

W. H. WARD.

Manufacture of Coil-Springs.

No. 136,473.

Patented March 4, 1873.

Fig. 1.

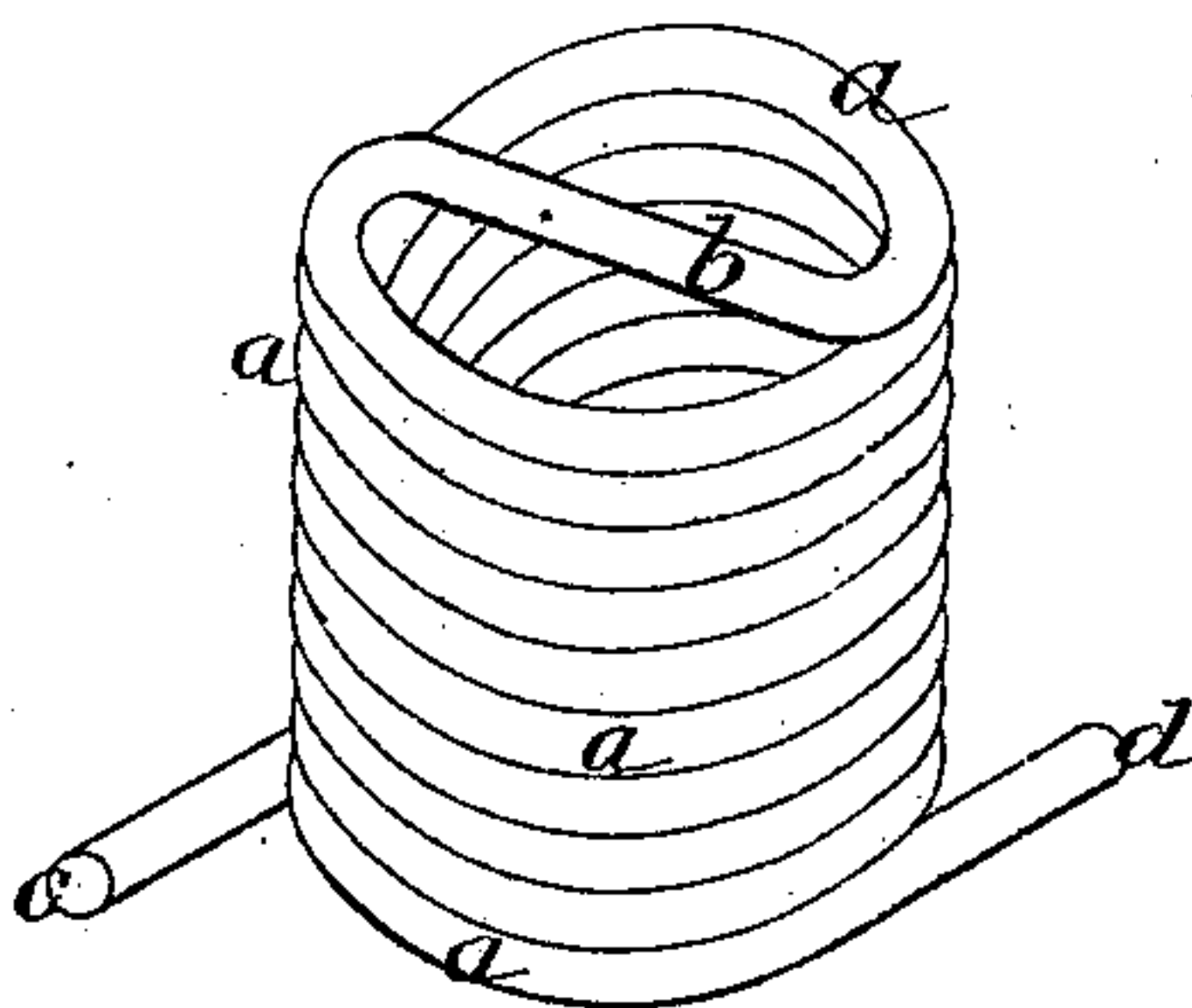


Fig. 2.

