(No Model.) 3 Sheets—Sheet 1.

J. D. ADAMS & F. M. PENNOCK.

ROAD GRADER.

No. 370,589. Patented Sept. 27, 1887.

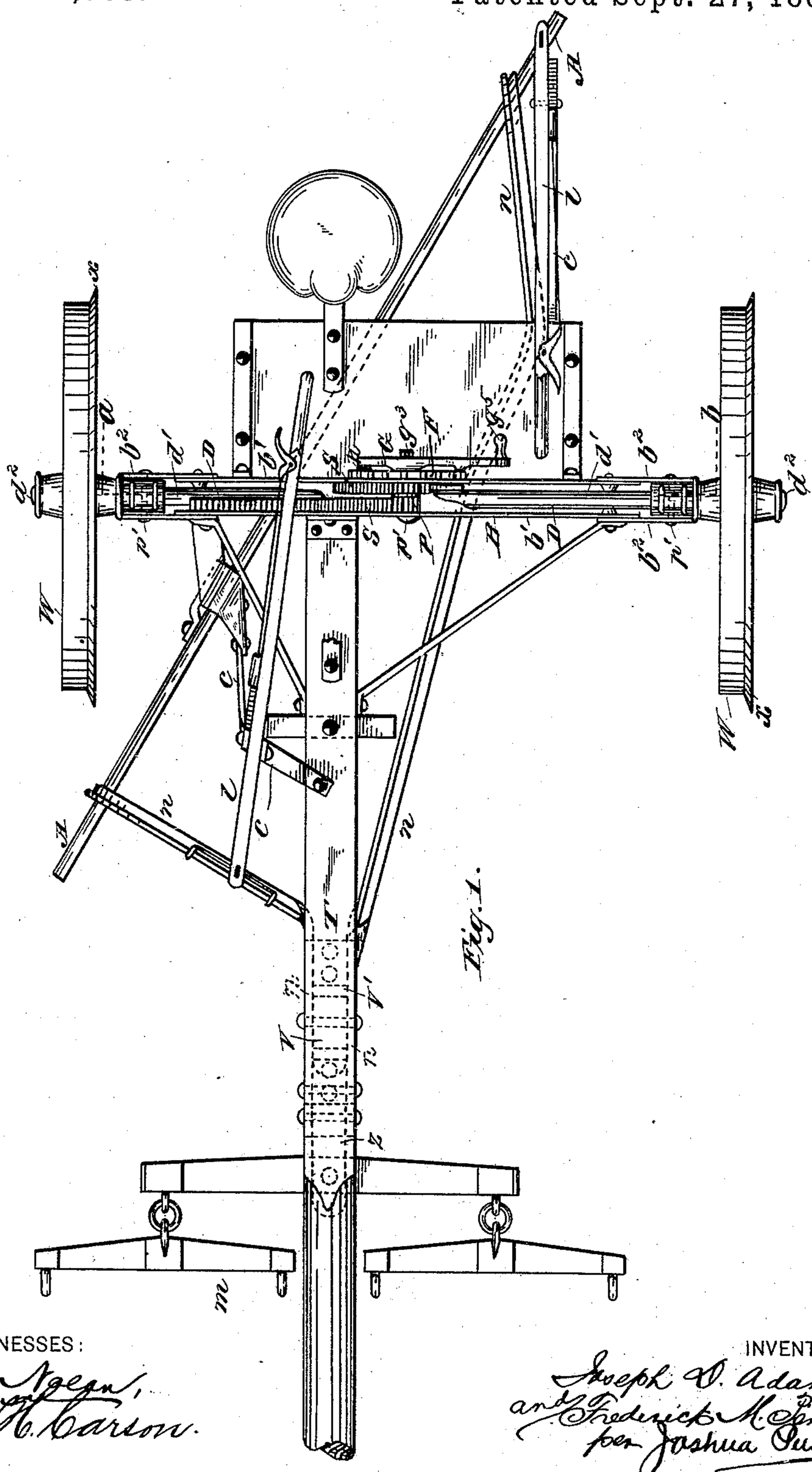

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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ROAD GRADER.

No. 370,589. Patented Sept. 27, 1887.

