

(No Model.)

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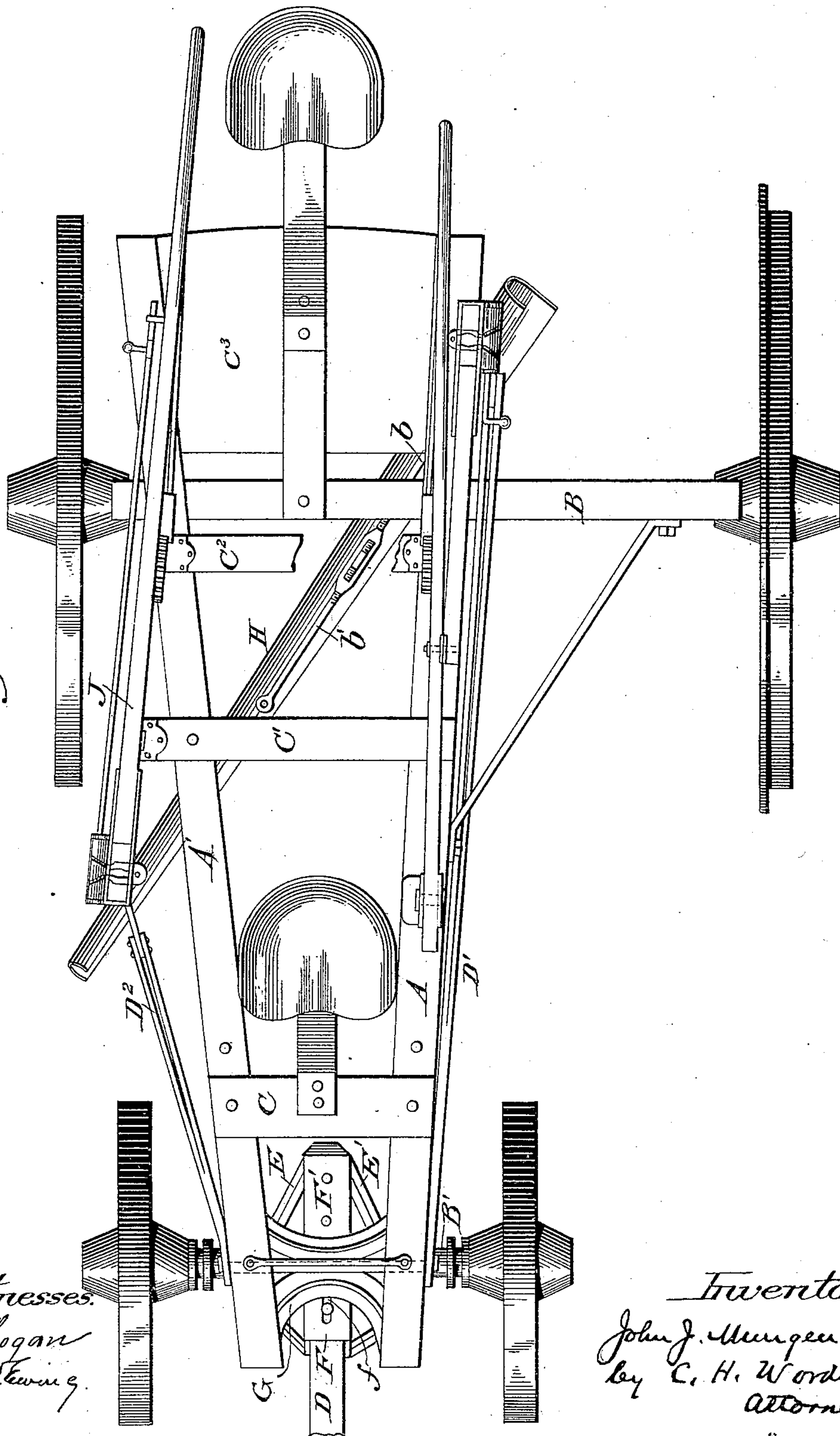
J. J. MUNGEN.