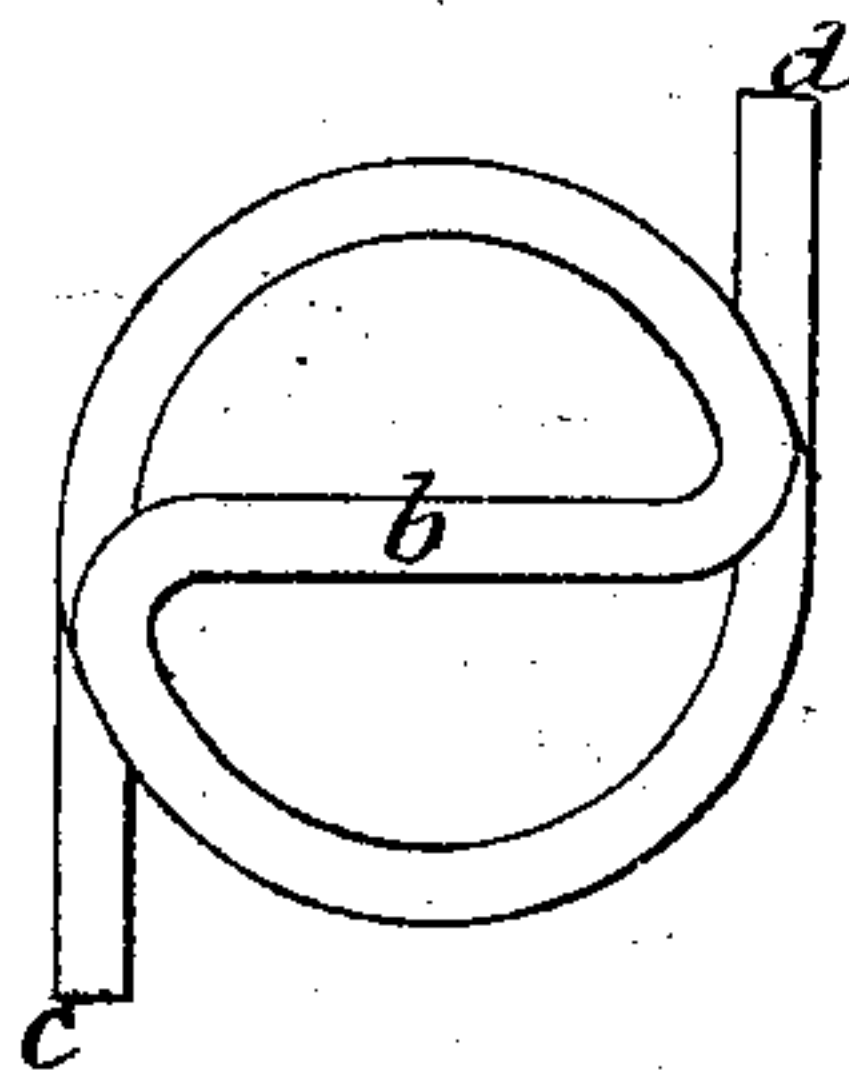
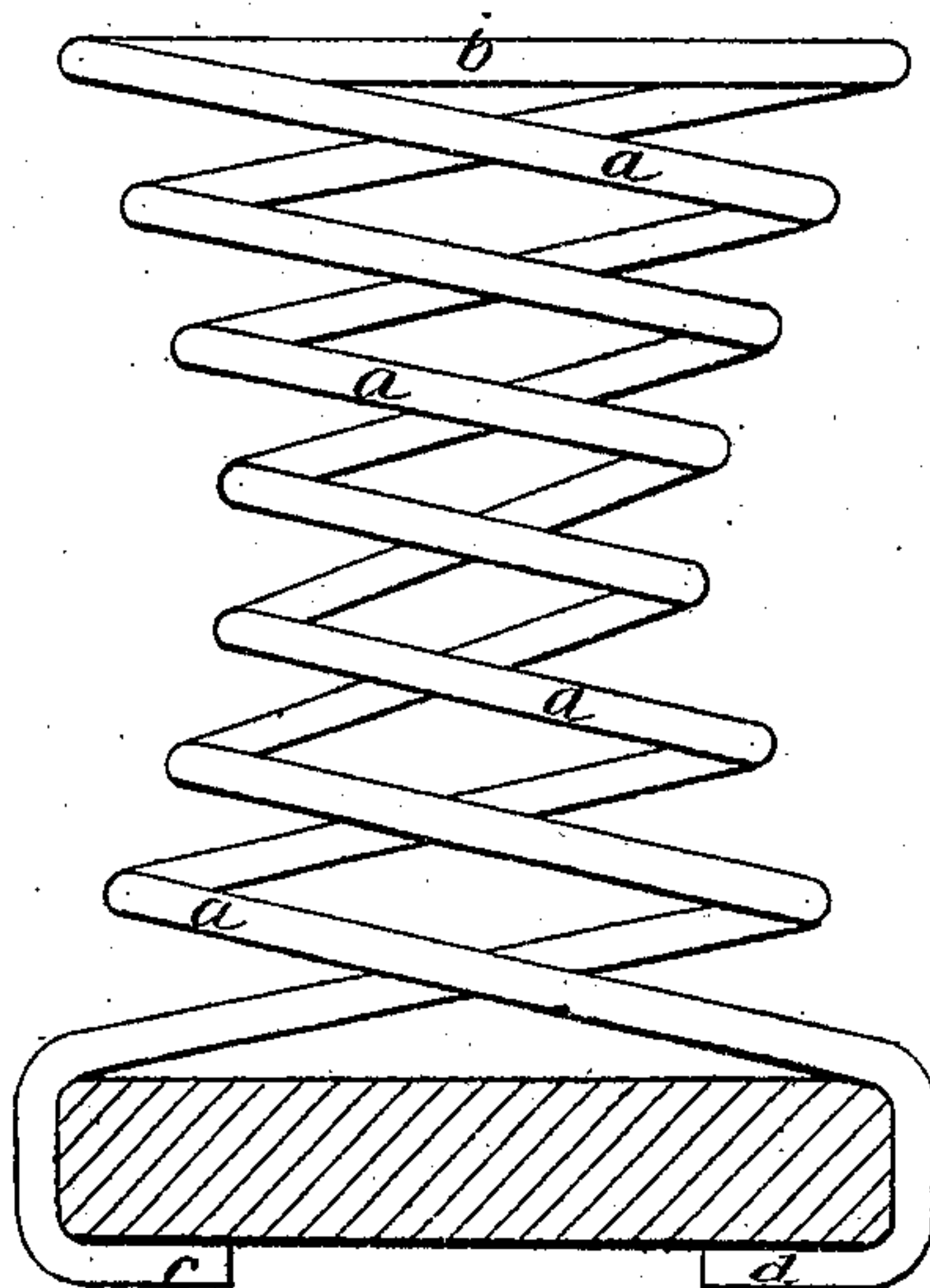


