L. Thomas,

Door Spring.

No. 16,759. Patented Mar. 3, 1857.

Fig 2.

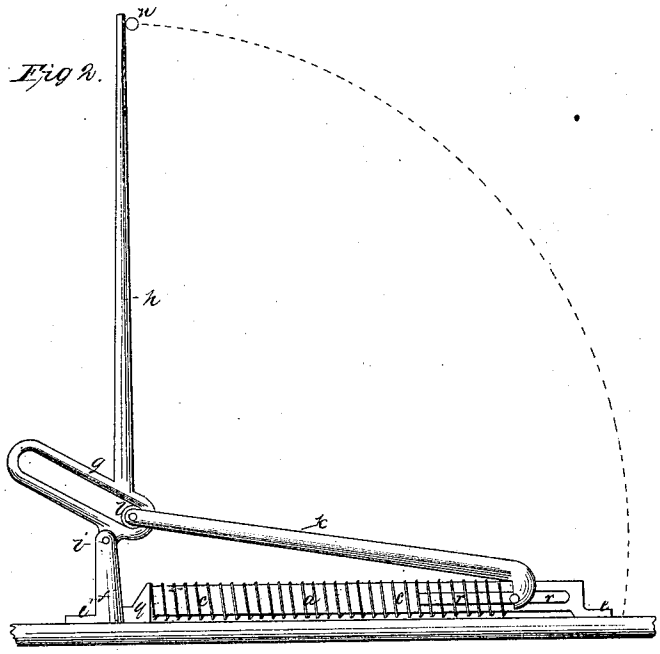


Fig 1.

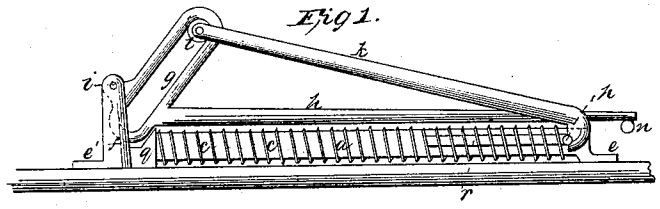
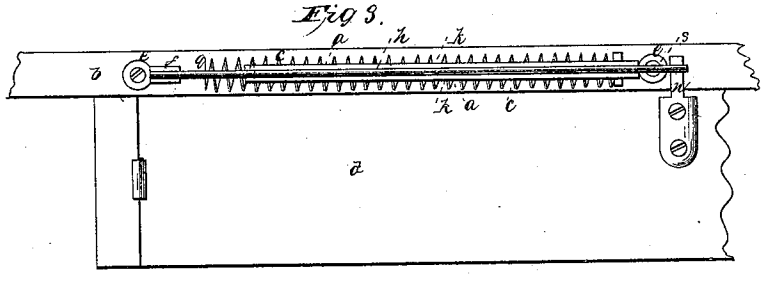


Fig 3.



N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LEOPOLD THOMAS, OF ALLEGHENY CITY, PENNSYLVANIA.

DOOR-SPRING.

Specification of Letters Patent No. 16,759, dated March 3, 1857.

To all whom it may concern:

Be it known that I, LEOPOLD THOMAS, of Allegheny City, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Door-Springs; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawing, forming part of this specification, in which—

Figure I is a side view of my improved door spring. Fig. II is a similar view, showing the door opened. Fig. III is a front or edge view thereof.

In all the drawings like letters of reference denote similar parts of my spring.

In order to enable others skilled in the art to make and use my improved door-spring, I will proceed to describe its construction and operation.

In the drawings *a* is an iron rod which may be either round or square, and which is fastened by screws *s*, *s*, (Fig. 3) horizontally to the door frame *v*, one end being placed over the hinges of the door, and the other one toward the lock post of the door. A spiral metallic spring *c*, is placed over this rod, and is of sufficient diameter to play freely on the rod. The ends of the rod are brackets *e*, *e'*, through which the screws *s*, *s*, pass, by which the rod *a* is secured to the door frame *b*. These brackets *e*, *e'*, raise the rod *a* from contact with the door frame, so as to allow room for the spring *c* to pass over the rod *a* without touching the door frame. From one of the brackets, *e'* (at the end of the rod *a* which is to be placed over the hinges of the door) rises a standard *f* at right angles to the rod *a* to which the loop *g* of the lever *h* is fastened, by a pin or pivot at *i*. The rod *a*, brackets *e*, *e*, and standard *f* are all made in one piece.

