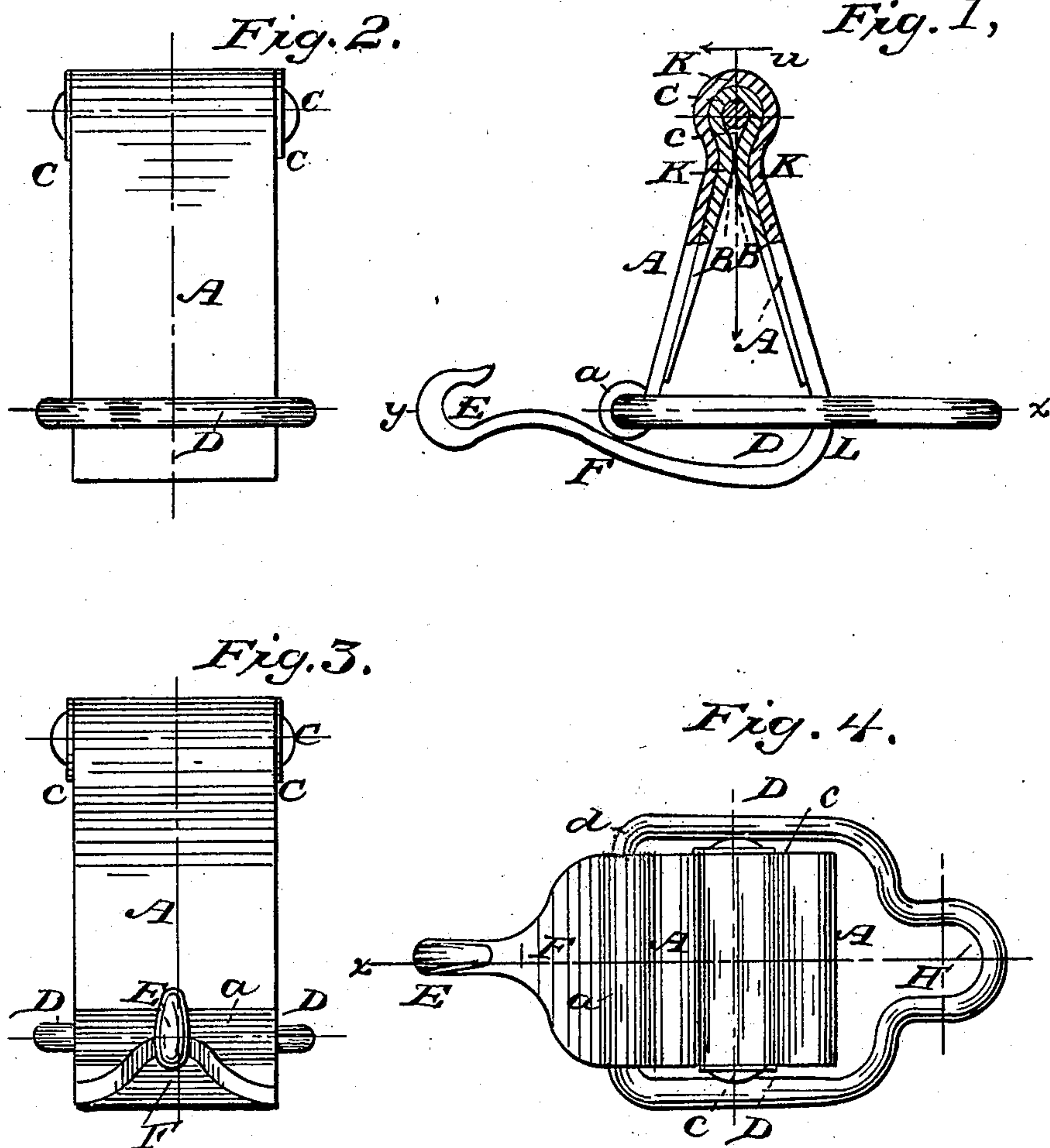


## Whiffletree Hook.

No. 86,863.

Patented Feb. 9, 1869.



WITNESSES  
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# United States Patent Office.

BENJAMIN RICHARDS, OF NORTH INDUSTRY, OHIO.

Letters Patent No. 86,863, dated February 9, 1869.

## IMPROVED SPRING DRAUGHT-LINK

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, BENJAMIN RICHARDS, of North Industry, in the county of Stark, and State of Ohio, have invented new and useful Improvements in Spring Draught-Links; and I do hereby declare that the following is a full, clear, and exact description of my invention, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon, of which drawings—

Figure 1 is a side elevation of my improved spring-link, with the head of spring shown in section.

Figure 2 is a rear elevation of the full link.

Figure 3 is a front elevation of the same.

Figure 4 is a plan of the same.

The nature of my invention consists in certain improvements in "spring draught-links," which are used at the ends of harness-traces, or between the whiffle-tree and its point of attachment to the wagon, or at any suitable point between the motive-power and moving load, for the purpose of reducing the sudden jerk on the horse or motive power, caused by any sudden obstruction to the movement of the load, and also for the purpose of lessening the evils resulting to the connections between the motive-power and load, from such sudden changes in the amount of resistance to the movement of the load.

Said improvements consist—

First, in the novel combination of parts, constituting the head of the V-shaped spring of the spring-link, whereby I greatly increase the strength and durability of said spring without any material increase in its weight.

Second, in so constructing and arranging the draught-link, which connects the front arm of the spring with the load, so that said spring may have a free movement around the front bar of the draught-link, and between the side-bars of the same, whereby I insure a free movement of the draught-link, and prevent any binding or cramping of the spring, which would impair its efficiency; and

Third, in so constructing and arranging the rear arm of the spring, with reference to the front arm and draught-link, as that the end of the same shall serve as the point of attachment for the motive-power, whereby the weight of an extra draught-link is avoided, and a simpler, cheaper, and a more efficient "spring draught-link" is obtained.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The spring A K A is made of flat-bar steel, of a width and thickness depending on the stiffness required in the spring.

