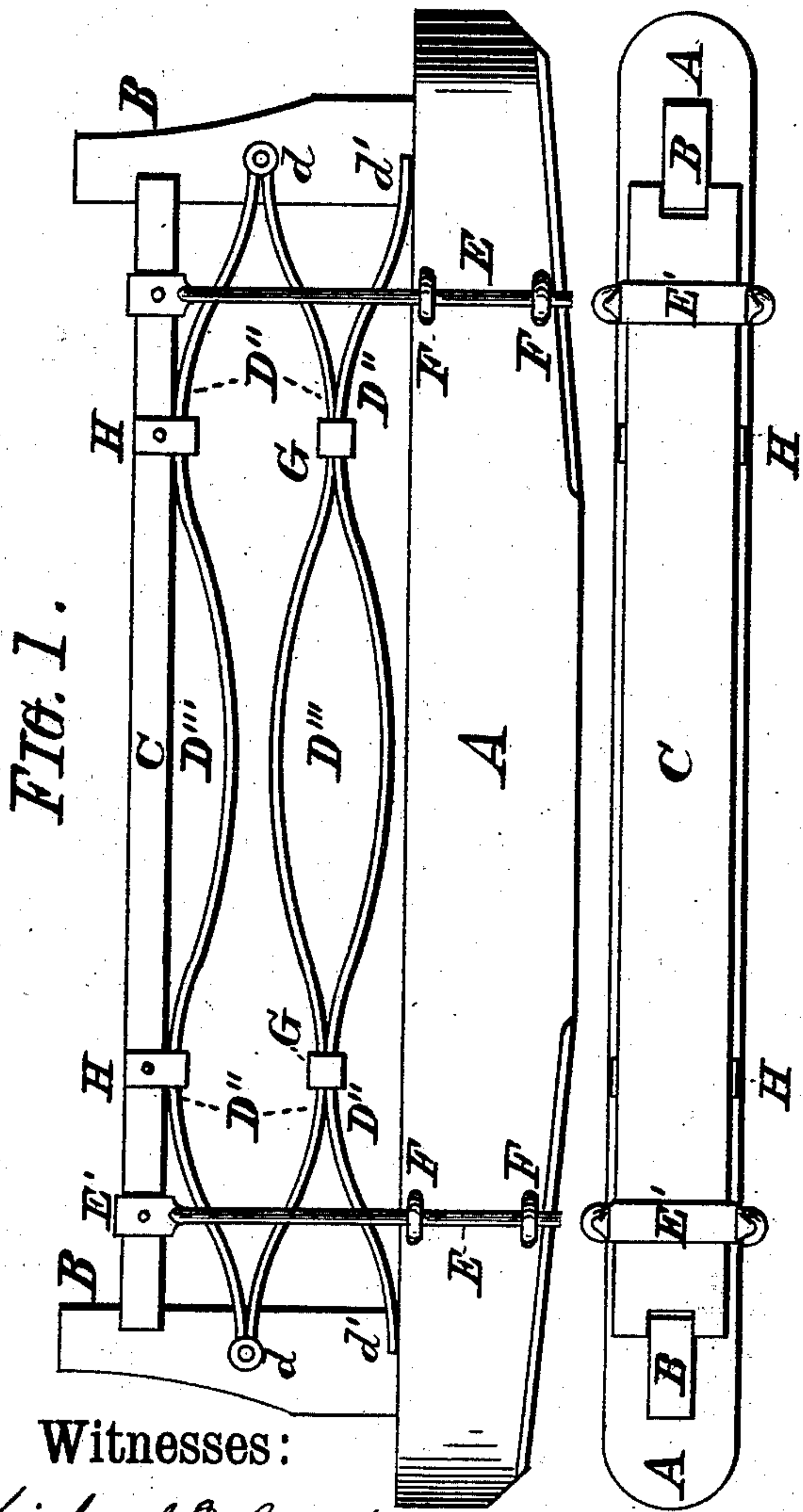
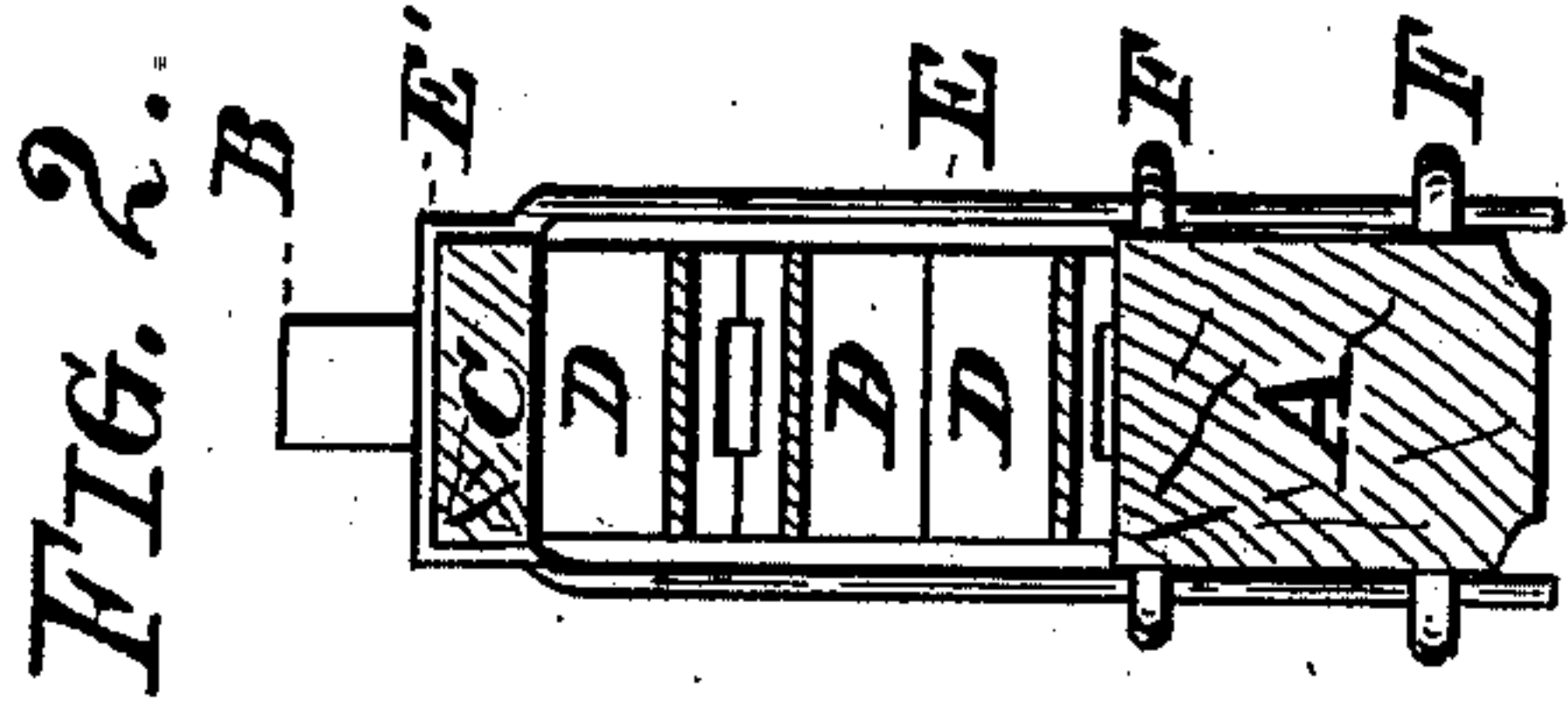