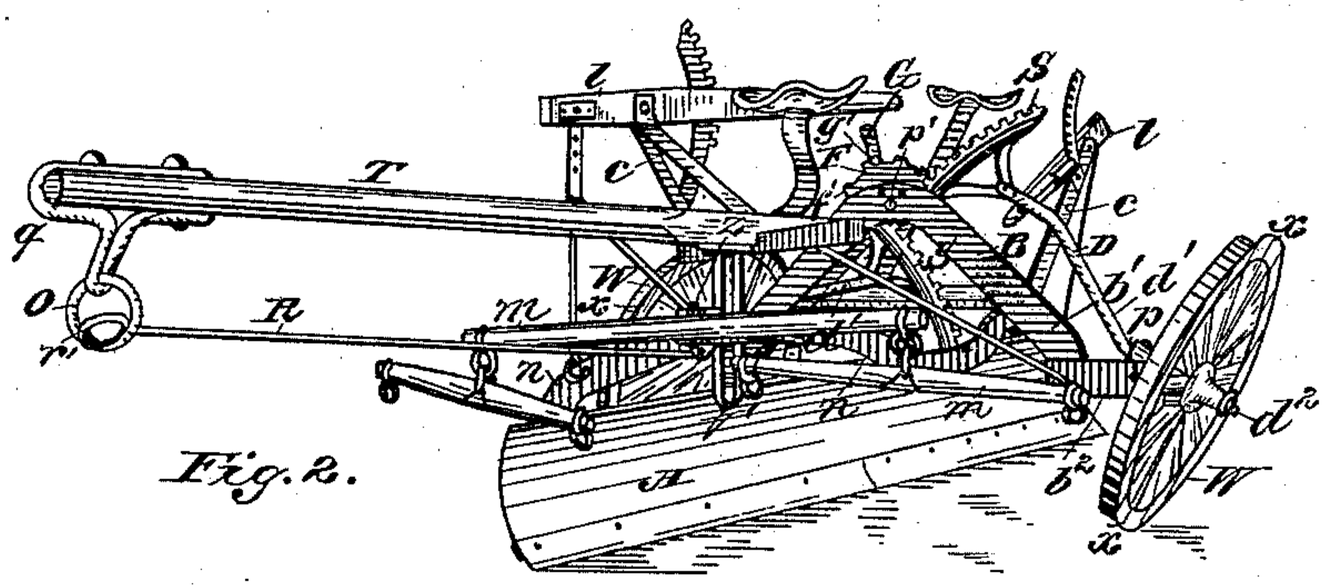


Fig. 2.

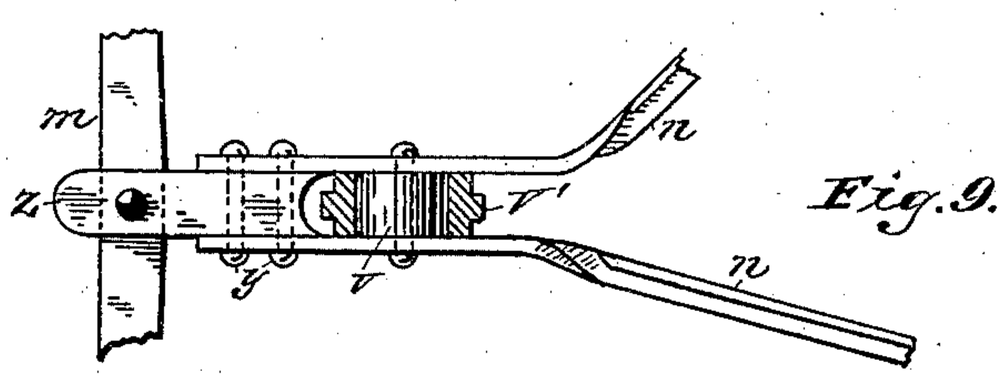


Fig. 9.

Fig. 5.

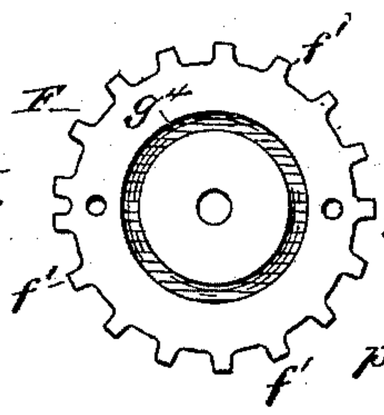


Fig. 6.

