

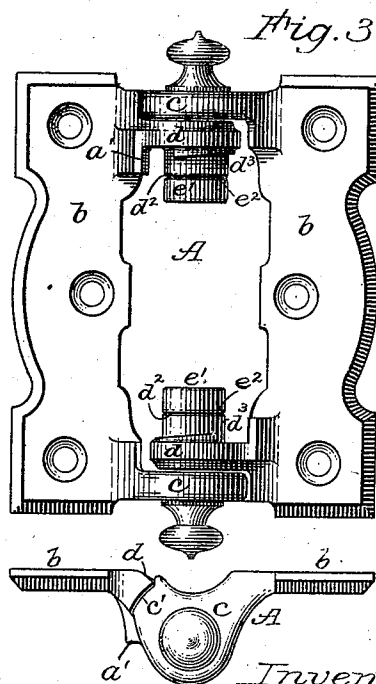
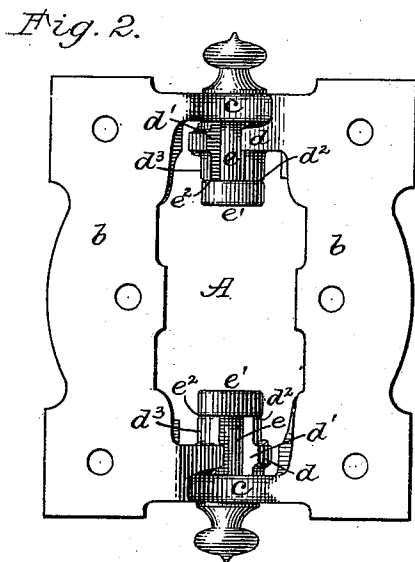
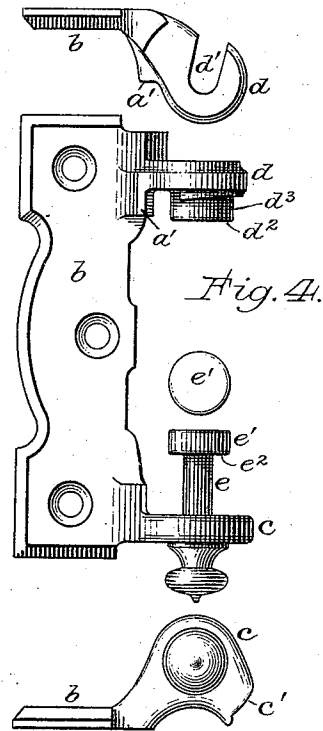
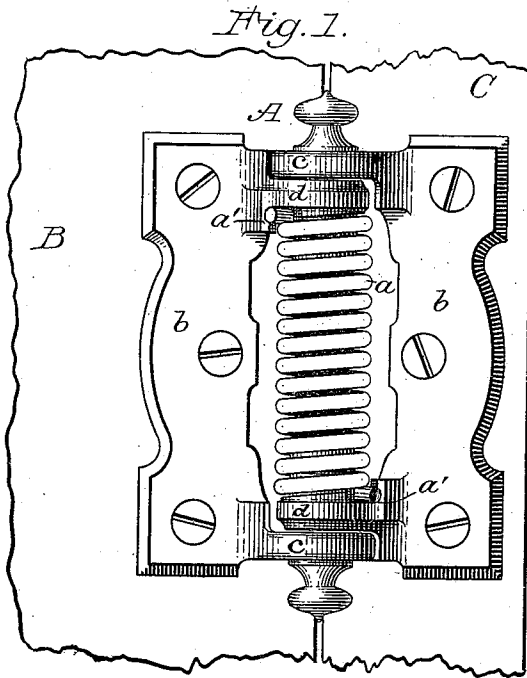
(No Model.)

LE DRU R. POMEROY.
SPRING HINGE.

3 Sheets—Sheet 1.

No. 504,403.

Patented Sept. 5, 1893.



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(No Model.)

