E. BOMMER.

DOOR SPRING.

APPLICATION FILED APR. 2, 1909.

978,548. Patented Dec. 13, 1910.

2 SHEETS—SHEET 1.

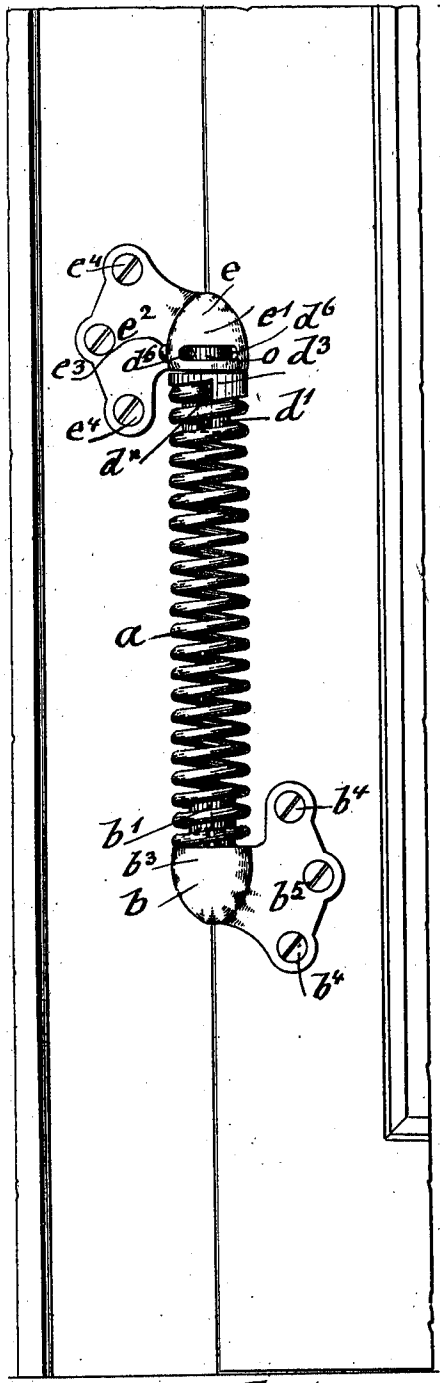

Fig. 1.

