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J. H. GRAHAM.

SPRING MECHANISM FOR DRAFT RIGGING FOR CARS.

APPLICATION FILED JULY 30, 1902.

NO MODEL.

Fig. 1.

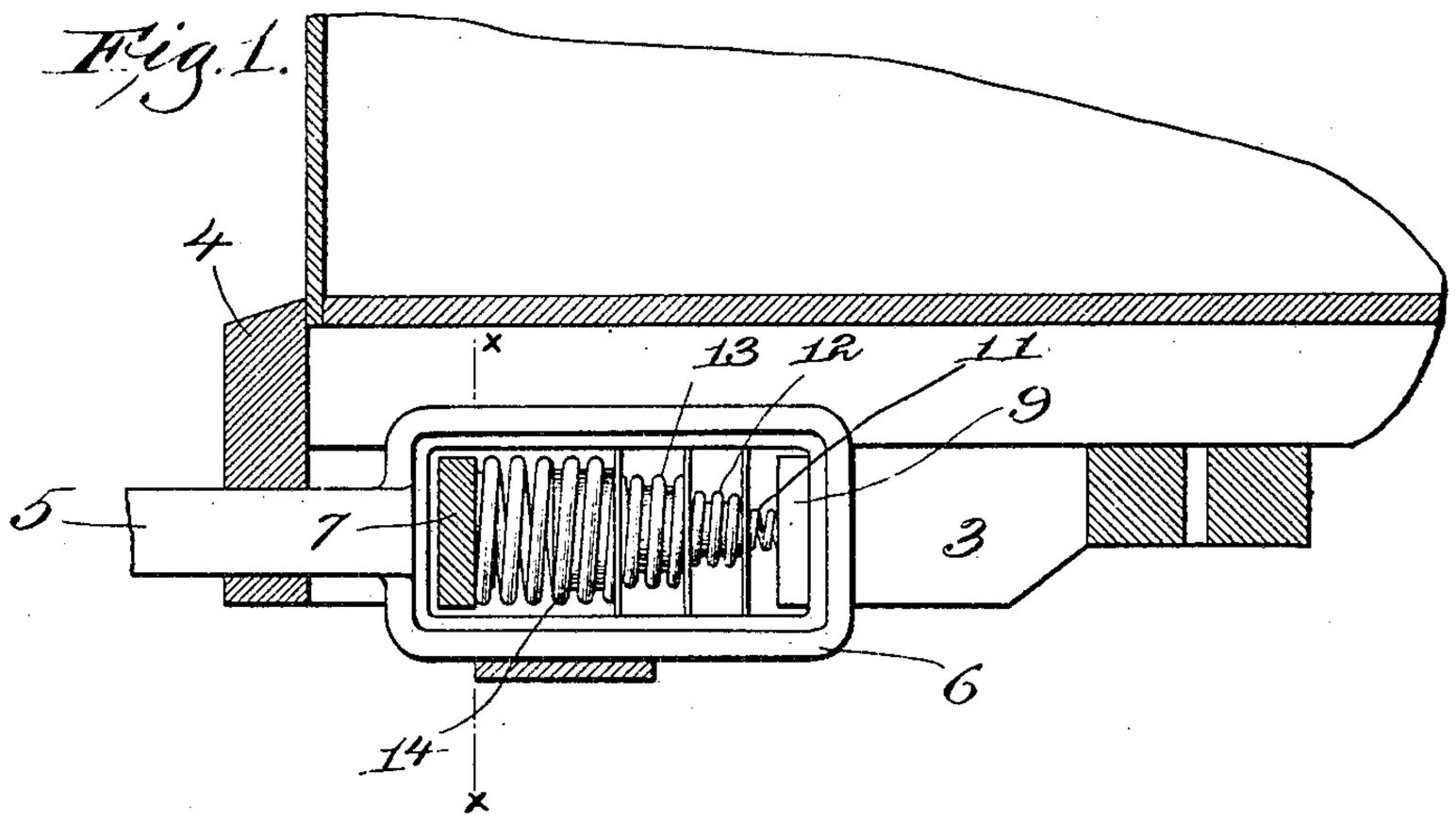


Fig. 2.

