

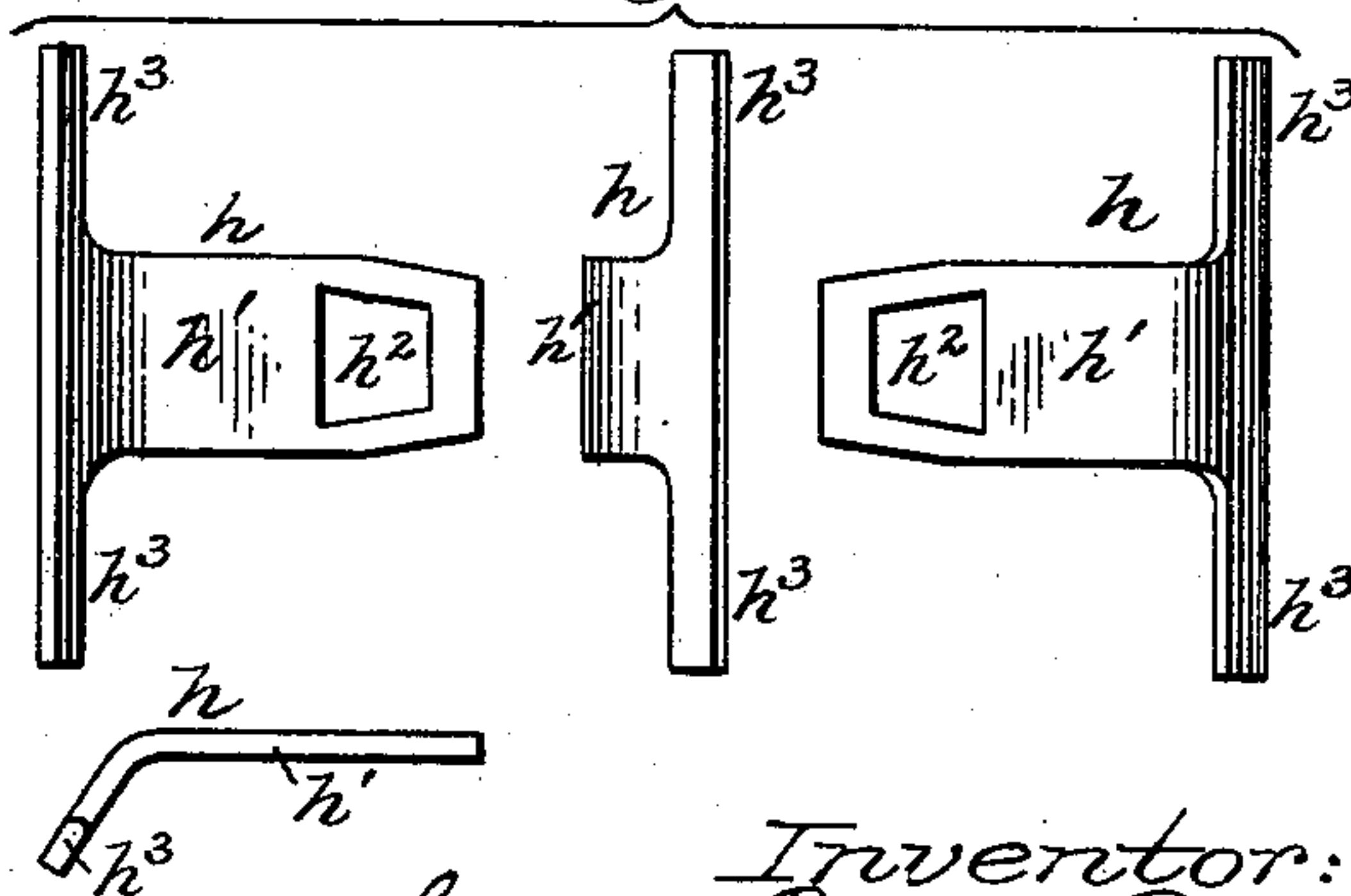
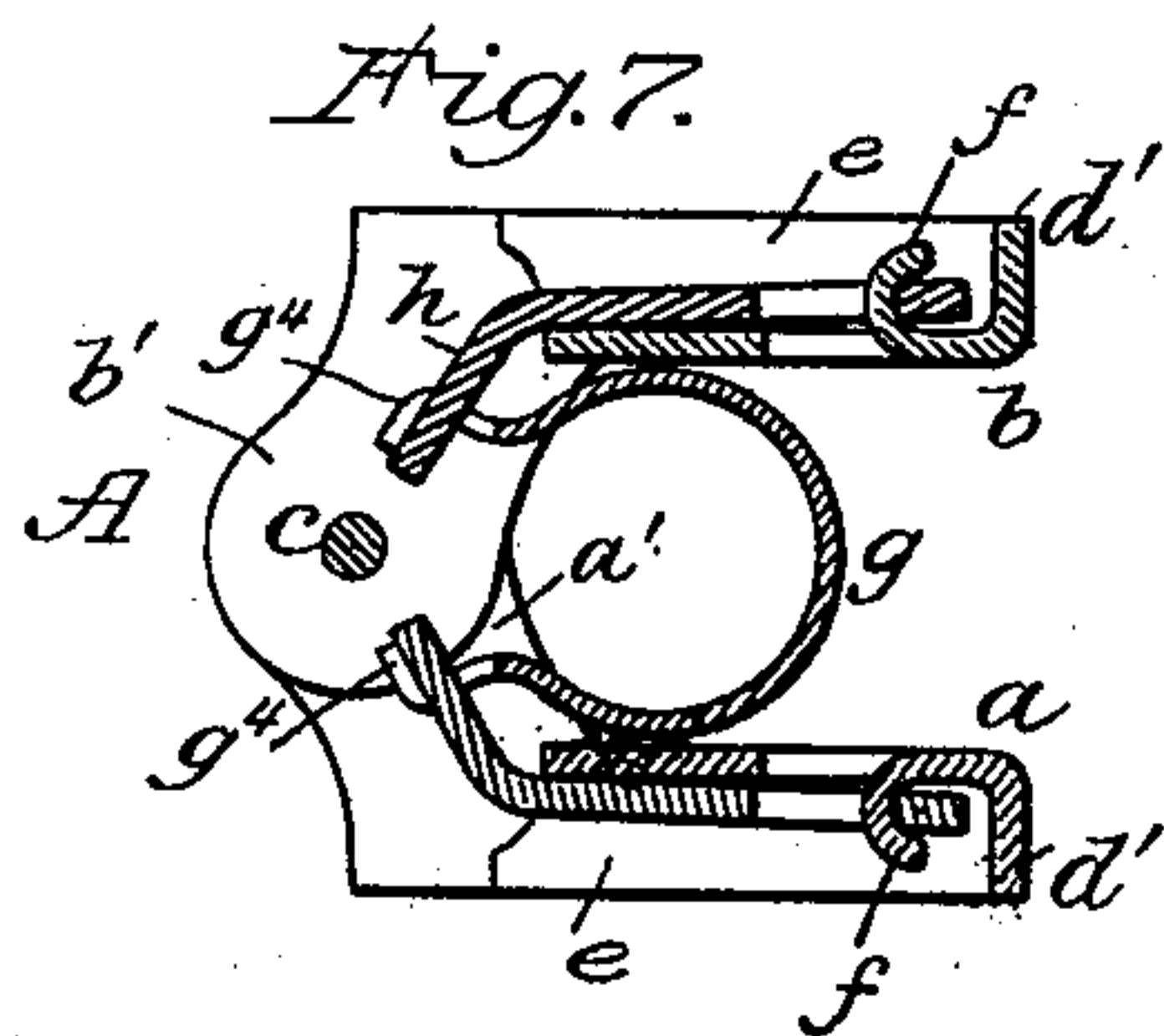
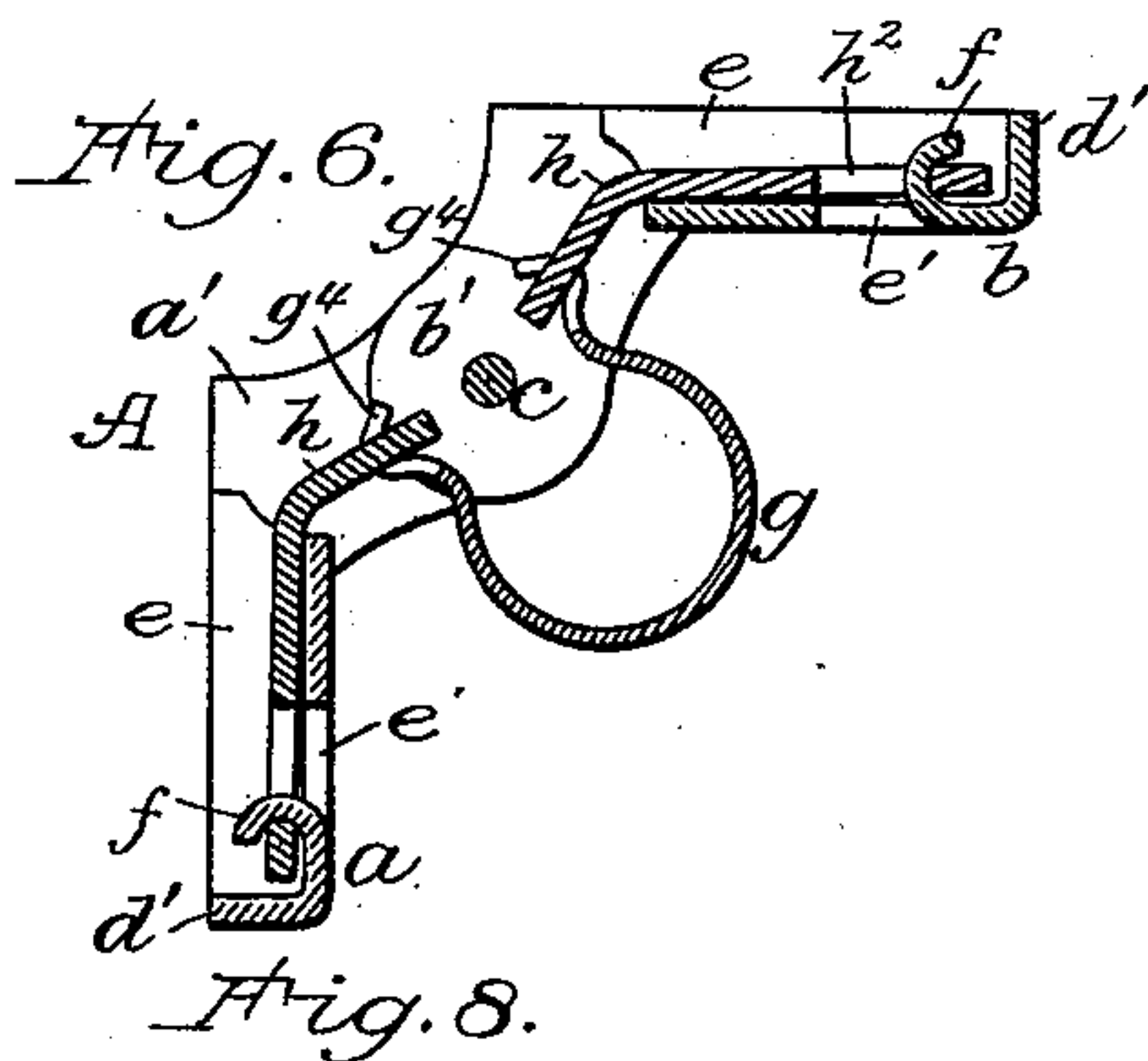
