

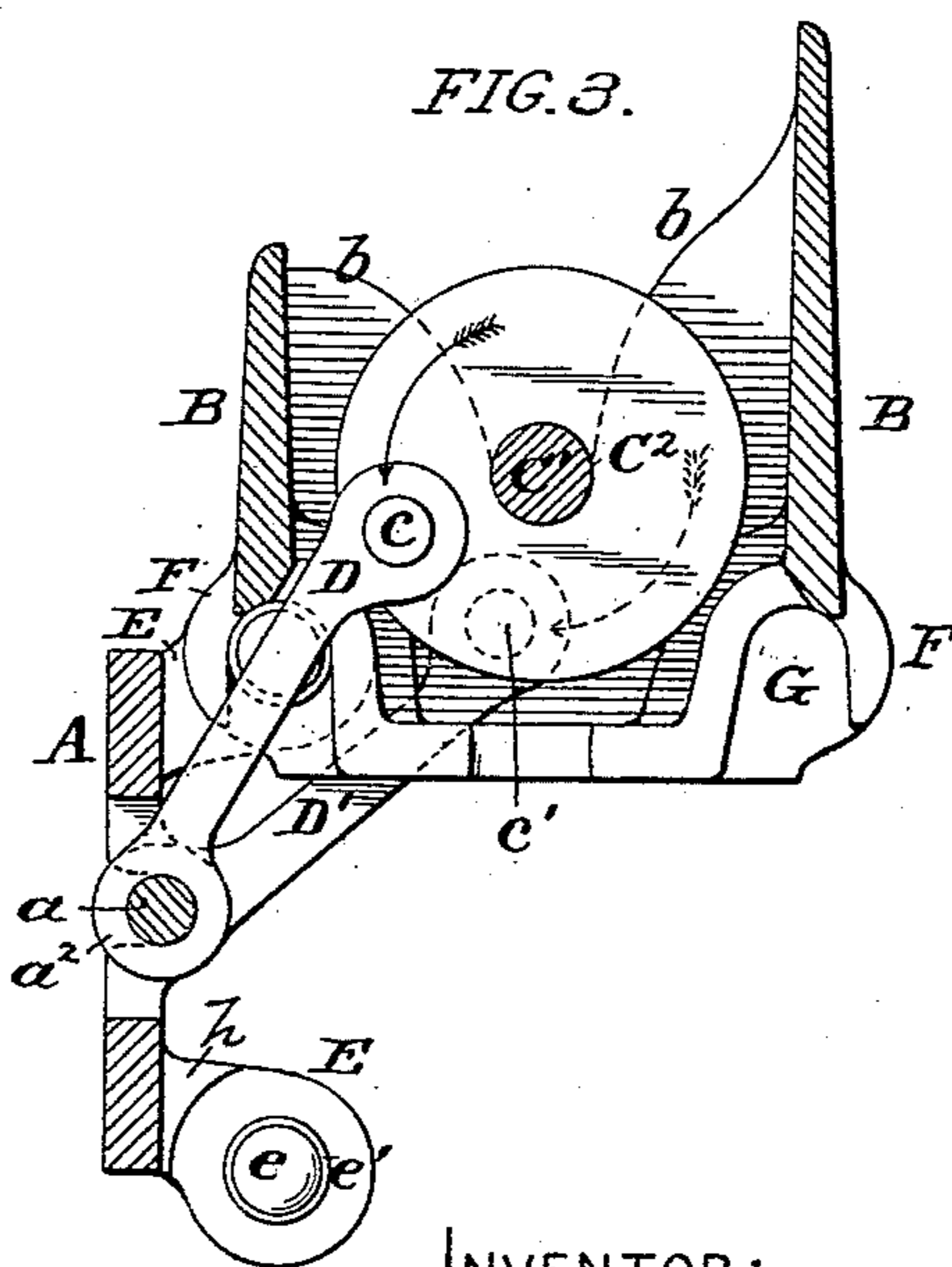
