

(No Model.)

E. STORM.  
VEHICLE SPRING.

No. 377,584.

Patented Feb. 7, 1888.

Fig. 1

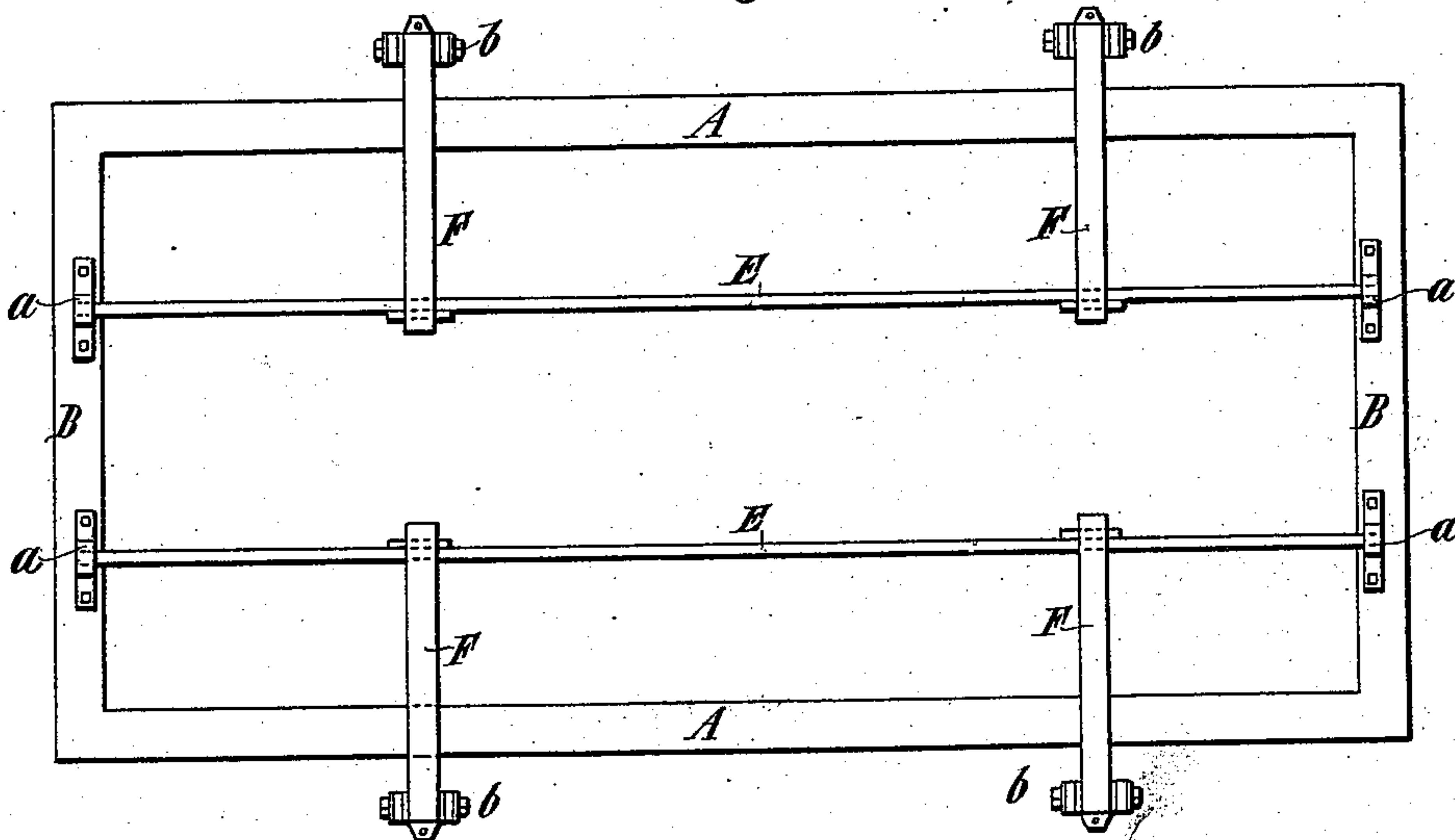


Fig. 2

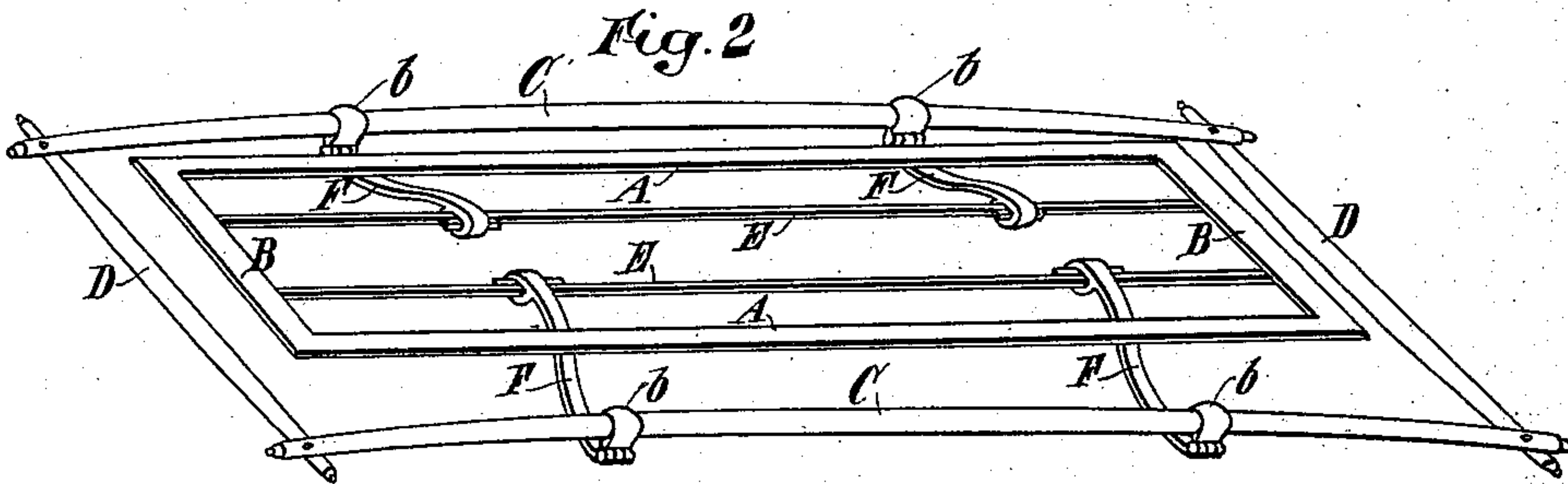


