

No. 764,833.

PATENTED JULY 12, 1904.

G. S. VAN WAGONER.  
HINGE.

APPLICATION FILED OCT. 20, 1902.

NO MODEL.

Fig. 1.

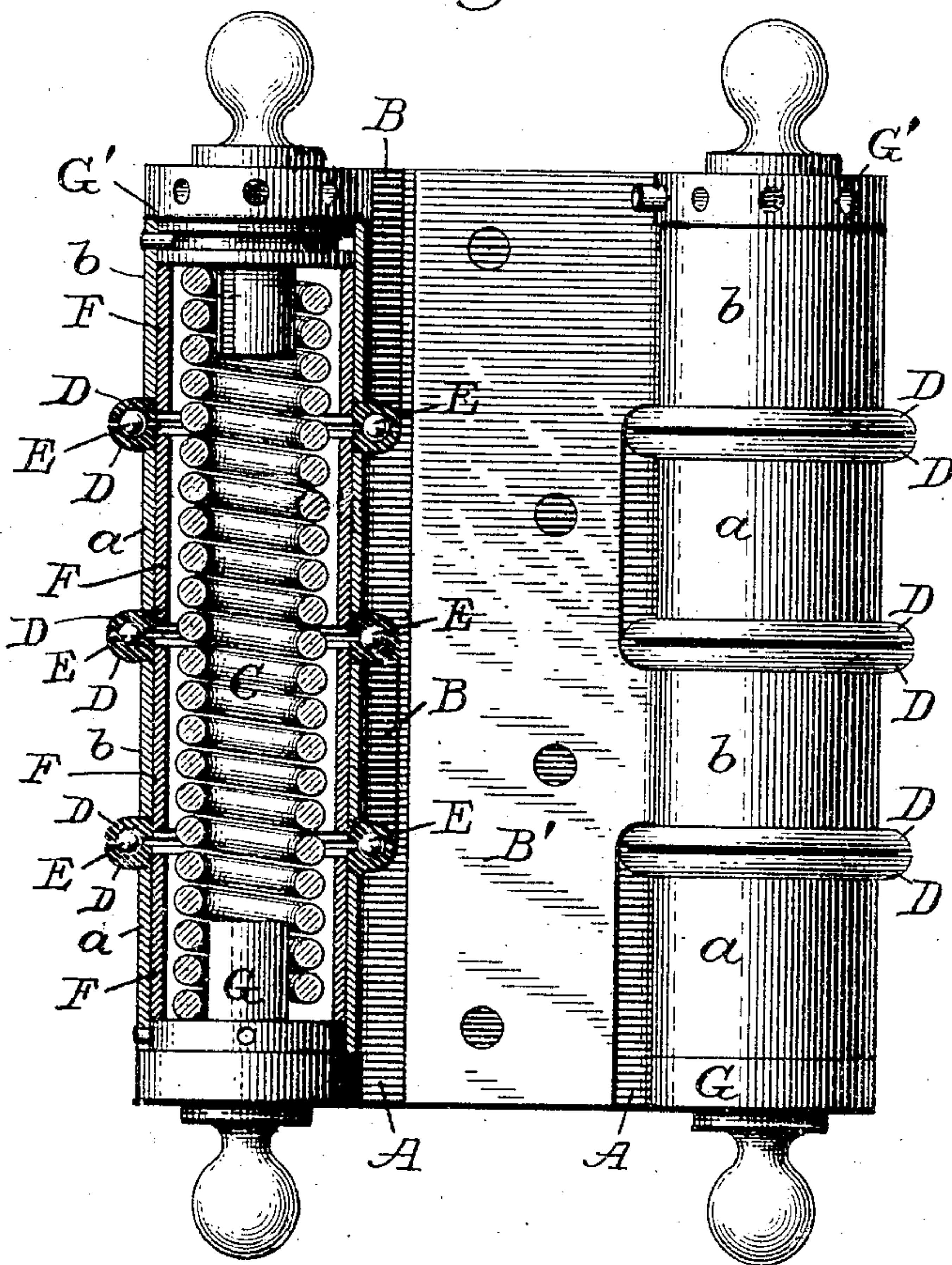


Fig. 3.

