No. 33,277. PATENTED SEPT. 10, 1861.

A. BRIDGES.

SPRING.

Fig. 1.

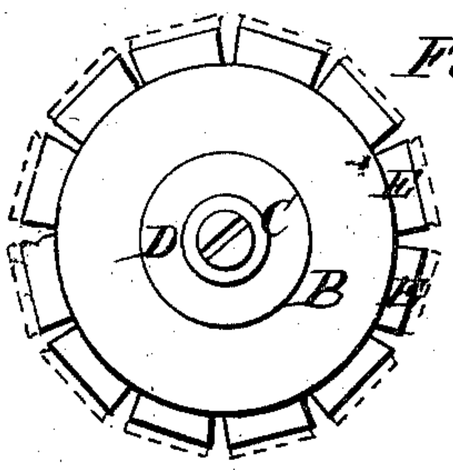


Fig. 2

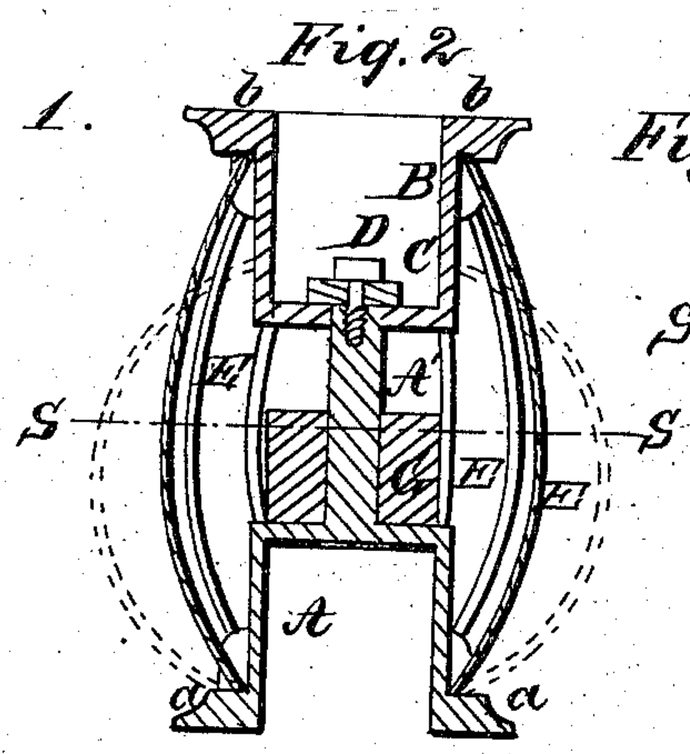


Fig. 3.

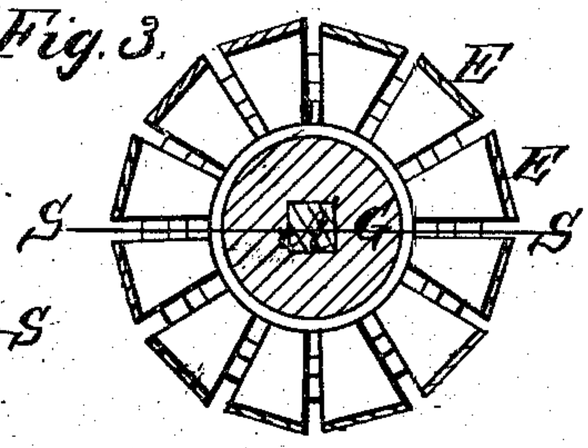


Fig. 4

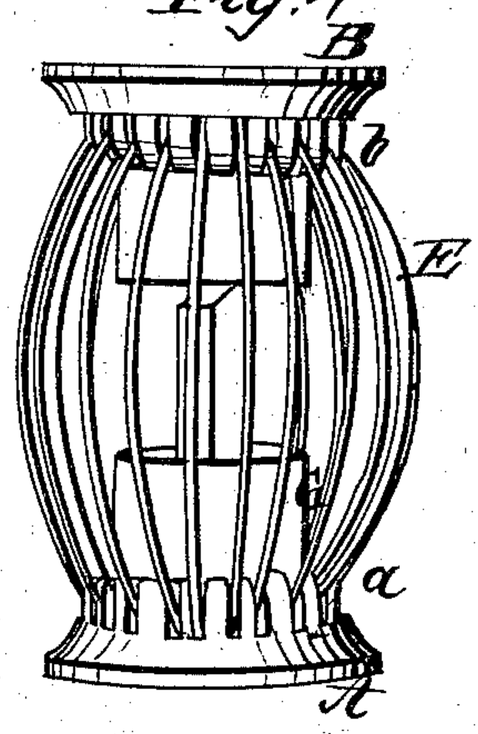
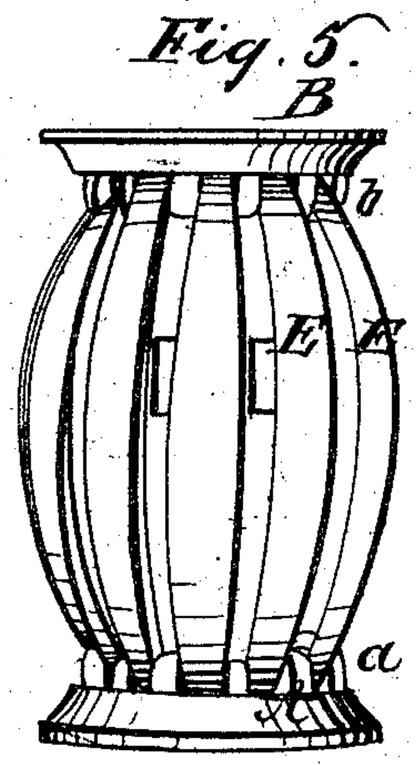


Fig. 5.