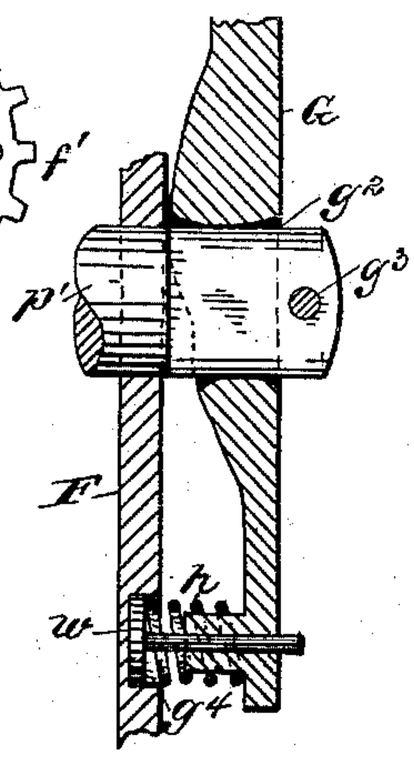


Fig. 7.

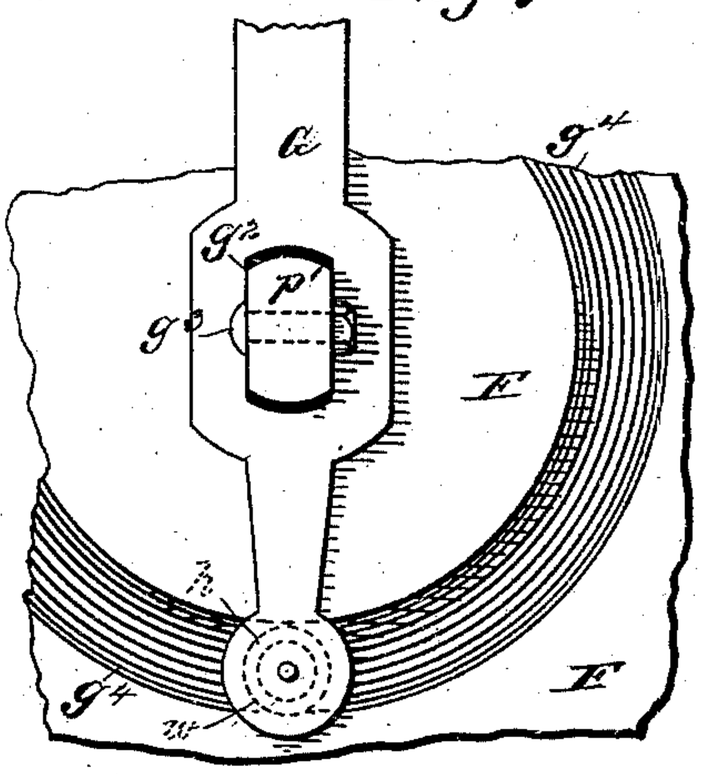


Fig. 4.

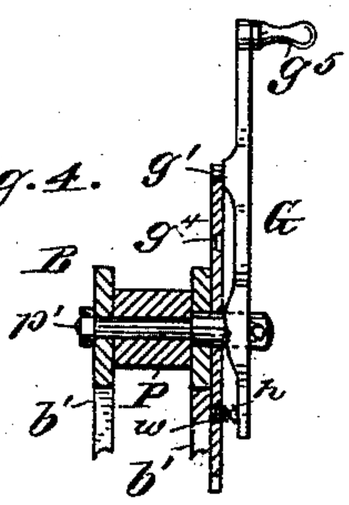
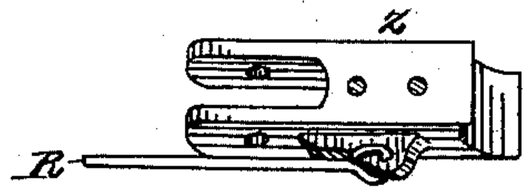


Fig. 10.



WITNESSES:

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(No Model.) 3 Sheets—Sheet 3.

