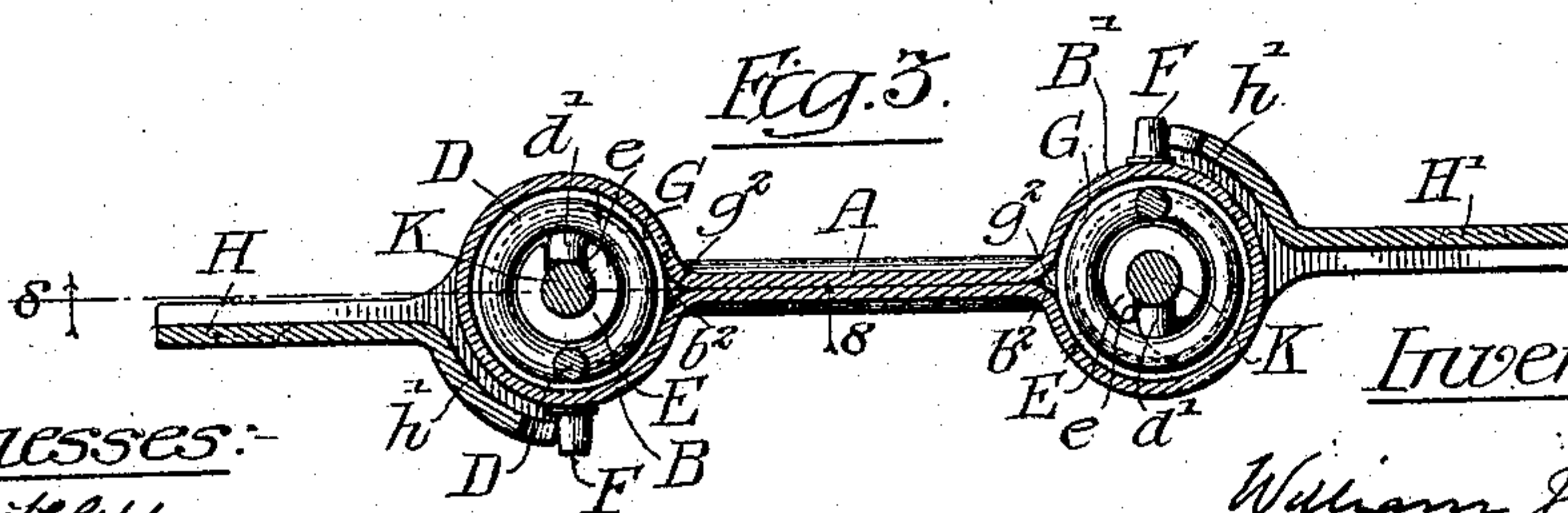
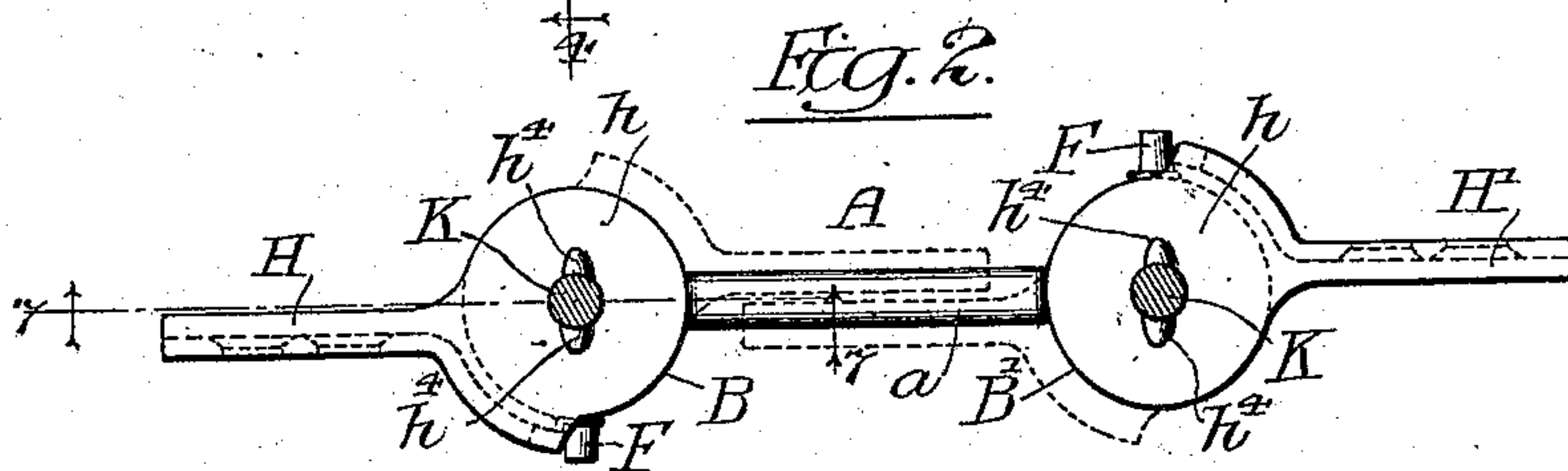