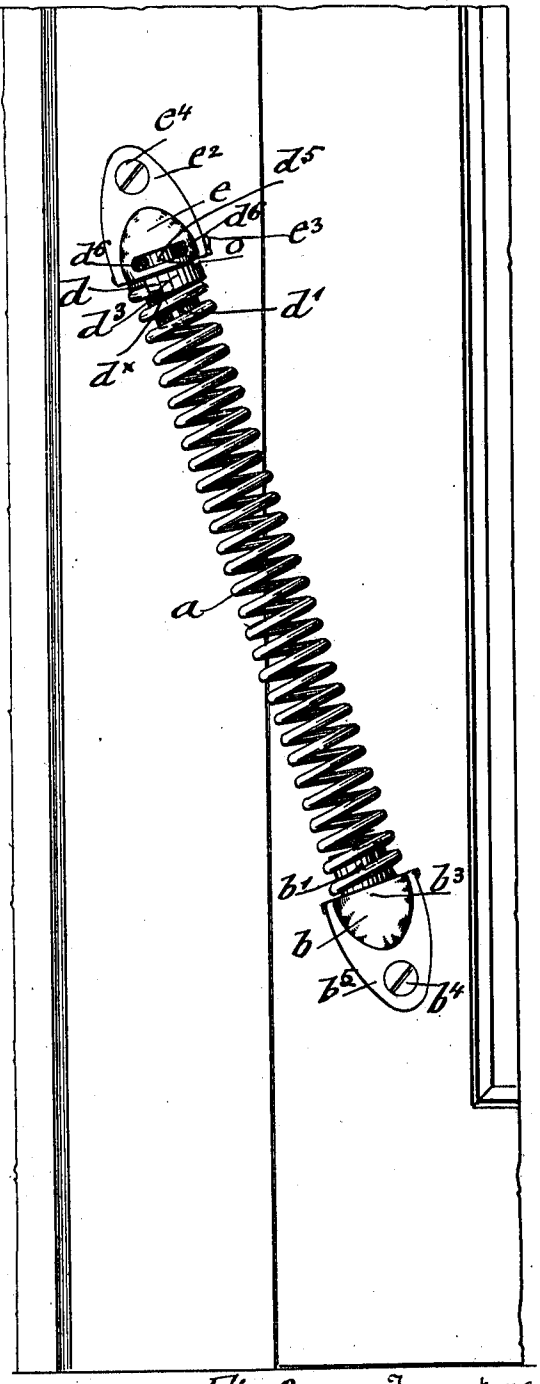

Fig. 2.

Witnesses
Fannie Fisk
H. J. Sulzbee.

Inventor
Emil Bommer.
By his Attorneys
Gowler & Gravel.

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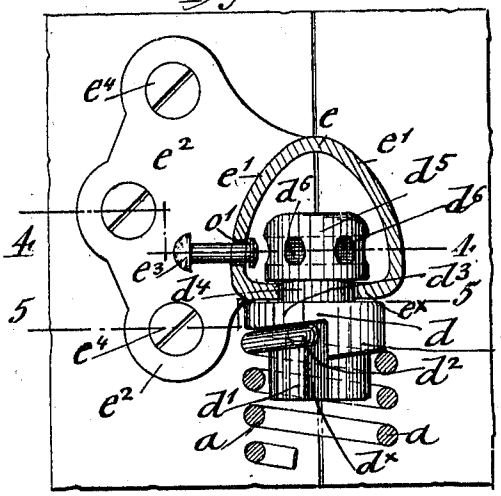
2 SHEETS—SHEET 2.

Fig: 3.



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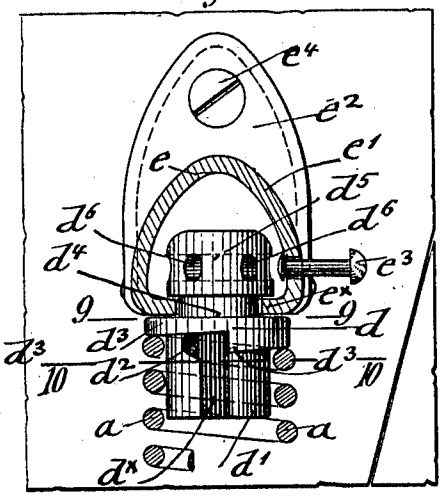


Fig: 4.

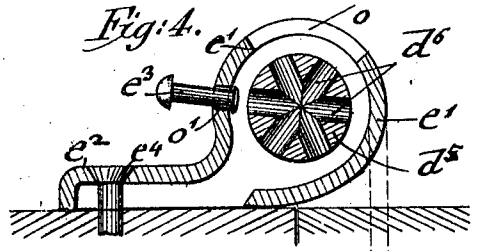


Fig: 9

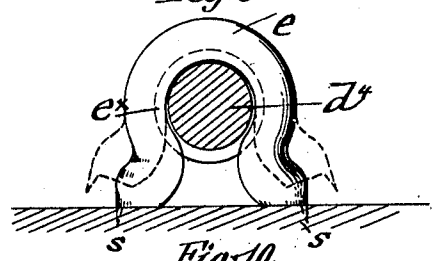


Fig: 5.

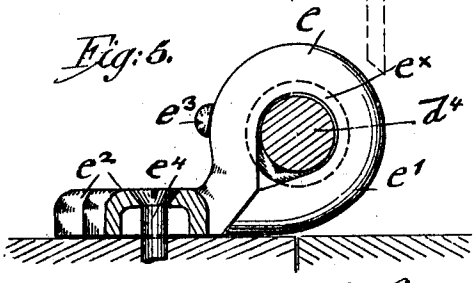


Fig: 10.

