

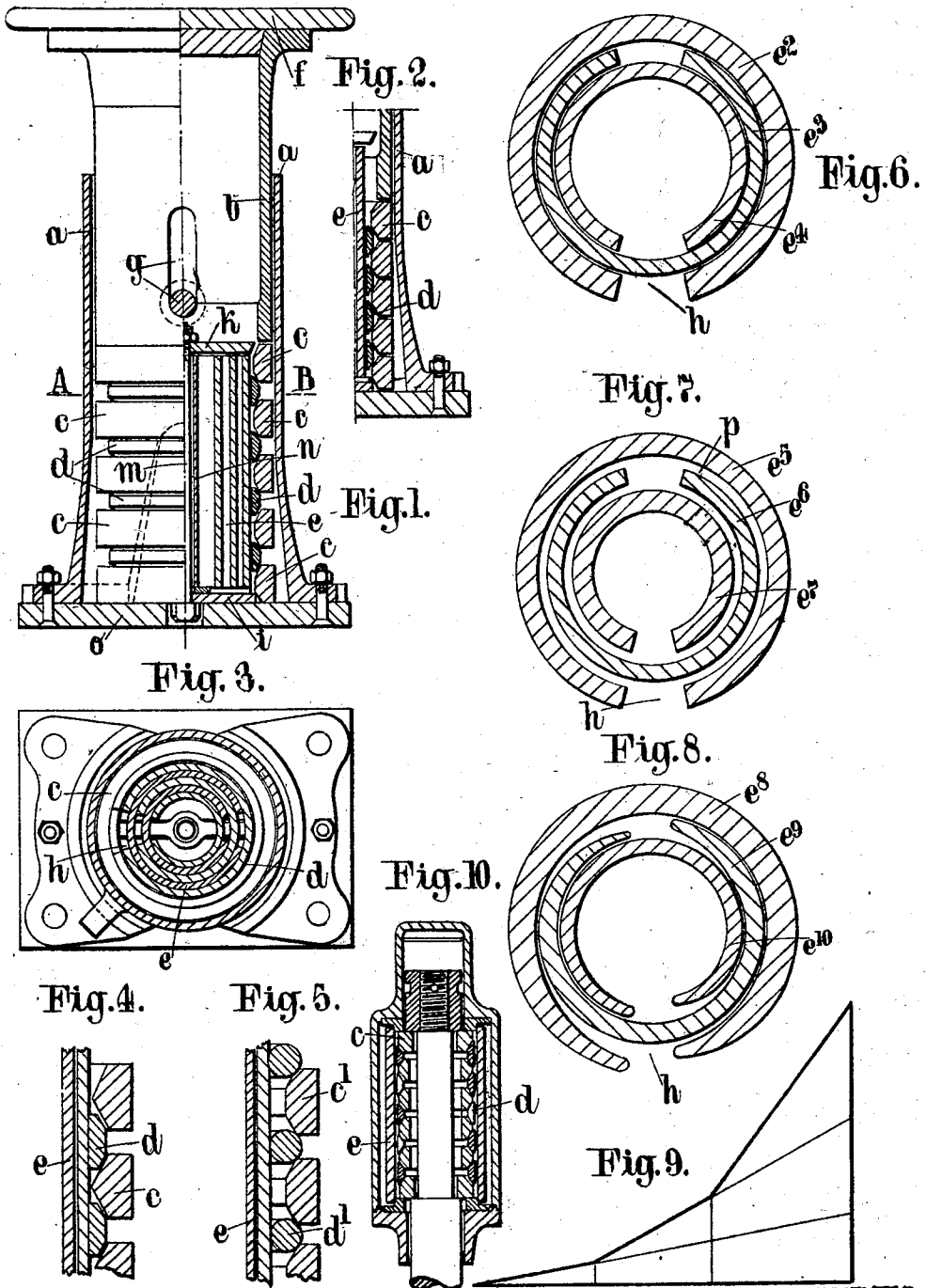
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BUFFER FOR RAILWAY AND LIKE CARS

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BUFFER FOR RAILWAY AND LIKE CARS.

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The known buffers for railway and like cars employing volute springs of rectangular or oval section have the drawback that the shocks are transmitted in an axial direction to the buffer frames and the underframes of the cars which are therefore liable to be damaged by violent or excessive shocks. The cost of replacing the broken or damaged buffer springs is very high.