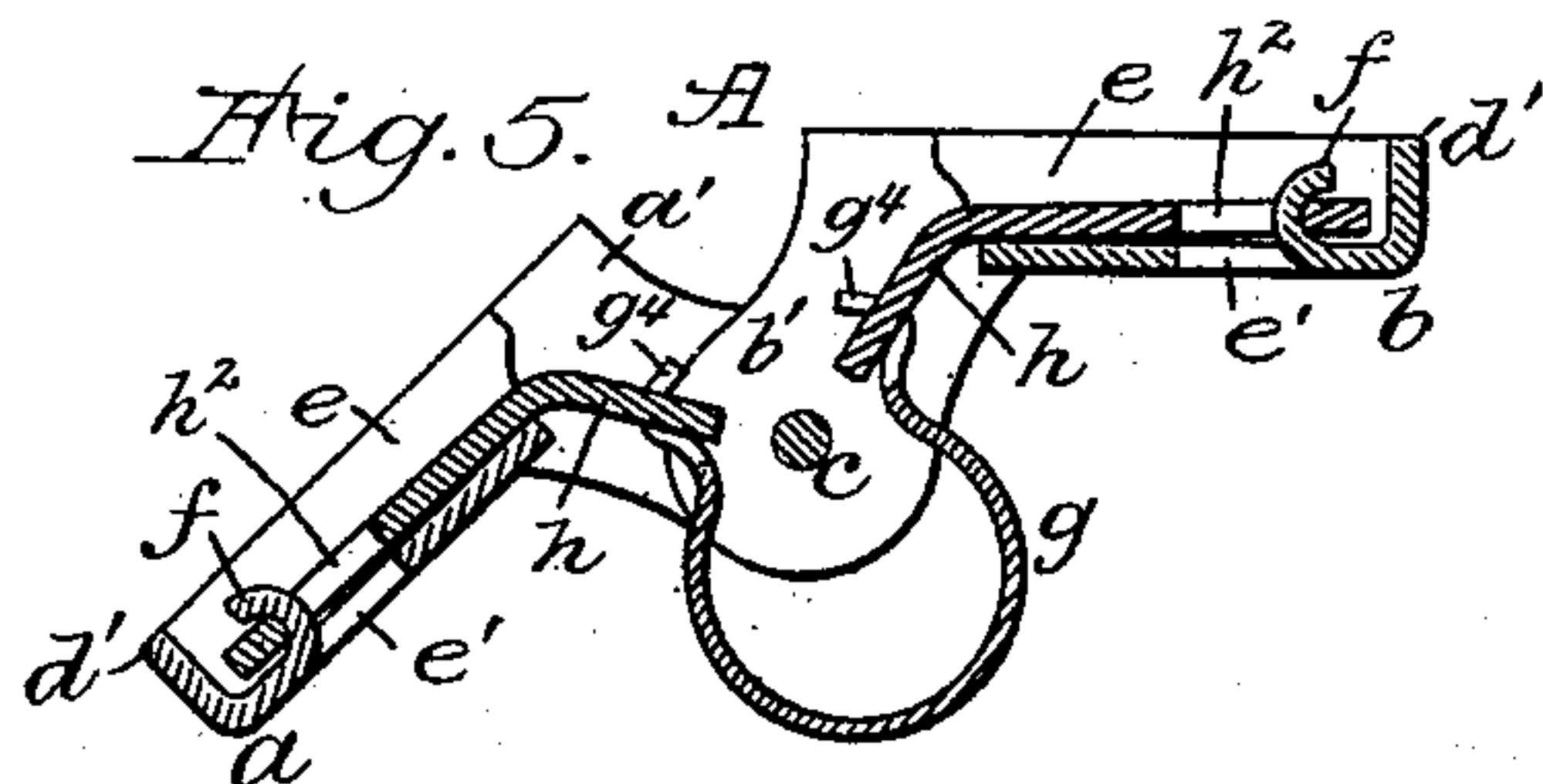
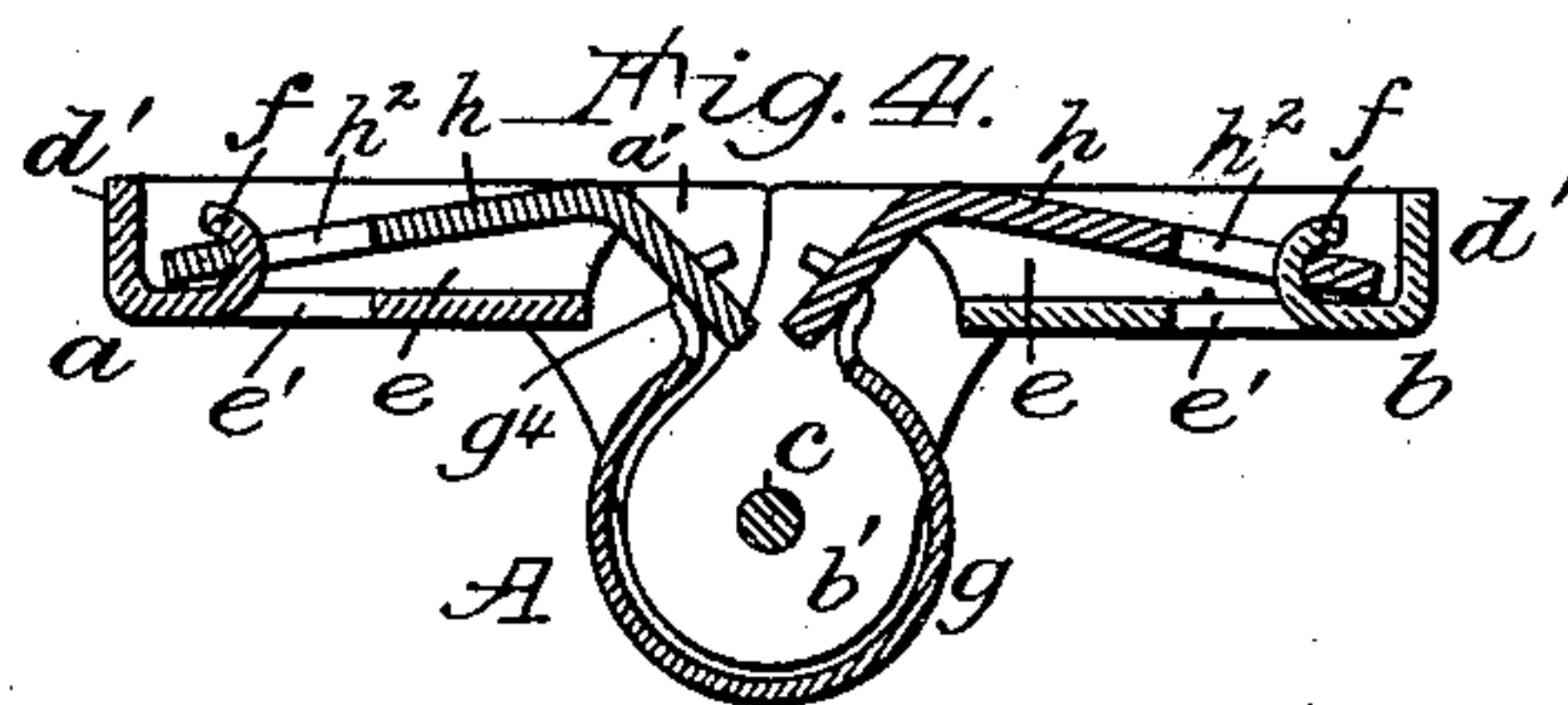
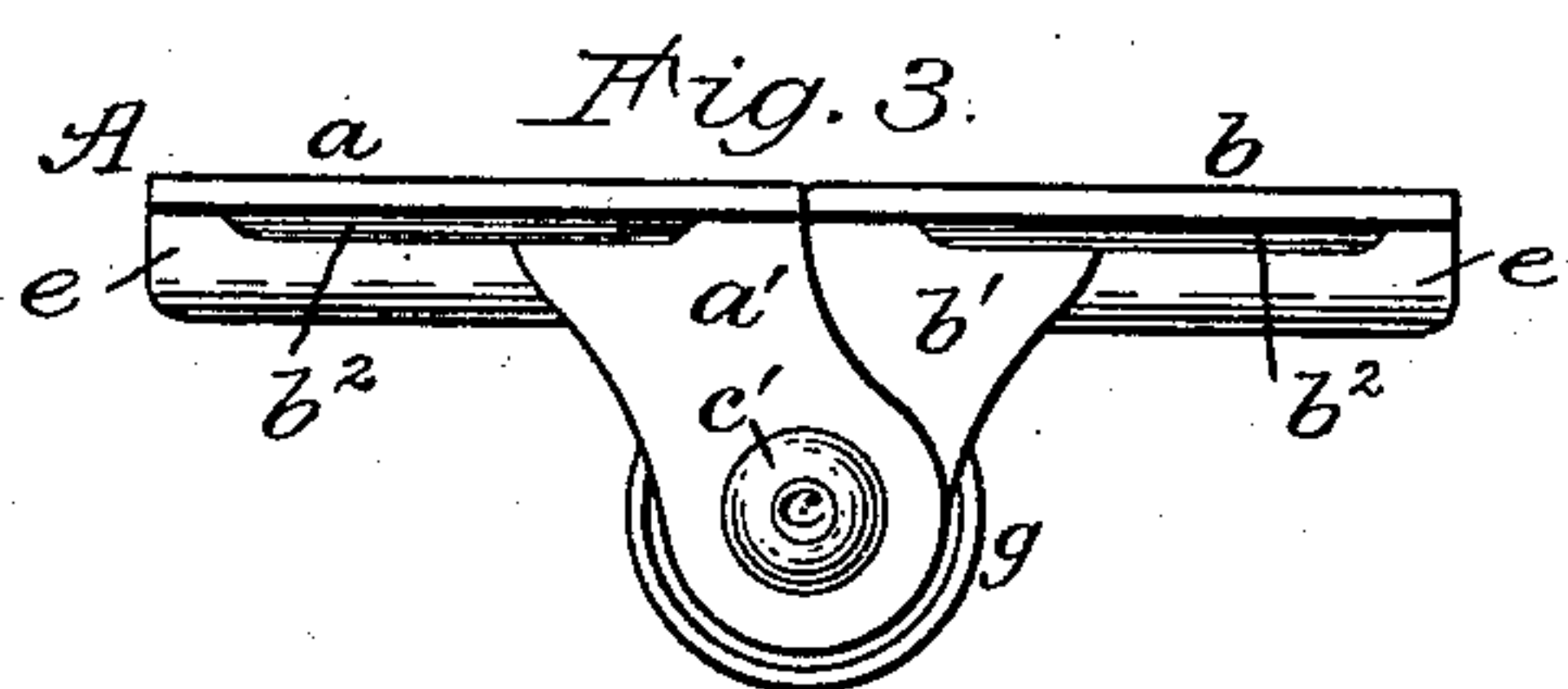
