

(No Model.)

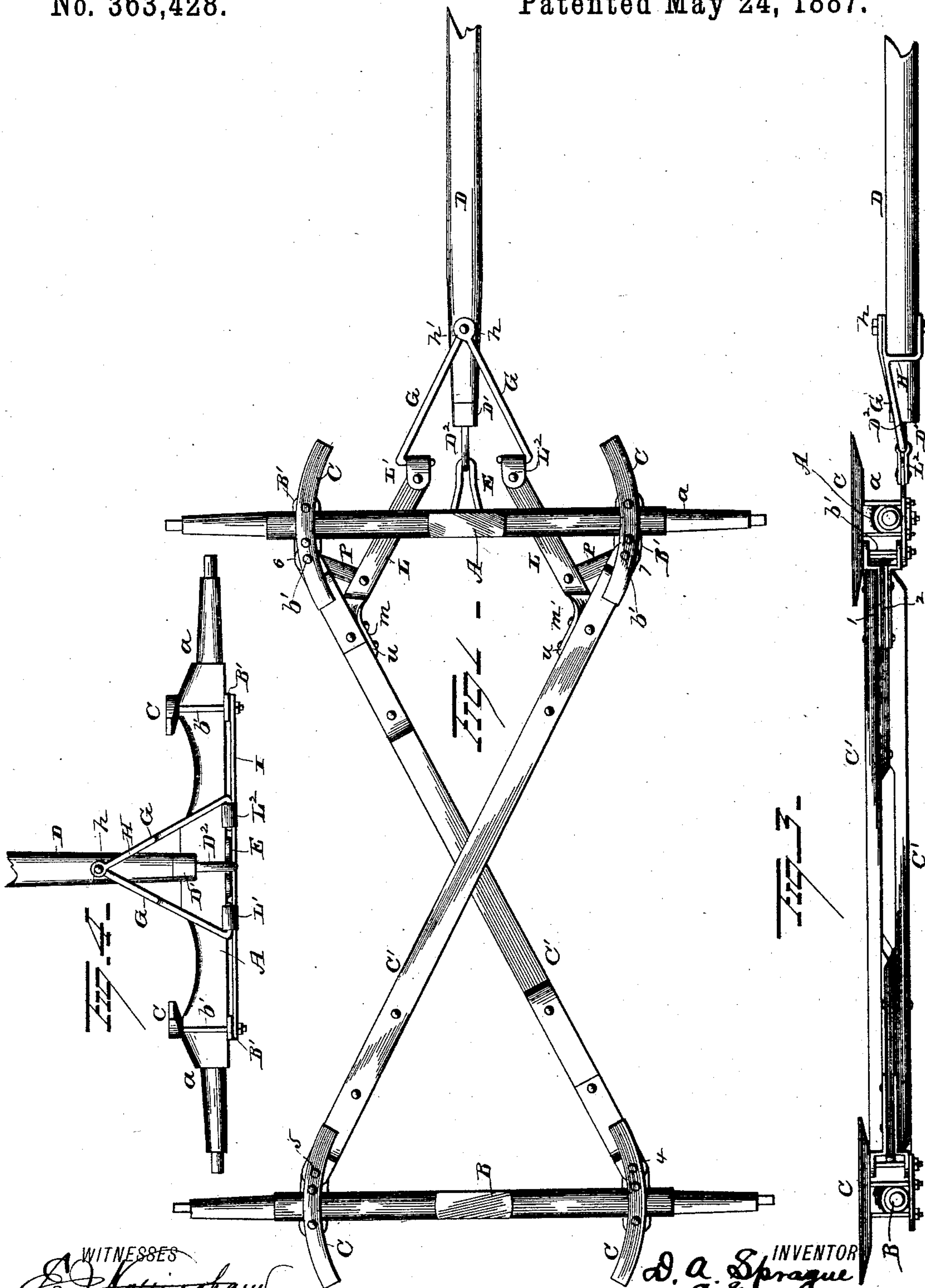
3 Sheets—Sheet 1.

D. A. SPRAGUE & S. PERRY.

WAGON RUNNING GEAR.

No. 363,428.

Patented May 24, 1887.



WITNESSES
Geo. F. Downing

INVENTOR
D. A. Sprague
S. Perry
By *H. A. Sprague* Attorney

(No Model.)

