May 14, 1940. H. E. VAN VOORHEES 2,200,311

HINGE

Original Filed March 1, 1937 3 Sheets-Sheet 1

Fig. 1

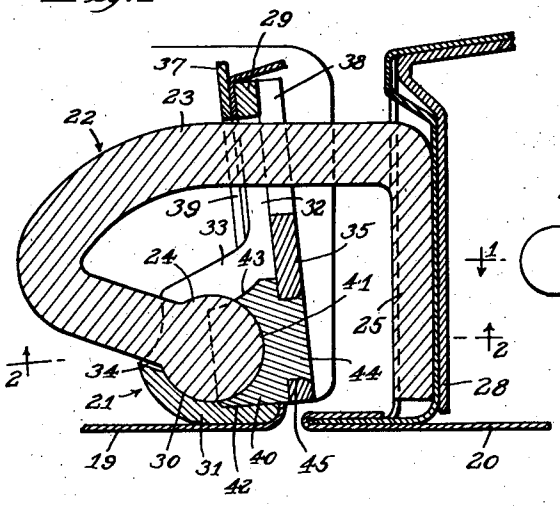


Fig. 2

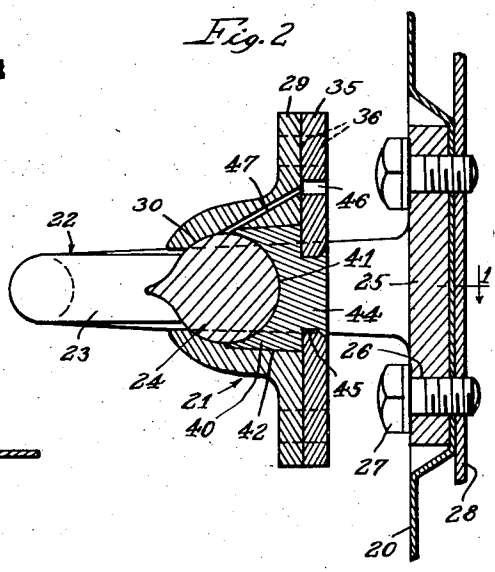


Fig. 3

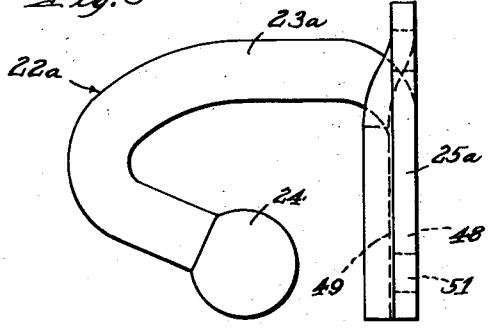


Fig. 4

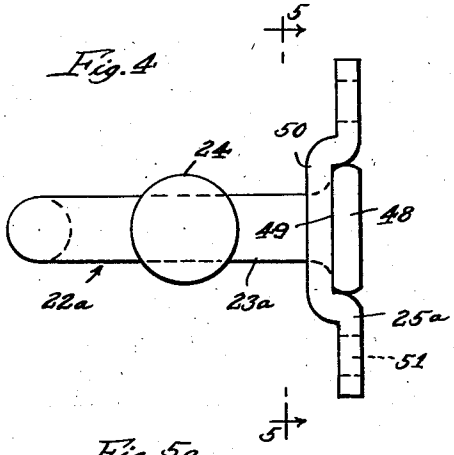


Fig. 5

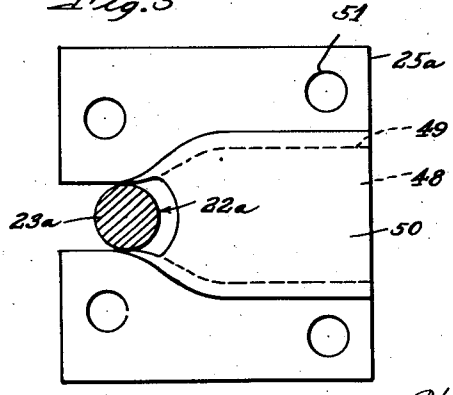
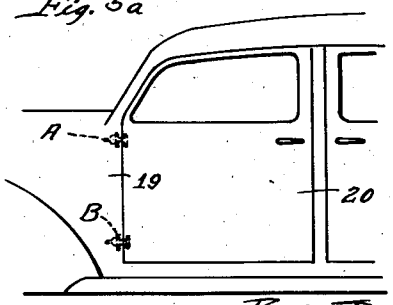


