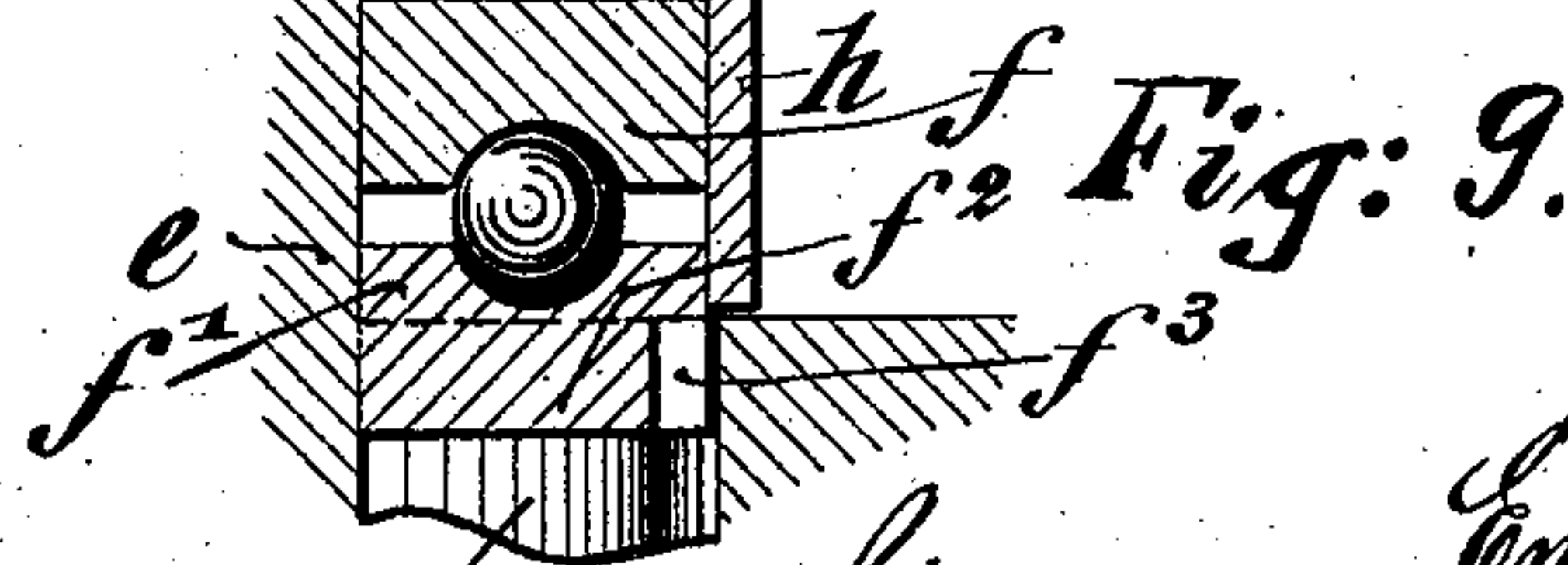