ROAD GRADER.

No. 389,851.

Patented Sept. 18, 1888.

Fig. 1.



Witnesses.

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(No Model.)

3 Sheets—Sheet 2.

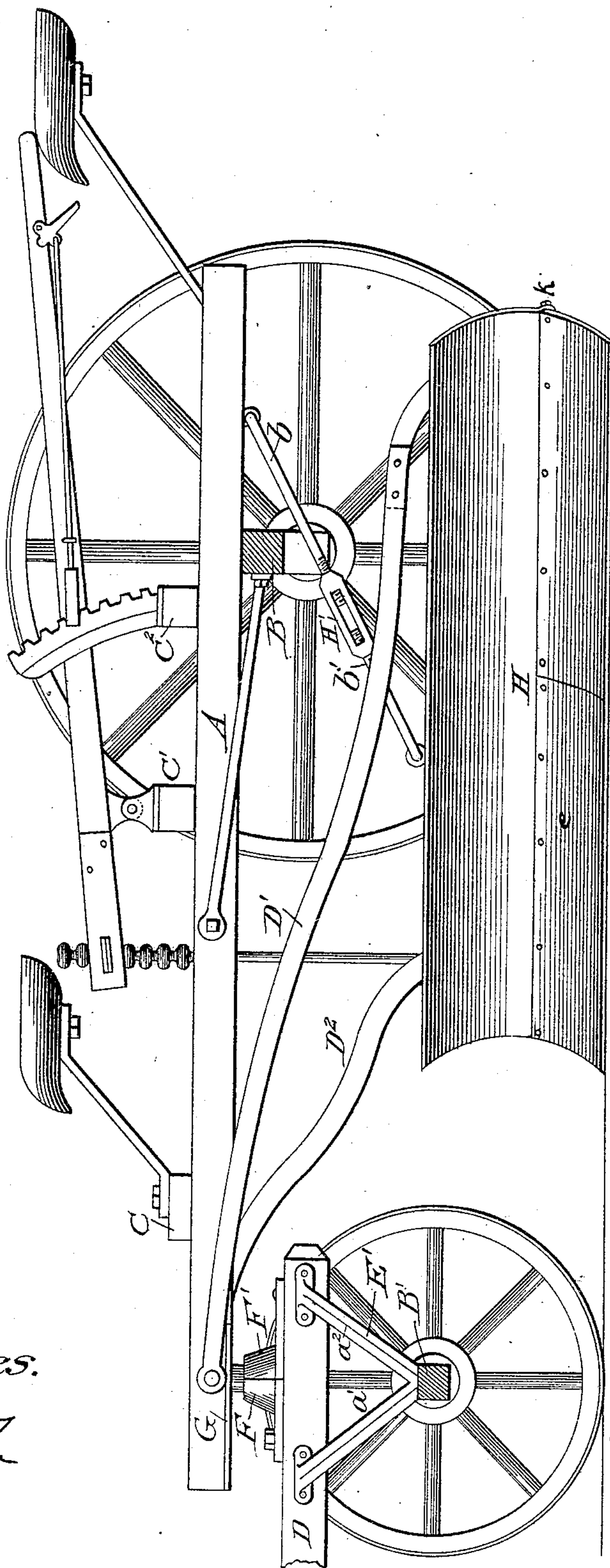
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ROAD GRADER.

No. 389,851.

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Fig. 2.



