F. HUTCHINSON & W. H. GRAHAM.
Utilizing Worn Out Springs.

No. 201,420. Patented March 19, 1878.

Fig. 1.

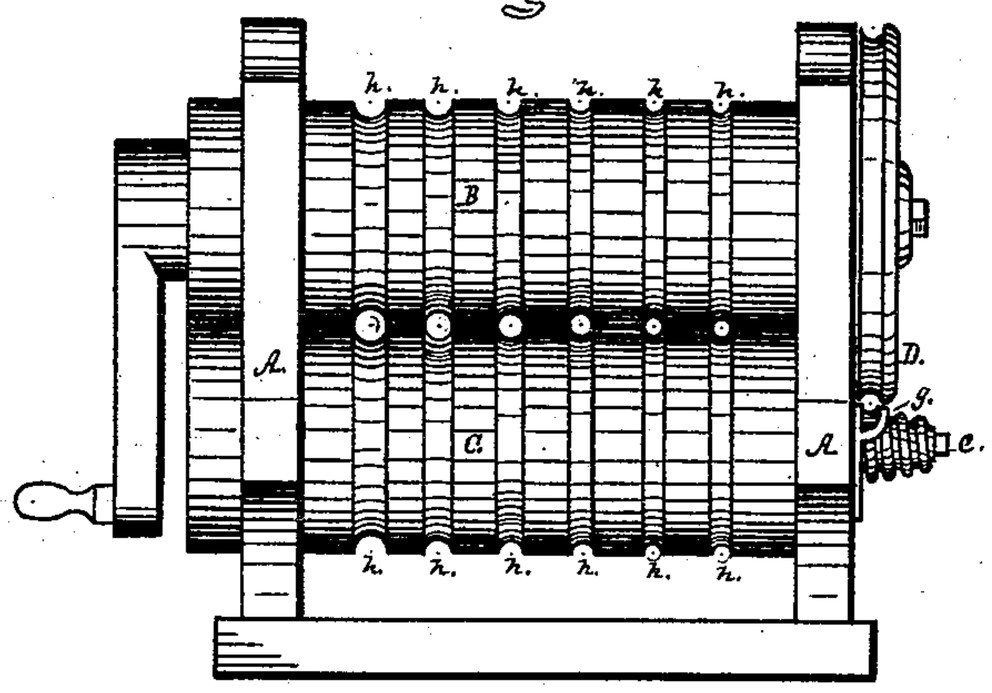


Fig. 2.

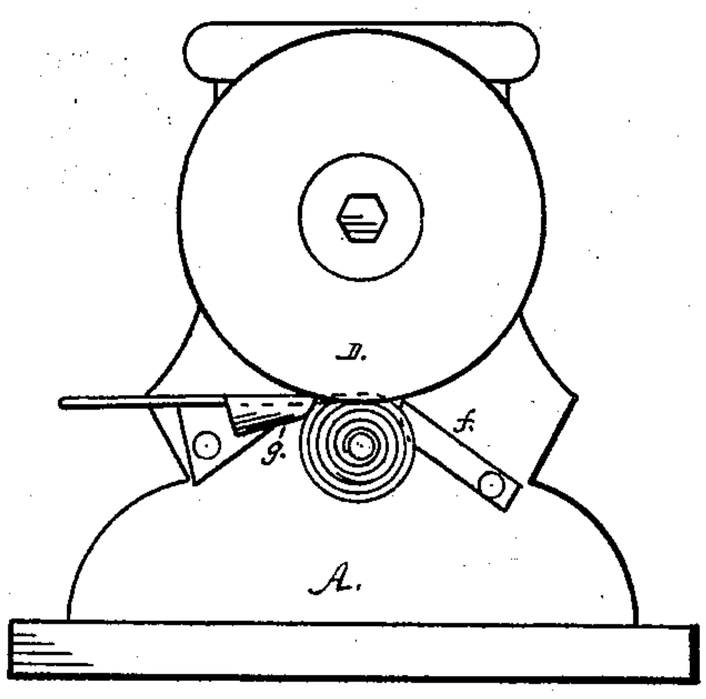


Fig. 3.