Fig. 5a



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HINGE

Original Filed March 1, 1937 3 Sheets-Sheet 2

Fig. 6

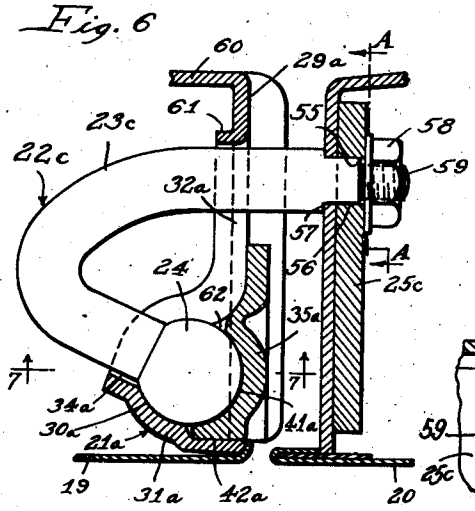


Fig. 11

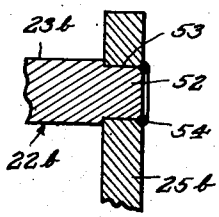
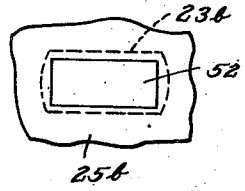


Fig. 12



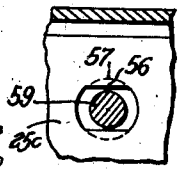


Fig. 6a

Fig. 7

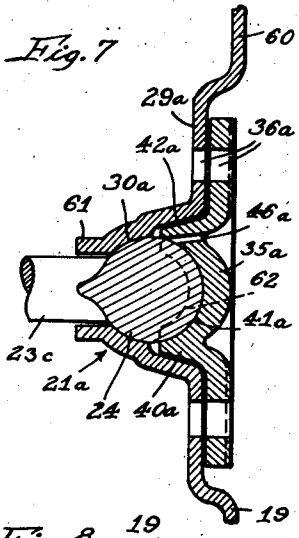


Fig. 9

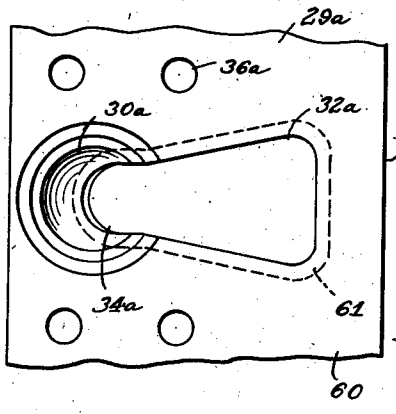


Fig. 10

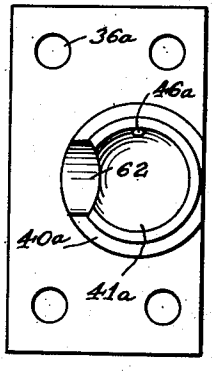
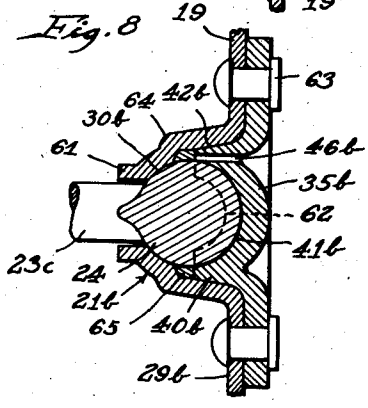


Fig. 8



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May 14, 1940. H. E. VAN VOORHEES 2,200,311

