adjustably connected with said pintle to vary the action of said friction exerting means on said pintle-receiving portions.

7. A friction hinge comprising butt members having pintle-receiving portions in stable supporting relation to one another to relieve the pintle of transverse strains, a pintle traversing said pintle-receiving portions and having friction exerting means, means adjustably connected with said pintle to vary the action of said friction exerting means on said pintle-receiving portions, and covering means to conceal said friction varying means and give a balanced exterior to the hinge.

8. A friction hinge comprising butt members having pintle-receiving portions in substantially fixed relation to one another with

respect to relative longitudinal movement, a pintle traversing said pintle-receiving portions and having means for exerting friction on said pintle-receiving portions, and means adjustably connected with said pintle to vary the friction between said pintle-receiving portions.

9. A friction hinge comprising butt members having pintle-receiving portions in substantially fixed relation to one another with respect to relative longitudinal movement, a pintle traversing said pintle-receiving portions and having means for exerting friction on said pintle-receiving portions at a plurality of points, and means adjustably connected with said pintle to vary the friction between said pintle-receiving portions.

10. A friction hinge comprising butt members having pintle-receiving portions, friction members alternating with said portions to maintain them in substantially fixed relation to one another with respect to relative longitudinal movement, a pintle traversing said pintle-receiving portions and said friction members, and adjustable means to exert longitudinal pressure on said pintle and vary the friction between said pintle-receiving portions and said friction members.

11. A friction hinge comprising butt members having pintle-receiving portions, a friction washer between said members and maintaining said members in stable relation with one another, a pintle traversing said members and washers, a shoulder on said pintle engaging a washer, and means for effecting a longitudinal movement of said pintle to vary the frictional contact between said members and interposed washer.

12. A friction hinge comprising butt members having pintle-receiving portions, friction washers alternating with said portions and maintaining said members in stable relation with one another, a pintle traversing said portions and washers, shoulders on said pintle engaging said washers, and means for effecting a longitudinal movement of said pintle to vary the frictional contact between said portions and washers.

13. A friction hinge comprising butt members having pintle-receiving portions in stable supporting relation to one another to relieve the pintle of transverse strains, friction exerting means between said pintle-receiving portions, a pintle traversing said portions and engaging said interposed friction exerting means, and means for effecting longitudinal movement of said pintle to exert pressure on said interposed means and create friction on a pintle receiving member.

14. A friction hinge comprising butt members having pintle-receiving portions in substantially fixed vertical relation to one another to relieve the pintle of transverse strains, a friction washer disposed between said pintle-receiving portions, a pintle traversing said portions and said washer, means to engage said pintle with said washer, and means to effect longitudinal movement of said pintle to create friction between said washer and a pintle-receiving portion.

15. A friction hinge comprising butt members having pintle-receiving portions in stable supporting relation to one another to relieve the pintle of transverse strains, a plurality of washers interposed between the pintle-receiving portions, a pintle traversing said portions and said washers and provided with shoulders to engage said washers, and means for moving said pintle longitudinally to exert pressure upon said washers and give frictional engagement between said washers and said pintle-receiving portions.

16. A friction hinge comprising butt members having pintle-receiving portions, a pintle traversing said pintle-receiving portions, means for moving said pintle in the direction of its longitudinal axis, and means actuated by movement of the pintle to exert friction on a pintle receiving portion.

17. Friction hinge structure, comprising a pair of leaves having aligned pintle receiving knuckles, a pintle passing within said knuckles, substantially non-yieldable friction exerting means slidable axially of the pintle into stable supporting relationship with respect to a knuckle of one of said leaves and normally circumferentially stationary with respect to the other leaf, and means threadedly cooperating with the pintle for pressing said friction exerting means into desired stable supporting relationship with respect to said knuckle of said first mentioned leaf.

18. Friction hinge structure, comprising a pair of leaves having aligned pintle receiving knuckles, a pintle passing within said knuckles, said pintle being adapted to normally remain non-rotatable with respect to one of said leaves, and a cap threaded over the end of the pintle and adapted to be screwed up thereon into desired stable supporting relationship with a knuckle of the other leaf for creating a frictional condition between the respective leaves.

19. A friction hinge comprising butt members having pintle-receiving portions, a pintle traversing said pintle-receiving portions and directly in contact therewith, means for moving said pintle in the direction of its longitudinal axis, and means in engagement with and actuated by movement of the pintle to exert friction on a pintle-receiving portion.

20. A friction hinge comprising butt members having pintle-receiving portions, a pintle provided with a shoulder traversing said pintle-receiving portions and in direct engagement therewith, means for moving said pintle in the direction of its longitudinal axis, and means in engagement with the shoul-

der of and actuated by movement of the pintle to exert friction on a pintle-receiving portion.

21. A friction hinge comprising butt members having pintle-receiving portions, a pintle provided with a shoulder traversing said pintle-receiving portions and in direct engagement therewith, means for moving said pintle in the direction of its longitudinal axis, and a friction washer in engagement with the shoulder of and actuated by movement of said pintle to exert friction on a pintle-receiving portion.

22. Friction hinge structure, comprising a pair of leaves having aligned pintle receiving knuckles, a pintle passing within said knuckles, substantially non-yieldable friction exerting means slidable axially of the pintle into contact with a knuckle of one of said leaves, and means cooperating with the pintle for pressing said friction exerting means against said knuckle of said first mentioned leaf.

23. Friction hinge structure, comprising a pair of leaves having aligned pintle receiving knuckles, a pintle passing within said knuckles, said pintle being adapted to normally remain non-rotatable with respect to one of said leaves, and means connected with the pintle and adapted to be moved generally axially thereof into stable supporting relationship with a knuckle of the other leaf for creating a frictional condition between the respective leaves.

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

HARRY E. WOERNLE.