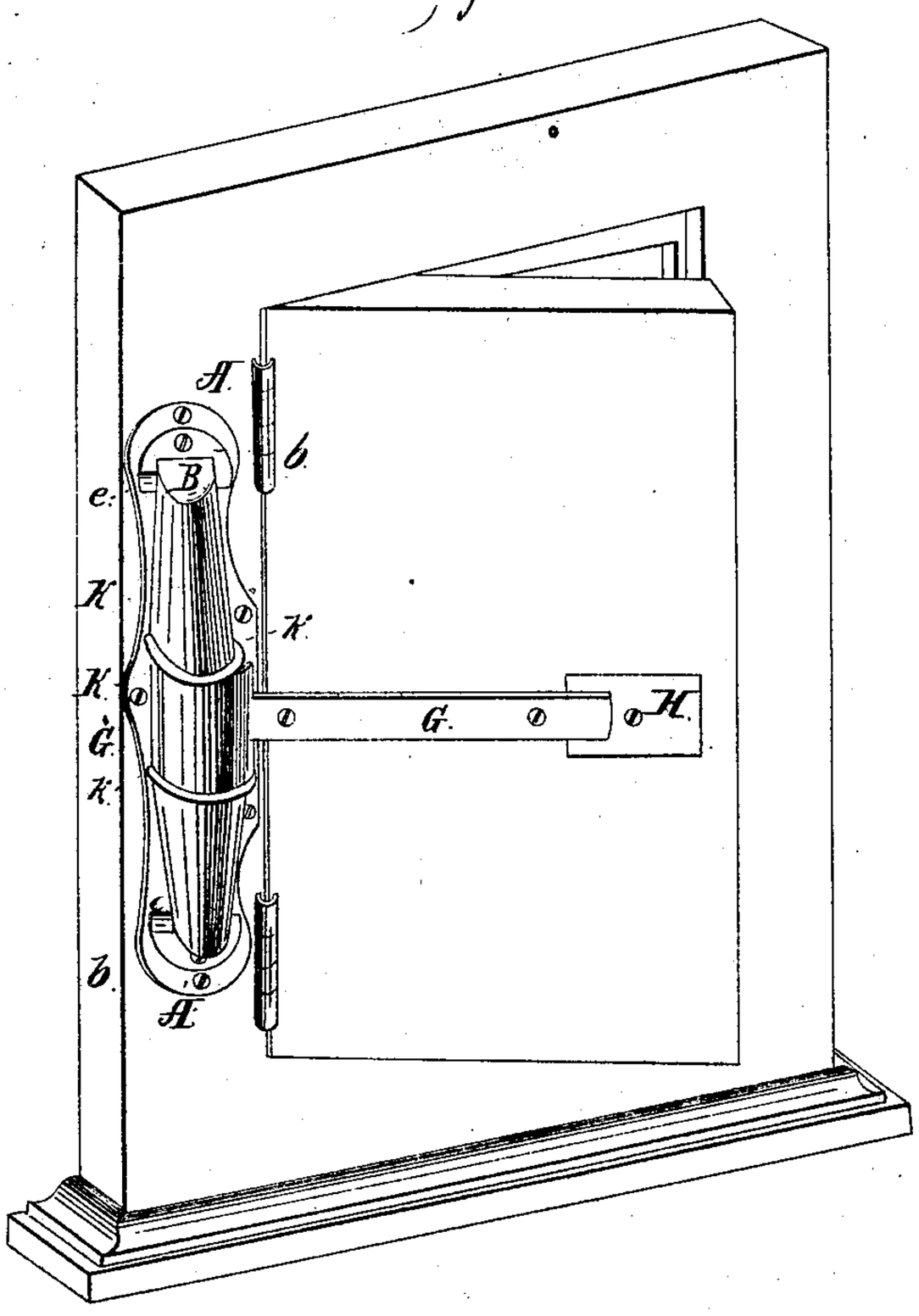
2 Sheets. Sheet 1.

J. M. Connel,

Door Spring.

No. 60,481. Patented Dec. 18, 1866

Fig. 1.



Witnesses:
Geo. H. Rothwell
A. M. Tanner.

Inventor:
J. M. Connel.

2 Sheets-Sheet 2

J. M. Connel,

Door Spring

No. 60,481. Patented Dec. 18, 1866.

Fig. 2.

