Dec. 10, 1935. M. KAHN 2,024,101

BUMPER

Filed March 5, 1934

Fig. 1

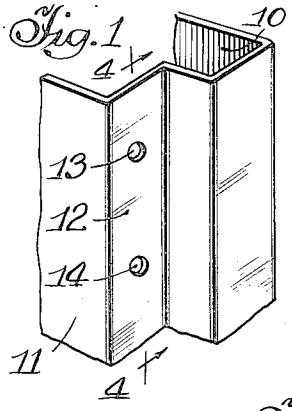


Fig. 2

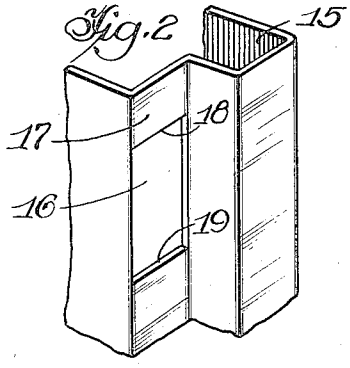


Fig. 3

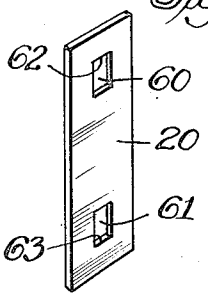


Fig. 5

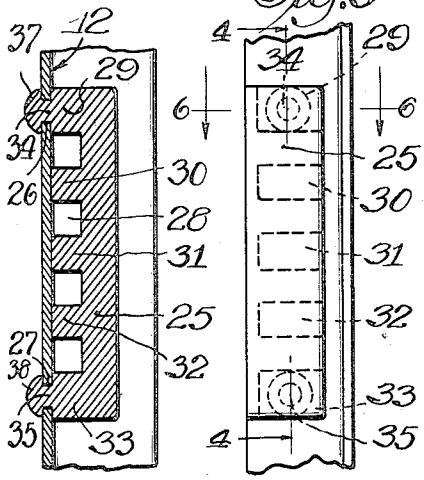


Fig. 7

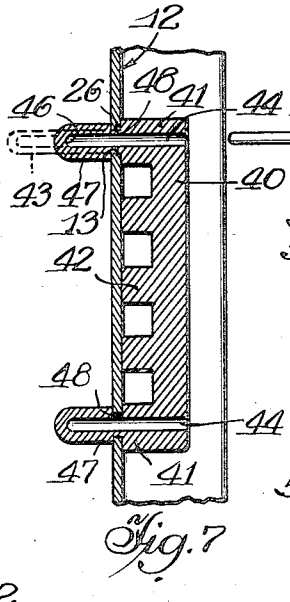


Fig. 8

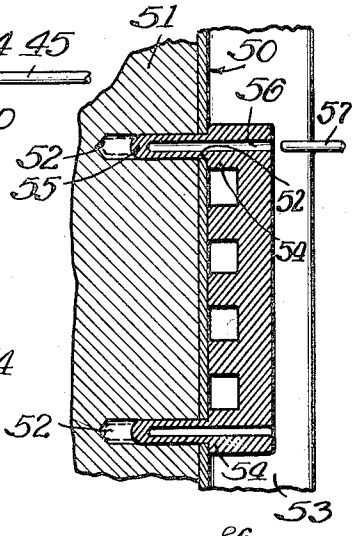


Fig. 4

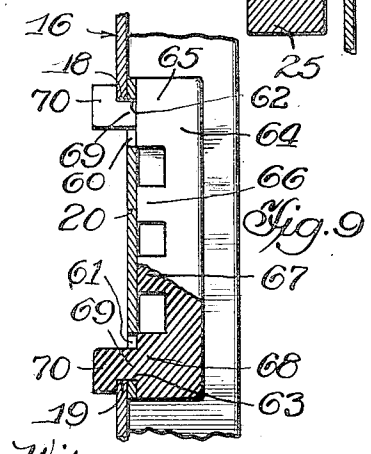


Fig. 6

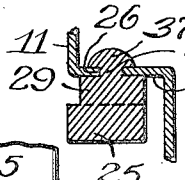


Fig. 10

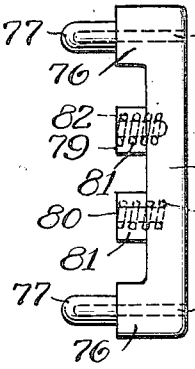
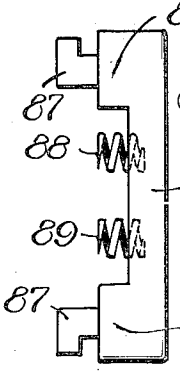


Fig. 11



Witness:
Chas. R. Kourek.

