Feb. 19, 1924. 1,484,536

A. W. WAY

HINGE

Filed Jan. 23, 1923 2 Sheets-Sheet 1

Fig. 1.

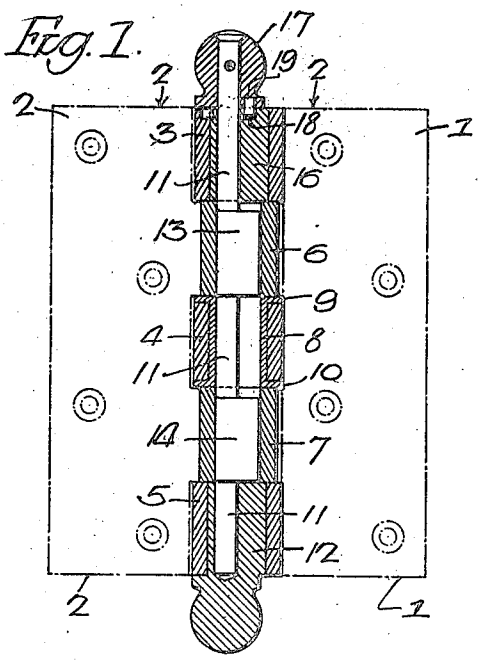



Fig. 2.

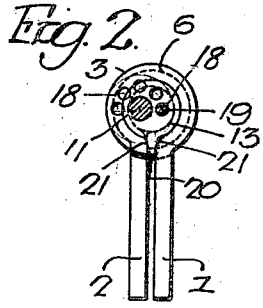



Fig. 3.

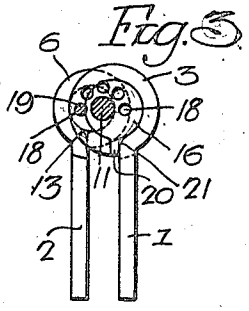



Fig. 5.

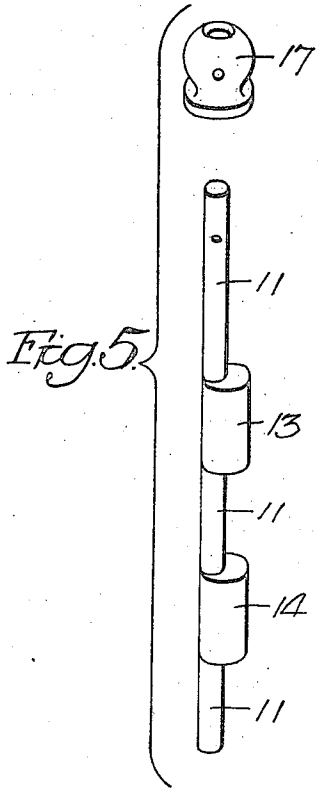
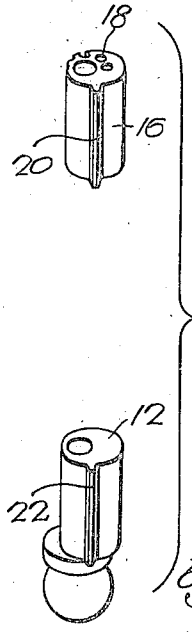



Fig. 4.




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Feb. 19, 1924. 1,484,536

A. W. WAY

HINGE

Filed Jan. 23, 1923 2 Sheets-Sheet 2

Fig. 6.

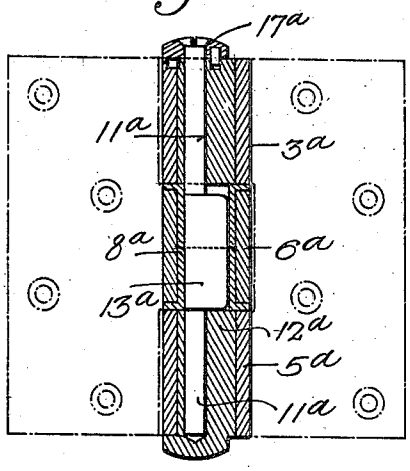



Fig. 7.

