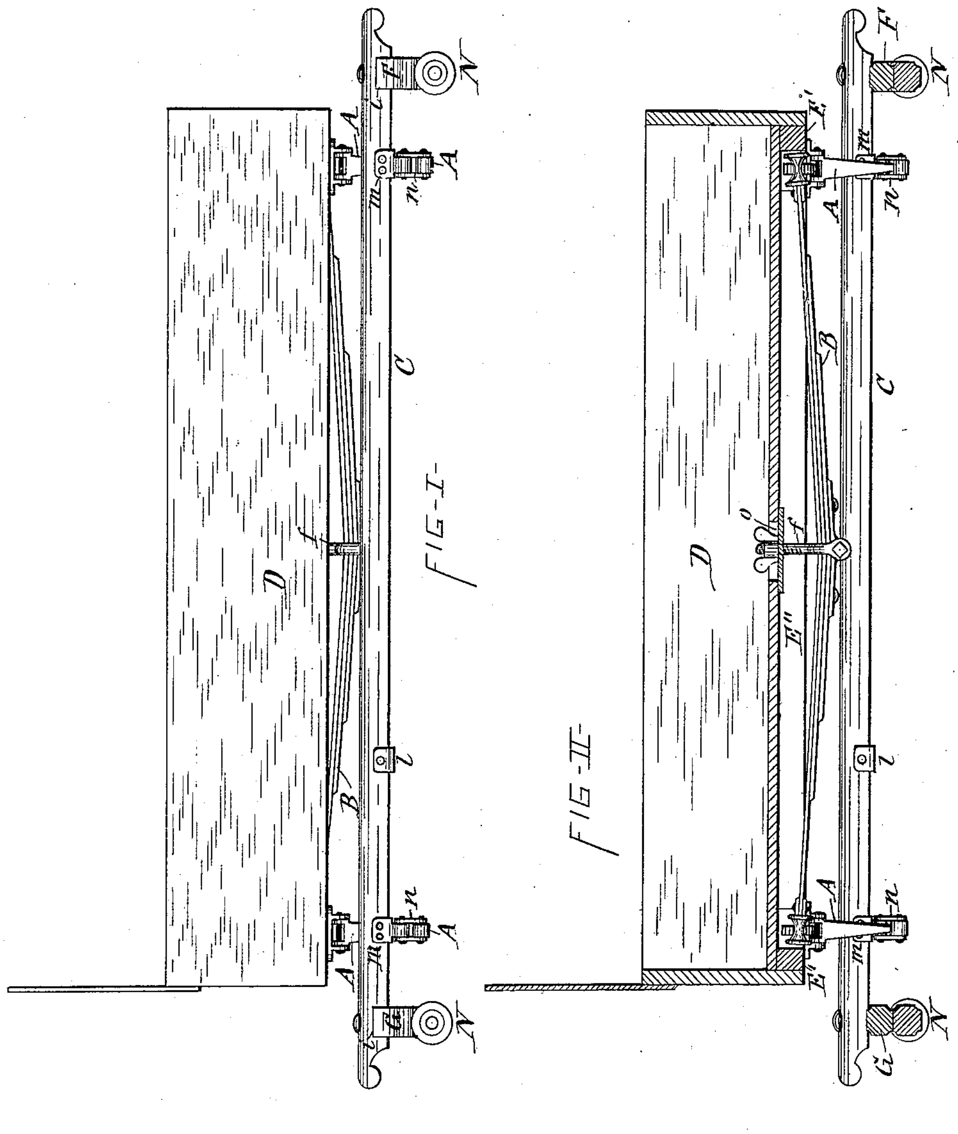
(No Model.) 4 Sheets—Sheet 1.

E. CLIFF.

SPRING FOR VEHICLES.

No. 342,731. Patented May 25, 1886.



WITNESSES

C. Bendixon

J. H. Gibbs

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per Dudl, Lacss & Hay

his Attys

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 4 Sheets—Sheet 2.

E. CLIFF.

SPRING FOR VEHICLES.

No. 342,731. Patented May 25, 1886.