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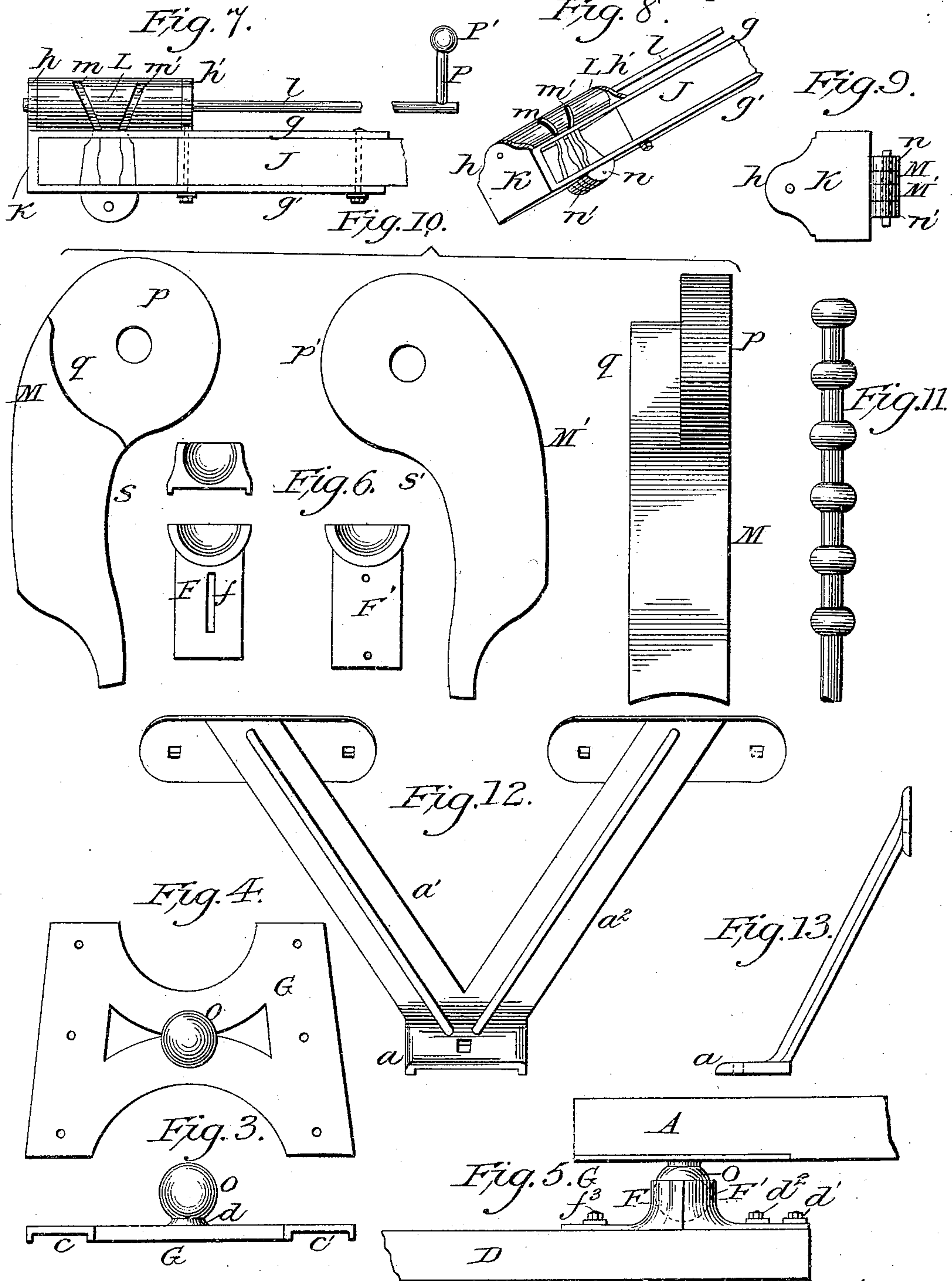
3 Sheets—Sheet 3.

J. J. MUNGEN.

ROAD GRADER.

No. 389,851.

Patented Sept. 18, 1888.



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UNITED STATES PATENT OFFICE.

JOHN J. MUNGEN, OF FORT WAYNE, INDIANA, ASSIGNOR TO THE FLEMING MANUFACTURING COMPANY, OF SAME PLACE.

ROAD-GRADER.

SPECIFICATION forming part of Letters Patent No. 389,851, dated September 18, 1888.

