April 16, 1935. J. T. ATWOOD 1,998,301

METHOD OF MAKING HINGES

Filed Sept. 2, 1932

Fig. 1

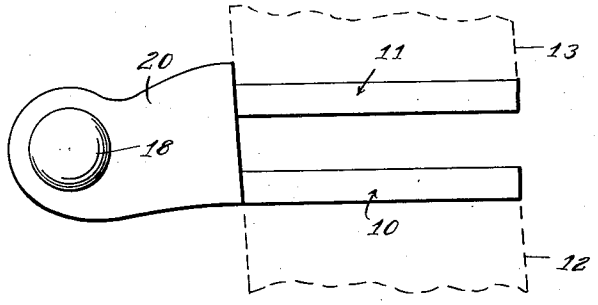


Fig. 2

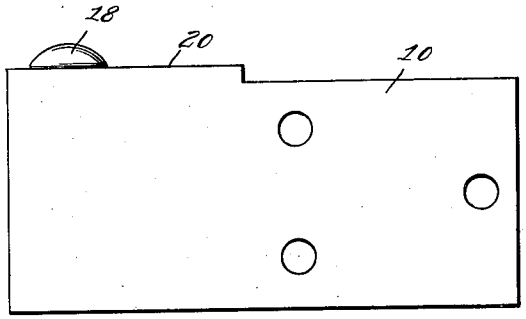


Fig. 5

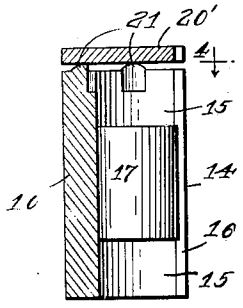


Fig. 3

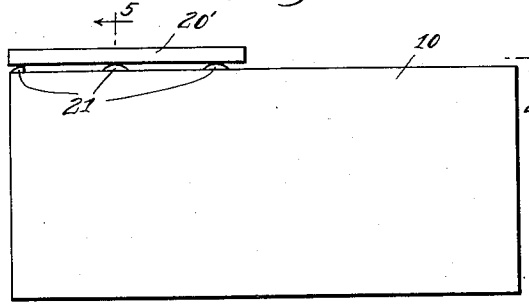
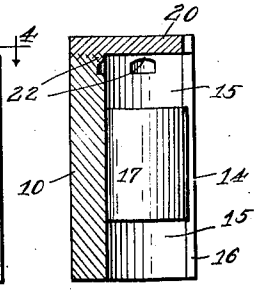


Fig. 6.



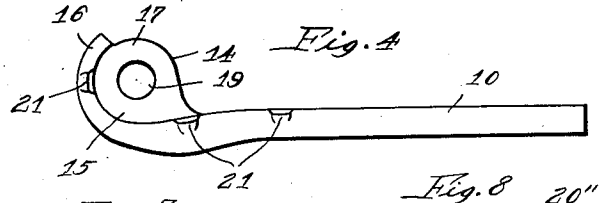


Fig. 4

Fig. 7

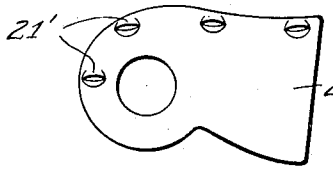
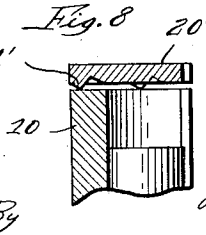


Fig. 8



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UNITED STATES PATENT OFFICE

1,998,301

METHOD OF MAKING HINGES

James T. Atwood, Rockford, Ill.

Application September 2, 1932, Serial No. 631,545

1 Claim. (Cl. 29—11)

This invention relates to a covered joint hinge adapted for use in the mounting of automobile doors, and the novel method of making the same.

This invention is an improvement on that disclosed in my application, Serial No. 327,506, filed December 21, 1928. In that application the outer hinge member is formed from flat bar stock with one end curled to provide the curved cover portion, and a pair of stamped sheet metal plates are welded to the opposed edges of the curled end by projection welding, the projections for the welding operation being left on the blank in a punching operation, in which the edges of the blank at the end to be curled are cut away for the accommodation of the plates which are to form the cover flanges. According to the present invention, the body portion of the outer hinge member is in the form of a blank cut from bar stock rolled to the desired cross-section, whereby to provide an enlarged end portion in which a hole may be provided for the hinge pintle and in which recesses may be milled to accommodate the knuckles of the inner hinge member, a single cover plate being welded to the upper edge of the blank by means of projections struck out or extruded preferably from the body portion of the outer hinge member, along the edge thereof, from the inner side. In that way the metal for the welding projections is derived from the body portion without any expensive operations being involved and in such a way that the smooth external surface of the body portion remains unchanged.

The invention is illustrated in the accompanying drawing, in which—

Figure 1 is a plan view of a covered joint hinge, the outer member of which is made in accordance with the present invention;

Fig. 2 is a side view of Figure 1;

Fig. 3 is a view indicating how the cover plate is arranged to be welded by projections to the body portion of the outer hinge member;

Fig. 4 is a view of the body portion of the outer hinge member taken on the line 4—4 of Fig. 3;

Fig. 5 is a cross-section on the line 5—5 of Fig. 3;

Fig. 6 is a cross-section similar to Fig. 5 but showing the plate welded to the body portion;

Fig. 7 is a bottom side view of a cover plate of a modified or alternative construction in which the projections are formed on the plate instead of on the body portion of the hinge member, and

Fig. 8 is a view similar to Fig. 5 indicating how this plate is arranged to be welded to the body portion.