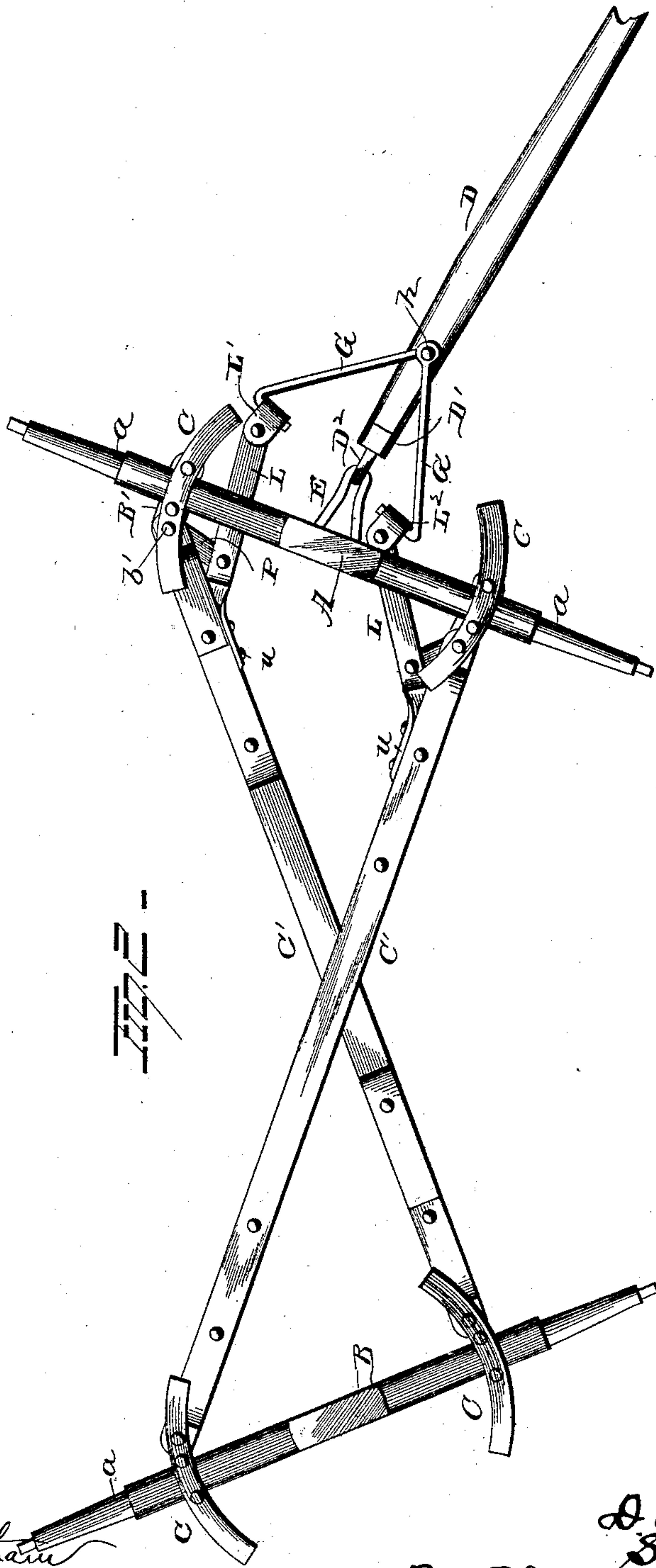
3 Sheets—Sheet 2.

D. A. SPRAGUE & S. PERRY.

WAGON RUNNING GEAR.

No. 363,428.

Patented May 24, 1887.



WITNESSES
Ed. Nottingham
Geo. F. Downing.

INVENTOR
D. A. Sprague
S. Perry
By *H. Seymour* Attorney

(No Model,)

