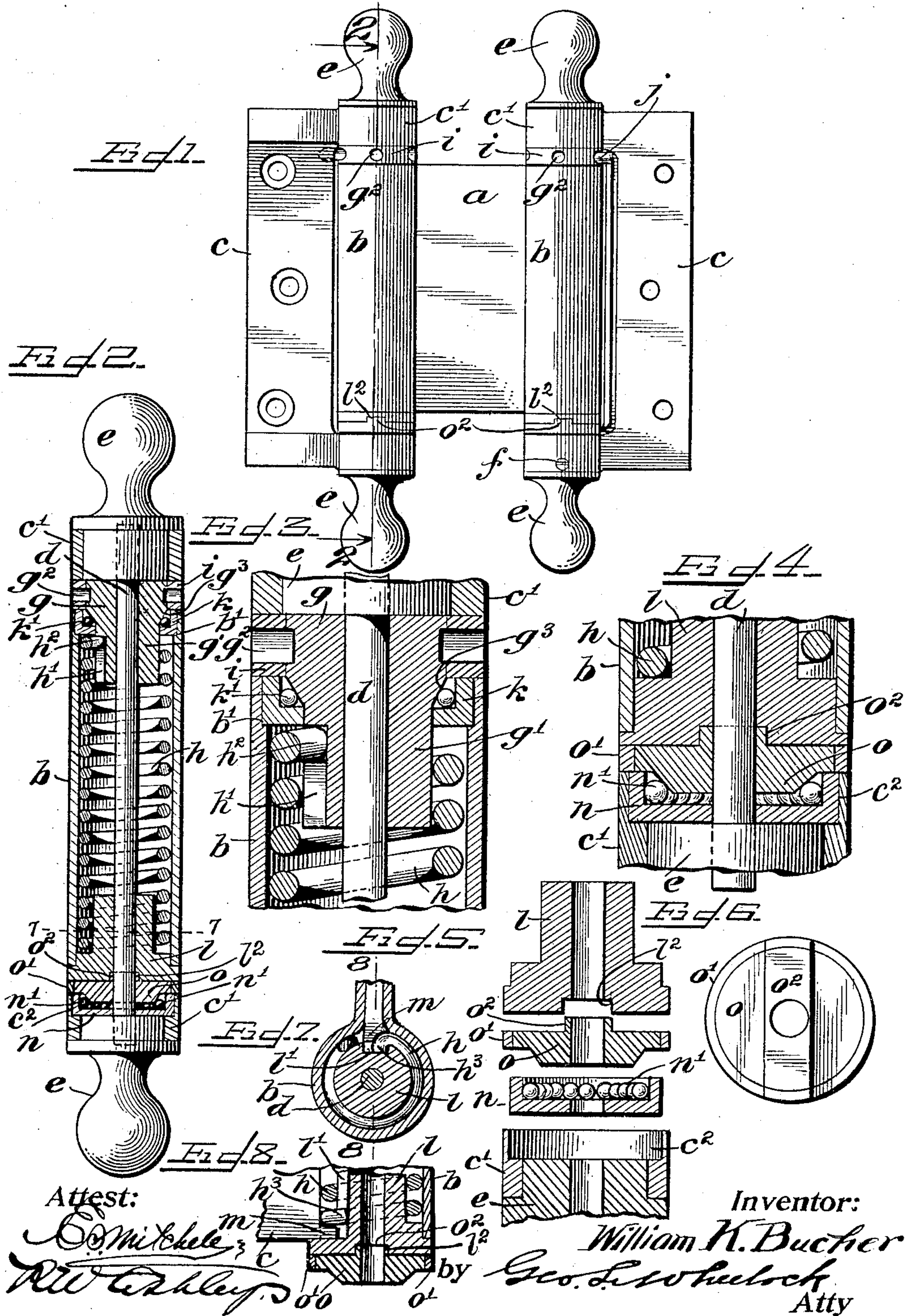


No. 882,140.

PATENTED MAR. 17, 1908.

W. K. BUCHER.  
SPRING HINGE.

APPLICATION FILED SEPT. 20, 1905.





# UNITED STATES PATENT OFFICE.

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## SPRING-HINGE.

No. 882,140.

Specification of Letters Patent.

Patented March 17, 1908.

Application filed September 20, 1905. Serial No. 279,298.

