D. G. ROLLIN.

Car Wheel.

No. 19,450.

Patented Feb. 23. 1858.

Fig: 1.

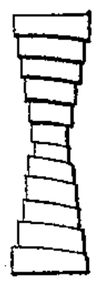

Fig: 2.

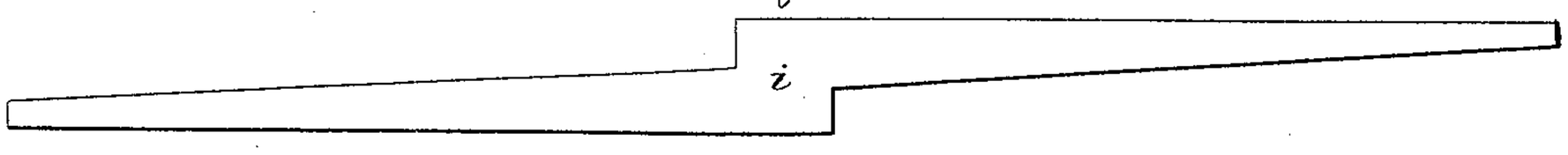

Fig: 3.

UNITED STATES PATENT OFFICE.

DANIEL G. ROLLIN, OF NEW YORK, N. Y.

VOLUTE SPRING.

Specification forming part of Letters Patent No. 19,450, dated February 23, 1858; Reissued October 15, 1867, No. 2,777.

To all whom it may concern:

Be it known that I, DANIEL G. ROLLIN, of the city, county, and State of New York, have invented a new and useful Improvement in Volute Springs, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, in which—

Figure 1 represents a side elevation of one of my improved volute springs, Fig. 2 represents a view of a plate of steel of the shape required to be made into such a spring and Fig. 3 represents a plan of a machine adapted to their manufacture.

Volute springs have hitherto been formed of a flat strip of metal coiled into a spiral form so as to form a single volute more or less conical according to the design of the constructor. Such springs are deficient, as they do not afford sufficient play or movement in the direction in which the weight rests upon them; hence two or more springs of this description have been placed one above the other, so that the amount of play or movement obtained is equal to the sum of the movements of the separate springs. This mode of combining several springs together is objectionable on account of the difficulty or cost of securing a series of separate springs in such manner that they shall be sufficiently rigid in a transverse direction to sustain lateral strains.

The object of my invention is to obtain in a volute spring the requisite amount of play in the direction of the endwise strain with sufficient rigidity to sustain strains transverse thereto, and it consists in a double volute spring which has the form of two volutes adjoining each other, and is constructed of a strip of metal coiled spirally so that the rings of the spirals overlap each other and form ends or bases which are symmetrical. In order to form such springs I make use of the machinery represented in plan at Fig. 3. This machine contains a double conical mandrel A upon which the spring is wound, and two conical rollers B and B′, whose exterior surfaces have the forms of volutes coiled in directions opposite to those of the volutes of the springs. The conical mandrel is formed in two parts the conical block *c* being perforated to fit upon an interior spindle secured to the block *d*, so that when the spring is finished the mandrel may be withdrawn from the interior. Each conical roller B and B′ is fitted upon a spindle which projects from a revolving head block E that is secured to a shaft F. The shafts of the two head blocks are in line with each other and with the mandrel, that is supported between them by means of sockets at the centers of the head blocks in which the ends of the spindle of the mandrel are received. The shafts F F are fitted with cogwheels G G gearing into pinions *h h* secured to counter shafts J J; and these counter shafts are each fitted with a belt pulley L L, to which motion is imparted by means of a suitable belt. The counter shafts are caused to revolve in opposite directions so that the head blocks and the conical rollers are also caused to revolve in opposite directions. Below the mandrel there is a support M, whose upper surface nearly touches the mandrel, the distance between the two being just sufficient to admit the plate of steel of which the spring is to be formed, and to this support there is pivoted a lever N, whose end can be made to bear upon the mandrel to prevent it from springing upward by reason of the strain.

In order to form springs of the form represented at Fig. 1 with this machinery plates of sheet steel of suitable thickness of the form represented at Fig. 2 are employed. These plates are heated in a furnace and are introduced endwise between the double conical mandrel and the support beneath until the central part *i* of the plate is directly beneath the mandrel; the conical rollers are then put in motion and by bearing against the exterior face of the plate in their revolution roll it down in spiral coils upon the mandrel; in effecting this operation the edges of the volutes of the rollers bear against the edges of the plate and thus direct it in coiling so that it assumes the proper conical or volute form. When the operation is completed the revolution of the conical rollers is stopped, one of the shafts F is moved endwise by means of a suitable shifting lever to free the mandrel, and the latter with the spring upon it is withdrawn from the machine; the mandrel is then removed from the spring by drawing its two parts endwise in opposite directions, and the spring is tempered and polished if necessary in any suitable manner. The spring thus formed is a double volute symmetrical in opposite directions from the center, or

may be considered as composed of two volutes joined at their apexes by the rigid connection of the plate of one volute with the plate of the other volute. It therefore has an amount of play or movement in an endwise direction equal to the sum of the movements of the two volutes, while it is sufficiently rigid in a transverse direction to withstand transverse strains.

Having thus described my invention I wish it to be understood that I do not confine myself to the peculiar manner in which the double volute spring is made or to the peculiar machinery which I have herein described for making it, as these may be varied without affecting the principle of my invention, but

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

A double volute spring constructed substantially as herein described having the form of two volutes rigidly connected so as to form a single spring.

In testimony whereof I have hereunto subscribed my name.

DANIEL G. ROLLIN.

Witnesses:
WM. COSGROVE,
W. L. BENNEM.

[FIRST PRINTED 1911.]