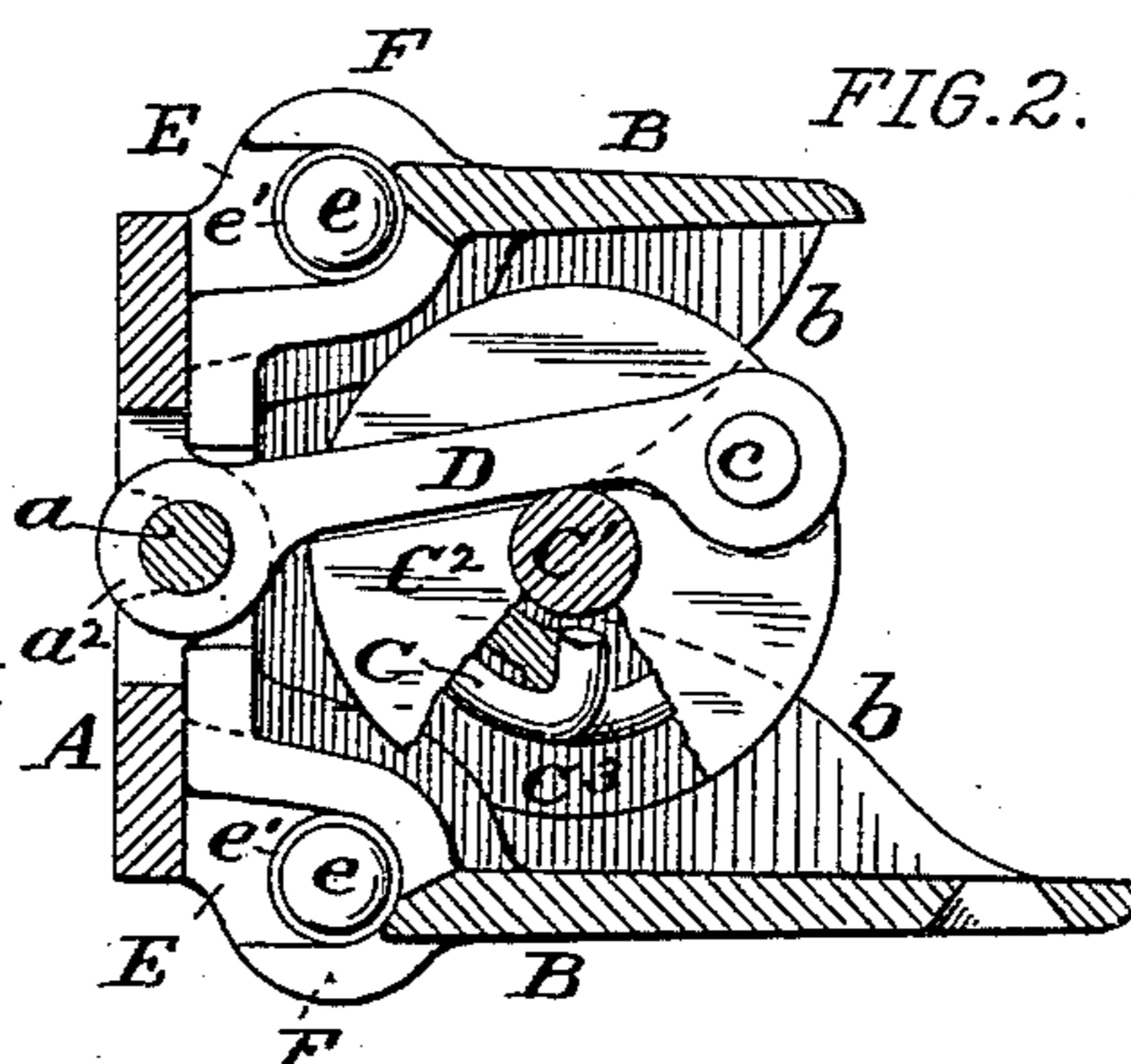