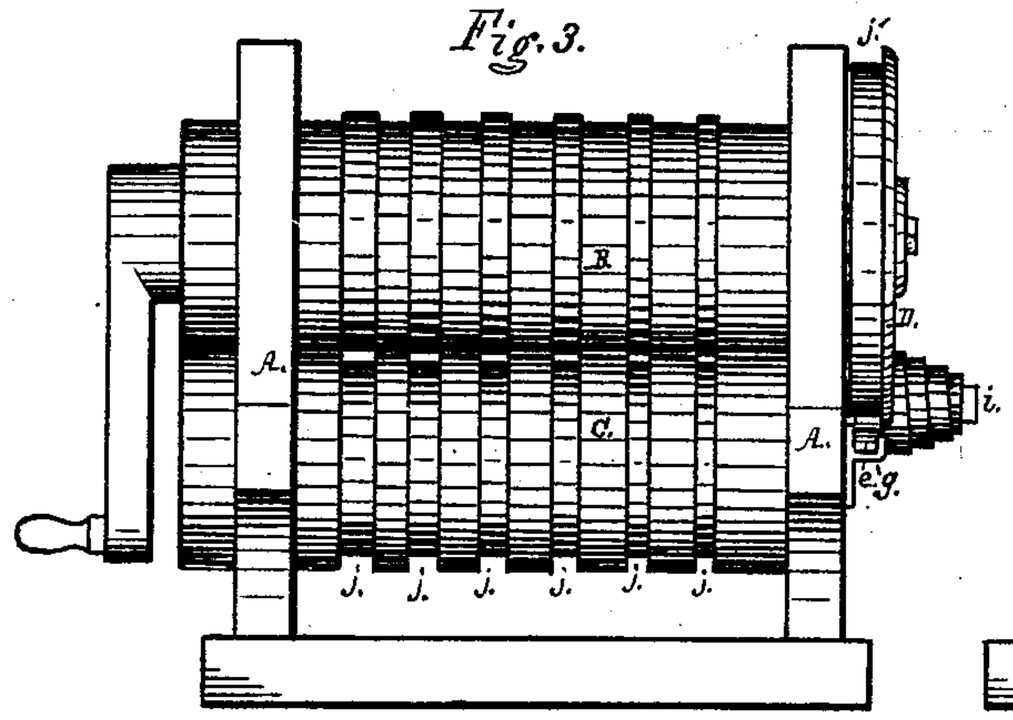


Fig. 4.

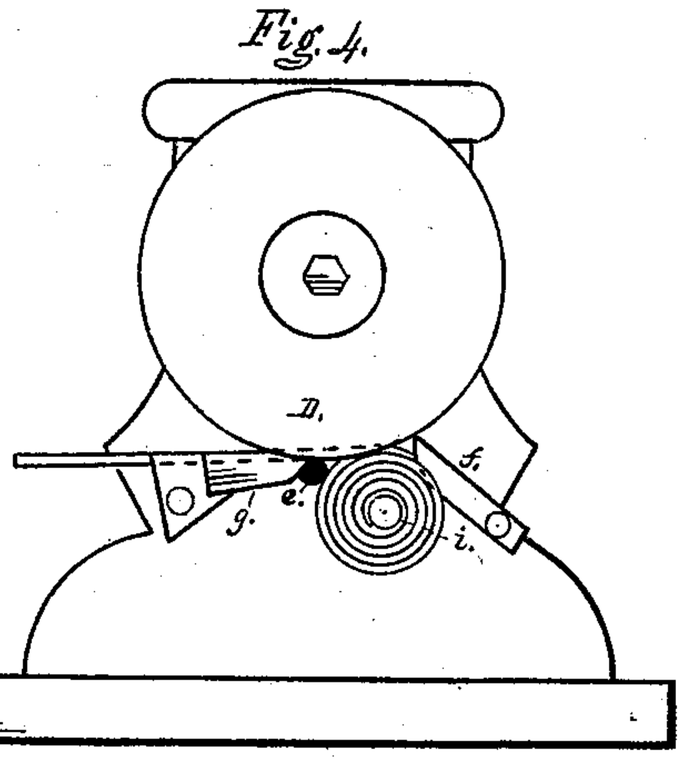
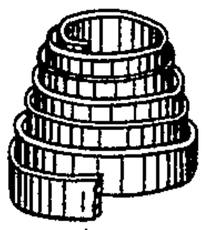


Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

FRANK HUTCHINSON AND WILLIAM H. GRAHAM, OF PITTSBURG, PA.

IMPROVEMENT IN UTILIZING WORN-OUT SPRINGS.

Specification forming part of Letters Patent No. **201,420**, dated March 19, 1878; application filed January 14, 1878.