HINGE

Original Filed March 1, 1937 3 Sheets-Sheet 3

Fig. 13

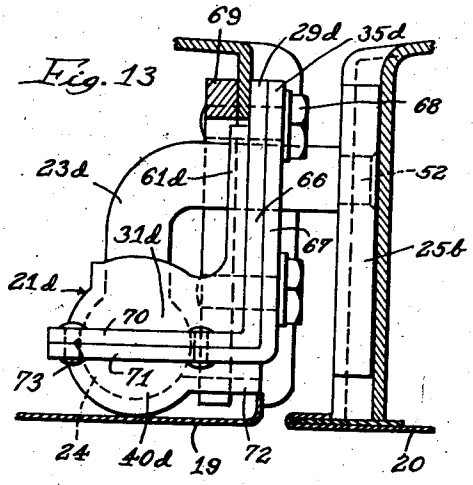


Fig. 14

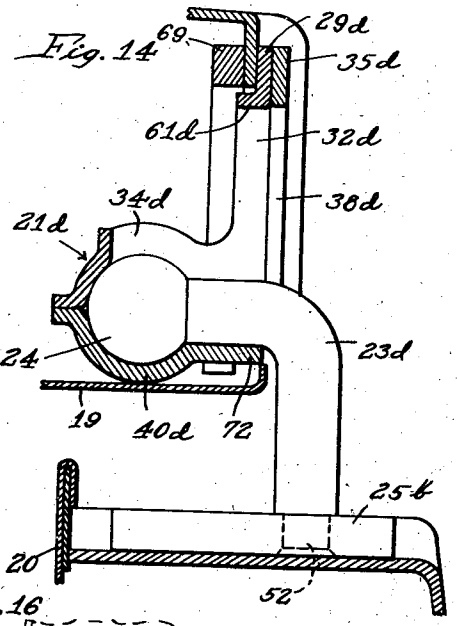


Fig. 15

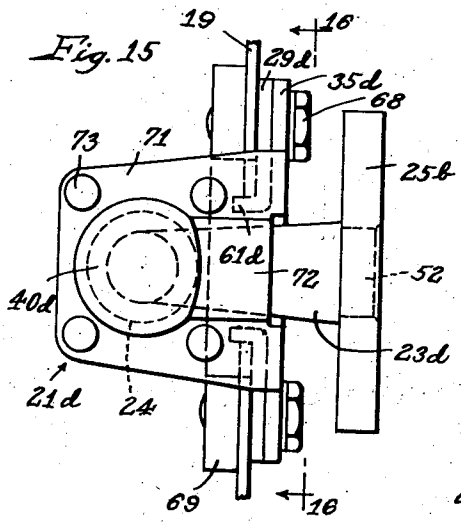


Fig. 16

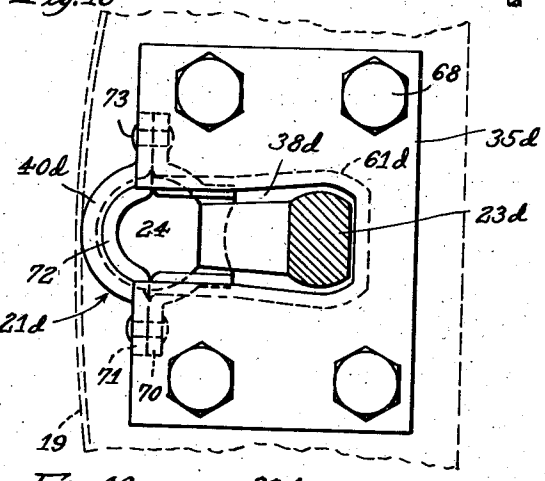


Fig. 17

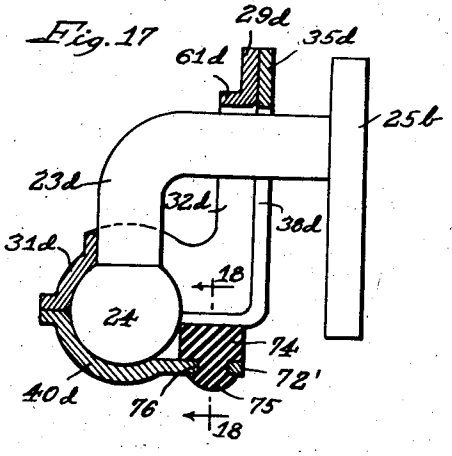
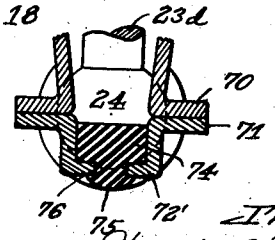


Fig. 18



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Patented May 14, 1940

2,200,311

UNITED STATES PATENT OFFICE

2,200,311

HINGE

Harold E. Van Voorhees, Detroit, Mich., assignor to The Atwood Vacuum Machine Company, a co-partnership composed of Seth B. Atwood and James T. Atwood, Rockford, Ill.

Application March 1, 1937, Serial No. 128,356
Renewed December 18, 1939

15 Claims. (Cl. 16—135)

This invention relates to improvements in concealed hinges for the doors of motor vehicles.

It is common practice to use exposed hinges of the pintle type in mounting doors on motor vehicles. Due to the curvature of the bodies and the amount of deviation from standard body specifications occurring in quantity production, there has been considerable difficulty in mounting these pintle hinges, and it has been customary to apply forked bars or other tools to the hinges and bend them enough to center the doors and align them relative to one another and to the body. This bending has been tolerated because no other way of meeting the problem has suggested itself, although it is apparent that pintles were thereby thrown out of alignment, resulting in the doors not opening and closing as they should. Also, it is generally conceded that most of the wear on pintles, and the consequent play and door rattling, is directly traceable to this practice of bending the hinges to make the doors fit. It should be obvious that, great as the problem was with exposed hinges, the difficulties would be multiplied if concealed pintle hinges were used. Nevertheless, now that automobile bodies are being made of streamline design, it becomes increasingly important to provide concealed hinges. It is, therefore, the principal object of my invention to provide a pair of ball-and-socket type concealed hinges of improved design on each door of a motor vehicle, whereby to secure easy operation of the door without any of the aforesaid difficulties in the mounting of the door on the body, whatever bending or twisting of the hinges is necessary for door alignment having no effect whatever on the easy working of the doors, because the individual balls working universally in the sockets provide point suspensions, and the two points at the two hinges determine the hinging axis of the door.

