(No Model.) 4 Sheets—Sheet 1.

M. G. BUNNELL.

ROAD SCRAPER.

No. 427,738. Patented May 13, 1890.

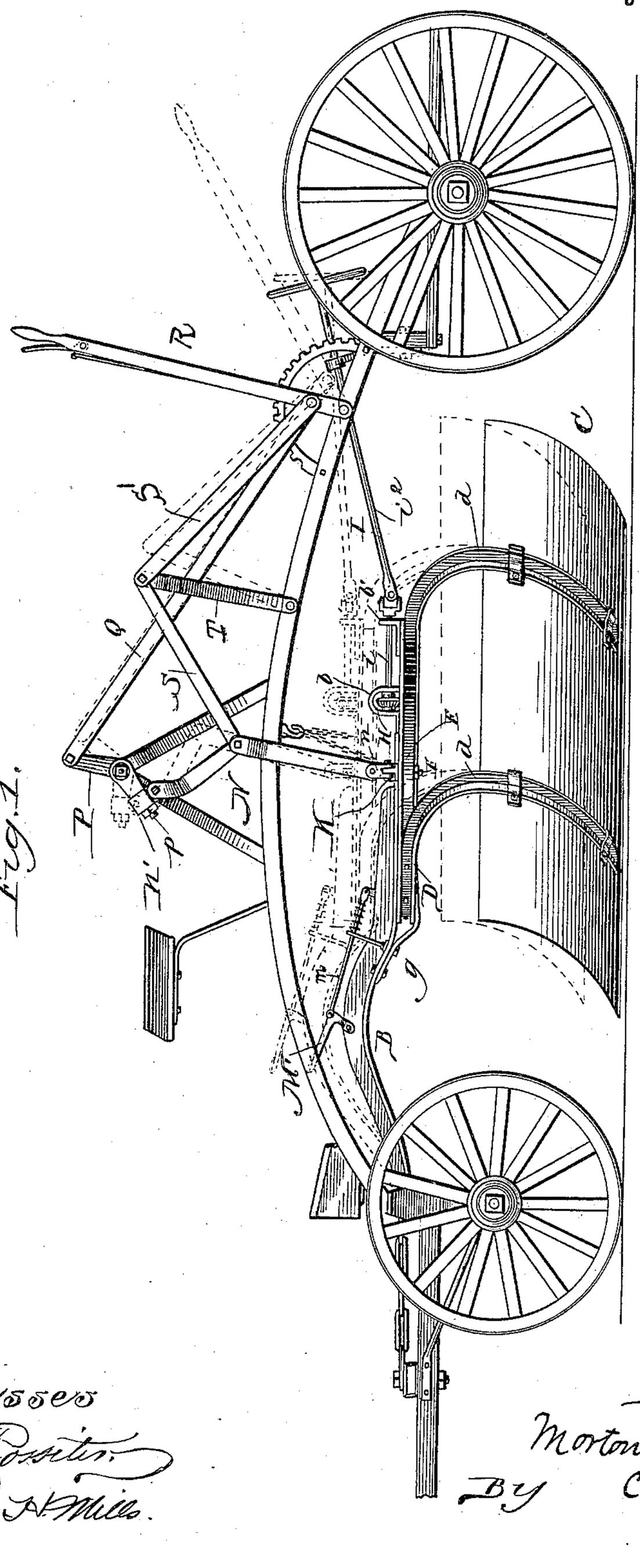

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

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ROAD SCRAPER.

No. 427,738. Patented May 13, 1890.