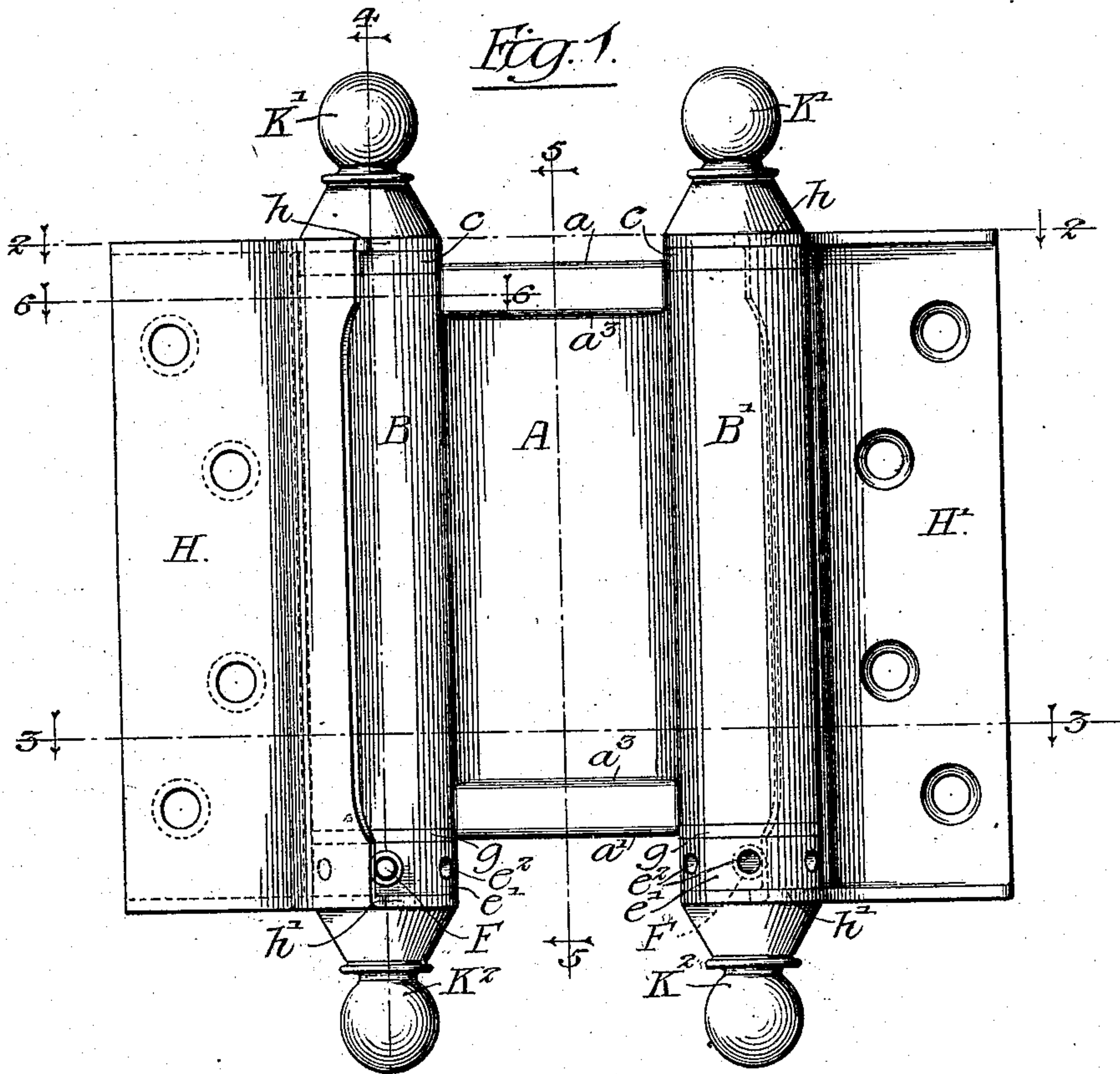


