J. K. WHITAKER, JR.

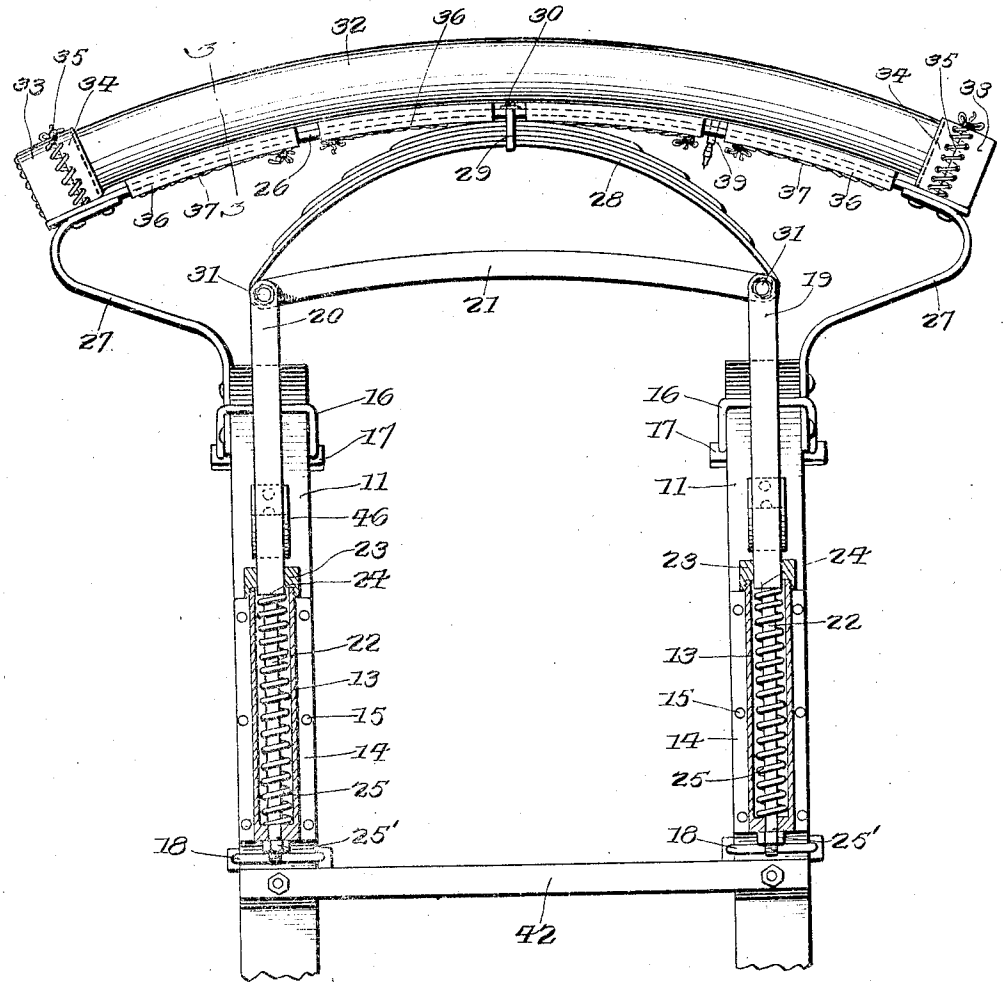
PNEUMATIC BUMPER.

APPLICATION FILED SEPT. 2, 1920.

1,380,759. Patented June 7, 1921.

2 SHEETS—SHEET 1.

Fig. 1.




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2 SHEETS—SHEET 2.

Fig. 2.

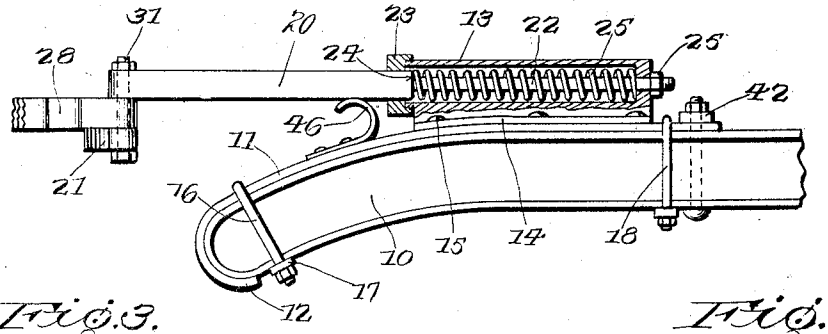



Fig. 3.