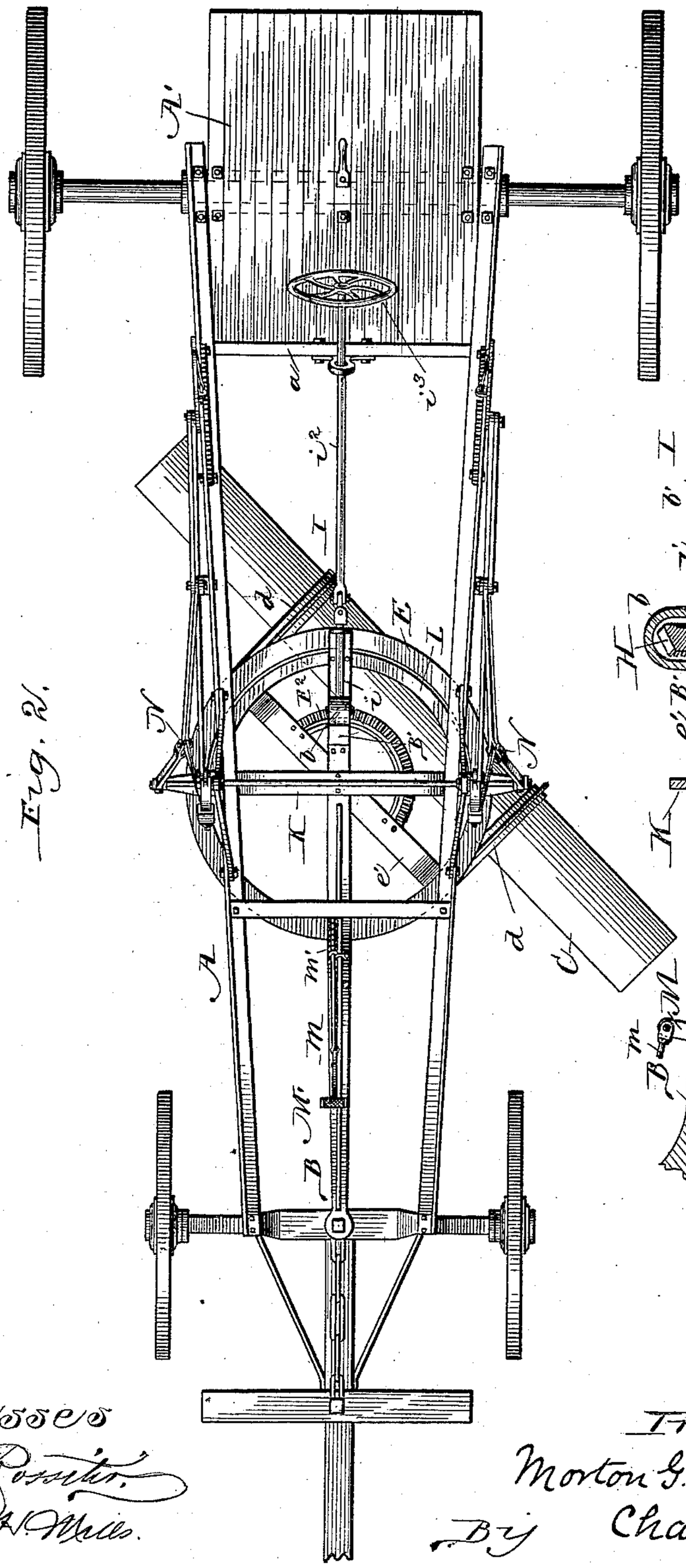

Fig. 2.

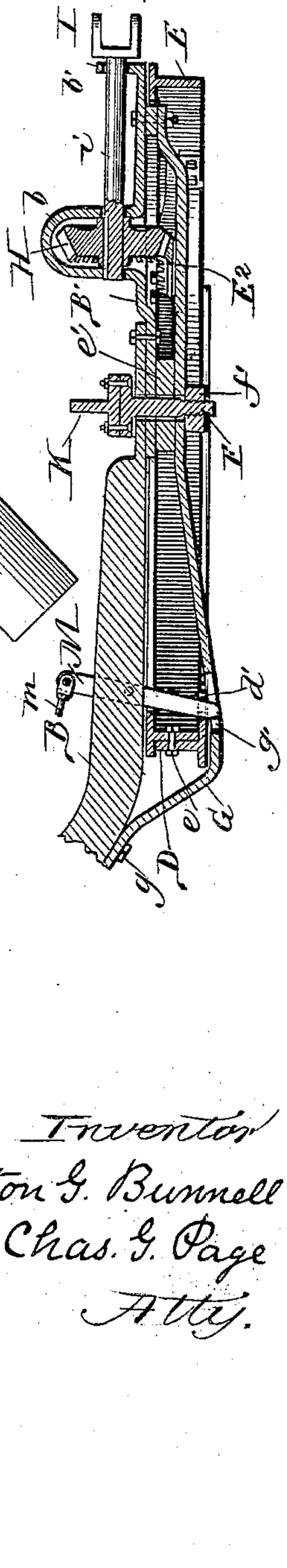

Fig. 3.

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(No Model.) 4 Sheets—Sheet 3.

