June 17, 1924. 1,497,902

W. J. GROTENHUIS

AUTOMOBILE BUMPER

Filed Dec. 6, 1923

Fig. 1

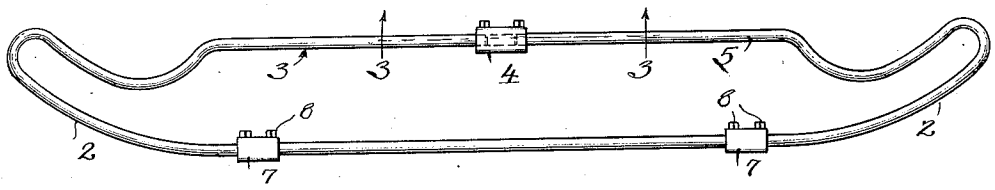
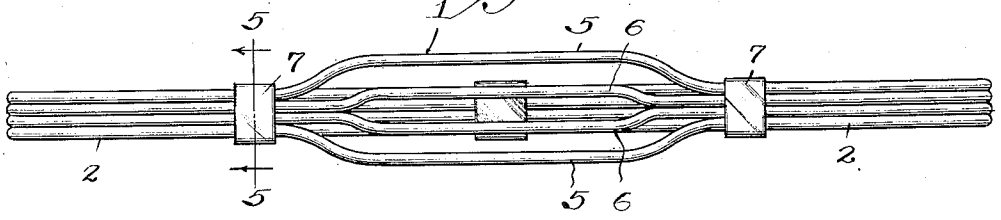


Fig. 2



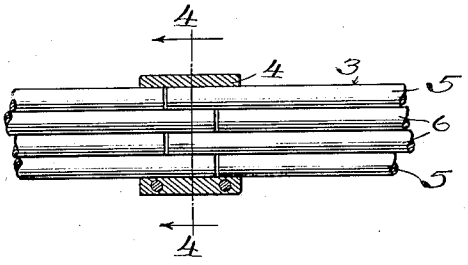


Fig. 3

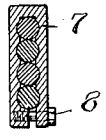


Fig. 5

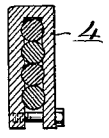


Fig. 4

Inventor,
William J. Grotenhuis
By Offield, Buckley, Baker & Baker, Attys.

Patented June 17, 1924. 1,497,902

UNITED STATES PATENT OFFICE.

WILLIAM J. GROTENHUIS, OF CHICAGO, ILLINOIS, ASSIGNOR TO BIFLEX PRODUCTS COMPANY, OF WAUKEGAN, ILLINOIS, A CORPORATION OF DELAWARE.

AUTOMOBILE BUMPER.

Application filed December 6, 1923. Serial No. 678,798.

To all whom it may concern:

Be it known that I, WILLIAM J. GROTENHUIS, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automobile Bumpers, of which the following is a specification.

This invention relates to improvements in automobile bumpers, and more particularly to bumpers of the resilient or spring bar type and characterized further by the provision of a widened impact area, centrally of the impact member.

The object of the invention is to provide an improved construction for bumpers of the general character described, by the utilization of a plurality of round bars secured together and arranged in a vertical plane, thus providing a composite structure having the same general characteristics of a single bar, but with the added advantage of increased strength.

The bumper embodying the invention is clearly illustrated in the accompanying drawing, wherein

Figure 1 is a top plan view of the bumper,

Figure 2 is a view in front elevation of the bumper,

Figure 3 is an enlarged detail view in section, taken on line 3, 3 of Figure 1, to show the manner in which the bars are held in position by means of the clamps,

Figure 4 is a detail view in vertical section through the rear clamp, taken on line 4, 4 of Figure 3, and

Figure 5 is a detail view in vertical section through one of the front clamps, as taken on line 5, 5 of Figure 2.

In general, the shape and contour of the bumper is a reproduction of the bumper disclosed in Letters Patent No. 1,374,893, granted to William G. Pancoast and myself, and carries out the scheme of a forward impact member having a widened central area 1 with narrow end sections 2, 2 of substantially the width of a single bar, which are bent rearwardly and inwardly in the form of loops, and thence carried inwardly and parallel to the impact member to form a rear bar 3, the ends of the bars meeting in abutting engagement and secured by a clamp 4 at the middle of said rear bar.

In the present construction the entire bumper is made up of several bars clamped together and similarly shaped or bent to extend throughout the entire length of the structure, that is, from the central clamp 4, around the front impact member, and back to the clamp.

As a preferable method of carrying out the invention, the material used consists of four steel bars of circular cross section, resembling round rods. They are of a uniform diameter of, say, five-eighths of an inch, and assembled so that they engage one upon the other, thus forming a composite bar of four times the diameter of a single bar, or what would ordinarily be the width of a single flat bar. Throughout the central impact area 1 the outer bars 5, 5 are spread in opposite directions to form the outline of this portion of the bumper, and the inner bars 6. 6 are spread or bent in a less degree, with the result that they form the central portion of the impact area. Moreover, the bending of the bars at the widened impact area is not abrupt, being rather a tapering or diverging from the ends of the widened area to the full spread of the bars. Aside from the bending of each bar to conform to its position in the assembled bumper there is no distinction between them, although it is convenient to consider them as arranged in pairs, particularly in the formation of the central impact area 1.