Other important objects of my invention are:

1. To provide a concealed hinge in which one member carries the socket and is slotted to provide working clearance for the gooseneck portion of the other member on the end of which the ball received in the socket is provided, preferably as an integral enlargement;

2. To provide a concealed hinge of the ball-and-socket type in which the socket member is made up of sections, part of the socket being formed on one section and the rest on another section, and the sections being made to interfit to provide an accurate bearing for the ball;

3. To provide a concealed hinge of the ball-and-socket type in which the socket member is of sectional construction, two sections being arranged to be fastened together to complete a socket therebetween, the sections being arranged to be fastened together in such a way that a predetermined spring tension is set up between the sections, whereby the ball operating in the socket is gripped resiliently and play is eliminated and an automatic take-up for wear secured;

4. To provide a hinge of the kind mentioned having rubber or other cushioning means limiting the opening of the door;

5. To provide a socket member of the kind mentioned made up of two pieces of L-shaped cross-section, one arm of which forms the attaching portion in a plane parallel to the edge of the door and the other portion carrying the socket in laterally spaced relation to the door opening, the portion of the latter arm next to the bend between the two arms serving as a limiting stop for abutment by the gooseneck and adapted to carry the bumper last mentioned, and

6. To provide a hinge of the construction last described in which the L-shaped pieces are slotted for extension therethrough of the gooseneck and at least the inner piece is flanged alongside the slot for reenforcement.

Other important objects will appear in the course of the following description in which reference is made to the accompanying drawings, wherein

Figure 1 is a horizontal section through a portion of a door pillar and door showing a concealed ball-and-socket type hinge made in accordance with my invention, this section being on the line 1—1 of Fig. 2;

Fig. 2 is a vertical section on the line 2—2 of Fig. 1;

Figs. 3 and 4 are isolated plan and front views of a gooseneck hinge member of modified form;

Fig. 5 is a front view of the retaining plate for said gooseneck member, this view being taken on the line 5—5 of Fig. 4;

Fig. 5*a* is a fragmentary side view of an automobile showing how the doors thereof appear when equipped with concealed hinges of the present invention;

Fig. 6 is a view similar to Fig. 1, showing another concealed hinge of the ball-and-socket type;

Fig. 6*a* is a section on the line A—A in Fig. 6.

Fig. 7 is a vertical section on the line 7—7 of Fig. 6;

Fig. 8 is another vertical section similar to Fig. 7, but showing a different construction;

Figs. 9 and 10 are face views of the sections of the socket member of Figs. 6 and 7, Fig. 9 being a view of the socket section formed integral with the door pillar or door, and Fig. 10 an inside view of the companion plate;

Fig. 11 is a sectional detail showing another method of fastening the shank of the gooseneck member to its attaching plate, and Fig. 12 is a back view of the attaching plate showing the flattened end of the shank attached thereto;

Fig. 13 is a view similar to Figs. 1 and 6, showing still another concealed hinge of the ball-and-socket type, the same however being shown in elevation;

Fig. 14 shows the same hinge in section with the door open;

Fig. 15 is a front view of the hinge of Fig. 13;

Fig. 16 is a side view showing the shank of the gooseneck in section on the line 16—16 of Fig. 15;

Fig. 17 is a section similar to Fig. 14, but showing the addition of a rubber bumper, and

Fig. 18 is a sectional detail on the line 18—18 of Fig. 17.

