

(No Model.)

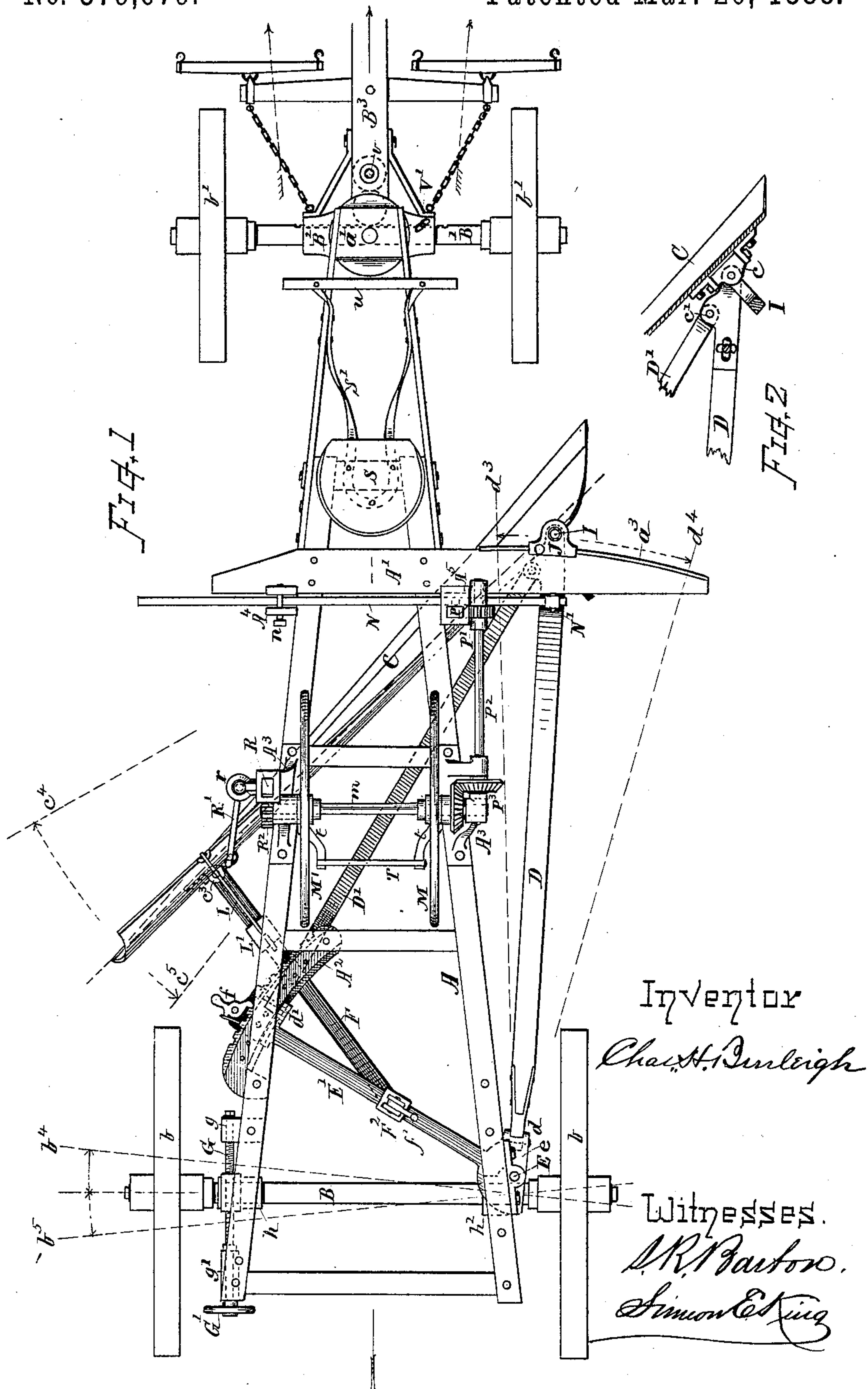
5 Sheets—Sheet 1.

C. H. BURLEIGH.

MACHINE FOR MAKING, REPAIRING, AND CLEANING ROADS.

No. 379,679.

Patented Mar. 20, 1888.



(No Model.)

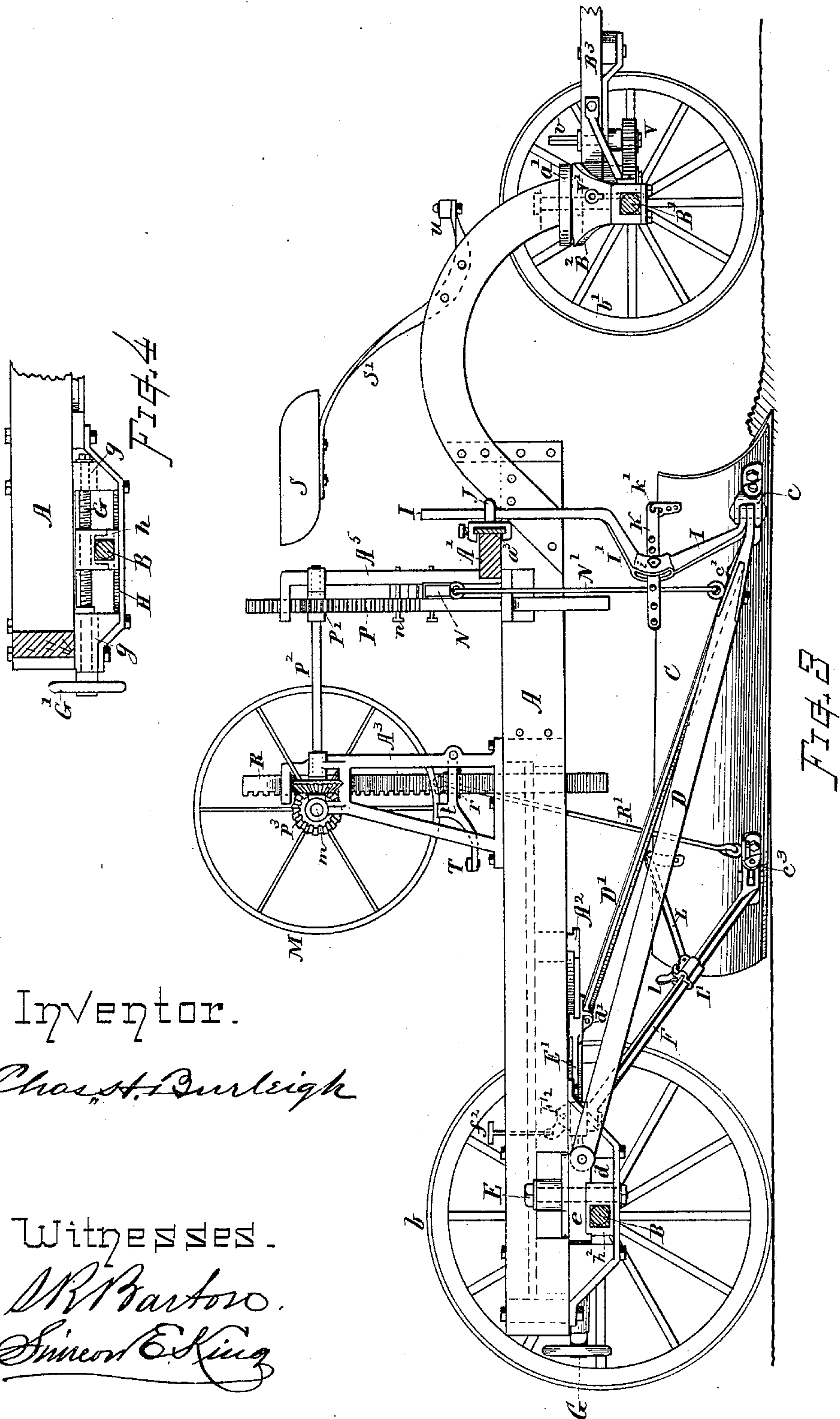
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Inventor.