LE DRU R. POMEROY.
SPRING HINGE.

3. Sheets—Sheet 2.

No. 504,403.

Patented Sept. 5, 1893.

Fig. 5.

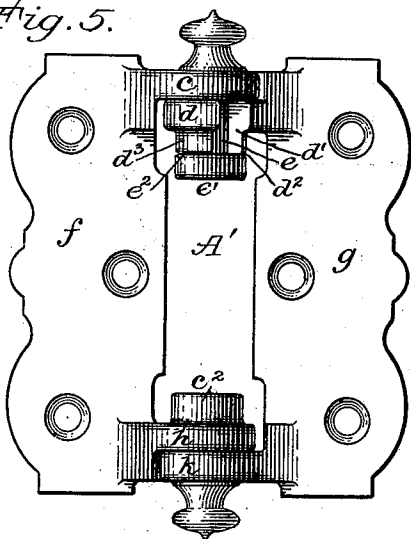
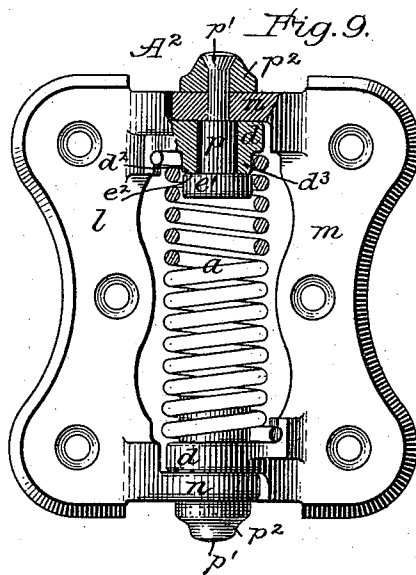
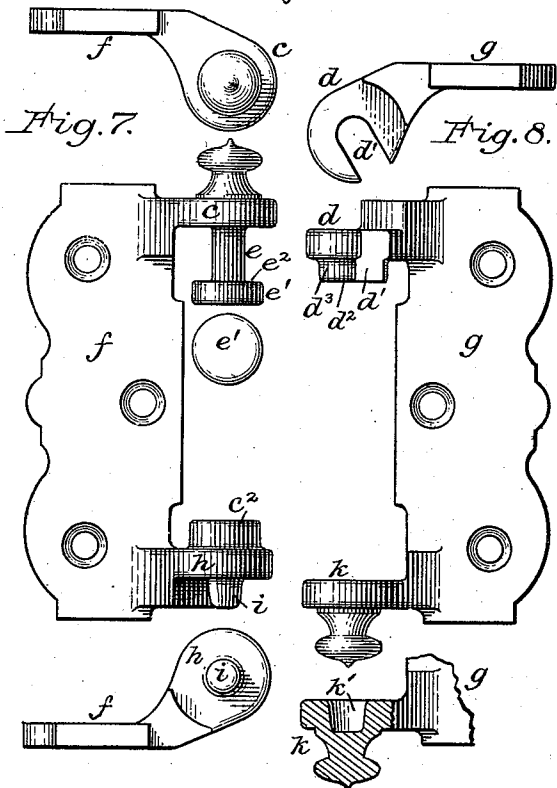
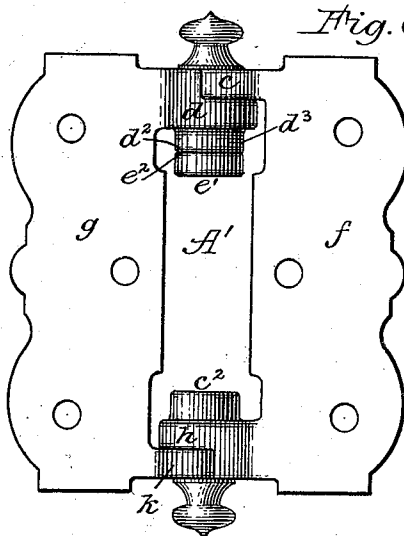


Fig. 6.