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HINGE.  
APPLICATION FILED MAR. 18, 1907.

919,881.

Patented Apr. 27, 1909.  
3 SHEETS—SHEET 1.



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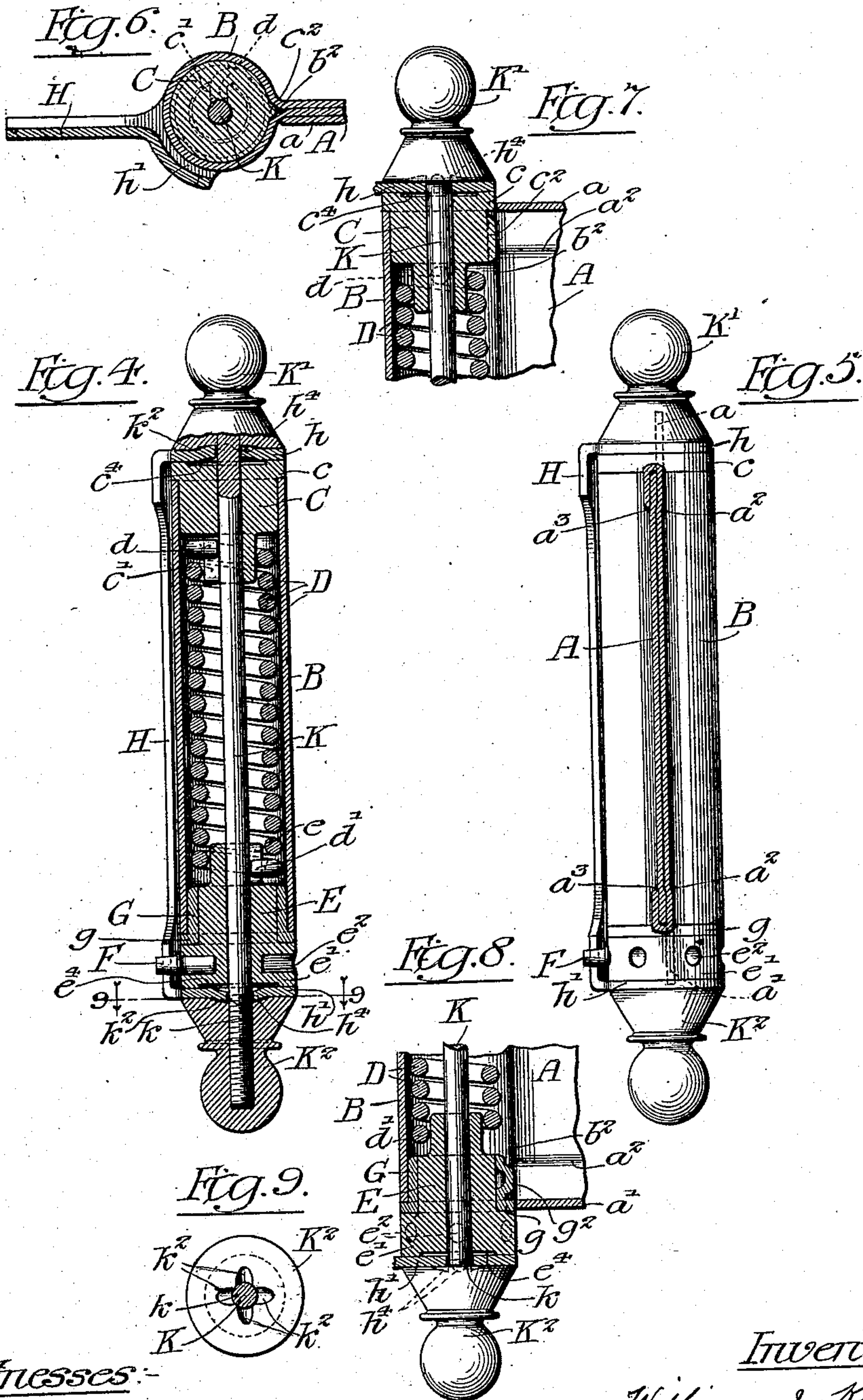
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3 SHEETS—SHEET 3.

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Fig. 10.

