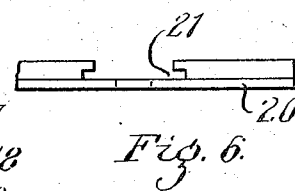
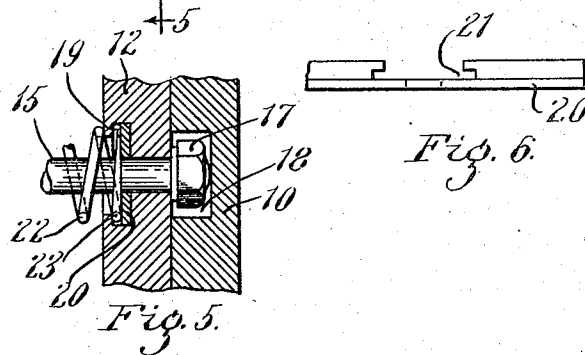
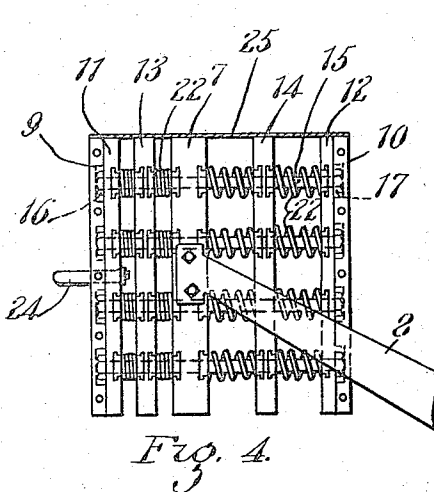
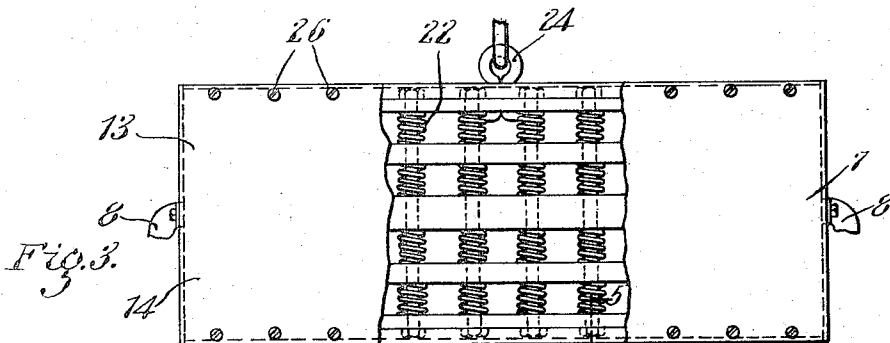
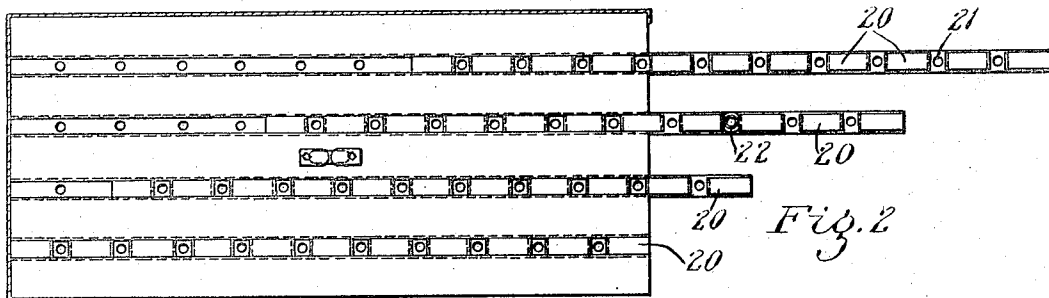
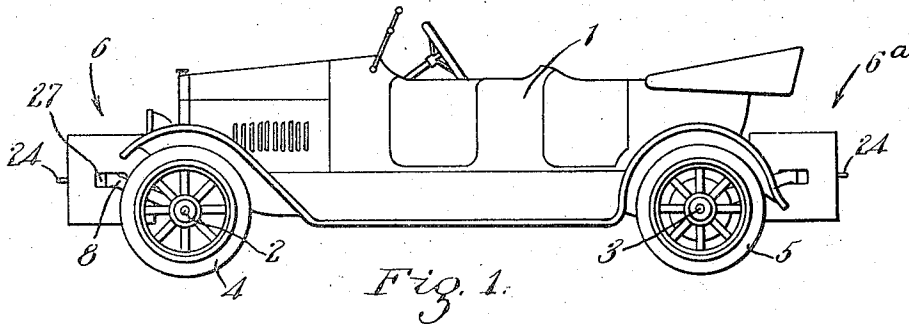


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M. FREEDMAN  
BUFFER FOR VEHICLES

Filed Aug. 4, 1924



Inventor:  
Max Freedman.  
by *Roberts Roberts & Cushman*  
Att'ys.

