

(No Model.)

3 Sheets—Sheet 1.

B. POULSON & E. L. LATHROP.

ROAD GRADER.

No. 370,655.

Patented Sept. 27, 1887.

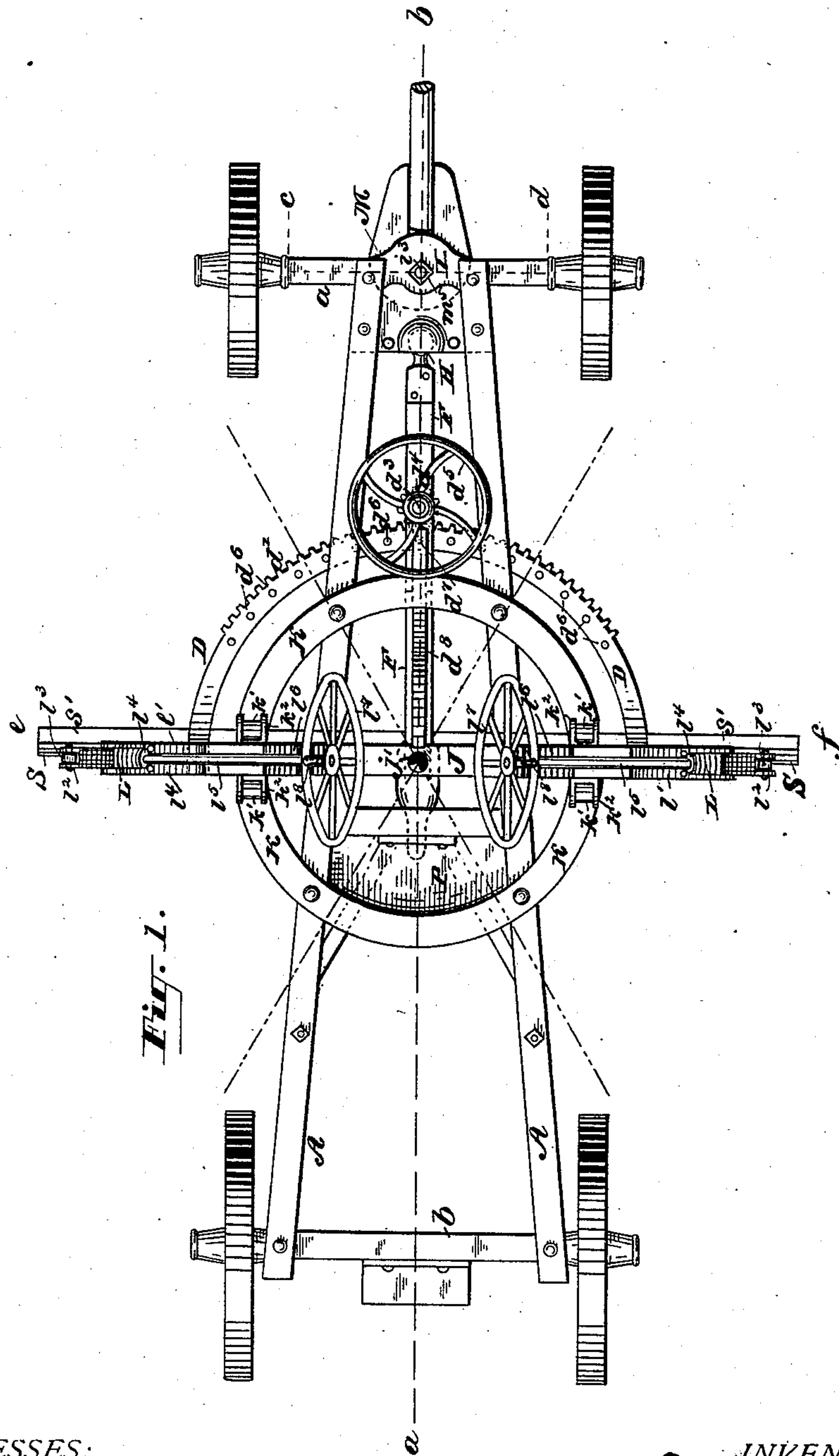


Fig. 1.

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INVENTOR

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*per Joshua Pusey*

ATTORNEY

(No Model.)