J. D. ADAMS & F. M. PENNOCK.

ROAD GRADER.

No. 370,589. Patented Sept. 27, 1887.

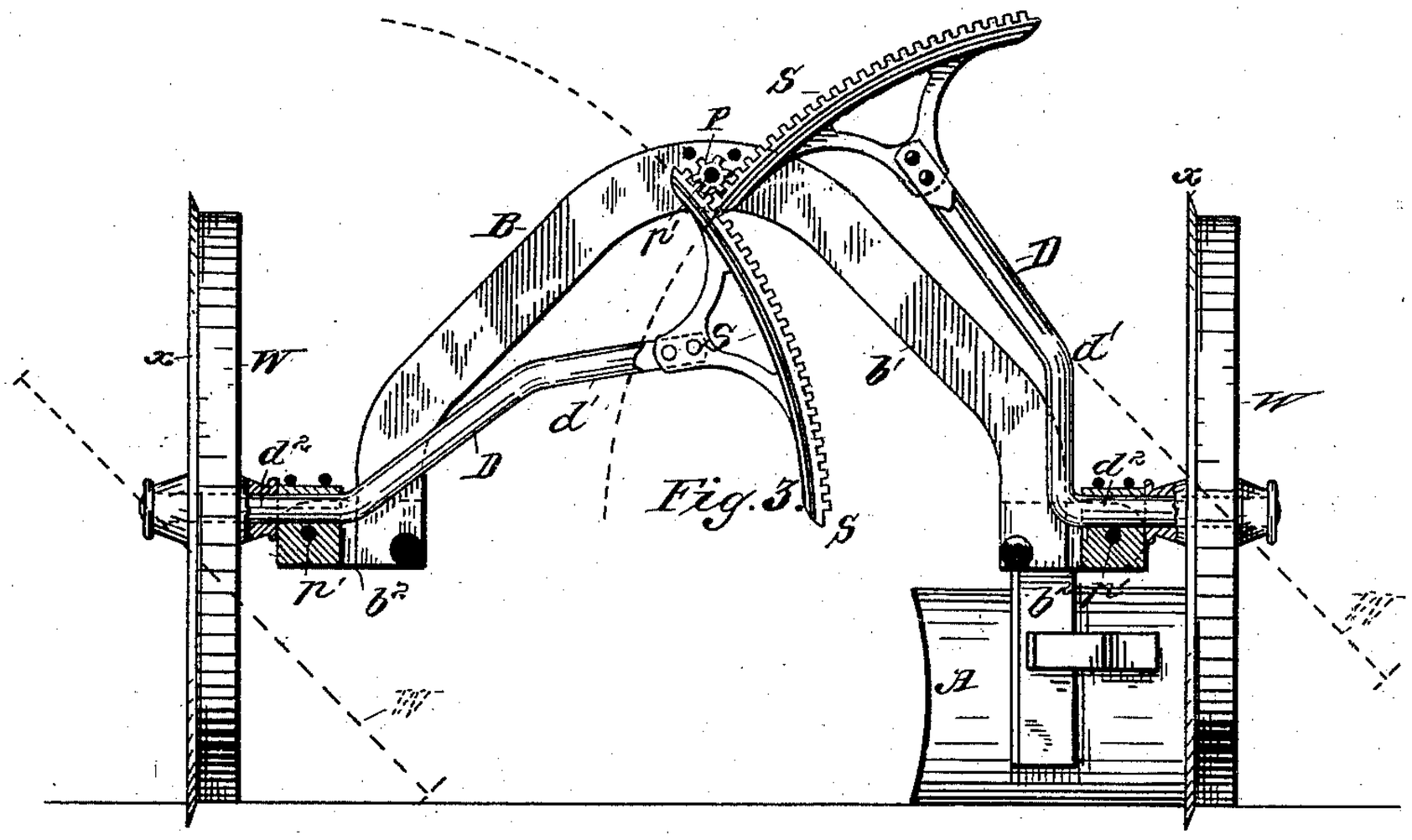

Fig. 3.