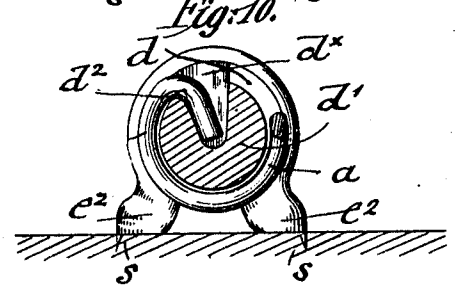


Fig: 6.

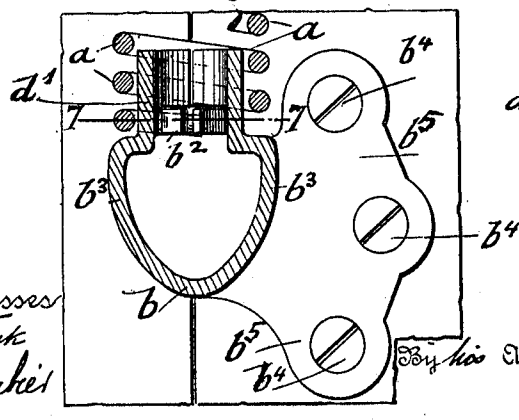
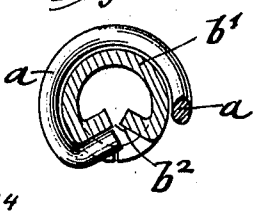


Fig: 7.



Witnesses
Fannie Fisk
H. F. Sulzbach

Inventor
Emil Bommer
By his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

EMIL BOMMER, OF NEW YORK, N. Y.

DOOR-SPRING.

978,548. Specification of Letters Patent. Patented Dec. 13, 1910.

Application filed April 2, 1909. Serial No. 487,496.

To all whom it may concern:

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

This invention relates to that class of door and gate springs which have one end secured to the door-frame or gate-post and the other end to or near the hinged edge of a door or gate, the spring being under torsional strain and serving to normally keep the door or gate in closed position.

The object of this invention is to provide a door-spring in which the tension of the coiled spring can easily be adjusted, and in which all the parts,—the coiled spring, the lower bracket, the upper bracket, and the adjustable spring-holder and its locking pin,—are so connected that these parts cannot of themselves become detached one from the other, so that the loss of any part is obviated, to the great convenience of hardware dealers, for the reason that the entire door-spring, with the exception of the fastening screws, is sold and handed over to the customer completely assembled for use; and for this purpose the invention consists in the combination of upper and lower brackets having cup-shaped enlargements and made of any suitable sheet-metal or malleable cast-metal that can be closed in over the connecting parts after the said brackets are struck up by dies or cast into shape, so that the parts cannot become disconnected from each other, with a coil-spring having an adjustable spring-holder at the upper end and a fixed spring-holder at the lower end, the adjustable spring-holder being provided with an integral seat for one end of the coil-spring, an integral neck for being rotatably seated in the bottom-flange of the upper bracket, an integral tension-head having perforations made larger than a perforation in the side of the cup-shaped portion of the upper bracket, the perforations of the tension-head being located so as to be in line with said perforation and a slot in the cup-shaped part of the upper bracket, a locking pin extending through the perforation in said bracket into one of the perforations of the tension-head and having its inner end enlarged so that it can enter the perforations of the tension-head, but cannot be withdrawn from the somewhat smaller perforation in the cup-shaped portion of the bracket, there being sufficient clearance between the perforated tension-head and the inside of the cup-shaped portion of the upper bracket to permit the adjustable spring-holder freely to rotate clear of the enlarged inner end of the tension locking pin. The coil-spring is seated at its lower end on a fixed spring-holder made integral with the cup-shaped enlargement of the lower bracket, said fixed spring-holder having a cylindrical stud and being provided with a transverse radially-bent depression between the cylindrical stud and the open rear-part of the cup-shaped portion of the lower bracket into which radially-bent depression the lower end of the coil-spring is seated, so as to prevent its lower end from turning when the spring is put to tension at its upper end, while the overhang of the cylindrical stud over the end of the spring when the same is seated in the transverse radially-bent depression prevents the spring from being pulled off of the lower bracket.

