No. 644,203. Patented Feb. 27, 1900.

E. C. HOFFMAN.

SPRING HINGE.

(Application filed Sept. 15, 1899.)

(No Model.)

Fig. 1.

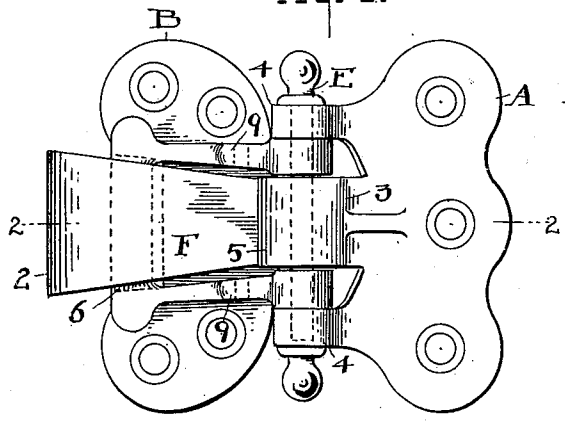
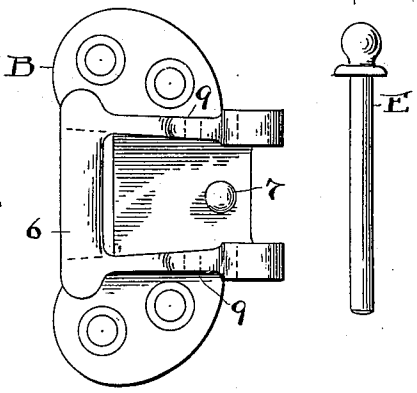


Fig. 4. Fig. 5.



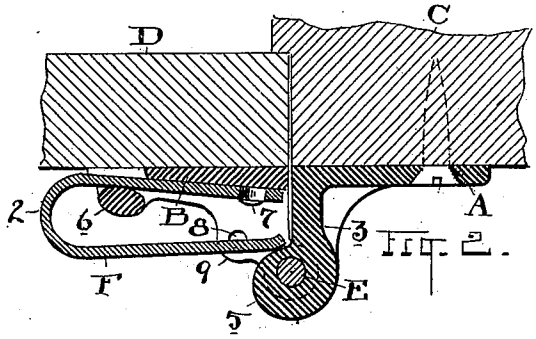


Fig. 2.

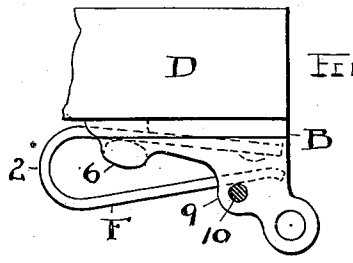


Fig. 5.

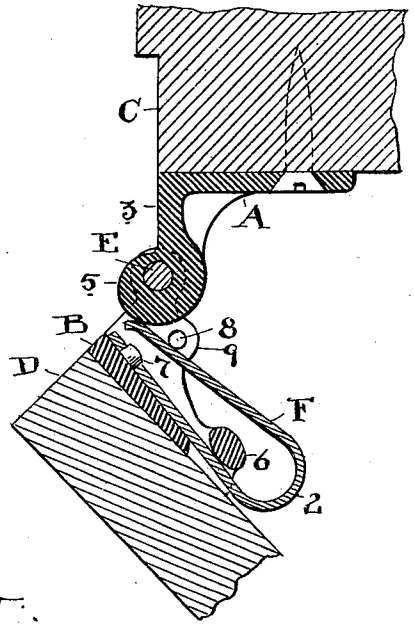


Fig. 3.

Attest

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UNITED STATES PATENT OFFICE.

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SPRING-HINGE.

SPECIFICATION forming part of Letters Patent No. 644,203, dated February 27, 1900.

Application filed September 15, 1899. Serial No. 730,573. (No model.)

To all whom it may concern:

Be it known that I, EDWARD C. HOFFMAN, 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 Spring-Hinges; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to spring-hinges; and the invention consists in a spring-hinge adapted especially to screen-doors, but not limited to this use, and designed to meet the demand for a hinge which will enable the hinge to be separated and the door removed and replaced for service without inconvenience on account of the spring and without removing the spring from its working position, all substantially as shown and described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation of the hinge with the sections connected. Fig. 2 is a cross-section on line 2 2, Fig. 1, showing also a section of the door and its casing and the door closed. Fig. 3 shows the same parts as Fig. 2, but with the door part way open. Fig. 4 is an elevation of the door-section alone. Fig. 5 is a plan view of said door-section and a section of the door open, as seen in Fig. 3, and with the spring bolted back, as hereinafter described. Fig. 6 is an elevation of the pintle.

A and B represent respective sections or parts of the hinge, the section A being attached to the door-casing C and the section B to the door D. Both attachments may be regarded as permanent, as it is not necessary nor desirable that either section should be removed when the door is taken down and put away for the winter. On the contrary, the invention contemplates the permanent attachment of both sections and their separation by the removal of the pin or pintle E. The said pin is free to be withdrawn in certain positions of the door, as will appear farther on, and the spring F is made of flat spring-steel blanked out the desired shape, bent, and tempered afterward. To utilize this spring, the two hinge-sections are fashioned as shown, the section A having a central outwardly-projecting arm 3 midway between the ears 4, with a cam-head 5, and the section B having a bridge 6 and a lug 7 for confining the spring. One end of the spring has an eye to engage over the lug 7, while the opposite end bears against the cam or head 5, as seen in Fig. 2. The said cam is so constructed that it increases from the closed toward the full-open position of the door, so that the greater tension of the spring is on when the door is open and the ends of the spring are nearest together. There is no relaxing of the spring, therefore, as in other constructions heretofore, when the half-way place is passed in opening the door; but, on the contrary, the tension and friction are such that the door will be held thereby in any part of its swing from half-way open back to the wall, and it can be set in any preferred position between these points and left there. This is exceedingly convenient on many accounts, for it is often desirable to have a screen-door stand partly open temporarily and not have to hold it by hand or slam back against the wall, if released. This style of spring and construction of hinge therefore has the double advantage of utility for removing the door and as a friction-stop for the door on the outer portion of its swing.