*Chas. H. Burleigh*

Witnesses.

*W. R. Bartow.*

*Simon E. King*

(No Model.)

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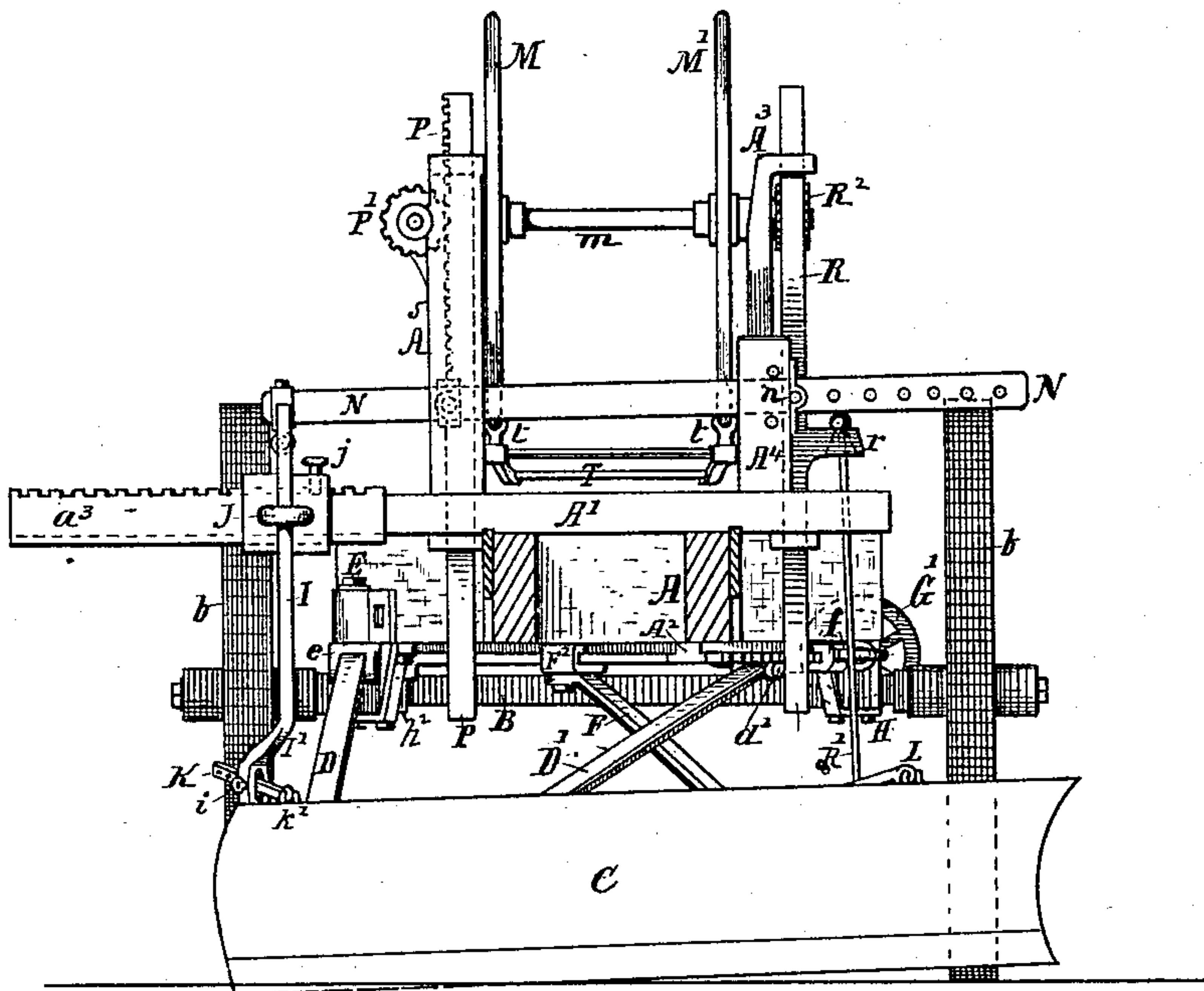