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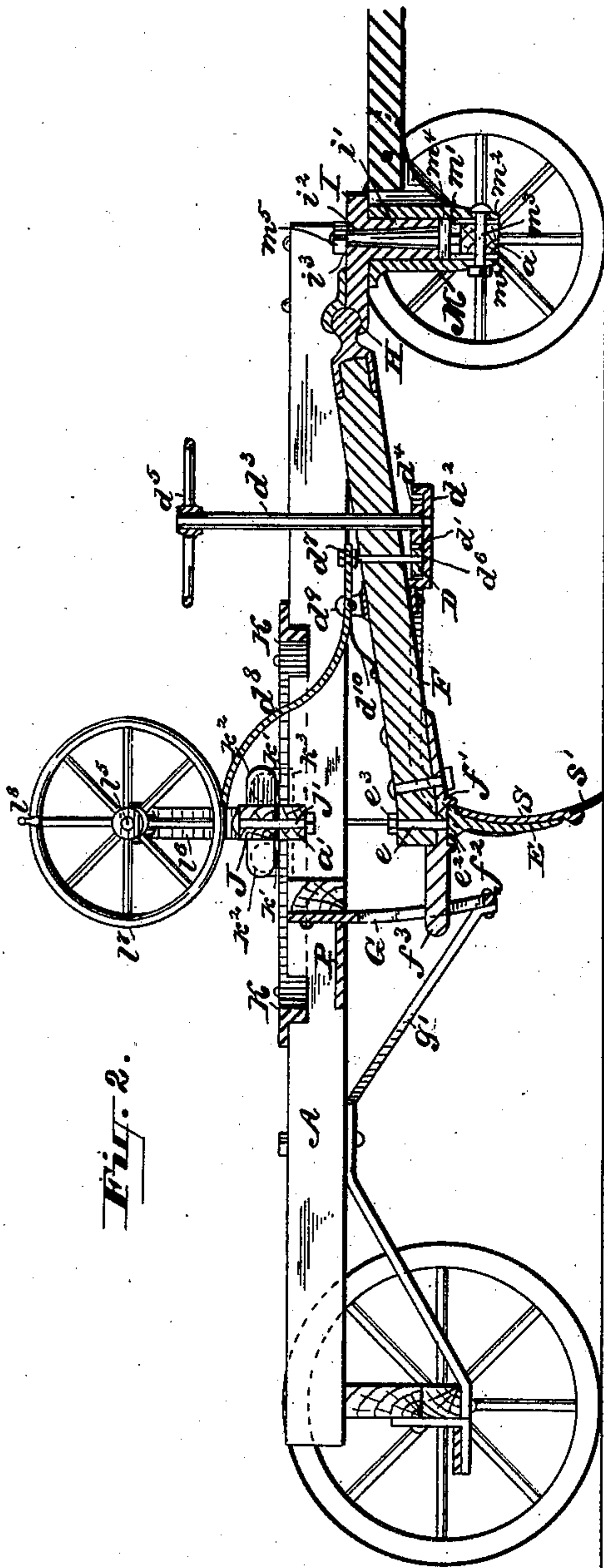
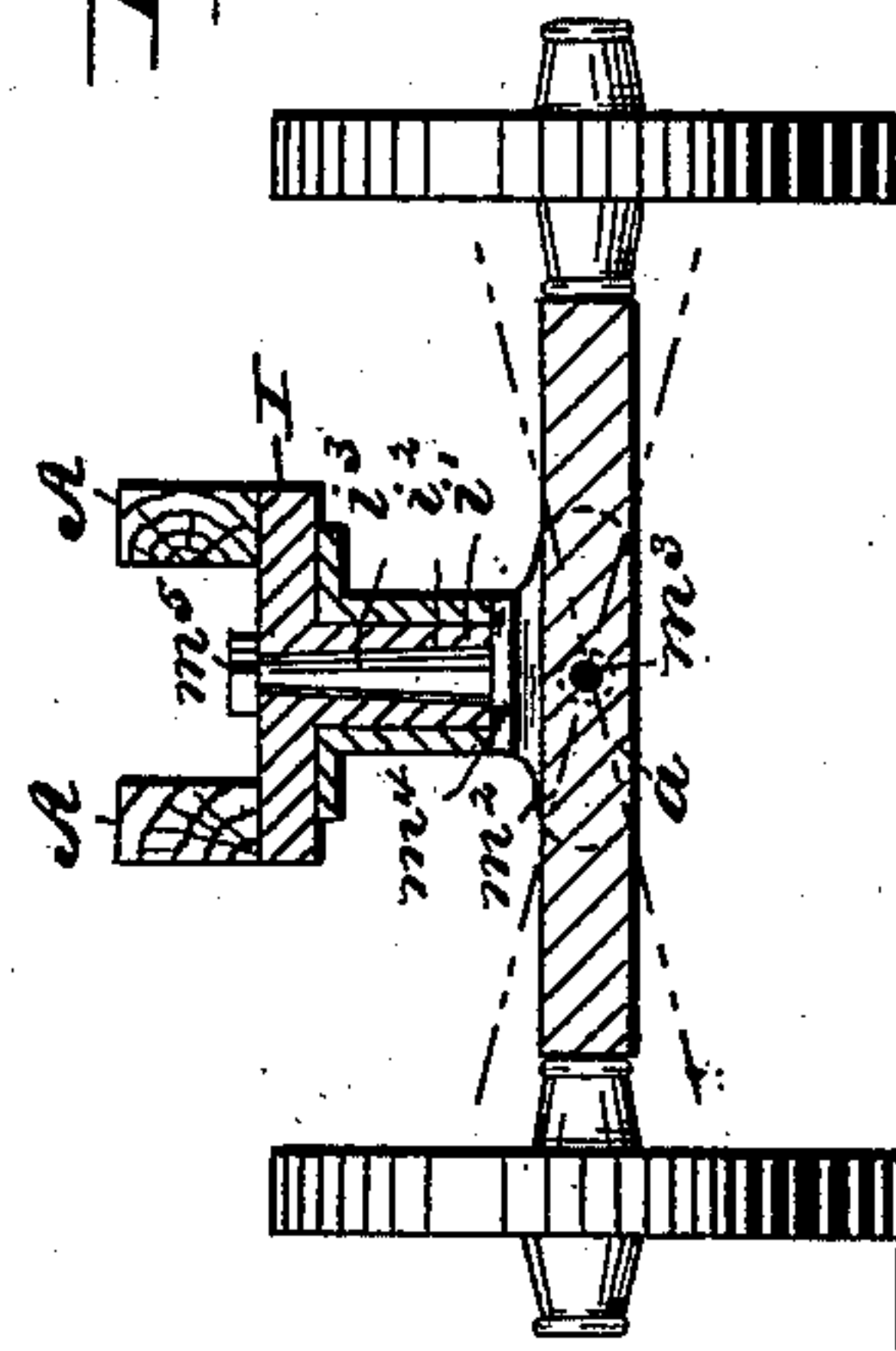