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

Referring first to Figs. 1 and 2, 19 designates the pillar and 20 the door frame or door portion, but it will soon be evident that it is immaterial whether the socket member 21 and gooseneck member 22 of my improved ball-and-socket hinge are mounted on the pillar and door, respectively, or vice versa. The gooseneck member 22 is preferably formed in one piece to provide a generally J-shaped shank 23 terminating in a ball head 24 formed as an integral enlargement of the end thereof. This shank is substantially round in cross-section and of gradually increasing diameter from the head end to the other end, where an enlarged flattened pad portion 25 is formed integral with the shank and in a plane substantially at right angles to the end thereof. The pad 25 is perforated, as at 26, to receive cap screws 27 for fastening the gooseneck member to the edge of the door 20 on the usual internal reenforcing anchor plate 28 provided with tapped holes for this purpose. The socket member 21 comprises a plate 29 formed with a hemispherical socket 30 in the hollow boss portion 31 thereof and slotted lengthwise, as at 32, into communication, as at 33, with one side of the socket 30. The small end of the shank 23 of the gooseneck member projects from the socket 30 through the hole 34 in the wall of the boss 31, and the slot 32—33 communicates with one side of the hole 34 and is wide enough to accommodate the shank of the gooseneck member 22 throughout its range of approximately 90° movement or shaped as the slot 32^a in Fig. 9. A companion plate 35 has abutment with the plate 29 and there are registering holes 36 in these two plates through which cap screws like the screws 27 are passed to fasten the socket member 21 to the reenforcing anchor plate 37 in the pillar 19. The plate 37 has tapped holes therein similarly as the plate 28. The plate 35 is slotted, as at 38, in register with the slot 32, and the anchor plate 37 is likewise slotted, as at 39, for registration with the slot 32 and also to accommodate the projecting boss 31, whereby to provide operating clearance through the assembled parts for the gooseneck member 22. A block 40 with a hemispherical socket 41 provided in the end thereof fits in a counterbore 42 in the boss 31 that is preferably tapered, as indicated in Fig. 2, to match the taper of the block 40 and make for a tight wedging fit between the parts when the plates 29 and 35 are bolted together to the pillar. Such interfitting also insures the desired accurate relationship of the sockets 30 and 41 so that the ball head 24 will operate with substantially the same fit in both parts of its socket. One side of the block 40 is cut away, as at 43, in register with the slot 33, whereby to give additional operating clearance for the gooseneck member 22 and allow full 90° movement of the door 20 relative to the pillar 19. The block 40 has a reduced shank portion 44 fitting in a hole 45 in the plate 35, and the end of the shank is upset to permanently secure the block to the plate in the tapered counterbore provided at the end of the hole 45. The fact that a separate block 40 is used makes it possible to provide a hardened steel bearing at low cost. It will be noticed that this bearing block provides the major portion of the socket bearing portion thereon. An oil hole 46 in the plate 35 registers with an oil hole 47 in the plate 29 extending to the socket 30 at a point adjacent the inner end of the block 40, so that oil is delivered simultaneously to both halves of the socket for good lubrication.

It should be clear from the above description that I have provided a concealed ball-and-socket hinge for the doors of motor vehicles of an extremely practical and commercially feasible design and construction, inasmuch as it can be produced at a low enough cost to be competitive with the old style pintle hinges, and its design is such that it lends itself to easy assembling on the doors and pillars of cars as now constructed. Two such hinges, as at A and B in Fig. 5*a*, will be provided on each door, and with reasonable accuracy in the location of the tapped holes in the plates 28 and 37 the door will fit fairly accurately and operate easily as soon as the hinges are fastened in place. However, the workman in the assembly line at the automobile factory may use a tool to bend or twist the gooseneck 22 of either or both hinges to bring the ball 24 on either or both hinges closer or farther from the door, or above or below the normal substantially horizontal plane of the gooseneck, or forwardly or rearwardly from its initial position, whereby to accordingly adjust the door in the door opening in the centering and aligning of the door with reference to the body. Whatever bending or twisting of the hinges is necessary to secure good door alignment and centering cannot affect the easy operation of the hinges, because the ball heads 24 swivelled in their sockets for universal movement each determines a single point suspension, and it is obvious that the two points thus fixed are sufficient to determine the hinging axis of the door in a plane inwardly spaced from the curved outside surfaces of the door and body portions. These hinges, for obvious reasons, make the door swing uniformly smoothly throughout its range of opening. It will be noted that the sockets are just inside the outer wall of the pillar, next to the joint line between the door and pillar. This locates the hinge axis properly for a large enough range of door movement and insures ample clearance between the door and the curved outside of the body. Hinges of this construction will not bind nor develop play and give rise to door rattling like the old style pintle hinges, because, as stated be-

fore, most of the wear on hinge knuckles and pintles was due to misalignment resulting from bending the hinges to produce door alignment. Furthermore, these ball-and-socket hinges afford a much lower unit bearing pressure than the old style pintle hinges, so that wear is greatly reduced and longer life assured.

Referring to Figs. 3 to 5, the gooseneck member **22***a* and retaining plate **25***a* may be substituted in Figs. 1 and 2 for the one-piece gooseneck member **22** with its integral bolting pad **25**. In this case, the shank **23***a* having the ball head **24** on one end, has the other end flattened to narrow elongated form, as at **48**, to fit snugly in a recess **49** formed in the bottom of the plate **25***a* and defined by the struck-up middle portion **50** of said plate. Holes **51** in the marginal portions of the plate are provided to receive cap screws like the screws **27** previously mentioned, whereby to fasten the gooseneck member securely to the door or pillar, as the case may be. The operation of a hinge with the gooseneck member constructed along these lines would be the same, of course, as one having the gooseneck member constructed along the lines shown in Fig. 2.