## UNITED STATES PATENT OFFICE.

MAX FREEDMAN, OF BOSTON, MASSACHUSETTS.

## / BUFFER FOR VEHICLES.

Application filed August 4, 1924. Serial No. 729,928.

*To all whom it may concern:*

Be it known that I, MAX FREEDMAN, a citizen of the United States of America, and resident of Boston, Roxbury, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Buffers for Vehicles, of which the following is a specification.

This invention relates to resilient buffers or shock absorbers adapted to relieve the shock of impact of two relatively moving bodies and more particularly to an improved buffer for use with vehicles, for example, automobiles, ships, elevators, railway cars, etc. to prevent or alleviate the destructive effects of collision.

Principal objects of the invention are to provide a buffer or shock absorber of compact, and yet highly efficient and resilient type which may be manufactured largely from standard materials at relatively low cost; to provide a buffer device which may readily be attached to a vehicle without substantial change in or modification of the latter; to provide a buffer device which is resilient when subjected to tension as well as to compression so that it may be employed as an elastic towing device; to provide a buffer which may, without substantial change in design or in the parts employed be made in large or small sizes and having more or less resiliency; and to provide a buffer device having interchangeable elements which may readily be replaced when worn or broken.

In the accompanying drawings a preferred embodiment of the invention is illustrated by way of example:

Fig. 1 being a side elevation of an automobile having the improved buffer device mounted at both its front and rear ends;

Fig. 2 is a vertical section through the buffer device, to a larger scale, showing one of the supporting plates with some of its spring carrier bars partially withdrawn to illustrate the mode of application of the springs;

Fig. 3 is a plan view of the buffer with a part of the outer casing broken away to show the internal construction, the springs being shown in their normal position;

Fig. 4 is an end elevation of the buffer, with the casing cut away and shown in section, illustrating the position of the parts when subjected to a heavy blow from the front;

Fig. 5 is a fragmentary section on the line 5—5 of Fig. 3, showing the mode of connecting the springs to the relatively movable supporting plates of the buffer device; and

Fig. 6 is a fragmentary edge elevation of one of the spring carrier bars.

Referring to the drawings the numeral 1 indicates an automobile of any usual construction having the front and rear axles 2 and 3 respectively and the wheels 4 and 5. The numerals 6 and 6<sup>a</sup> respectively indicate generally buffer devices embodying the present invention mounted upon the front and rear ends of the automobile.

Referring particularly to Figs. 4 and 5 the improved buffer comprises a support 7 preferably in the form of a relatively thick plate provided at its opposite vertical edges with brackets 8 by means of which it may be secured to the frame structure of the vehicle upon which it is to be mounted. Spaced from the opposite sides of the plate 7 are composite impact members comprising the outer plates 9 and 10 respectively and the inner supporting plates 11 and 12. The plates 9 and 11 and the plates 10 and 12 may be secured together if desired in any suitable manner, the securing means not being shown. One or more additional plates for example, the plates 13 and 14 may, if desired, be interposed between the respective impact members and the central supporting plate 7. The impact members, as well as the intermediate plates 13 and 14, are substantially parallel to the supporting plate 7 and the several plates are held in proper relationship and guided in their movements by means of a plurality of guide rods or bolts 15 whose opposite ends are engaged by nuts 16 and 17 respectively disposed between the outer plates 9 and 10 and the cooperating inner plates 11 and 12 respectively. Preferably the outer plates 9 and 10 respectively of the impact members are furnished with recesses 18 for the reception of the threaded ends of the rods 15 and the nuts 16 and 17. The rods 15 pass through aligned openings in the intermediate plates preferably with a sliding fit in said openings.

The opposed faces of each pair of adjacent plates, for example, the plates 12 and 14 are provided with parallel undercut slots 19 preferably of dovetail cross section. The slots 19 in the opposed faces of adjacent plates are opposite to each other and par-

allel. These slots are adapted to receive spring carrier bars 20 which may be slipped endwise into the slots as shown at the lower part of Fig. 2, or which may be withdrawn from such slots as shown at the upper part of Fig. 2. Each of these spring carrier bars is provided with a plurality of longitudinally spaced undercut or dovetail slots 21 which extend transversely of the width of the bars. These slots are in the outer surface of the bars when the latter are seated in the slots 19 of the plates.

Open coil springs 22 of the compression type embrace each of the bars 15, such springs preferably being interposed between each pair of adjacent plates.

In assembling the device the carrier bars 20 are first removed from their supporting plates and one end of each of the springs to be associated with each carrier bar is slipped into the transverse slot 21 in the latter. The opposite ends of said springs are then slipped into the corresponding slots of the opposed carrier bar, and the pair of bars with their interposed springs are then pushed endwise into the corresponding groove 19 of an opposed pair of supporting plates. Similarly the other pairs of carrier bars are provided with springs and slipped into position between the several sets of plates. After the carrier bars have been inserted in the slots in their supporting plates the ends of the springs are securely held in interlocked relation with the plates by reason of the undercut or dovetail character of the intersecting slots 11 and 19 so that the springs can not readily be pulled out of such slots when subjected to tension.