J. KREHBIEL.
Vehicle-Spring.

No. 221,925.

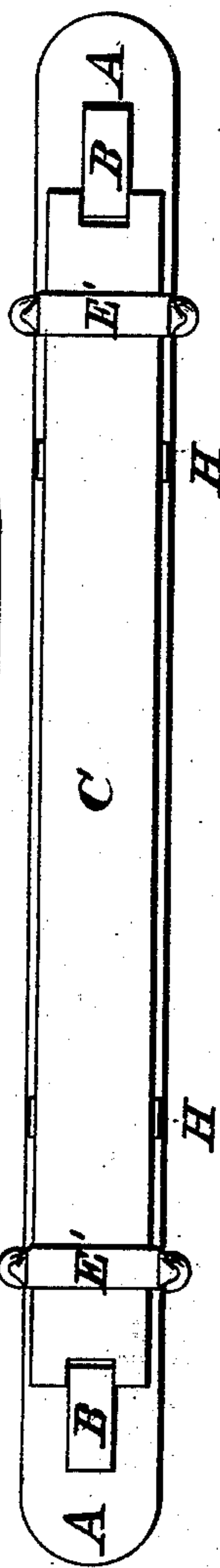
Patented Nov. 25, 1879.



Witnesses:

Michael J. Stark
J. M. G. G. G.