Figs. 11 and 12 show still another gooseneck construction in which the shank **23***b* of the gooseneck member **22***b* has a reduced flattened rectangular end **52** made to fit snugly in a rectangular hole **53** in a plate **25***b*. These two parts are then arranged to be fastened permanently together by welding along the joint lines, as at **54**.

Still another mode of connection between the shank of the gooseneck and the attaching plate therefor is shown in Figs. 6 and 6*a* wherein the gooseneck member **22***c* has the end of its shank **23***c* provided with diametrically opposed flats **55** to enter a correspondingly shaped hole **56** in the attaching plate **25***c*, so as to prevent turning of the shank relative to the plate while at the same time providing a pair of shoulders **57** next to the flattened end portion to permit tightening the nut **58** on the reduced threaded end **59** of the shank to fasten the shank securely to the plate, and incidentally also help to secure the plate to the door, although of course other additional cap screws or the like will be provided for that purpose.

The construction disclosed in Figs. 6, 7, 9, and 10 is mainly of interest from the standpoint that it discloses a sectional socket member **21***a* differing from the socket **21** of Figs. 1 and 2, principally in that the wall or body **29***a* corresponding to the plate **29** of the other construction is integral with the pillar, as indicated at **60**, and has an annular flange **61** outlining the slot **32***a* to give increased stiffness and strength to make up for the absence of a separate plate on the pillar. The flared or tapered shape of the slot **32***a* permits a correspondingly increased latitude of adjustment of the gooseneck in the mounting of the door, it being apparent from this view how the gooseneck may be cocked up or down from a mid position in the slot without interfering with its swinging movement in the opening and closing of the door and without interfering with the ball working freely in the socket. **31***a* is the wall of the socket **30***a* formed integral with the pillar, as shown, and it will be observed that the flange **61** is continued to form a reenforcing collar around the opening **34***a* into the socket through which the gooseneck **23***c* extends from the ball head **24**. A plate **35***a* formed with an embossed portion **40***a* providing a hemispherical socket portion **41***a* therein is fastened to the pillar by bolts or rivets entered through the registering holes **36***a* in the plate and pillar. The boss **40***a* fits with ample clearance in the recess **42***a* adjacent the socket **30***a*, and the arrangement is such that the perforated marginal portions of the plate where the bolts or rivets pass through are also spaced a few thousandths of an inch from the wall of the pillar before the bolts are tightened or the rivets upset. Thus, in the tightening of the bolts or the upsetting of the rivets, these marginal perforated portions of the plate **35***a* will be drawn into tight engagement with the wall of the pillar, as indicated by the dotted lines in Fig. 7, whereby to accordingly spring the plate and thereby place the ball head **24** under a predetermined spring tension, not sufficient to interfere with the more or less free operation of the door, but still enough to eliminate any likelihood of the ball developing play in the socket after the hinge has been in service for some time. In that way, there is no likelihood of the door rattling. Furthermore, if the ball has been finished reasonably smooth but the socket parts are relatively rough sheet metal stampings, this construction makes sufficient allowance for the ball wearing itself in; that is to say, it is equivalent to a lapping action in which the roughness of the socket parts and such roughness as still remains on the ball at the time of assembly are worn smooth soon after the hinge is in service, but the allowance for such wear is more than enough to prevent play being developed. The lapped surfaces give a long lifed, easy working bearing. The plate **35***a* is cut away on the inside next to the socket **41***a*, as at **62**, in register with the slot **32***a* to give additional working clearance for the nooseneck **23***c*. **46***a* is an oil hole in the plate **35***a* through which the socket **30***a*—**41***a* can be lubricated from the outside of the pillar similarly as in the hinge of Figs. 1 and 2. The operation of this hinge is substantially the same as the hinge previously described.

Fig. 8 shows a construction similar to Figs. 6 and 7, but modified in two respects, the first being that the plate **35***b* has its embossed portion **40***b* fitting with a wedging fit in the recess **42***b* when the rivets **63** are upset. The body **29***b* of socket **21***b* like the body **29***a* is formed integral with the pillar, and the socket **30***b* therein is in accurate registration with the socket **41***b* in the plate when the two parts are riveted together, as shown, the ball head **24** fitting snugly in the socket so as not to cause door rattling. The other deviation from the design of Figs. 6 and 7 is in the additional bulge **64** formed on the socket portion **21***b* to provide a recess between the halves of the socket for an annular wick **65** to absorb and hold lubricant delivered through the oil hole **46***b* and thus insure good lubrication of the hinge indefinitely. A hinge constructed along the lines of Fig. 8 will operate substantially like the hinges of Figs. 1 and 6.