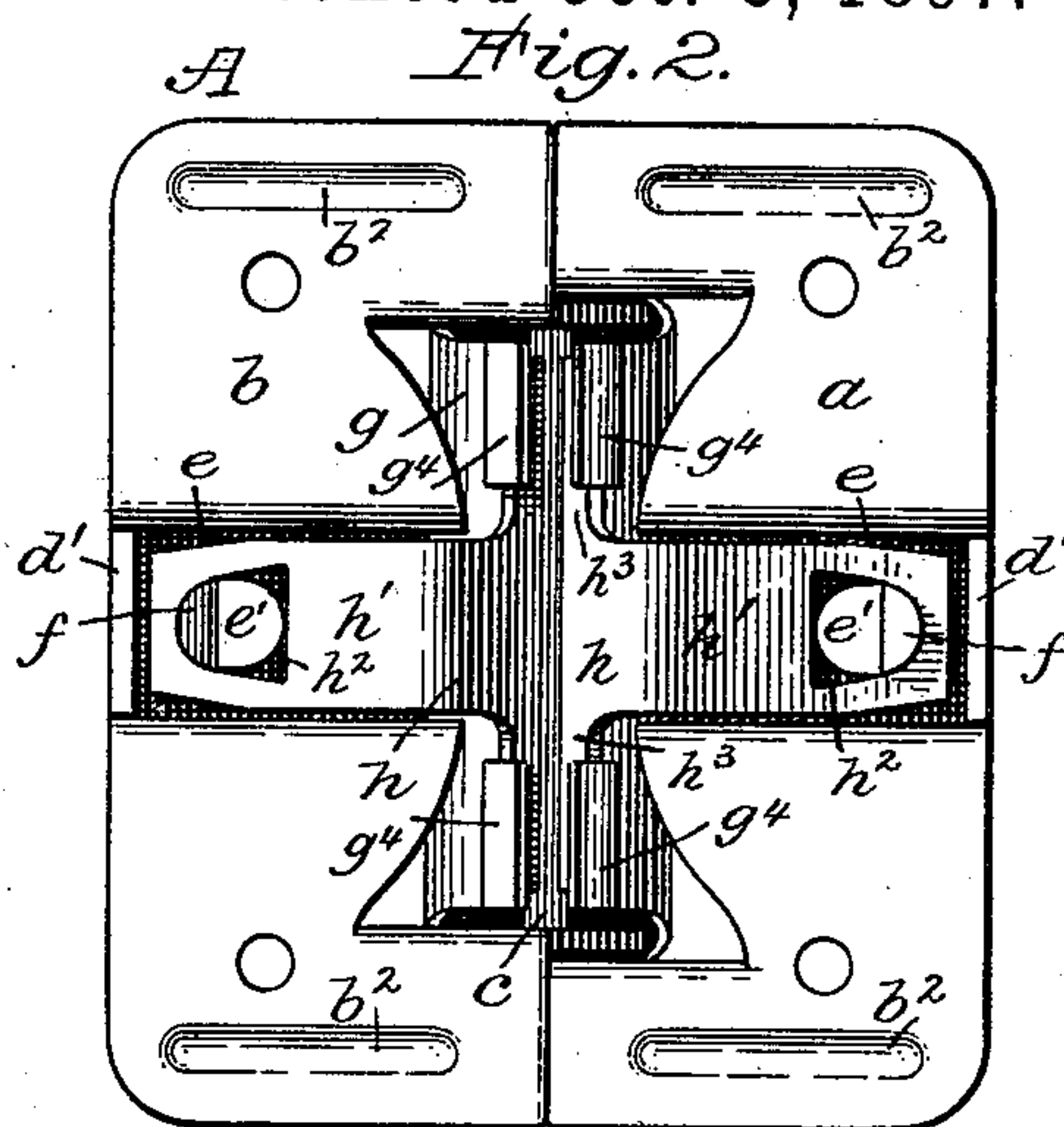
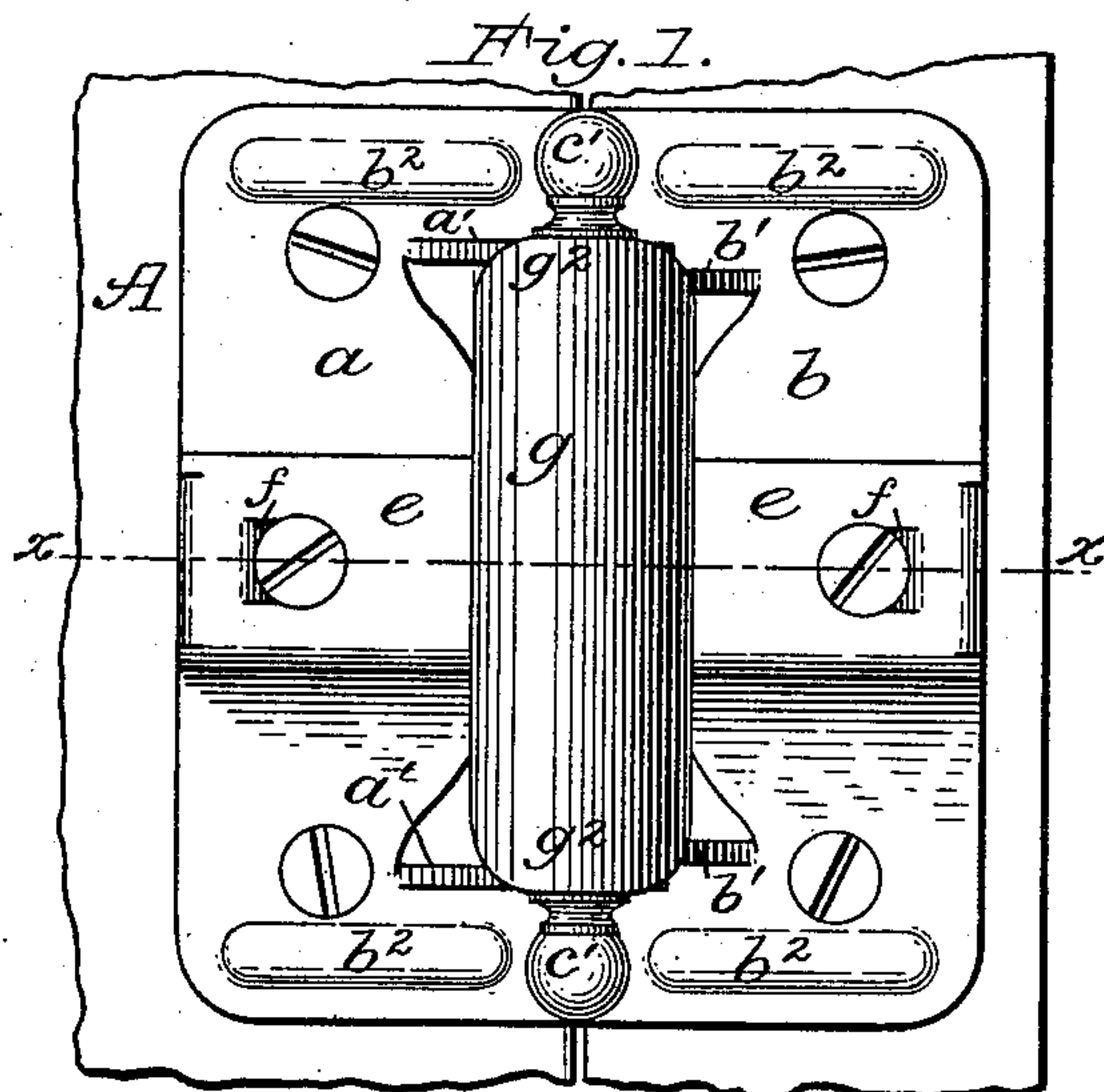
(No Model.)