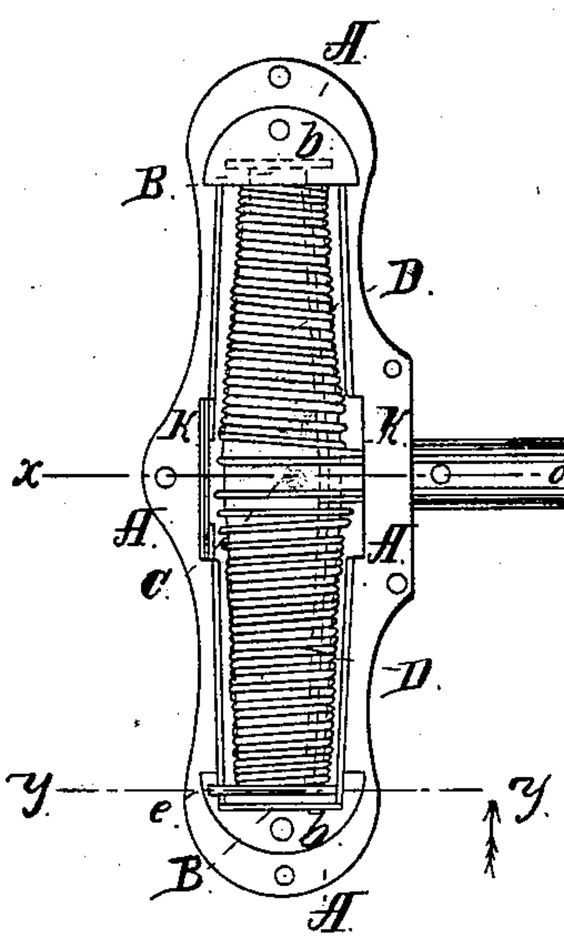


Fig. 3.

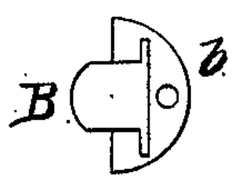


Fig. 4.

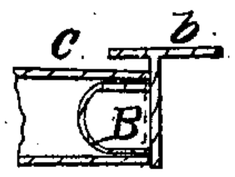


Fig. 7.

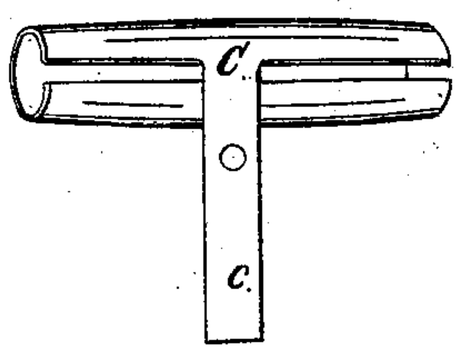


Fig. 5.

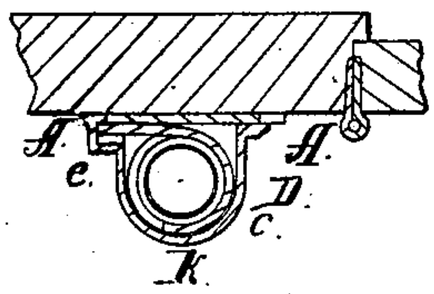
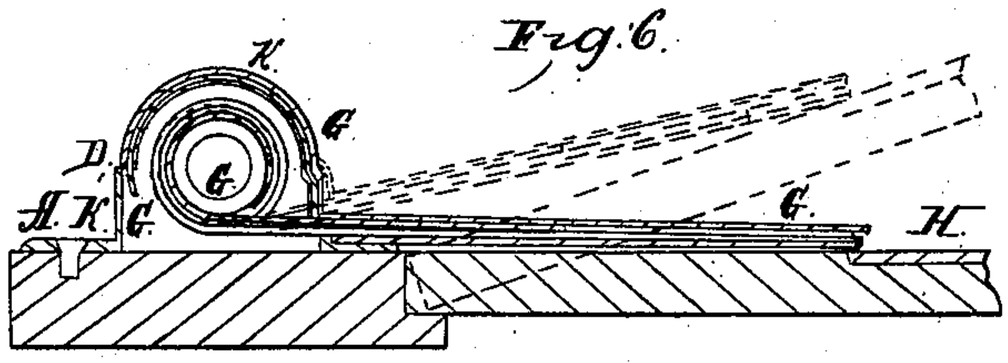


Fig. 6.



Witnesses:
Geo. W. Rothwell.
A. M. Tanner.

Inventor.
J. M. Connel

United States Patent Office.

IMPROVEMENT IN DOOR SPRINGS.