Fig. 4

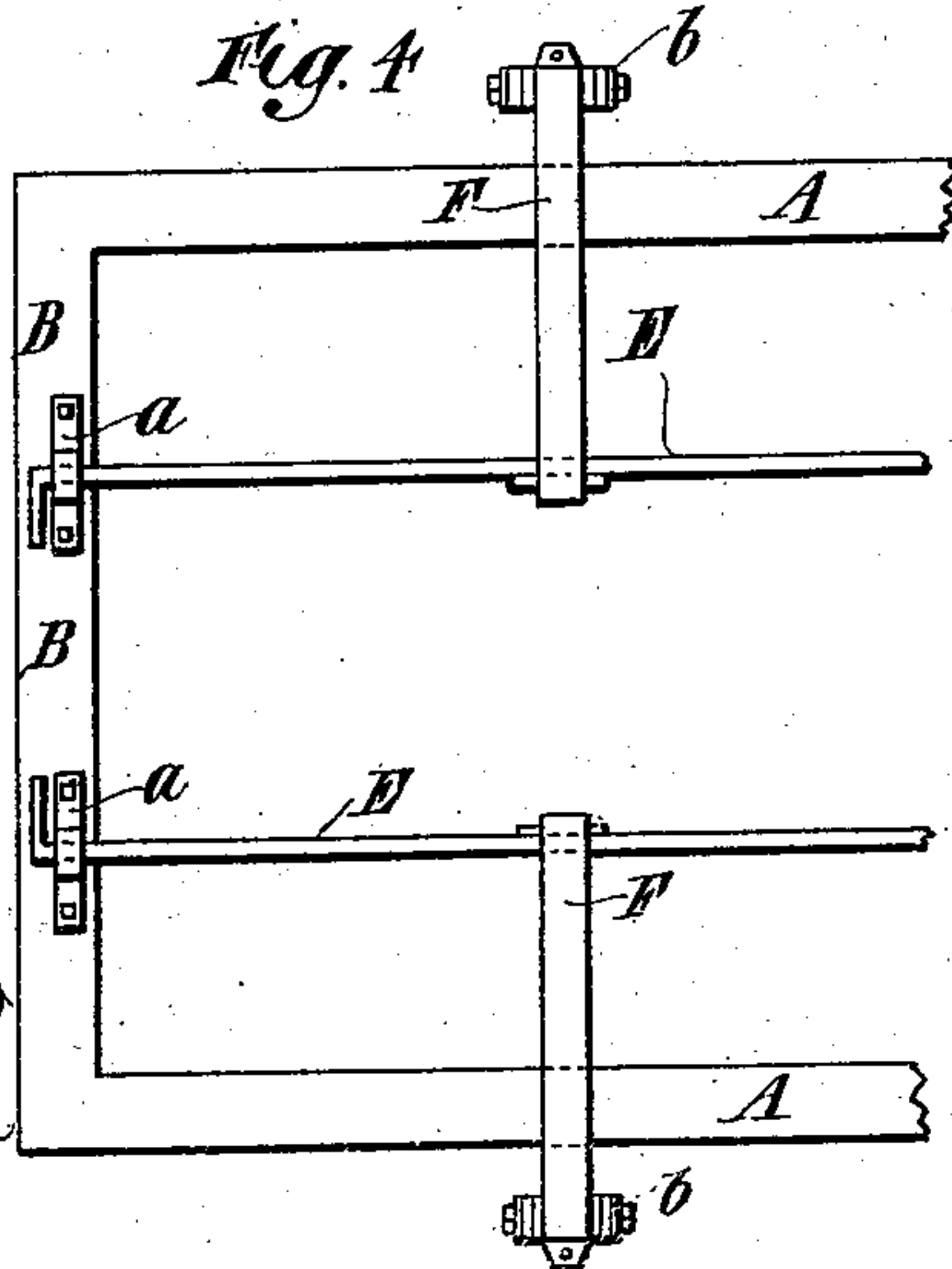
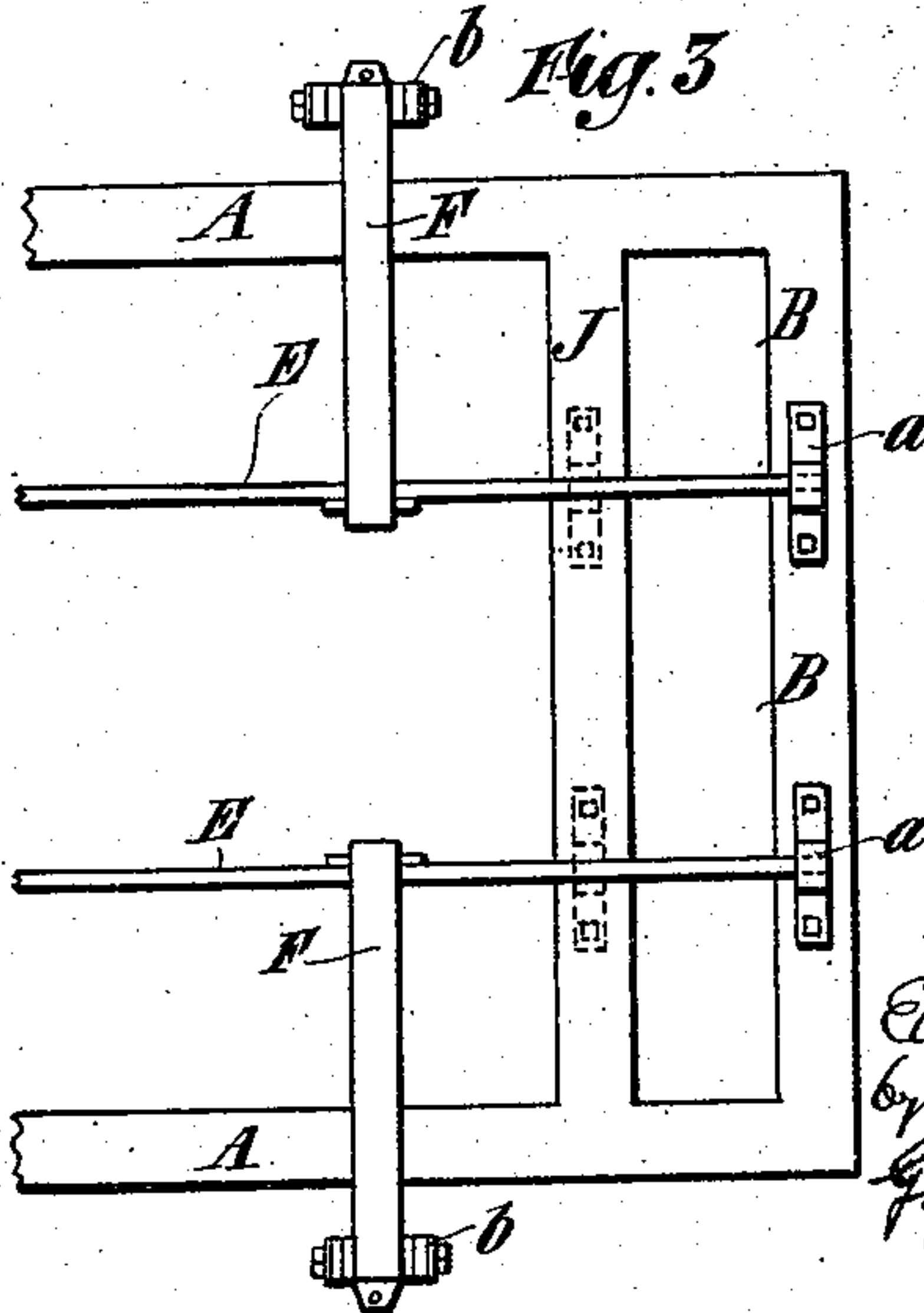