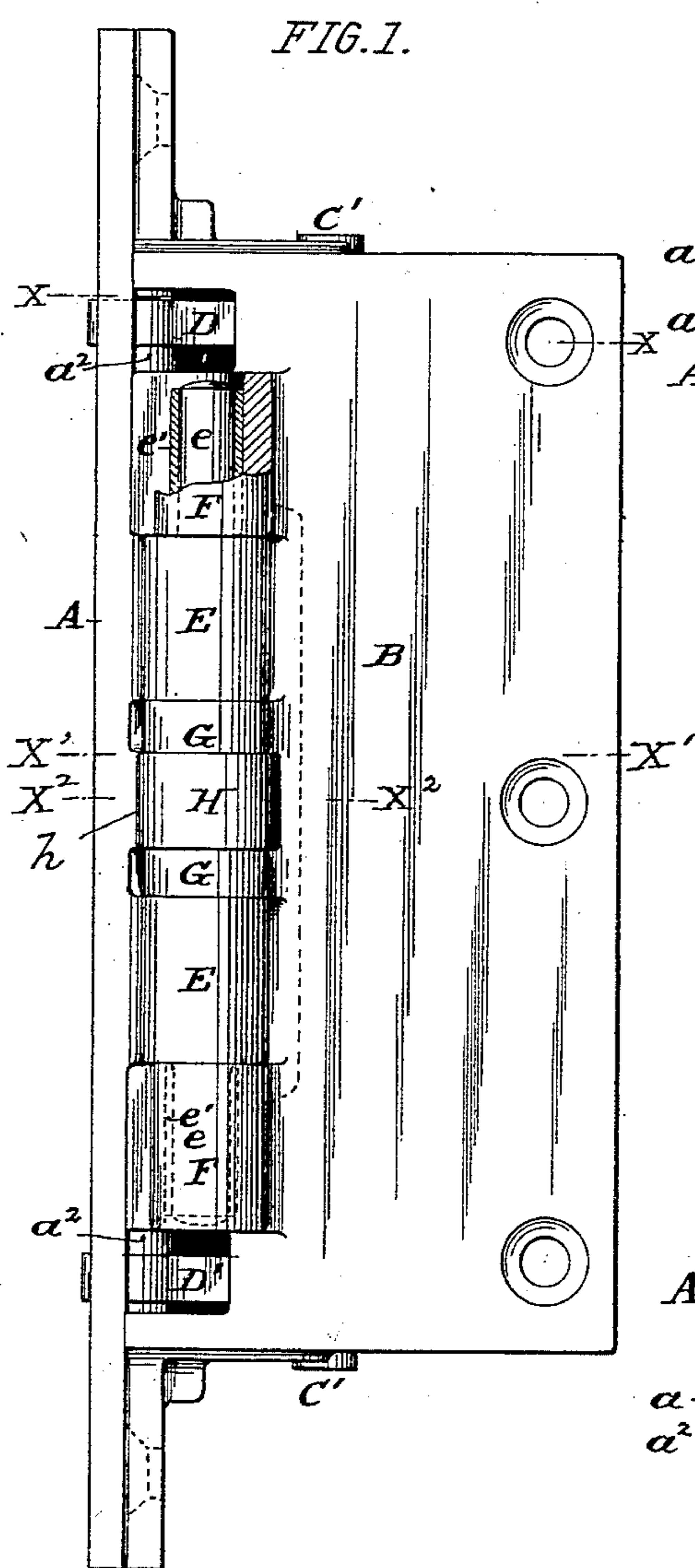
(No Model.)