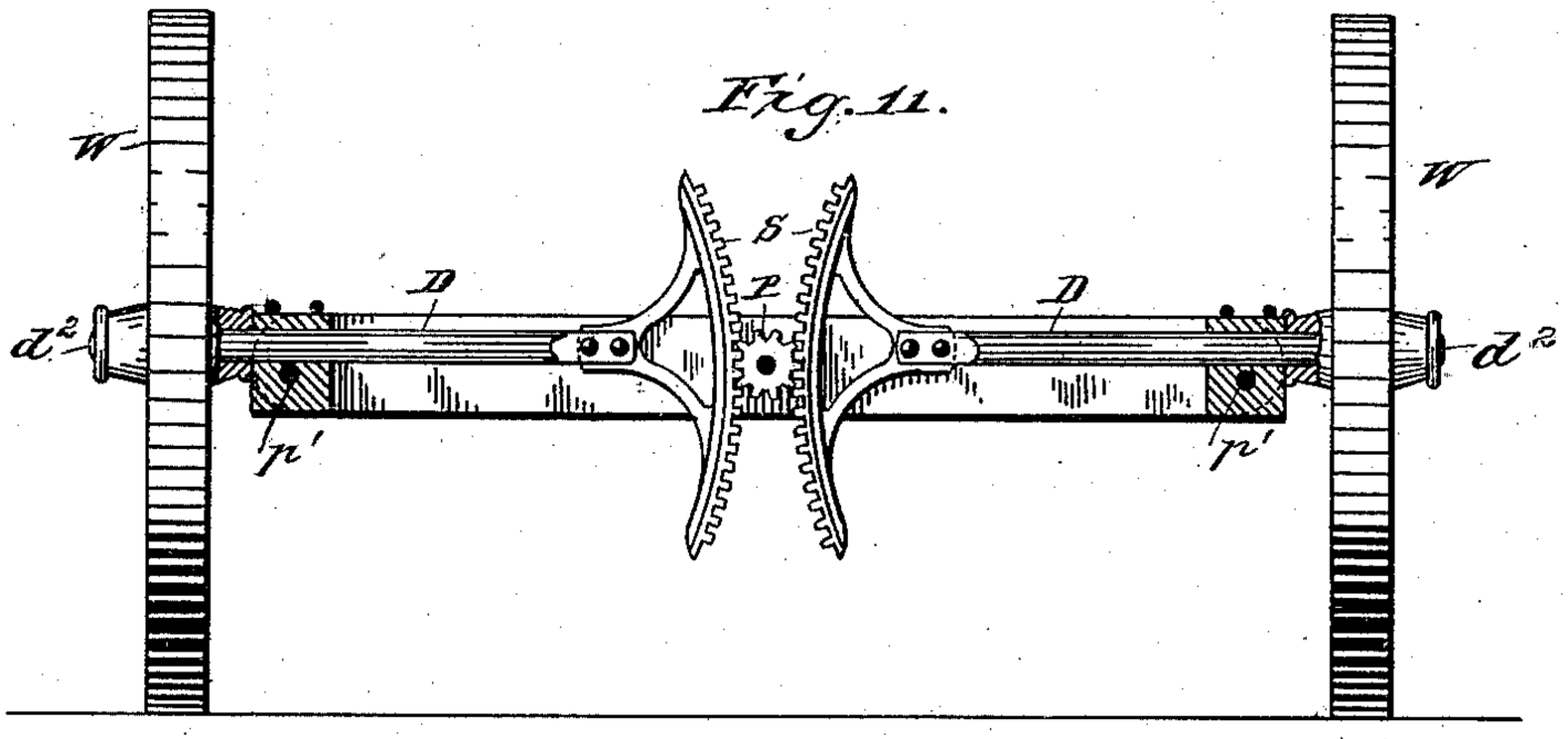

Fig. 11.

