

R. R. BROWN.
HINGE.

APPLICATION FILED APR. 1, 1907.

971,723.

Patented Oct. 4, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

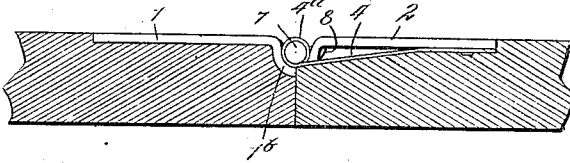


Fig. 2.

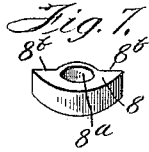
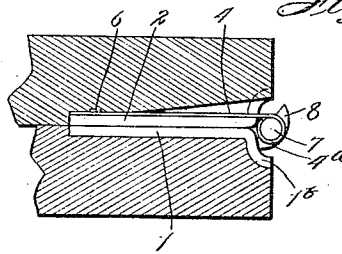


Fig. 4.

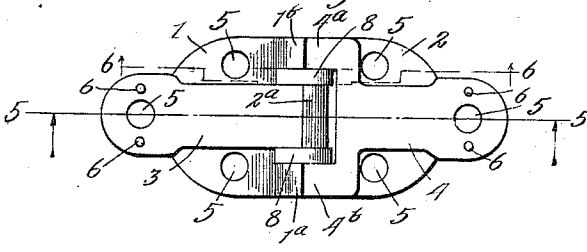


Fig. 3.

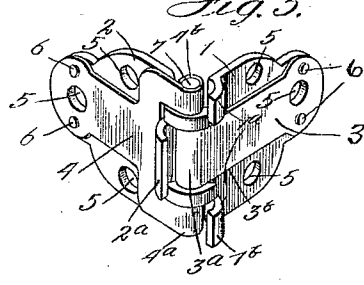


Fig. 5.

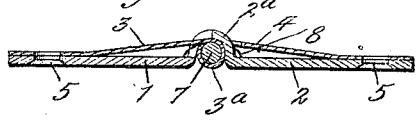
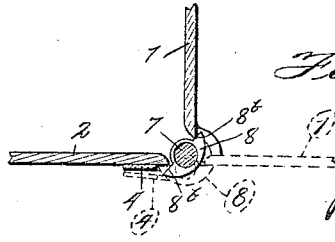


Fig. 6.



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Inventor:

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by Brown & Brown
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R. R. BROWN.

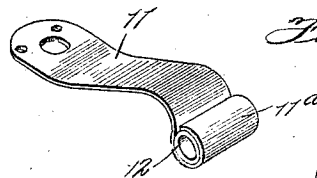
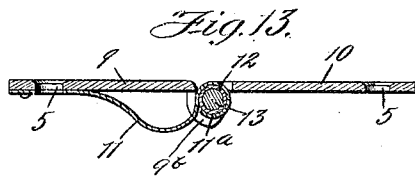
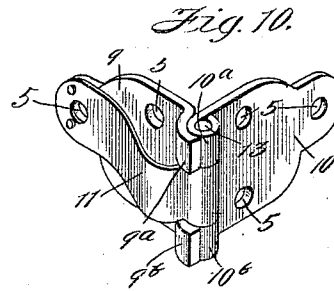
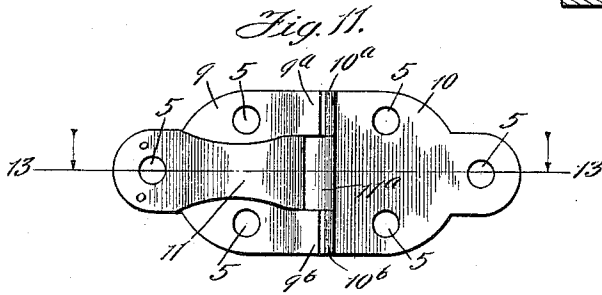
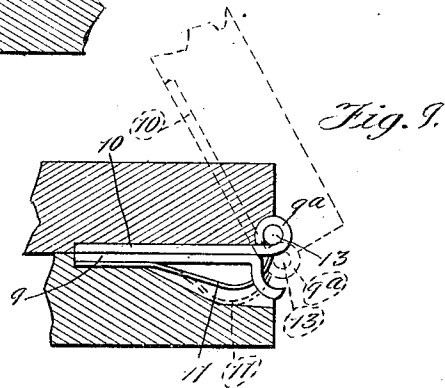
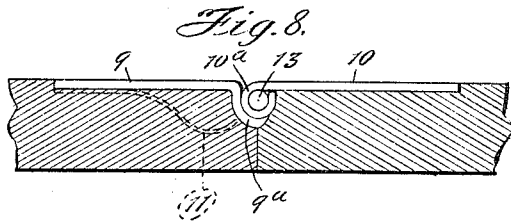
HINGE.