Inventor,
Mandel Kahn,
By W. Bartlett Jones, Atty.

Patented Dec. 10, 1935

2,024,101

UNITED STATES PATENT OFFICE

2,024,101

BUMPER

Mandel Kahn, Chicago, Ill., assignor to Harry H. Kahn, Wilmette, Ill.

Application March 5, 1934, Serial No. 714,048

6 Claims. (Cl. 16—86)

The present invention relates to bumpers for doors and the like, and especially for automobile doors, but useful elsewhere. It also relates to a door jamb construction which is cooperative with a bumper unit for the mounting of the unit to the door jamb or other fixed body.

Heretofore it has been a practice to provide in automobile door posts a socket, and in the socket a rubber block extending beyond the confines of the socket to provide projecting rubber in the path of the door. Various types of sockets, mounting means and rubber blocks are in use or are described for this general purpose. A disadvantage of such construction is the solidity of the rubber and a resulting stiffness in the resiliency. The blocks are nearly all solid forms and the major part within the socket together with the part outside of the socket act as a resilient unit. Where doors are out of line or are sprung, it frequently happens that one part of the block first receives the force of the door, and in further functioning is so overcompressed that it soon becomes permanently and locally injured or scarred, with deformation of the block. In such devices the shock-receiving part is the end of a block, the inward extension of which part receives the shock.

The present invention aims to correct these defects and to simplify and to improve upon the construction of the door post and of the resilient unit. The present invention in its preferred form aims to exert the bumping force directly upon the outside of the door jamb, rather than upon the interior of a socket in the door jamb. The preferred bumping unit of the present invention may be used with door jambs already provided with a socket by the use of a bridge-member to cover the socket opening. It may also be used with door jambs which may be constructed without reference to the future mounting of a bumper. By certain simple expedients for mounting the bumper, as by drilling holes, the preferred bumping construction may be attained.

Reference is made to my copending application Serial No. 670,637, filed May 12, 1933, of which this application is a continuation-in-part, and to its continuation-in-part Serial No. 714,049, filed March 5, 1934.

In is an object of the present invention to exercise the resiliency in an open space behind the buffer part, which space is partly occupied by resilient means.

It is another object of the present invention to distribute the resiliency to a series of resilient elements.

It is still another object of the invention to use a flexible buffer part which may flex in accommodating its bumping surface to the striking member, and thereby more readily receive or distribute the bumping force.

It is a further object of the invention to use one or several resilient means as the mounting or carrier for the buffer part.

Another object of the invention is the provision of a unit wherein the resiliency may occur outside of the door jamb or fixed body upon which the bumping unit is mounted.

Still another and more specific object is the use of an integral rubber unit in which a plurality of rubber resilient cushions exert the cushioning action.

Still another object of the invention is the reinforcement of the rubber cushions by resilient metal parts.

A more direct object of the invention is the provision of a unit with resilient means having direct pressure contact on the jamb of the fixed body which carries the unit.

Various other and ancillary objects and advantages of the invention will be apparent from the following description and explanation of the invention as it is illustrated by the several embodiments shown in the accompanying drawing in which:

Fig. 1 represents a door post of an automobile with an improved and simplified construction with holes adapted for mounting upon the outside of the post, the preferred forms of the invention.

Fig. 2 represents a door post with a large opening as used in the prior art, which may be adapted for use of the preferred forms of the present invention.

Fig. 3 represents a bridge-plate which may be used to bridge the socket opening of the post on Fig. 2, as shown in Fig. 9.

Fig. 4 is a view in longitudinal cross-section on a line 4—4 passing through the holes shown in Fig. 1, and shows in cross-section, also on line 4—4 of Fig. 5, a bumper unit mounted on the post of Fig. 1.

Fig. 5 is a vertical elevation looking to the left toward the device as shown in Fig. 4.

Fig. 6 is a cross-section on line 6—6 of Fig. 5.

Fig. 7 is a modified form of mounting plug as it is used on a door post like that shown in Fig. 1.

Fig. 8 is the same modified form of mounting plug as shown in Fig. 7, as it is used on a door post of Fig. 1 having a filler.

Fig. 9 is another modified form of mounting extension more particularly used for the type of

post of Fig. 2 when bridged by the plate of Fig. 3.

