(Model.)

F. W. SMITH.

DOOR SPRING.

No. 246,982. Patented Sept. 13, 1881.

Fig. 1.

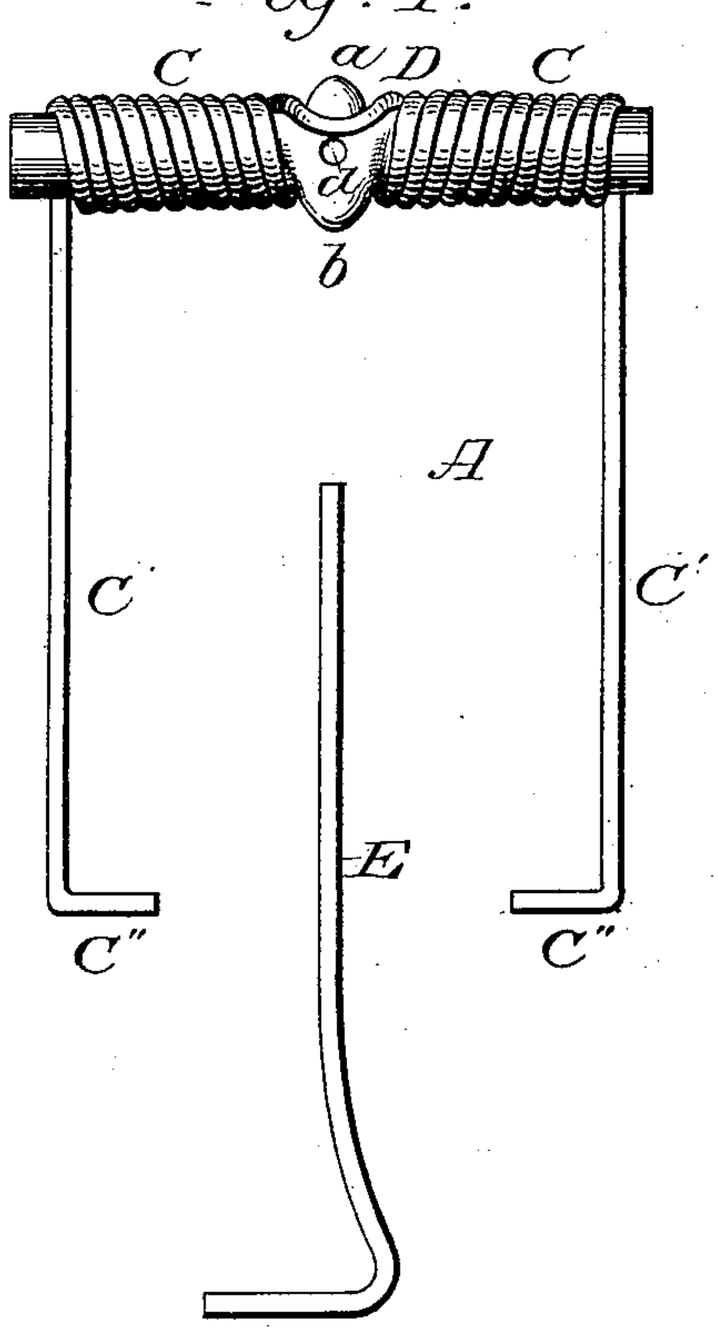


Fig. 2.

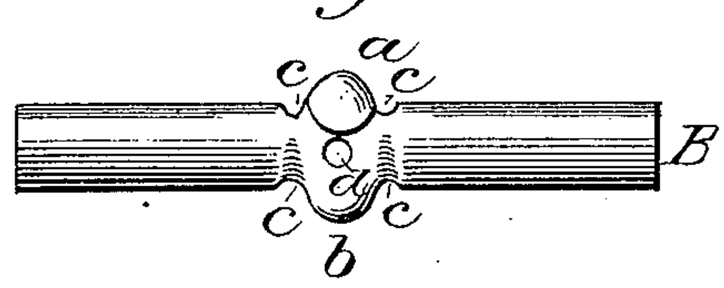


Fig. 4.