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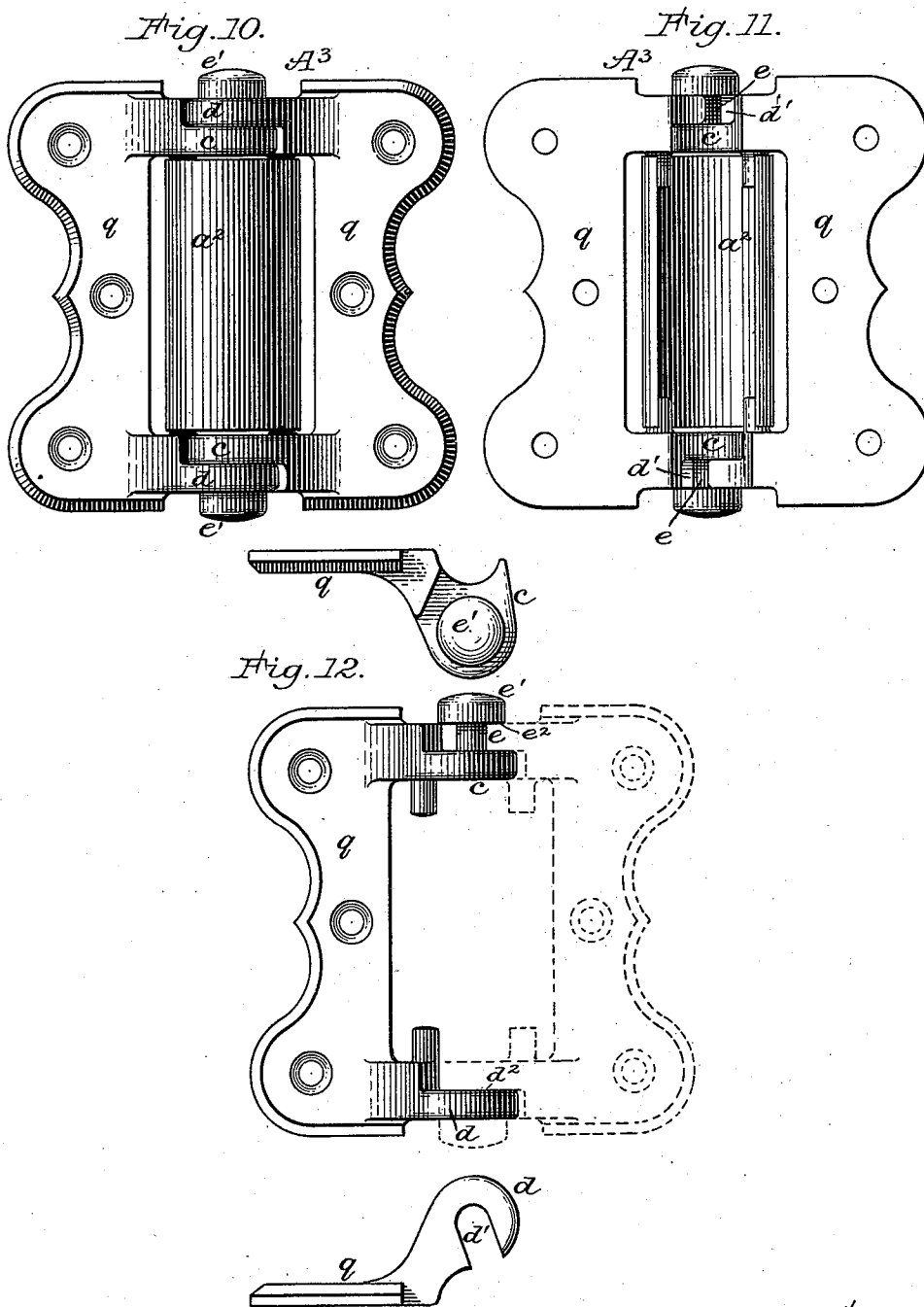
(No Model.)