FIG. 5

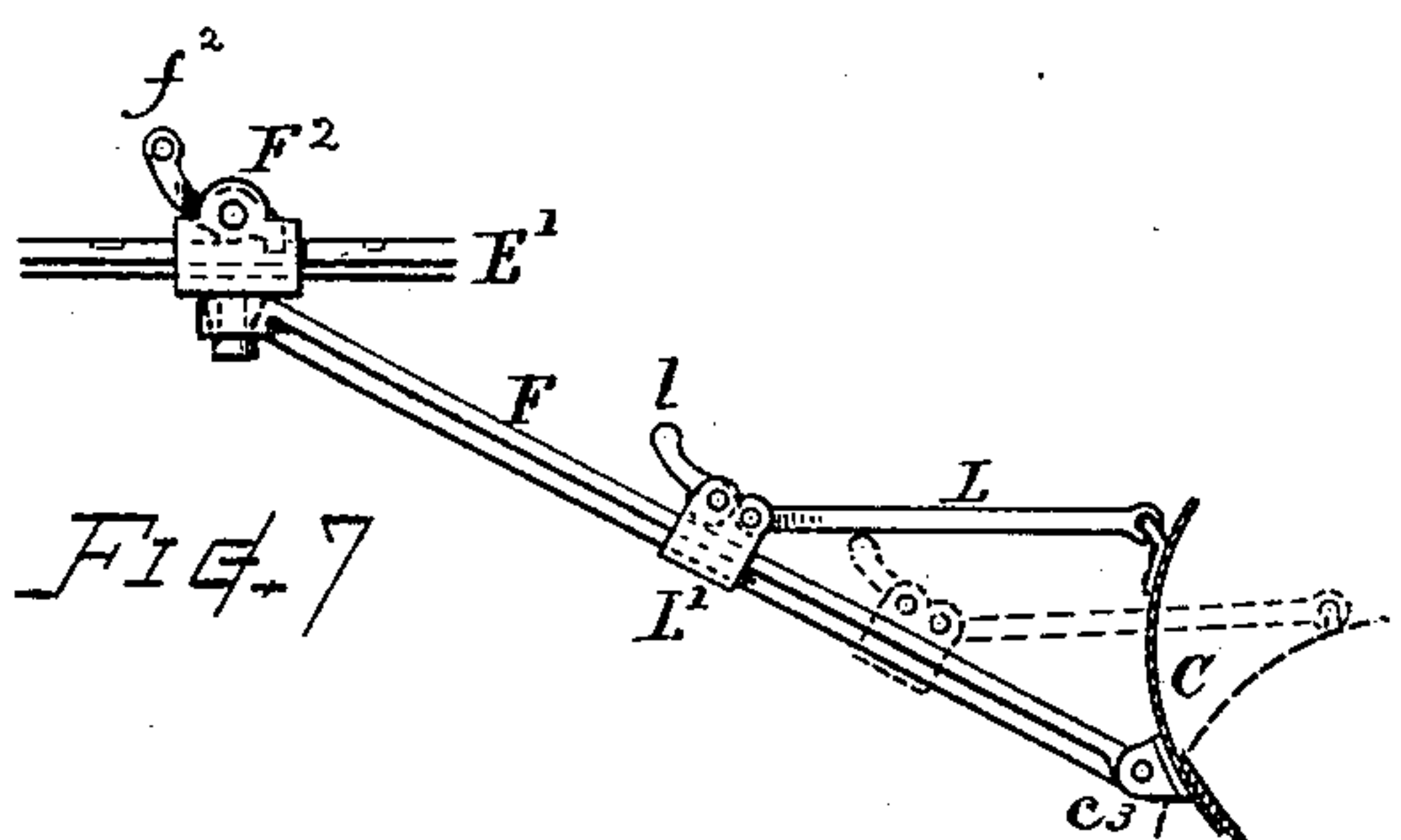


FIG. 7

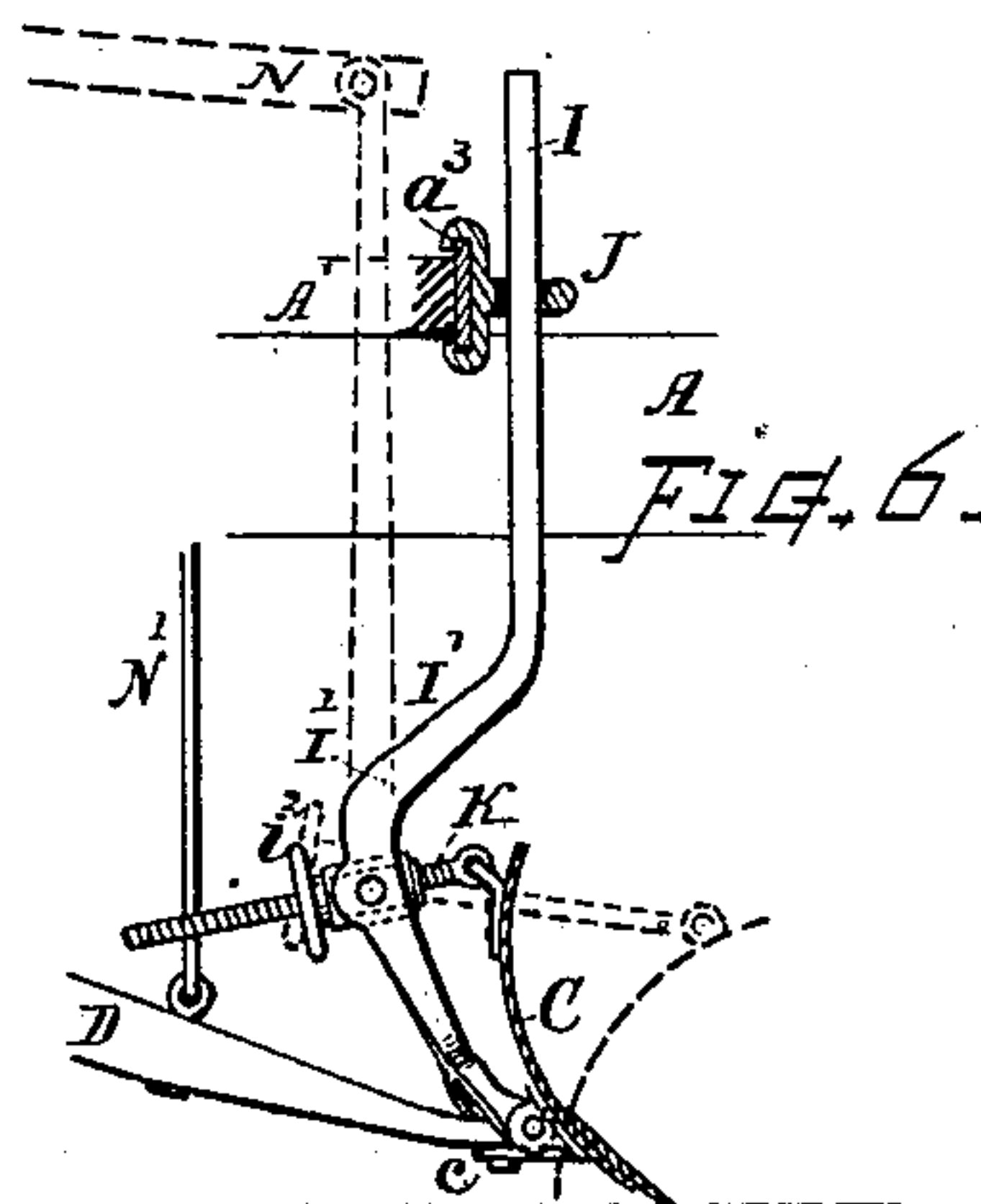


FIG. 6

Witnesses.

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*Simon E. King*

Inventor.

*Charles H. Burleigh*



(No Model.)

