J. HARRISON, Jr.

Car Spring.

No. 21,255. Patented Aug. 24, 1858.

Fig. 1

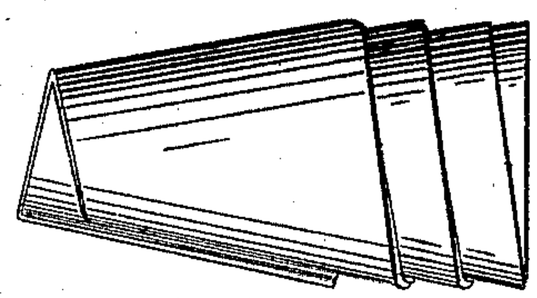


Fig. 3.

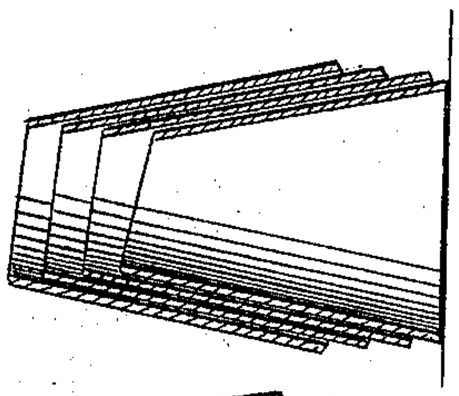


Fig. 2.

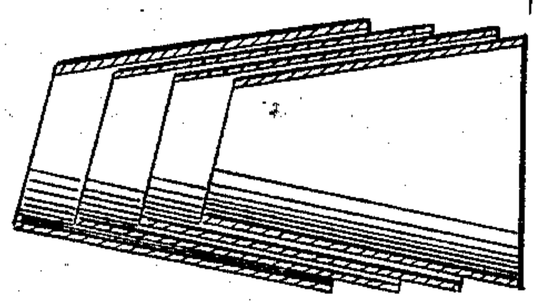
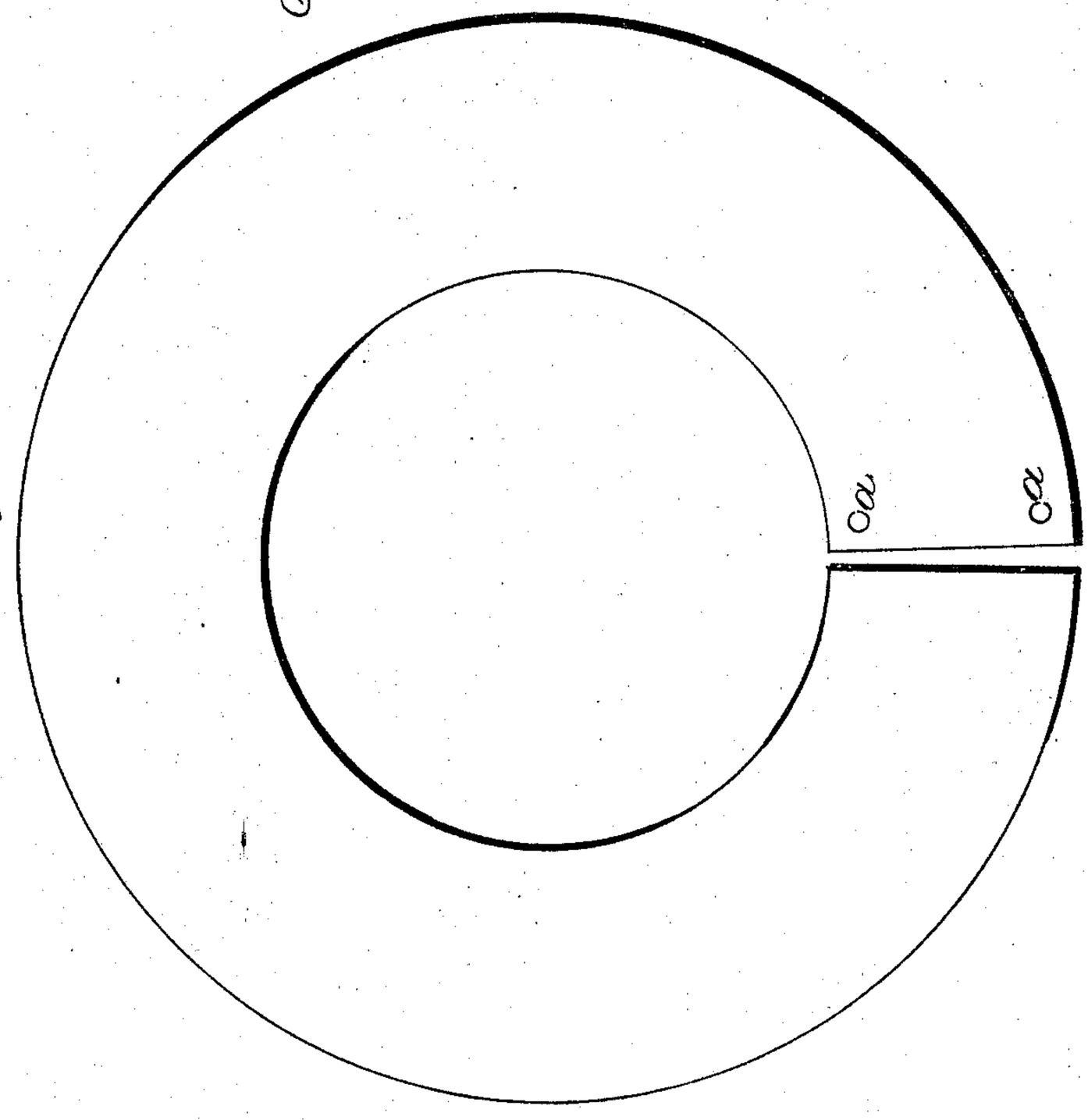


