

No. 681,577.

Patented Aug. 27, 1901.

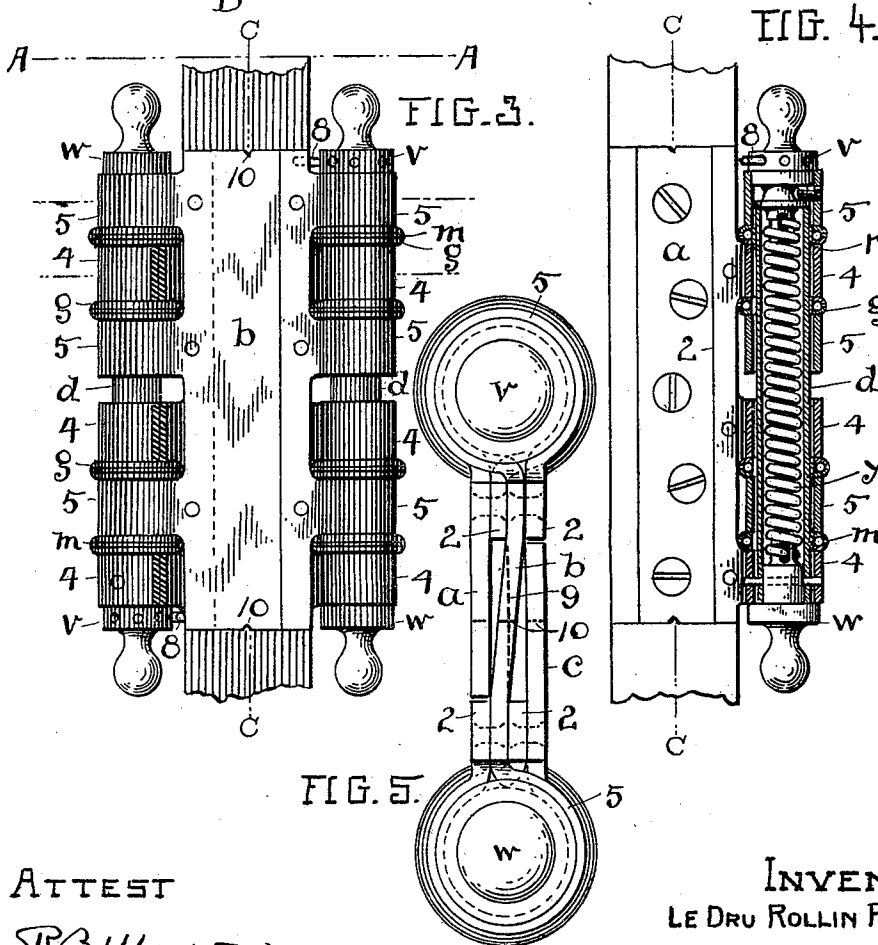
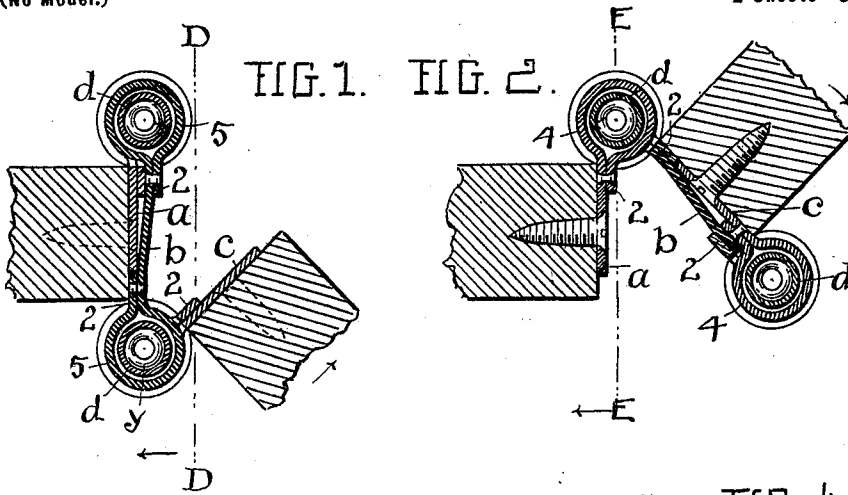
LE D. R. POMEROY & E. E. ALLYNE.