LE DRU R. POMEROY.
SPRING HINGE.

2 Sheets—Sheet 1.

No. 591,359.

Patented Oct. 5, 1897.



Attest:
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By *Wm. G. M. M.*
Attorney.

(No Model.)

LE DRU R. POMEROY.
SPRING HINGE.

2 Sheets—Sheet 2.

No. 591,359.

Patented Oct. 5, 1897.

Fig. 9.

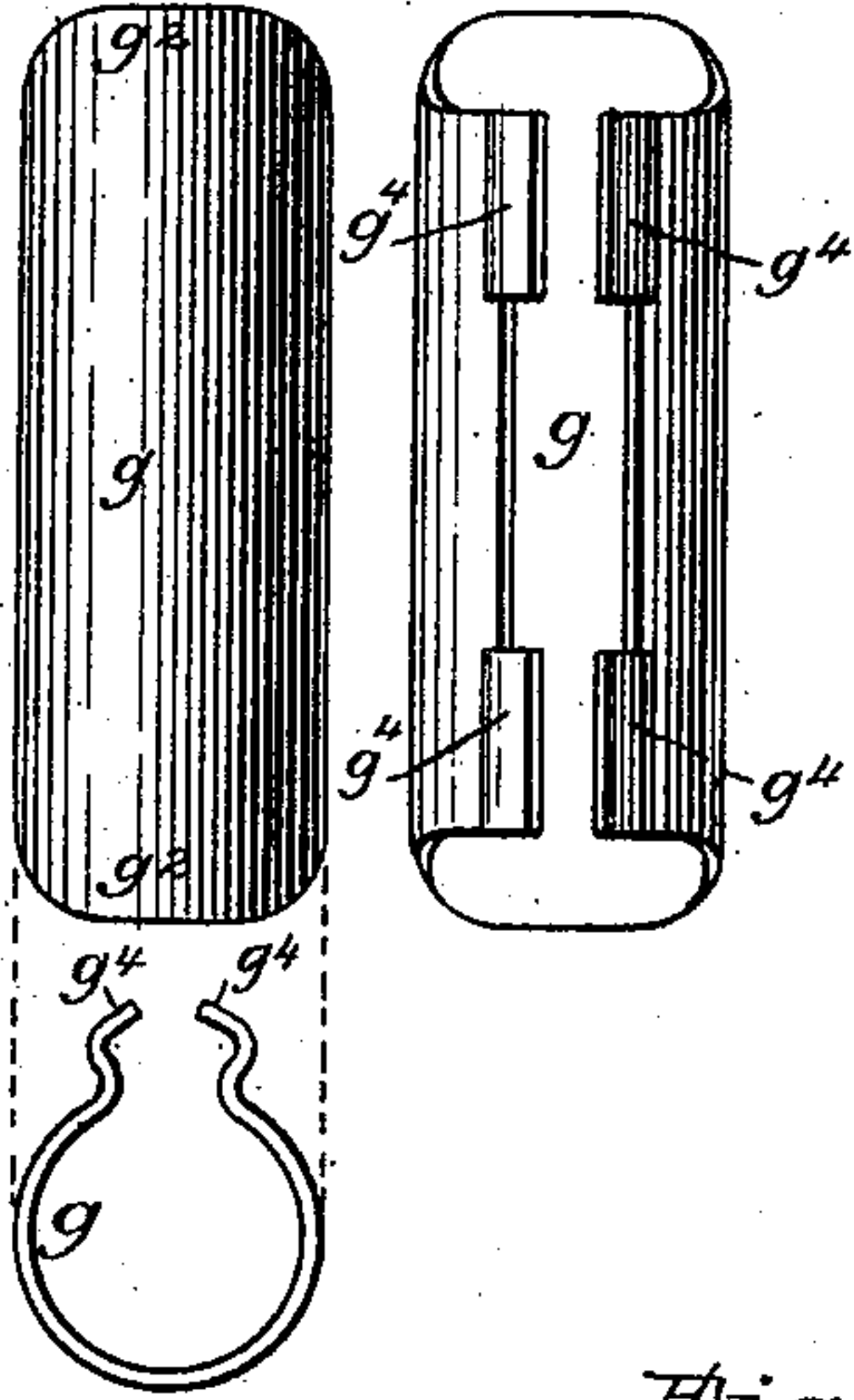


Fig. 10.

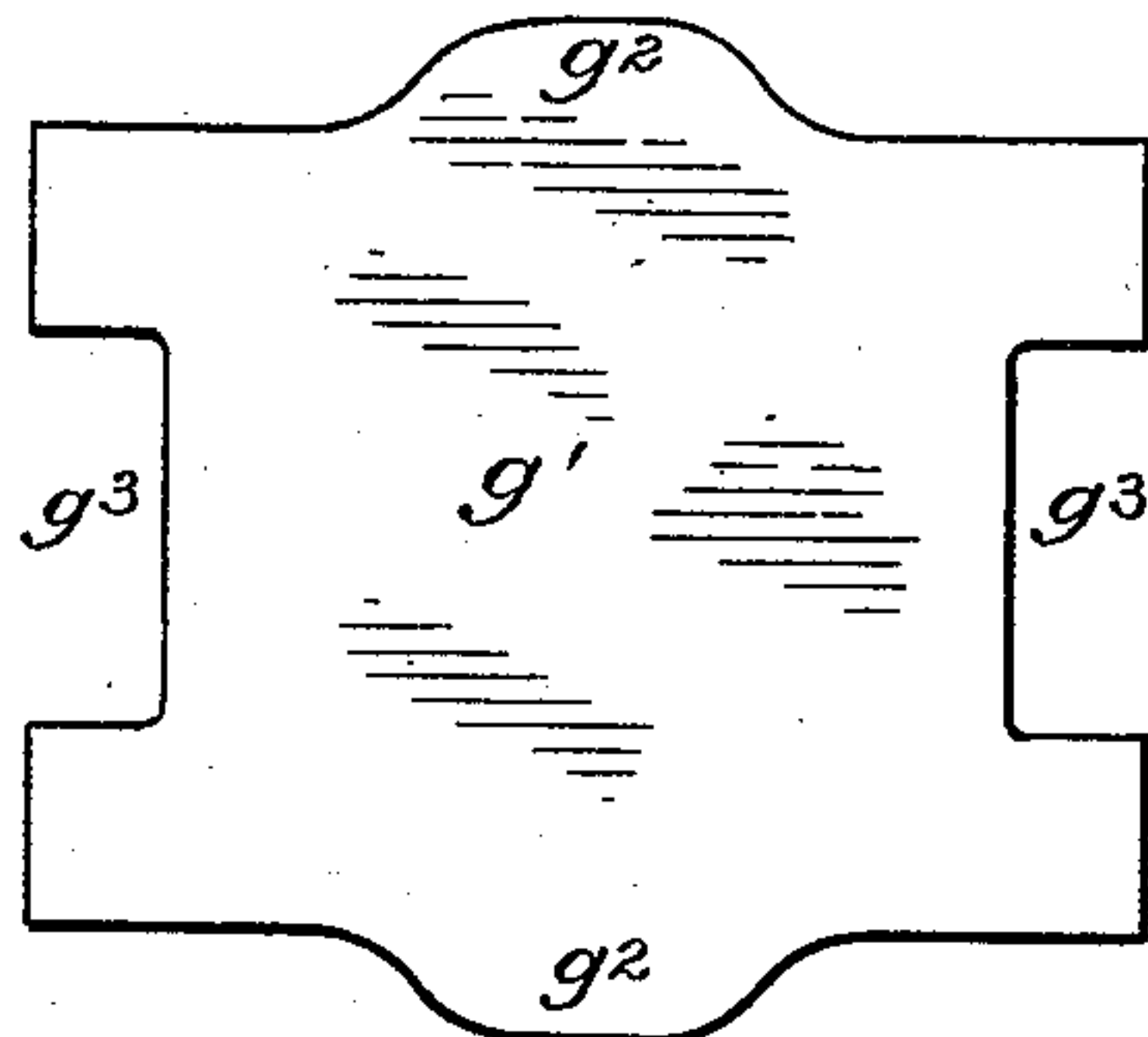


Fig. 11.

