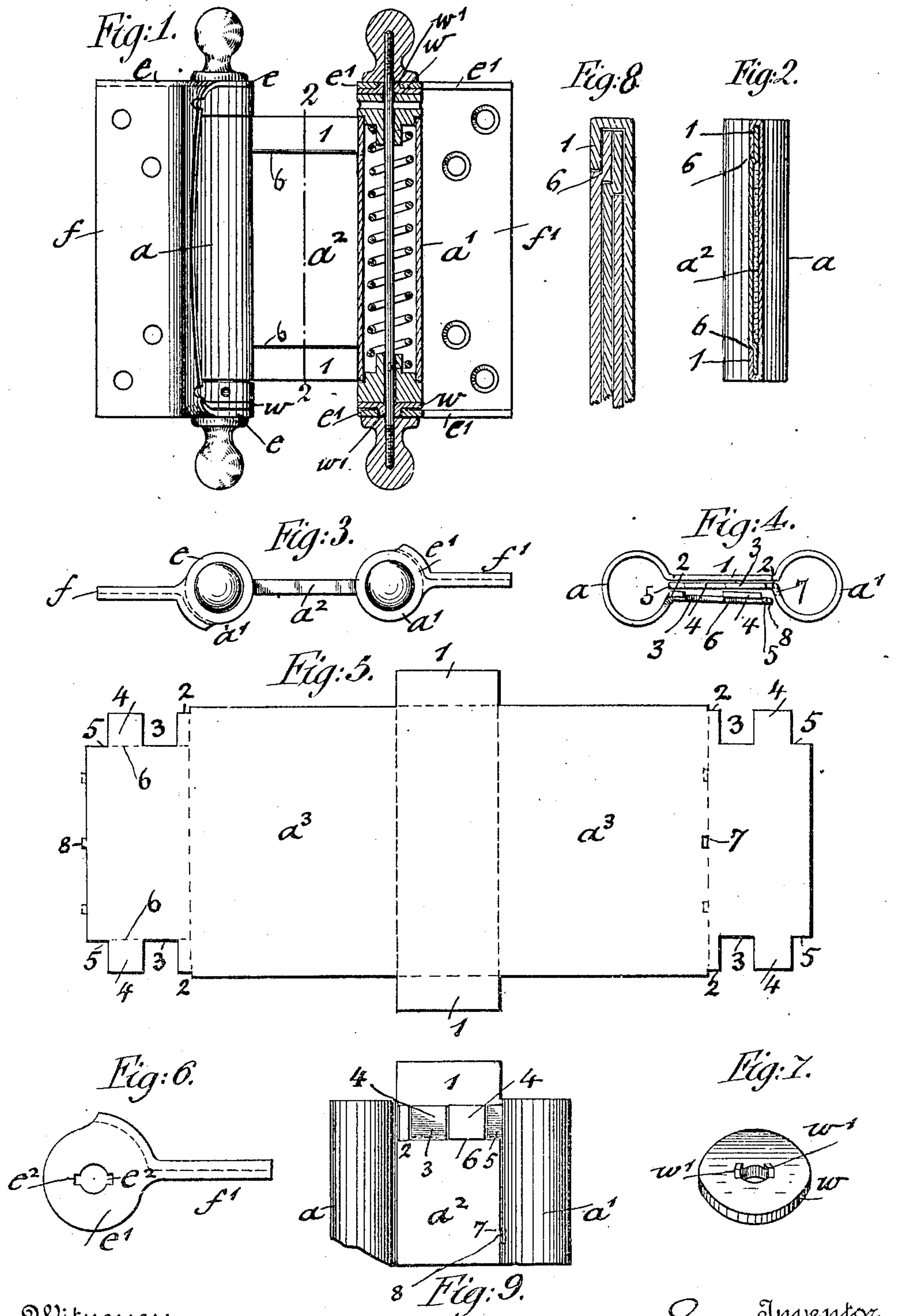


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DOUBLE ACTING SPRING HINGE.
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DOUBLE-ACTING SPRING-HINGE.