Fig. 3



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 377,584, dated February 7, 1888.

Application filed May 17, 1886. Serial No. 202,371. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD STORM, of Poughkeepsie, in the county of Dutchess and State of New York, have invented a certain  
5 new and useful Improvement in Vehicle-Springs, of which the following is a specification.

My improvement relates to the class of vehicle-springs which operate upon the torsion  
10 principle.

I will describe my improvement in detail, and then point out the novel features in the claim.

In the accompanying drawings, Figure 1 is a plan or bottom view. Fig. 2 is a perspective  
15 plan or top view of the same. Fig. 3 is a portion of a plan or bottom view showing a modified form of construction. Fig. 4 is a portion of another plan or bottom view showing another modification.

20 Similar letters of reference designate corresponding parts in all the figures.

A B designate a frame, of which A designates the side pieces, and B the end pieces or sills. This frame may be secured together in  
25 any suitable manner.

C designates side bars, and D end bars or bolsters, such as are ordinarily employed in what is termed a "side-bar" vehicle.

E designates spring-bars, which may advantageously be made of steel, and which will preferably be angular in cross-section. These bars, as shown, extend from front to rear of the frame A B, and are rigidly secured near their ends to the sills B by clips or keepers *a*.  
30

35 F designates arms or levers, of which I have shown four. These arms extend at approximate right angles to the bars E. Near their inner ends they are rigidly secured to the bars E, and at their outer ends they are secured to the side bars, C, by means of clips or couplings *b*, which may be of the usual or any desired construction. These arms or levers may be bent longitudinally into any desired shape. It will be observed that the distance between the arms F, secured to each of the bars E, is greater than the distance between said arms and the sills.  
40  
45

In case it is desired to shorten the spring-bars E, I may place additional sills, J, adjacent

to the sills B, to which the clips or keepers *a* 50 may be secured. By this means the length of the springs may be regulated as desired. I have shown such an arrangement in Fig. 3.

In Fig. 4 I have shown the end of one of the spring-bars E as bent in such manner as to 55 to lie against the sill.

By my improvement I do away with the use of a sill between the end sills, B, such as is commonly employed, whereby I obtain not only the advantage of the twisting or torsion 60 of the spring-bars E, but also a longitudinal flexure. I also do away with journals at the ends of the spring-bars, which is a common method of construction.

By my improvement the ease of the springs 65 is increased, while their cost of manufacture is lessened.

I am aware that a torsion-spring has been made comprising a spring-bar constructed of a single piece of metal and bent in such man- 70 ner as to form an approximately rectangular frame. Said frame is secured to the wagon-body by means of clips, and lever-arms extend from the side bars and are connected to the side portions of the spring. By my improvement 75 I am enabled to remove or replace either one of the spring-bars without disturbing the other, in case it should become necessary from breakage or other cause. In the construction referred to it would be necessary to remove 80 the entire spring-frame.

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

The combination, with a wagon-body, of sills adjacent to the ends of said wagon-body, 85 side bars, torsion-springs extending between said sills of approximately the same length as the wagon-body, and a pair of arms extending from each of the side bars to each of said springs and rigidly secured to the springs near 90 their ends, so that there will be a greater distance between the arms for each spring than between said arms and the sills, substantially as specified.

EDWARD STORM.

Witnesses:

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