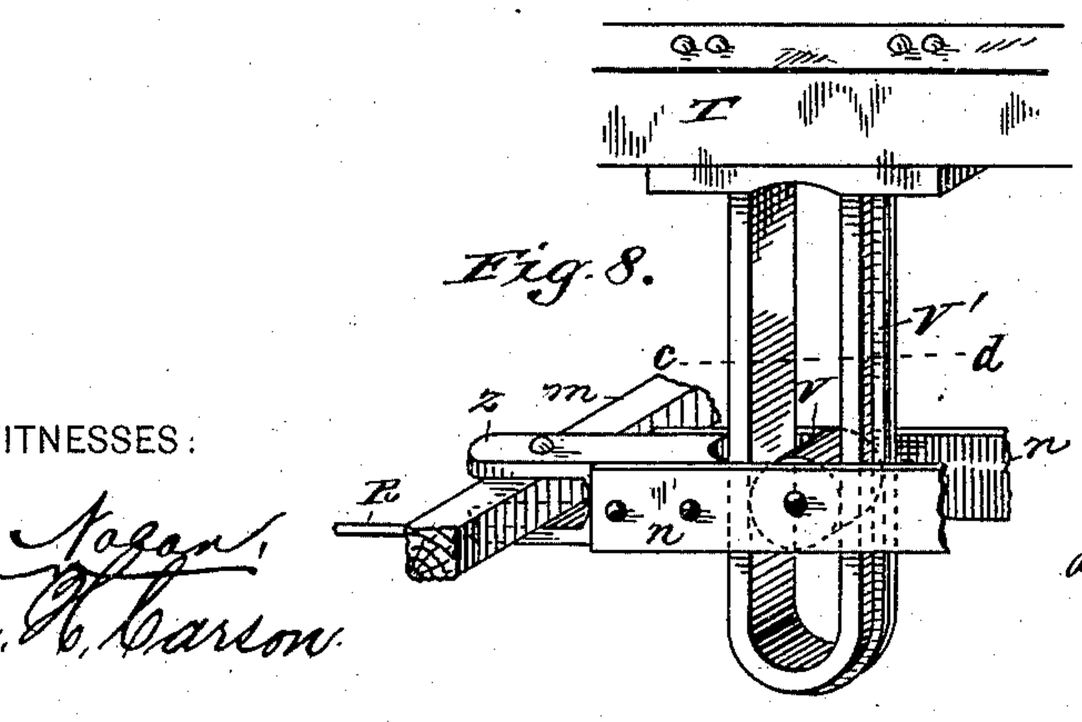

Fig. 8.

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

UNITED STATES PATENT OFFICE.

JOSEPH D. ADAMS, OF MARSHALL, INDIANA, AND FREDERICK M. PENNOCK, OF KENNETT SQUARE, PENNSYLVANIA.

ROAD-GRADER.

SPECIFICATION forming part of Letters Patent No. 370,589, dated September 27, 1887.

Application filed July 19, 1886. Serial No. 208,476. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH D. ADAMS, of Marshall, in the county of Parke and State of Indiana, and FREDERICK M. PENNOCK, of Kennett Square, in the county of Chester and State of Pennsylvania, both citizens of the United States, have invented certain new and useful Improvements in Road-Graders, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

Figure 1, Sheet 1, is a plan view, the wheels being in perpendicular position. Fig. 2, Sheet 2, is a perspective view of a road-grading machine in which our invention is embodied, the wheels being canted. Fig. 3, Sheet 3, is a partial section, as on line *a b*, Fig. 1, the wheels being shown in dotted lines as canted to their extreme limit. Fig. 4, Sheet 2, is a section, enlarged, through the middle of the arched double-plate frame and adjuncts, the crank-lever being shown in vertical position. Fig. 5 is a face view of the toothed disk with which said crank-lever engages. Fig. 6 shows, on a more enlarged scale, a vertical section of the lower end of the toothed disk, crank-lever, washer, spring, retaining-groove, &c. Fig. 7 is a front elevation of Fig. 6. Fig. 8, Sheet 3, is a detail of the forward end of the scraper draft-bar connection. Fig. 9, Sheet 2, is a transverse section, as on line *c d*, Fig. 8, Sheet 3. Fig. 10 is a perspective view of the block *z*, to which the forward ends of the draft-bars are attached, showing the pivotal connection of the draft-rod R. Fig. 11 is a sectional view of a modification of the invention.

This invention relates to that general class of wheeled road-graders wherein a vertically-adjustable diagonally-suspended scraper is employed—such, for example, as illustrated in Letters Patent No. 310,165, granted January 6, 1885, to Joseph D. Adams, and in Letters Patent No. 344,205, granted June 22, 1886, to Sharp, Pennock & Pennock.