Similar reference numerals are applied to corresponding parts throughout the views.

The hinge comprises an outer hinge member 10 and an inner hinge member 11 fastened by screws to the door frame 12 and door 13, respectively. Both hinge members have the main body portion provided by a blank cut from bar stock rolled to the desired cross-section, the general shape in longitudinal cross-section of the outer hinge member being evident in Fig. 4. The outer hinge member is milled out on the inner face thereof at the enlarged end 14 at the two points 15 to provide knuckle recesses, a circular milling tool being used and sufficient stock being left at the end of the milling operation to provide a cover 16 for each of the recesses. The recesses are of sufficiently larger radius than the enlarged end of the inner hinge member 11 to afford ample operating clearance when the knuckles of the inner hinge member are received in the recesses 15 and connected with the middle knuckle 17. Needless to state, there are two knuckles on the inner hinge member which when entered in the recesses 15 will have a close working fit on the ends of the knuckle 17. While a three-knuckle hinge is shown, it will be evident that the number might be different. The hinge pintle indicated at 18 has a drive fit in registering holes in the knuckles of the inner hinge member 11, and a close working fit in a registering hole 19 provided in the knuckle 14.

It is desired to provide a hinge of this construction with a top flange or cover plate as appears at 20 in Figure 1, to cover the projecting portions of the hinge members for protection against dirt and water, as well as to make for neatness in appearance. The top flange or cover plate prevents dirt and water from getting into the pintle bearing and interfering with the easy operation of the hinge. In winter time where the presence of water might mean the freezing together of the hinge members, it is evident that it is doubly important to give the hinge this protection. I am aware that stamped sheet metal hinges have been made providing a top flange or cover plate by forming the flange with the body portion from a single piece of sheet metal, but the objection to that sort of construction is that the body portion is then necessarily of as light weight material as the flange, and is accordingly weak and apt to bend out of shape under the shocks and strains of service. Other constructions have also been proposed in which the flange was provided as a separate part formed up from sheet metal in a special way to be fitted over the end of the

body member and fastened in place, but there again, the objection was weakness, and, furthermore, the expensiveness and poor appearance of the hinge, so that hinges of that design have not been adopted commercially. According to my invention, the body member for the outer as well as the inner hinge member may be produced from a blank cut from bar stock rolled to the desired cross-section, as above described so as to insure the desired strength, rigidity, and serviceability, and the top flange or cover plate is added to the outer hinge member simply by the welding thereon of a plate 20' of sheet metal. It is a problem to weld the plate to the hinge member without affecting the external appearance, and this is met by striking out or extruding a series of projections 21 from the inner side of the hinge member at its outer end, these projections reaching sufficiently above the plane of the edge of the hinge member, as appears in Figs. 3 and 5 to serve in the fastening of the plate to the body member by projection welding. Such welds are indicated at 22 in Fig. 6. The projections are, of course, instantly fused and the metal caused to blend with the metal of the plate, the slight burr or flash formed in the welding being usually not sufficient to project to any serious extent, if at all, from the cavities in the body portion resulting from the forming of the projections. It is usual to apply pressure on the plate up to about four thousand pounds during the welding operation and thus insure a tight joint. The plate is accurately located with the hole therein in proper alignment with the pintle hole 19 for obvious reasons. After the welding operation, the outside of the hinge member is ground smooth, and in that way the outer edge of the plate 20' is made absolutely flush with the outside of the body member and all trace of any actual joint between the plate and body member is obliterated, so that the resulting flange 20 appears to be an integral part of the body member.

While I have described above the formation of the projections 21 on the body member, it will be evident that these projections may be formed on the plate instead, inwardly spaced from the outer edge thereof so that after the weld is made, there will be nothing to show on the outside of the hinge. For that reason, I have shown in Figs. 7 and 8 a series of projections 21' on a plate 20'' struck up by means of a chisel or other tool sufficient to permit welding of the plate to the body member by projection welding, similarly as in the other form.

It is believed the foregoing description conveys a good understanding of all of the objects and advantages of my invention. The following claim has been drawn so as to afford a degree of protection commensurate with the improvements described.

I claim:

The method of producing a cover flange on an outer member of a covered joint hinge, which consists in taking a previously forged, straight-edged, hinge member which has been machined to provide smooth internal knuckle recesses and bearing surfaces to receive the knuckle portions of an inner hinge member, and taking a sheet metal plate member previously formed to fit on the knuckle end of the hinge member with the outer edges of said members in registration, then raising projections from the straight edge of the hinge member by forcing a die into the machined inside surface next to the straight edge to form internal recesses adjacent the projections, so that the outside surface is left unmarred and the projections are in inwardly spaced relation to the aforesaid registering outer edge, then placing the plate member on and in register with the hinge member, and by the application of pressure and simultaneous passage of electric current, welding the plate member to the hinge member at the projections and forcing projected metal back into the recesses so that the plate makes a closed joint with the hinge member.

JAMES T. ATWOOD.