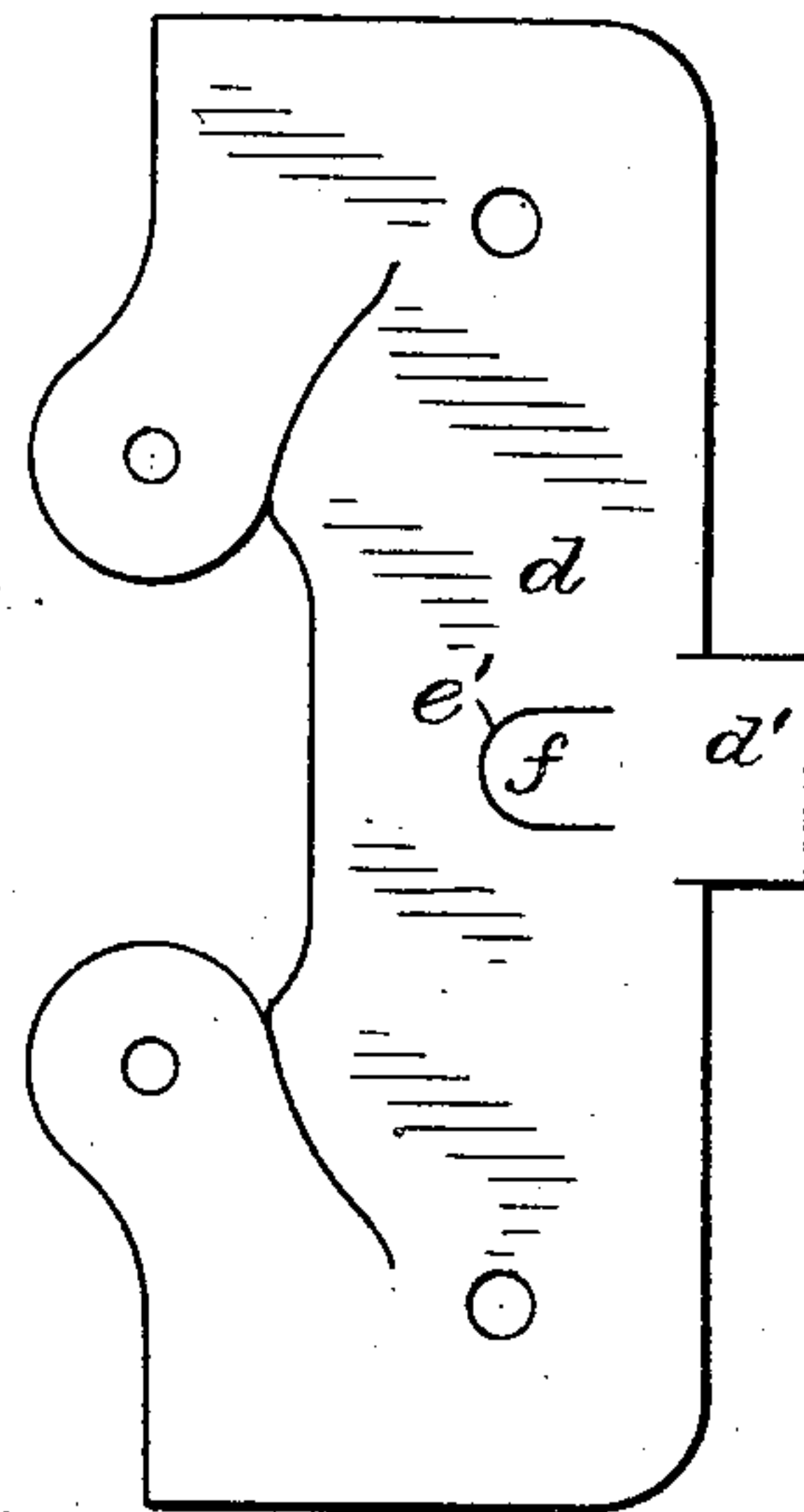


Fig. 12.

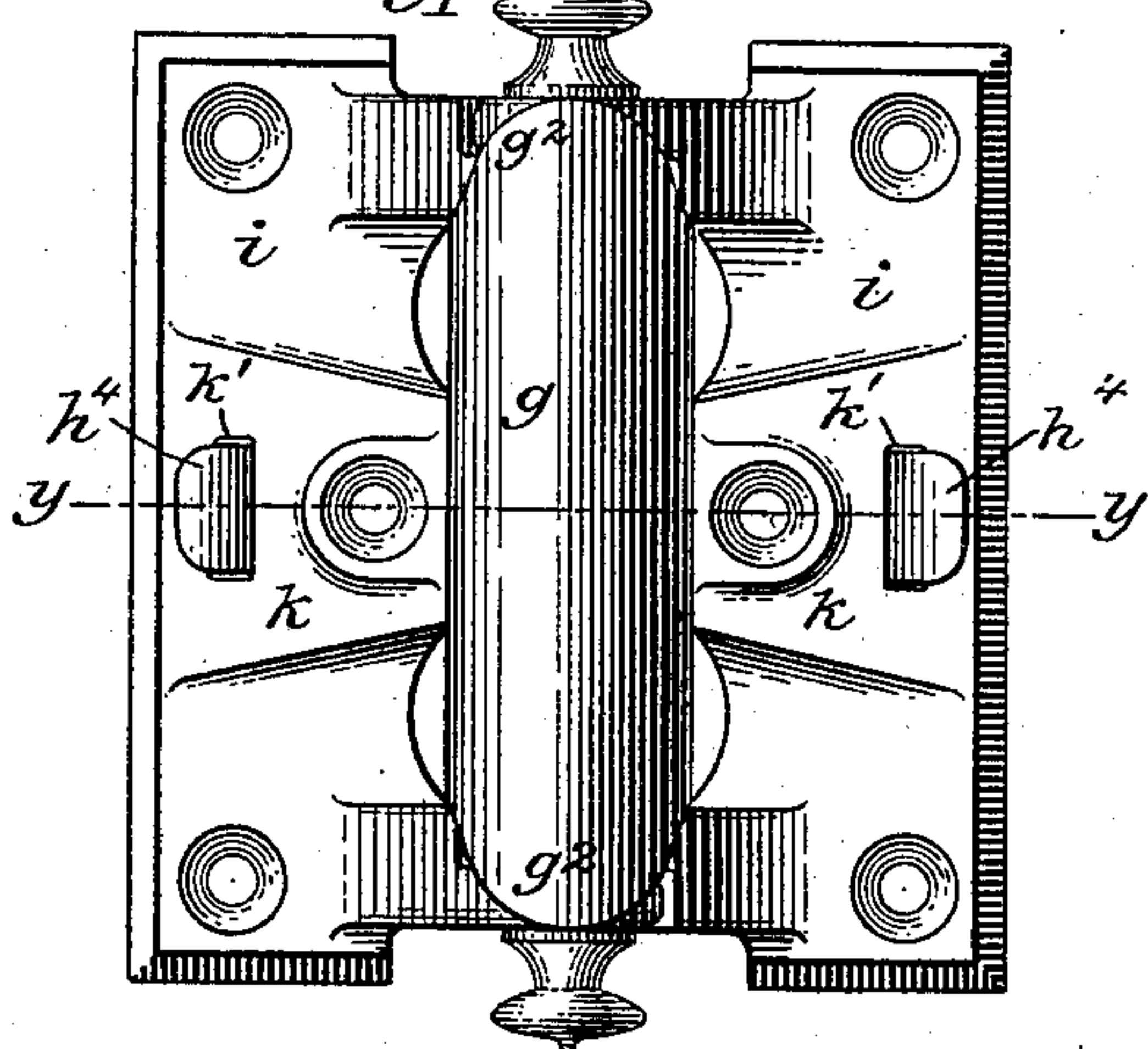


Fig. 15.