One or both of the impact members may be provided with a hook or eye 24 to which a tractor device, for example a draw-bar, may be secured for towing the vehicle.

In the normal position of the parts when not subjected to stress, the springs all occupy substantially like positions as shown in Fig. 3 with their coils open. If the vehicle collides with another the shock is received by the outer impact member and causes compression of all of the springs between the said member and central support 7. At the same time the movement of the bars 15 longitudinally through the support 7 causes the rear impact member to recede from the support 7, thus tensioning all of the springs between it and said support. Thus all of the springs in the device are stressed simultaneously when the device is subject to impact. Similarly if a tractor element, such as a draw-bar, be attached to the member 24 any pull exerted thereon is borne by all of the springs of the device, some of such springs acting under compression and others under tension.

If at any time any of the springs are broken or lose their resiliency they may

readily be removed by withdrawing the particular pair of carrier bars 20 to which they are secured and after replacement of the springs the carried bars may be returned to their position between the plates.

While not necessary, it is preferred to provide a cover or casing 25 enclosing the intermediate supporting plates and the springs. This cover or casing, preferably of sheet metal, may be attached by means of screws 26 to the edges of the members 9 and 10 and is provided with elongate slots 27 to permit the passage of the brackets 8 without interfering with the movement of the abutment members relative to the support 7.

When employed as a towing device it is unnecessary to employ a long rope or chain between the vehicle being towed and the towing vehicle for the resiliency of the buffer both to compression and tension eliminates all danger of injury due to sudden stopping or starting of either vehicle, thus making it practical to connect several vehicles in trains by means of short draw-bars or equivalent devices.

The construction is such as to adapt it to a wide variation in sizes and resiliency without departing from the general principle of its design, while it is highly effective for its intended purpose when subjected either to compression or tension.

While herein shown as applied to an automobile it is to be understood that the device is capable of application to other vehicles such for example as ships, elevators, railway cars, etc., and in fact in any place where it is desired to absorb the shock of impact of two relatively moving bodies and thus to avoid destruction of such relatively moving parts.

I claim:

1. A buffer device comprising a support, movable members disposed at opposite sides of the support and spaced therefrom, said members being connected to move as a unit, guide rods passing through openings in the support, the opposite ends of the rods being secured to the respective movable members, and springs interposed between the support and each of said movable members, the springs between the support and one of said members acting as compression springs and the springs between the support and the other of said members acting as tension springs.

2. A buffer device comprising a pair of spaced, substantially parallel relatively movable members, the opposed surfaces of said members being provided with dovetail slots, a carrier bar slidable endwise into each slot, and a plurality of springs having their opposite ends secured to the respective carrier bars.

3. A buffer device comprising a pair of

spaced relatively movable members, and a coiled spring having its ends disposed in and interlocked with undercut recesses in the opposed faces respectively of said members.

4. A buffer device comprising a pair of spaced relatively movable members, carrier bars detachably secured to the opposed faces of the respective members, and a plurality of springs attached to the carrier bars and normally interposed between said movable members, the springs being removable with the carrier bars from between said members.

5. A buffer device comprising a pair of spaced relatively movable members, detachable carrier bars having interlocking engagement with elements at the opposed faces of the respective members, and a plurality of coiled springs having their opposite ends respectively detachably interlocked with oppositely disposed carrier bars.

6. A buffer device comprising a pair of spaced substantially parallel relatively movable members, the opposed surfaces of said members being provided with dovetail slots, a carrier bar slidable endwise into each slot, each carrier bar having a transversely extending undercut slot in its outer face, and a coiled spring having its opposite ends seated in the undercut slots of the opposed carrier bars.

7. A buffer device comprising a pair of

spaced substantially parallel relatively movable plates, the opposed surfaces of the plates have series of parallel dovetail slots, a carrier bar slidable endwise into each of said slots, each carrier bar being provided with spaced dovetail slots in its outer face extending transversely of its length, and coiled springs interposed between said plates, the opposite ends of said springs being seated in the transverse slots of opposed carrier bars.

8. A buffer device comprising a supporting plate provided with means for attaching it to a vehicle, a plurality of spaced relatively movable and parallel plates disposed at either side of the supporting plate, parallel guide rods having their opposite ends secured to the outermost of the several plates respectively and passing freely through aligned openings in the intermediate plates, coiled springs embracing said guide rods, certain of said springs being interposed between each pair of adjacent plates, the opposite ends of each spring being detachably interlocked with the plates between which it is located, and a casing enclosing the springs and intermediate plates.

Signed by me at Boston Massachusetts  
this 1st day of August 1924.

MAX FREEDMAN.