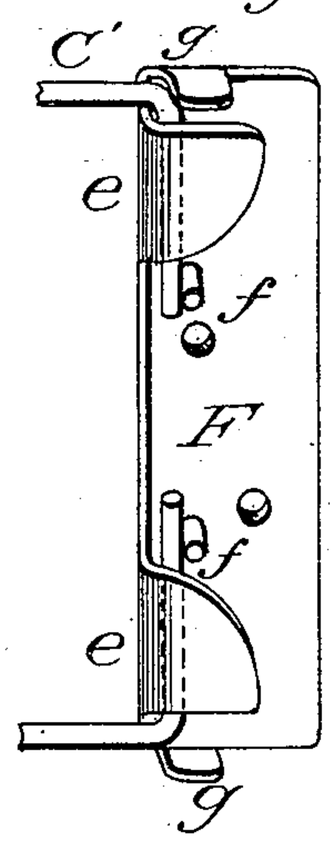


Fig. 3.

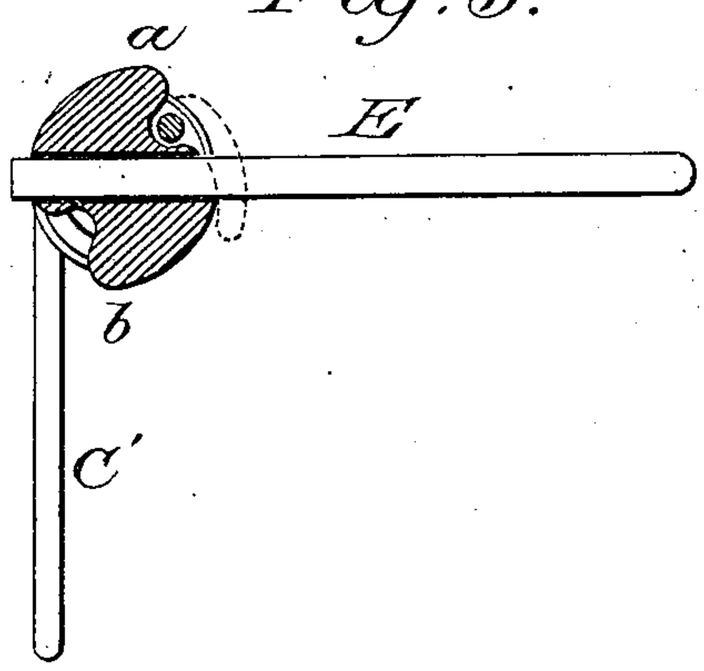
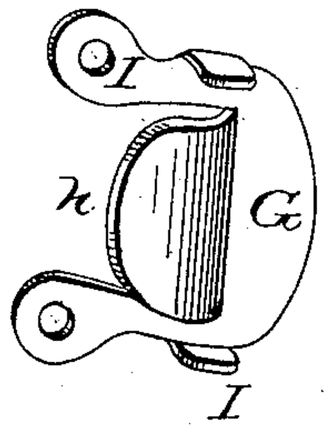


Fig. 5.



Witnesses:

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M. N. Wilcox

Inventor:

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UNITED STATES PATENT OFFICE.

FRED. W. SMITH, OF FREEPORT, ILLINOIS, ASSIGNOR OF ONE-THIRD TO GEORGE PURINTON, OF SAME PLACE.

DOOR-SPRING.

SPECIFICATION forming part of Letters Patent No. 246,982, dated September 13, 1881.

Application filed February 24, 1881. (Model.)

To all whom it may concern:

Be it known that I, FRED. W. SMITH, of Freeport, county of Stephenson, and State of Illinois, have invented a new and useful Improvement in Door-Springs, of which the following is a specification.

My improvement consists in the manner of forming the spring and the combination of the various parts incorporated therein, which parts in their relation to the spring serve to render said spring more cheap, durable, and effective.

There have been and are objectionable features existing in springs of this class, and I have by study and experiment devised the grouping of the various elements which, although not new in themselves, are essential and novel features in the combination I have devised.

The first element in my improvement consists of the two coils C C, the arms C′ C′, the inwardly-projecting ends C″ C″, and the loop D, formed from a single piece of wire, which can be wound directly around the core B in the form shown in Figure 1.

The core B (shown uncovered in Fig. 2) is peculiarly adapted to the purpose for which it is intended. Two triangular conical lugs project from the center, grooved indentations being formed on either side thereof, and the perpendicular faces of said lugs are curved inwardly. The grooves and curve of the face of the lugs are about one-half the thickness of the wire forming the spring. A sectional view of the lugs, cut transversely through the core at the apex of the lugs, is shown in Fig. 3, having the wire in position. The core is further provided with the opening *d*, in which to place the end of the detachable arm E, Figs. 1 and 3.

It will be seen by Fig. 3 that with the loop D in position on lug *a* the arm E, when thrust in the hole, is at right angles to the arms C′.