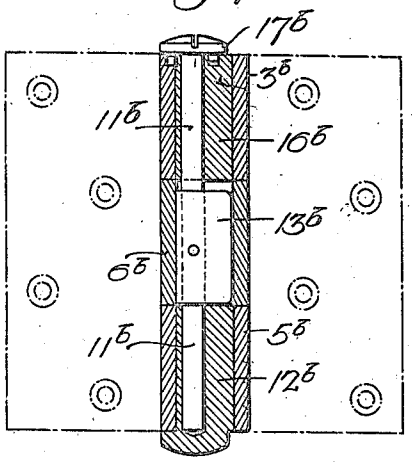



Fig. 8

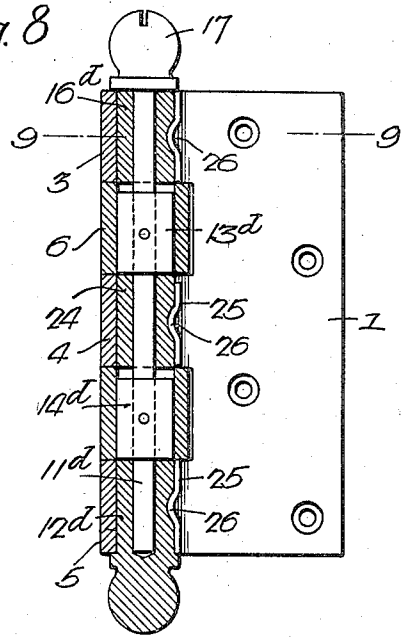



Fig. 10.

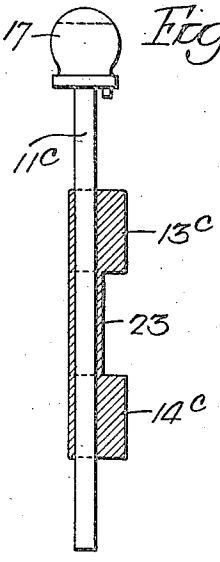
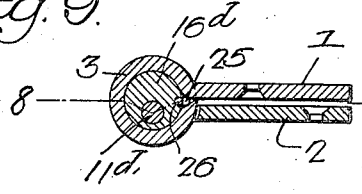



Fig. 9.




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Patented Feb. 19, 1924. 1,484,536

# UNITED STATES PATENT OFFICE.

ALBAN WARREN WAY, OF PHILADELPHIA, PENNSYLVANIA.

## HINGE.

Application filed January 23, 1923. Serial No. 614,411.

*To all whom it may concern:*

Be it known that I, ALBAN WARREN WAY, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Hinges, of which the following is a specification.

One object of my invention is to improve the construction of hinges, especially door hinges, whereby a door can be fitted accurately to the door frame.

A further object of the invention is to provide means for adjusting the hinge by turning the pintle.

A still further object of the invention is to design the hinge so that the pintle can be removed and the leaves of the hinge can be secured to the door and to the frame prior to locating the door in the frame.

These objects I attain in the following manner, reference being had to the accompanying drawings, in which:

Fig. 1 is a longitudinal view of a five knuckle hinge illustrating my invention;

Fig. 2 is a sectional plan view on the line 2—2, Fig. 1, showing the leaves close together;

Fig. 3 is a view, similar to Fig. 2, showing the leaves spread apart;

Fig. 4 is a detached perspective view of the upper and lower eccentric bushings;

Fig. 5 is a detached perspective view of the pintle;

Fig. 6 is a view illustrating my invention applied to a three knuckle hinge;

Fig. 7 is a view of another modification of a three knuckle hinge;

Fig. 8 is a vertical sectional view of a modified form of a five knuckle hinge on the line 8—8, Fig. 9;

Fig. 9 is a sectional plan view on the line 9—9, Fig. 8, and

Fig. 10 illustrates a modification showing the two cams of the pintle mounted on a sleeve.