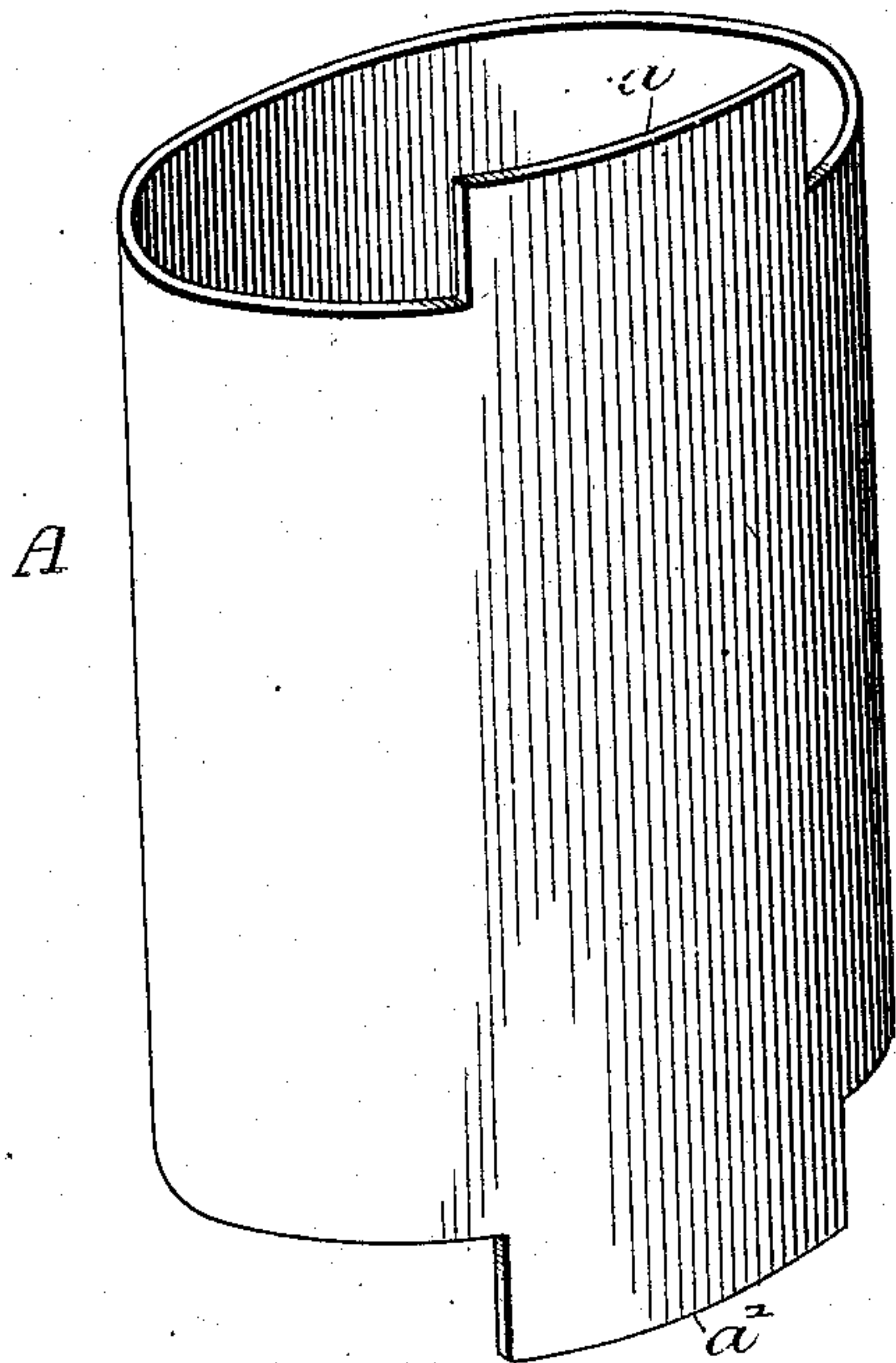


Fig. 11.