Fig. 2.

Fig. 3.



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(No Model.)

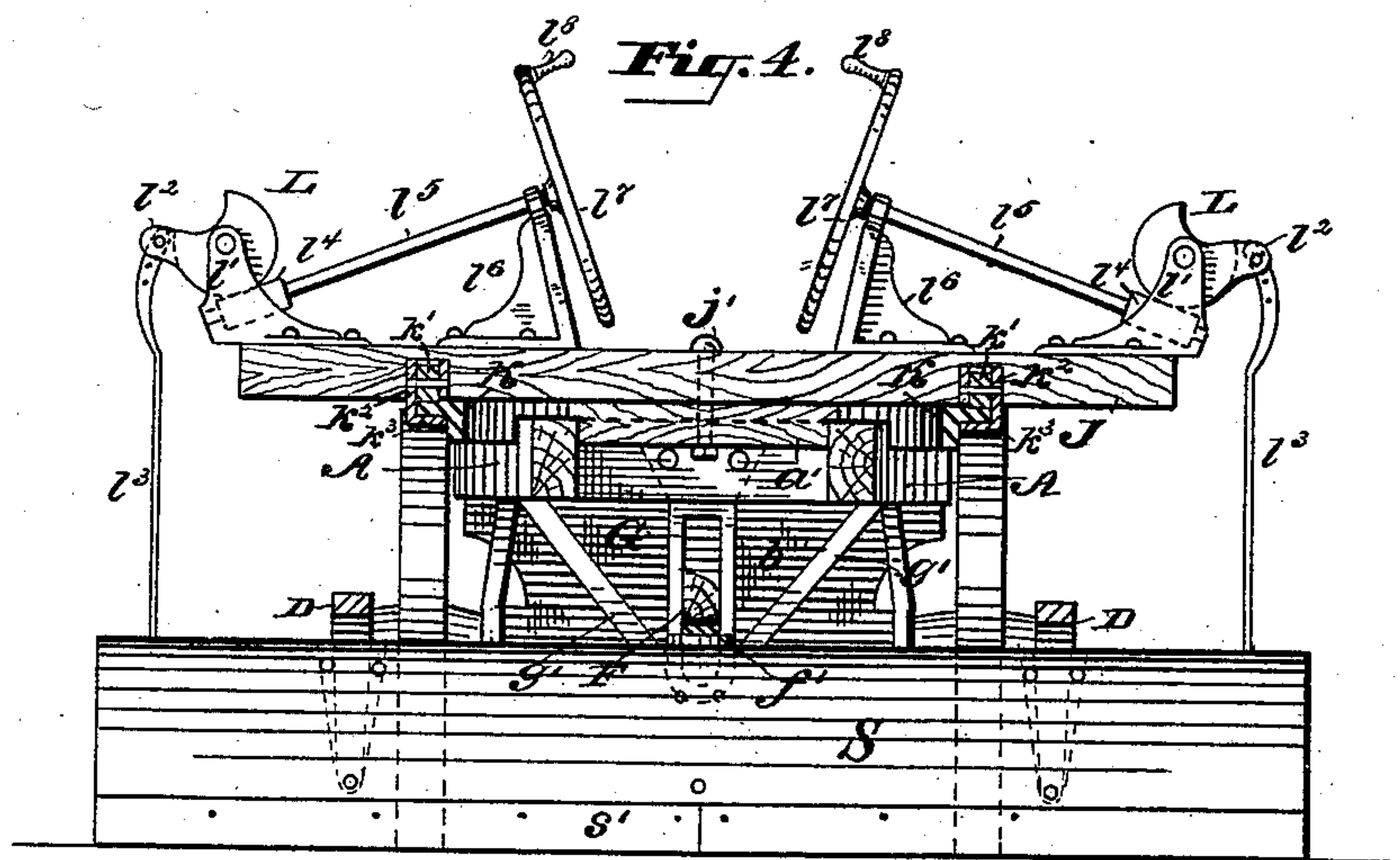
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B. POULSON & E. L. LATHROP.