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ROAD SCRAPER.

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Fig. 4.

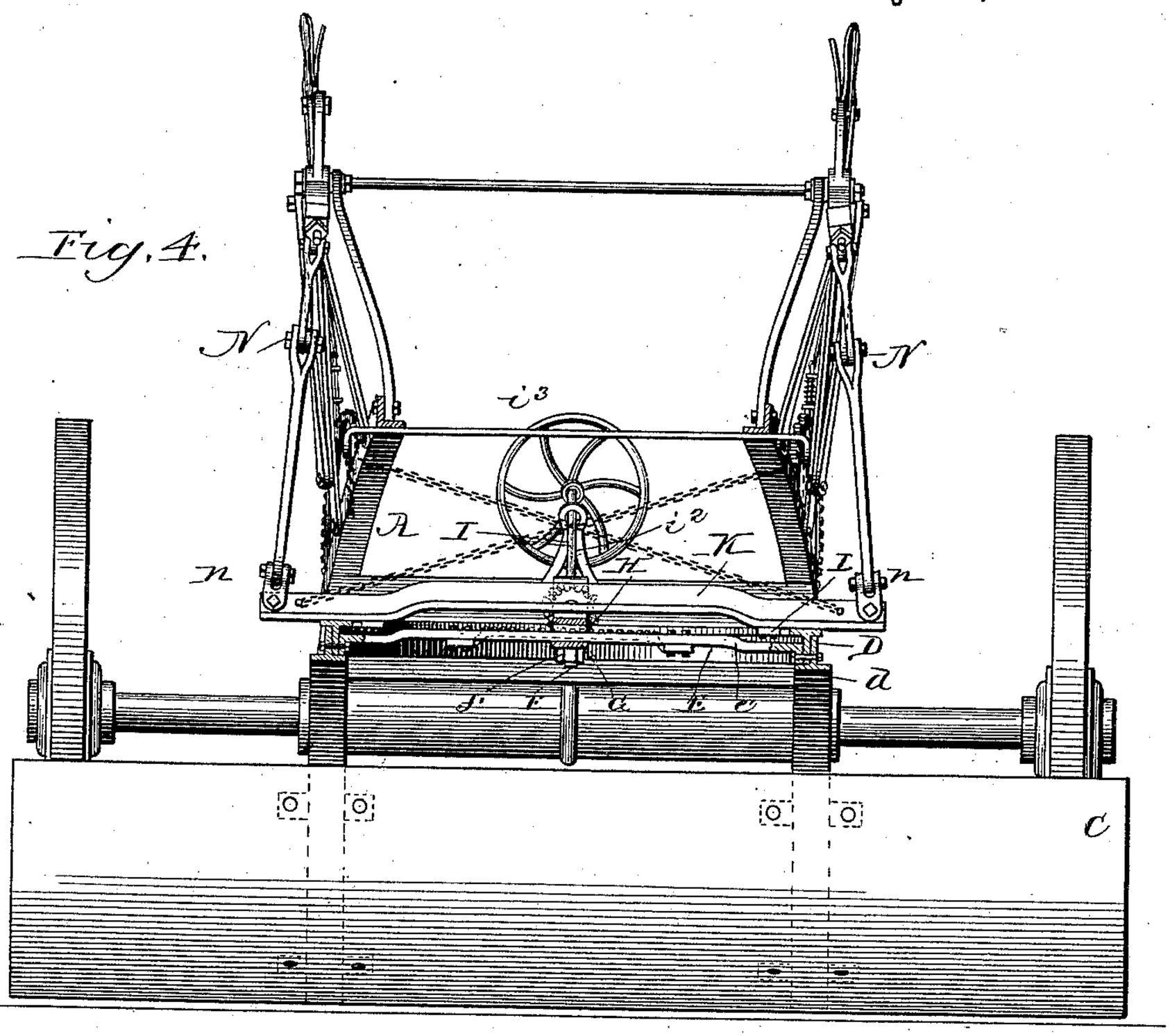
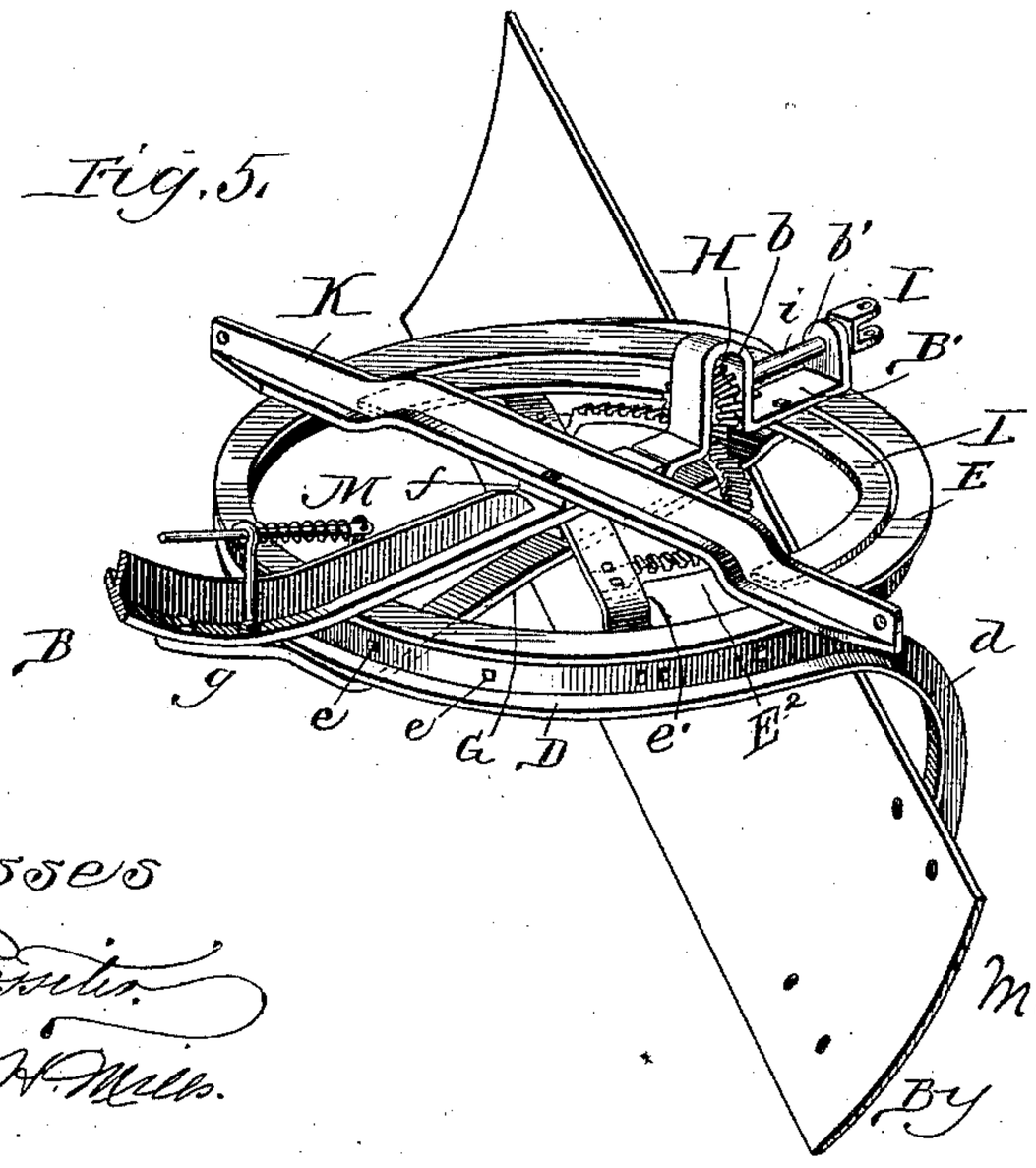