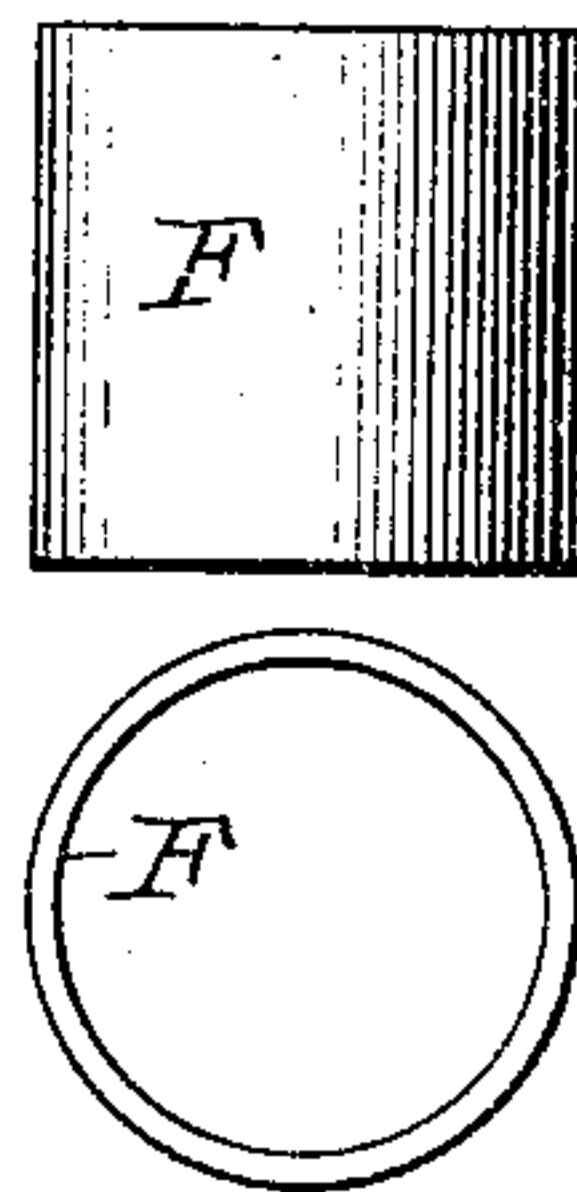


Fig. 4.