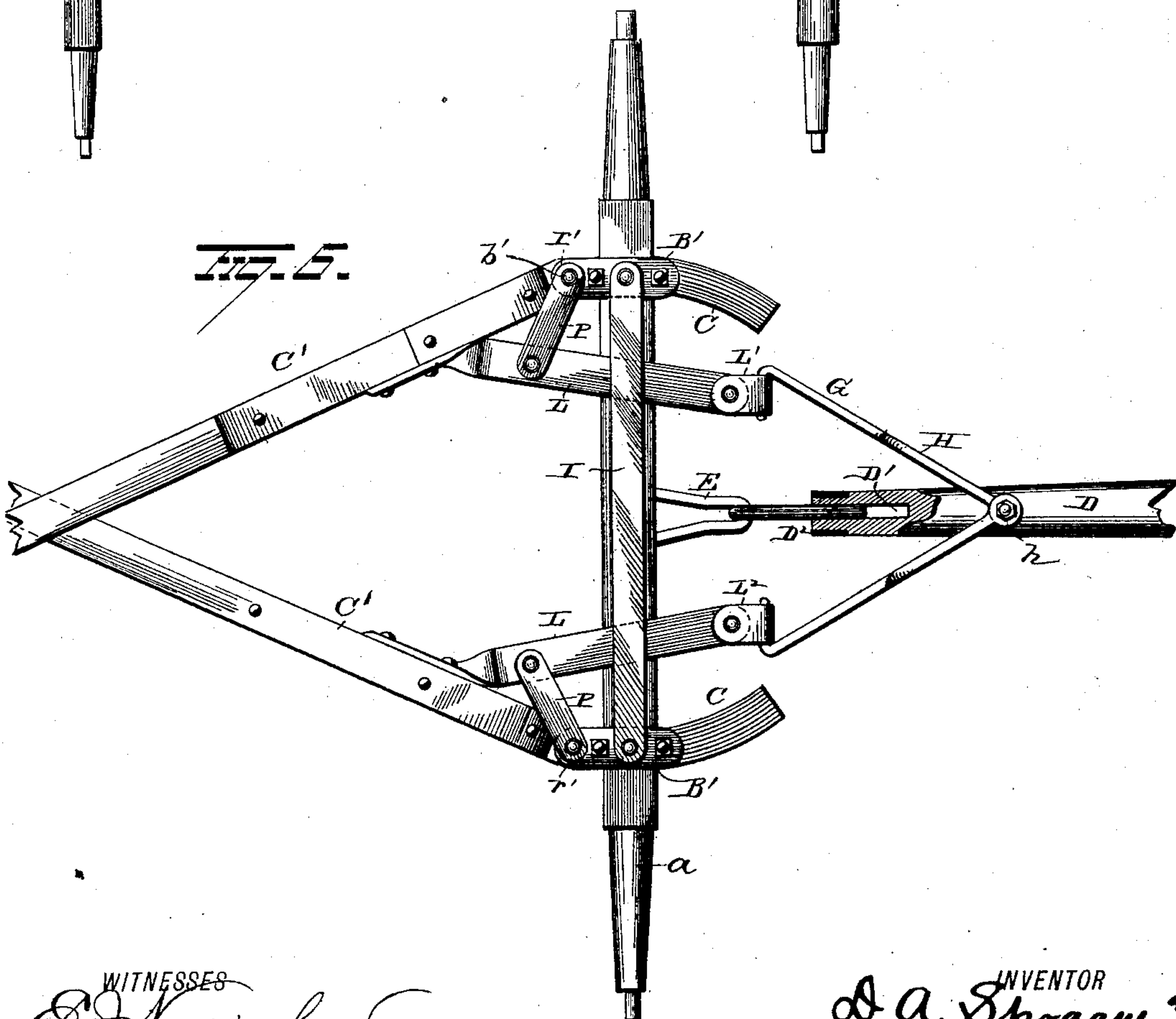
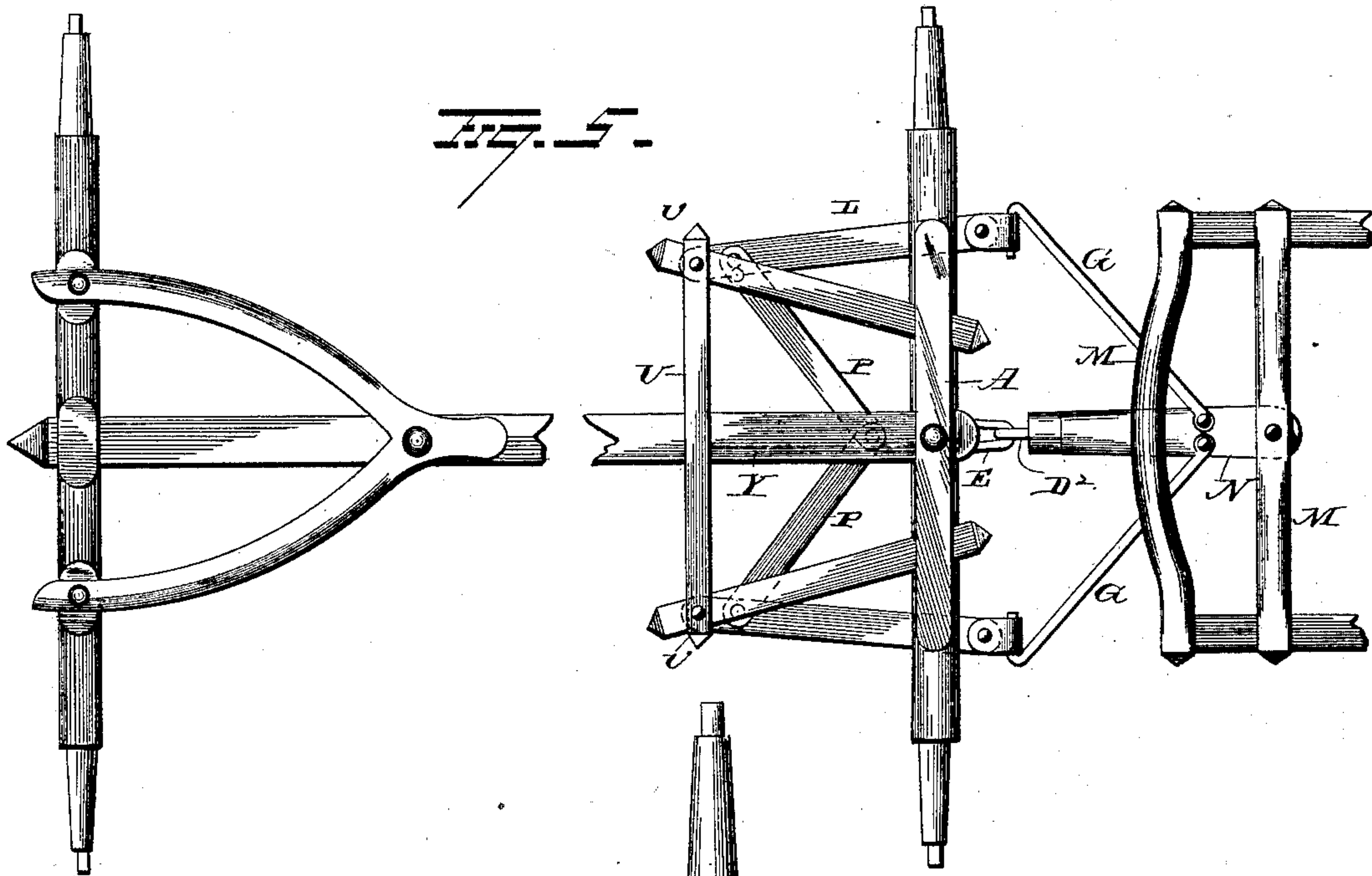
3 Sheets—Sheet 3.