Referring to Figs. 1 to 5 of the drawings, 1 and 2 are the two leaves of a five knuckle hinge. 3, 4 and 5 are the knuckles of the leaf 1. 6 and 7 are the knuckles of the leaf 2. In the present instance, the openings in the knuckles 3, 4 and 5 are larger than the openings in the knuckles 6 and 7. The knuckle 4 is provided with a hard metal bushing 8 made in a single piece as shown in Fig. 1, or in two pieces, as in Fig. 6. This bushing is flanged at both ends 9 and 10. The flanges extend between the knuckle 4 and the knuckles 6 and 7 and take the end thrust of the hinge.

11 designates the pintle, which consists of a rod having two internal cams 13 and 14. The cam 13 is located in the knuckle 6 and the cam 14 is located in the knuckle 7. The lower end of the pintle is mounted in an eccentric bushing 12 secured to the lower knuckle 5. The upper end of the pintle extends through an eccentric bushing 16 in the upper knuckle 3. A head 17 is secured to the upper end of the pintle in the manner shown in Fig. 1.

In the upper edge of the knuckle 3 is a series of holes 18 so located as to receive a pin 19 on the head 17 of the pintle 11 so that, when the pintle is turned to adjust the hinge, it can be locked in the position in which it is adjusted. The bushing 12 is preferably provided with an ornamental head corresponding to the head 17.

The upper, eccentric bushing 16 has a fin 20 extending into a space 21 left in bending the knuckle 3 from the blank, as shown in Fig. 2. The lower bushing 12 has a fin 22 extending into the space formed in bending the knuckle 5 so that both eccentric bushings are held in proper alignment with each other in their respective knuckles.

There is a clearance space between the upper end of each cam and the adjoining knuckle, which allows the pintle to be raised so that the pin 19 will clear the holes 18 to allow the pintle to be turned to adjust one leaf in respect to the other.

In Fig. 6 is shown a three knuckle hinge made in accordance with my invention. The central knuckle $6^a$ has a flanged bushing $8^a$. The flanges extend between the central knuckle and the upper knuckle $3^a$ and the lower knuckle $5^a$. The pintle $11^a$ has an integral cam $13^a$, which is rounded at the edges, as shown, so that, on removing the pintle from the hinge, the parts can be readily brought into alignment. The eccentric bushing $16^a$ of the upper knuckle is placed on the spindle prior to securing the head $17^a$ to the spindle. In the present instance, the pintle extends through the head and is riveted over the head.

The lower eccentric bushing $12^a$ is secured in position in the same manner as the bushing shown in Fig. 1. Both bushings may be driven in position and pinned, if desired.

In Fig. 7, the pintle $11^b$ is made separate from the cam $13^b$ and is secured thereto by a pin, or other fastening, after the upper, eccentric bushing $16^b$ has been located between the head $17^b$ and the cam $13^b$.

In Fig. 10, the pintle $11^c$ extends through an opening in a sleeve 23 on which are the cams $13^c$ and $14^c$.

Fig. 8 shows a five knuckle hinge, in which the central knuckle has a bushing 24 provided with an eccentric passage. The pintle $11^d$, in this instance, is a rod having a head at one end. The cams $13^d$ and $14^d$ are secured to the pintle in any suitable manner. The eccentric bushings $16^d$ and 24 and $12^d$ are each held in position by a rod 25 offset at 26 to extend into notches in the bushings.

In the construction hereinbefore described, the pintle can be removed so that one leaf can be secured to the door and the other leaf can be secured to the frame, as the present practice in building construction is to separate the parts of the hinges and to secure one part to the door and the other part to the frame, after which the door is placed in position in the frame and the pintles are driven into place.

To adjust a door, all that is necessary is to raise the pintles of the hinges so that their pins will clear the holes in the upper knuckles. Then the pintles can be turned, moving the door towards or from the frame at the opposite side of the doorway from the hinge.