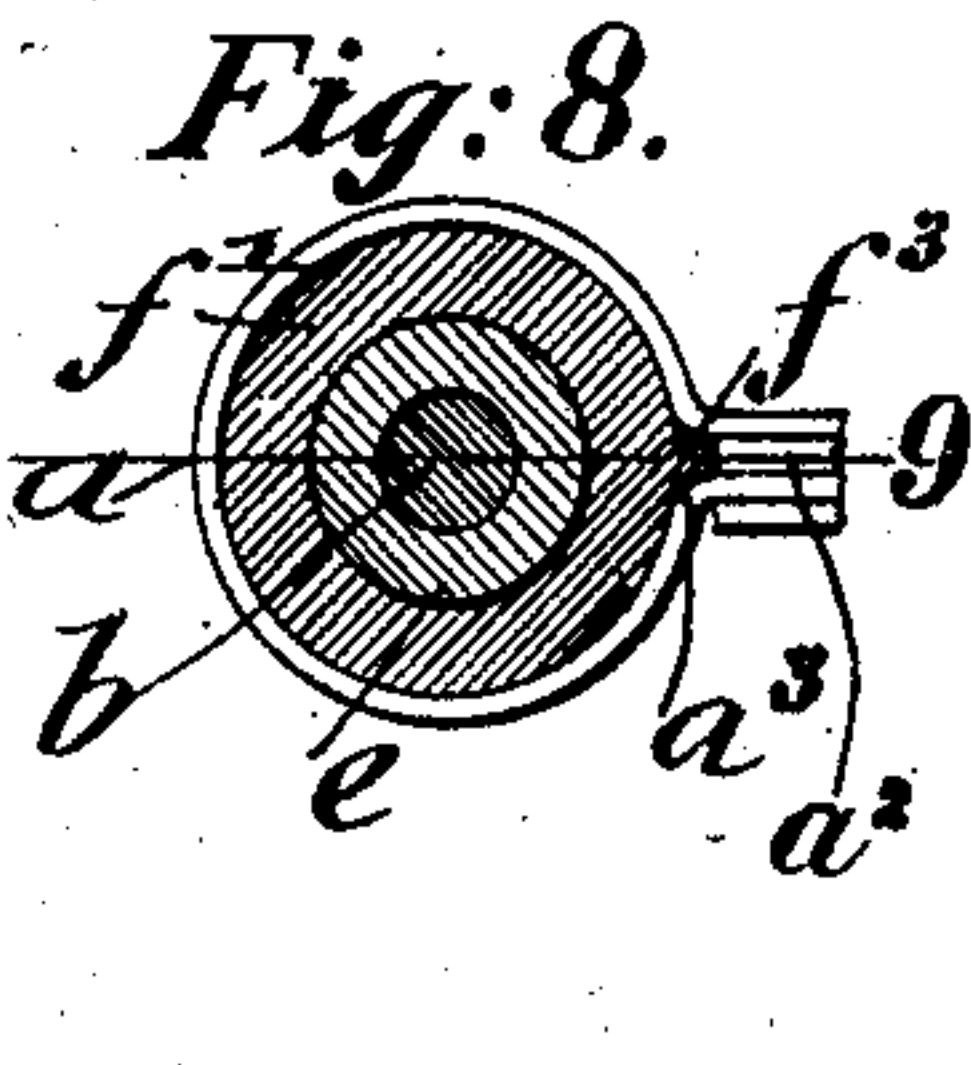
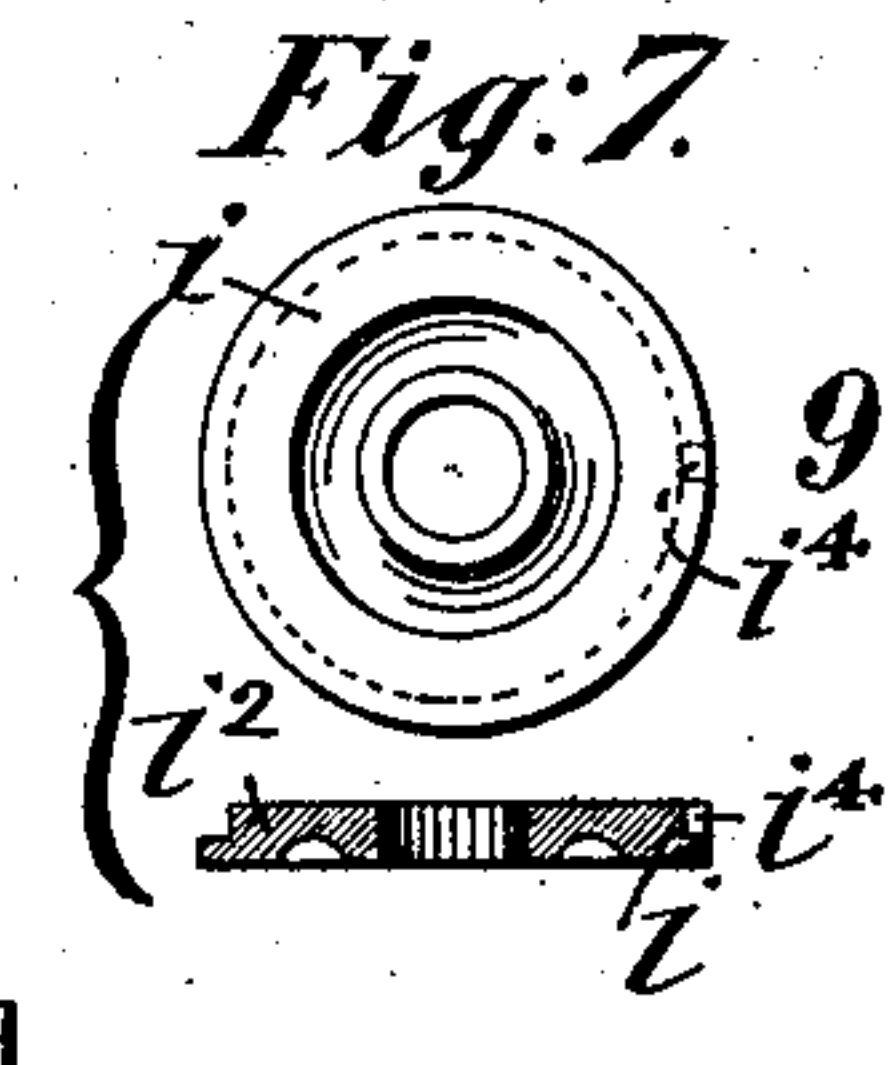