943,807.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EMIL BOMMER, a citizen of the United States of America, residing in New York, in the borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Double-Acting Spring-Hinges, of which the following is a specification.

10 This invention relates to an improved double-acting spring-hinge in which the web connecting the barrels is made of three layers which are connected in such a manner that the riveting of the three layers is dispensed with and a neater and better finished appearance is imparted to the web.

15 In Letters Patent No. 485,366, dated November 1, 1892, granted to my father, Lorenz Bommer, a double-acting spring-hinge is shown in which the barrel-connecting web is made of three layers which are made in one integral piece with the barrels and which are then riveted together. In my improved spring-hinge, the barrel-connecting web is also made of three layers which are formed in one integral piece with the barrels from a sheet-metal blank, the middle portion of which, between the barrels, forms the first layer of the web and is extended at its upper and lower ends, said extensions being bent or folded over the two end-
20 portions of the blank, which form the second and third layers of the web, and which are interlocked at their upper and lower ends into the plane of the second or intermediate layer. The third layer is depressed at both ends to a depth equal to the thickness of the extensions of the first layer, to provide seats for said extensions when they are folded over, whereby a web of three layers of uniform thickness is obtained; one or more projections on the longitudinal edge of the third or outer layer of the web being seated in corresponding slots of the adjacent barrel to prevent buckling.

25 The invention consists further in the peculiar formation of the blank used for the improved barrel-connecting web, and lastly in the introduction of washers provided with bent-up lugs at opposite sides of their central opening, which lugs are inserted into corresponding recesses of the ears formed on the flanges of the double-acting spring-hinge, said washers serving for taking up the wear with the adjacent faces of

the spring-holders and tension-collars and reinforcing the ears.

In the accompanying drawings, Figure 1 represents a side-elevation of my improved spring-hinge, the left-hand barrel being in elevation and the right-hand barrel in vertical section, Fig. 2 is a vertical transverse section on line 2, 2, Fig. 1, Fig. 3 is a plan-view of the spring-hinge shown in Fig. 1, Fig. 4 is a plan-view of the blank after it is partly bent to form the barrels and web, Fig. 5 is a plan-view of the blank from which the barrels and the connecting-web are made, Fig. 6 is a detail top-view of the ear bent up from the flange, Fig. 7 is a perspective view of the washer connected with the ear of the flange, Fig. 8 is a vertical transverse section showing a barrel-connecting web of four layers made according to my improved construction, and Fig. 9 is a side-elevation of the barrels and connecting-web shown as folded together preparatory to the final bending over of the extensions of the rear layer of the web.

Similar reference characters indicate corresponding parts throughout the several figures.

Referring to the drawings, a a^1 represent the barrels of my improved double-acting spring-hinge, and a^2 the connecting-web for the same. The barrels and web are made of one integral piece of sheet-steel that is formed of the blank a^3 shown in Fig. 5, which is cut by means of suitable dies from a piece of sheet-steel or other sheet-metal of suitable size and thickness. The blank a^3 is provided with central extensions 1 which extend beyond the height of the adjacent portions of the blank from which the barrels a a^1 are formed. At the corners of the barrel-forming portions are formed small recesses 2, and adjacent thereto longer recesses 3. Adjacent to the recesses 3 are formed projections 4, and adjacent thereto corner-recesses 5, the projections being equal or approximately equal in area with the area of the recessed portions. The blank a^3 is folded up so as to form the barrels, the middle portion of the blank a^3 between the barrels a and a^1 , with its extended ends 1, forming the first or rear layer, while the end-portion of the blank a^3 adjacent the barrel a^1 forms the second layer, and the end-portion of the blank adjacent the barrel a forms the third layer, as shown in Figs. 2