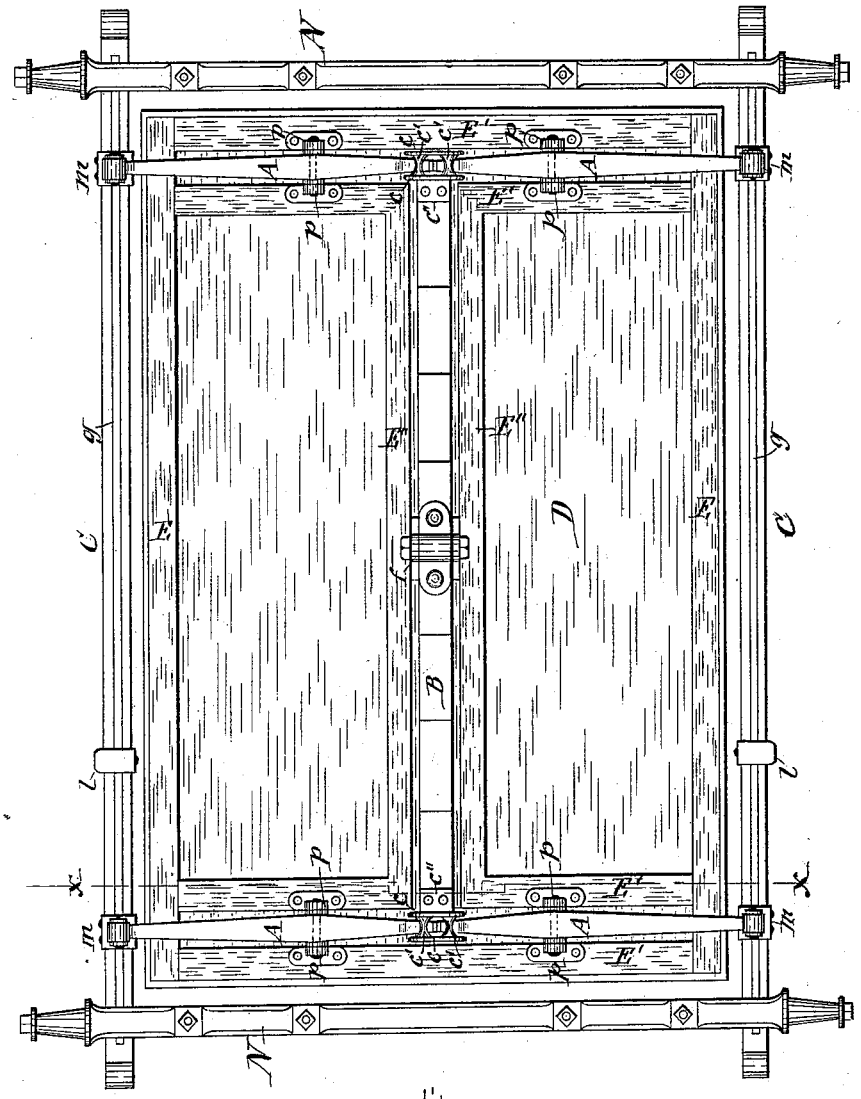

FIG. III.