D. A. SPRAGUE & S. PERRY.

WAGON RUNNING GEAR.

No. 363,428.

Patented May 24, 1887.



WITNESSES
W. J. Nottingham
Geo. F. Downing

INVENTOR
D. A. Sprague & S. Perry
By H. A. Seymour Attorney

UNITED STATES PATENT OFFICE.

DANIEL A. SPRAGUE, OF POLAND, AND STUART PERRY, OF NEWPORT,
NEW YORK.

WAGON RUNNING-GEAR.

SPECIFICATION forming part of Letters Patent No. 363,428, dated May 24, 1887.

Application filed November 19, 1886. Serial No. 219,401. (No model.)

To all whom it may concern:

Be it known that we, DANIEL A. SPRAGUE and STUART PERRY, of Poland and Newport, respectively, in the county of Herkimer and State of New York, have invented certain new and useful Improvements in Wagons; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to a "locking-gear" for draft or other wagons, the object being to provide a simple and comparatively cheap mechanism whereby the undue vibration of the front axle and the draft-pole or shafts will be prevented, and in this way render locomotion of the wagon on an uneven or stony road-bed less fatiguing to the draft-animals by obviating the jerking and thrashing of the draft-pole upon the fore quarters and limbs of the horses that are attached to it.

A further object is to provide a mechanism consisting of links and cross-bars pivoted together and to the running-gear of a wagon constructed with either two cross-reaches or a single center reach, to coact therewith and lock either one or both axles with increasing firmness, as the draft or other force transmitted by the levers is increased, without causing a perfectly rigid or dead lock of the running-gear of the wagon when it is being moved in any direction.

A further object is to construct a locking and draft gear for wagons, so that but little expensive manual labor is needed in its production, and thus permit manufacture of the same at a low initial cost.