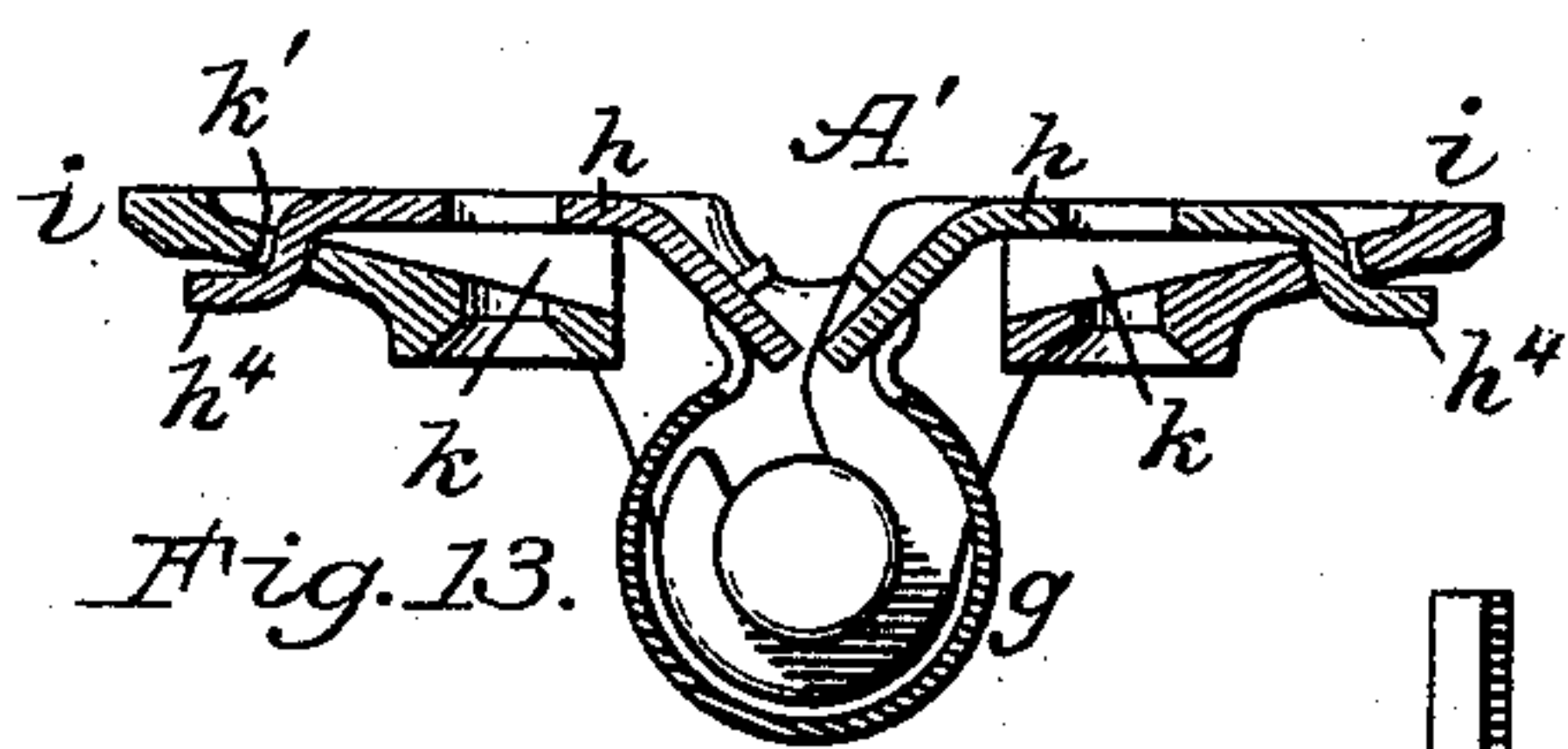
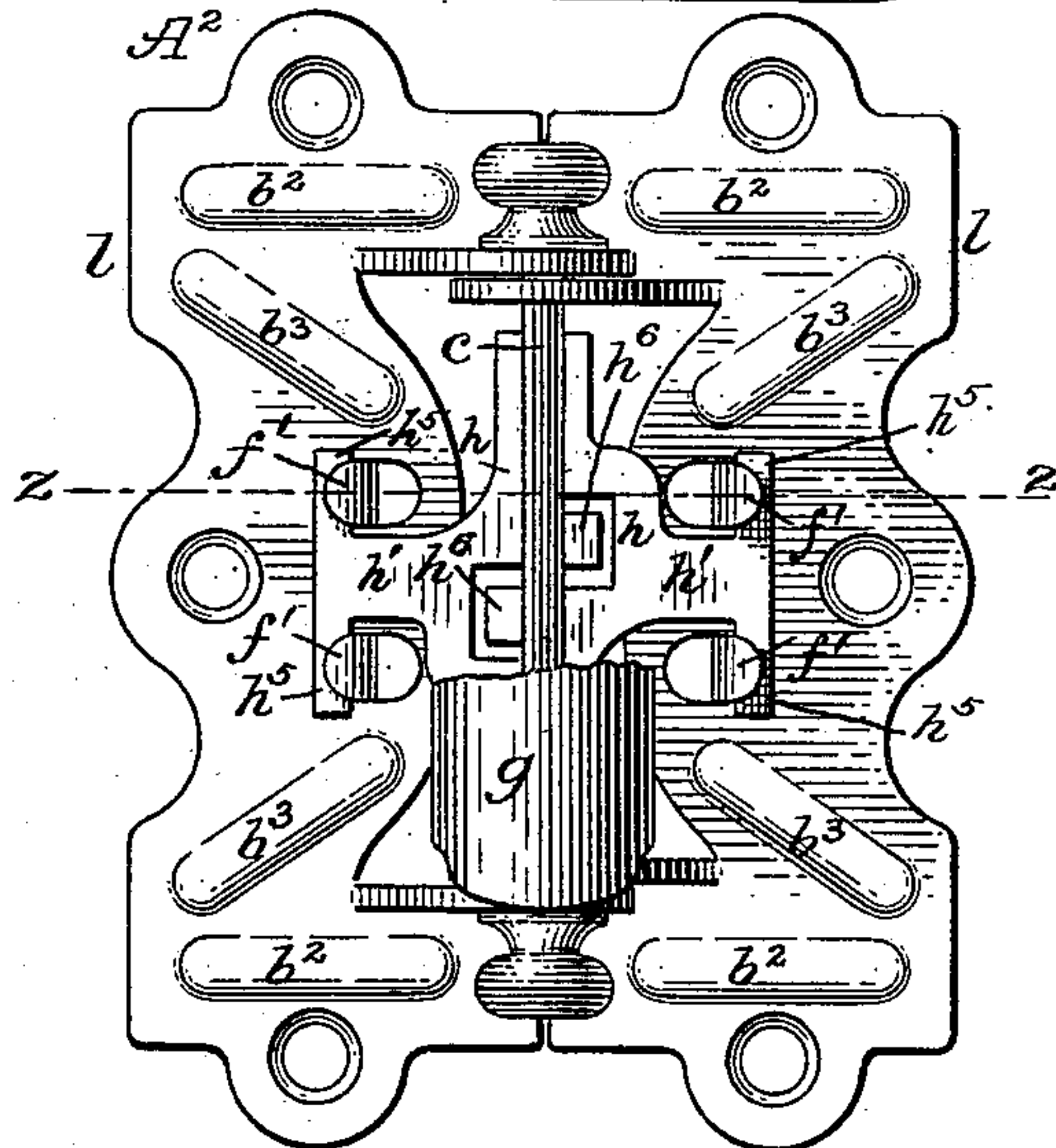


Fig. 17.