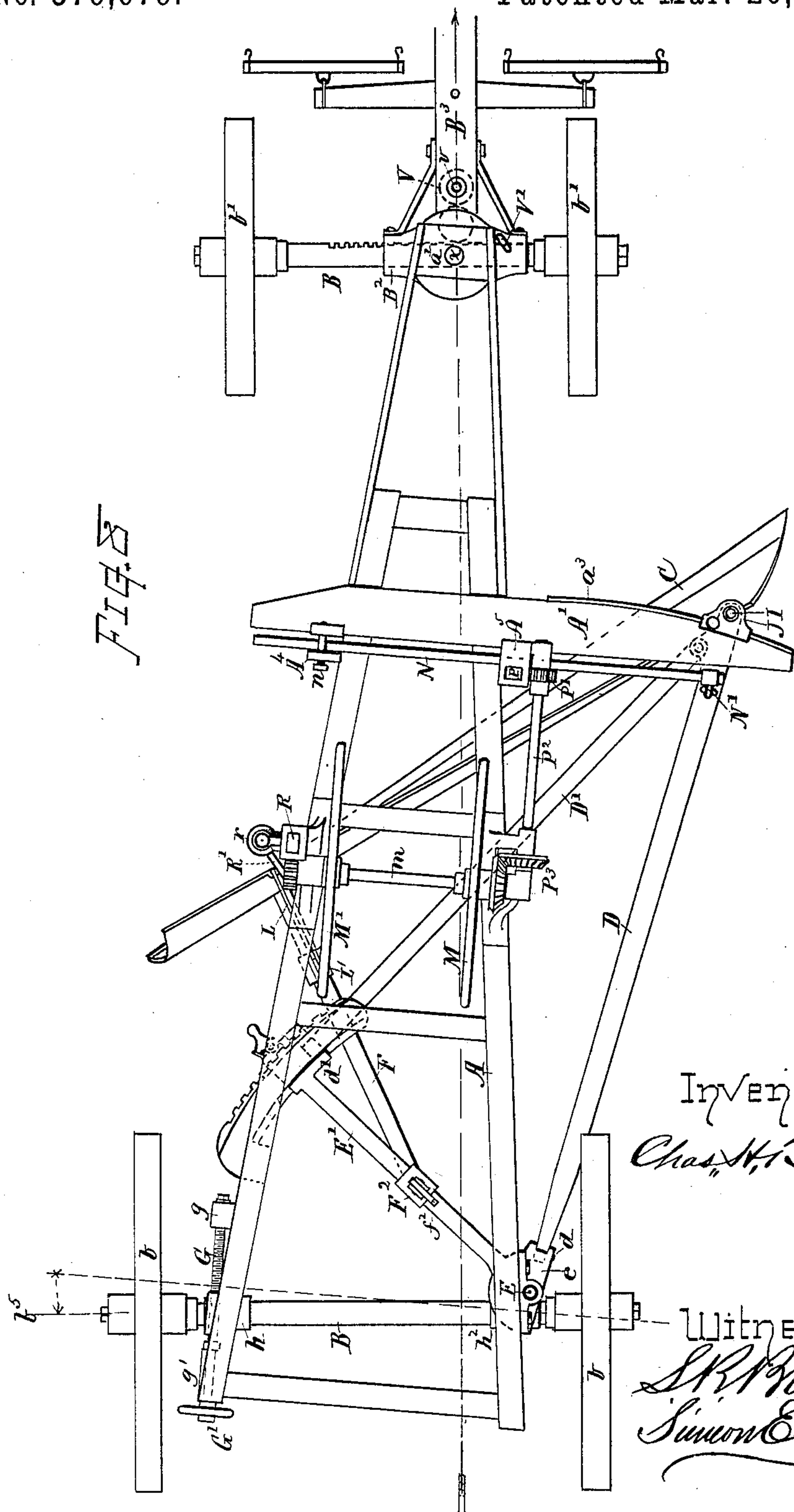
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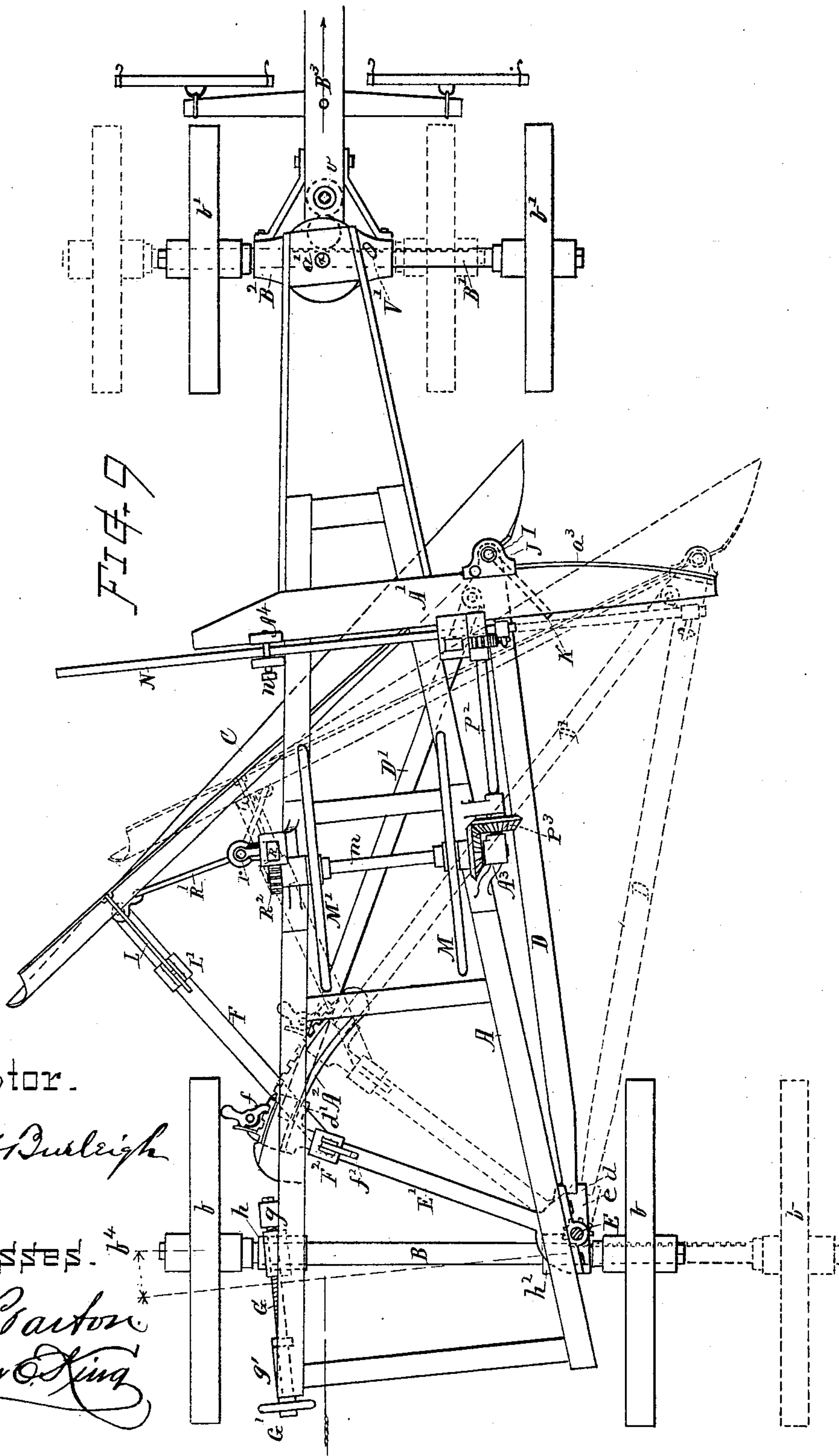
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Inventor.

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# UNITED STATES PATENT OFFICE.

CHARLES H. BURLEIGH, OF WORCESTER, MASSACHUSETTS.