3 Sheets—Sheet 3.

LE DRU R. POMEROY.
SPRING HINGE.

No. 504,403.

Patented Sept. 5, 1893.



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UNITED STATES PATENT OFFICE.

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

SPRING-HINGE.

SPECIFICATION forming part of Letters Patent No. 504,403, dated September 5, 1893.

Application filed December 23, 1892. Serial No. 456,152. (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.

One of the objects of my invention, is the production of specially efficient and reliable spring hinges, of that general class of hinges, which can be applied to service either end upward, and either to right hand, or left hand doors. Such hinges render special selection wholly unnecessary, as well as enable the hinges to be readily mounted by unskilled persons, because however applied to a door and its frame, the hinges cannot fail to perform their functions, in supporting or carrying the weight of doors independently of any form of spring, or spring frame, or spring arbor which may be interposed between the upper and lower pairs of hinge ears.

The main object of my invention, is to not only secure the said recited advantages, but also to enable any of the many kinds of springs to be employed, as well as to secure substantial economy in the production of the hinge parts, and also in their assemblage.

Hinges embodying my invention, have leaves composed of cast metal, and in their best form, I have so devised them, that both are exactly alike, and being counterparts, but one pattern is required for molding. Each leaf has on one ear an integral pintle provided with a head affording a laterally projecting bearing surface, and the other ear has a spring centering hub, and a slotted or open pintle eye, and such leaves can be readily molded and cast in sand, and without the use of cores. Two such leaves can be promptly assembled by merely interlocking them, and then the two pintles will extend inwardly or toward each other, and the two spring centering hubs will also extend toward each other, and their ends will be in rotative contact with the laterally projecting bearing surfaces on the heads of their appropriate pintles, so that when in use with a door in a

certain manner, the weight of the door will be vertically supported by the heads of the pintles.

The described organization in a spring hinge, of hinge leaves having a pair of ears, one of which has thereon a headed pintle, affording on its head a lateral bearing surface, and the other has an open or slotted pintle eye which rotatively engages with the pintle between its head and the ear on which it is carried, and is also in rotative supporting contact with the lateral bearing surface on said pintle head, constitutes a feature of my invention, whether one or two of such pairs of ears be employed in the hinge, and whether the pintles extend outwardly or inwardly, and regardless of the form of spring employed, or the manner of its organization with the hinge leaves.

Another feature of my invention, includes the organization in a spring hinge, of an ear having a headed pintle, and another ear having not only an open or slotted pintle eye, but also a spring centering hub which projects from its ear, toward the head of the pintle, and is not only in rotative contact with the shank of the pintle, but also in rotative contact at its end with the coincident lateral bearing surface on the head of the pintle, whether one or two of such pintles and ears, are employed in the one hinge, and whether a spiral spring be organized therewith, or some other form of spring.

To more particularly describe my invention I will refer to the accompanying drawings, in which—

Figure 1, illustrates one of my hinges, in one of the most approved forms, having a spiral spring, and applied to a right hand door and its frame, and with the door supported by the heads of the two hinge pintles. Fig. 2, illustrates the hinge leaves, detached from the door, but without the spring, and in rear view. Fig. 3, illustrates the same, in front, and end view. Fig. 4, illustrates one of the counterpart hinge leaves in front view, two end views, and an end view of the supporting head of the hinge pintle. Figs. 5 and 6, illustrate in front and rear views, a hinge (without its spring), embodying but one of my supporting pintles, and but one open pintle

eye. Figs. 7 and 8, illustrate the two leaves of the hinge, Fig. 5 in front view, with appropriate end views of the leaves, an end view of the pintle head, and a sectional view of the socketed hinge ear. Fig. 9, illustrates in front view, one of my hinges, complete with its spring, and having two non integral or inserted pintles, with supporting heads, the spring and the ears at one end being shown in section. Figs. 10 and 11, illustrate in front and rear views, a hinge having leaves with outwardly projecting pintles, and embodying my invention, but modified for use with a sheet metal bow spring. Fig. 12, illustrates in front and end views, one of the leaves of the hinge, Fig. 10, the counterpart of said leaf being shown in dotted lines, and in its co-operative position.