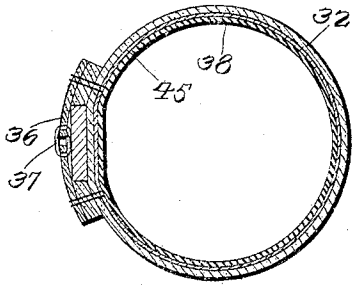



Fig. 4.

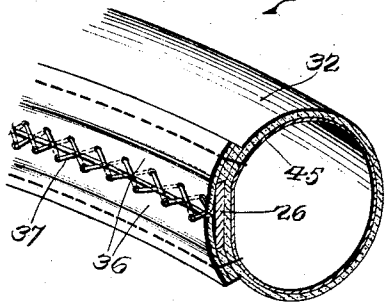



Fig. 5.

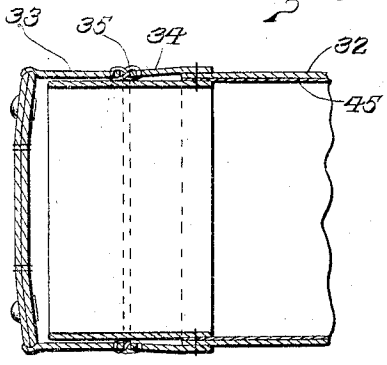
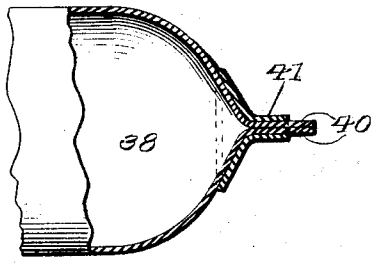



Fig. 6.




Inventor

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# UNITED STATES PATENT OFFICE.

JAMES KNOX WHITAKER, JR., OF ST. LOUIS, MISSOURI.

## PNEUMATIC BUMPER.

1,380,759. Specification of Letters Patent. Patented June 7, 1921.

Application filed September 2, 1920. Serial No. 407,790.

*To all whom it may concern:*

Be it known that I, JAMES K. WHITAKER, Jr., a citizen of the United States, residing at St. Louis, in the county of St. Louis City, State of Missouri, have invented certain new and useful Improvements in Pneumatic Bumpers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to fenders or bumpers and while it is particularly designed for use on automobiles, it will be understood that it may be employed wherever it will be of utility.

The object of the invention is to provide a structure that will be securely held in place upon the chassis frame and which will embody such an improved arrangement of pneumatic and spring members as will effectively absorb the excessive shocks of collision to which a motor vehicle is at times subjected, thus to save both the vehicle and its occupants from injury and to likewise avoid injuring whatever may be struck.

In the drawings:—

Figure 1 is a plan view of the forward portion of a chassis frame equipped with my invention, a portion of which latter is in section.

Fig. 2 is an elevation showing the inner face of the left hand horn of the chassis frame shown in Fig. 1, with the attached portion of the present invention, the spring housing being in section.

Fig. 3 is a transverse section on the line 3—3 of Fig. 1.

Fig. 4 is a sectional perspective view on the line 3—3 of Fig. 1.

Fig. 5 is a longitudinal sectional view through one end of portion of the pneumatic bumper casing.

Fig. 6 is a view of one end of portion of the pneumatic tube employed, a part being in elevation and a part in section.

Referring to the drawings, there is shown the front end portion of a chassis frame that includes the horns 10 upon which the present structure is mounted through the medium of a pair of flat plates 11 that are fitted upon the horns 10 and have at their forward ends the hooks 12 that take over and beneath the extremities of the horns, thus to positively hold the attaching plates against retrograde movement with respect to the chassis frame. Directly in the rear of the hook 12 a clip 16 is engaged over the attaching plate and the chassis horn, its clip plate 17 extending across the underside of the horn so that the attaching plate is held securely against upper displacement at this portion as well as against forward movement. To further hold the attaching plate, a second clip 18 is engaged over it and the chassis frame at the rear end portion of the attaching plate.