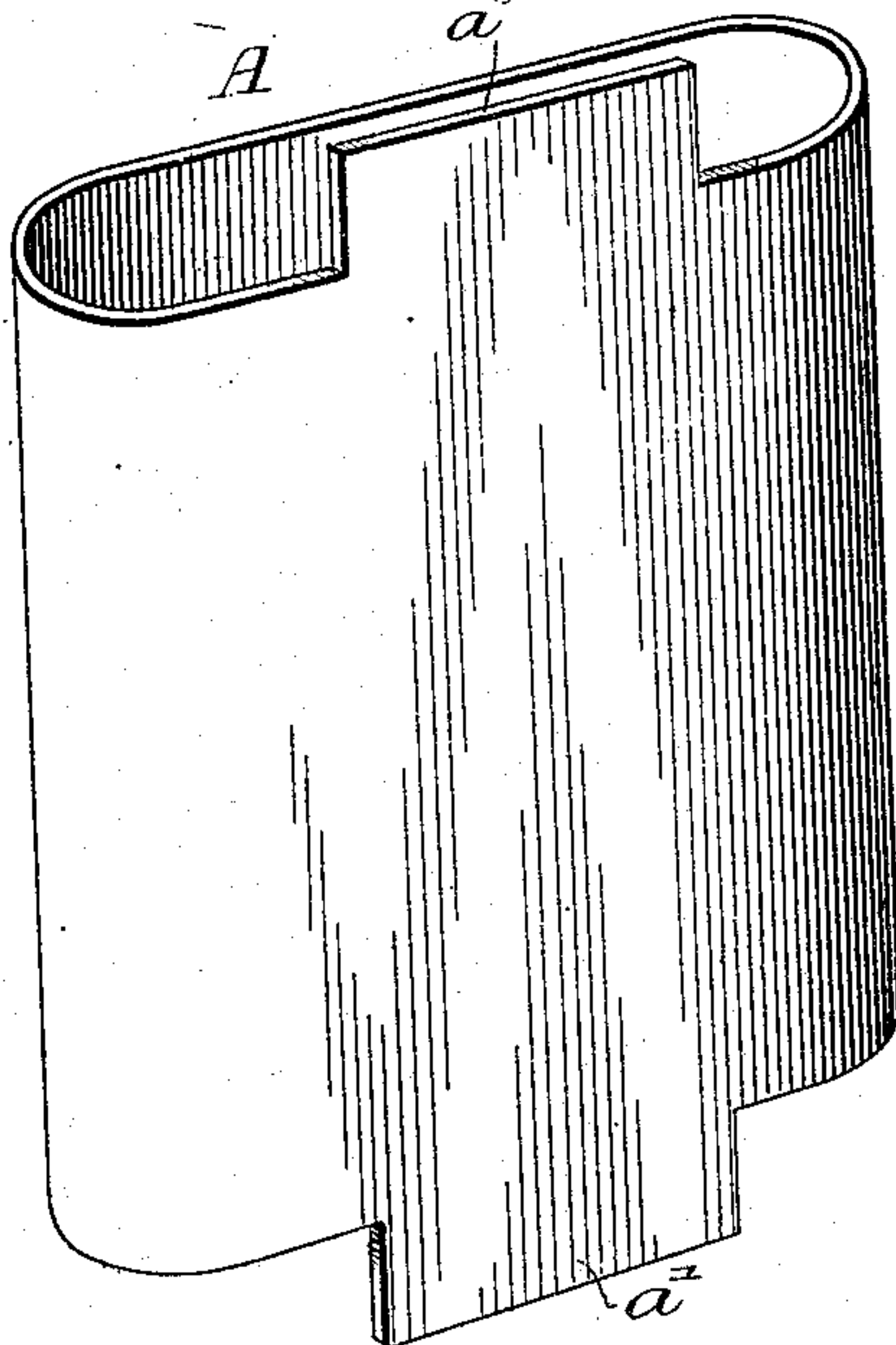
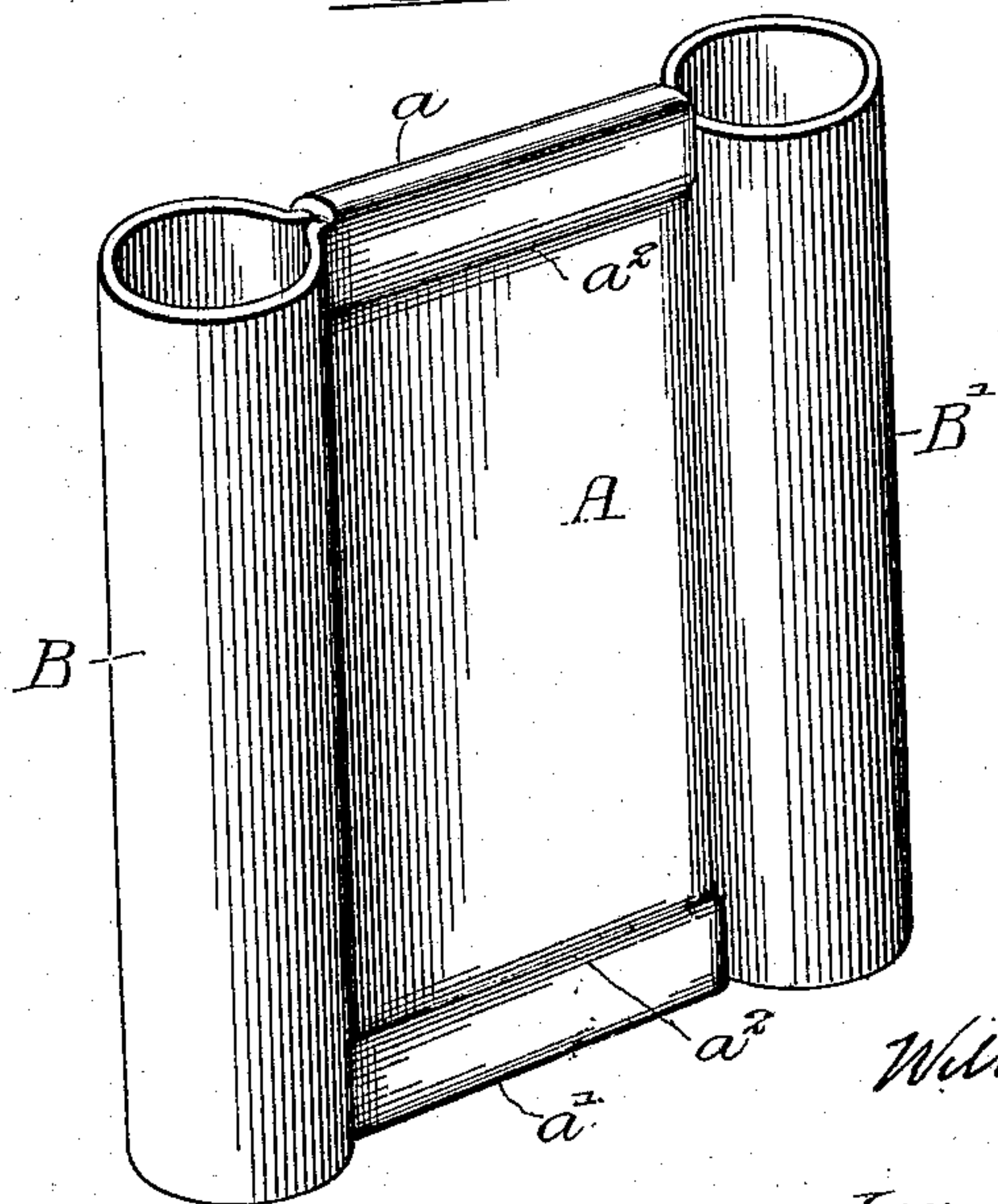