Referring now to Figs. 13 to 16, the hinge shown here resembles that shown in Figs. 1 and 2, because the plates **29***d* and **35***d* are assembled together to form the socket member **21***d*. However, in this case, the two plates are sheet metal stampings of right angle form providing abutting attaching portions **66** and **67** parallel to the edge of the door through which bolts or cap screws **68** are passed to secure the hinge to the pillar **19** by means of an inner reenforcing anchor plate **69** having tapped holes to receive the bolts or screws. The other portions **70** and **71** wherein the ball socket is formed are at right angles to

the attaching portions 66 and 67, respectively, and lie in a plane substantially parallel to the outside of the body, and the plate 29d has a substantially hemispherical socket portion 31d formed thereon as a hollow boss projecting from the plane of the flange 70, while the plate 35d has a hemispherical socket 40d registering with the socket 31d and formed in a boss projecting from the plane of the flange 71. An inturned flange 61d is formed on the plate 29d defining the slot 32d and affording reenforcement for the socket member 21d. This flange 61d, it will be noticed, is continued around the hole 34d through which the gooseneck 23d extends from the ball head 24 in the socket. The gooseneck member operates with ample working clearance in the slot 32d and the registering slot 38d in the plate 35d and it will be noticed that the plate 35d has a half round or trough-shaped boss 72 struck from the plane of the portion 71 and extending from the socket portion 40d to provide additional working clearance as well as a limiting stop for the gooseneck member so that the door can open through a full 90°. Rivets 73 are shown passed through registering holes in the portions 70 and 71 to join the plates 29d and 35d together in radially spaced relation to the socket. This is in keeping with an important object of the invention to provide a predetermined spring tension between the sections of the socket so that the ball head operating in the socket is gripped resiliently and play is eliminated and an automatic take-up for wear secured. It requires very little distortion of the flanges 70 and 71 when they are riveted together to provide enough spring tension for the purposes stated. The ball head which is usually machined or ground or burnished to a relatively smooth finish soon wears itself a seat between the relatively rough sheet metal stampings in the opening and closing of the door, and once the ball head finds its seat, there is found to be no perceptible wear, and this small amount of wear is easily taken up by the spring tension between the stamped socket parts so that no play and consequent rattles develop. Furthermore, the hinge works easily and quietly and a small amount of lubricant lasts indefinitely. An important advantage of this construction, aside from its economy, is the fact that it is more compact than the designs of Figs. 1 and 6 and permits the use of a gooseneck with a simple right-angle bend therein and still provides the desired range of door movement. The compact construction will obviously permit application of the hinge to bodies having shorter width pillars. There is also an advantage in this construction from the standpoint of easier lubrication, easy access to the socket being afforded when the door is opened, as should be clear from Fig. 14.

The construction of Figs. 17 and 18 is like that of Figs. 13 to 16, except that a deeper recess is afforded next to the socket in the boss 72', and this recess is of channel-shaped cross-section, as indicated in Fig. 18, and houses a rubber bumper block 74 arranged to be engaged by the gooseneck member 23d at the limit of the opening movement of the door. In that way, the opening of the door can be checked without other check means being required, or, if desired, the rubber bumpers may be provided simply to relieve the check straps or other check means provided from excess shock and strain. The bumper block 74 has a head 75, the reduced neck of which fits in the hole 76 in the wall of the boss 72' to retain the block in place, and of course it is obvious that the block "buttons" in place similarly as door bumpers are mounted on the door frame.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. The appended claims have been drawn with a view to covering all legitimate modifications and adaptations.

I claim:

1. A ball-and-socket hinge for mounting a door on a vehicle body comprising a generally L-shaped socket member with attaching flanges on one leg of the L for securing the same to one of said door and body and a socket in the other leg of said L, and a generally L-shaped ball-ended gooseneck member having its legs in transverse relation to the legs of the socket member in the closed position of the door, said gooseneck member having at one end of one leg of the L a ball-and-socket connection with the socket member and adapted to be secured at its other end to the other of said door and body.

2. A hinge as set forth in claim 1, wherein the socket member comprises two nested L-shaped plates, each of said plates being formed to provide a socket portion thereon, and the plates when nested having the socket portions in register to receive the ball end of the gooseneck member.

3. A hinge as set forth in claim 1, wherein the socket member comprises two nested L-shaped plates, each of said plates being formed to provide a socket portion thereon, the plates when nested having the socket portions in register to receive the ball end of the gooseneck member, and said plates being furthermore slotted in register with one another in the portions at right angles to the socket portions to provide working clearance therein for the gooseneck member.