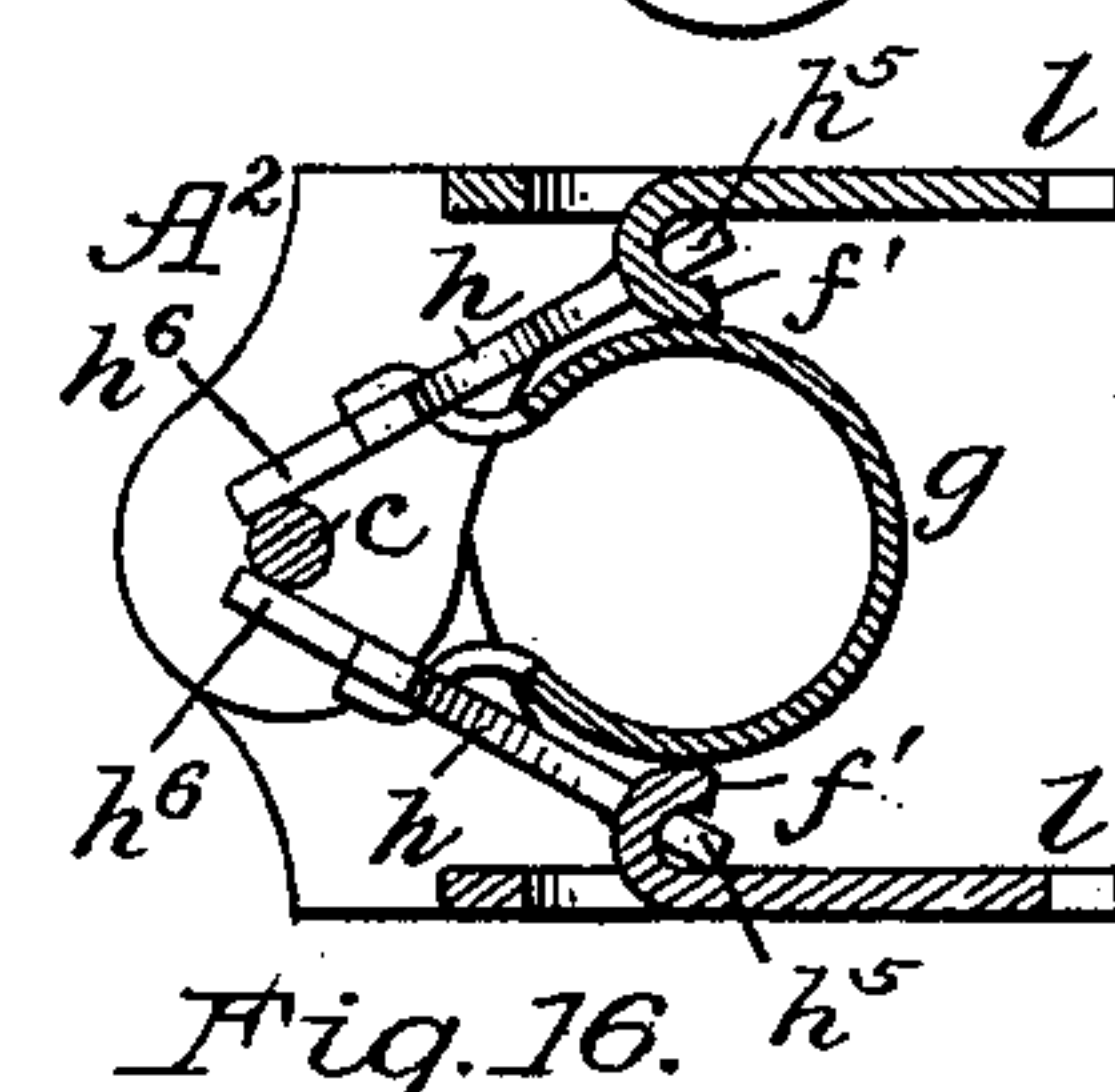
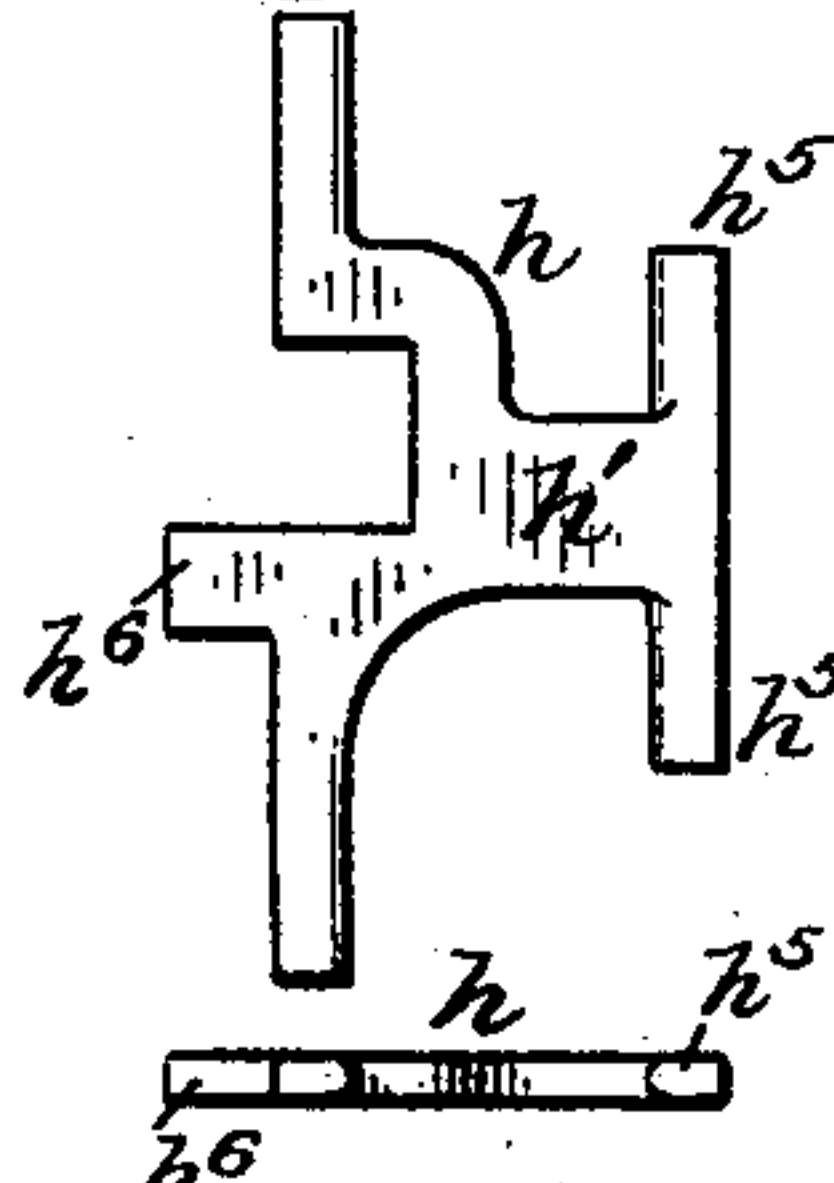
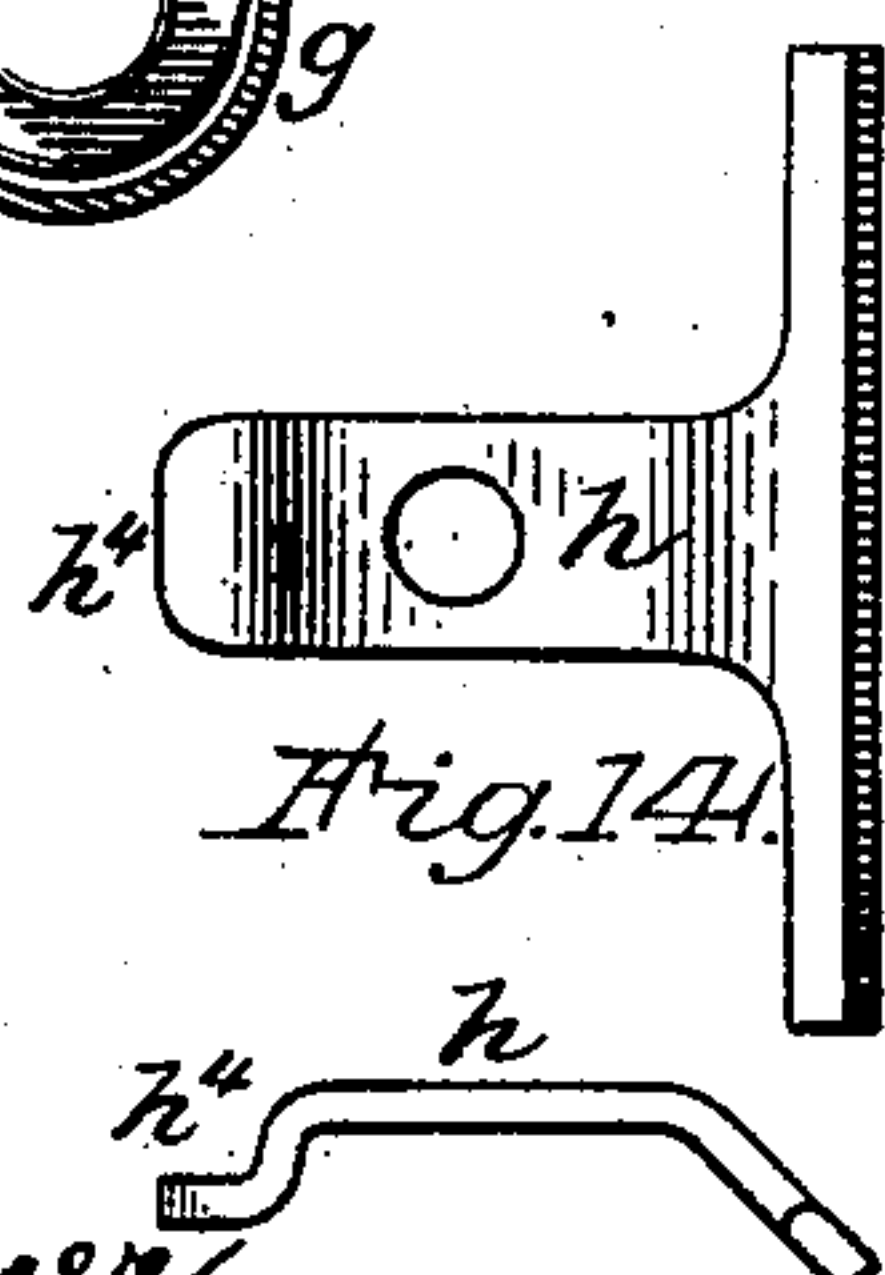


Fig. 14.



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UNITED STATES PATENT OFFICE.

LE DRU ROLLIN POMEROY, OF CLEVELAND, OHIO, ASSIGNOR TO THE VAN WAGONER & WILLIAMS HARDWARE COMPANY, OF JERSEY CITY, NEW JERSEY.

SPRING-HINGE.

SPECIFICATION forming part of Letters Patent No. 591,359, dated October 5, 1897.

Application filed June 14, 1893. Serial No. 477,559. (No model.)

To all whom it may concern:

Be it known that I, LE DRU ROLLIN POMEROY, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Spring-Hinges; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of my invention.

My said improvements relate to and have been embodied in double-acting spring-hinges of the variety disclosed in the Letters Patent issued to H. C. Hart, July 1, 1890, No. 431,349, and in which sheet-metal bow-shaped springs are employed. In this type of double-acting or "holdback" hinges the bow-springs are semicylindrical and are mounted in line with the hinge-axis, and when the spring is pivotally connected to the hinge-ears, as heretofore, either by means of rigid clamps or directly connected to rigid spring-seat studs on the ears, or directly connected with one pair of rigid studs on one leaf and with movable studs on the other leaf, the two edges or arms of the spring are necessarily so widely separated during the full operation of the hinge as to endanger the springs. These bow-springs if made light and freely resilient, as is specially important, the undue separation of their arms is liable to overstrain them and soon render them inoperative, and if the springs be specially heavy and strong they are equally liable to breakage.

A special object of my invention is to obviate all liability of unduly straining the bow-springs and the consequent liabilities of injury and breakage, and also to reduce to a minimum the slamming of doors controlled by said springs, both during their closing and their holdback or full rearward movements. I have accomplished this object by coupling both edges or arms of the bow-spring to both leaves of the hinge somewhat remotely from the hinge-ears and also remotely from the hinge-line, so that when, for instance, a door is closed the spring will be under its least or minimum tension, but sufficient to properly control the door, and be but slightly further strained when the door is fully opened and under somewhat less strain when the door is in its extreme rearward or holdback posi-

tion. In other words, I have coupled the arms of the bow-spring to the bodies of the two leaves by means of link connections, each at one end serving as a spring seat or stud and so hinged at its other end that both of said links may initially swing independently of the leaves and then move in harmony therewith during their further movement, and so that in the opening of a door the spring will be initially moved bodily away from both leaves and thereafter swing upon the spring-seats which are carried on the leaf secured to the door-frame. This organization also enables the bow-spring to be almost cylindrical and renders the hinge neat and symmetrical, and the spring may be composed of comparatively light sheet metal without sacrificing efficiency or durability. Although this portion of my invention is applicable to cast-metal hinges, as will hereinafter be fully described, I have also embodied it in a specially desirable and novel line of holdback-hinges, which, aside from the hinge-pintles and their tips, are composed of sheet metal, preferably steel, the several parts, including the spring, the leaves, and the spring-stud links, being economically produced from suitable plate or sheet metal by means of appropriate dies for cutting and shaping.

My holdback bow-spring hinge in its best form has a pair of sheet-metal hinge-leaves, each having a lateral centrally-located chamber provided with an interior stud or hook and open at its inner end for receiving the shank of a T-shaped spring-stud link which has an eye at its inner end in free or pivotal engagement with said stud or hook, the arms of said link being in engagement with the adjacent edge or arm of the spring and operating as spring-seats.

My hinges also involve certain minor features of invention, which with those already indicated will be duly specified in the several clauses of claim hereunto annexed.