Fig. 12.



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# UNITED STATES PATENT OFFICE.

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## HINGE.

No. 919,881.

Specification of Letters Patent.

Patented April 27, 1909.

Application filed March 18, 1907. Serial No. 362,839.

*To all whom it may concern:*

Be it known that I, WILLIAM J. KEENE, 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 Hinges, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention has relation more particularly to that class of hinges commonly known as double-acting spring hinges, although features of the invention will be found applicable to hinges of other types. Examples of double-acting spring hinges of the type to which my invention more particularly relates are illustrated in Patent No. 620,933 granted to Joseph Keene March 14, 1899.

The invention has for its object to provide an improved construction of spring hinge that shall be cheap, durable and effective and the invention consists in the features of novelty hereinafter described, illustrated in the accompanying drawings and particularly pointed out in the claims at the end of this specification.

Figure 1 is a view in elevation of a double-acting spring hinge embodying my invention. Fig. 2 is a view in cross section on line 2—2 of Fig. 1. Fig. 3 is a view in cross section on line 3—3 of Fig. 1. Fig. 4 is a view in vertical section on line 4—4 of Fig. 1. Fig. 5 is a view in central vertical section on line 5—5 of Fig. 1. Fig. 6 is a view in cross section on line 6—6 of Fig. 1. Fig. 7 is a view in vertical section on line 7—7 of Fig. 2. Fig. 8 is a view in vertical section on line 8—8 of Fig. 3. Fig. 9 is a view in cross section on line 9—9 of Fig. 4. Fig. 10 is a perspective view of the tubular blank from which the body portion of the hinge will be made. Fig. 11 is a view of the tubular blank after the same has been flattened. Fig. 12 is a perspective view of the finished body portion of the hinge.

The body of the hinge comprises the web portion A and the spring barrels B and B'. The web portion A and the barrels B and B' are formed integral and from a single piece of tubing,—preferably seamless tubing, as indicated in Figs. 10, 11 and 12 of the drawings. In forming the web and spring barrels

of the body portion of the hinge a piece of tubing is cut of proper length, as shown in Fig. 10 and from the opposite ends of the tubular blank thus formed, extend the projections or flanges *a* and *a'*. By means of suitable dies the tubular blank shown in Fig. 10 is first brought to the flattened shape shown in Fig. 11 and afterward by suitable dies to the shape shown in Fig. 12 of the drawings. In bringing the tubular blank to the finished form shown in Fig. 12, the opposite central portions of the tube are brought firmly into contact to form the web portion A that extends between the spring barrels B and B', and the projections or flanges *a* and *a'* are folded down over the upper and lower edges of the web portion A as clearly shown in Figs. 1, 5 and 12 of the drawings.