and 4. After the blank a^3 is bent into this shape, the projections and recesses at the upper and lower ends of the second and third layers are interlocked into the plane of the second layer. Then the central extensions 1 of the first layer are bent over the projections at the upper and lower ends of the second and third layers and are seated against lateral depressions 6 formed on the third layer at the line of interlocking of the projections and depressions of the third layer into the plane of the second layer, as shown in Figs. 1, 2, 4 and 5. The small recesses 2 at the ends of the barrel-portions of the blank serve for providing for the thickness of the bent-over central extensions 1 of the middle portion of the blank in order to produce a web of equal height with the barrels. By this construction a web of three layers of uniform thickness is obtained. The barrel a^1 is provided at its junction with the second layer with one or more slots 7 into which one or more corresponding projections 8 on the edge of the third layer of the web are inserted to prevent buckling after the blank is bent into shape. Finally, by means of powerful pressure applied to the web, the three layers are rigidly and permanently swaged together.

The improved barrel-connecting web can be used for double-acting spring-hinges of the diagonal ball-bearing as well as of the non-ball-bearing type, whether the fixed spring-holders and tension-collars are of the diagonal or non-diagonal arrangement.

Instead of being made of three layers, the barrel-connecting web may be made of four layers, as shown in Lorenz Bommer's Letters Patent No. 348,312, dated August 31, 1886, in which each barrel is provided with two extension-plates which overlap each other and are then riveted together to form the web of four layers. The present invention can be adapted for this construction by interlocking the upper and lower ends of the second and third layers into the plane of the second layer, the fourth layer being formed so as to follow the configuration of the planes of the interlocking second and third layers, the first layer being provided with extensions 1 at its upper and lower ends, which are bent or folded over the upper and lower ends of the second, third and fourth layers and finally seated in the depressions 6 formed by the offsetting of the fourth layer, where it follows the configuration of the interlocked planes of the second and third layers, so that a web of four layers of uniform thickness is obtained, as shown in Fig. 8.

The flanges f f^1 of my improved double-acting spring-hinge are provided in the usual manner at the upper and lower ends with perforated ears e e^1 that are bent up at right angles to the flange, and by which the

connection with the pintles and barrels is made. The central perforations in the ears are provided with rectangular recesses e^2 located at diametrically opposite points of the central perforations, into which the bent-up lugs w^1 of centrally perforated washers w are inserted, said perforations and lugs corresponding with the central perforations and recesses of the ears. The washers reinforce the ears and take up the wear produced on the ears by the friction of the tension-collars and spring-holders. The washers can be readily replaced when worn out by use, at a very insignificant cost, so that a spring-hinge of almost unlimited durability is obtained. The washers w are applied to the four ears of the double-acting spring-hinge and can be used on all forms of double-acting spring-hinges, whether with or without ball-bearings, but with special advantage on the spring-hinge for which Letters Patent were granted to me on September 8, 1908, No. 898,031, though in the application to the latter spring-hinge only two washers would be required at diagonally opposite points at the joints carrying the load, one at the lower end of the left-hand barrel and the other at the upper end of the right-hand barrel. For the sake of symmetry, however, washers may be introduced at the remaining ears between them and the adjacent projecting portion of the spring-holder and adjacent face of the tension-collar.

As the improved web-connection between the barrels is made without rivets, the appearance of the spring-hinge is rendered more finished. The transverse lines obtained by the folding over of the extended ends of the first layer of the web upon the interlocking ends of the remaining layers or plies may be repeated by transverse depressions upon the other side of the web so as to secure a uniform appearance to both sides of the web and give to the spring-hinge a distinct and readily recognizable characteristic, while by the use of the reinforcing washers, which are held in rigid position on the perforated ears of the flanges, the wear of the rotating parts is taken up and thereby the use of the more expensive pintle-sockets shown in Letters Patent No. 485,366 hereinbefore referred to is dispensed with.

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

1. In a double-acting spring-hinge, a web-connection for the barrels of the hinge made of a plurality of layers and formed of a first layer connecting one of the meeting edges of the barrels and having oppositely-disposed vertical extensions at the upper and lower ends, an intermediate layer and a front-layer overlapping each other and forming extensions of the opposite meeting edges of each of the two barrels, the layers and bar-

rels being made in one integral piece and united by folding over the vertical extensions of the upper and lower ends of the first layer.

