J. MURPHY.

Car Spring.

No. 57,365. Patented Aug. 21, 1866.

Fig. 1

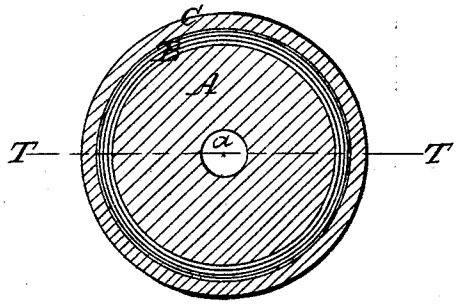


Fig. 2

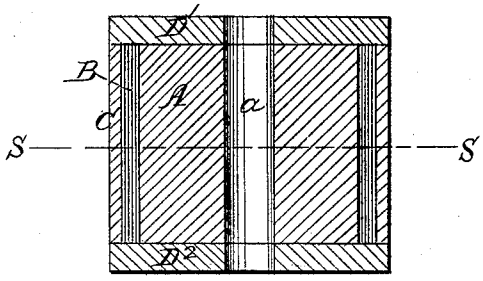


Fig. 3.

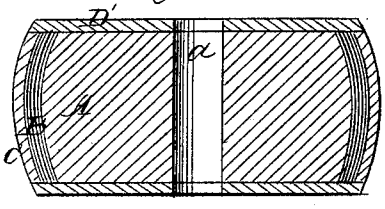


Fig. 4

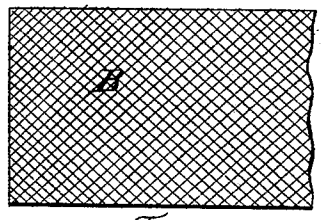


Fig. 5

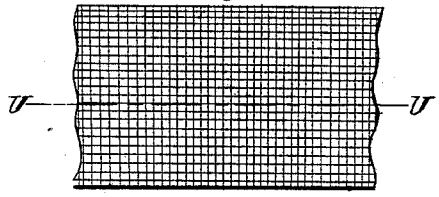


Fig. 6

Witnesses.

T. E. Sickels

Thomas D Stetson

Inventor.

John Murphy

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN MURPHY, OF NEW YORK, N. Y.

IMPROVEMENT IN SPRINGS FOR RAILROAD-CARS.

Specification forming part of Letters Patent No. **57,365**, dated August 21, 1866.

To all whom it may concern:

Be it known that I, JOHN MURPHY, of New York, in the county and State of New York, have invented certain new and useful Improvements in Springs suitable for Railroad-Cars and various other uses; and I do hereby declare that the following is a full and exact description thereof.

My invention relates to rubber springs; and it consists in the employment of a support wound around and incorporated with the body of the spring, the support being formed of cloth or analogous fibrous material having the fibers thereof laid obliquely, so that the fabric may yield to a limited extent. The material is cut on a bias or "biasing," as it is sometimes called, or it is manufactured with the yarns lying in an equivalent position.

Another portion of my invention consists in so embedding such a yielding fibrous envelope in the material of the spring, or, in other words, covering it on all its surfaces with rubber, so that no portion shall be exposed to the weather or to any destructive influence other than the mechanical strain to which it is subjected.

I will proceed to describe what I consider the best means of carrying out my invention.

The accompanying drawings form a portion of this specification.

Figure 1 is a horizontal section through the spring on the line S S in Fig. 2. Fig. 2 is a longitudinal section on the line T T in Fig. 1. Fig. 3 is a corresponding section, showing the condition of the spring when greatly compressed. Fig. 4 is a view of a portion of the stout muslin or analogous fabric extended. Figs. 5 and 6 represent a modification of the fabric, Fig. 5 being a face view, and Fig. 6 a longitudinal section on U U in Fig. 5.

Similar letters of reference indicate like parts in all the figures.

A is a cylindrical mass of rubber, formed, by preference, by rolling up a thin sheet of rubber in the manner according to which railroad-car springs are usually produced. There is a hole left in the interior through which the bolt may pass, if desired, in order to better control and guide the action of the spring.