Application filed February 28, 1888. Serial No. 265,640. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. MUNGEN, of Fort Wayne, county of Allen, and State of Indiana, have invented a new and useful Improvement in Road-Scrapers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to that class of road-scrapers or road-graders employing a four-wheel supporting and guiding carriage and having the scraper suspended obliquely either beneath or in front of the rear trucks thereof; and my improvements consist, first, in a novel construction of the forward end of the carriage or frame to which the scraper is attached by means of arms, and by which a ball-and-socket joint takes the place of the fifth-wheel; secondly, in a novel device for adjusting the scraper and preventing lateral motion thereof under the oblique thrust of the load; thirdly, in a novel construction of the scraper itself, by which the load with greater facility is thrown to one side; fourthly, in a novel construction of the weight or resistance end of the levers, by which the manipulation of the levers and the vertical adjustment of the scrapers are accomplished by the operator without moving from his seat, and in certain minor details of construction, which hereinafter will be described.

In the drawings accompanying this specification and forming a part thereof, Figure 1 represents a plan view of the road-scraper, showing some of my improvements. Fig. 2 is a vertical longitudinal section taken inside the left-hand wheels and showing only such of the parts as are essential to a clear understanding of my improvements. Figs. 3, 4, 5, and 6 are detail drawings, showing the construction of the forward end of the carriage, and particularly the adaptation of the ball-and-socket joint to the purpose of a fifth-wheel. Fig. 7 represents a plan view of the mechanism at the weight end of the levers. Fig. 8 represents a perspective view of the same mechanism; Fig. 9, an end view of the same. Fig. 10 shows detail views of the jaws or clamps. Fig. 11 is a view of the upper end of the hang-rod connecting the lever with the scraper. Figs. 12 and 13 are

detail views of the braces or brackets supporting the tongue above the axle.

Referring now to Figs. 1 and 2, the frame of the machine consists, mainly, of two heavy beams, A and A', supported by a bolster, B, which rests upon the rear axle or upon skeins which form a part of the axle-trees of the rear wheels. The beams A and A' are rigidly secured to the bolster B, the beam A' resting near the right end thereof, and the beam A resting a little to the left of the center thereof, and both beams converging toward the front. By this arrangement of the side beams upon the bolster B the left rear wheel is made to extend beyond the left forward wheel a greater distance than the right rear wheel extends beyond the right forward wheel, thus providing space for the discharge of the earth from the scraper without interfering with the left rear wheel. I prefer the converging form of the frame, as shown; but my improvements are also applicable to the rectangular form. Upon the under side of the forward end of the beams is secured a casting, which forms a part of the device which takes the place of the fifth-wheel, and which hereinafter will be described. The side bars or beams are further secured by cross-bars C, C', and C'', at suitable distances apart and bolted thereto, and by a platform at the rear end thereof for the use of the operator.

The tongue D is rigidly secured to the forward axle, B', by means of two oblique brackets or braces, Figs. 12 and 13, one on each side of the tongue, each provided with a horizontally-socketed block or plate at the lower end, as at *a* in Fig. 12, which fits over the axle B', and having diverging arms *a'* and *a''*, with end plates, which are bolted or secured to the tongue D. By the arrangement of the braces shown the forward end of the frame is elevated above the forward axle to a sufficient height to allow the wheels of the forward truck to move under the frame and to facilitate the vertical adjustment of the scraper.

I do not wish to confine myself to the method of elevating the tongue above and securing it to the forward axle shown. Any means by which the same result is accomplished will answer my purpose.

Near the rear end of the tongue, upon its up-

per face and immediately over the axle B', is secured the divided casting shown in Fig. 6, the two parts of which, F and F', are provided on their adjoining ends each with the half of a spherical socket, the upper wall of which is perforated to accommodate a shank or neck and ball formed on the under side of the casting G, Figs. 3 and 4, and which will be more particularly described hereinafter. The piece F' is secured to the upper face of the tongue, near the end thereof, by two strong bolts, d' and d". The bearing or pull of the larger portion of the machine is directly against this piece. The forward piece, F, is slotted, as at f, Fig. 6, to permit its easy adjustment. This piece is held in place by a bolt, f^a, Fig. 5, by tightening or loosening which the ball O, Figs. 3 and 4, may be held firmly in place, or the parts may be removed for repairs or oiling.