SPRING HINGE.

(Application filed Sept. 12, 1900.)

(No Model.)

2 Sheets—Sheet 1.



ATTEST

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2 Sheets—Sheet 2.

FIG. 7.

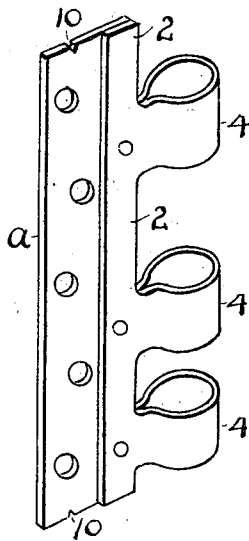


FIG. 6.

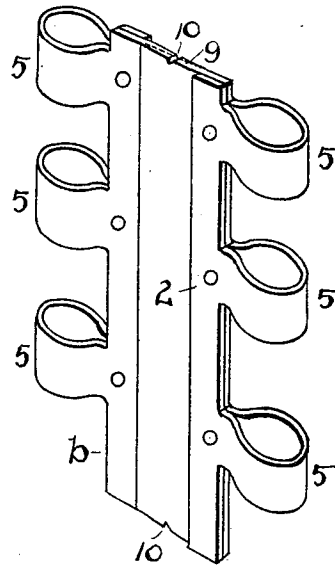


FIG. 8.

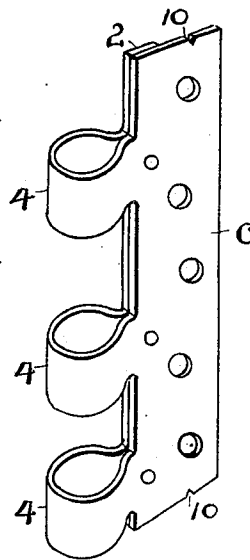


FIG. 9.

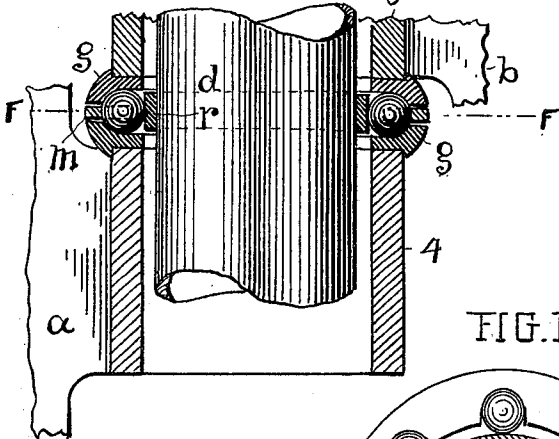


FIG. 11.

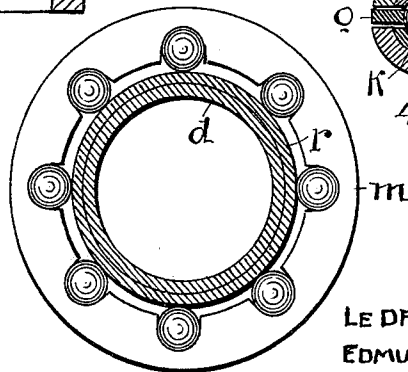
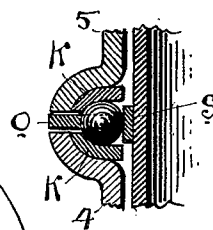


FIG. 10.



ATTEST

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# UNITED STATES PATENT OFFICE.

LE DRU ROLLIN POMEROY AND EDMUND ETHELBERT ALLYNE, OF CLEVELAND, OHIO, ASSIGNORS TO C. S. VAN WAGONER, OF SAME PLACE.

## SPRING-HINGE.

SPECIFICATION forming part of Letters Patent No. 681,577, dated August 27, 1901.

Application filed September 12, 1900. Serial No. 29,750. (No model.)

*To all whom it may concern:*

Be it known that we, LE DRU ROLLIN POMEROY and EDMUND ETHELBERT ALLYNE, citizens of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Door-Hinges; and we do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to door-hinges; and while the invention is applicable to what are known as "single-acting" hinges it is especially well adapted to double-acting hinges and is so illustrated in the accompanying drawings.