I will first describe the hinge illustrated in Figs. 1 to 4 inclusive.

Referring to Fig. 1, it will be seen, that the hinge A, is applied to the door B, and door frame C, in such a manner, that in opening the door from the outside, it will swing toward the right hand, and it is to be understood that when thus mounted, the weight of the door is supported upon the supporting heads of the two hinge pintles, and although this may not be readily apparent from an inspection of this figure, it will hereinafter be clearly indicated. It will be also understood, that if this hinge had been reversed, end for end, the door would be still supported in the same manner. If however the hinge should have been mounted, either end upward, at the opposite edge of the door, so that the latter when opened from the outside would have swung toward the left hand, the door would have been supported, upon the two hinge ears of the leaf then secured to the door frame C. This hinge A, as a whole, comprises three pieces, of which the spring a , is one, its terminals having appropriate bearing seats on the two hinge leaves, as at a' , a' . The two hinge leaves b , and b , are counterparts in every respect, and hence they cannot well be separately designated by different letters of reference.

As shown in Fig. 4, each leaf b , has appropriately projecting ears c , and d . The ear c , is the pintle ear, carrying the integral pintle e , which has a head e' , affording around the pintle shank, a lateral projecting annular bearing surface, as at e^2 , at right angles to the pintle. The ear d , is the pintle eye ear, this having an open or slotted pintle eye d' , and on its inner side, it has a lateral bearing surface at d^2 , located at the end of a hub portion d^3 , of the ear, said hub being annular, except as to the slot or opening into the eye. This portion d^3 , is a spring centering hub, which occupies the interior of the spring, and said hub with the remainder of the ear, affords an extensive contact with the co-operating hinge pintle e . The pintle head e' , also occupies the interior of the spring a , so that said head e' , serves as an interior guiding support for

the spring, when the two leaves are coupled. The slot or opening of each eye d' , enables the two leaves to be readily interlocked when the leaves are held at appropriate angles with relation to each other, and after being united they are secured against separation, in all other positions, by lateral contact of coincident portions of the ears.

As seen in the end view of Fig. 3, the pintle ear c , has at its outer end, a short convex surface at c' , concentric with the pintle; and the ear d , has a corresponding concave surface. These surfaces by their abutment, afford a locking joint, when both leaves occupy one plane, and also during the opening movement of the hinge, until the interlocking or unlocking position has been reached, and then after passing said position, the leaves cannot be separated, because of the abutment of an opposite outer portion of each ear d , against a coincident surface of the other ear c .

Referring now to Fig. 3, it will be seen, that if the hinge should be held upright, as by grasping the left hand leaf, the right hand leaf will be supported vertically by the bearing contacts between the coincident surfaces of the two pairs of ears c , and d , and that the pintles will then perform their ordinary function, as mere hinge pintles, so that the weight of the right hand leaf, with that of a door, if the hinge was mounted, would be borne by the two ears of the left hand leaf, and it is obvious that these conditions would not be changed by reversing the hinge, end for end, and remounting it on the door and frame. If now the right hand leaf be grasped, and the left hand leaf allowed to swing as with a door, it will be seen that the weight of the door would be carried by the heads e' , e' , of both pintles, the vertical support being then borne at the two pairs of lateral bearing contacts at d^2 , e^2 , above, and at e^2 , d^2 , below, and that these same conditions would remain, even if the hinge should be reversed, end for end and remounted on the door and frame. It will of course be understood, that the door supporting function referred to, is the vertical or weight carrying function, as distinguished from the lateral or bracing support, which is afforded by all hinge pintles. It will also be seen, that these counterpart leaves may be cast in a sand mold, and that there are no recesses or cavities, which require the use of cores, and that the assembling of the leaves with the spring a , can be accomplished with great facility.