In the accompanying drawings, two arrangements of door-springs are shown, one in vertical position, parallel with the meeting edges of the door-casing and door, in which case side-flaps are used for the upper and lower brackets, and an inclined door-spring, in which the upper and lower brackets are arranged in line with the axis of the coiled spring, as will appear from the said drawings, in which—

Figures 1 and 2 represent front-elevations of the improved door-spring arranged respectively with side-flaps for the upper and lower brackets, and with flaps arranged in line with the axis of the brackets and inclined spring, Fig. 3 is a vertical section of the upper bracket, drawn on a larger scale, and showing the locking pin located above the bottom-flange of the upper bracket, Figs. 4 and 5 are horizontal sections, respectively on lines 4, 4 and 5, 5, Fig. 3, after the bottom-flange of the upper bracket is closed around the neck of the adjustable spring-holder, Fig. 6 is a vertical section of the lower spring-supporting bracket which is provided, like the upper bracket, with side-flaps for attaching the brackets to the door and door-casing respectively, Fig. 7 is a horizontal section on line 7, 7, Fig. 6, Fig. 8 is a detail vertical section of the upper bracket provided with a flap in line with

the axis of the bracket and spring, and Figs. 9 and 10 are horizontal sections respectively on lines 9, 9 and 10, 10, Fig. 8.

Similar letters of reference indicate corresponding parts throughout the different figures.

Referring to the drawings, a represents a helical spring of any suitable size, according to the size and strength of the door-spring. The lower end of the spring a is coiled around a cylindrical stud b^1 of the lower bracket b, the end of the spring being seated in a radially-bent depression b^2 at the junction of the stud b^1 with the cup-shaped enlargement b^3 of the lower bracket b, as shown clearly in Figs. 6 and 7. The upper end of the coiled spring a is connected with an adjustable spring-holder d, which is provided with a cylindrical stud d^1 at the lower end, said stud being provided with a V-shaped opening d^x and a notch d^2 at one side of the stud adjacent to a collar d^3, which is arranged at the upper end of the cylindrical stud. Above the collar d^3 a neck d^4 is arranged, and above the same a tension-head d^5 provided with diametrical openings d^6, all of which,—the stud, collar, neck and tension-head,—are made in one integral piece. The neck d^4 of the adjustable spring-holder d is adapted to be embraced by the bottom-flange e^x of a cup-shaped enlargement e^1 of the upper bracket e, which is made integral with a side-flap e^2 that, like the side-flap b^5 of the lower bracket b, is provided with screw-holes, so that the brackets can be attached by means of screws b^4, e^4 to the door and door-casing or gate and gate-post respectively. The cup-shaped enlargement e^1 of the upper bracket e is provided with a transverse slot o in its front-part, through which access is given to the openings d^6 in the tension-head when it is desired to adjust the tension of the coil-spring a. The slot o may be made of slightly greater width than the diameter of said openings so as to permit the easy introduction of a nail or lever into the holes of the tension-head for adjusting the tension of the coil-spring. The cup-shaped enlargement e^1 of the upper bracket has also a hole o^1, sidewise of the slot o, which is located above the bottom-flange in which the neck of the adjustable spring-holder rotates and which is made somewhat smaller than the holes of the tension-head, for receiving a tension-pin e^3 for locking the coiled spring after the same has been set to the proper tension by means of the lever or nail. The inner end of the locking pin e^3 is enlarged so as to prevent its being withdrawn from its hole in the cup-shaped enlargement e^1 of the upper bracket, but as the holes in the tension-head are somewhat larger than the inner end of the locking pin, the latter can readily be inserted into the nearest hole of the tension-head after the spring has been properly tensioned. There is sufficient clearance space between the inside of the cup-shaped enlargement e^1 and the tension-head of the adjustable spring-holder to permit the tension-head to rotate when setting the spring to tension without interfering with the enlarged inner end of the locking pin, and the inner end of the hole may be countersunk if more room should be required.

