(No Model.) 2 Sheets—Sheet 1.

G. W. MORRIS.

ELLIPTIC SPRING.

No. 452,612. Patented May 19, 1891.

Fig. 1.

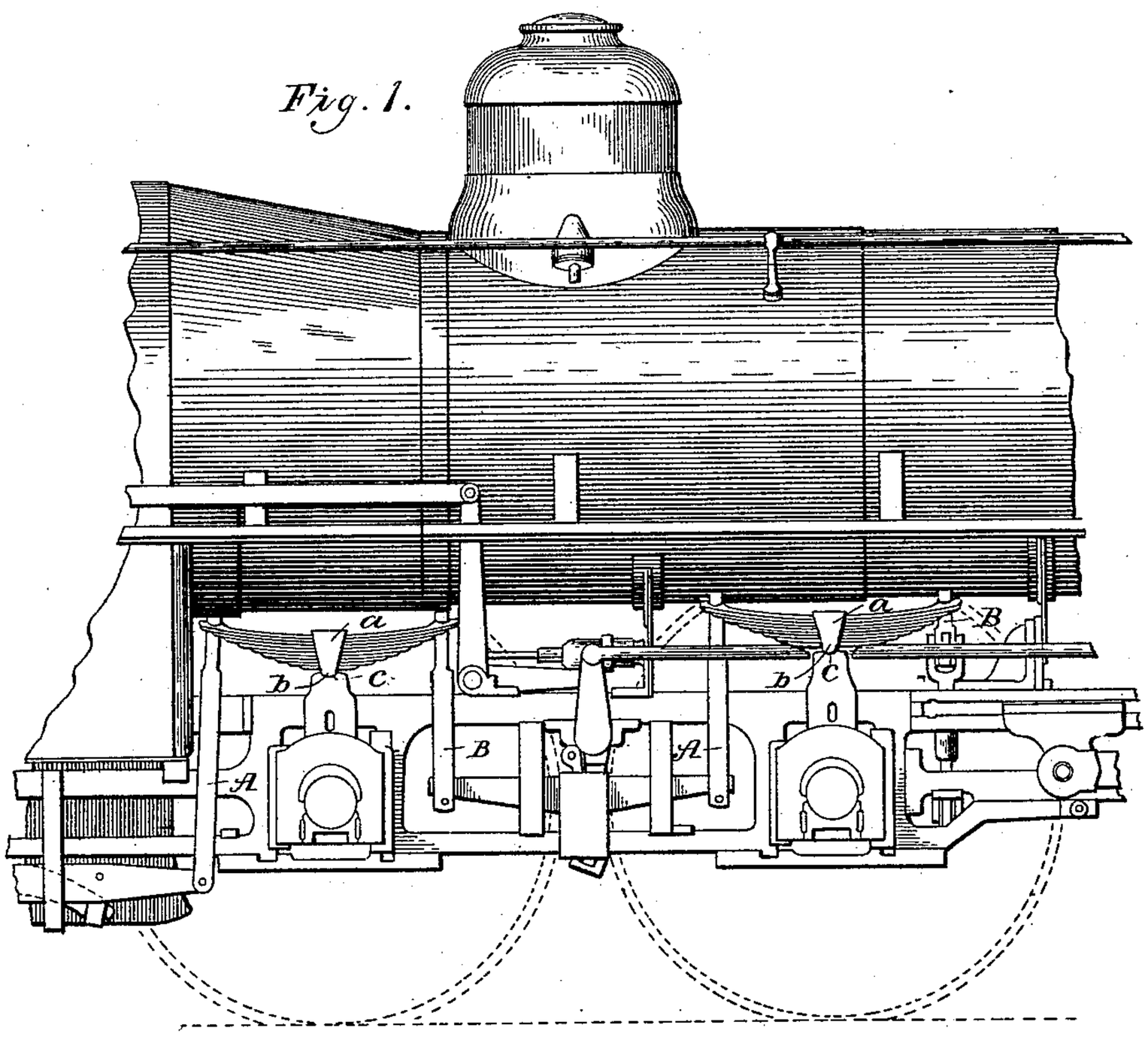
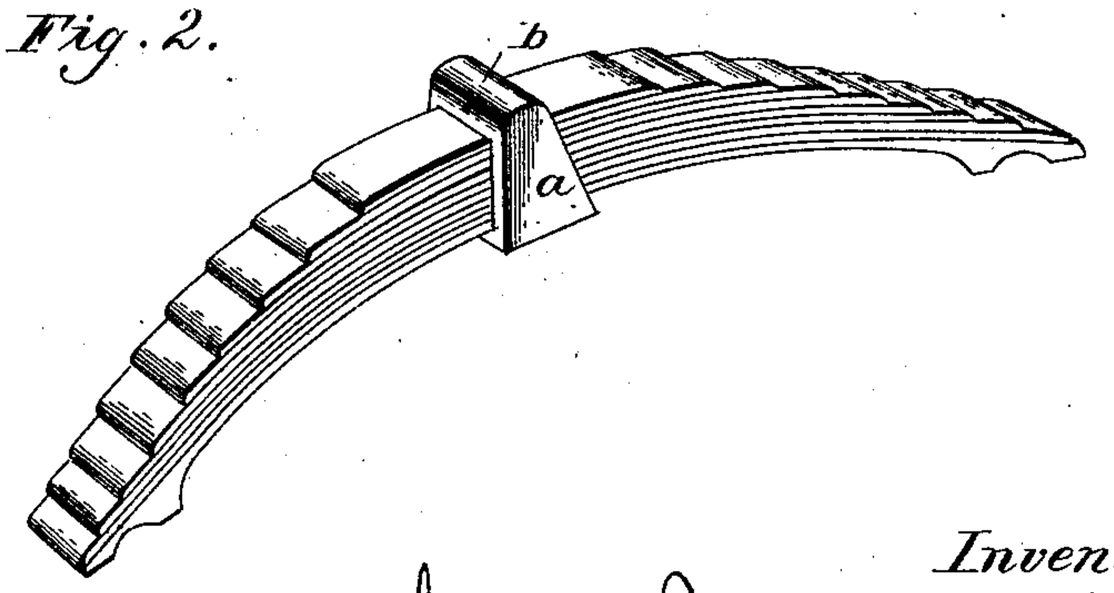