*To all whom it may concern:*

Be it known that I, WILLIAM K. BUCHER, a citizen of the United States of America, residing at Cleveland, Cuyahoga county, State of Ohio, have invented certain new and useful Improvements in Spring-Hinges, of which the following is a specification.

My invention relates to spring hinges in general, but especially to that class of spring hinges in which a door provided with the hinge may swing in either direction.

The invention has for its particular object an improved construction of ball bearing spring hinge, the same being so constructed that friction of the parts is reduced, the parts of the spring may be readily assembled or separated, and the bearing parts are of steel or other hard metal, while the exterior of the hinge has a finish, such as bronze, brass, copper, etc. These being some of the objects in view, my invention consists in novel features of construction and combinations of parts hereinafter described and then claimed.

With reference to the accompanying drawings, which illustrate a form of the invention Figure 1, is a front elevation of a hinge constructed in accordance with the invention, the leaves being spread apart; Fig. 2, is an enlarged central longitudinal section of the pivoted portion of the hinge on the line 2—2 Fig. 1; Fig. 3, is a still further enlarged similar section, parts broken away, of the upper portion only, showing the upper ball bearing and concomitant parts; Fig. 4, is a similarly enlarged section, showing the lower ball bearings and concomitant parts; Fig. 5, is a sectional elevation of the lower ball bearing and concomitant parts, the separate parts being slightly separated, showing their relative positions; Fig. 6, is a plan view of the lower ball cone; Fig. 7, is a detail transverse section on the line 7—7, Fig. 2, showing how the lower spring holder and spring are fixed to the spring housing or casing; and Fig. 8, is a section of the same parts on the line 8—8, Fig. 7.

The drawings illustrate a double acting spring hinge, but it is evident that the invention is equally applicable to single acting hinges.

Referring to the drawings, the intermediate member or web *a* is provided at each side with a spring housing, sleeve or casing,

*b*, and suitably mounted thereon in accordance with the present invention are the end leaves *c*. They are provided with knuckles *c'*, through which and the parts constructed in accordance with the present invention, pass the pintles *d*. The knuckles *c'* receive the hinge knobs *e*, which in turn receive the ends of the pintles *d*. The lower hinge knobs are preferably secured to the lower knuckles *c'* by countersunk screws *f*. The construction whereby one end leaf is connected with or mounted on one of the spring housings or casings *b*, is the same as for the other end leaf, and a description of the construction of one side of the double acting hinge shown, will apply to the other. The upper knuckle *c'* of the end leaf *c* is spaced a suitable distance apart from the adjoining spring housing or casing *b* to provide a space in which is arranged the head of the capstan *g*, the core *g'* of which extends into the actuating spring *h* in customary manner, and is provided with a suitable groove or notch *h'* to receive the bent upper end *h''* of the spring. The core *g'* of the capstan *g* is preferably of hard metal, as steel, while the head of the same is provided with an outer ring or rim *i* of bronze, brass or copper, or similar metal, which is the same as the metal finish of the end leaves and other exposed parts of the hinge. The said capstan *g* is provided in its head with the usual pin holes or sockets *g''* for the purpose of receiving the straining pin *j* in well known manner. The upper end of the spring housing or casing *b* is counterbored to form an interior annular recess or rabbet groove *b'*, in which is fixed snugly and securely a steel or other hard metal ball cup *k*, the depth of the groove and cup being the same. Said cup *k* is completely countersunk in the end of the housing so as to lie entirely within it. The anti-friction balls *k'* of steel or other hard metal, run in the race-way formed by the groove of the ball cup, and find a bearing not only against the walls of the ball cup, but against the ball cone or bearing portion *g''* formed preferably on the steel or other hard metal core of the capstan *g*. Said ball cup *k* is firmly held in position in the spring housing or casing *b* by the head of the capstan, the core of which extends downwardly through the central opening of the ball cup *k*.



The ball bearing for the upper end of the hinge members will be seen therefore to be formed of completely enveloped hard metal parts, while the exterior of the hinge is formed of suitable finishing metal; said parts are so arranged as to fit compactly and snugly together so that the bearing is dust proof.