Fig. 3.



Witnesses:

Wes Wagner,
Frederick Arto's

Inventor:

William H. Ward,

by Johnson, Klauke & Co.
His Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM HENRY WARD, OF AUBURN, NEW YORK.

IMPROVEMENT IN THE MANUFACTURE OF COIL-SPRINGS.

Specification forming part of Letters Patent No. **136,473**, dated March 4, 1873.

To all whom it may concern:

Be it known that I, WILLIAM HENRY WARD, of Auburn, in the county of Cayuga and State of New York, have invented a certain new and useful Improvement in Coil-Springs, which I denominate "The Balanced Spring," of which the following is a specification:

My invention relates to coil-springs, and the improvement which I have made therein consists of a single spring wire having its two ends coiled in the same direction, so that the ends terminating at the same end of the coil will perfectly balance each other throughout the coil, and thus obtain in a single coil a compact torsion-spring in which one coil will not overlap or be within the other, but each will be equal and each fold made in the same direction; by which construction the two ends are not only balanced throughout the length of the spring, but the springs may be made of rights and lefts, which is a great advantage for certain purposes, and which could not be obtained by springs coiled in opposite directions.

In the accompanying drawing, Figure 1 represents a view in perspective of my improved balanced torsion-spring; Fig. 2 represents an end view of the same, showing the diameter-bar; and Fig. 3 represents a side elevation thereof, showing its coils separated, when adapted as a yielding support.

The spring is made of a single wire, *a*, bent first in the middle of its length so as to form a cross-bar, *b*, equal in length to the diameter of the coil, and having its ends coiled in the same direction, so as to terminate at the opposite end of the coil in arresters *c d* to receive and resist the action of the torsion force. When used as such, the thing to be operated is connected to the cross-bar *b*, and the ends are held in any convenient manner.

When the spring is made into rights and lefts, it may be used wherever they are desirable, and especially for right-and-left doors and sash spring-hinges; and in rotary engines, in which the steam-resisters are arranged to be forced out by right-and-left-acting springs.

I contemplate applying my improved spring to whatever it may be found adaptable.

When applying the spring as an undulating support, its diameter-bar at one end and its terminating ends at the other form convenient means for attaching it to the thing which is to be supported.

Having described my invention, I claim—

The coil-spring *a b c d*, having its coils *a b* and its ends *c d* so arranged as to perfectly balance each other and allow of formation into right-and-left springs, as described.

W. H. WARD.

Witnesses:

A. E. H. JOHNSON,

J. W. HAMILTON JOHNSON.