Fig. 5.



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ROAD SCRAPER.

No. 427,738. Patented May 13, 1890.

Fig. 6.

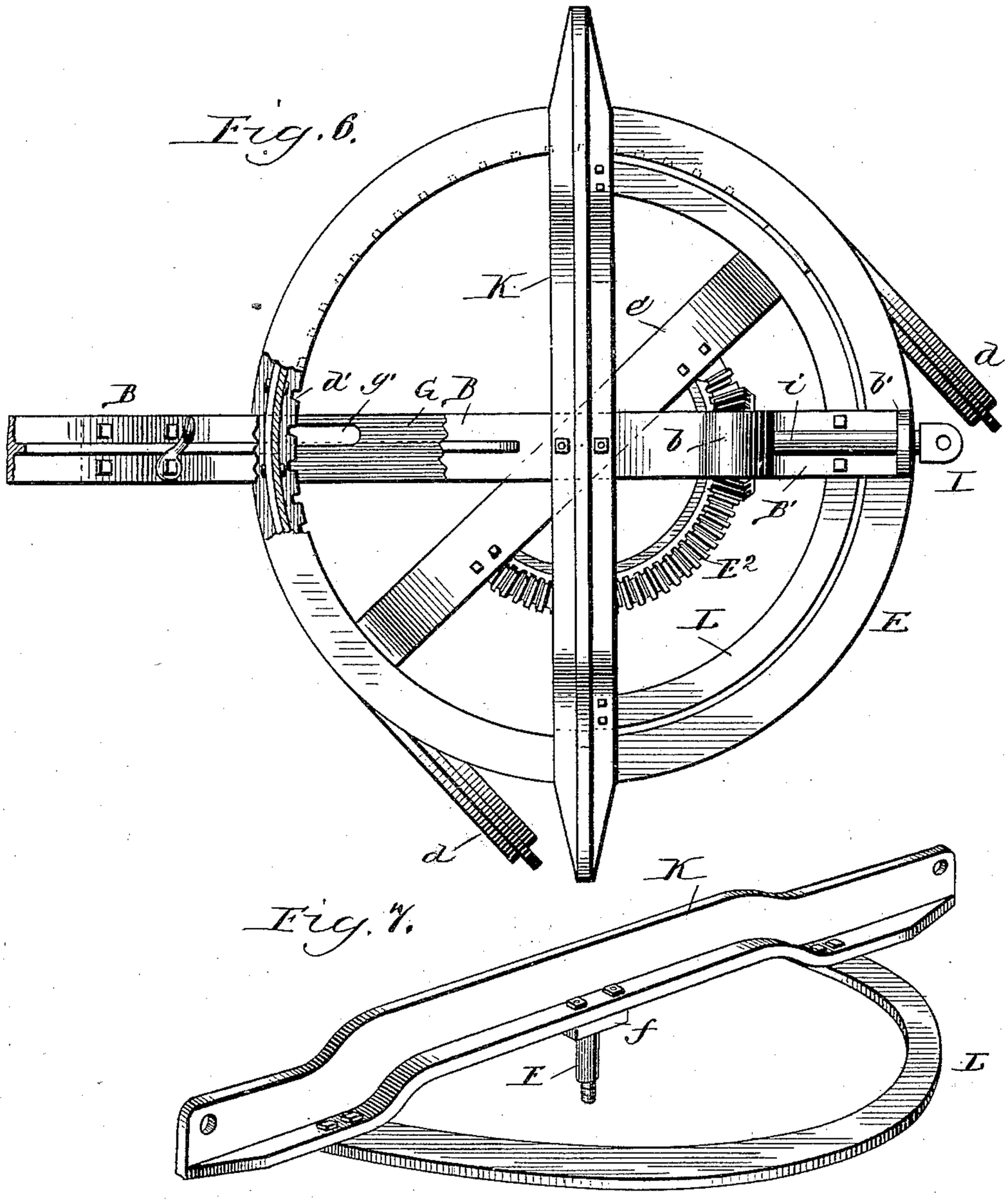
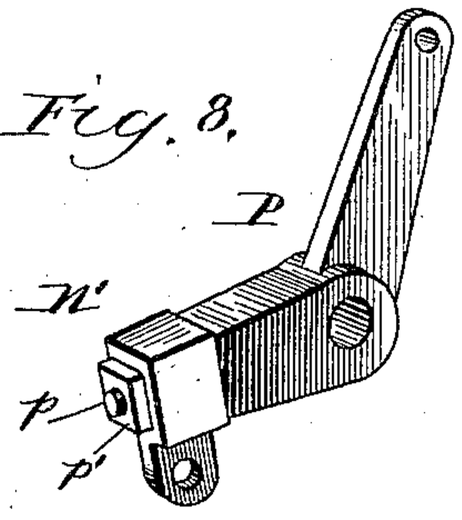


Fig. 7.

Fig. 8.



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UNITED STATES PATENT OFFICE.

MORTON G. BUNNELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO FREDERICK C. AUSTIN, OF SAME PLACE.

ROAD-SCRAPER.

SPECIFICATION forming part of Letters Patent No. 427,738, dated May 13, 1890.