4. A hinge as set forth in claim 1, wherein the socket member comprises two nested L-shaped plates, each of said plates being formed to provide a socket portion thereon, the plates when nested having the socket portions in register to receive the ball end of the gooseneck member, said plates being furthermore slotted in register with one another in the portions at right angles to the socket portions to provide working clearance therein for the gooseneck member, and at least one of said plates having a flange defining the slot therein, the flange extending to and being integral with the socket portion of said plate whereby to reenforce the socket member.

5. A hinge as set forth in claim 1, wherein the socket member comprises two nested L-shaped plates, each of said plates being formed to provide a socket portion thereon, the plates when nested having the socket portions in register to receive the ball end of the gooseneck member, said plates being furthermore slotted in register with one another in the portions at right angles to the socket portions to provide working clearance therein for the gooseneck member, and the outer plate having an outwardly bent hollow rib portion extending from the socket portion in the plane of the slot arranged to receive and provide additional working clearance for the gooseneck member at the limit of the door opening movement.

6. A hinge as set forth in claim 1, wherein the socket member comprises two nested L-shaped plates, each of said plates being formed to provide a socket portion thereon, the plates when nested having the socket portions in register to receive the ball end of the gooseneck member, said plates being furthermore slotted in register

with one another in the portions at right angles to the socket portions to provide working clearance therein for the gooseneck member, the outer plate having an outwardly bent hollow rib portion extending from the socket portion in the plane of the slot, and a rubber bumper block therein arranged to be engaged by the gooseneck member at the limit of the door opening movement.

7. As an article of manufacture, a hinge of the ball-and-socket type comprising two nested L-shaped plates conformed to provide a ball socket therebetween on the one leg of the L, and having registering slots in the other leg of the L, said plates also having registering holes provided therein in the latter leg of the L adapted to receive fastening means for fastening the hinge to a door pillar, and an L-shaped gooseneck having a ball end fitting movably in the socket and means for securing the other end to a door to be hinged.

8. A ball-and-socket hinge for mounting a door on a vehicle body, comprising a two-piece generally L-shaped socket member having the two pieces thereof conformed to provide a ball socket therebetween on the one leg of the L and having a slot in the other leg of the L communicating with one side of the socket, the latter leg of the L also having openings provided therein adapted to receive fastening means for mounting said hinge on the body, and an L-shaped gooseneck member working in the slot of the socket member having a ball end swiveled in the socket, and means for securing the other end to the door to be hinged.

9. A hinge as set forth in claim 8, wherein one piece of the socket member has a generally L-shaped reenforcing flange extending lengthwise of the attaching leg of the socket member alongside the slot therein and then transversely along the other leg of the socket member around the socket portion.

10. A hinge as set forth in claim 8, wherein the socket portion in one piece of the socket member has an opening provided in the wall thereof through which the ball end of the gooseneck member extends, said opening communicating on one side with one end of the slot in the attaching portion of said piece, and said piece having a continuous reenforcing flange provided thereon projecting from the inner side thereof along both sides of the slot in the attaching portion of said piece and then transversely and around the aforesaid opening in the socket portion.

11. A hinge of the character described comprising an L-shaped plate conformed to provide a half of a ball socket on one leg of the L and a longitudinal slot in the other leg of the L communicating at one end with an opening provided in the wall of the socket portion, the slotted leg of the L being adapted to be secured to a vehicle body adjacent a door to be hinged, another plate conformed to provide the other half of a ball socket, an L-shaped gooseneck having a ball end entered in the socket between said plates with the gooseneck extending through the opening in the wall of the first-mentioned socket portion and out through the aforesaid slot, means for securing the other end of said gooseneck to the door to be hinged, and means for securing the aforesaid plates together retaining the ball end of the gooseneck therebetween.

12. A hinge as set forth in claim 11, wherein the plates are formed from sheet metal and wherein the means for fastening said plates together serve to draw the plates together at points radially spaced with respect to the outside of the socket so that a predetermined spring tension is set up between the plates causing the ball end of the gooseneck to be gripped resiliently to eliminate play and provide take-up for wear.

13. A hinge as set forth in claim 11, wherein the first-mentioned plate has a continuous L-shaped reenforcing flange projecting inwardly therefrom defining the sides of the slot and socket opening.

14. A hinge as set forth in claim 11, wherein the second plate is formed to provide a channel portion extending radially from the socket portion and communicating with the lower end of the slot in the other plate adapted to receive and provide additional working clearance for the gooseneck at the limit of door opening movement.

15. A hinge as set forth in claim 11, wherein the second plate is formed to provide a channel portion extending radially from the socket portion and communicating with the lower end of the slot in the other plate adapted to receive and provide additional working clearance for the gooseneck at the limit of door opening movement, the hinge including a bumper of resilient material disposed in said channel and arranged to be engaged by the gooseneck at the limit of its movement.

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