## MACHINE FOR MAKING, REPAIRING, AND CLEANING ROADS.

SPECIFICATION forming part of Letters Patent No. 379,679, dated March 20, 1888.

Application filed October 8, 1887. Serial No. 251,832. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES H. BURLEIGH, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making, Repairing, and Cleaning Roads, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The objects of my invention are to afford facilities for adjusting the running-gear of a road-machine or wheeled scraper, as hereinafter explained; to provide facilities for transversely shifting the position of the scraper bar or blade in relation to the carrying frame or body; to provide a push-frame or thrust-bracing of improved construction pivoted to the scraper-blade at or near the front end thereof, and adapted to support said blade, while permitting its free adjustment; to afford facilities for the lateral adjustment of the forward part of the push-frame and scraper-blade, also to provide blade-elevating connections that will accommodate such adjustment, and to afford efficient means for securing the several parts as required at their different adjustments; to provide in a diagonal scraper or road-working machine, facilities for the horizontal swinging adjustment of the rear axle in relation to the carrying-frame, as hereinafter explained, also to afford convenient and efficient means for effecting such adjustment and means for supporting the parts at adjusted position; to provide a heel-brace or means for sustaining the rear end of the scraper that will allow backward and forward adjustment of the same and devices for securing the brace at adjusted positions; to provide in connection with such heel-brace an adjusting-bar and locking devices for sustaining the scraper at required working-pitch, while permitting backward and forward pitch adjustment. These objects I attain by mechanism the nature and organization of which are explained in the following description, the several features of improvement and particular subject-matter claimed being hereinafter definitely specified.

In the drawings, Figure 1 is a plan view of a road-machine illustrating my invention, the

floor or platform being omitted the better to show the arrangement of the mechanism. Fig. 2 is a sectional plan view showing the connection of the main push-bar with the scraper. Fig. 3 is a side view of the machine, the axles being shown in section. Fig. 4 is a sectional view showing means for adjusting the rear axle. Fig. 5 is a transverse section forward of the scraper, looking rearward. Fig. 6 is a sectional view showing the construction of the standard and devices for holding the rolling action of the blade at its connection with the push-frame. Fig. 7 is a view showing the thrust-bar or heel-brace and its detachable bearing for sustaining the rear end of the scraper, together with the brace-bar and locking device for facilitating and retaining the pitch adjustment of the scraper-blade. Fig. 8 is a plan view showing the machine with the scraper adjusted to the right-hand side thereof, as for working gutters with the advance end of the blade. Fig. 9 is a plan view of the machine with the scraper adjusted to the left, as for working gutters with the rear end of the blade, also with dotted lines showing another adjustment of the push-frame and scraper and the forward axle, also with dotted lines illustrating the arrangement of an extended endwise-adjustable rear axle.

In reference to parts, A denotes the body or carrying-frame, which may be of any suitable form for supporting the scraper and operating mechanism. In the present instance it is shown as consisting of divergent side timbers with suitable transom-bars, and having arch-irons at its front end, which connect with the rocker-block or fifth-wheel  $a'$ , that rests upon and is coupled with the bolster  $B^2$  or front axle by the king-bolt  $x$  in the ordinary or any suitable manner.

B indicates the axle for the rear traveling wheels,  $b$ , and  $B'$  is the axle for the front traveling wheels,  $b'$ . The pole  $B^3$  and draft devices for attaching the team can be connected with the bolster  $B^2$  in any well-known or suitable manner.

C indicates the scraper bar or blade, disposed beneath the carrying-frame between the front and rear axles, and adapted for upward and downward adjustment at either or both ends by suitable lifting mechanism mounted upon the carrying-frame; also for adjustment at its



rear end to give different degrees of angularity horizontally, and in the present instance I have also shown the scraper adapted for adjustment bodily to the right or left laterally in relation to the carriage or line of draft. In some instances, however, if preferred, the machine might be made without the facilities for this lateral adjustment of the scraper.

For sustaining and controlling the strain on the scraper, a main push bar or brace, D, extends from a position at or near the rear axle, B, to the advance end of the scraper-blade, and a diagonal push bar or brace, D', extends from the opposite side of the frame, also to the advance end of the scraper. The forward end of the main push-bar D is attached to the scraper at or near the end of the blade by means of a double hinge or connecting joint, c, that permits free action in all the various directions required for the several adjustments of the scraper, while the diagonal push-bar D' is attached to the side of the main push-bar, as at c'; or, if preferred, said diagonal push-bar can be socketed in the same hinge as the main push-bar at c.

The rear end of the brace or push-bar D is fitted, socketed, or hinged at d to a bearing-block, e, supported by the frame A and the rear axle. The rear end of the brace or push-bar D' is hinged to a bearing-block, d', supported in connection with the opposite side of the frame and preferably adjustable thereon. In the present instance the frame A, bearing-block e, and the rear axle, B, are connected by a pivot, E, that passes through suitable bearings at the rear end of the main push-bar, so that said parts can severally have adjustment independent of each other on said pivot.

A bar, E', extends from the bearing-block e laterally or diagonally to the opposite side of the frame A, where its end is supported by a curved guide-plate, A<sup>2</sup>, fixed on the carrying-frame, as indicated. The end of the bar E' is lipped onto or otherwise fitted to slide on the plate A<sup>2</sup>, and can be retained at any desired position by a suitable stop-dog or lock device, f, provided for that purpose. From the bar E' there extends a push-bar or heel-brace, F, for sustaining the strain on the rear end of the scraper C. One end of said bar F is attached to the scraper by a loose joint or double hinge, as at c<sup>3</sup>, while its other end is secured to the supporting-bar E' by an adjustable connection or sliding bearing, F<sup>2</sup>, having a cam-dog, f<sup>2</sup>, or other efficient means whereby the end of the heel-brace F can be locked at positions of adjustment along the bar E'. By adjusting the rear end of the heel-brace F laterally of the machine along the support or bar E' the horizontal diagonal adjustment of the scraper is varied to different angles in relation to the line of progression by backward or forward swing of the heel end of the scraper within the arc indicated by dotted lines c<sup>4</sup> c<sup>5</sup> on Fig. 1.

The bars or braces D, D', and E' form an adjustable push-frame for sustaining the scraper

from its rear and taking the working strain directly at the front end of the blade which plows into the earth, while the heel-brace F takes the lesser strain at the rear end of the scraper.

The rear axle, B, is made adjustable horizontally in relation to the carrying-frame A by swinging on the pivot E, as per dotted lines b<sup>4</sup> b<sup>5</sup>, Fig. 1, and a screw, G, is combined therewith for effecting the adjustment and retaining the parts securely at any position desired. The screw G is in the present instance arranged to turn in bearings g g', fixed on the frame A at its side opposite that at which the pivot E is located, and is fitted to engage a hub or bearing, h, which carries the axle B and works in a suitable guide or supporting way, H, attached to the carrying-frame A. (See Figs. 1 and 4.) A hand-wheel, G', is fixed on the rear end of the screw, or other convenient means is provided whereby said screw can be rotated when desired. The operation of the screw G serves to swing the end of the axle B more or less forward or back, and thus cause the rear wheel, b, or back part of the machine to run more or less out of track or alignment with the forward wheels, b'. This adjustment of the rear axle is a feature of my invention and is different from the heretofore-practiced method of inclining the wheels independently by bent or offset axle-trees.