2 Sheets—Sheet 1.

G. W. AMOS.
SPRING HINGE.

No. 446,617.

Patented Feb. 17, 1891.



ATTEST:

S. S. Niles

Geo. H. Arthur

INVENTOR:

George W. Amos

by

Robert S. Burns
Attorney.

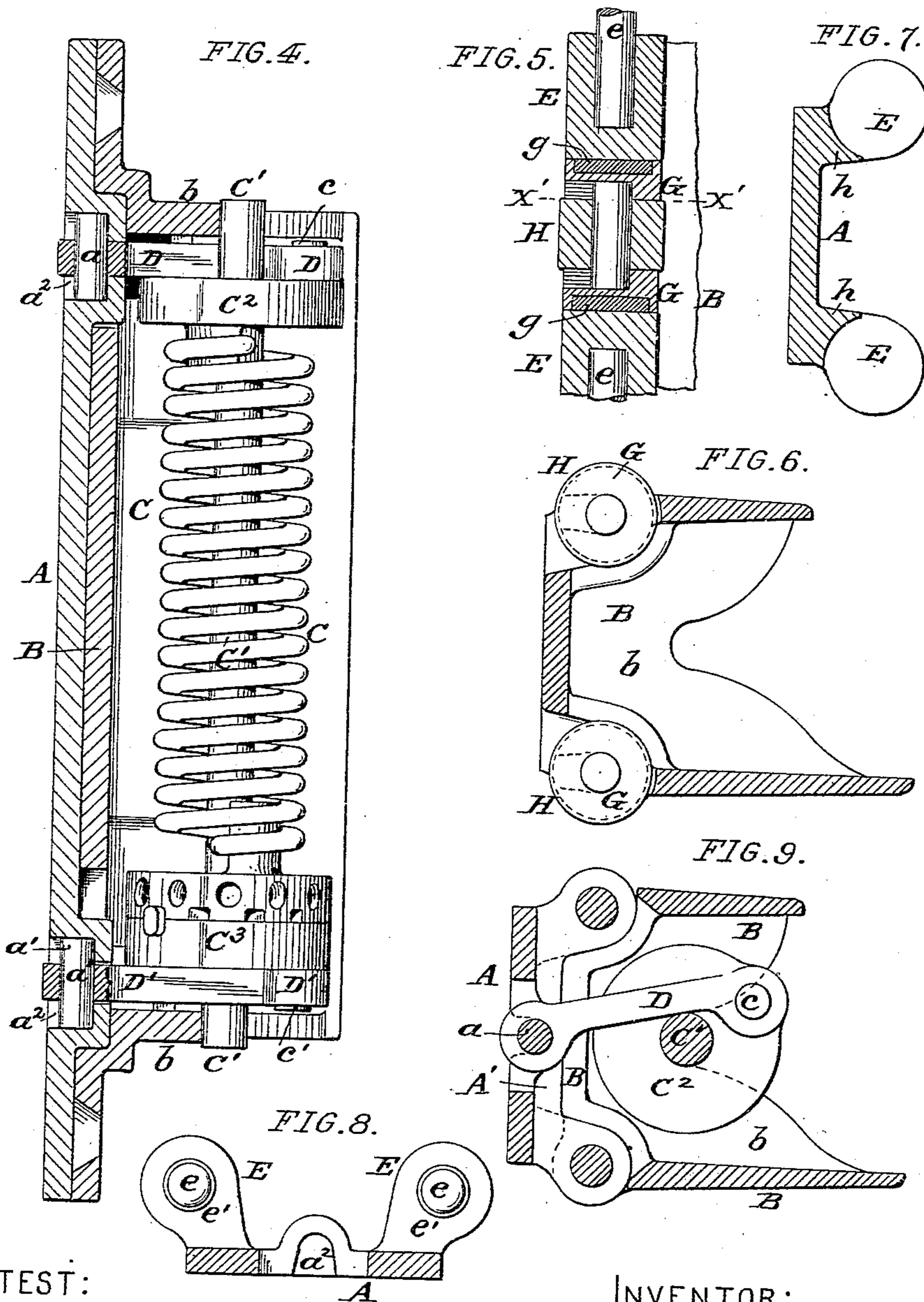
(No Model.)

2 Sheets—Sheet 2.

G. W. AMOS.
SPRING HINGE.

No. 446,617.

Patented Feb. 17, 1891.



ATTEST:

S. S. Niles
Geo. H. Arthur

INVENTOR:

George W. Amos
by *Robert H. Burns*
Attorney.

UNITED STATES PATENT OFFICE.

GEORGE W. AMOS, OF CHICAGO, ILLINOIS, ASSIGNOR TO SIDNEY S. MILES,
OF SAME PLACE.

SPRING-HINGE.

SPECIFICATION forming part of Letters Patent No. 446,617, dated February 17, 1891.

Application filed December 26, 1889. Serial No. 335,004. (No model.)

to all whom it may concern:

Be it known that I, GEORGE W. AMOS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Spring-Hinges, of which the following is a specification.