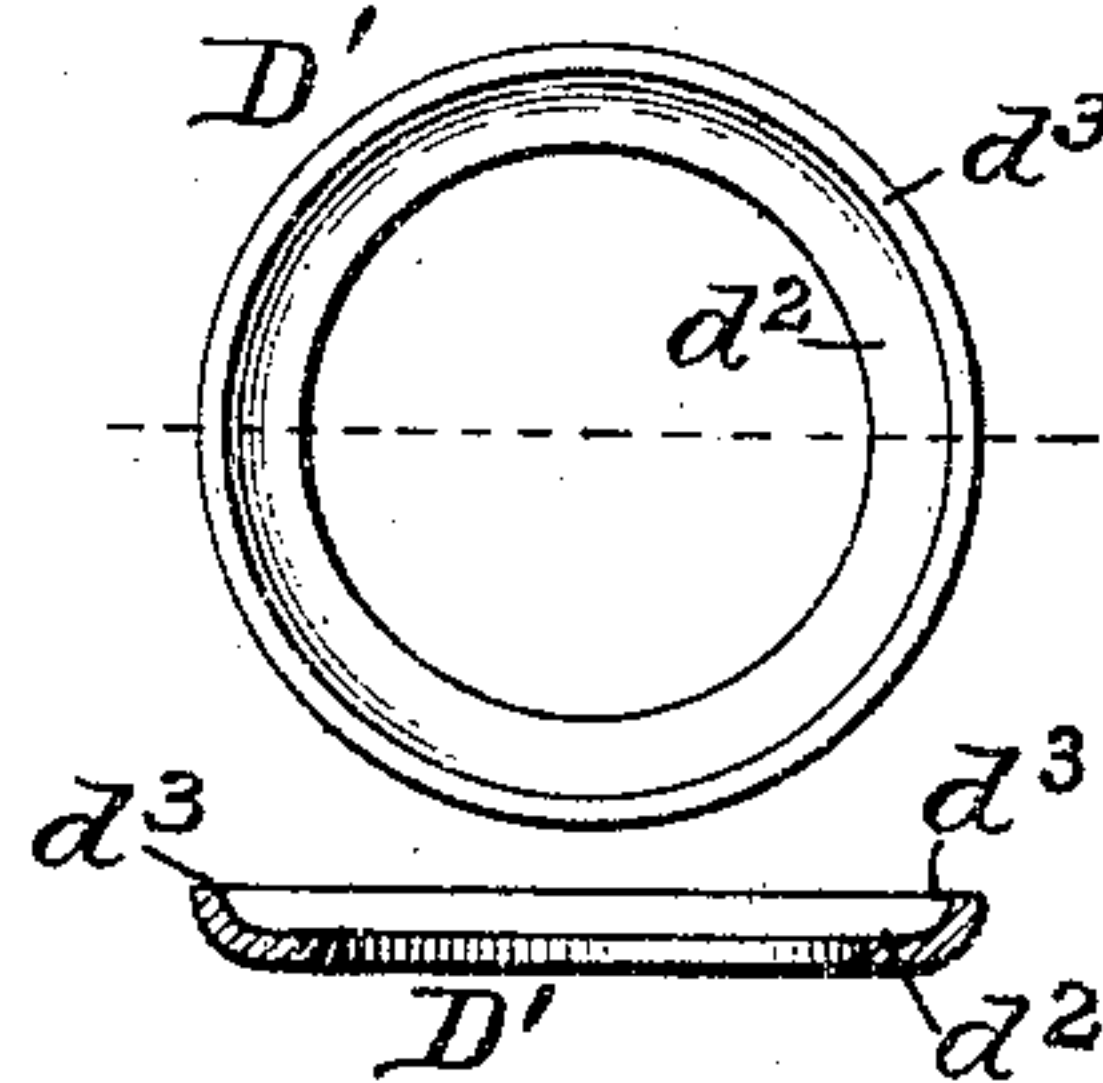
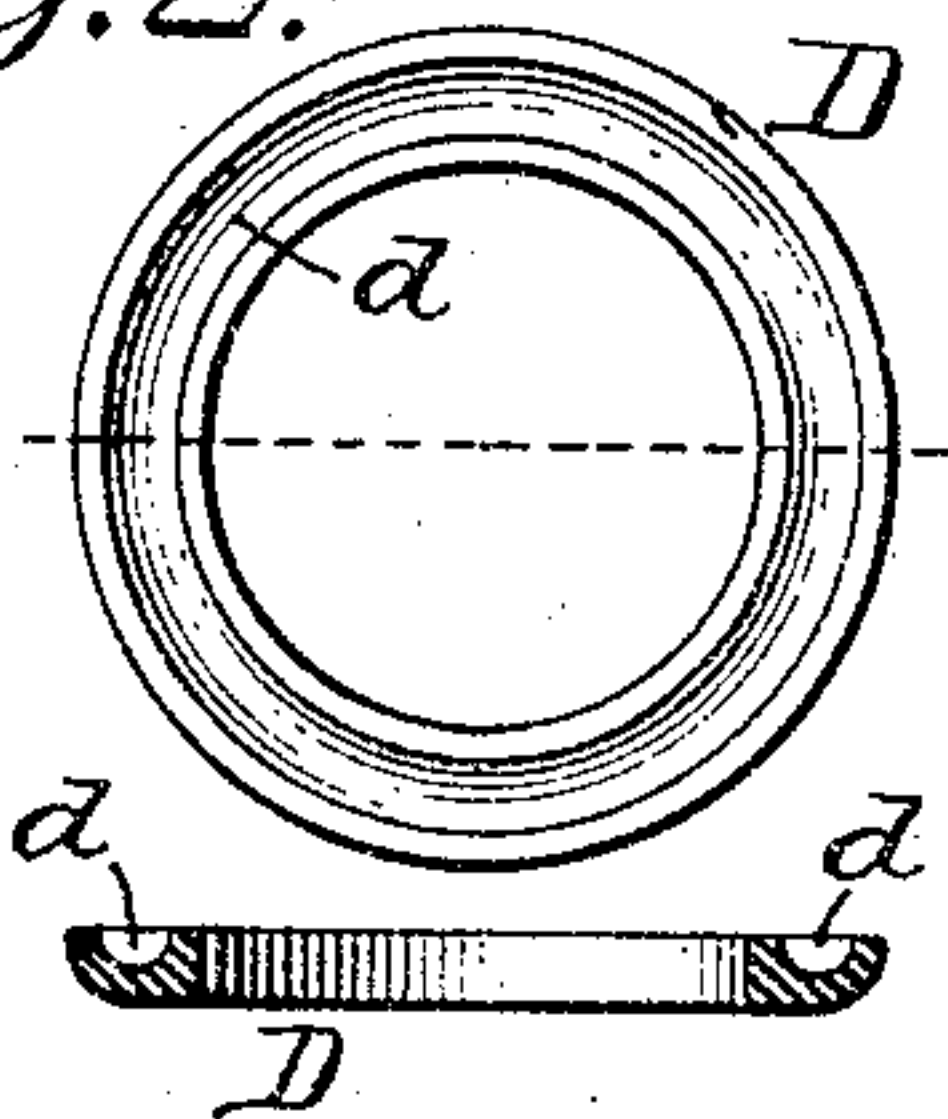


