April 6, 1943. G. W. ALDEEN 2,315,488

HINGE CONSTRUCTION AND METHOD OF MAKING SAME

Filed March 13, 1940

Fig. 1.

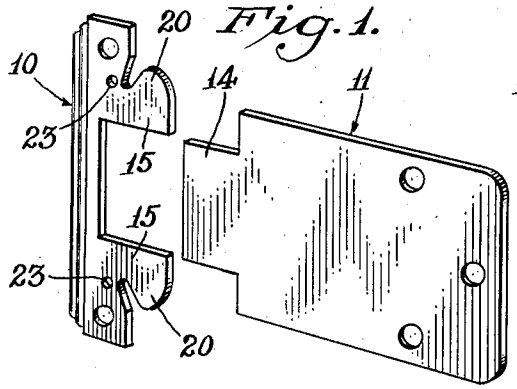


Fig. 2.

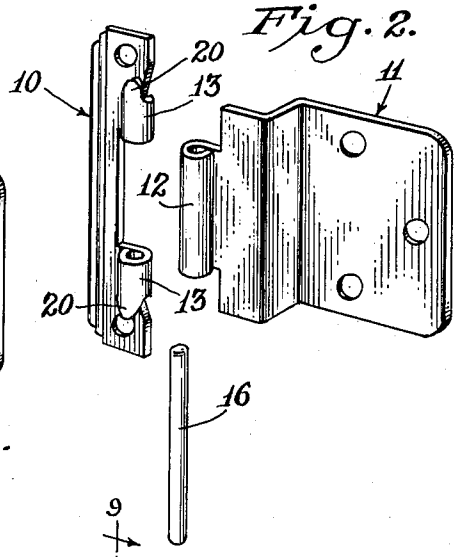


Fig. 3.

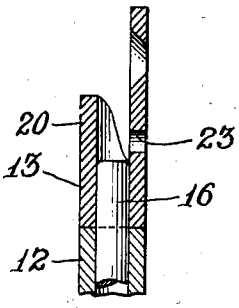


Fig. 4.

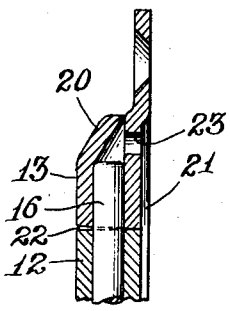


Fig. 8.

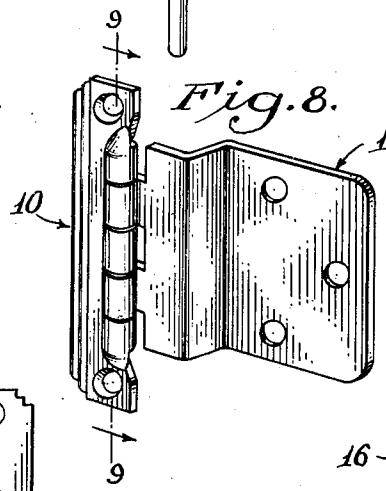


Fig. 5.

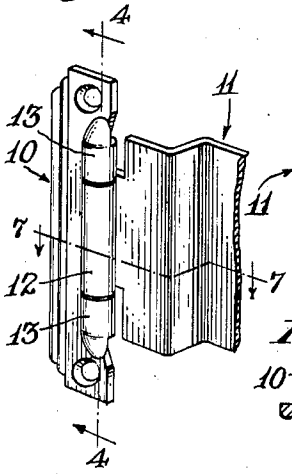


Fig. 6.

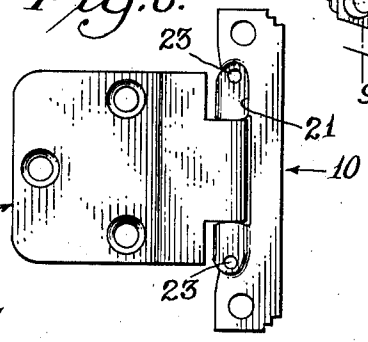


Fig. 7.

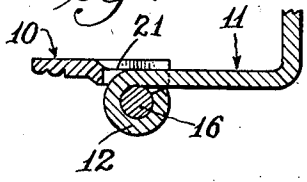
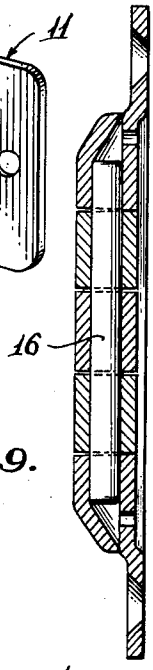


Fig. 9.