Fig. 4



UNITED STATES PATENT OFFICE.

JAS. HARRISON, JR., OF NEW YORK, N. Y.

METALLIC SPRING.

Specification of Letters Patent No. 21,255, dated August 24, 1858.

To all whom it may concern:

Be it known that I, JAMES HARRISON, Jr., of the city, county, and State of New York, have invented a new and Improved Metallic Spring; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is an outside view of the spring. Figs. 2 and 3 are central sections of the same. Fig. 4 is a plan view of the piece of metal of which the spring is composed.

Similar letters of reference indicate corresponding parts in the several figures.

My improved spring consists of a strip or plate of metal wound into a spiral form in such manner as to give the several coils or revolutions of the spiral a conical form. This spring differs from the spring known as the "conical volute" spring in its being formed by coiling a strip or plate of metal of annular form; the "conical volute" spring being formed by coiling a straight strip, and the sides of its several coils being parallel with its axis, and not inclined thereto, so as to approximate to the form of cones as the coils of my spring.

To make the spring, I first obtain a piece of plate metal of a circular or, more strictly speaking, an annular form; the proportion betwen the diameter of the inner and outer circles of the said piece being the same as is required for the larger and smaller diameters of the conical coils of the spring. In order to have the grain of the metal follow the direction of the coil, I produce this annular piece from a strip of straight form having the grain lengthwise, by rolling or otherwise drawing it; giving the greatest amount of draw at one edge and diminishing it gradually to nothing or almost nothing at the other edge. The annular formed piece is coiled upon a conical mandrel of the required size and degree of taper, by securing one end to the mandrel, with the edges at the required inclination to the axis of the mandrel, to give the coil the required pitch; and then giving the mandrel a rotary motion; while the other end of the piece is held by suitable means to produce the necessary drag or tension upon it to effect the coiling. The first revolution of the coil is by that means formed upon the mandrel, the next upon the first, the third upon the second, and so on, each upon its predecessor. The manner in which I generally secure the strip to the mandrel is by making two or more holes *a*, *a*, in or near the end, to receive a corresponding number of studs projecting up from the surface of the mandrel to a height equal to the thickness of the plate. It should be observed that each turn of the coil is to be formed upon the diminishing portion of the one inside it, so that there shall be little or no difference in size between the several revolutions of the coils. When the piece has been coiled up in this manner, and it is relieved of the drag or tension, the coil is sure to unwind itself more or less so as to leave spaces between the several revolutions of the coil, as shown in Fig. 2, to allow the necessary degree of play to the spring, in the direction of its axis, in which direction it is intended to receive pressure.

The spring formed as above described is applied either within a box or upon a pin passing through its center, for the purpose of keeping it in place. The pressure is applied to the spring in the direction of the axis of the coils, or parallel therewith; the difference in the strain at the two edges of the coil is much less than it is in the "conical volute" spring; but the greatest advantage of this spring is that there can be no bumping when it is subjected to an unusually violent shock, for, after the several coils close upon each other, as shown at Fig. 3, they do not have a solid bearing upon each other, but act upon each other in such a way as to cause the inner ones to close or diminish in diameter, and the outer ones to open or increase in diameter, still developing the elasticity of the metal, but gradually increasing in stiffness.

In some cases, I make the annular formed piece of metal which is to be coiled to form the spring, of a length more than sufficient to form a, complete circle, as shown in Fig. 2; and in that case, the ends will lap over each other, and it will begin to assume a

spiral form; but generally I propose to make the coil of a piece forming not more than a complete circle.

What I claim as my invention, and desire to secure by Letters Patent, is:

The coiled spring herein described, having the several revolutions of the coil approximating to the form of cones, or in other words, having the sides of its several coils inclined to the axis thereof, substantially as herein specified.

JAMES HARRISON, JR.

Witnesses:
W. TUSCH,
I. W. COOMBS.