WITNESSES

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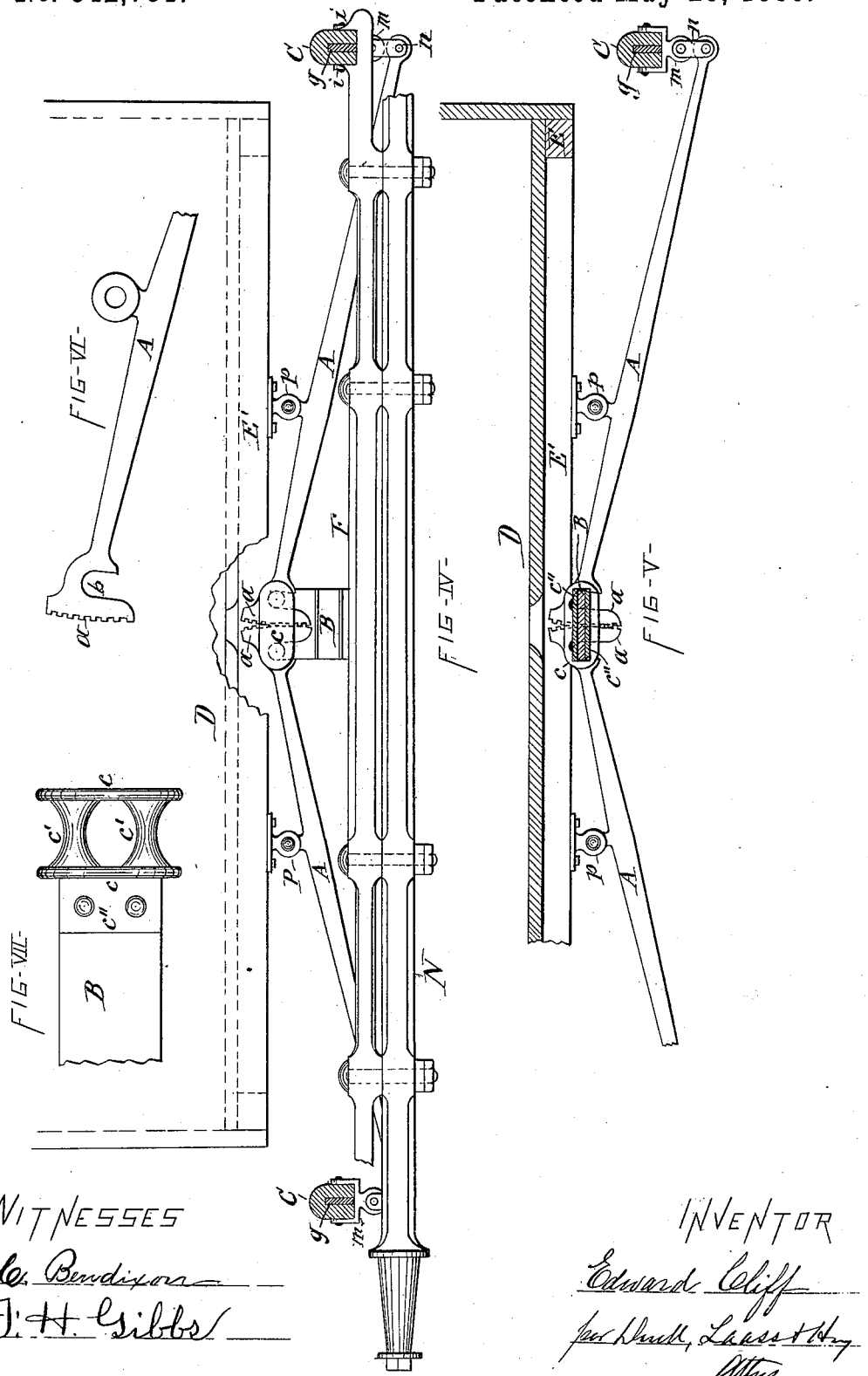
(No Model.) 4 Sheets—Sheet 3.

E. CLIFF.

SPRING FOR VEHICLES.

No. 342,731. Patented May 25, 1886.



WITNESSES

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(No Model.) 4 Sheets—Sheet 4.

E. CLIFF.

SPRING FOR VEHICLES.

No. 342,731. Patented May 25, 1886.