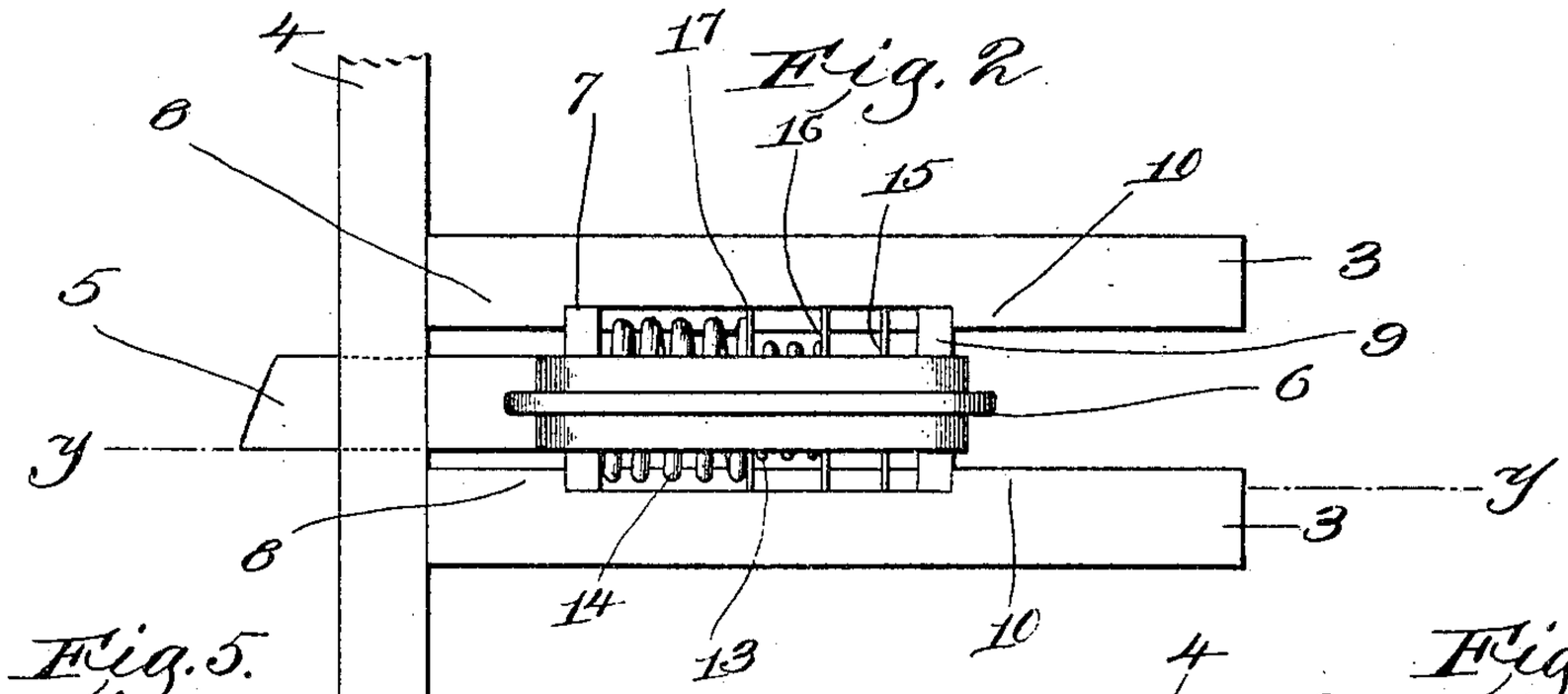


Fig. 5.

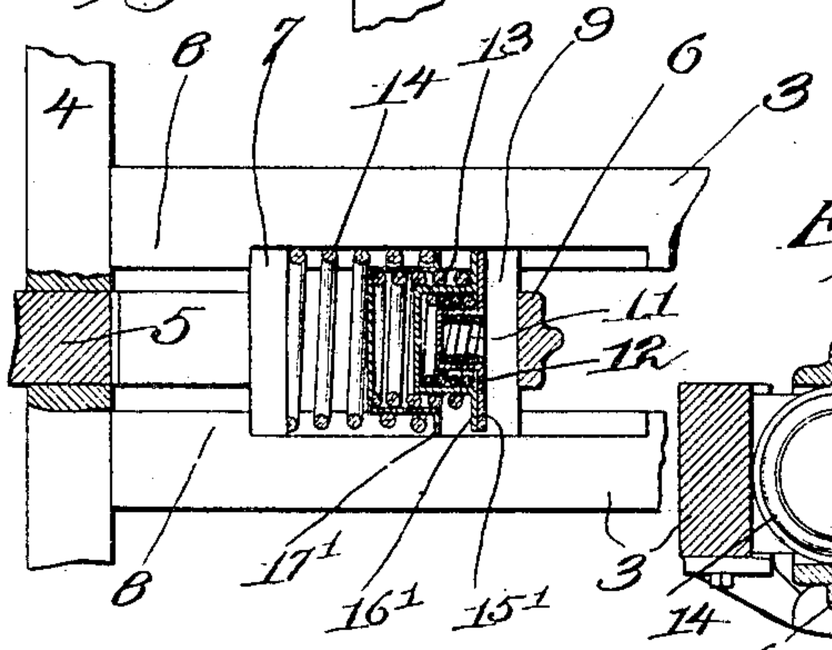


Fig. 3.