Referring to Figs. 2 and 3, a hole 8 is shown vertically through the rear portion of the ears 9 of the door-section of the hinge, which is adapted to receive a wire nail or small pin 10 (shown in cross-section, Fig. 5) to lock the spring back preparatory to the removal of the door for winter storing. These holes are cleared when the door is swung about half-way open, Fig. 3, when the locking-pin 10 can be dropped into place. Then upon closing the door the tension of the spring is entirely off the hinge, and it is only necessary to withdraw the pintle E and take away the door with the spring locked back. When the door is replaced, the pintle is restored, the pin 10 withdrawn, and the door is ready for use, as before, or it can at any time be converted into a door practically without a spring by simply inserting the locking-pin 10.

It will be noticed that the spring is an attachment of the door-section in all cases and that it is held in that position during use by the cam-head 5, against which the outer and otherwise free end of the spring rests and

over which it has a traveling bearing. This also causes the inner end to be held permanently by lug 7 and cross-bridge 6. In the absence of cam 5 when the door is removed the pin 10 confines the spring. Hence there is only a frictional bearing or engagement between the spring and the door-casing section of the hinge and no fixed connection at all.

As here shown, the spring is widest at its middle portion and tapered toward both extremities, which is the preferred form; but it might be of equal width throughout. It will also be noticed that it lies close to the door and is out of the way.

The cam projection 3 has a hole through its cam-head for the pintle E, so as to allow the pintle to pass through the ears below.

It will also be noticed that in accordance with my invention as one of the sections is provided with a spring member and the other section with a bearing member the spring-section travels on the other and that the bearing member has an unbroken periphery and is eccentrically mounted on its axis, that said axis is nearer to a certain point of the periphery of said member than any other point and gradually increases in depth from said point nearest the axis for a certain distance, that as said spring member is in initial contact with said bearing member an initial rolling contact is obtained and maintained between the spring member and bearing member until the highest point of the cam is reached, after which the action is a sliding one, that also when this highest point of the knuckle is passed the returning power of the spring is overcome, and that the swinging section is adapted to be held open at any point from said highest point to the wall.

What I claim is—

1. A hinge comprising two sections, one of said sections provided with a spring member, a bearing member on the other section, an axis about which one of said members travels on the other, said bearing member having an unbroken periphery and eccentrically mounted on the axis, said axis nearer to a certain point of the periphery than to any other point thereof and the bearing member gradually increasing in depth from said point nearest the axis for a certain distance, and said spring member in initial contact with said bearing member at or near said point nearest the axis, whereby an initial rolling contact is maintained between the spring member and bearing member, substantially as described.

2. In hinges consisting of two sections, one of said sections provided with a pintle, a cam-knuckle having a continuous unbroken surface and mounted on said pintle, the other section provided with a flat spring member, one end of which is rigidly secured to the section and the other end free, the free end adapted to bear at all times against the knuckle, said cam-knuckle gradually increasing in radial depth from the point of beginning of travel of the members to the highest point of the knuckle and of constant depth from that point to the other end of the knuckle, whereby as said knuckle is turned upon said spring member the tension of the spring is steadily increased until the highest point of the knuckle is passed whereupon the returning power of the spring will be overcome, and the swinging section adapted to be held open at any point from said highest point to the wall, substantially as described.

3. In a separable spring-hinge comprising a door-section and a door-casing section, one of said sections provided with a spring having one of its ends secured thereto and its other end free and adapted to be held in direct contact with the opposite section, in combination with a confining member to hold the free end of the spring out of contact with the opposite section, substantially as described.

4. In a separable hinge comprising a cam-carrying section and a spring-carrying section, the spring composed of a flat metal spring bent back upon itself, one of its ends rigidly secured to its section and its other end free and adapted to bear against the cam of the other section, and means for confining the free end of the spring when the cam-section is removed, substantially as described.

5. In spring-hinges, a hinge-section and a flat spring fixed thereon at one end and having its other end free to make frictional engagement with the opposite section, a removable pin for confining the spring when the hinge is separated, a support for said pin, substantially as described.

6. In hinges, a fixed section and a movable section, a flat removable spring mounted on one of said sections, a bridge and a projecting member intermediate said spring and section to hold the spring against longitudinal movement, said spring held under said bridge and in engagement with said projecting member, and bent back upon itself over the bridge, a bearing member on said other section with which the free end of said spring contacts, substantially as described.

7. In spring-hinges, a removable spring, a bridge and a lug for engaging said spring, said spring bent back over itself, and a confining member for engaging the free end of the spring, substantially as described.

Witness my hand to the foregoing specification this 9th day of September, 1899.

EDWARD C. HOFFMAN.

Witnesses:

H. T. FISHER,

R. B. MOSER.