APPLICATION FILED APR. 1, 1907.

971,723.

Patented Oct. 4, 1910

2 SHEETS-SHEET 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

RICHARD R. BROWN, OF BELVIDERE, ILLINOIS, ASSIGNOR TO NATIONAL SEWING MACHINE COMPANY, OF BELVIDERE, ILLINOIS, A CORPORATION OF ILLINOIS.

HINGE.

971,723.

Specification of Letters Patent.

Patented Oct. 4, 1910.

Application filed April 1, 1907. Serial No. 365,864.

To all whom it may concern:

Be it known that I, RICHARD R. BROWN, a citizen of the United States, residing at Belvidere, in the county of Boone and State of Illinois, have invented certain new and useful Improvements in Hinges, of which the following is a full, clear, and exact specification.

The invention relates to hinges, and has for its primary object to provide an improved form of hinge adapted particularly for use in tables and other cabinet work in which it is desired to pivotally connect the members in such a manner that they may be folded flat together, and when in an extended or open position it may present a smooth plain surface, the pintle or knuckle of the hinge being depressed below the level of the surface of the hinge members when in such extended or open position.

A common use to which a hinge of this general class is applied is to pivot the folding leaf to the table top of a sewing machine. In constructions of this character it is found that the opening of the hinged portion of the leaf or top often results in a straining on the hinges due to the inertia of the hinged member, and a further object of the present invention is to provide an improved hinge of the class described that is capable of exerting an elastic check on the pivoted or hinged member, thus checking the inertia of the same and reducing the liability of straining or breaking the hinges and their connections.

In the folding portions of table tops of the character described, when the parts fold flat in the manner described, it is often found that the parts coming together with considerable force in closing is injurious to the finish and objectionable for other reasons, and a further object of the invention is to provide an improved form of hinge of the class described which is capable of exerting an elastic tension to check the inertia of hinged members in being folded together.

To the attainment of these ends and the accomplishment of other new and useful objects as will be apparent, the invention consists in the combination and arrangement of the several parts as hereinafter more fully

described and claimed and shown in the accompanying drawings, in which;—

Figure 1 is a side elevation of a hinge embodying the invention and showing the same applied to members, the hinged members being shown in extended or open position. Fig. 2 is a view similar to Fig. 1, the hinged members being folded flat upon one another. Fig. 3 is a perspective view designed to show the relative arrangement of the operative parts. Fig. 4 is a bottom plan view. Fig. 5 is a longitudinal sectional view taken on line 5—5 of Fig. 4. Fig. 6 is a longitudinal sectional view taken approximately on line 6—6 of Fig. 4, the leaves of the hinge being at right angles to show the relative movement of the working parts. Fig. 7 is a detailed perspective view of one of the locking members on the pintle. Figs. 8 to 13 inclusive illustrate a modified form of the invention provided with elastic means adapted to check the closing flat of the leaves of the hinge, Fig. 8 being a side elevation of the hinge showing it attached to hinged members in cross-section; Fig. 9 is similar to Fig. 8, showing the hinged members folded flat upon each other, the mode of operation of the device being shown by the portions in dotted lines; Fig. 10 is a perspective view of this modification of the invention designed to show the relative arrangement of the various operative parts. Fig. 11 is a bottom plan view. Fig. 12 is a perspective view in detail of the elastic member secured to one of the leaves. Fig. 13 is a longitudinal sectional view taken on line 13—13 of Fig. 11, looking in the direction indicated by the arrows.

In the preferred form of the device as illustrated in Figs. 1 to 6 inclusive, the leaves of the hinge are indicated by the numerals 1 and 2. These leaves are similar in form and are provided with screw holes 5 or other suitable means for attaching the hinge to objects.

In order to secure the desired result, which is one of the objects of the invention, namely, to produce a hinge having leaves capable of being folded in one direction flat upon each other and at the same time having the pintle or knuckle portion depressed upon the sur-