Fig. 2.



Witnesses
Philip F. Lorner.
Roger Melles.

Inventor
George W. Morris
By his Attorneys.
Johnson & Johnson

(No Model.) 2 Sheets—Sheet 2.

G. W. MORRIS.

ELLIPTIC SPRING.

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Fig. 3.

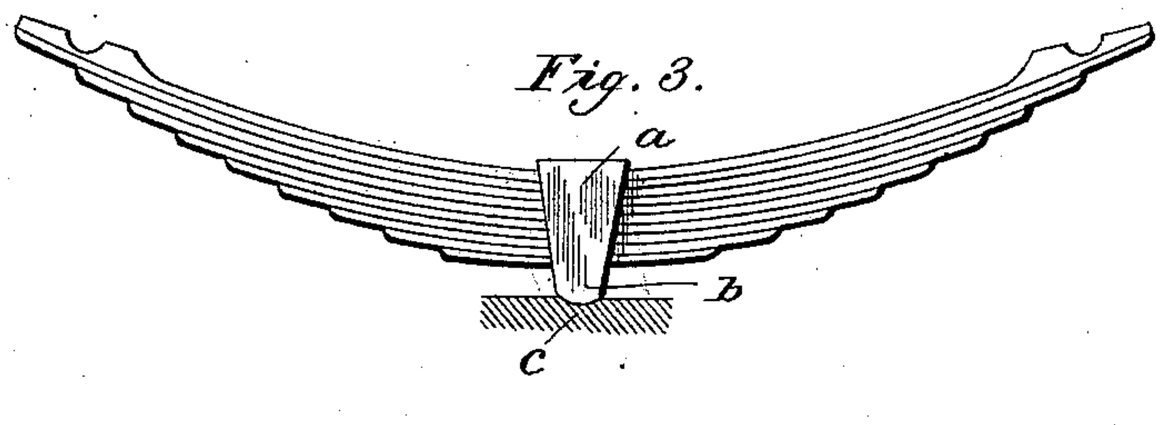


Fig. 4.