5 2. In a double-acting spring-hinge, a web-connection for the barrels of the hinge made of three layers and formed of a first or rear layer connecting one of the meeting edges of each of the two barrels, said layer being pro-
10 vided with oppositely disposed vertical extensions above and below the barrels, an intermediate layer and a front layer overlapping each other and forming extensions of the opposite meeting edges of the barrels,
15 the intermediate and front-layers being provided with recesses and projections at their upper and lower ends over which the extensions of the first or rear layer are folded.

3. In a double-acting spring-hinge, a web-
20 connection for the barrels of the hinge made of three layers and formed of a rear layer connecting one of the meeting edges of the barrels, said rear layer being provided with oppositely disposed vertical extensions above
25 and below the barrels, an intermediate layer and a front layer overlapping each other and forming extensions of the opposite meeting edges of the barrels, the intermediate and front layers being provided with re-
30 cesses and projections, the recesses and projections of the front layer being offset and interlocked with the projections and recesses of the intermediate layer, to lie in the plane of the intermediate layer, thereby forming
35 lateral depressions on the face of the front-layer at the upper and lower ends thereof into which the extensions of the rear-layer are folded and seated.

4. In a double-acting spring-hinge, a web-
40 connection for the barrels of the hinge made of three layers and formed of a rear-layer connecting one of the meeting edges of the barrels and provided with oppositely dis-
45 posed vertical extensions at the upper and lower ends, an intermediate layer and a front layer overlapping each other and forming extensions of the opposite meeting edges of the barrels, said extensions of the rear layer being folded over the projections and re-
50 cesses of the intermediate and front layers, and a slot or slots located at the junction of the barrel and the intermediate layer interlocking with a projection or projections at the edge of the front-layer for preventing
55 buckling of the front layer.

5. A blank for the web-connection of the barrels of a double-acting spring-hinge, formed of an oblong piece of metal having extensions at the middle portion and recesses
60 and projections at the upper and lower portions of the outer ends registering with each other on folding the blank into two barrels

and a three-ply web-connection between the same.

6. A blank of sheet-metal provided with 65 extensions at the middle portion equal in width with the web of the hinge, intermediate portions for forming the barrels, and end-portions for forming the overlapping layers or plies of the web, said end-portions 70 being provided with small corner-recesses and deeper recesses and projections at the upper and lower ends which register with the adjacent projections and recesses of the layers or plies forming the barrels and con- 75 necting-web.

7. A blank of sheet-metal for forming the barrels and web of a double-acting spring-hinge, provided with extensions at the middle portion equal in width with the web of 80 the hinge, intermediate portions for forming the barrels and end-portions for forming the overlapping layers or plies of the web, said end-portions being provided at the upper and lower ends with recesses and 85 projections registering with each other on folding the blank into two barrels and a three-ply connecting-web, said blank being provided with a slot or slots located at the junction of one barrel-portion and the por- 90 tion forming the intermediate layer of the web-connection and with a projection or projections at the outer edge of the portion forming the front-layer of the web-connection between the barrels. 95

8. In a spring-hinge, the combination, with a spring-barrel, of a flange provided with perforated ears bent up at the upper and lower ends of the flange, washers interposed between the ears and adjacent spring-holder 100 and tension-collar, and means for connecting the washers with the ears so as to reinforce the ears and move with the same for taking up the wear of the adjacent parts.

9. In a spring-hinge, the combination, with 105 a spring-barrel, of a flange provided with bent-up perforated ears at its upper and lower ends, said perforated ears being provided with recesses at diametrically opposite points of the central perforation, and wash- 110 ers provided with bent-up lugs also at diametrically opposite points of the central perforation, said lugs interlocking with the recesses of the ears for reinforcing the ears and taking up the wear of the adjacent mov- 115 able portions.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

EMIL BOMMER.

Witnesses:

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HENRY J. SUHRBIER.