When forming the cup-shaped enlargement of the upper bracket e, it is left open at its rear-part to a sufficient extent to permit the introduction of the neck of the adjustable spring-holder, as shown in dotted lines in Figs. 4, and 9, after which the cup-shaped enlargement is closed in by means of suitable dies in such manner that the inwardly-bent flange at its lower end embraces the neck of the adjustable spring-holder, as shown clearly in Figs. 3, 5 and 9. This permits the adjustable spring-holder to freely rotate in the cup-shaped enlargement when adjusting the coiled spring, and prevents the adjustable spring-holder from becoming disconnected from the upper bracket. The lower bracket may be constructed to close around a fixed spring-holder, in the same manner, by making the opening in the inwardly-bent flange and in the neck of the fixed spring-holder of square, hexagonal or other shape, to prevent the turning of the same in the lower bracket. The upper and lower ends of the coiled spring are bent inwardly so as to engage the notches in the cylindrical stubs of the adjustable spring-holder and in this case also of the fixed spring-holder and prevent the spring from being pulled off from the cup-shaped portions of the upper and lower brackets.

The upper and lower brackets with their cup-shaped portions are made either of sheet-metal or of malleable cast-metal, the softness of the metal being made use of for closing in the rear-parts of the cup-shaped enlargements of the brackets around the necks of the spring-holders after the spring-holders are entered therein, so that the adjustable spring-holder can freely turn, but cannot drop out of its position after the cup-shaped enlargement is closed in around the same. The same feature can be applied to the lower bracket for holding the lower spring-holder rigidly in position.

The door-spring shown in Fig. 2 is of the same general construction as that shown in Fig. 1, only that in this case the flaps of the lower and upper brackets are arranged in line with the axis of the coil-spring and require only one screw each for being attached to the door-frame or gate-post and door or gate respectively. The adjustable spring-holder is constructed in exactly the same manner, and the tension locking pin is likewise enlarged at its inner end so as

to prevent its detaching from the cup-shaped enlargement of the upper bracket. Both the upper and lower brackets may be provided with projecting points or spurs that are pressed into the door-frame or door respectively, so as to engage the same and prevent the shifting of the brackets after being placed in position.

After the adjustable spring-holder is introduced into the cup-shaped enlargement of the upper bracket and properly closed in, the upper end of the coil-spring is placed around the cylindrical stud of the adjustable spring-holder and the inwardly-bent upper end of the spring is inserted into the notch of the cylindrical stud. The lower end of the coil-spring is placed around the cylindrical stud of the lower bracket and seated in the radially-bent depression between the cylindrical stud and the cup-shaped enlargement of the lower bracket. This is readily accomplished by pressure on the ends, so that they are seated in the notch in the cylindrical stud of the adjustable spring-holder of the upper bracket and in the radially-bent depression of the cylindrical stud of the fixed spring-holder of the lower bracket; the lower edge of the outer wall of the cylindrical stud of the lower bracket overhanging the radially-bent depressed part of the cylindrical stud, whereby the different parts of the door-spring are held together. When the door-spring is to be used, the end-flaps of the brackets are then attached to their respective places on the door-casing or gate-post and door or gate respectively, all the parts being held in place without any possibility of detaching or loss of the same.

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

In a door-spring, the combination, with a coil-spring having inwardly-bent upper and lower ends, of an upper bracket having a cup-shaped enlargement with an inwardly-bent flange at its lower edge, and a transverse slot and a hole sidewise of said slot, an adjustable spring-holder having a cylindrical stud, a notch in said stud, a collar above said notch, a neck above said collar and a perforated tension-head above said neck, a locking pin guided in the hole of the enlargement, said tension-head having radial holes on a level with the slot and hole of the upper bracket, said radial holes being of a larger diameter than the enlarged inner end of the locking pin, and a lower bracket having a fixed stud, the inwardly-bent ends of the coil-spring engaging respectively the notched stud of the upper spring-holder and the notched stud of the lower bracket.

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

EMIL BOMMER.

Witnesses:
PAUL GOEPEL,
H. J. SUHRBIER.