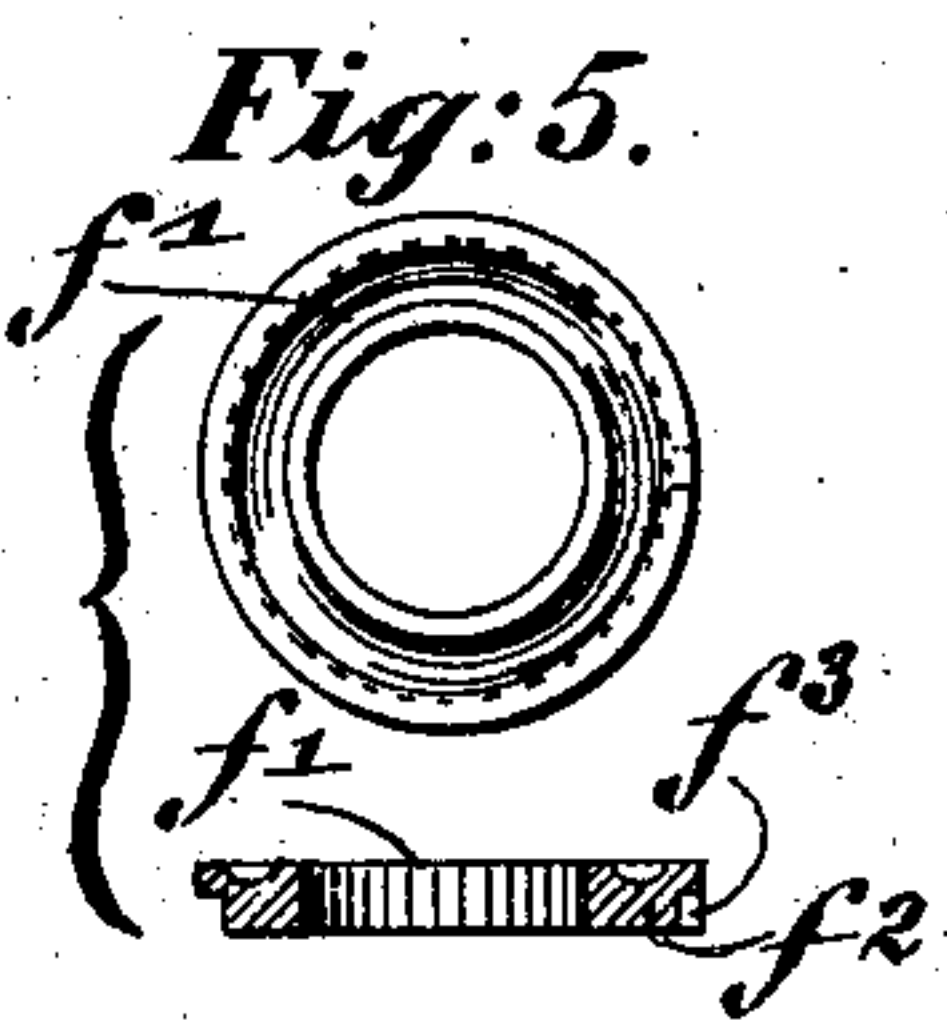