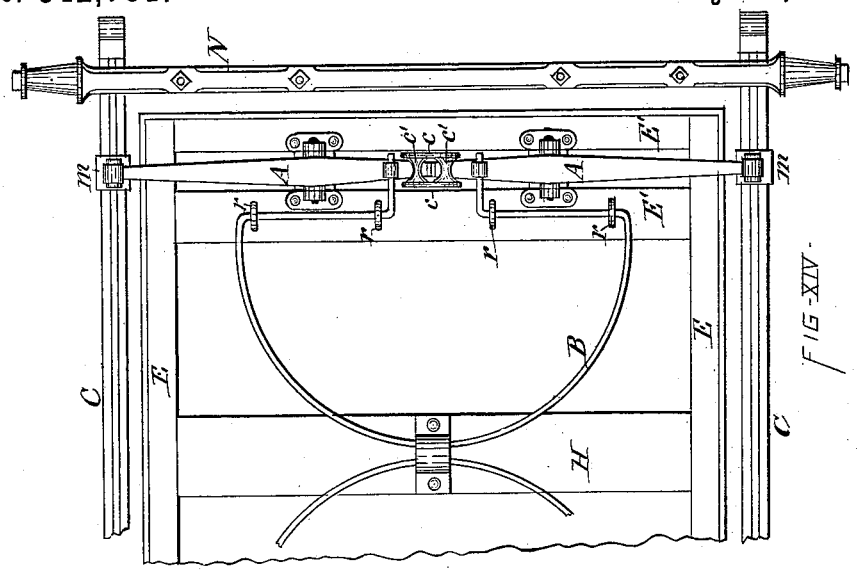

FIG-XIV-

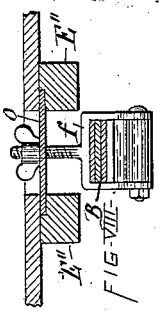

FIG-VIII-

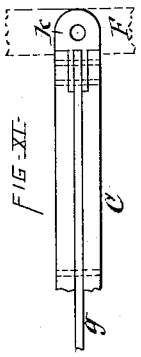

FIG-XII-

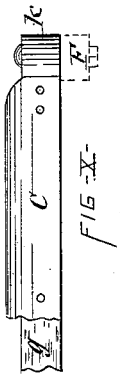

FIG-X-

FIG-XIII-

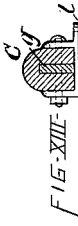

FIG-XIII-

FIG-IX-

WITNESSES

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UNITED STATES PATENT OFFICE.

EDWARD CLIFF, OF OSWEGO, NEW YORK, ASSIGNOR OF ONE-FOURTH TO O. A. HAYNES, OF ST. LOUIS, MISSOURI.

SPRING FOR VEHICLES.

SPECIFICATION forming part of Letters Patent No. 342,731, dated May 25, 1886.

Application filed February 19, 1886. Serial No. 192,477. (No model.)

To all whom it may concern:

Be it known that I, EDWARD CLIFF, of Oswego, in the county of Oswego, in the State of New York, have invented new and useful Improvements in Vehicle-Springs, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

The object of this invention is to provide vehicle-bodies with a spring-support which shall operate synchronously at opposite sides of the vehicle, so that when a load or downward pressure is applied to one side of the body the opposite side thereof shall become depressed correspondingly, and thus the lateral surging or swaying of the body under various positions of the load shall be obviated; and to that end my invention consists in the novel construction and combination of parts, as hereinafter fully described, and specifically set forth in the claims.

In the annexed drawings, Figure I is a side elevation of that part of a side-bar vehicle to which my invention is applied. Fig. II is a central longitudinal vertical section of the same. Fig. III is an inverted plan view of said vehicle. Fig. IV is an enlarged rear end view, with a portion of the body broken away to better illustrate my invention. Fig. V is an enlarged vertical transverse section on line *x x*, Fig. III. Fig. VI is an enlarged detail view of the inner end of the body-supporting lever. Fig. VII is an enlarged detail view of the link which connects the spring with the body-supporting levers. Fig. VIII is a detail view of the adjustable attachment of the spring to the center of the body. Fig. IX is an isometric view of a portion of the side bar or body-supporting bar constructed according to my invention. Fig. X is a side view of an end portion of the side bar embodying a modification of my invention. Fig. XI is an inverted plan view of the same. Fig. XII is an inverted plan view of the side bar, illustrating further modification of my invention. Fig. XIII is a transverse section of said side bar, showing the attachment of the so-called "rub-iron;" and Fig. XIV is an inverted plan view of a portion of a vehicle embodying modifications of my improved spring-support for the body of the vehicle.

Similar letters of reference indicate corresponding parts.

N N represent the two axles of the vehicle.