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HINGE CONSTRUCTION AND METHOD OF MAKING SAME

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Application March 13, 1940, Serial No. 323,729

5 Claims. (Cl. 29—11)

The invention relates generally to hinges and more particularly to hinges made of sheet metal.

The general object of the invention is to provide a novel hinge made of sheet metal, the leaves of which are secured together by a permanently retained pin, which is of inexpensive construction, and which is of relatively strong construction.

More specifically it is an object to provide a novel sheet metal hinge having a single full length hinge pin which is permanently held in position, and which is of plain construction to facilitate assembly of the parts and to hold the cost thereof to a minimum.

Another of the principal objects of the invention is to so construct the hinge that the only operation remaining to perform in the manufacture of the hinge, after the two leaves of the hinge are joined, is a simple pressing operation.

Still another object is to so construct the hinge that closed-end pockets or knuckles are formed for the hinge pin to permanently retain the pin in place, without utilizing any drawing operation in the formation of such pockets.

A further object is to so construct the hinge that, when painted, the paint will not chip off or crack at adjacent edges of the knuckles of the respective leaves.

A still further object is to provide a novel hinge construction with closed-end pockets for the hinge pin and with a normally concealed means provided for draining any solution which may collect in the pockets during plating of the hinge.

It is also an object to provide a novel method of making a sheet metal hinge.

Other objects and advantages will become apparent from the following description, taken in connection with the accompanying drawing, in which:

Figure 1 is a perspective view of the blanks from which are formed the members of a hinge embodying the features of the invention.

Fig. 2 is a perspective view of the hinge members ready for assembly to each other.

Fig. 3 is an enlarged fragmentary sectional view showing the hinge members after they are connected together.

Fig. 4 is an enlarged fragmentary sectional view similar to Fig. 3 taken on the line 4—4 of Fig. 5.

Fig. 5 is a perspective view of the complete hinge.

Fig. 6 is a rear view of the complete hinge.

Fig. 7 is an enlarged transverse section taken on the line 7—7 of Fig. 5.

Fig. 8 is a perspective view of a modified form of hinge.

Fig. 9 is an enlarged sectional view taken on the line 9—9 of Fig. 8.

A hinge of the character herein disclosed is made of sheet metal and is adapted for such uses as for doors of sheet metal or wood cabinets. In the particular form illustrated herein the hinge is of the type known as a semi-concealed hinge, that is, a hinge having one leaf adapted to be exposed to view when the door is closed, which leaf may, if desired, have some form of decoration upon it, and a second leaf adapted to be mounted on the door in such a way as to be concealed from view when the door is closed. Because of the market in which cabinets of this type are sold, it is desirable to manufacture the hinge at the lowest possible cost. Moreover, it is desirable to have as strong a hinge as possible, particularly in view of the fact that the leaf or member mounted on the frame of the door is usually of relatively narrow construction.

The hinge illustrated herein, which is designed to meet the foregoing requirements, has one member, indicated generally at 10, adapted to be secured to the frame of the door. It will be noted that this member is of relatively narrow construction and is also provided with some decorative features since it is exposed to view at all times. The other leaf or member, indicated at 11, is adapted to be attached to the door so that it is in a concealed position when the door is closed. Consequently the leaf 11 may be bent to fit along the edge of the door, and if desired it may extend to be secured to the rear face thereof.

Since it is desirable to make the hinge as strong as possible, a full length pin is utilized, rather than a pair of pins, and such full length pin is permanently held in place so that it cannot work loose from either of the members. Moreover, the pin is of plain cylindrical construction, which costs much less than a headed pin. The leaves or members are so constructed as to hold the pin permanently in place, that is, by providing abutments at the ends of the pin after the pin is inserted. One of the chief features of the invention lies in the formation of such abutment or closure for the ends of the pin without necessitating any drawing operation in the manufacture of the hinge members.

Heretofore the manufacture of the hinge member or leaf having the outer or end knuckles in-

cluded a drawing operation by which the pockets or knuckles for the ends of the pin were formed. Because of the character of a drawing operation, and particularly when such an operation is performed on a relatively narrow piece of metal such as the hinge member 10, a trimming operation had to be performed on the member after the drawing operation. Obviously this added to the cost of manufacture not only because of the waste of material, but chiefly because of the increased labor cost.