The hinge d' of the diagonal push bar or brace D' is in the present instance attached to the head of the bar E', which is in connection with the guiding and supporting plate A<sup>2</sup>, so that said bar and brace both adjust simultaneously and are fastened by the same locking-dog, f. This lock-dog can be a latch, pin, or other convenient device whereby the parts can be firmly and securely held when adjusted. When the lock f is released, the bar E' can swing back and forward, and the forward end of the main push-bar D and diagonal braces D' can be swung laterally on the pivot E as a center, or for shifting the scraper to the right or left bodily, (see Figs. 1, 8, and 9,) the toe-connecting hinge c moving in an arc substantially as indicated by the dotted lines d<sup>3</sup> d<sup>4</sup> on Fig. 1. This method of shifting the scraper laterally is a feature of my invention. If preferred, the hinge or bearing block d' can be made separate from the bar E' and be independently adjustable on the guide-plate A<sup>2</sup>; or, if non-adjustable construction is desired, said bearing-block can be fixed rigidly on the carrying-frame.

A' indicates a cross piece or arm of the carrying-frame, having a guideway, a<sup>3</sup>, upon which is supported a guide-bearing or an adjustable eye, J. Said eye occupies a position substantially in a line with and above the hinging-joint c at the junction of the main push-bar D and scraper.

I indicates a standard the lower end of which is connected with the scraper-blade and push-frame at or near the hinging-joint c, while its upper end is confined and supported by the



eye or guide J in a manner that will permit the said standard to move up and down freely with the upward and downward movement of the scraper, while maintaining a substantially upright position.

K indicates a bar or rod adjustably connected with the standard I, and having its forward end,  $k'$ , hinged to the upper part of the scraper-blade. The purpose of this bar K is to facilitate the pitch adjustment or to support the scraper against forward and backward tipping action. Said bar K can be provided with a series of holes and be secured to the standard I by a pin,  $i$ , as indicated in Fig. 3, at its various positions of adjustment; or, if preferred, the bar can be screw-threaded to work in conjunction with a rotatable nut,  $i^2$ , pivoted in the standard for effecting backward and forward adjustment of the scraper, as indicated in Fig. 6.

The standard I is preferably offset or crooked in the manner indicated at  $I'$ , to permit the top of the scraper to be laid back at an extreme degree of inclination. In lieu of making the standard I to slide through the guiding-eye J, the eye may be formed on the top of said standard to run on an upright bolt or pin attached to the arm of the frame A. The eye J is adjustable on the guideway  $a^3$  accordingly as the forward end of the push-frame and scraper are adjusted laterally, so that the standard I can be maintained in substantially upright position for supporting the pitch adjustment of the scraper and can swing on its vertical axis to accommodate itself to the adjustment of the scraper in a horizontal plane, and also rise and fall freely to accommodate the up and down adjustment of the scraper. The guideway  $a^3$  can be provided with a series of notches and the eye locked thereto by a detachable pin or dog,  $j$ , as indicated in Fig. 5, or other means may be employed for the adjustment of the guide.

L indicates an adjusting bar for supporting the rear end of the scraper against rolling action. The front end of said bar is hinged to the upper part of the scraper-blade, while its rear is connected with the heel-brace F by a locking-connection or slide-bearing,  $L'$ , provided with a clamp or locking dog,  $l$ , whereby it can be secured at any desired position along said brace F. By loosening the dog  $l$  the scraper can be adjusted to any desired pitch, and there held by again locking the adjusting-bar to the brace, as indicated by dotted lines in Fig. 7. This means for sustaining the rolling or pitch adjustment of a scraper-blade is a feature of my invention.

The devices for sustaining the pitch or backward and forward adjustment of the scraper may, if desired, be employed with a push-frame of other construction than that herein shown.

The scraper C is preferably made of a cylindrically-curved plate of metal and warped or twisted throughout its length in the manner of a mold-board, so that the rear end will

stand at a more upright angle than the forward end when in working position. This kind of scraper-blade, I am aware, has heretofore been used in road-machines, and I do not therefore restrict my invention to any particular form of the scraper-blade as essential, since other shapes of blade or scraper-bars may be mounted for adjustment and operation in connection with my improved mechanism.

Suitable standards or bearing-frames,  $A^3$ , are arranged on the frame A for supporting the bearings of the axle or shaft  $m$  of the hand-wheels M and  $M'$ , by which the scraper elevating and depressing mechanism is operated.

The advance end of the blade is elevated and depressed by means of a transversely-disposed lever, N, one end of which is connected by a rod,  $N'$ , while its other end is confined in connection with standards  $a^4$  by a fulcrum-pin,  $n$ , in a manner to be adjustable, so that the lever can accommodate itself to the lateral adjustment of the scraper. The fulcrum-pin  $n$  can be arranged through holes in the lever, or the lever can be arranged between two fulcrum-pins, one above and the other below it, as preferred. (See Fig. 5.)

The rod  $N'$  is in the present instance attached to an eyebolt fixed in the main push-rod D; but, if preferred, said lifting-rod might be attached to the hinge-joint  $c$  or directly to the scraper-blade.

The arm of the lever N is connected with a rack, P, which works up and down in guides on a standard,  $A^5$ , which standard also serves as a guide for the lever. The rack P is operated from one of the hand-wheels, M, by means of the pinion  $P'$ , shaft  $P^2$ , and gears  $P^3$ , disposed substantially as indicated.

The rear end heel of the blade is elevated and depressed by means of an upwardly and downwardly moving rack, R, and connecting-rod  $R'$ , operated by a pinion,  $R^2$ , connected with the other hand-wheel,  $M'$ . The rack R is supported in one of the bearing-standards  $a^4$ . Said rack is provided with a projection or arm,  $r$ , on its outer side, to which the upper end of the rod  $R'$  is attached in a manner that will give free swinging action in any direction to accommodate the various adjustments of the scraper-blade. In the present instance the projection or arm  $r$  is formed on the side of the rack immediately of its length and is made with a bell-shaped end having an upwardly-tapered opening through which the rod passes, and is confined by enlargements or nuts, so that it cannot slide longitudinally through the opening, but is caused to follow the up-and-down action of the rack. If preferred, said projection  $r$  might be made in other positions on the rack or at its upper end to give greater or less length for the rod  $R'$ , as may be required for following the movement of the blade adjustment.

Brakes  $t$ , operated by a foot-treadle, T, as heretofore employed, are arranged for holding the hand-wheels at positions of adjustment.