Fig. 10 is a form of bumper having modified resilient cushions embodying a coiled metal spring embedded in rubber.

Fig. 11 is a bumper showing the modified mounting means of Fig. 9, and a modified resilient element consisting of a coiled spring.

It is of course to be understood that various changes may be made in details and in combinations of parts, and that the drawing merely is illustrative of the principles involved. Numerous changes and other constructions are contemplated as falling within the scope of the invention as expressed in the appended claims.

The preferred form of the present invention is made with the intention of eliminating the work and expense of forming a socket in the door post which practically all manufacturers of automobiles now provide for bumpers. By avoiding socket formation a stronger post is permitted, and this is of great importance where lighter-weight metals are being utilized in the modern trend. The preferred bumper unit functions by exerting pressure directly onto the post. Hence it may be merely cemented to the surface of the post, but I prefer more positive anchorage. A suitable and simple anchorage is the extension of the unit, as by plugs thereon, into holes or recesses in the door post. Numerous forms of anchorage are herein described as illustrative, but other forms may be used.

The present invention provides a device having a shock-receiving part and compressible means connected to it by means of which the buffer part is supported, and through which it exerts pressure upon the door post or other mounting. A specific feature of the invention is the use of a somewhat flexible shock-receiving part which can be flexed and deformed to accommodate itself in form and position to the surface of the striking door. Still another feature of the invention is the provision of an open space between the door post, or other mounting body, and the buffer-part, across which space the bumper-part moves, and in a portion of which space lies the resilient means.

The resilient means of the present invention may be rubber, or may be spring metal, or may be both. In my copending application U. S. Serial No. 670,637, filed May 12, 1933, of which this application is a continuation in part, I have shown both rubber and spring metal, using a coiled compression spring, and also therein I have used the spring in combination with the rubber, and the spring embedded in the rubber.

Where I use rubber composition as the resilient means I provide a construction which permits the rubber to expand generally in a plane direction perpendicular to the bumping force. It is well known that rubber is relatively noncompressible when fully confined, and that its resilience is due to elasticity in displacement. For example, when a short column of rubber is compressed endwise, it shortens in the direction of the force, but expands circumferentially. In the present invention, where rubber is so used, the space between the mounting body and the buffer part is such as to receive the major portion of the expanding rubber of one or more compressible columns of rubber. The preferred arrangement further is such that the buffer part is not primarily the active resilient member, but, being flexible, it distributes the pressure exerted upon it somewhat uniformly over the active resilient means.

In Fig. 1 there is shown a door post **10** having jamb surfaces **11** and **12**. It is toward the jamb **12** that the door swings. In the door jamb **12** two drilled holes **13** and **14** are shown which are designed to be used in any suitable manner of mounting the bumper unit onto the door post. For many reasons the preferred mounting is by means of plugs, desirably of resilient rubber, entering said holes for suitable security therein. In some posts the interior is hollow, as shown in Fig. 1. But in other posts there may be a wood filler, and in such a case it is calculated that the drilled holes **13** and **14** extend also into the wood filler. The mounting construction used for the holes **13** and **14** may be modified, as hereinafter shown for use specially with each type of post construction, and some forms may be used with both types of construction.

In Fig. 2, I show another type of post **15** which may be found in existing automobiles with an opening **16** in the jamb face **17**, providing edges **18** and **19**, which edges may be utilized much as the outer edges of the holes **13** and **14** of Fig. 1. The opening **16** in Fig. 2 may be found in many door posts originally formed in this way to receive a bumper block, as described in the prior art. The present invention may be used in connection with the post of Fig. 2, so as to function the same as for a post as in Fig. 1, providing a rigid bridge member to span the opening **16** as will hereinafter be described. Such a plate is designated by numeral **20** in Fig. 3, and is merely representative of a bridge upon which the bumping force may be exerted. Its size and form may be varied as circumstances may dictate, and it may be made in any form suitable to cover any opening in a post, either of the kind as shown in Fig. 2 or of other kinds known to the trade. Where a bridge-plate is used over an opening, it is herein considered to be a part of the door post, irrespective of how it may be held in bridging position.