Referring to the drawings, Figure 1 illustrates one of my sheet-metal holdback-hinges in front view and as applied to a door and its frame. Figs. 2 and 3 illustrate the same respectively in rear view and in end view. Fig. 4 is a lateral central section of the hinge on line *x*, Fig. 1, the hinge being in its nor-

mal or closed position. Fig. 5, in a similar view, illustrates the same as when the door has been partially opened, showing the bodily movement of the spring rearward from both leaves. Fig. 6 illustrates the same with the hinge fully opened. Fig. 7 illustrates the same as when the hinge is performing its holdback duty. Fig. 8 illustrates one of the spring-stud links detached and in several views. Figs. 9 and 10 illustrate the bow-spring detached in different views and a blank from which it is formed. Fig. 11 illustrates a sheet-metal blank from which a hinge-leaf can be developed. Fig. 12 illustrates in front view one of my cast-metal hinges. Fig. 13 is a section of said hinge on line y , Fig. 12. Fig. 14 illustrates one of the spring-stud links detached from the hinge, Fig. 12. Fig. 15, in front view, illustrates a sheet-metal hinge embodying my invention having no chambers in its leaves and with a portion of the spring broken away. Fig. 16 is a central lateral section on line z of the hinge, Fig. 15, in its holdback position. Fig. 17 illustrates one of the spring-stud links detached from the hinge, Fig. 15.

The hinge A, Figs. 1 to 7, inclusive, has leaves a and b , which are alike except as to the location of their forwardly-projecting ears, the leaf a having ears a' a' , between which the two ears b' b' of the leaf b are interposed, the two pairs of ears being hinged upon or by a long pintle c , having ornamental tips c' c' at its ends. Both of these leaves are developed from the same form and size of sheet-metal blank d , as shown in Fig. 11, straight or flat lateral portions of the metal bent outwardly constituting the ears, and the variations in the ears involving only a variation in their bending-points at their junctions with the leaves. Each blank has a laterally-projecting portion at d' , and the blank is sufficiently longer than the finished leaf to provide for striking up in a suitable die a lateral centrally-located portion to form the recess or chamber e , the inner end of which is open and the outer end closed by the appropriate bending of the projecting portion d' of the blank. The top of the chamber is perforated at e' by cutting and forcing inwardly a portion of the metal for affording an interior integral stud or hook f . The sheet metal being quite thin and light is liable to yield and curl or bend at the ends of the leaves adjacent to the ears under working strains, and I have therefore stiffened said ends by means of lateral corrugations or ribs, as at b^2 , which are parallel with the outer sides of the ears. These corrugations are readily formed by means of suitable dies, and said corrugations and also the lateral chambers not only stiffen the leaves, but impart to the hinge desirable strength and solidity. Suitable screw-holes are specially provided in each leaf, and the opening or hole at e' may be and should usually be occupied by a screw when the hinge is mounted for service.

The bow-spring g is novel in its form and is composed of sheet metal and formed from blanks g' , Fig. 10, which have at each end a central outward curve at g^2 g^2 and at each side a rectangular recess at g^3 g^3 . At each side of the recesses g^3 the edges of the blank are bent to form engaging hooks g^4 , Fig. 9. The curved ends at g^2 g^2 in the spring project beyond the adjacent portions of the end, so that when mounted on the hinge-leaves the two curved portions overlie the ends of the adjacent ears and the other portions of the ends are parallel with the inner surfaces of the adjacent ears. This construction not only affords a neat and attractive appearance, but the spring, when in its normal position, is firmly confined by the ears against lateral displacement and injury. These extensions of the spring over the ears are also of special value in that the spring is materially reinforced on the line at which it is specially liable to crack or yield.

The arms or edges of the spring are coupled to the two leaves of the hinge by means of T-shaped spring-stud links h h . (Specially shown in Fig. 8.) These links are also composed of sheet metal, which is first cut into suitable blanks and then bent into the form desired. The shank h' of each link near one end is provided with an open eye h^2 to enable it to freely engage with the stud or hook f within its chamber e and so as to be in substance hinged or pivoted to the hinge-leaf. At its other or outer end each link h is bent so as to place the spring-seat arms h^3 h^3 of the link in a plane above the plane of the shank, each of said arms being engaged by its appropriate spring-hook g^4 and the adjacent or outer portion of the shank occupying the recess g^3 between the hooks.

With the several parts assembled the two edges or arms of the spring g are but slightly separated, as clearly shown in Fig. 4, and the spring is then under its least or minimum tension, and consequently when in its normal position, as when a door is closed, there is a minimum liability of the spring being weakened by maintaining it under that tension which need only be just strong enough to hold a door in its closed condition against the operation of air-currents through a doorway.

During the opening of a door the initial effect on the spring is a very slight increase of tension and an outward bodily movement of the spring, both links h h swinging independently of the leaves to which they are hinged until both occupy the same line, as from either hook f to the other, as shown in Fig. 5, this being the full extent of their independent swinging movement, because of the limited interior dimensions of the chambers e . During the further opening of the door—say to ninety degrees, as shown in Fig. 6—the spring is further strained, but to the least possible degree, and hence the slamming of a door will be reduced to a minimum.

So, also, will the spring, whether light or heavy, be exposed to a minimum liability of injury either by weakening or by breakage.

When the door is thrown fully backward, as indicated in Fig. 7, the hinge will then perform its holdback duty, and in that position the spring is under somewhat greater tension than it is when the door is closed.

The hinge A' (shown in Figs. 12 to 14, inclusive) has cast-metal leaves *i*, which are counterparts, each having an integral pintle projecting from one ear and another ear provided with an open or slotted pintle-eye, as disclosed in a contemporaneous application for Letters Patent filed by me. Each leaf has a lateral centrally-located chamber *k*, differing in form from the chambers *e* in the hinge A, and each chamber is provided near the outer edge of the leaf with a slot *k'* for the free reception of a bent end *h⁴* of the shank of the T-shaped spring-stud link, thus providing as between the link and the leaf a hinged or pivotal connection. This link *h* need not have its shank slotted unless a central screw-hole be desired, as here shown. The spring-seat arms of this link are as already described, and the spring *g* differs from that in the hinge A only in having its curved ends at *g² g²* sufficiently longer to enable them to cover the ears of the hinge, which, being composed of cast metal, are necessarily heavier than when sheet metal is employed. In its operation this hinge is precisely like the hinge A and its parts can be very cheaply constructed and readily assembled, the latter involving only an interlocking of the pintles and their open eyes and the placing of the links in appropriate relations with the spring and the leaves. It will be readily seen that the chambers *k* can be restricted in their dimensions to only so much as will afford the slots *k'* for the reception of the bent ends of the shanks of the links, the latter then being either free to swing, as before, or, being composed of sheet metal, as described, and resilient, they can bend slightly during the operation of the hinge.

While the chambered leaves are of special value in sheet-metal hinges embodying the other features of my invention, I dispense with chambers in one form of my sheet-metal hinges, as illustrated in the hinge A², Figs. 15, 16, and 17. In this hinge A² the sheet-metal leaves *l l* have the stiffening-ribs *b²* parallel with the ears, as in the hinge A, but having no chambers to serve as stiffeners these leaves have diagonal ribs *b³* extending inwardly from near the outer ends of the ribs *b²*, thus imparting to the portions of the leaves adjacent to the ears great stiffness or rigidity, as against all strains incident to use.

Each leaf is provided with integral lugs or hooks *f'*, cut or bent so as to project outwardly from the leaf and toward its outer edge, as shown, to serve as studs or hooks after the manner of the hooks *f* in the hinge A. The leaves are coupled, as in the hinge A, by

a long pintle *c*, and the bow-spring *g* is as before shown and described. The spring-stud links *h* in this hinge are composed of sheet metal and formed from cut blanks which are exactly alike. The outer ends of the shanks of these links are provided with pintles *h⁵* for properly engaging with the hooks *f'*, and each link has at its inner end an integral finger *h⁶*, located wholly at one side of the central longitudinal line of the shank *h'*, so that when two of these links occupy their proper positions in the hinge the two fingers *h⁶ h⁶* will be side by side and occupy space between the planes occupied by the pintle *c* and the bodies of the hinge-leaves and be so projected beneath the pintle that the spring when it has completed its bodily outward movement from both leaves will then swing laterally on the arms of one of the link-studs during the further opening movement of the hinge.

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

1. In a spring-hinge, the combination substantially as hereinbefore described, of a pair of hinge-leaves having projecting ears pivotally connected; a sheet-metal bow-spring in line with the axis of the spring; and a pair of spring-stud links, each of which is loosely connected at one end with an appropriate arm or hooked edge of the spring, and at its other end is hinged to its appropriate leaf remotely from the hinge-line, the organization being such that when the hinge is closed, the spring will be under its minimum tension, and moved bodily away from both leaves of the hinge during the initial opening movement.

2. In a spring-hinge, the combination substantially as hereinbefore described, of a sheet-metal bow-spring; a pair of hinge-leaves, and a pair of T-shaped spring-stud links, each having its two arms engaged by hooks on the spring, and its shank hinged to its appropriate leaf remotely from the hinge-axis.

3. In a spring-hinge, the combination substantially as hereinbefore described, of a pair of sheet-metal hinge-leaves, each having projecting ears, and a centrally-located lateral chamber, open at the inner edge of the leaf; a sheet-metal bow-spring in the line of the hinge-axis; and a pair of T-shaped spring-stud links, each of its arms in hook engagement with one arm of the spring, and at the end of its shank flexibly connected with an appropriate leaf within its chamber.

4. The combination with hinge-leaves having projecting ears, and a sheet-metal bow-spring in line with the hinge-axis, partly between the two pairs of ears, and partially overlying said ears at their outer ends, substantially as described.

LE DRU ROLLIN POMEROY.

Witnesses:

N. L. POST,

R. L. HOLMES.