S indicates the driver's seat, and  $u$  the foot-



bar, said parts being herein shown as connected with the arch-irons by means of the curved support bars or springs  $S'$ , as indicated in Figs. 1 and 3.

5 The front axle,  $B'$ , is preferably adjustable longitudinally or endwise through its bearings on the bolster  $B^2$ , gears, as at  $V$ , being provided for shifting it by means of a crank, hand-wheel, or wrench on the shaft  $v$ . A pin  
10 or locking-dog,  $V'$ , or other suitable means is provided for retaining it at position of adjustment.

The rear axle,  $B$ , can, if desired, be made endwise adjustable or to slide longitudinally  
15 through the bearings  $h$   $h^2$ . Gear-teeth can be formed on said axle, and a pinion for effecting its endwise movement can be fixed on the pivot-stud  $E$ , said stud being extended upward and provided with a hand-wheel for  
20 turning it when effecting the adjustment of the axle. (See dotted lines in Fig. 9.)

I am aware that endwise-adjustable axles have heretofore been employed in road-working machines, and I do not therefore claim  
25 such feature except as an element of the new combinations hereinafter defined.

In some instances, if desired, instead of using a separate rod,  $N'$ , for connecting the lifting-lever and scraper, the connection may  
30 be made directly with the standard  $I$ —as, for instance, in the manner indicated by dotted lines, Fig. 6.

The operation is briefly as follows: The machine is, in the customary manner, advanced  
35 over the road to be worked by the forward movement of the horses or other attached team. The forward end of the scraper is raised or depressed for plowing more or less into the earth by the proper manipulation of  
40 the right-hand hand-wheel,  $M$ , the motion of which is transmitted to the scraper by aid of the gearing  $P^3$ , shaft  $P^2$ , pinion and rack  $P$ , lever  $N$ , and rod  $N'$ . The rear end of the blade is raised or depressed for giving greater or  
45 less inclination to the slope of the road by the proper manipulation of the left-hand hand-wheel,  $M'$ , the motion of which is transmitted through the pinion  $R^2$ , rack  $R$ , and rod  $R'$ . For changing the pitch of the blade the rod  
50  $K$  is adjusted to lengthen or shorten the distance between the top of the scraper-blade and standard  $I$ , and the position of attachment at the rear end of the bar  $L$  is changed on the heel brace or bar  $F$ . For changing the diagonal  
55 adjustment or horizontal inclination of the scraper in relation to the line of draft the lock  $f^2$  is loosened and the connecting-bearing  $F^2$  is moved along the bar  $E'$ , thus shifting the end of the heel-brace  $F$  laterally of the  
60 machine and swinging the rear end of the scraper forward or back, as desired.

For bodily shifting the scraper more or less to one side the lock  $f$  is released and the push-frame is swung on the pivot  $E$ , the guiding-eye  $J$  also being shifted along the guideway  $a^3$ .  
65 As the bar  $E'$  moves with the push-bar, the heel-brace of course accommodates itself to

this lateral adjustment without attention and without regard to its position. (See Fig. 9.)

To change the lateral relation of the scraper  
70 in relation to the point of draft, the rear axle is swung by the screw  $G$  more or less to the front or rear, thus causing the rear part of the body or carrying-frame to run to the right or left of the track of the forward axle. (See  
75 Figs. 8 and 9.) These several adjustments give great range of action, while the attachment of the main support or push-bar to the forward end of the scraper, as at  $c$ , together with the diagonal push bar or brace  $D'$ , gives  
80 a very rigid and powerful plowing action and avoids liability of springing the front end of the scraper.

The several individual features of the invention may be used collectively or independ-  
85 ently in the construction of road-working machinery.

If preferred, instead of making the guide  $J$  adjustable along the part  $A^3$  of its supporting-bar  $A'$ , it will be readily understood that said  
90 guide may be fixed to the bar and the entire bar be made adjustable on the carrying-frame.

What I claim as of my invention to be secured by Letters Patent is—

1. In a road-machine having a diagonally-  
95 adjustable scraper bar or blade and a carrying-frame mounted on front and rear traveling wheels, the combination, with the scraper, of an adjustable push-frame hinged to and extending between the rear part of the carrying-  
100 frame and back of the scraper-bar for sustaining the working-thrust, said push-frame being laterally and vertically adjustable at its front part, together with the scraper, in relation to  
105 the longitudinal axis of the carrying-frame, and means for sustaining the parts at positions of adjustment, substantially as and for the purpose set forth.

2. In a road-machine having a carrying-frame mounted on front and rear wheels, the  
110 scraper-blade extending diagonally across the space beneath said frame and pivotally supported at its advance end, with its rear end backwardly and forwardly adjustable horizontally for varying the working-angle of said  
115 scraper in relation to the line of draft, in combination with a laterally and vertically swinging push-bar extending from the rear part of the carrying-frame and supporting the scraper-pivot, and means for sustaining the parts in  
120 positions of adjustment, substantially as set forth.

3. In a road-machine, the combination of the carrying-frame mounted on front and rear traveling wheels, a diagonally-disposed ad-  
125 justable scraper, a push-bar or thrust-frame pivoted at its rear to the carrying-frame and capable of lateral adjustment at its forward part, having the scraper-hinge connected thereto, and detachable locking devices that  
130 retain said thrust-frame at positions of adjustment.

4. In a road-machine, the combination of the carrying-frame mounted on wheels, the scraper



suspended beneath said frame, the main push-bar having its rear end supported in connection with the frame and its front end hinged to the advance end of the scraper, and a diagonal push-bar disposed from the advance end of said main push-bar and scraper obliquely to the opposite rear part of the frame, with its rear end supported in connection therewith, for the purpose set forth.

5. In a road-machine, the combination of the carrying-frame mounted on wheels, the diagonally and vertically adjustable scraper, the push-bars for sustaining backward thrust on the scraper, a thrust-bearing seat or block, *e*, and the upright pivot *E*, connecting said push devices and frame, for the purposes set forth.

6. In a road-machine, the combination, with the scraper and the carrying-frame having a support-bar, *E'*, attached thereto in lateral diagonal position, of the heel-brace having its forward end hinged to the rear part of said scraper and its end connected to said laterally-disposed support-bar by a locking-connection which is adjustable longitudinally along said support-bar, substantially as and for the purpose set forth.

7. In a road-machine, the adjustable support-bar *E'*, extending across the machine, pivoted at one end, and engaging with and adjustable upon the guideway *A<sup>2</sup>* at the other end, in combination with the carrying-frame *A*, scraper *C*, and brace-bar *F*, and a locking device, *f*, that confines said support-bar at adjusted position on said guideway, for the purpose set forth.

8. The combination, with the carrying-frame and scraper, of the main thrust-brace and lateral support-bar connected with a bearing-block and pivoted at their rear ends to the carrying-frame, the diagonal thrust-brace from the opposite end of said support-bar to the advance end of the scraper and the rear-thrust brace from the scraper to a slide adjustably attached to said support-bar, and means for securing the parts at position of adjustment.