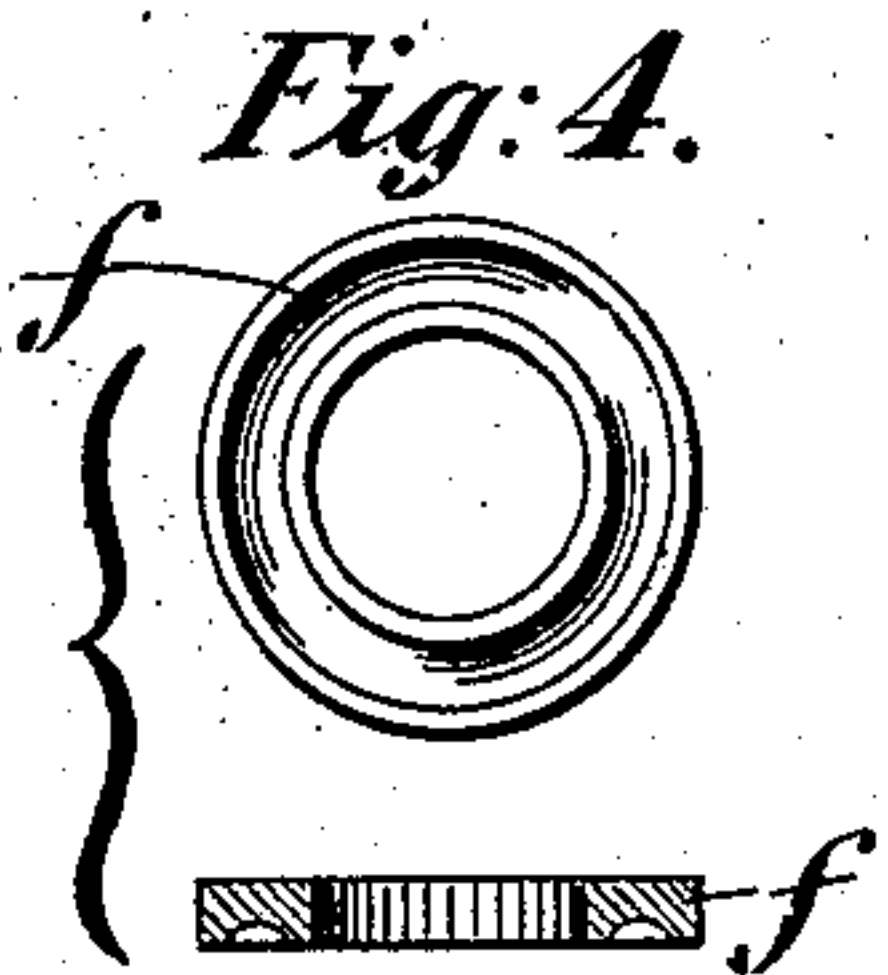