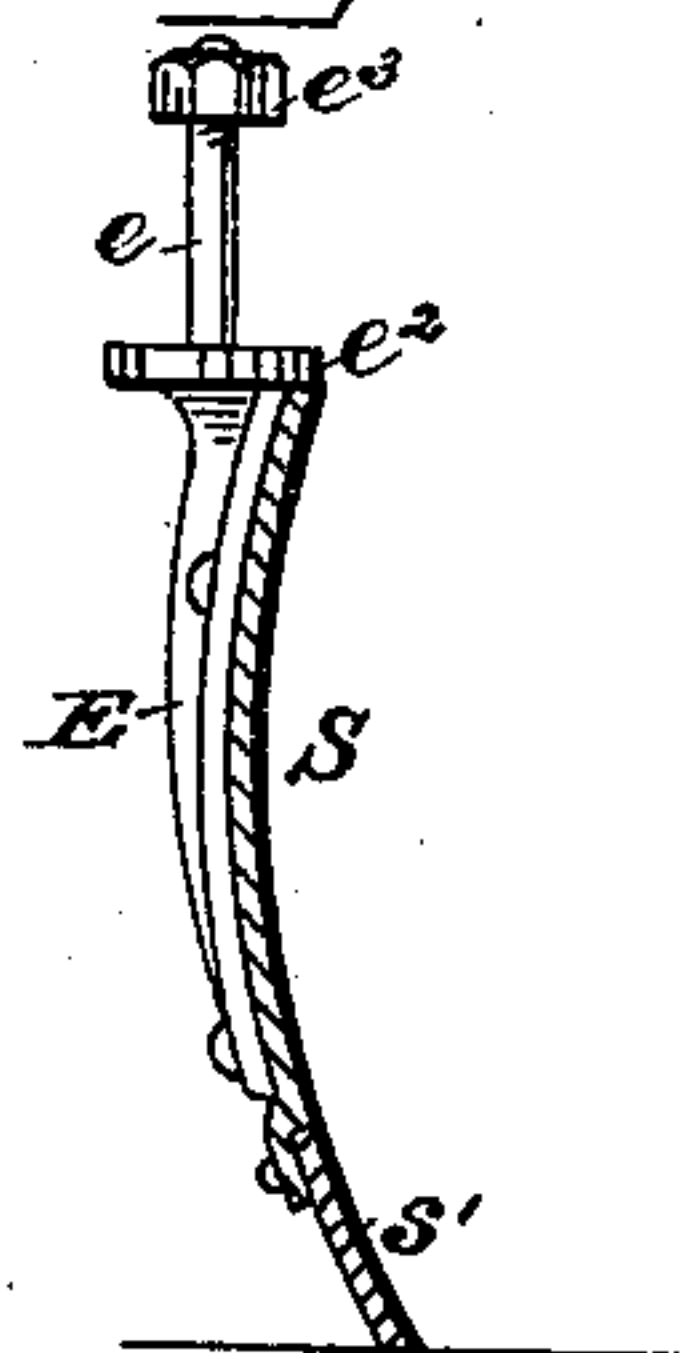
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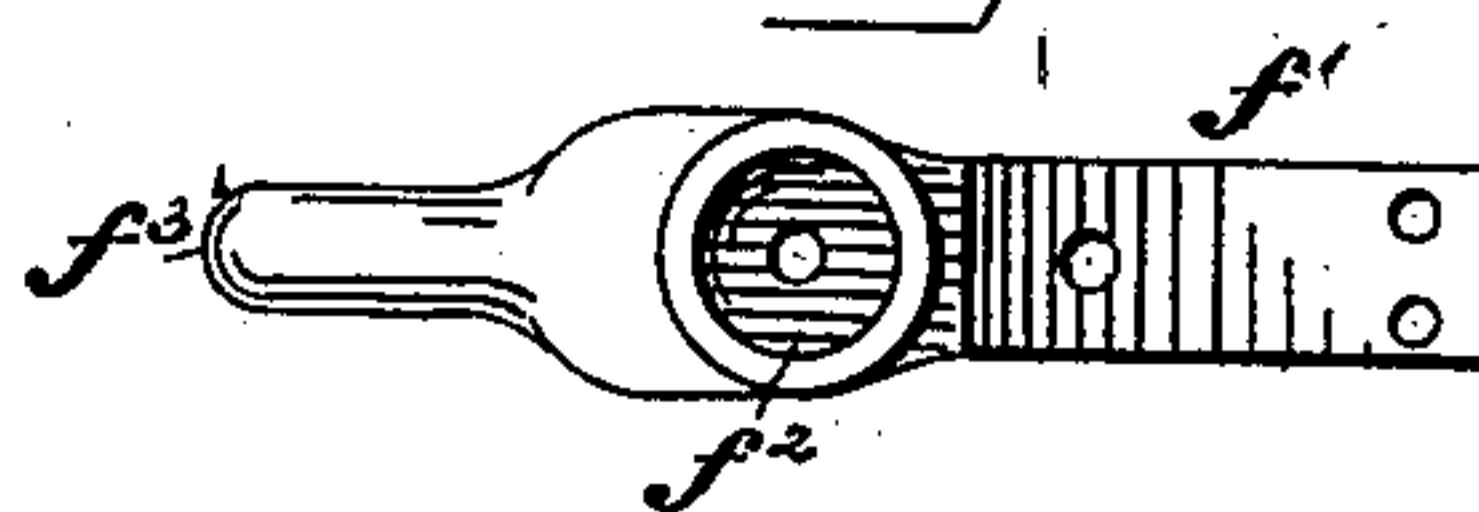
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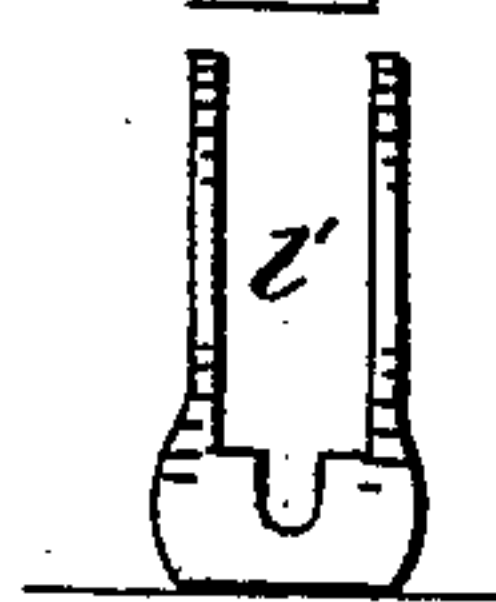
**Fig. 5.**



**Fig. 6.**



**Fig. 7.**



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# UNITED STATES PATENT OFFICE.