B is an envelope, of strong cotton fabric saturated with rubber, and having a sufficient surface of rubber on each face to cement the several layers firmly and strongly together. This envelope may be applied by cementing or sticking the end to the exterior of the previously wound rubber spring A, and turning the spring on a suitable arbor or shaft until the fibrous covering has been wound some sufficient number of times. The last end is then stuck to the spring and the envelope is completed.

Some of the advantages due to my invention may be realized by using the spring without further preparation, except the ordinary vulcanizing of the material; but I deem it very important in some cases to cover the outer face and both ends of the spring with additional rubber. To effect this I wind a thin sheet of rubber several times outside of the fabric B, as indicated by C, and then apply a disk of similar material on each end of the spring, as indicated by D' D^2. The whole is then placed in a suitable mold and vulcanized to the proper extent and at the proper temperature, according to the material and to the circumstances under which the spring is to be used.

The strain or pressure is received on my spring in the direction parallel to the axis, as usual. The load tends to swell the middle of the spring, as usual; but the strain is greatly resisted by the presence of the fabric B. The oblique condition of the fibers in the fabric allows it to yield to a sufficient extent to allow the elasticity of the rubber to be brought into play, but not sufficient to allow the rubber to crack or burst. The cylinder of rubber C defends both the fabric B and the working portion of the rubber A from being influenced by the weather or other external influences, and, by being kept free from strain by the presence of the strong envelope B, avoids the commencement of the fractures which are so destructive.

It is not necessary that the fibers of yarn in my envelope B shall lie obliquely. It is convenient to manufacture them thus, and I can produce my envelope with yarns so placed either by weaving goods in that condition by means well known to weavers, or by cutting the strips diagonally across a piece of goods woven in the ordinary manner; but I can produce an equally serviceable envelope, and one which will perform in almost identically the same manner in my spring, by introducing fiber in a wavy or finely-corrugated condition.

It is easy to effect this by the same means as are employed in weaving suspenders and other elastic goods, by introducing among the cotton or other fibrous yarn of the warp a certain number of strips or yarns, so to speak, of rubber or analogous elastic material, which are properly distributed and arranged so as to contract the goods in the direction of its length. Thus the muslin or other woven fabric for my envelope may be woven with the warp extending longitudinally of the piece, and the strips to form my envelope B may be cut along the same lines, so that the warp shall extend longitudinally therein, and yet, by being properly contracted or waved in fine convolutions by the introduction of rubber in the warp, or by any other convenient means, the effect of my invention will be attained—that is to say, the fibers will exist in the envelope in a condition so as to exert but a very slight resistance to the operation of the spring when the spring commences to be compressed; but when it has been so much compressed, and the fibrous envelope B consequently extended to a point beyond which the distention would endanger the safety of the rubber, then, all the elasticity or strength of the fibrous envelope B having been exhausted, it opposes a firm resistance, and absolutely forbids any further distention of the spring at the point which has been so distended.

My spring may be distended to the farthest limit along the center, and may still yield a little more by being distended nearer to each end. Thus the approach to the condition of absolute rigidity in the spring will be gradual as the limit of its elasticity is reached.

I prefer to use a stout cotton fabric with the yarns extending obliquely, as first described.

My spring may be made of various sizes and proportions. The quantity of the interior rubber, A, relatively to the envelope B and to the exterior rubber, C, &c., may be varied at will, and the spring may be mounted according to any of the approved plans.

The exterior of the outer rubber, C, may be hooped or otherwise provided with any of the previously known supports, if desired; but I do not consider any such exterior support necessary, and prefer to depend entirely upon the biasing cloth B, or the equivalent braided yielded fibrous envelope adapted to yield to a limited extent, as before described.

I use the word "rubber" in this specification to mean the well-known gummy material for springs, whatever may be the species of the plant from which it is obtained, or may be the name by which it is known in science.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. The yielding fibrous envelope B, so arranged around a mass of rubber, A, as to support the exterior, while the rubber in its interior is free from fiber, all substantially as and for the purposes herein set forth.

2. A rubber and fibrous spring composed of the interior mass, A, and an exterior layer, C, and ends D' D^2, of rubber, in combination with a yielding fibrous envelope or support completely embedded in and covered by the rubber, substantially as and for the purposes herein set forth.

JOHN MURPHY.

Witnesses:
F. E. SICKELS,
THOMAS D. STETSON.