To all whom it may concern:

Be it known that we, FRANK HUTCHINSON and WILLIAM H. GRAHAM, both of Pittsburg, county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Method and Apparatus for Utilizing Worn-Out Springs; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Our invention relates to an improvement in utilizing steel springs; and consists in heating, uncoiling, and rerolling and recoiling them, whereby their stiffness and elastic power are restored.

In the present state of the art springs, (particularly car-springs,) after they have lost their stiffness and elastic properties, are remelted and cast into ingots, which are subsequently formed into billets, and rolled into the desired size for constructing springs. Up to the date of our invention this has been the only means known to the art for utilizing springs after being worn out.

Our invention has for its object the utilization of worn-out springs constructed of cast-steel by a simple and economical method, which consists in reheating, uncoiling, and rerolling them, as hereinafter described.

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

In the accompanying drawings, which form part of our specification, Figure 1 is a side elevation of a pair of rolls and uncoiling device, which we use for uncoiling and rerolling the springs when constructed of round rods of steel. Fig. 2 is an end view of the same. Fig. 3 is a side elevation of the same, for uncoiling and rerolling springs made from flat bars of steel. Fig. 4 is an end view of the same. Fig. 5 is a side elevation of a coil-spring made from round bars of steel. Fig. 6 is a side elevation of a coil-spring made from flat bars of steel.

We embed the worn-out springs in charcoal in a crucible or heating-chamber of a furnace, and heat the springs to a bright-red heat. They are then ready for the uncoiling and rerolling process, which we accomplish by means of the machine represented in the accompanying drawings, in which—

A represents the housings for the rolls B C. On the axis of the roll B is secured a grooved roller, D, below which, to the housing A, is secured a mandrel, *e*, a guide, *g*, and spring *f*. The rolls B and C are furnished with grooves *h* or grooves *j*, for the purpose of rerolling the uncoiled spring and slightly reducing the diameter of the bars of which the springs were constructed.

The operation of uncoiling and rerolling is as follows: The worn-out springs being properly heated, as hereinbefore stated, a spring is placed on the mandrel *e*, with one end inserted in the groove of the roller D and resting on the mandrel *e*. The revolving of the roller will uncoil the spring, the uncoiled portion passing out through the guide *g*. The spring *f* is for the purpose of holding and guiding the spring in the groove of the roller D. After the spring is uncoiled it is passed through the grooves *h* of the roll B, for the purpose of slightly reducing the diameter of the bar for the purpose of bringing the particles of steel into the compactness that existed in the original spring.

When the spring is constructed from flat bars of steel, as indicated in Fig. 6, they are placed on the mandrel *i*, as shown in Figs. 3 and 4, and one end of a spring inserted in a groove, *j'*, of the roller D, the end of the spring resting on the mandrel *e*.

The revolution of the roller D will uncoil the spring, the uncoiled portion passing through the guide *g*, as indicated in Fig. 4. After the spring is uncoiled the bar is passed through the grooves *j* for reducing the diameter of the bar, for the purpose hereinbefore stated.

By heating and uncoiling and rerolling worn-out springs, as herein set forth, they can be renewed at a small cost, avoiding the labor, loss of time, and the expensive process heretofore employed for the utilization of worn-out springs.

If the elasticity of the springs is entirely destroyed, they should be subjected to the process of cementation prior to the process of un-

coiling and rerolling them. This will be found necessary in order to bring the steel back to the elastic quality required for a good spring.

In recoiling the spring from the bar formed as above, any of the means in common use in manufacturing coiled springs from either round or flat bars may be employed. As these are so well known to the trade, and so universally employed in the art of making the ordinary coiled spring, we have deemed further description and illustration of the same as unnecessary.

Having thus described the nature, construction, and operation of our improvement, what we claim as of our invention is—

1. The method herein described of utilizing or restoring worn-out springs, the same consisting in preparing the spring for recoiling by heating and uncoiling the spring between a suitable roll and mandrel, and then rerolling and recoiling the same, substantially as and for the purposes specified.

2. The roller D, mandrel *e*, guide *g*, spring *f*, combined, arranged, and operating with relation to each other, substantially as herein described, and for the purpose set forth.

3. The roller D and mandrel *e*, respectively arranged upon the axes of the grooved rolls, for rerolling the bars after they have been straightened between the said roller and mandrel, which are also located with relation to the spring *f* and guide *g*, substantially as set forth.

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