Upon the attaching plate 11 is mounted a cylindrical housing 13 having a flange 14 at its base through which are engaged rivets or bolts 15 that hold the housing firmly on to the attaching plate, with the longitudinal axis of the housing parallel to the chassis frame seat and in position thereabove. In connection with the housing 13 there is formed a U-shaped bumper frame including the spaced arms 19 and 20 and the connecting transverse portion 21. The free end portions of the members 19 are reduced in diameter and are cylindrical as shown at 22 and the end portions of these arms 19 are slidably disposed in the corresponding housing 13 through the caps 23 that are removably engaged on their forward ends. The reduced end portions 22 absorb in the formation of shoulders 24 that lie within the housings and against these shoulders there are helical springs 25 with their opposite ends resting against the inner ends of the housings. The reduced portions 22 are continued through the inner ends of the housings where each is provided with a nut 25′ that holds the bumper frame otherwise against the forward urging of the shock absorbing spring 25.

Sustained from the U-shaped bumper frame is an arc shaped carrier plate 26 in advance of the portion 21 of the bumper frame and which latter is also arc shaped and parallel with the carrier plate, the carrier plate being provided with a pneumatic shock absorber to be presently more particularly described.

The carrier plate 26 is supported from the bumper frame through the medium of shock absorbing springs including the outer goose necked spring plates 27 each of which has its straight inner end portion riveted against the outer face of the forward end portion of the corresponding side 19 of the bumper frame. At the forward end of the bumper frame, these goose necked spring plates extend curvingly in the plane of the bumper frame, first outwardly from the frame and

then forwardly and then inwardly, with their forward extremities securely attached by riveting or otherwise to the inner face of the carrier plate 26 near to its extremities respectively. With this arrangement, it will be understood that when the carrier plate 26 is pressed rearwardly, the goose necked springs 27 are tensioned.

In addition to these goose necked springs there is employed a laminated semi-elliptical spring 28 the intermediate portion of which is held by means of clips 29 engaged about this spring and through clip plates 30 that bridge the front face of the carrier plate 26 although it will be understood that this may be connected as desired. A common form of spring shackle 31 is pivoted at one end of the transverse portion 21 of the bumper frame and with this shackle are pivotally connected the ends of the semi-elliptical spring 28.

Upon the carrier plate 26 is mounted a pneumatic bumper head. This bumper head consists of a tubular casing 32 that may be of leather, that may be built up of rubber and fabric as is the shoe of a pneumatic tire or that may be of other specific material or combination of materials. Upon each end of the casing is disposed a cap 33, preferably of leather and which is connected to a flap 34 circumscribing the casing through the medium of a lacing 35. This lacing not only facilitates application and rule of the cap but holds it securely in place. This casing is disposed against the front face of the carrier plate 26 and in order to retain it in such position, it is provided at intervals with flaps 36 oppositely disposed in pairs and the flaps of each pair engage respectively over and under the corresponding edges of the carrier plate and are perforated to receive lacing thongs 37 which cause the flaps and the casing to grip the carrier plate with sufficient tenacity to hold the casing from sliding along the carrier plate. The upper line of flaps prevents the casing from downward movement while the lower line of flaps prevents its upward movement of the carrier plate.

Within the casing is disposed a pneumatic tube 38 having the usual filling stem 39 that is passed through the rear side of the casing and through a corresponding opening in the carrier plate whereby the two may be inflated and deflated without removal of it. The pneumatic tube is normally in a straight section that bends to conformity of the casing which in turn of course conforms to the arc shape of the carrier plate. In the formation of this pneumatic tube the end portions have their walls vulcanized together to form the end tabs 40. It is found in practice however that unless the tube is reinforced, it will blow out where the joinder of the walls initiates and for that reason, after the extremities of the walls have been joined by vulcanization of them, an inclosingly reinforcing band 41 is put about the tube and is vulcanized in place.

To prevent chafing of the pneumatic tube on the stitches and other roughnesses on the inner surface of the casing, a fabric lining 45 is provided for the casing while to prevent rattling by vertical movement of the arms 19 with respect to the housings 13, leaf springs 46 are riveted upon the plates 11 in advance of the housings 13 and extend upwardly curvingly in hook shape and press against the lower sides of the arms.