JAMES M. CONNEL, OF NEWARK, OHIO.

Letters Patent No. 60,481, *dated December* 18, 1866.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JAMES M. CONNEL, of Newark, in the county of Licking, and State of Ohio, have invented a new and improved Door Spring; and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of the same, sufficient to enable others skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of the door spring in position on a door jamb.

Figure 2 is a rear view of the door spring detached, being a view of that face which is attached to the jamb.

Figures 3 and 4 are illustrations, from different points of view, of the pintle or bearing for the central cylinder or mandrel, and the spring coil which surrounds it.

Figure 5 is a horizontal section on the line *y y*, fig. 2.

Figure 6 is a horizontal section on the line *x x*, fig. 2.

Figure 7 is a view of the central cylinder or mandrel, around which the spring wire is coiled.

In this door spring, the central mandrel around which the spring wire is coiled is made flexible and hollow, having its bearings in studs attached to the base-plates, and a tongue, which is associated with the ends of the spring wires, is their attachment to the arm which bears against the door; the ends of the spring, which are rigidly attached to the casing, are prolonged at a tangent, and received in recesses of the case. The portion of casing attached to and revolving with the arm, and partially enclosing the spring casings, moves in guides formed by flanges on the latter, and, when partially rotated, occupies an enlargement in the rear. In the drawings—

A is the base-plate, which is to be fastened to the door jamb, and to which the other portions are affixed; B B are studs with foot flanges, *b b*, by which they are riveted to the base-plate A. These studs form bearings for the hollow mandrel C, which consists of a metallic plate bent into a nearly cylindrical shape, but somewhat tapering towards its ends, and having a projecting tongue, *c*, whose purpose will be presently explained. Around the mandrel C are coiled the wires D D, whose outer extremities are laid in recesses, *e*, in the case, so as to be held rigidly when, by power applied to the arm G, the coiled spring is spirally moved. The ends of the springs are, for this purpose, prolonged tangentially, but not bent out of their plane, for the purpose of detention by a point of rigid support in the casing or base-plate. Attached to the core or slotted mandrel, C, is a tongue, *c*, which projects outward in company with the ends *d d* of the wire coils; these are enclosed by a casing, G, and together they form the spring arm, which presses against the plate H on the door to close it. The arm G connects with a semi-cylindrical portion, G′, which, as it is partially rotated by the opening of the door, moves in the space bounded by the flanges *k k* on the casing K, which encloses the springs D D. This casing, K, is a part of or attached to the base-plate A, and, as the portion G′ rotates, it passes behind the central part of the springs D, whose coils are larger near the centre than towards their ends, so as to bring the whole length of each coil into equal activity when operated. By the combination of the tongue *c* with the wires *d d*, they are much strengthened; and the central mandrel being moved with the spring, instead of the spring being moved upon it, the spring is strengthened at the point of strain; less friction is generated, and the parts act more smoothly and noiselessly, while the flexibility of the tongue *c*, and its attached cylindrical portion, assists the coiled spring in its operation. The central part of the casing K, marked K′, is enlarged for the reception of the semi-cylindrical plate G′, when it is rotated to the rear by the opening of the door; this provision of sufficient space for the reception of the portion G′, permits the opening of the door almost against the wall, that is, a vibration of nearly 180°. The wire coils are severally in the form of a conical frustum, for the purpose of equalizing the tension upon all parts, from the arm G to the point of attachment to the casing in the recesses *e*.

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

1. I claim the hollow slotted mandrel, C, or its equivalent, provided with a tongue, which projects into the arm G, substantially as specified.

2. I claim the mode of journalling the mandrel C, or its equivalent, on the studs B, projecting into the casing K, and attached to the base-plate A, substantially as described.

3. I claim the coils D, in combination with the hollow slotted mandrel C, or its equivalent, the tongue *c*, and arm G, substantially as described.

4. I claim the arrangement of the coils as conical frusta upon a core or mandrel of corresponding character, as and for the purpose described.

5. I claim the arrangement of the arm G, and the semi-cylindrical portion G′, rotating between guides, *k k*, on the casing K, and occupying in the rear the enlargement K′, substantially as described.

6. I claim the recesses *e* for securing the tangential prolongation of wire coil, substantially as described.

7. I claim the general combination of parts, consisting of the mandrel C, or its equivalent, tongue *c*, coiled springs D D, arm G G′, casing K, studs B B, and base-plate A, substantially as described.

J. M. CONNEL.

Witnesses:
GEO. W. ROTHWELL,
A. M. TANNER.