With these objects in view our invention consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the drawings making a part of this specification, Figure 1 is a plan view of the running-gear of a two-horse wagon with the wheels removed. Fig. 2 is a plan view of the running-gear with the parts in a position incidental to the turning of a two-horse wagon in a curved direction. Fig. 3 is a side view of the connected parts of a two-horse wagon. Fig. 4 is a front view with the pole elevated.

Fig. 5 is a plan view of a modification of the locking-gear to attach it to a single-horse wagon. Fig. 6 is an enlarged plan view of the rear portion of the draft-pole with its socket end in section to show interior parts.

A B represent, respectively, the front and rear axles of the wagon. At four points near the inner terminations of the wheel-spindles *a* are mounted upon the upper surface of the axles the inwardly-curved bolster-slides C. These plates are all in the same horizontal plane, and are held securely in connection with the body of the axles A B by bracket clamping-plates B'. These plates are inwardly extended to afford lugs for the pivotal attachment of the diagonal reaches C' C'. These reaches C' C' have each a pivotal-joint attachment at their ends. These joints, being made each of two plates, 1 2, that are suitably bent to make their upper perforated ends, 1, have surface contact with the under sides of the bolster-slides C on their inner limbs, and the lower parallel ears of plates 2 have a bearing on the extensions of the clamps B', a pivot-bolt, *b'*, passing through each bolster-slide and other adjacent parts to form a horizontally-movable joint at each of the four points 4 5 6 7 on the front and rear axles, A B. (See Fig. 1.)

The pole or tongue D of the wagon is connected directly with the center of the front axle on its under side by a loop, E, made of such material and proportionate thickness as to have proper strength laterally. It has an eye formed at its front or free end, the rear termination of the loop E being secured firmly to the axle by bolts, clips, or any other approved method. Upon the rear end of the draft-pole D a socket-piece, D', is secured. This is made of metal, and is so constructed as to answer the double purpose of a ferrule for the end finish of the pole, and also as a guide-box for the slide-hook D², that is inserted in a longitudinal perforation made axially in the socket to permit a free reciprocal movement of the hook-bolt D² therein, the body of the pole being also perforated a limited distance to permit a bolt of proper length to be introduced.

The bolt D² has a hook or other proper similar provision made on its free end to effect a

hinged connection of this end with the eye of the loop E, and thus allow the draft-pole to have vertical play as well as the limited longitudinal movement just explained. (See Fig. 6.)

5 At a proper point in the body of the pole a vertical perforation is made to receive a pivot-bolt, *h*. The pole at this point should be reinforced with suitable stay-plates. The bars G are made of proper strength, and are piv-
10 oted to the pole D by the insertion of the pivot-bolt *h* through an eye made in their pole ends.

The branched bars G are made with an integral bent portion, H, that is given a right-angle bend to cause the lower piece, H, to lie
15 in a plane parallel to the main upper bar, G, and have sufficient space to intervene between these parts to form a clevis for the pivotal attachment of the draft-bars G to the body of
20 the pole D, the pivot-bolt *h* being inserted through these parts and secured in place by screw-threads cut on one end with jam-nuts on it, or other proper means.

At points *m m'* directly opposite each other
25 on the forward ends of the diagonal reaches C' C' the draw-bars L are preferably attached rigidly to their inner or other faces. These draw-bars L are bent from a flat bar of metal by giving the material a quarter-twist from
30 the rear bearing-pad, *u*, to bring the flat side of the bar front, the free end of the bar extending downwardly a proper distance to permit a right-angle bend forward of the material, to render the body of the link horizontal
35 and capable, from this method of construction, of being held in sliding contact with the under side of the forward axle, A. We do not desire to restrict ourselves to an absolute rigidity of connection of the bars L to the reaches C' C', as a pivoted joint will also answer the pur-
40 poses sought, but is more expensive and unnecessary to use in this attachment of parts.

The description just given of the method of constructing the draw-bars L is the same in
45 both cases, with the exception that the quarter-twist of the material and set of the bearing-pad *u* to the diagonal face of each reach must be reversed to suit their relative position on right and left side of the wagon.

50 It will be noticed that the rigid connection of the rear ends of the draw-bars L to the diagonal reaches C' C' is made some distance to the rear of the pivot-joints at the front ends of the reach-bars.

55 To the draw-bars L the outwardly extending short links P are pivoted. These links P extend a proper distance to connect their outer ends, *v'*, pivotally with the clamp-plates B' by the insertion of the vertical pivot-bolt *b'*, that
60 is the center of motion of the forward joints of the reaches C' C'. To the forward ends of the link-bars L are pivoted the loops L' L². The loops L' L² are permitted to have a limited vibration on their points of pivotal connection
65 with the link-bars L, for a purpose that will be hereinafter explained.