In Fig. 4 there is shown a bumper unit having shock-receiving part **25**, which may be rigid, but which is preferably flexible and preferably of flexible rubber composition. The unit is shown in its mounted relation to the post of Fig. 1, in which there is no wood or other solid filler. The holes **13** and **14** (Fig. 1), in the absence of filler, provide shoulders **26** and **27** over which the unit may be fastened. A space **28** is arranged for between the door jamb **12** and the buffer part **25**. Across a portion of this space I place resilient means through the agency of which the jamb **12** and the buffer part **25** are connected for supporting the part **25**. The resilient means is preferably divided into a plurality of elements designated **29**, **30**, **31**, **32** and **33**. Two of these in the present instance, preferably the end ones **29** and **33**, are those used as the supports or carriers. For this purpose they are connected to the jamb **12** and to the buffer part **25**. The connection to the buffer part is herein shown in the integral construction of resilient rubber composition. By reason of using this form of construction the remaining elements **30**, **31** and **32** are also integral with the buffer part **12**. All of the resilient elements have flat bottoms adapted to rest upon the flat jamb face **12** to exert directly thereon the bumping force. These elements are in effect columns of rubber which expand laterally into the space **28**.

The means for mounting the unit to the jamb may be varied, and several suitable forms are shown. In Fig. 4 the supporting columns or re-

silient elements 29 and 33 cover the holes 13 and 14 (Fig. 1), and are provided with plugs, or studs 34 and 35, preferably also of integral rubber construction, to extend through the holes. The plugs at the ends are adapted to act as detent means catching over the shoulders 26 and 27 respectively. Several forms of detent action are illustrated. In Fig. 4 enlarged heads 37 and 38 are formed on the end of the plugs 34 and 35, respectively. These are so constructed that they may be forced through the holes 13 and 14 to provide the detent action. The drawing is representative of the general character, and may appear exaggerated for the purpose of illustration.

In Fig. 7 a modified form of mounting is shown. The unit may be otherwise like that in Fig. 4, with buffer part 40, and resilient columns 41 and 42. The plug is modified, and is made long, and is larger in cross-section than the hole 13 into which it is to fit. It is best represented in the dotted line position 43, but this is not its normal size. It represents a stretched or elongated form of sufficient extent to reduce its cross-section so that it will pass readily into and through hole 13. In order to effect stretching it from the outside (mounted position) a small channel 44 is provided into which a sufficiently small rod 45 may be temporarily inserted to engage the bottom 46 of the channel for elongating the plug. When the plug is then inserted in the hole as far as the column 41 will permit, the rod 45 is withdrawn, and the plug shortens and expands. Its form then provides an enlarged retaining head 47 and a constricted part 48 tightly binding in the hole 13.

In Fig. 8 the same integral form of Fig. 7 is shown as it is mounted in a post wherein the metal sheet 50 is backed by solid filler 51, as of wood. Hole 52 is drilled through plate 50 and well into the solid filler 51. The bumper unit has buffer part 53, and resilient column 54, with the plug 55, and channel 56 for rod 57. The plug 55 is elongated until it fits easily into the hole in placing the bumper unit. Then the rod 57 is withdrawn, and the plug expands into holding contact. If desired, a portion of the solid filler 51 may be removed to secure the effect described with reference to Fig. 7.

In Fig. 9 a cross-section is shown involving a mounting of a unit on post 15 (Fig. 2) with bridge-plate 20 (Fig. 3). Plate 20 is formed to bridge over the edges 18 and 19. Holes 60 and 61 are formed with the outer edges 62 and 63 coincident with edges 18 and 19. The holes may be round, and used as in Fig. 4, but because of the offset position of plate 20 and the metal of the door jamb 16 a further modification is useful. Holes 60 and 61 are vertically elongated, and are rectangular.

The bumper unit has the flexible buffer part 64, and the integral resilient columns 65, 66, 67 and 68, each adapted to push on plate 20, which is of course considered as a part of the post. End columns 65 and 68 extend further backward through holes 60 and 61 with integral extensions. The extensions have a rectangular cross-section at 69 of less area than holes 60 and 61 so that the unit may be bowed outwardly by pressure on its ends, thus to bring columns 66 and 67 away from plate 20, and to move plugs 69 toward each other. The ends of the plugs have retaining heads 70 adapted to engage the rear side of jamb plate 16 when the buffer unit is unflexed and in normal position as shown. By this means, the buffer unit with its integral plugs serves not only to mount itself but also to mount the bridge-plate 20 against which the bumper presses in bumping action.

Although I have shown and prefer to have a bumper unit composed of integral rubber composition with resilient rubber columns as the resilient means, I do not limit the invention to this form. In some forms the buffer parts may be of hard rubber integral with resilient rubber of the columns. Also I may use spring metal as the resilient means, or may embed coiled compression springs in the rubber columns.