On the end of the front arm A is formed the eye *a*, in which is secured the front bar *d* of the draught-link D D.

At the upper part of this arm A the steel is curved

into the arc of a circle, *k*, concave to the outer face of the arm, and from this concavity the steel is bent in the opposite direction, so as to form the round head K, which constitutes the point or toe of the spring.

This round head K is carried around to the point of the concavity *k*, at the head of the rear arm A of the spring, which concavity is of the same size and shape as that of the concavity *k*, at the head of the front arm A, and sets opposite the same, as shown in fig. 1.

The inner faces of the arms A A, at the concavities *k k*, may be so arranged as to touch each other, and thus bring the elasticity of the spring into the arms A A, instead of having it at the head K of the spring; or a considerable space may be left between them, and the elasticity of the steel, at both the head and in the arms of the spring, be thus brought into play; or both of these methods may be combined by leaving a small space between these inner surfaces, so that, as the spring commences to act, both the elasticity in the head and in the arms shall come in play, but as soon as the inner surfaces meet, the elasticity of the arms only shall be in action, thereby increasing the stiffness of the spring, these different modes of forming the heads of the leaves depending on the use to which the link is applied, and the amount of rigidity required in the spring.

In the spring shown in drawings, a second leaf, B B, is shown inside the main leaf A A, and more of these inner leaves can be used, if found desirable, in making a spring of considerable stiffness, each of these inner springs B B being of the same shape as the main spring A A, and setting inside of the same, as shown in fig. 1, or fitting one within the other, in an obvious manner, when more than one inner spring is used, and the space between the concavities of the inner leaf being regulated as before shown.

The lower part of the rear arm A of the spring is prolonged and bent up into an arm, F, which is curved to the shape of a circle, having its centre at the centre of the head K of the spring, and a radius a little greater than the extreme length of the arm A, as seen in fig. 1; and at the end of this arm is formed a hook, E, or any other suitable device, by which the power is secured to the spring.

The thickness of the arm A is somewhat increased at the bend into the arm F, so that as the power is applied to the hook E, the elasticity of the spring shall be obtained by the movement of the eye *a* toward the bend L, between the arms A and F, and the elasticity of the steel through the arm A, head K, and arm A, and not by any bending at the bend L.

The draught-link D D is of the general form shown, having a front bar, *d*, secured in the eye *a* of the spring A A and the side-bars D D, running from the bar *d*, on each side of the arm A of the spring, and forming a head, H, or other suitable device, for securing the link to the load, as shown in fig. 4, from which it is



readily seen that the spring A A can revolve partially around the bar *d*, as an axis, and that all cramping or obstruction to the action of the spring is thus avoided.

In order to give greater strength to the spring A A, as well as to unite with it any inner leaves, B B, that may be used, a bearing-bolt, *c*, of a diameter equal to that of the inside of the round head, K, of the main spring A A, where no inner leaves are used, or of the same diameter as that of the round head of the inner leaf B B, where these leaves are used, is inserted in the round head K, where it is secured by washers *c c*, as shown in figs. 2 and 3.

The peculiar utility of the round head K of the spring A A is, that it avoids the weak "toe" of the common V-shaped spring, which is the weak point in this form of spring, and, in combination with the concavities *k k*, forms a spring specially adapted to the purpose shown, while the bearing-bolt C, when used in combination with this round head, forms a brace to prevent any bending of said head, and thus tends to further reduce the liability of fracture at the toe of the spring.

The advantages resulting from the prolongation of the arm A into the draught-arm F, and the thickening of material around the bend L, so as to materially reduce the elasticity of the arm at said bend is, that by this arrangement the proper perpendicular, or nearly perpendicular, position of the central line *u v* of the spring A A to the line of draught *x y*, is insured, and also the free play of the arm A from its position shown, up to the arm A, whenever this amount of spring is called into play, the open form and arrangement of the draught-link D D allowing of this free play, without any danger of the binding or cramping of the spring against any part of the said link.

It is to be observed that the same action and arrangement of parts would be used, were the load attached to the hook E and the power to the head H, instead of being applied as shown in the foregoing description.

Having thus fully described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The bearing or brace-bolt C, when used in combination with the V-shaped spring A A, constructed with round head K and concavities *k k*, substantially in the manner and for the purpose specified.

2. The draught-link D D, having its front bar *d* pivoted in the eye *a* of the arm A of the spring A A, and being so constructed and arranged as to allow of the rotation of said spring A A around the front bar *d*, and between the side bars D D of said link, substantially as and for the purpose specified.

3. The prolonging of the arm A of the spring A A round to the front of the end *a* of the arm A', in such a manner as to form a draught-arm, F, substantially as and for the purpose specified.

4. So increasing the thickness of the arm A F at the bend L, as that the relative positions of the parts F L and L A shall remain nearly constant, under any tension to which the draught-link may be subjected, substantially as and for the purpose herein specified.

5. The improved spring draught-link, herein described, consisting of the spring A A F, having an eye, *a*, concavities *k k*, round head K, draught-arm F, with hook E, or its equivalent, and thickened bend L formed thereon, the draught-link D D, and bearing or brace-bolt C, the several parts being constructed, combined, and arranged substantially as herein shown, and whether the inner leaves B B be or be not used, substantially as is herein specified.

As evidence that I claim the foregoing, I have hereunto set my hand, in the presence of two witnesses, this 2d day of December, A. D. 1868.

BENJAMIN RICHARDS.

Witnesses:

RUTH K. ABBOTT,  
JOB ABBOTT.