The free ends of the branched draft-bars G

are bent or otherwise formed to enter the loops L' L², and are properly secured in place to permit a vertical vibratory movement of the pole
70 D; and in order to accomplish this motion the center hinged connection at the rear end of the pole D is preferably made to line with the side joints just mentioned, and all of these joints, to work freely, should have the plane of
75 their pivotal motion parallel to the front face of the axle A when the pole D is directly to the front or at a right angle to this face of the axle A. A bearing-plate, I, is attached at its
80 ends to permit a space to intervene between it and the lower surface of the front axle, A, upon which it is located. This plate is intended to afford a proper sliding surface for the support of the draw-bars L, that are introduced between it and the lower surface of the
85 axle.

A fifth-wheel is not necessary in this form of wagon-gear; but a proper anti-friction bearing-surface is provided by rigidly-secured metallic plates located on the top face of each
90 axle at the center bearing of the bolsters, which are of the ordinary form, and pivoted at the center to the forward and rear axle to carry the body, with the exception that they have end bearings or rollers provided, which bear
95 upon the arched brackets or bolster-slides C, metallic wearing-plates being provided at these points of contact; and as these latter features are not embraced in our present invention as a novelty, they are not shown in the
100 drawings.

In operation the action of turning the wagon from a straight line to describe curves of a varying radius the diagonal reaches C' C' and the draw-bars L, with their loops L' L² and
105 short links P, move on their respective pivot-connections, so as to draw the inner spindles of the front and rear axles toward a common center point, and two longitudinal lines produced from the centers of the wheels describing the inner curves will intersect at a point
110 central to both spindles, as shown in Fig. 2.

When the draft of the load is directly forward, the draft-pole D is held by its connection in a position at a right angle to the front
115 axle, A, and from the manner of connecting the draw-bars L to the reaches C' C' by a proper attachment back of the pivotal end joints these bars, when acted upon by the draft on their front ends, transmit the energy expended
120 on these ends to the reaches C' C' and hold the angular pivot-connection of the forward and also the rear ends of these reaches to a degree rigid or partially "locked" to prevent undue
125 oscillation of the spindle ends, or a side sway of the wagon-pole.

Should one of the wheels of a wagon (provided with this locking-gear) encounter an insurmountable or immovable obstacle, that
130 otherwise would cause breakage or injury to the attached parts, a yielding movement will be afforded that is sufficient to obviate the contingency of accident just mentioned.

An inspection of Figs. 1 and 2 will show

that the pivotal points of connection of the links P with the plates B' and draw-bars L are the fulcrums of vibratory motion of compound levers that are formed by the connection of the shafts or pole D and the cross-reaches C' C' in the manner and by the appliances exhibited in these figures. The long arms of these composite levers just mentioned extend to the front of the points where the links P are pivotally secured to the bars L, the shorter limbs extending to the rear to attach to the diagonal reaches C' C', as shown. It is manifest that the draft force applied to the pole D and its adjunctive parts that transmit this energy to the reaches C' C' will measurably lock the forward pivotal joints made between these reaches and the axle A, and that this resistance to deviate from a straightforward progressive movement will increase in proportion to an increased inertia and consequent augmentation of the draft force necessary to overcome it.

The encounter of ordinary road obstructions will be resisted by the preponderance of leverage afforded by this device; but if an obstacle of unusual magnitude is encountered the obstructed wheel will diverge from a straight track and prevent breakage, as before stated. The pole D can thus be turned horizontally to the right or left to change the direction of the wagon with the same ease as in ordinary wagons that vibrate on a fifth-wheel or king-bolt. At the center of the front axle in Fig. 2 the divergence of the draft-pole D is shown and the position of the relative parts when these are in such adjustment.

The lateral vibration of the pole D or shafts will cause the slide bolt D² to move inwardly in its socket to accommodate the swing movement, and the pivoted loops L' L² will also turn on their fulcrums to permit this lateral movement. The receding of the draw-bar, together with the inward movement of its mated draw-bar on side of the wagon that is making the inner curve, will increase the leverage of the pole to overcome the locking action produced by the progressive and lateral motions that are now combined, and by this increase of lever-power the turning will be readily executed, while at the same time undue or improper oscillation of the axle or vibration of the pole D is prevented. It is also apparent that a retrograde movement of the wagon will give the same result as a forward motion to prevent whipping of the pole or free swinging motion of the front axle; and, further, the locking of the front axle and its pivotal connections with the cross-reaches will effectually lock the rear axle, as its pivotal joints, with the reaches C' C', are locked by the measurable rigidity of the front joints of these reaches in an obvious manner.