Fig. 2.



Attest:

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# UNITED STATES PATENT OFFICE

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## HINGE.

SPECIFICATION forming part of Letters Patent No. 764,833, dated July 12, 1904.

Application filed October 20, 1902. Serial No. 127,945. (No model.)

*To all whom it may concern:*

Be it known that I, CORNELIUS S. VAN WAGONER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Hinges, of which the following is a specification.

My invention relates to the construction of what are known as "antifriction-hinges," and has been devised with special reference to that class of spring-hinges which have the controlling-spring housed within the hinge-knuckles.

The object of my invention is to provide an antifriction-bearing between the knuckles of the hinge, the parts of which may be economically produced and assembled and which will operate to lock the knuckles together, and thus avoid the necessity for the usual connecting pin or pintle.

My invention consists in the combination, with a hinge having tubular knuckles, of a pair of rings or centrally-perforated washers inserted between the knuckles of the companion leaves, said rings being provided with grooves or annular depressions in their adjacent faces forming an annular ball-raceway and being confined against independent lateral movement by antifriction-balls inserted in said grooves or raceway, the rings and balls being locked to the adjacent knuckles by sleeves, which closely fit said knuckles and project into or through the central opening in said rings or washers, the projecting edges of the said rings terminating at a point between the edges of the adjacent knuckles, as will be hereinafter more particularly described.

Referring to the drawings furnished and forming a part of this specification, Figure 1 illustrates a double-acting spring-hinge embodying my invention, said hinge being shown partly in section and partly in side elevation. Fig. 2, in two views, illustrates one of the rings or washers which is inserted between the hinge-knuckles for affording support for the antifriction-balls. Fig. 3, in two views, illustrates one of the sleeves which are employed for locking the rings and balls to the

adjacent hinge-knuckles; and Fig. 4, in two views, illustrates a ring or washer of slightly-modified form.

As hereinbefore indicated, my invention is applicable to spring-hinges in which the controlling-spring is housed or inclosed within the knuckles of the hinge-leaves. Its chief value will, however, be found in its application to sheet-metal hinges of the character indicated, and I have selected a sheet-metal double-acting spring-hinge for the purpose of illustrating the invention in what I deem to be its best form.

The central leaf A and the side leaves B and B' of the hinge illustrated are, so far as general structure and appearance are concerned, similar to the leaves of prior sheet-metal hinges of like character.

The central leaf A is provided with two tubular knuckles *a a* on each of its side edges, and similar knuckles *b b* are provided on one of the side edges of each of the side leaves B and B', said knuckles when the leaves are properly placed with reference to each other forming a spring-barrel along each of the side edges of the center leaf for receiving a controlling-spring C. The knuckles on the several leaves are so proportioned as to length as to afford a space between the knuckles of adjacent leaves for a pair of rings or washers D, between which the antifriction-balls E are housed. Said rings, one of which is shown in plan and sectional views in Fig. 2, have an interior diameter corresponding to the interior diameter of the hinge-knuckles, and on one of the faces of each of the rings there is an annular groove or depression *d* for receiving the antifriction-balls E, the latter being practically housed in the grooves of a pair of the rings placed face to face, as illustrated in Fig. 1.