Although it is obviously advantageous, to embody two of the headed pintles in a hinge as hereinbefore indicated, I do not preclude myself from securing such advantages, as will accrue from the use of one of those pintles, at only one pair of hinge ears, regardless of the manner in which the other pair of ears are, or may be coupled; as, for instance, as illustrated in Figs. 5, to 8 inclusive. This hinge A', has a pintle ear c , pintle e , with its head e' , and laterally projecting bearing surface e^2 ,

as in the hinge of Figs. 1 to 4, inclusive. The pintle eye ear d , has the spring centering hub d^3 , and a lateral bearing surface d^2 , coincident with the bearing surface e^2 on the pintle head, as in the hinge Fig. 1, but this slotted pintle eye d' , opens from the front, instead of from the rear, although this variation is immaterial. These leaves f , and g , are, however, not counterparts, the two pairs of ears being quite unlike. The leaf f , which has on its ear c , the pintle e has another ear h , provided on its inner side with a hub c^2 (which occupies the interior of the spring a), and on its outer side, a short pintle i , which occupies a pintle eye or socket k' , in the ear k , of the leaf g , said eye or socket involving the use of a core in casting, and this, in view of the dissimilarity of the two leaves, precludes the degree of economy in manufacture which accrues from casting counterparts, but in facility in assembling, this hinge compares favorably with the other. With this hinge A' , mounted either end upward on a door and frame, as in Fig. 1, the weight of the door would be borne by the ears d and k , but if the hinge either end upward should be applied to the other edge of the door, the weight of the latter would be borne by the head e' , of the one pintle e . In other words, whenever the right hand leaf of this hinge, (either end up) is applied to a door, the latter will be supported by the head e' of the pintle e , and whenever the left hand leaf (either end up) is applied to a door, the latter will be supported by direct contact of the coincident bearing surfaces at both pairs of ears.

For producing specially strong but light spring hinges, the matter of economy in manufacture is of course correspondingly subordinated, either in the matter of construction of parts, or assemblage, or in both; as for instance, when strong inserted hinge pintles composed of ductile metal, are employed, while still securing some of the substantial advantages accruing from portions of my invention.

In the hinge A^2 , Fig. 9, the leaves l , and m , are cast metal counterparts, each having an ear d , with an open or slotted eye d' , a spring centering hub d^3 , and its bearing surface d^2 , as in the hinge A , Figs. 1 to 4. The other ear n , of each leaf, is however unlike the ears c , of the hinge A , in that this ear has no integral pintle, and said ear may be cast solid, and thereafter bored for receiving a pintle, or the required pintle socket or hole may be afforded in the mold, while casting by the use of a core. This pintle p , is separately constructed, and is composed of ductile metal, capable of being riveted, but it has, like the other pintles e , a large annular head e' , affording the same laterally projecting annular bearing surface e^2 , for engagement with the bearing surface d^2 , at the end of the spring centering hub d^3 , on the slotted eye ear d . An ornamental tip p^2 , serves also as a foundation or washer between the riveted outer end p' , of the pintle, and

the coincident surface of the hinge ear n , on which it is mounted. This pintle is integral with its head e' , as when cast malleable iron is used, and the same kind of iron or other strong metal should be used in the ornamental tips p^2 , the holes in the latter being tapered and large at their outer ends, so that the riveting of the pintle can be well effected, without having its end unduly protruded. After the headed pintles have been united to their appropriate ears, the assembling of the leaves and the spring, is proceeded with, as in the case of the hinge Figs. 1 to 4, the open pintle eyes interlocking with their pintles, as in that hinge. It will be seen, that in this hinge A^2 , the two pintle heads are organized for door supporting duty, only when the left hand leaf is applied to a door, with the hinge either end up, as with the hinge Fig. 1, and that the annular heads e' , of the pintles, occupy the interior of the spring a , and afford the same internal guiding support. This hinge A^2 , obviously embodies those portions of my invention, which include the organization in a spring hinge, of a hinge ear, having a headed pintle, with a co-operating hinge ear, having not only an open or slotted pintle eye, but also a spring centering hub, projecting toward the head of the pintle, and having rotative contact, with the pintle shank, and a rotative supporting contact, with the lateral bearing surface on the head of the pintle.