BRITTON POULSON AND ELIAS L. LATHROP, OF FORT WAYNE, INDIANA,  
ASSIGNORS TO THE AMERICAN ROAD MACHINE COMPANY, OF KENNETT  
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## ROAD-GRADER.

SPECIFICATION forming part of Letters Patent No. 370,655, dated September 27, 1887.

Application filed October 8, 1886. Serial No. 215,670. (No model.)

*To all whom it may concern:*

Be it known that we, BRITTON POULSON and ELIAS L. LATHROP, both citizens of the United States, residing at the city of Fort Wayne, in the county of Allen and State of Indiana, have  
5 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  
10 which—

Figure 1, Sheet 1, is a plan view of a road-grader in which our improvements are embodied. Fig. 2, Sheet 2, is a medial longitudinal section thereof, as on line *a b*, Fig. 1.  
15 Fig. 3 is a transverse section thereof, as on line *c d*, Fig. 1. Fig. 4, Sheet 3, is a transverse section, as on line *e f*, Fig. 1. Fig. 5 is a transverse section of the detached scraper-bar enlarged, showing the pivot on which it  
20 turns. Fig. 6 is an under view of the casting on the rear end of the draft-bar *F*, to which casting the scraper is pivoted. Fig. 7 is an end view of one of the brackets on the ends of the bolster.

25 This invention relates more particularly to that class of machines for grading or mending roads (known as "reversible" road-graders) wherein a vertically-adjustable scraper is pivoted to the frame of a four-wheel truck or carriage, whereby the scraper can be set to different angles with relation to the line of draft. Certain features of the invention are, however,  
30 adapted to be used in graders which are not reversible.

35 Our improvements consist, mainly, first, in the combination, with a pivoted scraper, of mechanism for the vertical adjustment of the scraper at either end, or at both ends simultaneously, at any point or angle at which the  
40 scraper may be set or turned, said mechanism consisting of rods connecting the ends of the scraper with pinions, worms, and hand-wheels mounted on a carriage that is adapted to rotate upon the main frame of the machine with  
45 the scraper as it is swung to the different positions or angles.

It consists, secondly, in an improved construction of the connection of the forward end  
50 of the frame from which the scraper is suspended, whereby the action of the scraper

when in operation will not be affected by the front wheels entering a depression or striking an obstruction, this construction consisting in pivoting the bolster which supports the bearing or fifth-wheel of the machine to the forward axle.

It consists, thirdly, in certain details of construction of said pivoted bolster and adjuncts or connections.

It consists, fourthly, in devices relating to  
60 the suspension and adjustment of the scraper, and, finally, in several minor details of construction that will be hereinafter described, and pointed out in certain of the claims.

Referring to the annexed drawings, *A* is the  
65 main frame of the machine, which consists of two strong longitudinal timbers converging toward the front, one end of each of said timbers being secured to a cross-piece or bolster, *b*, that is firmly fastened to the rear axle, and the  
70 other or forward end has attached thereto a fifth-wheel device of the peculiar construction hereinafter described, which is supported by the front axle.

*S* is the scraper-bar, to which the curved  
75 scraper *s'* is securely bolted. To this bar is attached a forwardly-projecting segment, *D*, having teeth or cogs *d'* on its front edge. The scraper, or rather a downwardly-projecting bracket, *E*, to which it (the scraper-bar) is se-  
80 cured, swings on a pivot-pin, *e*, that passes vertically through a longitudinal bar, *F*, and also through a strong iron bar or piece, *f'*, that is bolted to the under side of bar *F* and projects from the rear of the latter, as shown. 85  
The piece *f'* has a circular socket, *f''*, on the under side, (see Fig. 6,) into which fits a corresponding disk, *e''*, of the bracket *E* on the top centrally of the scraper-bar. Thereby a bearing is given to the latter. The pin *e* pro-  
90 jects upwardly from this disk, passing through the longitudinal bar *F*. The nut *e'''* retains the pin in place. The projection *f'''* of the piece *f'* extends into a yoke, *G*, which is secured to the main frame of the machine, and is braced by  
95 the irons *g'*, also fastened to the frame. The bar *F*, to the rear or free end of which, as stated, the scraper-bar and segment are pivoted, as described, is connected by means of a ball-and-socket joint, *H*, to a plate, *I*, at the  
100



front of the machine, which plate constitutes a part of the fifth-wheel of the machine, hereinafter described.