The casting or plate G, Figs. 3 and 4, is obliquely socketed along the sides of its upper face, the forward ends of the beams A and A' resting in the sockets c and c', Fig. 3. Upon the under face of the casting, and near the center thereof, is cast a short neck or shank, d, upon the end of which is the ball O, which is made to fit in the spherical socket formed by the union of the parts F and F', Fig. 6. The connection of the several parts is clearly shown in Figs. 2 and 5. It will readily be seen that this simple device does away with the fifth-wheel, and by it the action of the scraper when in operation will not be affected by the front wheels entering a depression or striking an obstruction.

In describing the ball-and-socket connection between the frame and the forward axle I have described the ball-casting as being connected to the frame and the socket-casting as being connected to the forward axle or tongue. I do not desire to limit myself, however, to this distribution of the several parts of the ball-and-socket joint. The ball-casting may be connected to the forward axle or tongue, and the socket-casting may be secured to the forward end of the frame; but I prefer the method first described.

I will now describe the device for preventing lateral motion of the scraper owing to the oblique thrust of the load. The scraper is hung obliquely either between or in front of the rear trucks of the carriage (the former being shown in the drawings) and is attached to the forward end of the carriage by two draft-arms, D' and D², which are loosely connected to the beams A and A' by a bolt passing through the ends of the arms D' and D² and through the beams A and A' immediately over the ball-and-socket joint heretofore described, as shown in Figs. 1 and 2, and held in place by a nut or washer and key. The tendency of the scraper under the load is to move to the right. I prevent this by a simple device, which consists of two links or rods, b and b', one of which is attached to the scraper and the other to the frame in such a manner as that when connected, as presently

described, the whole device will be at an angle of about forty-five degrees to the scraper. I usually link one rod to the under side of the beam A, near the rear end thereof or in front of the rear axle, accordingly as the scraper is suspended between or in front of the rear wheels, and the other I usually link near the upper edge of the scraper at a point between the center and the forward end thereof. The inner ends of the rods b and b' are threaded—one having a right and the other a left hand thread—and are connected by a turn-buckle having in one end a right and in the other a left hand thread. This device performs two functions—one by preventing lateral motion of the scraper under the oblique thrust of the load, the other by turning the turn-buckle in one direction. The ends of the rods b and b' are drawn together, and consequently the scraper is drawn inside the line of the right-hand rear wheel, and by turning the turn buckle in the opposite direction the ends of the rods b and b' are separated, and the scraper is extended beyond the line of the same wheel, thus increasing the usefulness of the machine by permitting its use in gutters or near a sidewalk.

The machine herein described is what is usually called "a left-hand" machine—that is, it throws the dirt to the left; but all the improvements herein described are equally applicable to and are used by me upon not only right-hand machines, but upon machines in which the scraper is suspended obliquely between the front and rear wheels. In those machines in which the scraper is hung obliquely between the front and rear wheels the frame of the machine is made longer and the side beams, A and A', rest upon the rear axle or bolster at equal distances from the rear wheels.

The scraper may consist of but one solid piece, the lower edge being sharpened; or the knives may be made detachable, as shown in the drawings. I usually make this scraper of steel. The scraper is concave on its front and convex on its rear surface, the curvature at both ends being the same. In case the knives are detachable the lower edge of the scraper-bar is so formed as to lap partly over the knives, as shown at k in Fig. 2, so that the front face of the scraper will present a smooth and even surface. From the forward to the rear end of the scraper, whether made solid or with detachable knives, is a twist along the upper portion of the scraper, so that the rear end is not in line with the upper end. The lower edge of the scraper-bar is straight. To the front face of the lap formed on this edge the knives e and e' are held in place by bolts, the heads of which are countersunk in the front face of the knives and are secured by nuts on the back. The object of the twist in the scraper is to facilitate the movement of the load from the forward to the rear end of the scraper in the forward progress of the machine, thus acting somewhat the reverse of the mold-board of a plow.