As hereinbefore indicated, the springs employed may be varied, both in their character, and in their mode of organization with the leaves, without departure from certain portions of my invention; as, for instance, as illustrated in Figs. 10—11— and 12, the hinge A^3 , is shown to be provided with a sheet metal bow spring a^2 .

Although in some forms of my hinge, it is specially important, that the hinge pintles should extend inwardly, this feature is not employed in the embodiment of a portion of my invention in this hinge A^3 . These hinge leaves, have pintles e , which are integral with their ears c , and project outwardly therefrom. The pintle eye ears d , in this instance are not provided with spring centering hubs, but the pintles have heads e' , each of which affords a lateral projecting bearing or supporting surface at e^2 , coincident with the bearing surface d^2 of the ear d , around its slotted or open eye d' , as clearly indicated in Fig. 12. This form of spring, requires extensive contact with its spring seats, and however these latter may be afforded, it will in no manner involve a departure from such portions of my invention, as are independent of any special form of spring.

The importance of relieving the sheet metal spring from longitudinal compression, (*i. e.*, in line with the hinge axis,) is as great as with the spiral spring, but in both cases, this relief is absolutely assured, and by precisely the same means as in the hinge, Fig. 1. These leaves q , q , being counterparts, can be as read-

ily cast and assembled, as those having inwardly projecting pintles, and this hinge A³, embodies that portion of my invention, which includes the organization in a spring hinge
 5 of one hinge ear carrying a headed pintle, and a co-operating hinge ear which has an open or slotted pintle eye, and which is not only in rotative contact with the pintle between its head and the adjacent surface of its ear, but
 10 is also in rotative supporting contact with the laterally projecting bearing surface, on the head of the pintle, it being obvious, that said feature may or may not be embodied with the counterpart feature.

15 Although still other hinges involving other variations in construction and organization might have been shown and described, it is believed that ample disclosures have been made to enable persons skilled in the art to
 20 widely apply my improvements, without any substantial departures from my invention; as an instance, I will refer to highly efficient water closet hinges, with leaves in either of the forms shown, but with the spiral spring
 25 arranged so as to be reversely operative, for throwing the leaves forwardly instead of rearwardly.

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

1. The combination substantially as hereinbefore described, with a suitable spring, of hinge leaves having projecting ears, and a

headed hinge pintle, affording a laterally projecting bearing surface, and also an open or
 35 slotted pintle eye, in rotative contact with the shank of said pintle between its head and the ear on which said pintle is carried, and also in rotative supporting contact with the lateral surface on the head of said pintle. 40

2. The combination substantially as hereinbefore described, with a suitable spring, of hinge leaves having projecting ears, and an inwardly projecting headed pintle, and also
 45 an open or slotted pintle eye ear having a spring centering stud projecting toward the head of the pintle and in rotative supporting contact with a laterally projecting bearing surface on said pintle head.

3. The combination substantially as hereinbefore described, of a spiral spring, a pair of
 50 counterpart hinge leaves, each having an inwardly projecting headed pintle, and an open slotted pintle eye within an inwardly projecting spring centering stud, said eye and stud
 55 being not only in rotative contact with the shank of the pintle, but also in rotative supporting contact with a lateral projecting bearing surface on the head of the pintle, and with both centering studs, and the heads of
 60 both pintles located within the spring.

LE DRU ROLLIN POMEROY.

Witnesses:

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 F. A. BRODHEAD, Jr.