It should be stated that the construction of the joints between the branched draw-bars G and the lateral draw-bars L, together with the combined length of these connected parts, should be so proportioned to the jointed con-

nection of the draft-pole D to the center of the axle A that all or the larger proportion of the draft force required to overcome the weight of the wagon and its load will be thrown upon the side draft-bars, L, the center connection being mainly of use to give horizontal directive movement to the front axle near the center of horizontal vibratory motion of this axle.

In the modification shown in Fig. 5 the locations of the draw-bars L and lateral links P are changed to adapt these principal features to the running-gear of an ordinary single-horse wagon. The shafts are by their cross-bars M secured to the short center bar, N, that extends rearwardly, and the branched draft-bars G are pivotally attached at a point on the bar N between these cross-bars. The branched draft-bars G are secured with hinged joints to the forward ends of the flat draw-bars L. These bars extend through horizontal slits in the axle A a sufficient distance to the rear of this axle to permit them to be pivoted to the outer ends, v, of the parallel cross-bars U of the front hounds of the wagon, or to other devices of analogous construction. At a short distance from the points v on the draw-bars L the links P are pivotally secured by one of their ends. These links P extend toward the center reach-pole, Y, and are pivoted together upon this reach by a center bolt secured through the body of the reach Y. The edges of the links P, by the position given them, form angles of about forty-five degrees with the edges of the draw-bars L. The rear end of the center bar, N, is preferably attached by a joint the same as shown on the double-horse pole or tongue. In operation the same results follow as are obtained by analogous means in the previously-described device for a double-horse wagon.

The draft of the load can be mainly transmitted to the two lateral draw-bars L, that are pivoted to the cross-bars of the hounds, and preferably is so transmitted. The draft of a horse upon a loaded wagon has a tendency to draw the lever draft-bars L inward in a line nearly parallel to the reach pole; and as these bars L and their pivoted links P have to diverge from their normal position to permit a swinging movement of the front axle, A, it follows that this axle will be to a degree locked, while a direct draft is made on the points to which power may be applied through a singletree pivoted to the center bar, N, and no sudden jerking vibrations will result from an uneven or stony road-bed.

It is evident that if desired the pole may be removed from the wagon that is constructed with diagonal reaches, and a pair of shafts or thills, constructed as shown and described herein, may be utilized, and also that a pole may be substituted for shafts in the wagon last described with equally good results in every respect. The peculiar method of constructing the metallic portions of this locking-gear permits the economical use of a suitable gage of bar-iron or soft steel bars, that can be cut to length, and with but little hand-work or

blacksmithing may be bent or dropped by a power-hammer and formed into shape, so that strong and shapely gear may be produced at a low cost for labor; and it is also evident that the distribution of material and method of connecting and bracing the parts will afford a strong durable wagon with a minimum consumption of material and consequent reduction in cost for same.

In regard to the method herein shown of transmitting draft force from the pole or shafts to the draw-bars L, we do not desire to restrict ourselves to the specific device shown, as it is evident that other analogous means may be employed for this purpose—as, for instance, a solid bar may be bent to form an angular draft-iron, which by a pivot-connection to the pole and hinged attachment to the front ends of the draw-bars will effect a transmission of draft force thereto; or a cross-piece at a right angle to the pole D may be connected by links to the front ends of the draft bars L and accomplish the same results.

Further, in respect to the device shown for the connection of the rear end of the pole D with the front axle A, so as to obtain a limited reciprocal movement, as well as a vertical vibration of this pole, we do not wish to be confined to this means of obtaining such results, as we have in contemplation that several analogous methods may be employed—as, for example, a socket-tube may be mounted on brackets by lateral journals or trunnions, the brackets being affixed rigidly to the center of the front axle to permit a vibration of the socket-tube. A round bolt that will slide neatly in the trunnioned tube is axially inserted and rigidly secured in the rear end of the pole, which can by these instrumentalities be afforded a reciprocal and also a vertical motion. Another obvious means of accomplishing this result is by the pivoting at the center of the front axle of two or three sections of the well-known lazy-tongs levers to give a limited reciprocal action.