The present invention more particularly relates to that type of double-acting spring-hinges in which the operating torsion-spring of the hinge is located away from the pintle-axis of the hinge and is adapted to close the door when opened from either direction; and the main object of the present improvements is to afford a simple and durable hinge mechanism, by the action of which in the opening of the door torsional movement is imparted to the spring from each end and in opposite directions, the construction being such that the torsional movement imparted to the spring is of a progressively decreasing nature, the movement being greater on the initial opening of the door and progressively decreasing until the door is at right angles to the jamb, in which position the torsional strain of the coiled spring will exert but little force upon the door, merely enough to start the same toward its closed position, the force of the spring upon the door augmenting as the same draws near to its closed position, the force being greatest when the door is in or immediately adjacent to such closed position.

A further object of my present improvements is to provide various features of construction for relieving the knuckles and their pivot pins and sockets of a two-part double-acting hinge from undue or excessive strain and frictional wear.

I attain such objects by the construction and arrangement illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a two-part double-acting hinge constructed in accordance with my present invention; Fig. 2, a horizontal section of the same on line X X, Fig. 1, illustrating the parts in a closed position; Fig. 3, a similar view illustrating the parts in an open position; Fig. 4, a vertical section of the hinge, illustrating the arrange-

ment of the coiled torsion-spring, &c.; Fig. 5, a detail vertical section through the pivot-knuckles, illustrating the wear-plates and friction-roller for the same; Fig. 6, a horizontal section of the door leaf or member of the hinge, taken at line X X', Figs. 1 and 5. Fig. 7, a horizontal section of the jamb leaf or part of the hinge, taken at line X² X², Fig. 1; Fig. 8, a similar view taken at line X X, Fig. 1; and Fig. 9, a horizontal section of a modification.

Similar letters of reference indicate like parts in the several views.

As illustrated in the drawings, my improved hinge consists of a stationary or jamb leaf A and a movable or door leaf B, hinged together so as to swing in either direction by means of a series of vertically-arranged pivot-knuckles E F, that project laterally from the side corners or edges of the leaves A and B.

The movable or door leaf B is of a box form to receive and house the coiled torsion-spring C of the hinge, its top and bottom webs *b* being notched out, as shown, to form open-sided bearings for the vertical stem C', around which is arranged the torsion-spring C and its top and bottom carrying-disks C² C³, to which the ends of the spring C are attached in any suitable manner, the lower disk or hub C³ being divided horizontally into an upper and lower section that are radially notched and perforated in the usual well-known manner to effect the required adjustment of the tension of the spring, access being gained to such tension-adjusting device through a suitable orifice or transverse slot in the face-plate of the movable leaf B.

As above constructed, the webs *b* form a support for the spring C midway the transverse width of the hinge, so that in use the spring will occupy a position centrally in the thickness of the door and concealed from view.

In the present invention the carrying disks or hubs C² C³ of the torsion-spring C, in addition to their usual function, constitute crank-disks for the attachment of the draw or eye bars D D', by which torsion is imparted to the spring in the movement of the hinge parts, one end of the eye-bars engaging the crank or wrist pins *c c'* of such disks, the

other end of such eye-bars being connected by journal-pins a a' to the stationary leaf at its mid-width, such journal-pins fitting into semicircular cavities a^2 in the back of the stationary leaf A, as shown in Figs. 2, 3, 4, and 8.

By the location of the torsion-spring C midway the transverse width of the hinge the draw or eye bars D D' can be connected to the carrying-disks C² C³ of the torsion-spring at opposite sides of their center, as illustrated in Fig. 3, so that on the opening of the hinge in either direction a movement of both ends of the spring will be effected to coil up or impart a torsional movement to the same, and it will be observed that as the movable hinge-leaf travels to an open or right-angle position the amount of torsional movement imparted to the spring progressively decreases, so that progressively less force is required to effect a wider opening of the door after its initial opening, and vice versa, that the initial force exerted by the spring in closing the door will be very light, and will progressively increase until the door is closed. With such improved action of the hinge parts the handling of the door is made easy, its proper closing insured, the pressure of the wind on outside doors resisted, and the life of the spring prolonged. The lateral swing or movement of the draw or eye bars D D' during the movement of the movable hinge member takes place in transverse slots in the face-plates of the stationary and movable hinge members A and B, as clearly illustrated in the drawings.

In the drawings I have illustrated the coiled torsion-spring arranged in and moving with the movable or door member of the hinge. It is immaterial, however, to the proper working of my improved construction which part is stationary and which part is movable, the arrangement shown in the drawings being preferred on account of ease of application and accessibility of parts.