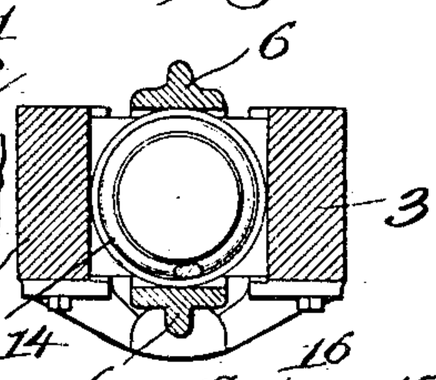
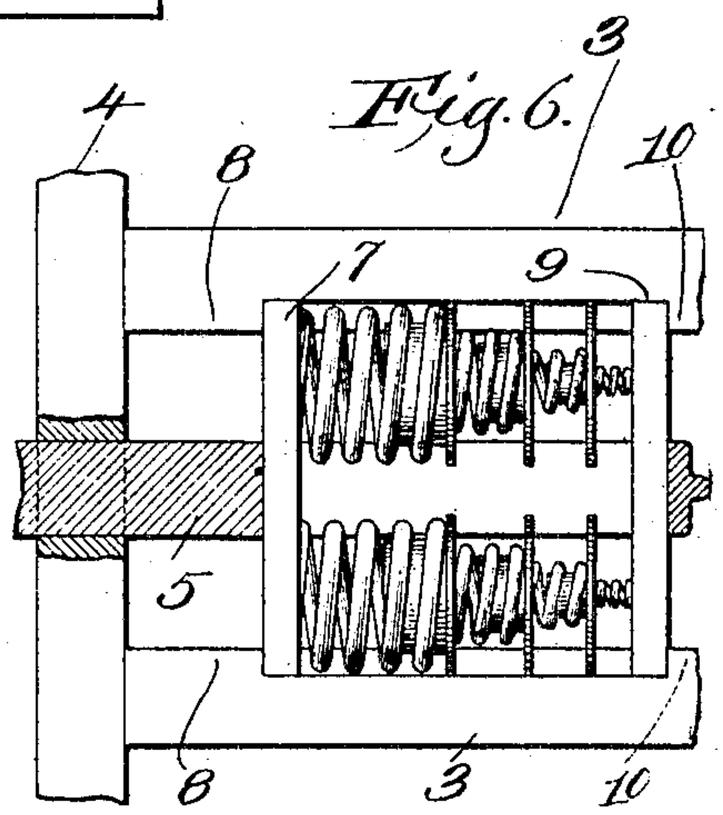


Fig. 4.

Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN H. GRAHAM, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO LEVER SUSPENSION BRAKE COMPANY, A CORPORATION OF MAINE.

SPRING MECHANISM FOR DRAFT-RIGGING FOR CARS.

SPECIFICATION forming part of Letters Patent No. 775,216, dated November 15, 1904.

Application filed July 30, 1902. Serial No. 117,685. (No model.)

To all whom it may concern:

Be it known that I, JOHN HECTOR GRAHAM, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Spring Mechanism for Draft-Rigging for Cars, of which the following description, in connection with the accompanying drawings, is a specification, like figures on the drawings representing like parts.

The draft-rigging of cars is subjected ordinarily to two different kinds of strain—viz., the towing strain, occasioned by the drawing of the cars forward, and the buffing strain, which is that to which the rigging is subjected when two cars move toward each other—as, for instance, when the brakes are suddenly applied to the engine or cars at the front of the train. The latter or buffing strain is generally more or less in the nature of a sharp blow, while the towing strain is more of a steady pull. These strains on the draft-rigging of any one car vary considerably, depending upon the load which is being drawn, the suddenness of a stop, &c., and also depending upon the position of the particular car in the train. For instance, in the case of a long freight train, the draft-rigging at the forward end of the forward car will be subjected to very much greater strain than that on the caboose, for the latter is subjected only to the strain necessary to draw the caboose, while the force necessary to move the entire train is transmitted through the former. It is obviously essential that the spring mechanism in a draft-rigging shall be so constructed as to be capable of withstanding the most severe strain to which it is subjected, whether it be a steady pull, as in the case of towing, or a violent shock, as in the case of buffing, and since the buffing and towing strains vary between wide limits it is extremely desirable to provide a spring mechanism which shall be capable of yielding under any strain whether large or small.