9. The combination, with the carrying-frame, scraper, and scraper-supporting push-braces *D'* and *F*, of the support-bar *E'*, having on its head the hinge-block *d'*, to which the rear end of the push-bar *D'* is hinged, and carrying an adjustable slide, *F<sup>2</sup>*, to which the bar *F* is hinged, the guideway *A<sup>2</sup>*, and locking-dogs *f* and *f<sup>2</sup>*, for the purposes set forth.

10. In a road-machine, the combination, with the carrying-frame and scraper-blade hinged to its supports for backward and forward pitch adjustment, of an upright standard for sustaining the pitch adjustment having its lower end hinged in connection with the scraper, while its upper end is movably confined by a guide connected with the carrying-frame, and an adjusting-bar connecting the upper part of the scraper with said upright standard, for the purpose set forth.

11. The standard *I*, backwardly offset, as at *I'*, and having its lower end connected with the scraper and its upper end movably con-

finer by a guide on the carrying-frame, in combination with the scraper hinged for backward and forward pitch adjustment, and the bar *K*, hinged to the scraper-blade and adjustably retained in connection with the offset portion of said standard, substantially as set forth.

12. The carrying-frame provided with a projecting arm or cross-bar having a guideway, *a<sup>3</sup>*, thereon, and the adjustable guide *J*, movable along said guideway, in combination with the scraper and its push-frame, adapted for lateral adjustment, and the pitch-supporting standard *I*, for the purpose set forth.

13. The combination, with the scraper and a push-brace, *F*, hinged to the lower part of said scraper, of the adjusting-bar *L*, hinged at one end to the upper part of the scraper and having its opposite end adjustably attached to said push-brace by a detachable bearing or locking device, substantially as and for the purpose set forth.

14. In a road-machine having a diagonal scraper and a carrying-frame mounted on front and rear traveling wheels, the combination, substantially as described, of the rear axle attached at fixed position to one side of said frame by the vertical pivot *E* and at the opposite side forwardly and backwardly adjustable in a guideway, *H*, and the rotatable screw or holder *G*, for adjusting and retaining the movable end of said axle, for the purposes set forth.

15. In a road-machine, in combination with the carrying-frame *A* and rear axle, *B*, the movable axle-bearings *h/h<sup>2</sup>*, through which said axle extends longitudinally, one of said bearings pivotally connected to the frame and the other confined thereto by a guideway, as *H*, and a screw, *G*, engaging with said bearing and adapted for moving it back and forth, for the purpose specified.

16. In a road-machine, the combination, with the carrying-frame mounted on front and rear wheels, the diagonal scraper, and scraper-operating mechanism, of a longitudinally-adjustable rear axle supported in bearings or axle-holding guides which are movably connected with said carrying-frame, and means, substantially as described, for effecting adjustment of said axle longitudinally, and the axle-holding screw for swinging said axle laterally of its length.

17. In a road-machine, the combination, with the carrying-frame mounted on wheels, a diagonal scraper, and scraper-supports, of a horizontally-swinging rear axle pivoted to said carrying-frame, an adjuster in connection with the frame for shifting and holding said axle, and an endwise-adjustable front axle provided with means, substantially as described, for shifting and locking the same in position of adjustment, for the purposes set forth.

18. The combination of the carrying-frame mounted on wheels, the scraper *C*, the main thrust-bar *D*, diagonal thrust-bar *D'*, and heel-



brace F, respectively hinged to the scraper and to an adjustable support, as  $e$   $E'$ , connected with the carrying-frame, the swinging rear axle, B, axle-supporting guide H, connecting pivot E, and axle-adjusting screw G, for the purpose set forth.

19. In a road-machine, the combination, with a carrying-frame, the endwise-adjustable front axle, the swinging adjustable rear axle, a diagonal scraper, and a thrust-support or push-frame the forward end of which is adjustable laterally for carrying the scraper more or less to one side in relation to the carrying-frame, substantially as set forth.

20. The combination of the carrying-frame mounted on wheels, the scraper C, main thrust-bar D, diagonal thrust-bar  $D'$ , and heel-brace F, respectively hinged to the carrying-frame and scraper, and the lifting-lever N, rod  $N'$ , hand-wheel M, and connecting-gearing, substantially as and for the purpose set forth.

21. The combination, with the wheeled carrying-frame A, scraper C, and push-bar for sustaining said scraper, of the hinge  $c$ , standard I, arm  $A'$ , guide J, a lifting arm or lever, and a connecting-link for raising and depressing said scraper.

22. The combination, with the carrying-frame, diagonal scraper, and laterally-adjustable push-bars, of the endwise-adjustable lever N, a lifting-rod connecting said lever and the scraper, the fulcrum  $n$ , vertically-moving rack P, gears  $P'$   $P^3$ , shaft  $P^2$ , and hand-wheel M, for the purposes set forth.

23. The rack R, having the rigid outwardly-projecting arm  $r$ , supported in bearings on the frame A, in combination with rod  $R'$ , its upper end confined to arm  $r$  of said rack and its lower end attached to the scraper and capable of swinging in all directions, the gear R, and hand-wheel  $M'$ , for the purposes set forth.

24. The combination, with the frame A and scraper C, of the thrust-brace F, support-bar  $E'$ ,

and detachably-fastened joint  $F^2$ , substantially as and for the purposes set forth. 45

25. The combination of the carrying-frame A, mounted on wheels, the scraper C, main push-bar D, diagonal push-bar  $D'$ , heel-brace F, adjustable support-bar  $E'$ , guide  $A^2$ , locks  $f$   $f^2$ , and hinge-joints at  $c$   $c^3$   $d$   $d'$ , standard I, guide J, adjustable brace-bars K and L, and lifting-rods  $N'$  and  $R'$ , substantially as and for the purpose set forth. 50

26. The combination, with the bolster  $B^2$ , pole  $B^3$ , and toothed axle  $B'$ , of gears V, shaft  $v$ , and locking-dog  $V'$ , substantially as set forth. 55

27. In a road machine, the combination of the carrying-frame pivoted on the rear axle, a diagonal scraper supported in connection therewith and adapted for lateral adjustment in relation to said frame, and a lifting connection connected with said scraper and laterally adjustable in relation to the carrying-frame. 60

28. In a road-machine, the combination of the carrying-frame mounted on front and rear wheels, a diagonal scraper supported in connection therewith and adapted for lateral adjustment in relation to the frame, a standard for supporting the blade in upright position, a guide for the upper part of said standard, which is laterally adjustable in relation to the supporting-frame, and a laterally-adjustable lifting-connection for raising and depressing the blade. 70

29. In a road-machine, the combination, with the carrying-frame, rear axle, scraper, and scraper-supporting mechanism, of the pivot E, for the purpose set forth. 75

Witness my hand this 30th day of September, A. D. 1887. 80

CHAS. H. BURLEIGH.

Witnesses:

S. R. BARTON,  
SAML. H. CLARY.