The shaped bars are assembled in proper order, and clamped together in front as well as rear by pairs of clamps 7, 7 which are located on either side of the central impact area. These clamps may be of any suitable form, such as U-shaped members opening at one end to permit it to be slipped over the bars, and a bolt or screw 8 passed through the open end. It is necessary, however, that the clamp hug the bars tightly in order to secure them against displacement, and for this reason the inner faces of the openings through the clamps are provided with a series of concave depressions which fit the circular periphery of the bars.

The rear clamp 4 is similarly formed, it being understood that the same is applied after the bars have been assembled and the ends brought together. As a preferable method, however, of treating the ends of the bars, the points of contact or abutment are offset from a vertical line, in staggered

relation, as shown in Figure 3, and resembling somewhat a dove-tailing of the ends. This tends to increase the strength at the joint. Moreover, the end portions of the bars are preferably welded together, both at the abutting ends and adjacent thereto, so as to provide a substantially solid bar at the point of clamping.

The primary advantage of this construction, as hereinbefore intimated, is to obtain the maximum of strength, with a minimum of material, and therefore, of weight. By strength is meant the capacity of the bars to resist the force of a horizontal blow delivered against any portion of the forward impact member. Since each bar individually offers the maximum resistance by reason of its circular cross section, it follows that the uniting of two or more bars multiplies the strength without increasing the weight in any greater proportion. Thus, comparing an impact member formed of several bars with a solid flat bar of the same width and weight per linear unit, the former affords greater transverse dimension or thickness, and therefore offers greater resistance against impact. To illustrate, a solid bar of, say, $2\frac{1}{2}$ inches in width and $\frac{3}{8}$ inch in thickness, and a bar made up of four $\frac{5}{8}$ inch bars, are of the same width and substantially the same weight per linear unit, with the advantage in favor of the latter with $\frac{1}{4}$ inch greater effective thickness without increase in weight.

It is to be understood that the same advantages herein enumerated can be obtained by the use of bars of shapes other than round. Moreover, the bars may be spaced apart throughout the entire length of the bumper without departing from the spirit of the invention.

Having described the structure embodying the invention, and the principal advantages thereof, I claim:

1. A bumper comprising a resilient impact member consisting of a plurality of separate bars of substantially uniform transverse dimension, extending throughout the length thereof and secured together one above the other throughout a portion of its length, and spaced apart to form a portion of increased width.

2. A bumper comprising a composite bar consisting of a plurality of smaller bars extending one above the other throughout the length thereof and spaced apart vertically throughout one portion of its length to provide an area of increased width.

3. A bumper comprising an impact member consisting of a plurality of round bars secured in contact one above the other throughout the end portions of said member, and offset vertically from the center line of said member throughout the central portion thereof, to form an area of increased width.

4. A bumper comprising an impact member having the form of a composite bar extending the length of said member and consisting of a plurality of smaller bars secured together and having a portion of increased width intermediate its ends formed by spreading said smaller bars apart vertically with substantially uniform spaces therebetween.

5. A bumper comprising a composite bar of greater width than thickness and consisting of a plurality of round bars of a diameter equal to the thickness of the composite bar, and having a portion of increased vertical dimension whereat said round bars are spaced apart at substantially uniform distances.

6. A bumper comprising a composite bar consisting of a plurality of round resilient bars clamped together in contact one above the other in the same plane, said bar being shaped to form an impact member and U-shaped end portions extending rearwardly and inwardly and meeting in abutting engagement rearwardly of said impact member, and clamps for securing said bars together at a plurality of points and at the ends thereof.

7. An automobile bumper consisting of a composite bar made up of a plurality of round bars secured together in lengthwise contact, the end portions of said bar being bent rearwardly and inwardly and brought together and secured with the ends of said round bars in abutting relation.

8. A bumper comprising a composite bar consisting of a plurality of round bars secured together in lengthwise contact and bent to form an impact member and U-shaped end portions, the central portion of said impact member being increased in width by the spreading of said bars in vertically spaced relation.

9. A bumper comprising a composite bar consisting of a plurality of resilient bars of circular cross section secured together one above the other in the same plane, said bar being shaped to form an impact member, U-shaped end portions, and a rear bar, the abutting ends of said circular bars being welded together in staggered relation and further secured by means of a clamp, said impact member having a widened central portion formed by the spreading of said bars in vertically spaced relation, and clamps applied beyond said widened portion.

In witness whereof, I hereunto subscribe my name this 4th day of December, A. D. 1923.

WILLIAM J. GROTENHUIS.