It is the object of the present invention to provide a construction which will avoid these drawbacks. According to the invention the buffer is so arranged that a shock or force acting in the longitudinal direction is transmitted in a radial direction to the buffer casing. The buffer spring is composed of a number of sections which are independently exchangeable and replaceable.

The invention will now be fully described with reference to the accompanying drawings and the scope of the invention will be set out in the appended claims.

Fig. 1 is a longitudinal section and partly a plan of a buffer construction embodying the features of the invention.

Fig. 2 is a fragmentary longitudinal section similar to Fig. 1 showing the parts in the extreme position corresponding to full compression of the buffer spring.

Fig. 3 is a cross section on line A—B of Fig. 1.

Figs. 4 and 5 illustrate in longitudinal section two constructions of the parts transmitting the shock to the spring device.

Figs. 6, 7 and 8 are cross sections of three different constructions of the buffer spring.

Fig. 9 is a pressure diagram.

Fig. 10 illustrates an arrangement in which instead of an internal an external buffer spring is used.

The buffer comprises a casing *a*, a ram or plunger *b* having the usual head *f*, the casing and the plunger having the usual pin and slot connection *g*. The spring device comprises a number of springs *e* arranged within each other separated from one another by concentric air spaces and each being of approximately cylindrical form open at both ends and provided with a longitudinal slot of the required width. Five springs are shown in Figs. 1 and 3, but any desired number of springs may be used. Slots *h* of two adjacent springs are preferably arranged diametrically opposite each other. The springs *e* are loosely held between end bars *i* and *h* which are connected by a bolt *m*

and are held at the required distance by a distance sleeve *n*. The outermost spring *e* is enclosed by a number, in the example shown four, split rings *d* having conically shaped ends or bevelled surfaces bearing against conically shaped ends or bevelled surfaces of solid rings *c* (see Fig. 4). In the modified construction shown in Fig. 5 the rings *d'* are of circular section. The outermost ring *c* is in contact with the inner end of the buffer plunger *b* whilst the innermost ring *c* bears against the base *o* of the buffer casing. The operation is as follows.

Upon the buffer ram *b* being forced inwards, the solid rings *c* are moved towards each other compressing the rings *d* which in turn compress the springs *e*. The outermost spring *e* will be first compressed and will in turn compress the adjacent spring and so on. Fig. 2 shows the rings *c* in the extreme position.

It may be pointed out that the rings *d* are compressed by the action of the conical ends of the rings *c*. A considerable amount of the shock is absorbed by the friction between the rings *c* and *d* before or at the same time as the inner spring sections *e* are brought into action. Experiments carried out with the described arrangement show that the recoil amounts to only 2-10% of the shock.

In order to subject the sections *e* of the inner spring to a uniform strain, these sections may be constructed in the manner shown in detail in Figs. 6, 7 and 8. In the construction shown in Fig. 6 the thickness of the outermost spring section *e*² is greater than that of the spring section of the middle spring section *e*³ which again is greater than that of the inner spring section *e*⁴. In this construction it is assumed that the sections are arranged close together or with very small intervening space in the normal condition of the buffer.

In the construction shown in Fig. 7, the thickness of the three sections *e*⁵, *e*⁶ and *e*⁷ is the same or approximately the same, a fairly considerable intervening space or play *p* being left between the adjacent sections.

In the construction shown in Fig. 8 the sections *e*⁸, *e*⁹ and *e*¹⁰ are so formed as to allow their ends to overlap in the fully compressed condition of the buffer.

Fig. 9 illustrates the working or pressure diagram which shows that the pressure line is concave in the case of an intervening space

being left between the individual sections of the inner spring.

It will be understood that the shock is taken up to a considerable extent by friction whereby the strain upon the inner spring is relieved. The spaces between the various parts of the spring device viz, *c*, *d* and *e* may be filled with grease.

The number of the sections *e* may be any desired number and depends on the particular conditions of working. The sections *e* may be of coned cylindrical form.

The arrangement of the parts *c* and *e* may be reversed as shown in Fig. 10, that is, the solid rings *c* may be arranged internally and the split cylindrical springs *e* may be arranged externally, the split ring *d* being, as in the previous case, arranged between *c* and *e*. The latter arrangement is particularly suitable for tramcars and light railway cars.

The whole spring device comprising the parts *c*, *d* and *e* may be easily removed as a whole.