I will now describe the device or mechanism at the weight or resistance end of the lever.

Referring to Figs. 7 and 8, J represents the upper face of the short arm of the lever. K is a casting having side plates, *g* and *g'*, which embrace or clasp the sides of the short arm of the lever J and are bolted thereto. The casting K and its plates or arms *g* and *g'* are of the same width as the lever J. Projecting from the outside face of the casting K, just at the end thereof, is a lug or ear, *h*. A similar lug, *h'*, is not cast on the arm *g*, but is bolted thereto, the bolts passing through the arms and lever and secured by nuts on the face of the arm *g'*. L is a cylinder or shaft journaled between the lugs *h* and *h'*. The rod *l* is cast with the cylinder L. The lug *h'*, after being passed over the rod *l*, is bolted, as described above. The cylinder L is obliquely grooved, as shown at *m* and *m'*, the grooves diverging outward at an angle of about thirty-five or forty degrees and extending round the cylinder about one hundred and eighty degrees. Projecting from the face of the arm or plate *g'* are two longitudinal lugs or ears, *n* and *n'*, with a wide slit between for the insertion of the jaws or clamps M and M'. The jaws M and M' are provided on the larger ends with ears, as at *p* and *p'*, in the center of which are holes for a bolt. The upper ends are rounded and rest in seats or bearings formed on each half of the jaws, as at *q*. The jaws, after being placed together, are placed between the lugs *n* and *n'* and are secured by a through-bolt. The ends of the jaws extend through similar longitudinal slot in the arm *g* and are made to work in the grooves *m* and *m'* on the face of the cylinder K. The ends of the jaws are slightly hollowed, as at *r*, as also the inside faces or edges, *s* and *s'*. It will now be seen that by revolving the rod *l* the cylinder K is revolved, thus causing the jaws, the ends of which move in the grooves, to open or close at the will of the operator, according to the direction in which the cylinder is revolved. Upon the end of the rod and near the handle of the lever, and extending outward, is a short rod or handle, P, upon the end of which is a ball or knob, P'. The ball should hang at an angle of about forty-five degrees when the jaws are closed, so that sudden jars of the machine will not permit it easily to be thrown up and thus open the jaws allowing the hang-rod to drop. The rod or shaft *l* is supported near the handle of the lever by a bracket, in which it is journaled. Upon the upper end of the hang-rod which connects the lever to the scraper are a series of balls or knobs, as shown in Fig. 11. The lower end of the hang-rod is linked to the forward end of the scraper, and the upper end is placed between the jaws. It will now be seen that the operator can, without rising from his seat, adjust the lever to any position on the hang-rod by simply raising the knob P', thus opening the jaws and allowing the lever to pass freely up and down the rod at will.

I have now described the mechanism attached to the end of the short arm of the right-hand lever, which lever is shown and described in the patent of Elias Lathrop, assignor to the Fleming Manufacturing Company, No. 334,177, dated January 12, 1886. The same device may be duplicated upon the left-hand lever described in the same patent with but a slight change in the arrangement of the rod *l*, which upon the left-hand lever is short, so as to be near the operator. The same device may be used upon any form of bar-lever, and I do not wish to limit myself to the particular lever referred to.

Having now described my invention, what I claim as new, and what I desire to secure by Letters Patent, is—