FIG. 3.



Inventor:

John Krehbiel
by Michael J. Stark,
Attorney.

UNITED STATES PATENT OFFICE.

JOHN KREHBIEL, OF WILLIAMSVILLE, NEW YORK.

IMPROVEMENT IN VEHICLE-SPRINGS.

Specification forming part of Letters Patent No. 221,925, dated November 25, 1879; application filed April 9, 1879.

To all whom it may concern:

Be it known that I, JOHN KREHBIEL, of Williamsville, in the county of Erie and State of New York, have invented certain new and useful Improvements on Vehicle-Springs; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheet of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has general reference to vehicle-springs; and it consists essentially in the peculiar combination of parts and details of construction, as hereinafter first fully set forth and described, and then pointed out in the claim.

In the drawings already mentioned, which serve to illustrate my invention more fully, Figure 1 is a front elevation of a bolster supplied with a set of my improved springs. Fig. 2 is a transverse sectional elevation. Fig. 3 is a plan. Fig. 4 is a plan of one extremity of the springs.

Similar parts are designated by corresponding letters of reference in all the figures.

A is the bolster, and B the stakes, of a wagon, both parts being of the usual construction. C is the spring-board, having on both extremities notches fitting the stakes B. D are a series of leaf-springs interposed between the bolster A and spring-board C. They consist each of a flat piece of steel, of even width and thickness throughout, bent into a triple curve, $D'' D'''$, the two end curves, D'' , being in one, and the middle curve, D''' , in the opposite direction. This latter curve is slightly less convexo-concave than the two end curves, so that, if the spring is placed upon a plane surface resting upon both curves $D'' D'''$, the center curve will not touch the said surface, as shown in Fig. 1. The ends d' of these springs are notched at d'' , Fig. 4, so as to fit between the stakes B to retain them in proper position. They may, however, be provided with eyes d , Fig. 1, and a bolt or rivet passed through the eyes to secure a pair of these springs together. I prefer the former construction because it is simpler and gives other advantages, as hereinafter mentioned.

One or more of these springs form a set,

which, when being placed in position, are deflected by the load placed upon the spring-board in such a manner that the two end curves, $D'' D''$, are flattened, while the center curve, D''' , is increased in convexity until said middle curve reaches the bolster, or in case of more than one spring being used, one reaches said bolster and the others meet each other. The load being still further increased, the middle curves will also begin to flatten, thus offering additional resistance to the disturbing cause in exact proportion to the weight placed upon the spring or springs.

In the drawings I have illustrated a series of three leaf-springs placed in position, as described. Any greater or lesser number may, however, be employed, according to the degree of flexibility desired, without departing from the spirit of my invention.

By constructing the springs as described I derive the special advantage that they are always tensioned in exact proportion to the load placed upon them, in contradistinction to the usual elliptic or other springs, which are tensioned to the maximum load they are designed to carry, and are therefore far too stiff and rigid when light or but little loaded.

The construction of the springs as described does not require that they should be placed in the order mentioned, but allows them being applied in a reverse order, so that the uppermost leaf will bear with its middle curve against the spring-board C.

In this manner I am enabled to graduate the springs in accord with the load to be carried, and for this purpose I prefer to leave the spring-leaves separate, as already mentioned, so that I can at any time place them into that position best adapted for each requirement.

Although especially designed for bolster-springs, my invention is equally applicable to platform or box wagons by simply fastening their ends together by means of the eyes d and securing the uppermost leaf to said platform, &c., by clips or other similar means, H. In this case I also prefer to connect the middle and lower leaves by means of clips G, placed onto said springs at their meeting places.

My invention is furthermore applicable as a car-spring, and for many other purposes

which will readily suggest themselves to an intelligent person.

Having thus fully described my invention, I claim as new and desire to secure to me by Letters Patent—

In vehicles, cars, &c., the combination, with the bolster A, of a series of undulated leaf-springs, each having the two end curves, D'' D'', and the center curve, D''', said center curves being less convexo-concave than the end curves, and the leaves placed with their curves in opposite directions, whereby the center curve of one does not meet that of the

next adjacent leaf, and whereby the spring is graduated in accordance with the load bearing upon the series, substantially as and for the use and purpose specified.

In testimony that I claim the foregoing as my invention I have hereto set my hand and affixed my seal in the presence of two subscribing witnesses.

JOHN KREHBIEL. [L. S.]

Attest:

MICHAEL J. STARK,
J. A. MCINTOSH.