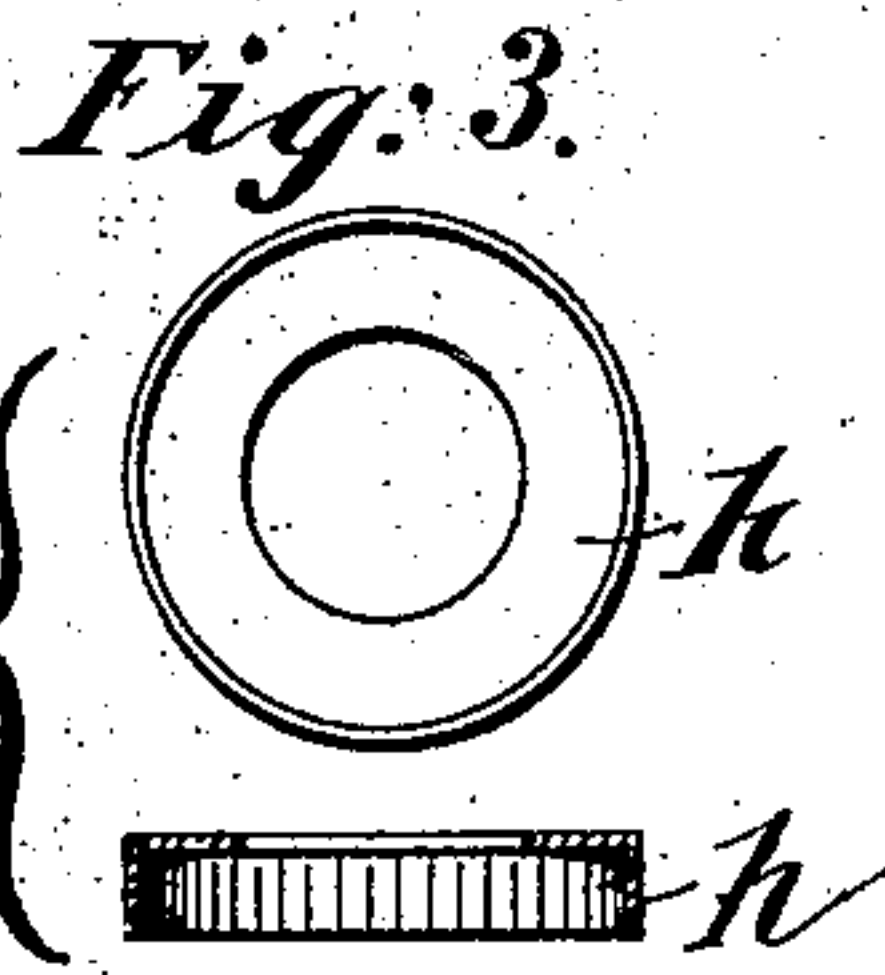
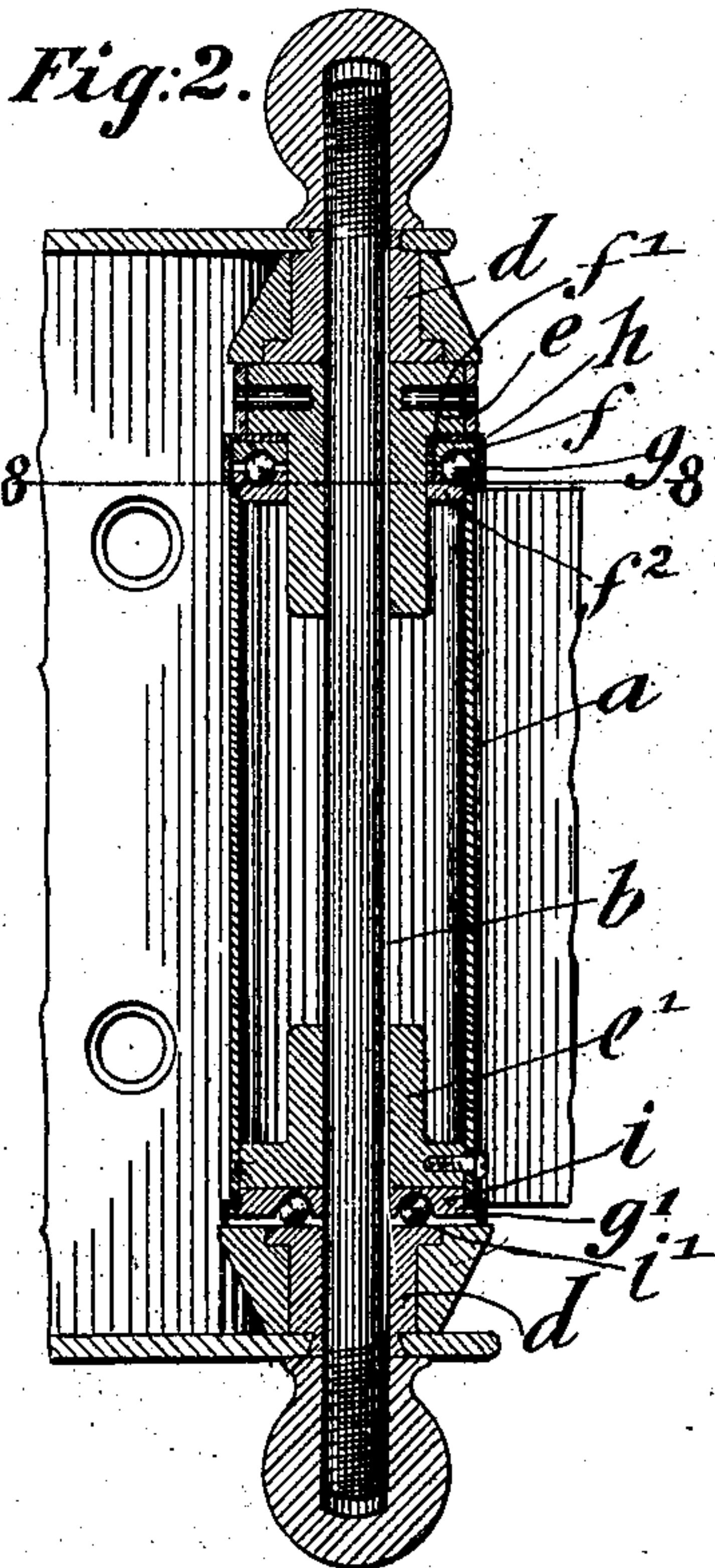