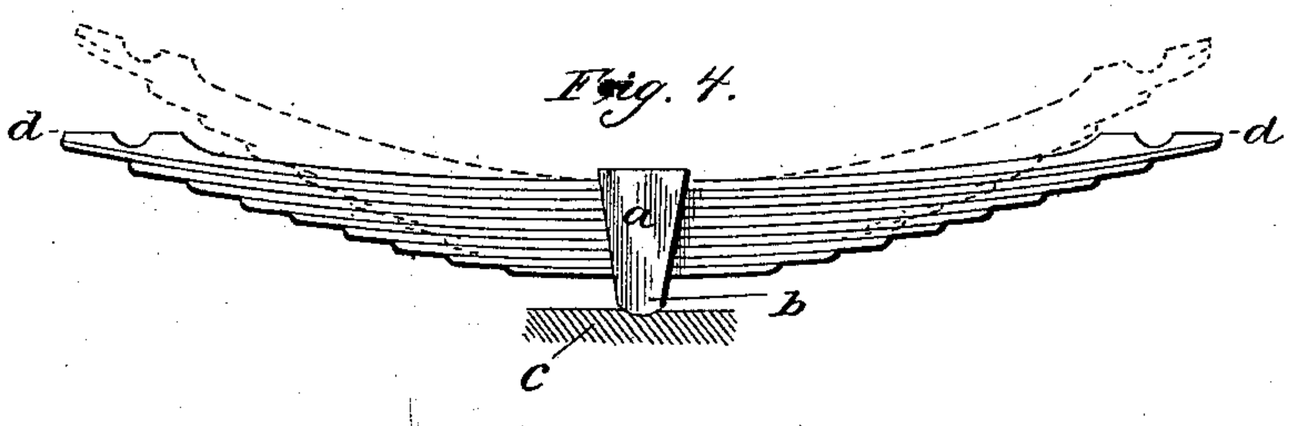


Fig. 5.

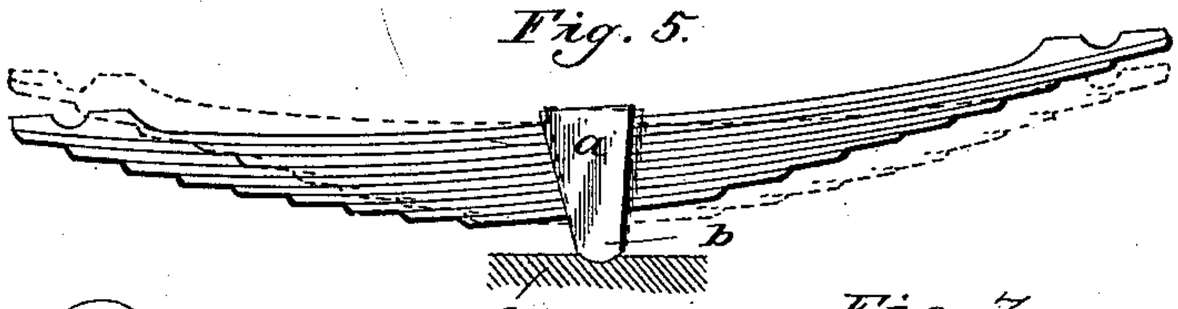


Fig. 6.

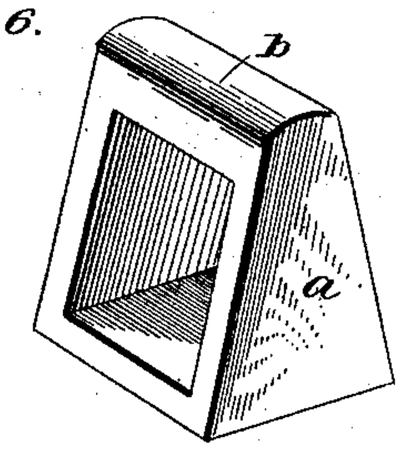


Fig. 7.

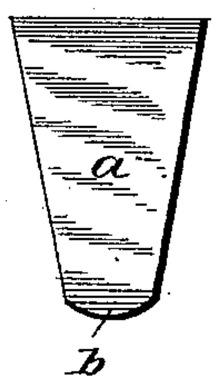
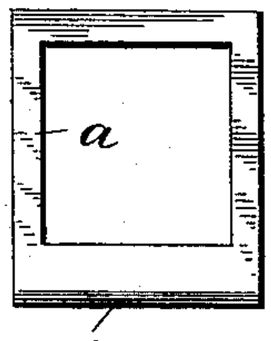


Fig. 8.



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George W. Morris
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UNITED STATES PATENT OFFICE.

GEORGE W. MORRIS, OF PITTSBURG, PENNSYLVANIA.

ELLIPTIC SPRING.

SPECIFICATION forming part of Letters Patent No. 452,612, dated May 19, 1891.

Application filed October 17, 1890. Serial No. 368,391. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. MORRIS, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Elliptic Springs, of which the following is a specification.

The particular type of spring which I have improved is of the elliptical form, and is composed of graduated curved leaves, called "lifts," tightly confined by a clamping-band at the middle of their length, which forms the bearing for the spring; and the object of my improvement is to provide for a free longitudinal rocking motion of the spring upon such clamping-band to adapt the spring, particularly when used for railway-locomotives and caboose-cars, to accommodate itself to the inequalities of the tracks and to bad joints thereof, and which rocking band-bearing serves to equalize the shocks upon the springs transmitted from the running-gear of the truck and to give an easy-running movement.

My invention consists of certain novel parts and combinations of parts, which will be separately pointed out in the claim concluding this specification.

In the accompanying drawings I have illustrated my improved spring as used for carrying the weight of railway-locomotives, and which embodies in total combination all the features of improvement which constitute my invention.