Within each of the knuckles *a* and *b* there is a sleeve F, which closely fits the interior surface of the knuckle and projects therefrom (at one or both ends of the knuckles, as the case may be) into the central opening of the ring or rings D that are next adjacent thereto. The ends or edges of said sleeves terminate in the space between the adjacent knuckles and



serve merely as shoulders, which hold the rings in proper position.

It is to be noted that there are no means employed for securing the knuckles of the leaves together other than the balls and rings above described. The rings are held against lateral movement by the sleeves F, and the balls E, occupying the grooves in two adjacent rings, which are, in effect, locked to adjacent knuckles, serve to confine the knuckles against independent lateral movement. No pin or pintle is therefore necessary in a hinge embodying my invention.

The operating-spring C is mounted within the knuckles between a fixed spring-holder G and an adjustable spring-holder G', which are appropriately mounted at opposite ends of the barrel formed by the knuckles. These parts of the hinge form no part of my invention and will need no description in this specification.

In assembling the various parts of the hinge two companion leaves are placed in proper relations to each other, and a pair of rings or washers D, with an appropriate number of balls E inserted therebetween, is then placed between the knuckles *a* and *b* at that end of the hinge at which the fixed spring-holder G is located. A sleeve F of proper length is then pushed through the open end of the hinge-barrel into the lower knuckle *a*. A pair of rings with appropriate balls is then inserted between the next two knuckles and another sleeve F inserted in the same manner in the next knuckle *b* for locking the rings and knuckles together. When all of the rings and balls have been thus properly placed and secured in position, the spring C is inserted and the adjustable spring-holder G secured in place, as will be readily understood.

The several sleeves F may be riveted or otherwise secured to the knuckles; but I have found that if they be made to tightly fit the knuckles no fastening of any kind will be required.

In Fig. 4 I have illustrated a ring or washer D' of slightly-modified form, which has been used by me in lieu of the ring D illustrated in the hinge of Fig. 1. Instead of having a groove, as in the ring shown in Fig. 2, the ring D' has a depressed surface *d'* on one of its faces adjacent to its central opening.

When rings of this form are used, the sleeves F must project sufficiently beyond the edges of the hinge-knuckles to afford a side bearing for the antifriction-balls, the latter being confined between the outer edges *d'* of the pair of rings and the ends of the sleeves F, as will be readily understood.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a hinge the leaves of which are provided with tubular knuckles, the combination of a pair of rings or centrally-perforated washers inserted between adjacent knuckles, said rings having grooves or depressions on their opposing faces which together form a practically closed annular ball-raceway, antifriction-balls in said raceway, and means for independently locking each of said rings to the adjacent knuckle, substantially as described.

2. In a hinge the leaves of which are provided with tubular knuckles, the combination of a pair of rings or centrally-perforated washers inserted between adjacent knuckles, said rings or washers having grooves or depressions in their opposing faces forming an annular ball-raceway, antifriction-balls in said raceway, and separate locking-sleeves inserted in each of said knuckles and projecting into or through the central opening in the adjacent ring or washer, the ends or edges of said sleeves terminating in the space between the adjacent knuckles, substantially as described.

3. In a hinge the leaves of which are provided with tubular knuckles, the combination of a pair of rings or centrally-perforated washers inserted between the knuckles, said rings or washers being provided with grooves or depressions in their opposing faces forming an annular ball-raceway, antifriction-balls in said raceway and separate sleeves closely fitting the interior of each of said knuckles and frictionally held therein, each of said sleeves having a terminal edge projecting into or through the adjacent ring or washer, substantially as described.

In testimony whereof I hereby set my hand this 18th day of October, 1902.

CORNELIUS S. VAN WAGONER.

Witnesses:

WM. M. MONROE,  
C. H. OLDS.