I claim:

1. A buffer gear for railway and like cars comprising in combination: solid rings adapted to move longitudinally, intermediate split rings adapted to be compressed or expanded radially by the longitudinal movement of said solid rings, and a single series of concentrically arranged approximately cylindrical split springs separated one from another by concentric air spaces and adapted to be compressed or expanded one after the other in successive operations by the action of said intermediate rings whereby longitudinal forces or shocks are transmitted radially to the said series of split springs, substantially as described.

2. A buffer gear for railway and like cars comprising in combination: solid rings adapted to move longitudinally, intermediate split rings adapted to be flexed radially by the longitudinal movement of said solid rings, and a single series of concentrically arranged approximately cylindrical split springs separated one from another by concentric air spaces and adapted to be flexed one after the other in successive operations by the action of the said intermediate rings, whereby longitudinal forces or shocks are transmitted radially to the said series of split springs, said cylindrical split springs being so constructed as to enable the edges of each spring at the split part to overlap during flexing and being of diminishing thickness according as their radial distances from the point of application of the transmitted forces increase, substantially as described.

3. A buffer gear for railway and like cars comprising in combination: solid rings adapted to move longitudinally, intermediate split rings adapted to be compressed or

expanded radially by the longitudinal movement of said solid rings, and a single series of concentrically arranged split springs of approximately cylindrical form separated one from another by concentric air spaces and adapted to be compressed or expanded one after the other in successive operations by the action of the said intermediate rings whereby longitudinal forces or shocks are transmitted radially to the said series of split springs, said springs being of diminishing thickness according as their radial distances from the point of application of the transmitted forces increase, substantially as described.

4. A buffer gear for railway and like cars comprising in combination: solid rings adapted to move longitudinally, intermediate split rings adapted to be compressed radially by the longitudinal movement of said solid rings, and a series of approximately cylindrical split springs arranged concentrically and interiorly to said split rings and separated one from another by concentric air spaces, said cylindrical split springs being adapted to be compressed one after the other in successive operations by the action of the said intermediate rings whereby longitudinal forces or shocks are transmitted radially to the said series of split springs, said springs being of diminishing thickness according as their radial distances from the point of application of the transmitted forces increase, substantially as described.

5. A buffer gear for railway and like cars comprising in combination: solid rings adapted to move longitudinally and having interior bevelled surfaces, intermediate split rings adapted to be compressed radially by the longitudinal movement of said solid rings and having exterior bevelled surfaces adapted to co-operate with said interior bevelled surfaces on said solid rings, and a series of concentrically arranged approximately cylindrical split springs separated one from another by air spaces and adapted to be compressed one after the other in successive operations by the action of the said intermediate rings whereby longitudinal forces or shocks are transmitted radially to the said series of split springs, said springs being of diminishing thickness according as their radial distances from the point of application of the transmitted forces increase, substantially as described.

6. A buffer gear for railway or like cars comprising in combination: solid rings adapted to move longitudinally, intermediate split rings adapted to be compressed or expanded radially by the longitudinal movement of said solid rings, a series of concentrically arranged approximately cylindrical split springs separated one from another by air spaces and adapted to be compressed or

expanded one after the other in successive operations by the action of said intermediate rings, and easily detachable end plates connecting said solid rings said split rings and
5 said split springs in such manner as to render the whole of the said parts easily removable, said springs being of diminishing thickness according as their radial distances from the point of application of the transmitted forces increase, substantially as described.
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7. A buffer gear for railway or like cars comprising in combination: solid rings adapted to move longitudinally and having
15 interior bevelled surfaces, intermediate split rings adapted to be compressed radially by the longitudinal movement of said solid rings and having exterior bevelled surfaces adapted to co-operate with said interior
20 bevelled surfaces on said solid rings, a series of concentrically arranged approximately

cylindrical split springs separated one from another by concentric air spaces and adapted to be compressed one after the other in successive operations by the action of the said
25 intermediate rings, whereby longitudinal forces or shocks are transmitted radially to the said series of split springs, said cylindrical split springs being so constructed as to enable the edges of each spring at the split
30 part to overlap during compression, and detachable end plates connecting said solid rings said split rings and said split springs in such manner as to render the whole of the
35 said parts easily removable, said springs being of diminishing thickness according as their radial distances from the point of application of the transmitted forces increase, substantially as described.

In testimony whereof I have hereunto set
40 my hand.

HEINRICH MOHR.