It is impossible practically to construct a spring which will be elastic under all conditions, for a spring which is sufficiently strong to withstand the severest strains to which a draft-rigging is subjected will not yield when the compressing strain is comparatively slight, and therefore is inelastic with reference to a light strain. On the other hand, a spring which will yield and be elastic when the compressing pressure is comparatively small has not sufficient strength to withstand the heavier shocks. In other words, no single spring can be practically made to be elastic when subjected to widely-varying compressing strains.

The ordinary draft-rigging now commonly employed includes a spring mechanism which is made strong enough to withstand the heaviest shocks to which it is subjected, but which is incapable of yielding under a light strain, and the result is that while the spring mechanism of the draft-rigging between any two cars at the front end of a long train is partially compressed by the strain to which it is subjected, and thus the requisite yielding connection between the cars is provided, the spring mechanism between the caboose and the last car or any two cars at the rear of the train is not appreciably affected by the strain to which it is subjected, and hence the connection between said cars or the car and caboose is practically a rigid connection.

It is the object of my invention to devise a novel form of draft-rigging in which the spring mechanism shall be of such a character as to provide the necessary yielding connection between the draw-bar or coupler-shank and the draft-sills whatever may be the tension or strain to which the spring is subjected, and for this purpose I have provided a spring mechanism comprising a plurality of successively-compressible springs, the said springs being arranged in series and being of different strength or tension. The spring of lightest tension or least strength is constructed to yield under the minimum strains to which the draft-rigging is subjected, while the heaviest spring or that of greatest tension and strength is constructed to be capable of withstanding the severest shocks. The springs are arranged in series, so that normally the strain to which they are sub-

jected is transmitted through them in succession, and suitable separators are provided between the springs, which not only hold them in position, but also serve to limit the amount which any one spring can be compressed. With my improved spring mechanism, therefore, as the strain on the draft-rigging increases the spring of least strength or tension is first compressed to its limit. Thereafter any added strain is taken entirely by the remaining springs of the series, and the second spring will be gradually compressed until it reaches its limit of compression, when further strains will be taken entirely by the remaining springs, &c.

My mechanism therefore includes a plurality of springs and means whereby that spring corresponding to the strain to which the mechanism is subjected is brought into action to resist the strain.

Referring to the drawings, Figure 1 is a section on the line *y y*, Fig. 2, showing the spring mechanism of my draft-rigging in elevation. Fig. 2 is a plan view of the draft-rigging. Fig. 3 is a section on the line *x x*, Fig. 1. Fig. 4 is a detail of the spring mechanism. Fig. 5 is a view showing the spring partially compressed, and Fig. 6 is a modification.

3 designates the usual draft-sills of any car, and 4 the end sill. 5 is the shank of any usual or suitable draw-bar or coupler-bar, which has at its inner end the usual strap or yoke 6 surrounding the spring mechanism. 7 is the front follower-plate, which engages the usual cheek-pieces 8 on the draft-sills, and 9 is the rear follower-plate, which engages similar cheek-pieces 10. These parts are or may be of any suitable or usual construction, and as their function is well known to those skilled in the art further description thereof is not necessary.

My invention relates particularly to the spring mechanism which is confined between the front and rear follower-plates, and, as herein illustrated, said mechanism comprises a plurality of springs arranged in series, said springs being of different tension. The number of springs employed may be varied according to the circumstances, and I have herein illustrated the series as comprising four springs 11, 12, 13, and 14. The spring 11, which is shown as abutting against the rear follower 9, is a spring of comparatively small tension and will yield under the minimum strains to which the draft-rigging is subjected. The spring 12 is one of greater tension than spring 11. Spring 13 is still stronger and has a greater tension than spring 12, and spring 14 is the one of greatest tension, it having a strength sufficient to resist the maximum strains to which the draft-rigging is subjected. The springs are separated and are retained in position by means of separators 15, 16, and 17. These separators are preferably in the form of cup-shaped members having flanges 15′, 16′, and 17′, respectively.