Our invention is an improvement upon said patented machines, and more especially upon the devices shown in said Adams patent for tipping or canting the carrying-wheels, in order to counteract the lateral strain or thrust of the earth against the scraper-bar, which tends to force the machine from a direct path.

The improvement consists, first, in the use of an arched frame for supporting the scraper and the devices for raising and lowering the same, with lateral extensions, upon which the wheels are directly or indirectly journaled, whereby a greater scope of vertical adjustment of the scraper is secured in a grader having wheels of comparatively small diameter.

It consists, secondly, in the combination of two-armed levers pivoted near the ends, respectively, of the frame, or on lateral extensions thereof, one arm of each lever projecting beyond said frame, forming a spindle for the wheel, and the other arm having on its end a toothed segment, which engages with a pinion that is common to the said segments of the respective lever-arms, together with devices for rotating said pinion and locking the same in any desired position, whereby the wheels may be readily canted from a vertical position, so as to counteract the lateral strain against the scraper.

The improvement also consists in the combination, with the scraper draft-bar of the class of road-graders wherein the draft attachment is directly with the scraper, (as in said Sharp-Pennock machine,) of a rod connected with said draft-bar and extending forward, to which rod the leading team of horses is attached.

The improvement also consists in certain minor details of construction, that will be hereinafter pointed out.

Referring to the annexed drawings, A is the usual diagonal vertically-adjustable scraper.

B is an arched frame, to which the tongue T and the supports *c* for the scraper-lifting levers *l* and some other parts are connected. The object of this arched frame is to attain increased resistance and to allow room for the vertical movement of the scraper, thus requiring smaller wheels than would otherwise be necessary. This arched frame is made in two separated sections or plates, *b'*, bolted or otherwise firmly secured together, and extends out horizontally at each end. Near each extremity of these horizontal extensions b^2, and in the present instance between the plates *b'*, is pivoted on pin *p* an obtuse-angled lever, D, the longer arm, *d'*, of which projects inwardly between the plate-sections, and its shorter arm, d^2, extends out beyond the end of the arched

frame, and constitutes a spindle or axle for the wheel W, which is usually provided with flanges *x*.

Fixed to the end of each of the arms *d'* is a toothed segment, S, whose teeth engage with those of a broad-faced pinion, P, that is journaled on a transverse shaft or bolt, *p'*, in the apex of the arched frame. Secured to the latter, concentrically with the pinion, in a vertical position, is a disk, F, (shown detached in Fig. 5,) provided with studs or teeth *f'* on its edge. On the extremity of the pinion-shaft *p'*, outside the disk, is secured a two-armed crank-lever, G, having a stud, *g'*, adapted to enter the spaces between the teeth of the disk. The end of the shaft is flattened, and passes through a slot, g^2, in the lever in such manner as to allow the latter to be moved to and from the disk, as on a pivot. It is retained in place by a pin, g^3. A spring, *h*, bears against the short arm of the lever and against a washer, *w*, in a circular retaining-groove, *g*, Figs. 6 and 7, in the face of the disk.

The mode of operation of the foregoing-described mechanism is as follows, premising that the position of the parts when the wheels are vertical is shown by the full lines in Figs. 1 and 3, wherein it will be observed that while the upper end of one of the segments S is engaged with the pinion the lower end of the other segment is so engaged, and when the wheels are canted to their full extent the relative positions of the segments are reversed, as indicated by the dotted lines in Fig. 3.

In order to change the cant or position of the wheels to any required extent, the operator takes hold of the handle g^5 of the crank-lever, draws the same out away from the disk against the stress of the spring *h* until the stud *g'* is entirely disengaged from the particular indentation of the disk in which it may then be. The lever is then turned to the right or the left, according to whether the cant of the wheels is to be lessened or increased, the washer on the spring *h* riding in the groove g^4. This rotates the pinion P, and consequently both the segments S, on the pivoted angle-levers D, to the free outer end, *d'*, of which the wheels are journaled, and when the latter are brought to the desired angle or cant the operator releases the lever, allowing the spring to force the same toward the disk, whereupon the stud *g'* enters one of the indentations on its edge, thereby retaining the pinion and segments, levers and wheels in position.