I claim:

1. The combination in a hinge, of two leaves, each leaf having knuckles; a pintle adapted to be inserted into position from one end of the hinge, said pintle having a cam located in one of said knuckles; and an eccentric bushing detachably mounted in one of the other knuckles and through which the pintle extends so that, when the pintle is withdrawn, the bushing is also withdrawn.

2. The combination in a hinge, of two leaves, one leaf having upper and lower knuckles and the other leaf having an intermediate knuckle, the upper knuckle having a detachable, eccentric bushing, and the lower knuckle having a fixed eccentric bushing; a pintle adapted to be inserted into position from one end of the hinge, said pintle extending through the upper bushing and into the lower bushing; and a cam on the pintle located in the intermediate knuckle, the upper bushing being removable with the pintle.

3. The combination in a hinge, of two leaves, one leaf having three knuckles spaced apart, the other leaf having two knuckles located in the spaces between the knuckles of the first mentioned leaf; a pintle extending through the several knuckles and having cams located in the two knuckles of one leaf; a fixed, eccentric bushing on the lower knuckle of the three knuckle leaf; and a removable, eccentric bushing in the upper knuckle thereof, removable with the pintle.

4. The combination in a five knuckle hinge, of two leaves, one leaf having three knuckles spaced apart, the other leaf having two knuckles located in the spaces between the knuckles of the first mentioned leaf, the opening in the upper and lower knuckles of the three knuckle leaf being greater in diameter than the openings in the knuckles of the two knuckle leaf; eccentric bushings in the upper and lower knuckles of the three knuckle leaf; a pintle extending through one of the eccentric bushings and into the other eccentric bushing; and cams on the pintle located in the knuckles of the two knuckle leaf, one of the eccentric bushings being removable with the pintle.

5. The combination in a hinge, of two leaves having knuckles; eccentric bushings in the knuckles of one leaf; a pintle having a cam located in the knuckle of the other leaf; and a head on one end of the pintle, one of the eccentric bushings being located on the pintle between the cam and the head so that it can be removed with the pintle.

6. The combination in a hinge of two leaves having knuckles; eccentric bushings in the knuckles of one leaf; a pintle having a cam located in the knuckle of the other leaf; and a hard metal bushing in one of the knuckles, said bushing having flanges at each end extending between two knuckles and forming thrust members for the hinge.

7. The combination in a hinge, of two leaves, one leaf having three knuckles and the other leaf having two knuckles; a hard metal bushing located in the middle knuckle and flanged, said flanges extending between said knuckles and the adjoining knuckles; a fixed, eccentric bushing in one end knuckle of the three knuckle leaf; a removable, eccentric bushing in the other end of the knuckle; means for preventing said knuckle from turning; a pintle having cams located in the knuckles of the two knuckle leaf and extending through the removable, eccentric bushing and into the fixed, eccentric bushing; and a head on the end of the pintle holding the removable, eccentric bushing on the pintle so that, when the pintle is withdrawn, it will carry the removable bushing.

8. The combination in a hinge, of two leaves; a fixed, eccentric bushing and a removable, eccentric bushing mounted in one leaf; means for preventing the bushings from turning in the leaf; a pintle extending through the removable bushing and into the fixed bushing; a cam on the pintle located in the other leaf; and a head on the

pintle retaining the removable bushing on the pintle.

9. The combination in a hinge, of two leaves having knuckles; a removable, eccentric bushing and a fixed, eccentric bushing mounted in the knuckles of one leaf; a pintle extending through the removable bushing and into the fixed bushing; a cam on the pintle engaging the knuckle of the other leaf, said cam being less in height than the knuckle to allow clearance; a head on the pintle confining the removable bushing to the pintle; and means for locking the pintle in the position in which it is adjusted, the clearance of the cam allowing the pintle to be raised clear of the locking means.

ALBAN WARREN WAY.