Application filed March 21, 1889. Serial No. 304,209. (No model.)

To all whom it may concern:

Be it known that I, MORTON G. BUNNELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Road-Scrapers, of which the following is a specification.

My invention relates to road-scrapers of that class wherein a reversible scraper-blade is drawn by a draft-bar and means provided for raising and lowering and for effecting side movements on the part of the scraper-blade.

The object of my invention, generally stated, is to increase the practical efficiency of road-scrapers, and to adapt them to resist the various accidents and to overcome various defects which have so largely existed in road-scrapers.

To the attainment of the foregoing and other useful ends, my invention consists in matters hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 represents in side elevation a road-scraper embodying the principles of my invention, the position of the scraper-blade when raised, and also of its adjuncts, being indicated in dotted lines. Fig. 2 is a top plan view of the machine shown in Fig. 1. Fig. 3 represents a section taken longitudinally and centrally through the rear portion of the draft-bar and through the circle and segment, this view being on a somewhat enlarged scale and on a vertical plane coincident with the longitudinal center of the draft-bar. Fig. 4 represents a transverse section taken through the machine on line 4 4 in Fig. 2. Fig. 5 represents in perspective the rear portion of the draft-bar and the devices appended thereto. Fig. 6 represents a top plan view of Fig. 5 on a somewhat larger scale, the scraper-blade being omitted, and also portions of the draft-bar, and the circle being broken away for convenience of illustration. Fig. 7 represents in perspective an auxiliary segment to which the cross-bar K is attached, as hereinafter set forth. Fig. 8 represents on a large view one of the bell-cranks P, and a rocking bearing attached to one of the arms of the bell-crank as a means for connecting the bell-crank with a hanger.

In said drawings, A indicates the wheel-supported body-frame of the machine; B, the draft-bar, and C the scraper-blade that is connected with and drawn by said draft-bar.

The draft-bar is pivotally or flexibly held at its forward end, whereby it may allow and swing in unison with the several bodily movements which it is desired the scraper-blade shall be capable of. The scraper-blade is backed by and attached to the downwardly-bent end portions *d* of the segment D, which consists of a bar having a portion of its length bent to form a part circle, while its end portions are bent downwardly, so as to back and connect with the scraper-blade, as aforesaid. While the segment could be formed of a bar rectangular in cross-section, I prefer forming it of a construction of bar-iron commercially known as "T-iron." The horizontal portion of the segment extends partially around and is bolted to the outside of a circle E. The circle E is pivotally attached to the draft-bar, whereby the circle and segment can be turned for the purpose of reversing the scraper-blade. As a preferred matter of detail, the circle is like the segment formed of T-iron, so that the bars which form the circle and the segment can be fitted together in a manner to brace one another, it being seen in Fig. 3 that the vertical web portions of the two bars fit closely together, and that each bar has the edge of its web portion abutting against one of the horizontal flanges of the other bar. Said arrangement obviously insures strength and rigidity and assists the bolts *e*, by which the bars are bolted together, in preventing said parts from becoming loose under the great strain to which they are subjected during use.

F indicates a bolt or pivot by which the circle is pivotally attached to the draft-bar, and *e'* denotes a flat bar that is extended diametrically across the space within the circle, and at its ends rigidly secured to said circle, whereby said bar serves to provide the circle with a bearing for the pivot F. Under the rear portion of the draft-bar (see particularly Figs. 3 and 5) is a bar G, which is at one end

bolted or otherwise firmly secured to the draft-bar at a point forward of the combined circle and segment, and herein indicated at *g*. The bar G is for a portion of its length bent downwardly from its said point of securement to the draft-bar, so as to provide room for the forward portion of the combined circle and segment which passes between the bar G and the draft-bar. The cross-bar *e'*, hereinbefore referred to, extends between said bar G and the draft-bar, and the pivot F, which passes through the bar *e'*, extends upwardly through the draft-bar and downwardly through the bar G, which latter is from its lowest forward point inclined upwardly to the rear to an extent to permit it to cross the under side of and serve as a seat, whereon the bar *e'*, that forms a part of the circle, may bear and turn, as best shown in Fig. 3.