Witnesses

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Inventor

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UNITED STATES PATENT OFFICE.

ALBERT BRIDGES, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF, AND ALFRED BRIDGES, OF NEWTON, MASSACHUSETTS.

IMPROVEMENT IN SPRINGS

Specification forming part of Letters Patent No. **33,277**, dated September 10, 1861.

To all whom it may concern:

Be it known that I, ALBERT BRIDGES, of the city, county, and State of New York, have invented a new and useful Improvement in Springs for Railroad-Cars and other Purposes; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and the letters of reference marked thereon, in which—

Figure 1 is a plan view. Fig. 2 is a vertical section; Fig. 3, a horizontal section on the line S S in Fig. 2, and Figs. 4 and 5 perspective views of two styles slightly differing each from the other.

Similar letters indicate like parts in all the figures; and to enable others skilled in the art to make and use my invention I will proceed to describe it.

A is a casting having the form represented, the part A′ being squared and smoothly finished.

B is a corresponding casting fitted nicely to the squared part A′ and adapted to slide vertically thereon.

C is a washer, the external diameter of which is larger than A′, and D is a screw securing it to A′.

E E, &c., are thin strips of rolled steel or other suitable elastic material cut in the form represented, each being wider at its center than at its ends. Suitable recesses or cavities *a b* are formed in A and B to receive the ends of each strip E and retain it in the manner represented, the elastic force of each strip E being exerted to separate B from A. The strips E are equal in size and form each to the other, and the recesses *a* and *b* are disposed uniformly around A and B, so that the stem A′ is inclosed within a circular series of the slender strips E. These strips E are not bolted or otherwise secured, except that the pressure or load presses upon their ends and holds them within the cavities provided for them.

The washer C and screw D prevent the escape of B when the spring is unloaded. When the spring is loaded, the load or compressing force is allowed to act on the upper surface of B, forcing it downward toward A and causing it to slide on the smooth stem A′. Such a movement is resisted by the springs E, and in proportion as the force is increased the curvature of the several strips E increases and the diameter of the structure becomes greater, as shown in red outline. If the force is variable, the part B slides with a corresponding motion up and down on the stem A′.

The resistance offered to the descent of B is nearly uniform, but increases slightly as B descends. A rubber spring G is introduced in the manner represented, so that it adds its resistance to the descent of B after the latter has been depressed to a certain extent.

By the arrangement of the several strips E E in a series completely around A′ the structure expands itself equally and slightly in all directions, when compressed, and requires but little space in any one direction to give great force and range. Each strip is also distinct in its action and divided or separated from its neighbors by a small space, as represented. The strips E may furthermore be made from material which would otherwise be wasted in various branches of manufacture and may be produced at a very trifling expense, because no heating or bending is required, but only that they be reduced to their proper dimensions and sprung into the curve required. The spring is also in consequence of the arrangement of E E affected equally by lateral forces acting in all directions, and the several strips may, by reason of their arrangement and the manner in which they are confined, be removed at pleasure in whole or in part to rework and retemper, or one half or any other proportion may be removed and retained in order to modify the tension of the spring.

My strips E E may be of a greater or less thickness and length, according to the force and range required in the spring. They may be widest at their centers, as represented, and of uniform thickness, or may be of uniform width and thicker at their centers than at their ends, or they may be both wider and thicker at their centers, as may be most convenient; or they may be of uniform section throughout—as, for example, they may be made of cylindrical wires or square rods of suitable thickness, according as suitable material in either or all of these forms is most available. When strips are employed for these springs they may, if desired, be made

very thin and two or more thicknesses may be laid, one exterior to the other.

The rubber mass G may be of any diameter less than the space inclosed within the series of strips or springs E and may be of such thickness as the conditions may require; or the rubber may be dispensed with altogether, or introduced only when necessary to provide for extraordinary loads, or to aid in supporting an ordinary load after the springs E have become partially set. The rubber may, if desired, be of such thickness as to fill the entire space between A and B, even when the spring is unloaded, and in such case will of course aid in supporting the load at the very commencement of any downward motion of B; but the resistance of the rubber to such motion will increase in a much more rapid ratio than that due to a series of springs E, which surround it, and according to a different law.

The sliding guide A′ may be flat or star-shaped instead of square, or may be of any other form which will allow B to slide vertically with freedom and prevent it from moving laterally or twisting.

Shoes may be provided to receive the ends of the strips or rods E, if desired, and in such case the recesses in A and B may be more cheaply formed by simply turning a groove in each, extending continuously around, the shoes being depended upon to preserve the proper and uniform distance of E E each from the other.

I do not confine myself to any particular form of the strips E or to any particular form or proportion of the rubber mass G, or of any other part; but,

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

1. The novel bearing-spring herein described, as a new article of manufacture, the same being composed of detachable strips, wires, rods, or any other form of springs E, arranged in a circular or polygonal series uniformly disposed or distributed around a central guide or slide A′, so as to expand equally in all directions by the bending of the same, and each being so nearly straight when the spring is unloaded that the resistance of the spring to compression shall increase but slightly as the load is increased, the entire structure possessing the qualities and advantages herein set forth.

2. The mounting of a rubber spring G within a circular or polygonal series of metallic springs E, so as to act in combination therewith and to contribute to the tension and modify the range of the spring, substantially in the manner herein specified.

In testimony whereof I have hereunto set my name in the presence of two subscribing witnesses.

ALBERT BRIDGES.

Witnesses:
THOMAS D. STETSON,
D. W. STETSON.