It will be seen that the described construction will permit not only the rotation of the scraper-bar with the scraper upon the pivot  $e$ , but also the independent vertical adjustment of the scraper or either end of the same.

We will now describe the mechanism by which such vertical adjustment of the scraper may be effected at any point of the rotation or "set" of the scraper. To this end we provide a strong bar or bolster, J, and pivot the same on a bolt or pin,  $j'$ , which passes through a cross-piece,  $a'$ , secured to the main frame, and which is in line vertically with the pivot  $e$  of the scraper, and we secure to and upon the longitudinal bars of the frame A a horizontal circular trackway, K, upon which sets of rollers  $k'$ , journaled in a box or frame,  $k^2$ , on the side of bolster J, travel as the latter is swung on its pivot.

The boxes  $k^2$  have lips or flanges  $k^3$  taking underneath the trackway, thereby steadying or bracing the bolster against the stress that would come upon it when the machine is doing work. This bolster carries the mechanism for raising and lowering the scraper, and it will be seen that the scraper and said bolster, with the described mechanism, all turn when the rotating devices are operated, as hereinafter described. Said raising and lowering mechanism consists of a toothed pinion, L, journaled in a frame or bracket,  $l'$ , on the end of the bar J. This pinion has an outward projection,  $l^2$ , to which is pivoted a rod,  $l^3$ , whose lower end is also pivoted or linked to the scraper-bar. A worm,  $l^4$ , engages with the teeth of the pinion, which worm is on the end of an inclined shaft,  $l^5$ , the lower extremity of which is journaled in the bracket  $l'$  and its upper end in another bracket,  $l^6$ , which is also secured to the bolster J. On the end of the shaft  $l^5$  is a hand-wheel,  $l^7$ , (preferably provided with a handle,  $l^8$ .)

The described mechanism is duplicated at the other end of the bar. The wheels  $l^7$  are in a convenient position to be turned by the operator of the machine, who stands upon the platform P at the rear, Figs. 1 and 2. Now, it will be obvious that when the wheel or wheels  $l^7$  are turned in one direction the connecting rod or rods  $l^3$  will be drawn up and the scraper will be raised, and when turned in the opposite direction the scraper will be lowered or forced down into the ground when grading, and that one end of the scraper may be elevated or depressed independently of the other. It will also be seen that the manner in which the scraper is pivoted and the ball-and-socket connection of the front end of the bar F, together with the yoke-connection of the other end of said bar, allows the free movement of the scraper we have just referred to. The projection  $f^3$ , entering the yoke G, retains the rear end of the bar F (and the scraper and other mechanism connected to said bar) in position

laterally, yet allows the vertical movement of the same.

We will now describe the devices for rotating the scraper (with its connections) to the different angles or drafts with relation to the line of the roadway, and for locking the same in the desired positions. As previously stated, the segment D, which is attached to the scraper-bar, is provided with cogs  $d'$  on its edge. The segment bears upon the bottom of a box or bracket,  $d^2$ , which is secured to and underneath the bar F. A vertical shaft,  $d^3$ , passing through the latter has at its lower end, which is also journaled in box  $d^2$ , a pinion,  $d^4$ , whose teeth are engaged with those of the segment. The shaft extends up beyond the top of the main frame of the machine, and has a hand-wheel,  $d^5$ , thereon in convenient position for the operator. By turning this wheel the pinion will be rotated, and consequently the segment and scraper, also the bolster J, which carries the mechanism for vertical adjustment.

The segment is provided with a series of holes,  $d^6$ , at suitable intervals apart, adapted to receive a locking-pin,  $d^7$ , which passes through the bar F and is operated by means of a lever,  $d^8$ , which is pivoted to a bracket,  $d^9$ , on said bar F, and projects up and back in a position convenient to the operator. The short arm of the lever engages with the head of pin  $d^7$ , and is held down by a spring,  $d^{10}$ , that bears under the long arm. Normally the pin will be dropped into one of the holes of the segment, thereby locking the same; but when the scraper is to be rotated the operator presses with the hand or foot upon the end of the long arm of the lever, thereby raising the pin out of engagement with the segment, and allowing it to drop and relock the latter when the scraper has been brought into the desired position.

It will be seen that with the described construction the rotating and locking devices all rise and fall with the rise and fall of the scraper, and thereby always maintain their relative positive engagements.