In Fig. 10 there is shown a modified form having a flexible buffer-part 75, integral end columns 76 of resilient rubber, with mounting plugs 77 and rod channels 78, and with intervening resilient columns 79 and 80. These columns consist of an annulus 81 of rubber integral with the buffer part and a coiled spring 82 embedded in the annulus and extending into the buffer part.

In Fig. 11 there is another modified form having a flexible buffer part 85, end columns of integral resilient rubber 86, with mounting extensions 87, resilient columns 88 and 89 in the form of coiled springs with one end embedded in the buffer part 85.

Various other changes and modifications are contemplated and the invention is therefore not to be considered as limited to or by the description and the exemplary embodiments herein adopted to illustrate the nature of the invention. In the appended claims I aim to set forth broadly the invention as herein described, and as it is embodied in other devices more specifically set forth in my copending applications above referred to. The present invention as herein embodied is considered specific in the sense that the unit utilizes the door jamb itself, or some separable part, as the pressure resisting body against which the resilient means functions. The copending applications are considered specific in the sense that the units thereof utilize a more or less rigid part of the unit for the same purpose, and for the purpose of mounting the unit. The present invention is considered generic to these specific forms in providing a unit having a buffer part spaced away from a resisting member by means which carry the buffer part and which permit it to move resiliently into said space and toward the resisting member. Broadly considered the invention provides a bumper in which the essential parts, either standing alone, or united to mounting means, has a comb-like structure, in which the teeth elements are compressible resilient elements, through one or more of which the back-ridge of the comb is carried, and in which the back-ridge may be rigid or flexible in the plane of the comb.

I claim:

1. A bumper for automobile doors and the like comprising in combination a buffer part adapted in use to be spaced away from a door jamb or other fixed body by an open space when mounted in the path of a striking door or other object, spaced resilient compressible means secured to said buffer part and adapted to carry and provide the sole support for said buffer part, said means being positioned in said open space and arranged resiliently to resist motion of said buffer part into said space, said resilient means having exposed ends for pressure contact upon said fixed body, and means secured to and extending from said exposed ends and adapted to enter said fixed body for mounting the bumper.

2. An integral rubber composition bumper unit comprising a buffer part, a series of spaced re-

silient rubber columns on one side of said buffer part with exposed ends adapted for pressure contact when the unit is mounted for use on a fixed body with said columns positioned in an open space between said body and said buffer part as the sole support for the buffer part, and integral extensions from a limited portion of the exposed ends of a plurality of said columns adapted to enter the fixed body for mounting the unit.

3. A bumper construction comprising in combination a fixed body towards which a striking object is movable, said body presenting a jamb surface having a recess, and a buffer unit pressing on said jamb surface and mounted upon said body, said unit comprising in combination mounting means entering said recess and secured therein, a resilient column carried by said mounting means and having at one end pressure contact upon said jamb surface, a buffer part secured to the other end of said resilient column and carried thereby with an open space between said buffer part and said fixed body, and other resilient columns positioned between said buffer part and said fixed body for resiliently resisting motion of said buffer part toward said body, said columns being the sole support between the jamb surface and the buffer part.

4. A bumper construction comprising in combination a fixed body towards which a striking object is movable, said body presenting a jamb surface having a recess, and a buffer unit pressing on said jamb surface and mounted upon said body, said unit comprising in combination mounting means entering said recess and secured therein, a resilient column carried by said mounting means and having at one end pressure contact upon said jamb surface, a buffer part secured to the other end of said resilient column and carried thereby with an open space between said buffer part and said fixed body, and other resilient columns positioned in said space and secured at one end to said buffer part and at the other end having pressure contact with said jamb surface.

5. A bumper construction comprising in combination a fixed body towards which a striking object is movable, said body presenting a jamb surface having a recess, and a buffer unit pressing on said jamb surface and mounted upon said body, said unit comprising in combination mounting means entering said recess and secured therein, a resilient column carried by said mounting means and having at one end pressure contact upon said jamb surface, a flexible buffer part secured to the other end of said resilient column and carried thereby with an open space between said buffer part and said fixed body, and other resilient columns positioned in said space and secured at one end to said buffer part and at the other end having pressure contact with said jamb surface.

6. A bumper construction comprising a fixed body towards which a striking object is movable, said body presenting a surface with a hole therein, a buffer part spaced away from said surface, compressible columns between said surface and said buffer part, one of said columns being united to the buffer part, being set over said hole, and having an extension therefrom mounted in said hole.

MANDEL KAHN.