It will be understood that in the use of this apparatus the shock is taken initially by the bumper head and is absorbed in large part by the contained air cushions and blow at the center of the head furthermore, effects tension of the semi-elliptical spring 28 and the goose necked spring 27 while the blow is of sufficient violence and if it is additionally violent it effects retrograde movement of the bumper frame and a further compression of the springs 25 which latter are at all times under a degree of tension sufficient to prevent rattling of the associated parts.

The shackle suspension of the semi-elliptical spring permits also lateral swinging movement of the bumper head which is yieldingly restricted by the goose necked spring 27 and it will be readily understood that these various shock absorbing elements respond correspondingly to the resultance of the various blows delivered to the bumper head. The particular characters of the various shock absorbing media and their particular arrangements are found in practice to respond to every requirement, thus saving the vehicle from injury as well as the occupants of the vehicle and whatever may be struck by the vehicle. Furthermore, the very rigid manner of mounting the apparatus insures against slipping of it with respect to the chassis frame while the utilization of the particular bumper frame and the addition of the cross brace 42 which connects the other ends of the attaching plates 11 and is bolted through them and to the chassis frame, insures against lateral collapsation of the structure and affords that element of durability against glancing blows that is essential in a structure of this kind.

What is claimed is:

1. The combination with a chassis frame and its horns, of attaching plates disposed upon the frame and having terminal hooks in which the extremities of the horns are received, of a shock absorbing mechanism connected with the plates rearwardly of the hooks in position to deliver shocks in use, in the direction of seating of the hooks about the extremities of the horns.

2. A bumper for motor vehicles compris-

ing a frame having means for yieldably connecting it with a chassis, a bumper head, and a leaf spring connected intermediate of its ends with the bumper head and having terminal shackle connections with the bumper frame.

3. A bumper for motor vehicles comprising a bumper frame including spaced arms and a connecting portion at their forward ends, the frame being adapted for connection with a chassis, a bumper head, a leaf spring connected between its ends with the bumper head and having terminal shackle connections with the bumper frame at the forward ends of its arms whereby the head may have lateral movement with respect to the frame and springs disposed to retard such lateral swinging movement.

4. A bumper for motor vehicles comprising a bumper frame including spaced arms and a connecting portion at their forward ends, the frame being adapted for connection with a chassis, a bumper head, a leaf spring connected between its ends with the bumper head and having terminal shackle connections with the bumper frame at the forward ends of its arms whereby the head may have lateral movement with respect to the frame and a goose necked spring connected between each end portion of the bumper head and the forward end portion of a frame arm.

5. A bumper for motor vehicles comprising a bumper frame including spaced arms and a connection portion at their forward ends, the frame being adapted for connection with a chassis, a bumper head, a leaf spring connected between its ends with the bumper head and having terminal shackle connections with the bumper frame at the forward ends of its arms whereby the head may have lateral movement with respect to the frame and a goose necked spring connected between each end portion of the bumper head and the forward end portion of a frame arm, the bumper head including a pneumatic element disposed forwardly in position to receive direct contact in use.

6. A bumper for motor vehicles comprising an arcuate pneumatic head, a bumper frame, a spring disposed between the bumper head and the frame in position to resist movement of the head toward the frame and connected with the head and frame to permit of limited lateral movement of the head with respect to the frame and supplemental means for resisting such lateral movement.

7. A bumper for motor vehicles including a head comprising a carrier plate, a casing disposed against the outer face of the carrier plate and having flaps engaging over the upper and lower edges of the carrier plate and having securing means, and a pneumatic filler for the casing.

8. A bumper for motor vehicles comprising a head including a tubular collapsible casing having a circumscribing flap near each end, a pneumatic filler removably disposed in the casing and a cap disposed over each end of the casing and laced to the corresponding flap.

9. A bumper for motor vehicles comprising a head including a carrier plate, a casing removably connected therewith and an air tube within the casing, the air tube having the end portions of its walls united to effect disclosure of the tube and a reinforcing strip secured about the tube and extending longitudinally of it in both directions of the line of initiation of joinder of the two walls.

In testimony whereof I affix my signature in the presence of two witnesses.

JAMES KNOX WHITAKER, JR.

Witnesses:

ARTHUR F. SULLIVAN,

ERNEST ZAHN, Jr.