We here remark that the combination of a toothed segment connected to a reversible scraper and a pinion engaging with the teeth of the segment with a hand-wheel for rotating said pinion, and consequently the segment, is not new, the same being shown and described in Marcus E. Cook's patent, No. 296,138, dated April 1, 1884.

We will now describe another important feature of our invention—that relating to the fifth-wheel or front-axle connection before alluded to.

The plate or piece I, in which is the ball-and-socket H, previously referred to, is bolted underneath the converging forward ends of the longitudinal timbers of the main frame of the machine. This piece is made with a downwardly-projecting stud,  $i'$ , which enters and neatly fits a socket,  $m'$ , in a bolster, M, the lower end of which latter has a transversely-



bifurcated side extension,  $m^2$ , adapted to receive the axle freely, (see Figs. 2 and 3 on Sheet 2,) to which it (said bolster) is pivoted on a pin,  $m^3$ , that passes centrally through the axle and the bifurcation of the bolster. A hole,  $i^2$ , for the reception of the king-bolt  $i^3$  passes vertically through the plate I and its stud. The head of the king-bolt bears against the offset  $m^4$  on the bolster, and the nut  $m^5$ , being screwed on, holds the connected parts together.

By this described construction, while there is no interference with the usual turning movement of the forward truck, the running of the wheels over an ordinary obstruction or into a depression in the roadway will not affect the action of the scraper, as has heretofore been the case.

We are aware of the Letters Patent, No. 341,609, of Geo. W. Taft, dated May 11, 1886, wherein the mechanism for elevating the scraper consists of connecting-rods, racks, and pinions, with hand-wheels and chains for rotating the pinions, and thereby lifting the scraper; and we do not claim the devices shown in said patent as within the scope of our invention.

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

1. The combination, with the vertically-movable scraper, of mechanism for raising and lowering the scraper, consisting of the worms and pinions and connecting-rods at each end of the scraper, and the inclined shafts with the hand-wheels, as shown, whereby the operator is enabled to turn both of said wheels simultaneously or separately, and thereby raise or lower the scraper or either end thereof independently of the other, substantially as and for the purpose set forth.

2. In a reversible road-machine, the combination, with the rotatable vertically-movable scraper, of the rotatable bolster J, pivoted on the main frame of the machine, the support or trackway K, the hand-wheels, shafts, and worm-and-pinion gearing, and the rods connecting said pinion with the end of the scraper, substantially as and for the purpose set forth.

3. The combination, with the bar F, connected to the forward part of the machine by a universal joint, such as the ball-and-socket

shown, and having the scraper connected to the rear end of said bar, of means for vertical adjustment of the scraper, together with the yoke G and the projection  $f^3$ , extending into said yoke, substantially as and for the purpose described.

4. In a reversible road-grader, the combination, with the scraper, of the forwardly-projecting toothed segment D, the bar F, to which the scraper is pivoted, the forward end of said bar being connected to the frame of the machine by a universal joint, such as H, the bracket or support  $d^2$ , attached to bar F, the pinion  $d^4$ , with teeth engaging those of said segment, the shaft  $d^3$  and its hand-wheel  $d^5$ , the devices for locking the segment in the different angles or positions, and the yoke G, the rear projection of bar F entering said yoke, together with the mechanism for raising and lowering the scraper, all constructed and adapted to operate substantially as and for the purpose set forth.

5. The combination, with the pivoted bar F and the piece  $f'$ , having the socket, and the rear projection adapted to enter a suitable yoke, G, of the piece E, having the disk  $e^2$ , and the downward projection for attaching the scraper thereto, substantially as and for the purpose set forth.

6. In combination with the pivoted bolster J, the circular trackway K and the box attached to said bolster, provided with the rollers  $k'$  and lips or flanges  $k^3$ , extending underneath the said trackway, together with the scraper and devices for rotating and raising and lowering the same, substantially as and for the purpose recited.

7. The combination, with the wheel-truck, of the plate attached to the main frame and having the stud  $i'$ , and the bolster pivoted on the axle and having the socket  $i^2$  for the reception of the stud, substantially as and for the purpose set forth.

In testimony whereof we have hereunto affixed our signatures this 2d day of October, A. D. 1886.

BRITTON POULSON.  
ELIAS L. LATHROP.

Witnesses:

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FRANCIS S. BROWN.