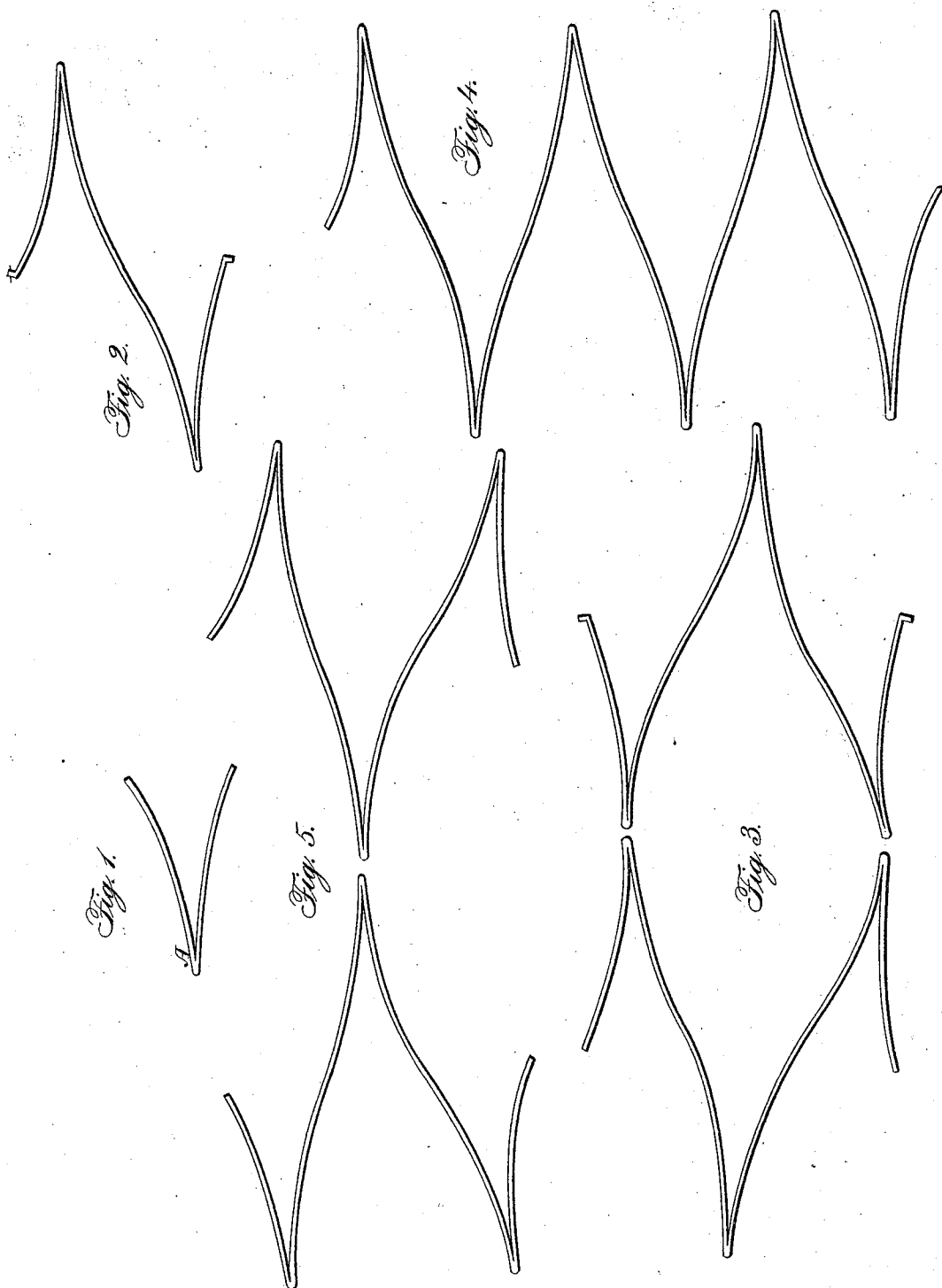# P. HILL.

Carriage-Spring.

No. 489.

Patented Nov 25, 1837.

UNITED STATES PATENT OFFICE.

PORTER HILL, OF VETERAN, NEW YORK.

IMPROVEMENT IN THE MODE OF CONSTRUCTING SPRINGS FOR CARRIAGES, WAGONS, &c.

To all whom it may concern:

Be it known that I, PORTER HILL, of Veteran, in the county of Chemung and State of New York, have invented a new and useful Improvement in Springs for Wagon-Seats, Carriages, Railroad-Cars, Stage-Coaches, and for other Purposes; and I do hereby declare that the following is a full and exact description of the construction and operation of the said springs as invented or improved by me.

A curved bar of iron or spring-steel is prepared, of any desired curvature, of length, width, and thickness to make the spring. A hole is made in each end to fasten it by means of a screw-bolt at one end to the axle-tree or place where the spring is to rest, and at the other end to the seat or carriage, or whatever is to support the weight that is to rest upon it. Said bar is then bent so that half the length of it forms a convex curve, the convexity being upward toward the carriage-body. The other end is then bent over or turned back and made to form a corresponding curve, the convexity of which curve being downward or toward that of the first-mentioned segments. They are then bent together, so that when fastened to the axle or place where it is to rest it forms a convex curved segment with a convex curved segment of equal length resting upon it. This constitutes a single spring. (See Figure 1.)

To increase the length of the spring the curved bar must be bent in a contrary direction from that last described, forming a cyma recta or serpentine curve, as at Fig. 2; then bent back again in a similar manner, so as always to bring two convex surfaces toward each other, and so on, until the spring is of the required length, the last bend (which is fastened by a bolt to the under side of the carriage) being half the length of the cyma recta or serpentine curve.

In bending the curved segments back against each other they must be brought close together at the bent ends, as at A, Fig. 1, and made gradually to open from each other in regular curves of the same curvature of the iron from which the spring is made, by which construction the upper segment is brought down by the weight of the load upon the under segment with a gradual pressure from the joining toward the extended ends, thereby gradually shortening the length of lever as the weight is increased.

The action of this spring is different from any other spring known, the segment of the curved bar from which it is constructed being supported by convex segments of curves placed toward each other in such a manner that they may yield to the lightest pressure, and yet will preserve their elasticity and sustain a weight vastly greater than other springs of the same size can do formed in any other manner, for as the weight on these springs is increased so the length of the springs is diminished, thereby increasing their strength in geometrical proportions. Their durability also forms an important consideration, there being very little friction to them, and consequently but little wear; and if the weight placed upon them should be too great for the resistance they merely straighten out and rest upon their outer extremities without breaking. Their cheapness is evident from their simplicity of construction and durability.

Two of these springs may be arranged opposite each other in such a manner as to answer the purpose of the common elliptical spring; but they will be much more elastic and durable than the latter. (See Fig. 3.) The springs may likewise be arranged in the manner represented at Fig. 4, or in any other mode to suit the views of those who use them.

The invention claimed by me, the said PORTER HILL, and which I desire to secure by Letters Patent, consists in the before-described mode of constructing springs.

PORTER HILL.

Witnesses:
WM. P. ELLIOT,
WM. BISHOP.