In order to give greater rigidity to the web portion A of the body and as well also to improve the ornamental appearance of said portion, the web A is offset by means of suitable dies as indicated at the points *a*<sup>2</sup> and *a*<sup>3</sup> of the drawing. This offsetting of the upper and lower portions of the web A more securely interlocks these parts and enables the web to more effectively resist the strain to which it is subjected in use. Inasmuch as the extensions or flanges *a* and *a'* are formed integral with the web portion of the hinge body, great strength is given to the upper and lower edges of the web upon which points the most severe strain is thrown in the operation of the hinge. Moreover, it is unnecessary to connect the sections of the web by rivets, the punching of holes for which necessarily weakens the metal of the web.

Within the upper end of each of the barrels B and B' is set a bearing sleeve C that is provided with an annular flange *c* that rests upon the upper edge of the barrel. The lower portion of each of the bearing sleeves C is reduced to sit within the upper end of the coil spring D and, as shown, is formed with a slot *c'* to interlock with the upper end of the spring. Each of the bearing sleeves C is formed with a vertical lug or offset *c*<sup>2</sup> (see Figs. 6 and 7) that enters the vertical groove or channel *b*<sup>2</sup> formed at the junction of the barrels B and B' with the sides of the web portion A of the hinge body. The vertical lugs or offsets *c*<sup>2</sup> thus securely lock the bearing sleeves C to the barrels B and B' and con-



sequently hold the upper end of the spring D rigid with respect to said parts.

In the lower end of each of the spring barrels B and B' sits a bearing sleeve E, the reduced inner portion of which is formed with a slot  $e$  to engage the lower end  $d'$  of the spring D. Each bearing sleeve E is shown as formed with a head portion  $e'$  provided with radial holes  $e^2$  adapted to receive a pin F whereby the bearing sleeve E is interlocked with the corresponding swinging leaf or side of the hinge. Preferably, each of the lower bearing sleeves E is of smaller diameter than the barrel of the hinge wherein it sits and this reduced portion of the sleeve E is encircled by a tubular bushing G having an annular flange  $g$  that extends between the lower end of the hinge barrel and the head portion  $e'$  of the sleeve E. This tubular bushing G is preferably formed of steel or like hard wear resisting metal and in order to hold it against rotation with respect to the spring barrel wherein it sits, this bushing G is preferably formed with an offset  $g^2$  adapted to enter the slot or channel  $b^2$  formed at the junction of the lower portion of the spring barrel with the side plates of the web A (see Figs. 3 and 8).

The leaves or wings H and H' of the hinge will be formed from sheet steel plates, each of these wings or leaves being provided with the upper and lower ears  $h$  and  $h'$  that are perforated to receive the retaining bolt K. The ear  $h$  of the leaf H sits over and rests upon the top of the bearing sleeve C, and similarly, the ear  $h'$  of the leaf H extends across the end of the bearing sleeve E. At the upper end of the retaining bolt K is formed a cap or head  $K'$ , more or less ornamental as desired, and the lower end of the bolt K is screw-threaded as at  $k$  to enter a correspondingly threaded socket formed in the lower head or cap  $K^2$ .

In order to securely hold the cap  $K^2$  in proper position upon the bolt K and prevent its working loose or becoming displaced, the cap  $K^2$  is formed with a series of notches or seats  $k^2$  (see Fig. 9) that will be engaged by corresponding offsets  $h^4$  formed upon the ear  $h'$  of the adjacent hinge-leaf. The offsets  $h^4$  are preferably formed by "bumping" out the metal of the ear  $h'$  at such points. Preferably also the upper ear  $h$  of each hinge-leaf is provided with similar offsets  $h^4$  that will sit within seats  $k^2$  formed in the lower face of the upper cap  $K'$ . In order to permit the metal of the ears  $h$  and  $h'$  to yield slightly as the cap  $K^2$  is secured firmly to position, thereby causing the seats  $k^2$  to override the offsets  $h^4$ , the adjacent outer faces of the bearing sleeves C and E are formed respectively with the spaces  $c^4$  and  $e^4$ .