The middle knuckle G on each side edge of the movable hinge member is adapted to fit snugly in a space left between the knuckles E E of the fixed hinge member to take up a greater part of the wear and strain upon the parts and form a strong and substantial bearing at such points to carry the vertical weight and strain upon the pivot parts.

In the present invention the wearing-face of the knuckle G is formed by a disk g , of hardened steel or other metal, cast in the bearing-face thereof, as shown in Fig. 5, to increase the wear-resisting properties of the bearing. If preferred, the hard-metal bearing-disk g may be arranged in the bearing-face of the knuckle E instead of the knuckle G without departing from the spirit of my invention.

In constructing the hinge with open-sided sockets or knuckles F, as illustrated in Figs. 1, 2, 3, and 8, it is preferable to provide the pivot pins or studs e with friction thimbles or collars e' , the purpose of which is to

avoid in a great measure the uneven wear that would take place upon the pins or studs e were such open sided sockets to bear upon the pin direct. In use, as the socket moves around the pin the thimble will move with the socket, and such thimble having a continuous bearing around the pin will equalize the friction and wear upon the same, and by excluding dust and grit from the bearing-surface will prevent excessive wear of parts in a very effective manner.

To relieve the pivot pins or studs e from a portion of the lateral strain upon the same in the action of the hinge, I provide the knuckle G with a bearing-roller H, journaled in line with the axis of the pivot-studs e and adapted to bear against the curved projections h on the stationary hinge member A, as shown in Figs. 1, 3, and 7.

It is evident that with very little, if any, modification my improved arrangement of the torsion-spring and the means for winding the same from its ends can be applied to the ordinary three-leaf type of hinges. In Fig. 9 I illustrate such application. In this the spring is arranged in the movable leaf, the draw-links D are attached to the fixed leaf A', or above and below the same, and are connected with the crank-disks of the torsion-spring that have bearing in the movable hinge member B.

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

1. A spring-hinge comprising, in combination, two or more leaves or members pivoted together, a torsion-spring supported in one of the hinge members midway the transverse width thereof, a disk or hub for the spring having a crank or wrist pin, and an eye or draw bar extending from said wrist-pin to a pivot pin or stud located on the opposite hinge member midway of its width, substantially as set forth.

2. A spring-hinge comprising, in combination, two or more leaves or members pivoted together, a torsion-spring supported in one of the hinge members midway the transverse width thereof, top and bottom disks for the spring having crank or wrist pins, and a pair of eye or draw bars pivoted to the opposite hinge member midway of its width and connected to the wrist-pins at opposite sides of the axis of their disks, whereby the spring will have tension imparted to it simultaneously from each end in the operation of the hinge, substantially as set forth.

3. In a spring-hinge, the combination, with two or more leaves pivoted together, of an eye or draw bar connected to one hinge member by a journal-pin and semicircular socket at the back of said member, a torsion-spring attached to the opposite hinge member, and a disk or hub for the same, having a crank or wrist pin to receive the end of the eye or draw bar, substantially as set forth.

4. In a spring-hinge of the type herein de-

scribed, the combination of the stationary
and movable hinge members hinged together
by duplicate studs, and open-sided sockets at
their side edges, with thimbles or collars sur-
5 rounding the studs and embraced by the
open-sided sockets, substantially as and for
the purpose set forth.

In testimony whereof witness my hand this
17th day of December, 1889.

GEORGE W. AMOS.

In presence of—

S. S. NILES,
ROBERT BURNS.

Correction in Letters Patent No. 446,617.

It is hereby certified that the name of the assignee in Letters Patent No. 446,617, granted February 17, 1891, upon the application of George W. Amos, of Chicago, Illinois, for an improvement in "Spring Hinges," was erroneously written and printed "Sidney S. Miles," whereas said name should have been written and printed *Sidney S. Niles*; and that the said Letters Patent should be read with this correction therein that the same may conform to the corrected files and records of the case in the Patent Office.

Signed, countersigned, and sealed this 14th day of April, A. D. 1891.

[SEAL.]

Countersigned:

C. E. MITCHELL,

Commissioner of Patents.

CYRUS BUSSEY,
Assistant Secretary of the Interior.