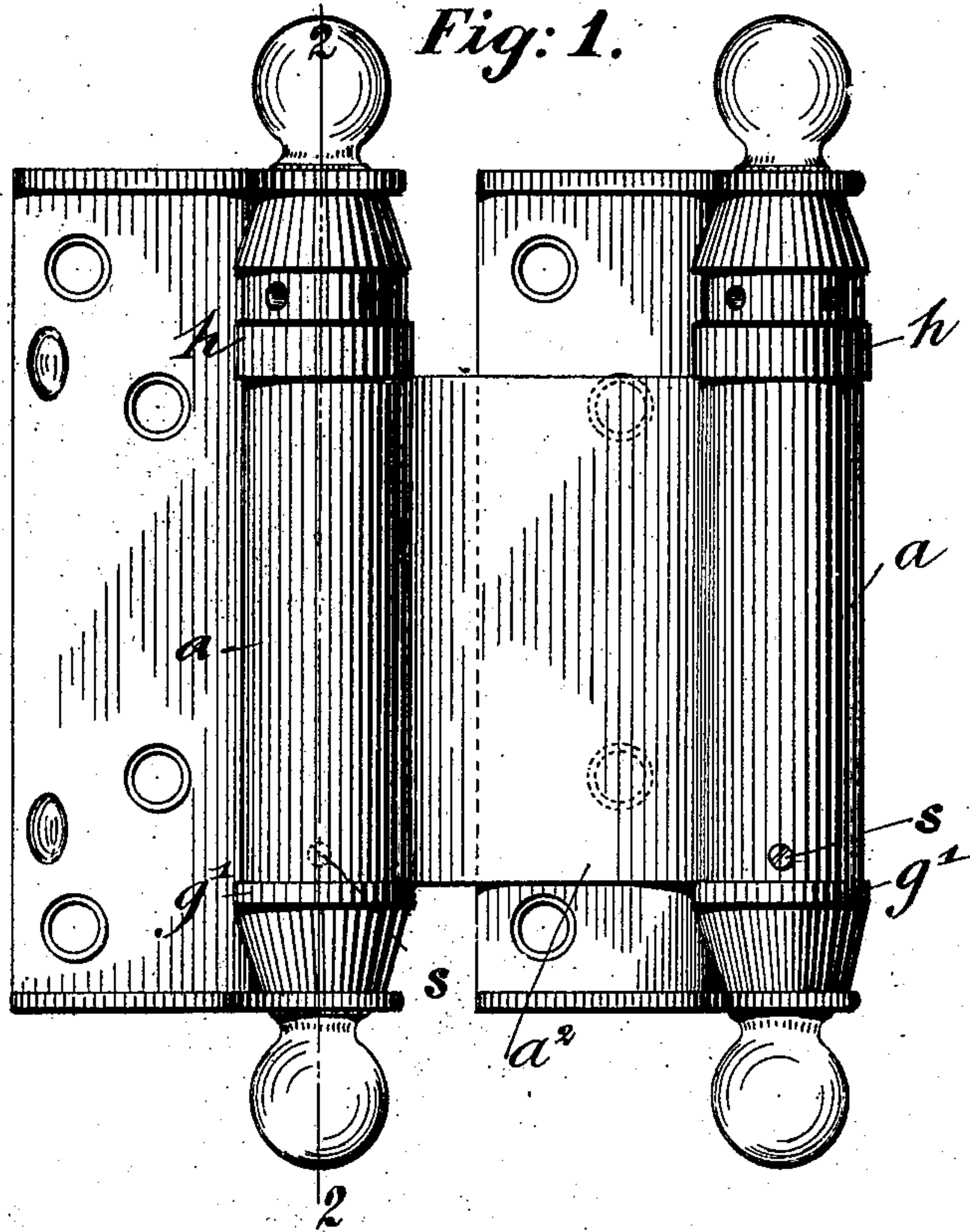