F is the bolster on top of the hind axle, and G is the head-block, mounted on the forward axle in any ordinary and well-known manner.

C C denote the body-supporting side bars, mounted on the aforesaid bolster and head-block. These side bars are usually formed of wood, on account of the lightness of said material and the facility of finishing the same, and in order to retain these advantages, and at the same time combine minimum of dimensions with maximum strength, I provide the side bar or body-supporting bar, C, with a longitudinal channel and countersink therein edgewise a flat metallic bar, *g*, extending lengthwise the wooden bar C, and secured therein by bolts or rivets passing transversely through the wooden bar and inclosed metallic bar. The metallic bar may be terminated flush with the ends of the wooden bar, as represented in Fig. IX of the drawings, and when so constructed the bar C is secured to the bolster and head-block by lugs *i i* on top of the latter, embracing the bar C between them, and by bolts or rivets passing transversely through said lugs and bar, as represented in Fig. IV of the drawings; or the wooden bar C may be shortened to permit of attaching to the ends of the metallic bar eyes *k k*, by which the bar C is supported on top of the bolster and head-block, and secured thereto by bolts passing through said eyes and through the aforesaid parts, as illustrated in Figs. X and XI of the drawings. Furthermore, if it is desired to entirely conceal the metal bar, the wooden bar can be made of sufficient length to project beyond the eyes *k k* and permit of embedding said eyes, as well as the metallic bar, in the wooden bar, as represented in Fig. XII of the drawings.

The rub-iron *l*, I extend across the under side of the side bar, C, and provide it with vertical lips, which abut against opposite sides of the side bar, and by a rivet or bolt passing through said lips and through the side bar and

inclosed metallic bar *g* the rub-iron is firmly secured in position, and at the same time serves to secure the metallic bar *g* in the wooden bar.

To the under side of the body I attach a frame, consisting of longitudinal rails E E under the sides of the body, two sets of cross-rails, E′ E′, attached to the ends of the rails E E, with a space between said cross-rails, and two longitudinal rails, E″ E″, arranged under the center of the body and with a space between said rails, and attached to one of the cross-rails at each end.

On each side bar, C, near the ends thereof, I fasten two clips, *m m*, on which I pivot hangers *n n*, and on the lower ends of said hangers I pivot levers A A, which stand transversely in relation to the body D and project under the same and terminate at the longitudinal central line thereof, where they meet the inner ends of the levers A A, hung on the side bar, C, at the opposite side of the vehicle. The inner ends of the levers A A, I form with toothed vertical segments *a a*, which mesh in each other, and thereby positively lock them together, so as to compel the two levers to vibrate in unison.

Back of the segments *a a* the levers A A are formed with bearings *b b*, by which the levers rest on cross-bars *c′ c′* of a link, *c*, which embraces the sides of the segments *a a*, and thus maintain the latter in line with each other.

Longitudinally under the center of the body and in the space between the longitudinal rails E″ E″ is arranged a spring, B, the center of which is connected to the body D, adjustable vertically by a hanger, *f*, the lower end of which is firmly secured to the spring, and the upper end is of the form of a screw-threaded shank, which projects through a plate, *o*, secured to the top of the rails E″ E″ and spanning the space between said rails, as illustrated in Fig. VIII of the drawings. By a nut on the upper end of the said screw-threaded shank the hanger *f* is adjustably suspended under the body of the vehicle. The ends of the springs B are secured to the links *c c* by means of lips *c″ c″*, which project from the links and receive between them the ends of the spring, as best seen in Figs. II, V, and VII of the drawings, and rivets passing through the said lips and intervening end of the spring serve to securely fasten said parts together. The levers A A are thus yieldingly supported at their inner ends by the spring B. Said levers are directly under the space between the cross-rails E′ E′, and are pivoted intermediate their lengths on brackets *p p*, attached to said rails. The body D is thus mounted on the vibratory portion of the levers and supported by the spring B.

If the load should happen to be placed on one side of the body, the lever A under said side draws down with it its companion lever under the opposite side of the body by means of the engaging segments *a a* on the adjacent ends of the levers, and consequently the lateral swaying of the body incident to the shifting of the load toward one side of the body is effectually prevented.