In the class of hinges to which this invention relates and known as "single and double acting" hinges for light and heavy doors as ordinarily made there are only plain contact or rubbing bearings for the swinging parts or sections to ride on, and as the door is hung at its side edge the binding effect, especially on wide doors and heavy doors, is very great, and the spring in order to swing the door must necessarily be heavy enough to overcome this additional side friction as well as perform its allotted function, so that with this additional burden upon the spring it usually follows that the action of the hinge is slow and sluggish and often noisy and squeaky. Furthermore, it is quite a difficult matter to hang the hinges in perfect alinement top and bottom, and unless they are in such alinement there is an additional bind and strain, which is often destructive to the hinge. These defects and contingencies necessitate that the spring be much heavier and the general construction of the hinge also heavier and thicker than would otherwise be required. Then, again, when mounting a heavy hinge the woodwork has to be cut much deeper than is desirable and always with its attendant mutilations, which is a very great objection to thick or heavy spring-sections.

In the accompanying drawings, Figures 1 and 2 are each cross-sections of a section of a door and of a door-jamb and of a double-acting hinge in open relations, as hereinafter

fully described. Fig. 3 is an elevation of the hinge on line D D, Fig. 1, looking to the left, the door and its section being removed. Fig. 4 is a part-sectional elevation on line E E, Fig. 2, especially disclosing the internal mechanism. Fig. 5 is a view looking down from line A A, Fig. 3, of the hinge when folded together and closed. Figs. 6, 7, and 8 are perspective details of the three prime members of the hinge, as hereinafter described. Figs. 9, 10, and 11 are section views designed to illustrate the antifriction-ball races and balls as used by us and each as hereinafter fully described, Fig. 11 being a cross-section of Fig. 9 on line F F and Fig. 10 a modification of Fig. 9.

Our invention as thus illustrated is shown as consisting of a hinge constructed, preferably, of sheet metal, such as sheet-steel, and designed to overcome all objections enumerated against the old style of hinge. Sheet metal especially affords lightness without sacrificing strength and helps to protect the woodwork, because with a thin hinge the wood requires comparatively little cutting. To obviate any undue friction we provide ball-bearings, as hereinafter described, which by having a hardened race on the spring-containing tube, as well as at the top and bottom of the ball, not only takes care of the weight of the door, but its side pull or strain as well. Thus we provide a bearing with great wearing qualities which allows the hinge to return the door quickly and noiselessly to its closed position. On the ends of the flanges of the double-acting hinge we have well-defined lines showing the center of the width and thickness of the hinge, so that to insure the hanging of the hinge in perfect alinement the carpenter will set his gage to the lines showing the center of the thickness of the hinge and mortise accordingly. Then at the setting of the hinge it would have the cross-mark corresponding to a line first drawn, showing the middle of the thickness of the door and jamb. As the hinge is preferably made of sheet-steel, it is of a neat thin construction and possesses great strength and durability.

The hinge thus shown and briefly outlined in its double-acting form consists of the three

sections *a*, *b*, and *c*, Figs. 6, 7, and 8. Of these section *b* is the intermediate section and sections *a* and *c* the side sections. These sections are stamped up out of blank sheets of suitable material in such manner as to leave the loop-blanks between the strips or laps 2 and the body of the blank, and the loops are then formed by bending the said blanks into the form substantially as shown.