The lower ball bearing and concomitant parts are more fully illustrated in Figs. 4 to 8 inclusive. The lower end of the spring housing or casing *b* receives the core or center of an annularly flanged spring holder *l*, said holder being fixed against relative rotation in the housing or casing *b*, by means of a short lug or projection *m* from the web or central portion of the intermediate member *a*, as fully shown in Figs. 7 and 8. A recess *l'* in the spring holder *l* receives the inturned end *h*<sup>3</sup> of the spring *h*, so that the spring holder is fixed to the housing or casing *b* and the lower end of the actuating spring is anchored to the said spring holder, thus permitting the straining of the spring by the capstan *g*. The said spring holder is also preferably of bronze, brass, copper or the like, corresponding with the exterior finish of the hinge.

The lower bearing of the hinge members is formed by a steel or other hard metal cup *n* which is seated snugly in the annular recess or rabbet groove *c*<sup>2</sup> formed in the upper part of the lower knuckle *c*<sup>1</sup>, said cup providing a race-way for the series of anti-friction balls *n*<sup>1</sup> that also find a bearing against a steel or other hard metal ball cone *o*, the ball bearing portion of which is surrounded by a ring or rim *o*<sup>1</sup> of bronze, brass, copper or other finishing metal corresponding with the exterior finish of the hinge. Said lower ball cone *o* is positively fixed against turning relatively to the spring holder *l* and the receiving housing or casing *b* by means of a tongue or rib *o*<sup>2</sup> extending diametrically of the upper side of the said cone and received in a corresponding diametrical groove *l*<sup>2</sup> in the lower end of the spring holder *l*. This means of connection forms an interlock between the cone *o* and holder *l*. The centering of the parts of the hinge is also facilitated by said tongue and groove connection.

From the described construction of the lower bearing and concomitant parts, it is evident that the lower balls are fully protected from dust, and the hinge is finished in conformity with the exterior finish of the remaining parts.

Some of the advantages of the improved hinge described and shown may be enumerated as follows: The hinge is a ball bearing hinge at all working parts, the cones and ball cups being made of steel or other hard metal and which are a part of the hinge, in such a way that neither the balls, ball cups

or cones will show on the outside of the hinge, in consequence of which a hinge can be made of bronze, brass, copper or other finishing metal, and the balls, ball cups and cones of steel or other hard metal, and the exterior finish of the hinge will thereby be the same throughout but modifications of said hard metal parts will also be resorted to; also the parts of the ball bearing hinge described can easily be taken apart and put together without necessitating any great amount of mechanical skill; also the capstan and the spring holder become a part substantially of the ball cones; also all bearing, end movement, end thrust and weight of door is transmitted to and supported by the capstan nuts and the spring holders; also the spring holder and lower ball cone being preferably tongued and grooved, the parts of the hinge may be separated by pulling out the center rod, so that the parts may be separated by a pressure or movement of the spring holder and ball cone in opposite direction, in line with the tongue and groove. The parts of the hinge may also be made entirely of steel, as well as partly of steel, and in fact the entire hinge may be made of any suitable metal or metals.

Obviously all of the objects of the invention may be substantially realized without departing from the invention, when the construction of the hinge is substantially in accordance with the claims.

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

1. In a spring hinge, the combination of hinge members provided with knuckles, and a spring housing or casing, a ball bearing for said parts comprising a ball cup applied to one of the knuckles, balls in the race-way of said cup, a ball cone, a spring holder secured to the housing or casing, and a tongue and groove connection between the ball cone and the spring holder.

2. In a spring hinge, the combination of hinge members provided with knuckles and a spring housing or casing, a spring, and a spring holder provided with a recess receiving the lower end of the spring, and a short lug extending from the web of the hinge member into the interior of the housing or casing and entering the said recess of said spring holder.

3. In a spring hinge, the combination of hinge members provided with knuckles and a spring housing or casing, a ball bearing for said parts comprising a ball cup applied to one of the knuckles, balls in the race-way of said cup, a ball cone located wholly outside the housing between the end of the housing and the ball-cup, and means for securing the ball cone against turning relatively to the said housing or casing.

4. In a spring hinge, the combination of  
hinge members provided with knuckles and  
a spring housing or casing, a ball bearing for  
said parts comprising a ball cup applied to  
5 one of the knuckles, balls in the race-way of  
said cup, a ball cone, a spring holder se-  
cured to the housing or casing and extend-  
ing beyond the same, and means for posi-  
tively and directly connecting the ball cone  
and spring holder against relative turning. 10  
Signed at Cleveland, Ohio, this 12th day  
of September, 1905.  
WILLIAM K. BUCHER.

Witnesses:

HERMAN FLECK,  
Mrs. E. MOORE.