For the purpose of informing those skilled in the art to which my invention appertains of the nature of my invention, and for the purpose of instructing them how the same may be particularly and advantageously employed, I will now describe the same as illustrated in the accompanying drawings, and in which—

Figure 1 represents in elevation so much of the running-gear of a railway-locomotive as illustrates the application thereto of my improved spring. Fig. 2 shows the spring and its convex tapering bearing-band in perspective. Fig. 3 shows the spring in elevation in its normal position in relation to its convex tapering bearing-band. Fig. 4 is a similar view of the spring when under compression upon its convex tapering bearing-band. Fig. 5 is a similar view of the spring when under compression and rocked upon its convex tapering bearing-band in a longitudinal direction. Fig. 6 shows the tapering convex bearing-band in perspective. Fig. 7 is a side, and Fig. 8 an end, view of the tapering convex bearing-band.

While I have shown my improved spring as applied to the bearings and equalizing connections of a railway-locomotive, yet it will be understood that it is equally applicable to railway-cars and to other vehicles in an elliptic or semi-elliptic form. The spring is composed of a nest of leaves or plates termed "lifts," of graduated lengths, placed upon each other in the usual manner and number, according to the use for which such springs are designed. These leaves are bound together in the middle of their length by a band *a*, which also forms the bearing for the spring. I make this bearing-band of the form of the keystone of an arch, with its narrowest end *b* at the shortest leaf or plate of the spring, and I make this narrowest end of the band convex to form a rocking bearing, which fits into a concave seat *c* of the box or the saddle of the box upon which the spring rests. The band is shrunk or otherwise secured upon the plates, and at its convex bearing end is about half the width of its widest end, so that it has a graduated clamping action upon all the graduated plates of the spring, whereby the shortest leaves have freer play and yield more evenly to pressure upon the ends of the spring than would be possible with a band of even width at all the plates. By making the band tapering and placing it so that its apex will be at the outside of the arch and form the bearing-support for the spring and its tapering edges standing with the graduation of the leaves or plates undue pressure is decreased proportionally on all the short leaves, and the latter are not so liable to snap off at the edges of the clamping-band, and an easier motion is imparted to the spring. This action is illustrated in Fig. 4, in which the spring, in attaining the straight line *d d*, will place the greatest strain upon the shortest leaf at the narrowest end of the band, and its liability to snap or break at the binding-edges of the band will be greatly lessened, the elasticity of the spring is increased, and it is rendered more durable.

Looking now at Fig. 5, the importance of the function of the keystone-band for rocking upon its bearing-seat to accommodate the motion of the spring will be seen in the fact that the spring and its convex tapering-band are caused to rock together in a longitudinal direction, and thereby not only equalize the sudden shocks transmitted from the running-gear to the spring, but to greatly reduce the force of the concussions upon the spring and to adapt and to reconcile the spring to the roughness of the tracks and to the jumping caused from uneven joints of the rails. In this figure the spring is shown in a canted position in full lines and its binding bearing-band rocked in its concave seat out of a vertical line in the direction of the movement of the spring, thus allowing the latter perfect freedom of movement in tilting upon its clamping-band toward either end and relieving the spring from being cramped and strained and making it more durable. Referring to Fig. 1, this rocking action of the spring, due to the inequalities of the track and to bad joints, is there illustrated by the hanger connections of the springs, because the spring bearing-band being seated and supported by its smallest convex end in the concave seat upon a fixed part of the axle-box, the hangers A and B of the equalizing running-gear connections are free to rise and fall with the rocking motion of the spring, which is communicated to it through the hangers by the roughness of the tracks. As the hanger A rises the hanger B falls, and vice versa, according as the wheels may transmit to the springs the causes for their rocking movements. The keystone form of the band and its rocking freely upon its bearing-seat are the important matters which co-operate to prevent the snapping of the leaves of the spring at the band, which prevent the cramping and straining of the spring, which render the latter free to rock longitudinally upon its bearing-band, and which neutralize the bad results to the springs due to the inequalities and bad joints of the tracks, and all tend to enhance the durability and satisfactory service of the spring and to produce an easier movement of the vehicle, and especially for locomotives.

In Fig. 1 the hangers A and B are shown in connection with a system of equalizing-levers and the driving-wheels and their journal-boxes, and it is such equalizing connections that a tapering rocking clamping-band for the leaves or lifts of the spring is of special importance and advantage.

I claim as my improvement—

The combination, with a system of equalizing levers and hangers connecting the springs of the running-gear of a railway-locomotive, of a banded elliptical half-spring composed of graduated leaves or lifts and having a tapering clamping or binder band formed with a convex bearing end, and a concave seat therefor, substantially as described.

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

GEO. W. MORRIS.

Witnesses:
GEO. B. MOTHERAL,
E. W. BEACH.