E. BOMMER.  
SPRING HINGE.

APPLICATION FILED FEB. 24, 1903.

NO MODEL.



Witnesses  
John J. Stittle  
Henry J. Schrier

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Geyer & Viles



# UNITED STATES PATENT OFFICE.

EMIL BOMMER, OF NEW YORK, N. Y.

## SPRING-HINGE.

SPECIFICATION forming part of Letters Patent No. 747,680, dated December 22, 1903.

Application filed February 24, 1903. Serial No. 144,671. (No model.)

*To all whom it may concern:*

Be it known that I, EMIL BOMMER, a citizen of the United States, residing in New York, in the borough of Brooklyn and State of New York, have invented certain new and useful Improvements in Spring-Hinges, of which the following is a specification.

This invention relates to improvements in single and double acting spring-hinges, and more especially to spring-hinges in which the spring-holders are provided with ball-bearing washers, so that the friction of the parts is reduced and the movement of the flanges facilitated; and the invention consists of a spring-hinge in which the adjustable spring-holder, which usually has radial holes for adjusting the tension of the springs, is provided with washers between it and the adjacent end of the barrel, while the fixed spring-holder, which is connected to the opposite end of the barrel, has ball-bearing washers between it and the adjacent pintle-socket, both of said ball-bearing washers being inclosed by dust-caps of angular cross-section, so as to protect the ball-bearings against dust and moisture.

In the accompanying drawings, Figure 1 represents a side elevation of a double-acting spring-hinge provided with my improved ball-bearing washers and dust-caps. Fig. 2 is a vertical central section through one barrel of the spring-hinge. Figs. 3 and 6 are details of the dust-caps. Figs. 4 and 5 are details of the upper ball-bearing washer. Fig. 7 is a detail of the lower ball-bearing washer. Fig. 8 is a horizontal section on line 8 8 of Fig. 2; and Fig. 9 is a vertical section of Fig. 8 on line 9 9, but on a larger scale.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, *a* represents the barrel of a single or double acting spring-hinge in which the springs are placed, *b* the pintle, *d d* the pintle-sockets, and *e e'* the spring-holder, of my improved spring-hinge. Between the adjustable spring-holder *e*, which is provided with the usual radial holes for adjusting the tension of the spring, and the adjacent end of the barrel is interposed a ball-bearing washer consisting of two circular ball-races *ff'*, which are shown in detail in Figs. 4 and 5. Each ball-race is provided with a circular groove, between which the

antifriction-balls *g* are interposed when the parts are placed in position. A circular dust-cap *h* of angular cross-section is interposed between the adjustable spring-holder *e* and the upper ball-race *f*, the horizontal portion of the angular dust-cap being firmly held in position between the spring-holder *e* and upper ball-race *f*, while the vertical portion of the angular dust-cap encircles the ring-shaped ball-races, so as to prevent the ingress of dust, moisture, &c., to the balls and bearing. The lower ring-shaped ball-race *f'* is provided with a shoulder *f<sup>2</sup>*, that fits in the barrel *a*, while the ring-shaped ball-race itself rests on the adjacent edge of the barrel. The ball-race *f'* is also provided at one part of its circumference with a lug *f<sup>3</sup>*, that fits into a recess *a<sup>3</sup>* of the barrel, as shown clearly in Figs. 2, 8, and 9, the interlocking of the lug *f<sup>3</sup>* in the recess *a<sup>3</sup>* preventing the axial turning of the lower ball-race *f'* on the upper part of the spring-barrel. The two spring-barrels are usually joined by flanges forming a web *a<sup>2</sup>*, which are integral with the spring-barrels proper, in which web a small space is formed in the making of the same. This space acts as a recess for the lugs *f<sup>3</sup>* of the lower ball-race *f'* and is clearly shown in Fig. 8. At the opposite or lower end of the spring-barrel, between the spring-holder *e'*, which is held tightly to the spring-barrel *a* by a screw or pin, and the lower pintle-socket of the spring-hinge is interposed a ball-bearing washer consisting of a ball-race *i*, which is provided with a circular groove for the antifriction-balls *i'*, which rest on the upper plane surface of the adjacent pintle-socket, as shown clearly in Fig. 2, so as to follow the motion of the flange attached to the barrel or of the web *a<sup>2</sup>*, connecting the two spring-barrels, as shown in Fig. 1. The ball-race *i* is provided with a circumferential shoulder *i<sup>2</sup>* of smaller circumference than the barrel and fitting in the same. Between the ball-race *i* proper and the adjacent edges of the barrel is interposed the horizontal portion *g<sup>2</sup>* of a ring-shaped dust-cap *g'*, while the vertical portion *g<sup>3</sup>* of said dust-cap incloses the circumference of the ball-race *i* and prevents the ingress of dust or moisture to the balls *i'* and bearings of the spring-hinge. The ball-race *i* is also provided with a lug *i<sup>4</sup>*, which fits in a recess