As a means for reversing or turning the scraper-blade horizontally about a vertical axis midway of its ends, the circle E, which carries the scraper-blade, also carries a gear or gear-segment e^2, which is secured to the cross-bar *e'* and arranged within the radius of the circle E. The gear e^2 is engaged by a comparatively small cog or gear H, which is supported independently of the circle E and operated so as to turn the gear E^2, and thereby cause the circle and segment to turn. The cog H is fixed upon the section *i* of a jointed rotary shaft I, and as a support for said shaft-section *i* the draft-bar is provided with a rear extension B', consisting of a bar or plate which at suitable points is provided with bearings *b* and *b'* for said shaft-section. The longer section i^2 of the jointed shaft I extends toward the rear of the machine and is provided with a handle or hand-wheel i^3, that is arranged to be within convenient reach of an attendant standing upon the rear platform A' of the machine. By such arrangement the gears E^2 and H constitute together reversing-gearing which is operated by the jointed shaft, since one member of said gearing is connected with the blade while the other member is connected with the rotary jointed shaft. When the suspended scraper-blade is raised from the ground, so that it may swing toward either side of the machine, the joint in the shaft adapts it to such movements; also, the jointed shaft adapts itself to the up-and-down swing or movement of the blade.

The shaft I has a bearing upon some suitable portion of the body-frame of the machine—as, for example, upon the cross-bar *a*, Fig. 2—it being understood that the shaft will rest sufficiently loose in the bearing to permit it to swing or tilt in unison with such swing or tilt as the draft-bar may be called upon to perform. It will also be obvious that where the suspended scraper-blade is swung to any considerable extent toward either side of the machine the shaft I will slide to some extent in its bearing on the main frame, so as to increase the length of shaft between said bearing and the reversing-gearing. The rear end portion of the longitudinally-arranged bar G is connected with the bar B' at a point to the rear of the pivot F, in which way the bar G is in effect attached at its ends to the draft-bar and at its middle, or thereabout, provided with a bearing for the pivot F, and arranged as a seat or rest for the cross-bar *e'*, that is rigid with the circle, it being seen that while the forward end of bar G is herein shown attached directly to the draft-bar its rear end is attached to a bar or plate B', which is herein provided as a rear extension of the draft-bar, and so used for the reason that it can be conveniently bent, as at *b* and *b'*, to provide bearings for a section *i* of the jointed shaft I.

In connection with suitable hangers or suspending devices I arrange over and across the circle a bar K, to which the hangers can be pivotally attached. The pivot F is at its upper end attached to the bar K, and while it could be made integral with said bar I prefer, as a matter of further improvement, to provide the pivot with a flat head *f*, which can be fitted against the bar K and bolted thereto. With such arrangement the head of the pivot rests upon the draft-bar, while the lower end of the pivot can be provided with a nut *f'*, arranged against the under side of the bar G, as in Fig. 3. The pivotal connection between the draft-bar, circle, and bar K serves as a connection between the suspending devices and the said draft-bar and circle; but in addition to such mode of support I arrange within the circle a segment or semicircle L, which at its ends is secured to the cross-bar K and at a point midway of its ends secured to the extension B' of the draft-bar. The semicircle is also desirably secured to the bar G, which is arranged substantially as one of the sides of a longitudinal division of the rear portion of the draft-bar, and as a simple and convenient mode of securement the semicircle L, bar G, and draft-bar extension B' can be all bolted together at a point within the space of the circle E. The semicircle L steadies and strengthens the connection between the draft-bar and the bar K. The semicircle L may also serve as a guide for the circle, and to such end it may fit against the inner side of the circle E. By the foregoing arrangement the shaft I can be operated so as to turn the circle independently of both the cross-bar K and the draft-bar, while, on the other hand, said members can, as a whole, be thrown to either side or raised and lowered, as may be desired.

As a means for locking the circle against rotation, I pivot to the draft-bar a latch M and provide the inner horizontal flange of the segment D with a series of notches *d'*, in which said latch may engage. The lower end of the latch extends through and works in a slot *g'* in the bar G, whereby it will be held against such lateral displacement as might be occasioned by any tendency on the part of the scraper-blade when locked in an oblique

position to swing into a position coincident with the line of progression. The vibratory latch M is connected with a vibratory foot-treadle M′ through the medium of a rod *m*. The foot-treadle is pivoted upon the draft-bar, and the latch is subject to a spring *m′*, arranged to normally hold it in engagement with the segment.