It is evident that the mechanism of the several parts described may be varied in form and arrangement in other ways than those above mentioned without departing from the spirit and scope of our invention; hence we do not desire to limit ourselves strictly to the construction herein set forth; but,

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A wagon having a pole or shafts, and provided with suitable devices for transmitting all or a sufficient portion of the draft or other force applied in running it to diagonal reaches, and through these, by means of pivotal connections therewith, to the axles, to measurably lock and prevent the latter from being swayed by the wheels when they meet road obstructions, substantially as set forth.

2. A wagon having a pole or shafts, and provided with suitable devices for transmitting all or a sufficient share of the draft or other

force applied in running it to a reach, and through the same, by means of its pivotal connections therewith, to the front axle, to measurably lock and prevent the latter from being swayed by its wheels when running against or over road obstructions, substantially as set forth.

3. A wagon having a draft-pole or shafts hinged to the center of a front axle to have vertical play, and provided with side draft-bars to transmit all or the major portion of draft force applied to the pole or shafts to parts of the running-gear that are in the rear of the front axle, substantially as set forth.

4. A wagon having a draft-pole or shafts hinged to the center of the front axle to move vertically, and pivotally connected by front draft-bars hinged to two side draft-bars, these side bars extending rearwardly and attached to two diagonal reaches that are pivotally secured to the front and rear axles, substantially as set forth.

5. A wagon having a pole or shafts so hinged and jointed to the center of the front axle as to have both longitudinal and vertical play, and provided with side draft-bars to transmit all the draft or other force applied in running the wagon or a portion of such force sufficient to measurably lock and prevent said axle or both axles from being swayed by the wheels when they meet road obstructions, substantially as set forth.

6. A wagon having a pole or shafts so hinged or jointed to the center of the front axle and so pivotally connected by bars with the running-gear that the angles made by either pole or shafts with this axle are changed whenever the angles of the latter with its reach or reaches are changed in the running or by the turning of the wagon, by which means the leverage of said pole or shafts is or are increased to prevent axle-swaying caused by road obstructions, substantially as set forth.

7. In a wagon, the combination, with the front axle, of a draft-pole or shafts pivotally connected with draw-bars and links to a reach, so as to transmit sufficient draft force to these bars and links and reach to measurably lock by their action the front axle from a vibratory motion that is effected by other means than the draft-pole or shafts, substantially as set forth.

8. In a wagon, the combination, with a front axle, of a draft-pole or shafts so pivotally connected with draw-bars and links to two diagonal reaches and a rear axle as to transmit sufficient draft force to these bars, links, and reaches to measurably lock by their action the front and rear axles from a vibratory motion that is produced by other means than the draft-pole or shafts, substantially as set forth.

9. In a wagon, the combination, with the front and rear axles and diagonal reaches pivoted to them, of a draft-pole or shafts pivotally connected to draft-bars which are attached by their rear ends rigidly or pivotally to the front

ends of the diagonal reaches, so that sufficient draft force is transmitted to lock the pivot-joints of the reaches and prevent vibration of the front and rear axles when their wheels encounter obstructions, substantially as set forth.

10. In a wagon, the combination, with the front axle, of a draft-pole or shafts pivoted to the center of this axle to permit a vertical movement of the pole or shafts, draft-bars that receive the major portion of the draft or other force and transmit it to pivoted draft-bars which are rigidly or pivotally attached to diagonal reaches, so as to lock measurably the front and rear axles from vibratory motion other than that communicated by the lateral movement of the draft-pole or shafts, substantially as set forth.

11. In a wagon, the combination, with the front and rear axle and pivotally-attached diagonal reaches, of a center pole or shafts centrally attached by a hinge that permits vertical movement, draw-bars hinged to clips pivoted to plate draw-bars, which latter are attached securely to the diagonal reaches, a short

link pivoted to each draw-bar to connect it with the pole or shafts through the bars, that are pivoted to the pole, plate draw-bars and links transmitting the effective draft force, so as to measurably lock the front and rear axles from leaving planes parallel to each other, considered vertically, substantially as set forth.

12. In a wagon, the combination, with the pole or shafts, of the front draw-bars, two short links pivotally connecting them to lateral draw-bars that are fixedly secured to two diagonal reaches to the rear of the front pivot-joints of these diagonal reaches, a longitudinally-secured slide-plate for the draw-bars, two diagonal reaches pivoted to front and rear axles, and a front and rear axle, substantially as set forth.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

DANIEL A. SPRAGUE.
STUART PERRY.

Witnesses:

J. T. WOOSTER,
ELISHA THORNTON.