I do not limit myself to the arrangement of the spring B along the longitudinal central line of the body, inasmuch as different styles of springs may be employed to resist the downward pressure of the levers A A. A modification in this respect is illustrated in Fig. XIV of the drawings, in which B represents the spring formed of a bar, the central portion of which is bent into semicircular shape and attached at the center thereof to the center of a plate, H, secured across the under side of the body. The portions adjacent to the semicircular portion of the said spring-bar are bent inward on the line of the diameter of the semicircular portion, and pass through eyebolts or staples *r r*, attached to the cross-rail E′, and the ends of spring-bar are bent at right angles toward the levers A A, to which they are connected, so as to receive the downward pressure of said levers. By said construction a torsion-spring is obtained. It is also obvious that instead of hanging the levers A A on the side bars, C C, they may be pivoted on the head-block and bolster or on some other suitable portion of the vehicle-frame.

Having thus described my invention, what I claim is—

1. A spring-support for vehicle-bodies, consisting of two sets of levers arranged transversely under opposite ends of the body and connected at their outer ends to the vehicle-frame, and having their inner ends interlocked with each other, a spring extending lengthwise the vehicle and connected at opposite ends to said inner ends of the levers to resist the vibrations thereof, and the body mounted on the vibratory portions of the levers, substantially as set forth.

2. The combination, with the vehicle and its body, of two sets of levers arranged transversely under opposite ends of the body and hung at their outer ends on the vehicle-frame, and having their inner ends interlocked with each other, the body mounted on the intermediate portions of the levers, and a spring extended along the longitudinal central line of the body and connected at the center with said body and at its ends with the inner ends of the two sets of levers, substantially as described and shown.

3. On a side-bar vehicle, the combination of the levers A A, arranged transversely in relation to the body and hung at their outer ends on the side bars and formed at their inner ends with toothed segments *a a*, meshing in each other, the spring B, connected with the inner ends of said levers, and the body mounted on the intermediate portion of the levers, substantially as set forth.

4. The combination, with the vehicle and its body, of the transverse levers A A, pivoted at their outer ends on the vehicle and formed at their inner ends with the toothed segments

a a and with the bearings *b b*, the link *c*, having cross-bars *c' c'* under the said bearings and provided with lips *c'' c''*, the spring B, arranged longitudinally under the center of the body and secured thereto, and having its vibrating end attached to the lips *c'' c''*, and the body mounted on the intermediate portions of the levers, substantially as described and shown.

5. In combination with a side-bar vehicle and its body, two sets of brackets, *p p*, attached to the body, two sets of hangers, *n n*, pivoted on the side bars, the two sets of transverse levers A A, pivoted on said hangers and brackets and formed at their inner ends with toothed segments *a a* and with the bearings *b b*, the link *c*, having cross-bars *c' c'* under the bearings *b b*, and the spring B, arranged longitudinally under the center of the body and secured to the center thereof, and connected at opposite ends with the links *c c*, substantially as described and shown.

6. In combination with the two sets of transverse levers A A, arranged under opposite ends of the body and connected at their outer ends to the vehicle-frame, and having their inner ends interlocked with each other, to vibrate in unison, and the body mounted on the intermediate portions of the levers, the longitudinal spring B, connected at opposite ends with the inner ends of the levers A A, and the hanger *f*, suspended from the center of the body vertically adjustable and connected to the center of the spring, substantially as and for the purpose set forth.

7. In combination with the body D and its central longitudinal supporting-spring, B, and levers A A, the body-supporting frame consisting of the longitudinal rails E E under the sides of the body, two sets of cross-rails, E' E', attached to the ends of the rails E E, with a space between said cross-rails, and the longitudinal rails E'' E'', arranged under the center of the body and with a space between said rails, and attached to one of the cross-rails at each end, substantially as described and shown.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, at Oswego city, in the county of Oswego, in the State of New York, this 15th day of February, 1886.

EDWARD CLIFF. [L. S.]

Witnesses:
R. B. HAWKINS,
C. C. PLACE.