The long arm *h* of the looped lever, lies (when the door is shut) horizontally, immediately over, and parallel with the center of the rod and projecting toward the extremity of the bracket *e*, the point of the lever *h* resting on the outside of the finger *n*, which is attached to the upper edge of the door, and projects upward to operate the lever arm whenever the door is opened. At the other extremity of the lever *h* is a loop *g* of the shape shown in Figs. 1, 2, being oblong, with parallel sides, straight or but slightly curved, and the sides connected by curved ends. This loop *g* is of one piece with the lever, and is set at an acute angle to it; and the point of attachment of the loop *g* to the standard *f* at the pivot, *i*, is near to one end of the loop on its outer edge, *g*. Inside this loop is placed a roller, *l*, which works in a groove in the inner edge of the loop (which is the edge nearest to the lever) or the inner edge of the loop *g* may be beveled off to fit in a groove in the periphery of the roller *b* or the roller may have a plane edge, being kept in place on the inner edge of the loop *g* by the arms *k*, *k*, so that in either way the roller will traverse the inner edge of the loop without getting displaced. To the center of the roller are attached, by a pin or pivot, *i* (which forms the axis of the roller *l*) two arms *k*, *k*, which connect the roller *l* with the rest *r*, which is a pin placed at the outer extremity of the spiral spring *c*, and passing through a longitudinal slot *r* in the rod *a*. One extremity of each of the arms *k k* is attached on either side to the roller, and the other extremity of each hooks on to the rest *p*, one on one side of the rod *a* and spiral spring *c*, and the other, on the other side, the lever *h* passing between the arms *k*, *k*. The slot *r* in the rod *a* is long anough to admit of the necessary play of the spring *c*, caused by the retrograde movement of the rest, *p*, when drawn back by the arms *k*, *k*. The lever *h* is attached to the loop *g* near to the pivot *i* end of the loop *g*, so as to give double leverage, as hereinafter explained. The outer extremity of the spiral spring *c* presses against the rest *p*, and the other extremity against a pin *q* or shoulder on the rod.

Having thus described the several parts of my improved door spring, I will proceed to explain its operation. When the door is closed the several parts are in the position shown in Fig. 1. When the door begins to open, the finger *n* presses against the extremity of long arm *h* of the loop lever, and the roller being at the outer extremity of the loop *g* draws the spring *c* (by means of the arms *k*, *k*, connecting the roller *l* and the rest *p*) backward with a rapid movement, the leverage being very powerful at the start, but diminishing gradually as the door opens, and the loop *g* assumes an angle with the rod *a* more obtuse, meanwhile the roller *l* slips down the inner edge of the loop *g* toward the pivot end of the loop, and in doing so also diminishes greatly the leverage, and the action of the spring, so that

after the door is started to open it meets with scarcely any resistance from the spring and lever until it is about halfway open, or at an angle of 45 degrees, with the door frame. Then the edges of the loop *g* are at about right angles to the rod *a* as seen at Fig. 2 and the roller *l* has passed into the pivot end of the loop *g* back of the long arm *h* of the lever, and now the further opening of the door causes the loop *g* to carry the roller *l* around the center or pivot *i*, which requires a considerable further compression of the spiral spring *c*, and a powerful leverage is again exerted to shut the door.

The great advantage of this arrangement over other door springs is that the chief pressure is exerted at the door when it is wide open, and when it is nearly closed, and that between these points the pressure is so slight, as to give no inconvenience or undue resistance to a person opening it, whereas in the use of any other springs with which I am acquainted the pressure is least at the point when the door is nearly closed, and increases rapidly, as it is opened, to the great annoyance of persons passing through.

Having thus described my improved door spring, I do not claim the use of the spiral spring *c* nor the roller *l;* but

What I do claim as my invention, and desire to secure by Letters Patent, is—

The use of compound lever *g h* in combination with the connecting arms *k k* and spiral spring *c*, or their equivalent, in the manner and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand this fourth day of February 1857.

LEOPOLD THOMAS.

Witnesses:

W. DUDLEY KING,

L. P. STONE.