The present invention provides a hinge having closed-end pockets or knuckles on the member 10 in order to retain the pin in place, but in the manufacture of this member no drawing operation is required, thus materially reducing the cost. The invention also contemplates plating the hinge if desired after it is assembled, and the closed-end knuckles are so constructed that the solution utilized in plating will readily drain from such knuckles.

Cabinets on which hinges of this type are used are often painted. If the hinge is also painted, with the usual form of hinge, the paint tends to cover over the knuckles of the respective leaves or hinge members in such a way that when the door is first moved after the paint has dried, the paint will tend to chip off and break away from the edges of adjoining knuckles. Obviously this gives an unsightly appearance to the hinge, and it may occur even before the cabinet leaves the factory. The hinge herein disclosed provides sufficient gap between the knuckles of the respective hinge members on the outer face thereof so that the paint when applied will not tend to bridge over from one knuckle to the other. Thus when the hinge members are first moved relative to each other, there is no chipping or cracking off of the paint.

In Figs. 1 to 7, inclusive, I have illustrated a hinge of the so-called three-knuckle type, that is, a hinge one member of which has two spaced knuckles, and the other hinge member has a single knuckle therebetween. As is clearly shown, particularly in Fig. 5, the hinge member or leaf 11, which is adapted to be attached to the door, has a knuckle 12 located between and in line with a pair of knuckles 13 on the hinge member 10. In forming the hinge member 11, a flat blank is punched out and is provided with a tongue or extension 14, as shown in Fig. 1. The extension 14 is then rolled upon itself, as is clearly shown in Fig. 2, to form the knuckle 12. In the same operation, the hinge member 11 may be bent to fit the door. In the present instance two right angle bends are placed in the member 11, as illustrated in Fig. 2.

In making the hinge member 10, a flat blank is first punched with a pair of extensions 15 which are rolled reversely over the front face of the base portion of the member 10 to provide the knuckles 13. Decorative forms and holes for retaining devices such as screws or rivets may be made on the member 10 simultaneously with punching the blank.

Each knuckle 13 on the member 10 after being rolled to the form illustrated in Fig. 2 is of course open at both of its ends so that the hinge pin, indicated at 16, may be inserted. The two leaves are then placed together and the pin 16 inserted from one end to hold the knuckle 12 between the two knuckles 13.

It will be noted that the operations thus far include no drawing operation, and that all the steps in the manufacture are punching and rolling operations. Such operations are of a simple character and may be performed with a minimum of cost, particularly because many of them may be performed simultaneously.

The finished hinge is so constructed as to permanently retain the pin 16 in place, and to this end the outer ends of the knuckles 13 are closed after the pin has been inserted. To accomplish this result, each extension 15 is provided with a lobe-shaped portion or tongue 20 at its outer end which is so located as to extend endwise from the outer face of the knuckle 13, as is shown in Fig. 2. After the pin is inserted, the hinge may be completed merely by pressing or bending down the portions 20 over the respective ends of the pins 16 and against the base portion of the hinge member 10, the result of which operation is apparent from an inspection of Figs. 3 and 4. The portions 20 thus retain the pin in place and close the pockets within the knuckles 13. The portions 20 may be shaped in any manner to provide the desired form after they are bent over the ends of the pin. One common form of hinge ends is a bullet shape, and to this end the portions 20 are initially given an ogival form, as is clearly apparent in Fig. 1.

Another feature of the invention resides in so forming the hinge that the movable member 11, which is attached to the door, will not contact the frame of the door and consequently will not mar it. To this end, the rear face of the knuckles 13 are offset slightly forwardly from the rear face of the member 10, as indicated at 21, so that the member 11 will be held in spaced relation to the door frame by the amount of the offset. Since such offset may be made by a simple pressing operation, it may be performed in the same dies simultaneously with the bending of the end portions 20 over the ends of the pin. Thus this added feature may be embodied in the hinge without increasing the cost of manufacture.

As mentioned above, another feature of the hinge is that it may be painted and the painted surface of the knuckles will not chip off or crack the first time the door is moved. It is of course essential in any hinge to have the knuckles fit closely endwise of the hinge to prevent endwise play of the door. Usually the adjoining end faces of the knuckles of a hinge are made parallel and in substantial contact. The paint when applied to such a hinge obviously covers over the crack between the adjoining knuckles and upon relative movement of the hinge members such paint chips off, the chipping extending back over the knuckles for some distance from the intervening crack, giving the hinge an unsightly appearance.