face of the leaves when in extended position, that is, one lying at an angle of 180° to the other, it is necessary to provide one or both of the leaves with a movable or shifting knuckle capable of being shifted in relation to one or both of the leaves of the hinge. For this purpose the elastic leaf springs 3 and 4 are firmly secured to the leaves 1 and 2 by rivets 6, or by other suitable means. The knuckles forming the hinge connection between the leaves may be of any desired number and in any desired arrangement, but in this embodiment elastic member 3 is provided at its inner end with a knuckle 3^a , and the elastic member 4 on the leaf 2 is bifurcated and the inner end of each branch thereof provided with knuckles 4^a and 4^b located as shown adjacent to the exterior sides of the leaves and adapted to take the knuckle 3^a between them. The knuckles 4^a , 4^b and 3^a are each provided with suitable sockets, such sockets being arranged in line forming the pivotal axis of the hinge and adapted to take a suitable pintle 7. The springs 3 and 4 being secured to the under side of the leaves 1 and 2 have the knuckles 3^a , 4^a and 4^b formed integrally therewith by forming the material in the required shape on the upper side thereof as illustrated. This brings the knuckles normally flush with the under side of the leaf springs, and if the pintle be of approximately the size shown in the illustrations and the thickness of the material in the leaves 1 and 2 be as illustrated, the knuckles will extend normally somewhat above the upper surface of the leaves 1 and 2. Sufficient space is preferably provided between the interior knuckle 3^a and the exterior knuckles 4^a and 4^b to permit of the insertion of one or more pintle-operating members 8, one of such members being preferably provided at each end of the knuckle 3^a . These pintle-operating members are provided with a suitable perforation 8^a for securing them on the pintle 7 and also have extended lugs or bosses provided with stop surfaces 8^b preferably situated in the same plane or approximately 180° apart and adapted to bear against corresponding surfaces on the leaves 1 and 2, providing stops against which the leaves contact when in open or extended position and which also operate in conjunction with the leaves 1 and 2 to depress the pintle by flexing the leaf springs 3 and 4 and their corresponding knuckles as hereinafter described. To furnish means of supporting the shifting joint embodying the pintle and knuckles as described, the leaves 1 and 2 are provided with suitable integral depending members 1^a , 1^b and 2^a . These last mentioned members may be of any desired number, but it is preferable that one such member be provided on each leaf

to cooperate with each of the knuckles appearing on the leaf spring of the opposite leaf of the hinge. Thus, the leaf 1 is provided with two such depending supports cooperating with the knuckles 4^a and 4^b , while the leaf 2 is provided with a central depending member 2^a cooperating with the knuckle 3^a . These members 1^a , 1^b and 2^a are curved to conform to the exterior surface of their cooperating knuckles and are in the form of a segmentally curved surface comprising about 90° of the complete circumference.

The operation of the hinge is as follows: The leaf springs 3 and 4 are normally held flush with the under side of leaves 1 and 2, thus placing the pintle and the knuckles in the position in which these parts are found in the ordinary leaf hinge which is capable of being folded flat, and if the pintle should remain in this position in relation to each of the leaves of the hinge and the leaves would be permitted to open to an angle of 180° , the pintle would project above the upper surfaces of the leaves, as in ordinary constructions. It will be seen, however, that the relation of the parts will not permit the leaves to open farther than approximately 90° , as clearly illustrated in Fig. 6, and when the leaves reach this position, the surfaces 8^b on the pintle-operating member 8 contact with their corresponding surfaces on the leaves. If, then, the leaves be further separated, the result will be that the pintle 7 will be depressed, which will result in flexing the leaf springs carrying the knuckles. This depression of the pintle in relation to the leaves will continue until the knuckles are brought to bear against the rigid depending supports or lips 1^a , 1^b and 2^a on the leaves which will form a permanent stop against further opening of the hinge. It will thus be seen that the hinge acts normally to open or close the leaves approximately between zero and 90° , while the elasticity of the leaf springs is exerted in depressing the pintle as the opening continues from approximately 90° to 180° , and when the limit of 180 degrees is reached, the pintle will be depressed until it is flush with the upper surfaces of the leaves 1 and 2, and this depression of the pintle under the elastic pressure of the leaf springs 3 and 4 may be utilized for the purpose of furnishing a check to overcome the inertia of the movable part carried by the hinge when the said part is operated in opening carelessly or hurriedly.

In the modification of the invention as illustrated in Figs. 8 to 13 inclusive, the leaves of the spring are indicated by the reference numerals 9 and 10. In this embodiment of the hinge, leaf 10 is the female portion of the hinge and is provided with the knuckles 10^a and 10^b , these knuckles prefer-