These elements, as grouped in Fig. 1, represent a complete spring, A, with the exception of the parts to be used in attaching the same to the door or casing.

The improvements to be noted in the spring A are these: By the method of forming the core with lugs, as shown, and the wire with a short loop, D, the coils C C can be wound directly upon the core or on two thin metallic sleeves, which may be used to surround the core during the process of winding. This is a much cheaper method of winding than when the coils are formed and the core subsequently inserted. It is further an improvement in that, the loop being very short and closely fitting the core, it is never possible for the coils C C to spread enough to allow the core to drop from between them, and it can never be pulled or forced laterally out of the coils. It is further an improvement, and a very vital one, in the matter of shipping the completed spring, as the arm E is not inserted in the opening *d* until it is applied to the door.

It is now customary to form the spring so that the arms C′ C′ are at right angles to the equivalent to the arm E, which equivalent is either an elongated loop or a single arm continuous from one of the coils. Springs so formed are cumbersome to pack, and therefore the arms are forced into a parallel position and there secured, and thus shipped to the various dealers. They may be kept on hand by the dealer for a considerable time, perhaps from season to season, and it must naturally follow that the compressed state of the spring must serve to set the wire, and thus defeat the very object of having the arms at right angles when formed, which is to have a reserve force in the spring.

By having the arm E detachable and not inserted in the opening, the spring can be shipped in the natural state and subject to no tension whatever, and no length of time can injure or set the spring. It is further an improvement for the reason that the tension of the spring can be increased, if desired, or, if weakened by use, can be renewed. This is accomplished by turning the core backward until the loop D overlaps the opening *d*. The arm E is then inserted and takes the place of the lug *a*. The dotted lines, Fig. 3, show this position. It can further be increased by reversing until the loop D overlaps lug *b*. Thus the tension can be increased on the spring as needed or desired by quarter-turns. This class of springs, as now formed, can only be increased in tension by a full turn, which is more objectionable than

the weakened spring. I contemplate, if it should be desirable to make larger and stronger springs, to increase the number of lugs, so that the tension can be increased by eighths. As a further feature of improvement I have devised the attachments shown in Figs. 4 and 5. Fig. 4 represents the attachment to go on the casing. This plate can be cut laterally across the center, and thus form two attachments for single arms.

The device now used consists of a plate with two eyes at either end, into which the ends C″ C″ are thrust. I have found that that method is very insecure, for the reason that the arms C′ C′ are liable to spread and force the ends C″ C″ out of the eyes. I have noticed several cases in which a wire has been used to bind the two arms together to prevent this. Plate F, Fig. 4, is formed with two overlapping triangular lugs, *e e*, two projections, *f f*, and two projecting lugs, *g g*. The ends C″ C″ are placed between the long open side of the lugs *e e* and the projections *f f* and forced slightly outwardly and back upon the plate F. Then, being allowed to resume their natural position, the angle is carried inwardly under the lug, resting against the broad inner side of same. I have shown by dotted lines on the upper lug, Fig. 4, the position when about to enter, and by solid lines the position when in. Lug *g* prevents any lateral motion of the arms, and the tension of the spring acts directly to draw end C″ farther inward, unless in certain positions, when the point *f* will prevent any outward motion, unless a twist is given the arm. No position of the spring will ever do that, so there is no danger of the arms escaping without other influence. Plate G, Fig. 5, is designed to go on the door. It consists of a curved outward-projecting lip, *h*, and two projections, *i i*. This is placed on the door with its closed part toward the hinge side thereof, and serves to hold the hooked or looped end of arm E.

I am aware, as stated, that the various elements forming this spring are not new and novel only as they are grouped and combined in the spring shown. As they are, as far as known to me new, in this combination, and as by this combination I am able to cheaply produce a durable, convenient, and much more perfect spring than any now formed, I desire Letters Patent covering the same, based on these specifications and the following claims.

I claim—

1. The core formed with lugs *a b*, grooves *c c c c*, and opening *d*, arranged in combination with the detachable arm E, the coils C C, and loop D, as shown and described.

2. The plate F, with its lugs *e e* and projections *f f* and *g g*, arranged for securing the hooked arm E to the door, substantially as described.

3. The curved plate G, with its lip *h* and lugs *i i*, arranged for securing the hooked arm E to the door, substantially as described.

4. The combination of a door-spring formed of the coils C C, loop D, arms C′ C′, core B, and detachable arm E, together with the attaching-plates F and G, as shown and described.

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Witnesses:

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