To avoid the foregoing difficulty in painting a hinge and yet to provide a hinge in which there is no undue play between the knuckles of the respective hinge members, a gap of substantial size is provided between adjoining knuckles at the front face thereof in the finished hinge. At the same time no such gap is permitted between the adjoining end faces of the knuckles at the rear of the hinge. Play is thus avoided. To provide a gap of this character, the entire knuckle 13, at the time that the end portion 20 is bent over the end of the pin, is slightly deformed by the same operation to form a tapering gap, as illustrated at 22 in Fig. 4. When a hinge of this construction is painted the paint will not bridge over the gap 22, and consequently when the door is swung, there will be no chipping off of the paint at the front face of the adjoining knuckles. Thus the neat painted appearance is retained.

In the case of a plated hinge, the pockets within the knuckles 13 are closed by the pin 16 and, since the plating is done after the hinge members are assembled, means is provided to permit the solution utilized in plating to readily drain therefrom. To this end, small holes 23 are punched through the base portion of the member 10 underlying the ends 20. Thus when the hinge is dipped in the plating solution, none of such solution will be retained within the knuckles 13.

As illustrated in Figs. 8 and 9, a hinge of this construction lends itself to the five knuckle type in which three knuckles are provided on a hinge member 10 and two knuckles on the hinge member 11. In this type of hinge the end knuckles on the member 10 are of the same construction as those heretofore described, while the intermediate knuckle on the member 10 is of the simple rolled construction.

From the foregoing it will be apparent that I have provided a novel sheet metal hinge in which the hinge pin is permanently retained in place. The hinge is of a very inexpensive construction and yet its parts have a maximum strength. Thus the utilization of a single full length pin adds to the strength of the narrow hinge member. As to the cost of manufacture, all of the operations required are simple and many may be performed simultaneously. Particularly it is apparent that no drawing operation is required in the manufacture of the hinge. The hinge is also constructed so that it may be painted without danger of the paint chipping off when the hinge members are first moved relative to each other. It will also be apparent that I have provided a novel method of making a sheet metal hinge.

I claim as my invention:

1. The method of making a sheet metal hinge, which comprises punching a blank for one leaf provided with spaced portions adapted to be rolled to form pockets for receiving the ends of a pin with lobe-shaped portions extending beyond said ends of the pin, placing a rolled knuckle portion of a second leaf between said pockets, inserting a pin into said pockets and said knuckle portion, and bending said lobe-shaped portions over the ends of the pin and by the same operation deforming each of said pocket portions so that the end face thereof is out of parallelism with the adjacent end face of the knuckle portion to provide a relatively wide gap therebetween at the front of the hinge.

2. The method of making a sheet metal hinge, which comprises punching a blank for one leaf provided with spaced extensions, rolling said extensions reversely over the front face of the leaf to provide a pair of pockets, placing a rolled knuckle portion of a second leaf between said pockets, inserting a pin into said knuckle portion and said pockets, and bending a portion of each of said extensions downwardly over the adjacent end of the pin and simultaneously offsetting said pockets forwardly from the plane of said one leaf whereby the second leaf will be held out of contact with the surface on which said one leaf is mounted.

3. A sheet metal hinge comprising a pair of leaves, one leaf having a pair of spaced knuckles between which the other leaf fits, and a pin extending through said knuckles to connect the two leaves, the outer ends of said knuckles having portions bent against said one leaf to retain the pin in place, said knuckles being offset forwardly from the rear face of said one leaf whereby the other leaf is held out of contact with the surface on which said one leaf is mounted.

4. A sheet metal hinge comprising a pair of leaves, one leaf having a pair of spaced knuckles and the other leaf having a knuckle fitting therebetween, the adjacent end faces of each of said spaced knuckles and the knuckle on the other leaf diverging from the rear toward the front to provide a gap between said faces at the front or outer face of the hinge whereby the hinge may be readily painted without the paint bridging over the gap and later peeling off upon turning the hinge.

5. A sheet metal hinge comprising a pair of leaves, one leaf having a pair of spaced knuckles and the other leaf having a knuckle fitting therebetween, and a pin connecting said leaves, the outer ends of said spaced knuckles having portions bent over the ends of the pin and closing said knuckles, said one leaf having a pair of holes through the back of the respective knuckles opening into the interior thereof to provide for drainage of plating solution.

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