ably being formed integrally with the leaf and separated as indicated in order to take the knuckle on the leaf 9. The knuckle on the leaf 9 is not formed integrally there-
 5 with as the knuckles on the leaf 10, but in order to secure the desired result of a shifting pintle, a suitable leaf spring 11 is secured to the leaf 9 and provided at its inner end with the knuckle 11^a. In this form of
 10 the invention, it is preferable that the knuckle 11^a be provided with an interior bushing 12, to furnish a more suitable bearing for the pintle 13 which also extends to the knuckles 10^a and 10^b, thus pivotally se-
 15 curing the leaves of the hinge together. Leaf 9 is provided with suitable depending integral lips or supporting members 9^a and 9^b adapted to cooperate with the knuckles 10^a and 10^b. In this modification of the inven-
 20 tion it is necessary that the leaf spring 11 be normally deflected from the leaf 9 as shown in the illustration (see Figs. 8, 9 and 13), and it will be apparent in this construction the pintle is normally depressed below the
 25 plane of the upper surfaces of the leaves of the hinge. By the use of this modification of the invention, therefore, when the leaves of the spring are opened 180 degrees as illustrated in Fig. 13, the leaf spring 11 is in
 30 normal position. But it will be seen that if the pintle were permanently fixed in its position, it would be impossible to close the leaves of the hinge as illustrated in Fig. 9, for the upper surfaces of the leaf 10 will
 35 bind against the upper surfaces of the leaf 9 when the leaves are brought in a relation a little less than 90 degrees apart. As the closing of the leaves continues, the contacting surfaces of the leaves adjacent to the pintle
 40 will raise the pintle out of its socket in contact with the depending leaves 9^a and 9^b against the elastic tension of the leaf spring 11, and when the upper surfaces of the leaves are brought together as illustrated in Fig. 9,
 45 it will be seen that the pintle is carried entirely above the upper surface of the leaf 9.

By this construction it will be seen that the leaves of the spring are closed against the elastic tension of the leaf spring, thus
 50 providing a check which may be utilized in preventing possible injury due to the inertia of the parts carried by the hinge when such parts are closed hurriedly or carelessly.

In order that the invention might be fully
 55 understood, the details of the foregoing embodiment thereof have been specifically described but it will be apparent that many changes may be made by those skilled in the art without departing from the purpose or
 60 spirit of the invention, and

What I claim is—

1. In a hinge, the combination with a leaf, of a knuckle movably secured to the leaf, and a lip on said leaf adjacent to the

pintle of the hinge and adapted to cooperate with and support the said movable knuckle of the hinge when in open position.

2. In a hinge leaf, the combination of a knuckle movably secured to the leaf, and lips on the said leaf adjacent to the said
 70 knuckle and adapted to cooperate with the pintle of the hinge.

3. In a hinge, the combination with leaves, of knuckles movably secured to the leaves, a pintle for securing the knuckles together,
 75 and a pintle operating member journaled on the pintle.

4. In a hinge, the combination with leaves, of flexible members secured to the leaves, knuckles carried by the said flexible mem-
 80 bers, a pintle adapted to pivotally secure the said knuckles together, and lips carried by the said leaves and adapted to furnish seats for the knuckles secured to the co-
 85 operating leaf.

5. In a hinge, the combination with leaves, of elastic flexible members secured to the leaves, knuckles carried by the elastic flexible members, a pintle, and a pintle operating member journaled on the pintle and pro-
 90 vided with stops for checking the opening of the said leaves beyond a predetermined angle.

6. In a hinge, the combination with leaves, of elastically controlled knuckles movably
 95 secured to the leaves, a pintle journaled in the said knuckles, and a pintle operating member carried by the pintle and provided with stop surfaces adapted to cooperate with the leaves to shift the pintle in relation to
 100 the leaves.

7. In a hinge, the combination with leaves, of elastically controlled knuckles movably secured to the leaves, a pintle journaled in the said knuckles, a pintle operating mem-
 105 ber carried by the pintle and provided with stop surfaces adapted to cooperate with the leaves to shift the pintle in relation to the leaves, and lips on the said leaves adapted to furnish seats for the said movable
 110 knuckles.

8. In a hinge, the combination with leaves, of elastic flexible members secured thereto, knuckles carried by the said elastic flexible members, a pintle journaled in the said
 115 knuckles for pivotally securing the said leaves together, pintle operating members carried by the said pintle between adjacent knuckles, and engaging surfaces carried by the said pintle operating members and
 120 adapted to engage corresponding surfaces on the said leaves.

9. In a hinge, the combination with leaves, of elastic flexible members secured thereto, knuckles carried by the said elastic flexible
 125 members, a pintle journaled in the said knuckles, pintle operating members cooperating with the knuckles and with the said

leaves by which the said knuckles are shifted
in relation to the leaves, and integral lips
carried by the leaves adjacent to the
knuckles and adapted to furnish seats there-
5 for.

In testimony whereof I have signed my
name to this specification, in the presence

of two subscribing witnesses, on this 26th
day of March A. D. 1907.

RICHARD R. BROWN.

Witnesses:

WILLIS L. BROWN,
JOHN W. ELDREDGE.