The springs are of such a size relative to each other and to the separators that one end of the spring 11 is received in the cup-shaped portion of the separator 15, while one end of the spring 12 sets over said cup-shaped portion and bears against the flange 15′, the other end of said spring 12 being received in the cup-shaped portion of the separator 16. The spring 13 in turn sets over the cup-shaped portion of the separator 16 and bears against its flange 16′, the other end of the spring being received in the cup-shaped portion of the separator 17. One end of the spring 14 bears against the flange 17′ of the separator 17 and the other end against the front follower-plate 7.

The operation of the spring mechanism will be readily understood from the foregoing, from which it will be seen that the minimum strain to which the spring mechanism is subjected will be transmitted through the entire series of springs; but yielding movement will take place entirely in the spring 11 of least tension. When the strain reaches a predetermined amount, the spring 11 will be compressed to such an extent as to bring the flange 15′ against the rear follower-plate 9, after which any added strain will be transmitted directly from the rear to the front follower-plate through the remaining springs of the series, and the second spring 12 will begin to yield, said spring yielding until the flanges of the separators 15 and 16 are brought together, as seen in Fig. 5. Thereafter any further added strain will be transmitted directly through the last two springs of the series, and further yielding movement will result from the compression of the spring 13. In case the spring mechanism is subjected to the maximum strain the spring 13 will be compressed until the flanges 17′ 16′ are brought in contact, when any further strain is taken entirely by the spring of maximum tension.

From the above it will be seen that I have provided a spring mechanism for draft-rigging which has the capacity for yielding and giving the requisite elastic movement under any and all conditions, whether the strain to which it is subjected be the sharp blow occasioned by buffing or the irregular strain occasioned by towing.

While I have herein illustrated a spring mechanism having a series of four springs of different tension, the number of springs may be varied without departing in any way from my invention, and I will use two, four, or any number of springs, as circumstances may dictate.

The particular form of separators employed is not essential to my invention, as it is only

necessary that they have such a shape as to limit the compression of the springs, as above described.

In Fig. 6 I have shown a slight modification wherein two series of springs are employed, said series being arranged side by side. Each series of springs, however, is constructed the same as above described. Where two such parallel series of springs are employed, it will be obvious that the individual springs of each series need not have as great strength as where a single series of springs are employed, for in the former case the strains are divided between the two series.

My invention would not be departed from if more than two series of springs should be employed.

Believing that I am the first to provide a draft-rigging which comprises a plurality of springs arranged in series and having different tension, whereby the springs are successively compressed when subjected to strain, I desire to claim the same broadly.

In the foregoing specification and in the following claims I have used the word "tension" when referring to the springs having "different tension" as meaning the strength of the spring.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a draft-rigging for cars, a draw-bar, draft-sills, and a yielding connection between said parts, said connection comprising a plurality of springs of different strength arranged in a series whereby the initial compressing strain is transmitted through all the springs, and that of least strength is first compressed.

2. In a draft-rigging for cars, a draw-bar, draft-sills, and a yielding connection between said parts, said connection comprising a plurality of nesting springs of different tension arranged in series in the order of their strength whereby the springs are successively compressed beginning with the spring of least tension.

3. In a draft-rigging for cars, a draw-bar, draft-sills, and a yielding connection between said parts, said connection comprising a plurality of nesting springs of different tension arranged in series in order of their strength whereby the springs are successively compressed beginning with the spring of least tension, and means to limit the compression of each spring.

4. In a draft-rigging for cars, a draw-bar, draft-sills, and a yielding connection between said parts, said connection comprising a plurality of springs of different tension arranged in series in the order of their strength, and means to limit the amount of compression of each spring.

5. In a draft-rigging for cars, a draw-bar, draft-sills, and a yielding connection between said parts, said connection comprising a plurality of springs of different tension arranged in series, a separator between adjacent springs, and means to limit the amount of compression of each spring.

6. In a draft-rigging for cars, a draw-bar, draft-sills, and a yielding connection between said parts, said connection comprising a plurality of springs of different tension arranged in series, a separator between adjacent springs, said separator being constructed to engage the next adjacent separator when the intermediate spring has been compressed to a certain amount whereby after any spring has been thus compressed any increased strain is transmitted directly from one separator to the next.

7. In a draft-rigging for cars, a draw-bar having a strap, draft-sills, follower-plates, and a spring mechanism between said plates, said mechanism comprising a series of springs of different tension, and cup-shaped separators having flanges between adjacent springs.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN H. GRAHAM.

Witnesses:
LOUIS C. SMITH,
JOHN C. EDWARDS.