1. In a road-grader, the combination, with the frame of the supporting-carriage, of the tongue elevated above the forward axle by means of braces or brackets, the divided casting or socket-plates having the spherical socket formed therein, and the plate or casting provided with a ball fitting said socket and connected with the forward end of the supporting-frame, and operating substantially as described.
2. In a road-grader, the combination, with the frame of the machine, of the ball-and-socket-joint connection between said frame and the forward axle, substantially as described.
3. The combination, with the frame of the supporting-carriage, of the ball-and-socket-joint connection between said frame and the tongue of the carriage, rigidly supported above the forward axle, substantially as described.
4. The obliquely-arranged scraper, in combination with draft-arms converging toward the front and connected to the forward end of the frame, having a ball-and-socket connection with the tongue, elevated above and rigidly connected to the forward axle, substantially as described.
5. The scraper arranged obliquely beneath the rear axle of the carriage-supporting frame, in combination with draft-arms converging toward the front and connected to the forward end of the frame, having a ball-and-socket connection with the tongue elevated above and rigidly connected to the forward axle, substantially as described.
6. The scraper arranged obliquely behind the forward wheels of the supporting-carriage, in combination with draft-arms converging toward the front and connected to the forward end of the frame, having a ball-and-socket connection with the forward axle, substantially as described.
7. The combination, with the obliquely-arranged scraper, of the obliquely-arranged draft-arms connected to the forward end of the converging sides of the carriage-frame, and the ball-and-socket connection between said frame and the tongue, supported above the forward axle, substantially as described.
8. In a road-grader, the combination, with the obliquely-arranged scraper, of the draft-

arms D' and D^2 , converging toward the front and loosely connected to the side beams, A and A' , by a through-bolt held in place by a nut or key, and the ball-and-socket connection between said frame and the tongue D , rigidly supported above the forward axle, substantially as described.

9. In a road grader, the combination, with the frame of the supporting-carriage, connected to the forward axle by means of a universal joint, such as the ball and socket shown, of the draft-arms D' and D^2 , loosely connected to the frame and diverging to the obliquely-arranged scraper, all substantially as described.

10. In a road-grader, the combination, with the frame of the supporting-carriage, connected to the tongue of the carriage, and rigidly secured above the forward axle by means of a universal joint, such as the ball and socket shown, of the draft-arms D' and D^2 , loosely connected to the frame of the machine and diverging to the obliquely arranged scraper, substantially as described.

11. The combination, with the frame of the machine, of the casting G , having on its lower face a ball fitting a spherical socket formed by the union of the divided casting F and F' , the divided casting F and F' , the two parts of which are provided on their adjoining ends each with the half of a spherical socket, the upper wall of which is perforated to accommodate the shank or neck of said ball, the forward part of which has a horizontal slot in the plate resting on the tongue and secured thereto by a set-bolt through said slot, and the tongue D , elevated above the forward axle and rigidly connected thereto and operating substantially as described.

12. The combination, with the frame of the carriage, of the obliquely-arranged scraper, and the connection between the scraper and the carriage frame, consisting of the rods b and b' , linked, respectively, to the frame and scraper and having on their ends, respectively, a right and left hand thread and connected by a turn-

buckle having in its ends, respectively, a right and left hand thread, substantially as described and set forth.

13. The combination, with the frame of the supporting-carriage, of the ball-and-socket connection between said frame and the forward axle, the draft-arms secured to said frame by a through-bolt and diverging to the scraper, and the connection between the scraper and the frame, consisting of the rods b and b' , connected by a turn-buckle, H' , and operating substantially as described.

14. The casting K , provided with arms or plates g and g' , having a lug cast thereto projecting outwardly from the casting just at the end thereof, a lug, h' , bolted to the arm g , the horizontal lugs n and n' , projecting from the plate g' , with a slot between, the cylinder L , journaled between the lugs h and h' , having on its face two oblique grooves, in which work the ends of the jaws M and M' , the jaws M and M' , held in place between the lugs n and n' by a through-bolt, and the rod l , cast with the cylinder L , having near its end a handle provided with a ball or knob on the end thereof, and operating substantially as described.

15. In a road-grader, the combination, with the levers by which the vertical adjustment of the scraper is accomplished, of the mechanism attached at the end of said levers, consisting of the casting K and its appendages g g' h h' n n' , the jaws or clamps M and M' , the cylinder L , provided with two oblique grooves, by which the jaws are opened or closed, the rod l and the handle P , provided with a ball or knob, P' , the obliquely-arranged scraper, and the connection between said scraper and said mechanism, consisting of the hang-rod provided on its upper end with a series of balls, all operating substantially as described.

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Witnesses:

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