In that class of road-graders like that shown in the drawings, wherein the scraper is "non-reversible"—that is, not adapted to be turned from one side to the other—it is necessary to cant the wheels on only one side of a vertical line; but in the reversible machines it will be necessary to cant the wheels on either side of the vertical. In the latter case we increase the length of the segments, the pinion being at the middle of the latter when the wheels are in vertical position, all as seen in Fig. 11.

The remaining features of our invention relate to the class of road-graders (of which that shown in the drawings is an illustration) in which the draft-bar is attached directly to the scraper or scraper-bar; and it consists in the combination, with the draft attachment, of a rod connected thereto, and having an eye or hook at its free extremity for attaching thereto the tree-hook or other draft attachment of a leading horse or team connected to the tongue and the doubletree *m* of the draft-bar.

In the drawings, R is a strong rod that is pivoted to a block, *z*, which is connected by bolts *y* with the free end of the bifurcated draft-bar *n*. Said rod extends forward beneath and near the end of the tongue, and has an eye, *r'*, at its free end. This end is retained in place and supported when not in use by a ring, *o*, that depends from a plate, *q*, on the end of the tongue, as seen in Fig. 2. The hook of the doubletree of the leading team is inserted in the eye *r'*.

It will be obvious that by the construction described the draft of both teams will be directly upon the scraper.

The draft-bar is slotted, or in two parts, and has between the latter a pin, or, as in the present instance, a roller, *v*, that passes between the limbs of an elongated staple, *v'*, which is bolted to the tongue.

We are aware of the fact that there has been described a plow wherein the carrying-wheels are borne on short pivoted axles, to whose inner ends are secured toothed segments engaging with a common pinion, whereby, by rotating the latter, the said wheels may be tipped or canted to either side. We therefore do not claim, broadly, such wheel tipping or canting mechanism.

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

1. In combination with road-graders having diagonally-suspended vertically-adjustable scrapers, the transverse arched frame B, beneath which the scraper is suspended, whereby a greater range of vertical adjustment is secured, substantially as and for the purpose set forth.

2. In a road-grading machine, the combination of the diagonally-suspended vertically-adjustable scraper, the transverse arched frame, beneath which the scraper is suspended, whereby a greater range of vertical adjustment is secured, the angle-levers pivoted on the ends thereof, one arm of said levers extending beyond the ends of said frame, the wheels journaled on said extended arms, respectively, the toothed segments connected to said levers, the common pinion, and mechanism, substantiall as shown, for rotating said pinion and locking the same in position, substantially as and for the purpose set forth.

3. The combination, with the scraper, of the arched frame, made in two parallel plates or sections bolted together, the pivoted angle-levers, the pinion and toothed segments working between said sections, and the wheels jour-

naled on the projecting ends of said angle-levers, together with the mechanism for rotating and locking said pinion, substantially as and for the purpose set forth.

4. The combination of the diagonally-suspended vertically-adjustable scraper, the frame B, the angle-levers pivoted on the ends thereof, one arm of said levers extending beyond the ends of the frame, the wheels journaled on said extending arms, respectively, the toothed segments on the inner ends of said levers, the common pinion, the serrated disk G, and the rocking crank-lever connected to the shaft of said pinion and having the stud g^4, substantially as and for the purpose set forth.

5. The combination of the scraper, the frame B, the angle-levers pivoted on the ends thereof, one arm of said levers extending beyond the ends of the frame, the wheels journaled on said extending arms, respectively, the toothed segments on the inner ends of said levers, the common pinion, the serrated disk G, and the rocking crank-lever connected to the shaft of said pinion and having the stud g', together with the spring for retaining said crank-lever in place, substantially as and for the purpose specified.

6. In a road-grading machine of the class recited, in combination with the draft-bar n and the tongue, the draft-rod having the eye r', substantially as and for the purpose described.

7. In a road-grading machine of the class recited, in combination with the draft-bar n and the tongue, the draft-rod having the eye r', together with the supporting-ring o, attached to the tongue, substantially as and for the purpose described.

JOSEPH D. ADAMS.
FREDERICK M. PENNOCK.

Witnesses as to signature of Joseph D. Adams:

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ALBERT J. CANNON.

Witnesses as to signature of Frederick M. Pennock:

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WILLIAM W. POLK.