of the spring-barrel and holds the ball-race to the same, and the dust-cap  $g'$  is provided in its horizontal flange  $g^2$  with a recess  $g^4$ , which is engaged by the lug  $i^4$  of the ball-race, so that the ball-race  $i$  and the dust-cap  $g'$  move with the barrel. Thus, it is seen, the upper ball-bearing washer takes up the friction between the barrel and the adjustable spring-holder as the same is moved under the influence of the flange, while the lower ball-bearing washer takes up the friction between the barrel, with its fixed spring-holder  $e'$ , and the lower pintle-socket  $d$  when the barrel is moved under the influence of the second flange or web  $a^2$ . By the insertion of the washer at the opposite ends of the barrel and by providing a dust-cap for each ball-bearing the friction between the parts of the spring-hinge is greatly reduced, an easier motion of the spring-hinge thereby obtained, and the dust and moisture kept from entering the bearings, increasing thereby the life and utility of the same.

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

1. In a spring-hinge, the combination, with the spring-barrel and spring-holder, of a ball-bearing washer interposed between said spring-holder and the adjacent edge of the barrel and provided with means for engaging a recess in the inner circumference of the adjacent edge of the spring-barrel, substantially as set forth.

2. In a spring-hinge, the combination, with the spring-barrel and spring-holder, of a ball-bearing washer interposed between said spring-holder and the adjacent edge of the barrel, having a lug engaging a recess in the inner circumference of the adjacent edge of the spring-barrel, substantially as set forth.

3. In a spring-hinge, the combination, with the spring-barrel and spring-holder, of a ball-bearing washer interposed between said spring-holder and the adjacent edge of the barrel and provided with means for engaging a recess in the inner circumference of the ad-

50 jacent edge of the spring-barrel, and a dust-cap extending over and inclosing said ball-bearing, substantially as set forth.

4. In a spring-hinge, the combination, with the spring-barrel and the spring-holder, of a ball-bearing washer interposed between said spring-holder and the adjacent edge of the barrel, said washer consisting of two circular ball-races, antifriction-balls between the same and provided with means for engaging a recess in the inner circumference of the adjacent edge of the spring-barrel, substantially as set forth.

5. In a spring-hinge, the combination, with the spring-barrel, the fixed spring-holder, and the adjacent pintle-socket, of a ball-bearing washer interposed between the fixed spring-holder, adjacent edge of the spring-barrel and the pintle-socket, a shoulder on said washer fitting in the spring-barrel, and a dust-cap interposed between said washer and the adjacent edge of the spring-barrel, said dust-cap extending around said washer, substantially as set forth.

6. In a spring-hinge, the combination, with the spring-barrel, fixed spring-holder, and adjacent pintle-socket, of a ball-bearing washer interposed between the fixed spring-holder, adjacent edge of the spring-barrel and the pintle-socket, a shoulder on said washer fitting in the spring-barrel, a lug on said washer engaging a recess in the inner circumference of the adjacent edge of the spring-barrel, and a dust-cap interposed between said washer and the adjacent edge of the spring-barrel, said dust-cap extending around the ball-bearing washer, and provided with a recess for engaging the lug on the washer, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

EMIL BOMMER.

Witnesses:

C. P. GOEPEL,

HENRY J. SUHRBIER.