By my present invention an exceedingly cheap and durable hinge is produced. By

forming the spring barrels integral with the web portion of the hinge body, and without joint between the barrels and the web portion, the web portion that is subjected to the greatest strain is formed at its ends with three thicknesses of the metal plate and by this construction a thinner plate may be used than would otherwise be required. So also by uniting the upper and lower edges of the web portion of the hinge body by means of flanges or offsets formed integral with the web, a most effective locking together of the plates that comprise the web is secured, and the necessity for employing rivets for uniting the plates is avoided. Obviously, the spring hinge shown in the drawing may be used either end up according to its position upon the door frame.

It should be noted that the overlapping flanges  $a$  and  $a'$  extend between the barrels B and B' for the entire width of the connecting web A and form rigid braces between the barrels. By this means the hinge body is strengthened at the point of greatest weakness, namely, at the ends of the junctures between the spring barrels and the web. Moreover, the upsetting and overlapping of the flanges  $a$  and  $a'$  serves to temper and strengthen the metal at the ends of the connecting web, so that the hinge body is greatly strengthened at the parts subjected to the most strain.

It will be understood that the precise details of construction above set out may be varied without departure from the spirit of the invention and that features of the invention may be employed without its adoption as an entirety.

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

1. A hinge body comprising a spring barrel formed of a single thickness of metal and a web portion formed of two thicknesses of metal, one of the thicknesses of metal comprising the web portion having integral therewith an extended end folded over and interlocked with the adjacent end of the other thickness of said web.

2. A hinge body comprising two spring barrels each formed of a single thickness of metal and a connecting web formed integral therewith of two thicknesses of metal in contact, the sections of said web being united by overlapping flanges at its upper and lower edges, each of said flanges being integral with one of said sections and folded over and interlocked with the edge of the other section.

3. A hinge body comprising spring-barrels formed of a single thickness of metal and a connecting web formed of two thicknesses of metal, said barrels and said web being formed integral and said web having upper and lower integral flanges folded over its



edges, the upper and lower portions of said web being offset adjacent its top and bottom edges.

4. A spring hinge comprising a spring barrel formed of a single thickness of metal and a web formed of two united thicknesses of metal, said barrel and said web being formed integral with an open space or channel at the junction between said web and barrel, a fixed bearing sleeve fitted within one end of said barrel, a bushing fitted within the opposite end of said barrel, a revoluble bearing sleeve fitted within said bushing, said bushing and said fixed bearing sleeve having offsets extending into said space or channel at the junction of the integral barrel and web, a coiled spring within said barrel connected at its ends to said fixed and revoluble bearing sleeves, a hinge leaf having ears extending over the ends of said bearing sleeves, a connecting pintle extending through said ears and said bearing sleeves, and means for connecting said hinge leaf to said revoluble bearing sleeve, substantially as described.

5. In a spring hinge, the combination with a spring barrel having bearing sleeves at its ends, a hinge leaf having flat ears extending across the outer ends of said bearing sleeves, and a through-bolt extending through said several parts, of a cap for engaging the free end of said through-bolt, said cap having seats upon its inner face and the adjacent ear of the hinge leaf having offsets to engage said seats of the cap, the central portion of the bearing sleeve adjacent said offset ear being cut away to permit a slight yielding movement of the offset ear.

6. A hinge body comprising two spring barrels each formed of a single thickness of metal and a connecting web formed integral therewith of two thicknesses of metal in contact, the sections of said web being united by

parts each integral with one of said sections and folded over and interlocked with the other sections.

7. A hinge body comprising two spring barrels and a connecting web portion formed of a seamless tubular blank, the spring barrels being of a single thickness of metal and the connecting web of two thicknesses of metal in contact with each other, the sections of said web portion being united by parts integral with one of said sections and folded over and interlocked with the other of said sections.

8. A hinge body comprising two spring barrels each formed of a single thickness of metal and a connecting web formed integral therewith of two thicknesses of metal in contact, the sections of said web being united by overlapping flanges at its upper and lower edges, each of said flanges being integral with and folded over and interlocked with the edge of the other section, said folded over and interlocked flanges extending for the full width of said web between said spring barrels with the end portions thereof abutting against said spring barrels.

9. A hinge body comprising two spring barrels and a connecting web formed of a seamless tubular blank, the spring barrels being each of a single thickness of metal and the connecting web of said two thicknesses of metal in contact, the sections of said web being united by overlapping flanges at its edges, each of said flanges being integral with one of said sections and folded over and interlocked with the edge of the other section, said flanges extending between said barrels for the full width of said web.

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