The laps 2 are thus brought back upon the inner face of the body-blank contiguous to its outer edge and secured thereto. Each outer section has a series of three loops 4, and the inner and middle section *b* has three loops 5 at each edge, and the respective edges come together and are united by means of a tube *d*, which is of a length substantially equal to the full length of the hinge and of such a size as to practically fill the said loops, so that it forms a perfectly-rigid pintle for all the loops and both springs sectioned together, and thus distributes the bearing or pull upon all said loops alike at the middle, as well as at the ends. The remaining space between the edges of the interlapping loops 4 and 5 of the sections is taken up with the ball-races shown in Figs. 3 and 4 and in enlarged section, Figs. 9 and 10. Of these races two styles are illustrated herein, Figs. 9 and 10; but the invention is susceptible of still further modifications in this particular. In practice the said races are constructed in two circumferential sections or rings *g* and *g*, Fig. 9, and *k* and *k*, Fig. 10. These races are always meant to have or form hardened metal bearings, such as steel, with hardened balls, so that the down pressure or weight of the door will be carried thereby with the least possible friction, while the side strain or pull will be relieved by the balls bearing against the steel band *r*, as in Fig. 9. This band is sprung or forced upon steel tube *d* opposite each set of balls. (Shown in Figs. 3 and 4.) The said balls are kept apart and held in right working relations in respect to each other by means of suitable separating-rings *m* and *o*, respectively, Figs. 9 and 10. In Figs. 9 and 10 said rings have cavities in their inner edge, Fig. 11, in which the balls are rotatably confined, and said rings are placed centrally between the upper and lower sections of the race about the outside of the balls, thus leaving the balls free in Fig. 9 to bear against the steel band *r*, sprung upon tube *d*, and in Fig. 10 to bear against a like band *s* about said tube. Now carrying the sections shown in Figs. 6, 7, 8, and 9 to Figs. 1 to 4 we find that section *a* takes its place on the door-jamb, section *c* on the door, and the middle section *b* between these parts. Said middle section is secured to both sections *a* and *c* in exactly the same way, and the hinge in or upon said sections is the same on both. It will also be noticed that it depends on the direction the door is swung whether the middle section lies with the door or with the jamb, and it is always positively with one or the

other in all the positions of the door. Thus, swinging to the right, as in Fig. 1, the middle section stays with the jamb and the swing is on the door and middle sections; but swinging to the left, as in Fig. 2, the swing is on the jamb and middle sections and the middle section lies against the door. These positions are arbitrarily taken by reason of the construction and arrangement of the parts, and while the action is substantially the same as occurs in double-acting hinges generally it yet serves to show that we get all the best advantages of the old double-acting hinge, while we work material economy in the original cost and get a greatly-improved operation in respect to ease of action and absolutely noiseless in so far as the hinge itself is concerned or can control conditions.

At each end of the hinge-barrels are separate plugs *v* and *w*, entering tube *d*, and engaged with the inner extremities of these plugs are the ends of spring *y*. One of these plugs is preferably fixed permanently by a transverse pin or otherwise and the other is rotatable and has a series of holes about its side and a pin 8 for turning and locking it when turned and serves to give the desired tension to the spring.

In Fig. 5 we show the lines 9 and 10, by which we show the center of the width and thickness of the hinge, as hereinbefore described, and whereby the carpenter is afforded an unerring guide for alining the hinges, and which is of such vital importance in hinges of this kind. Line 9 shows exactly the depth of mortise or recess to cut in the door and jamb, and when mounting the hinge line 10 shows the center, which will match the exact center of the mortised parts. In Fig. 10 the loops of the sections are shown as upset correspondingly at their abutting edges, and the bearing members or parts are confined within and between the said upset portions.

In light hinges we may omit the overlapping edges 2 and by turn the loop, so as to abut and weld the abutting end to the integral base portion of the loop.

What we claim is—

1. In a spring-hinge, the combination with a set of hinge-sections having loops on their edges and a pintle uniting said sections, of ball-races each comprising in its construction two horizontally-disposed recessed sections, so arranged with reference to each other as to form an open annular groove, and adapted to be secured between the adjacent ends of the hinge-loops and surround the pintle with the open face of said groove adjacent thereto, and balls in said annular groove whereby the weight of the door is sustained and the pintle relieved from side pressure, substantially as described.

2. In door-hinges, a hinge-section formed of sheet metal and consisting essentially of three portions, a body portion, a series of loops and a strip of metal in one piece, and

the said strip of metal secured flatwise on the body portion of the hinge along the edge having the loops and serving as a reinforcement for said edge, substantially as described.

5 3. In spring door-hinges, a set of hinge-sections formed out of sheet metal and having loops, a tube through said loops serving to unite the sections, ball-races and antifriction-balls between each set of loops, and a band  
10 fastened upon said tube opposite each series

of balls to take the side pull on the door, substantially as described.

Witness our hands to the foregoing specification this 5th day of September, 1900.

LE DRU ROLLIN POMEROY.  
EDMUND ETHELBERT ALLYNE.

Witnesses:

M. A. SHEEHAN,  
R. B. MOSER.