The scraper-blade connected with the draft-bar and the means for reversing the scraper-blade, as hereinbefore described, can be employed with various kinds or constructions of suspending devices. With reference, however, to the devices herein shown for suspending and raising and lowering the scraper-blade, I have employed toggle-jointed hangers N, (see Fig. 1) connected at their lower ends with the bar K, and at their upper ends connected with bell-cranks P, that are pivotally supported on standards or like fixtures rising from the sides of the body-frame. The upper arms of the bell-cranks are, by means of rods or links Q, connected with the hand-levers R, which are fulcrumed upon the body of the machine; but in place of connecting the toggle or jointed hangers N with said hand-levers through the medium of single links, each extending from a hanger to its allotted hand-lever, as in the Moats road-scraper, I connect each toggle or elbow-jointed hanger with its allotted hand-lever by a couple of links S and S′, which at a point between the hanger and lever are pivotally attached to a vibratory lever T, that is in turn pivotally supported upon the body-frame of the machine. By such arrangement an attendant operating the hand-levers can raise the scraper-blade with greater ease, and since the levers rise from the body of the machine and connect with the links at their upper ends the forward links S will be so inclined as to avoid to a certain extent a direct back-pull on the hangers during the operation of raising the scraper-blade.

The hangers N are connected with the bar K by double or universal joints, as at *n*, and as a means for permitting the hangers to swing toward both sides of the machine, in addition to their capability of working in vertical planes parallel or substantially parallel with the length of the machine, the hangers are at their upper ends pivoted to blocks or boxes *n′*, arranged to turn upon studs *p*, with which the lower arms of the bell-cranks P are provided, the best illustration of such construction of joint being herein shown in Fig. 8, wherein one of the blocks or boxes is held upon one of said studs by a suitable nut *p′*.

While it will be obvious that the plate B′ could be made in one piece with the draft-bar, and also that the plate G and the draft-bar could be similarly united, yet the expense and mechanical difficulties in the way of such construction render the separate plates more desirable, and hence while for the broader purpose of my invention the rear portion of the draft-bar may be considered to be divided to provide a space between its upper and lower divisions for the circle and segment, yet as matters of special further improvement I desire to cover the plates when so expressed in the claims.

What I claim as my invention is—

1. The combination, substantially as hereinbefore set forth, with the circle E, of the segment D, attached to the scraper-blade and having its horizontal portion fitted against and secured to the outer vertical side of the circle.

2. The combination, substantially as hereinbefore set forth, of the circle pivotally attached to the draft-bar, and the segment secured to the circle and having its downwardly-bent ends attached to the scraper-blade.

3. The combination, substantially as hereinbefore set forth, of the draft-bar, the circle pivoted to the draft-bar, the bar G, secured to the draft-bar and extending under the forward portion of the circle, and a scraper-blade connected with the circle.

4. The combination, substantially as hereinbefore set forth, of the pivotally-supported circle carrying a scraper-blade, a gear of less radius than the circle and arranged within and rigidly connected with said circle, and a cog supported independently of the circle and engaging said gear, for the purpose described.

5. The combination, substantially as hereinbefore set forth, of the pivotally-supported circle carrying a scraper-blade, a gear rigid with the circle, and a jointed rotary shaft supported independently of the circle and provided with a cog which engages said gear,

6. The combination, substantially as hereinbefore set forth, of the draft-bar, the circle pivoted to the draft-bar and carrying a scraper-blade, and the segment L, secured to a cross-bar K, and also attached to the rear portion of the draft-bar.

7. The combination, substantially as hereinbefore set forth, of the draft-bar, the circle pivoted to the draft-bar and carrying a scraper-blade, the segment L, attached both to a bar K and to the draft-bar, a gear rigid with the circle, and a cog engaging said gear and supported upon the draft-bar.

8. The combination, substantially as hereinbefore set forth, with the draft-bar, of the bar B′, secured to the draft-bar at the rear end portion thereof, the bar G, secured at its forward end to the draft-bar and at its rear end connected with the bar B, and the circle E, carrying a scraper-blade and provided with a cross-bar *e′*, which is pivotally held between the bar G and the draft-bar.

9. The combination, substantially as hereinbefore set forth, of the circle carrying a scraper-blade, the draft-bar having its rear end portion bent to provide a bearing *b*, a gear rigid with the circle, and a cog fixed upon a shaft which is supported in said bearing *b*.

10. The combination of the circle carrying a scraper-blade and pivotally attached to a draft-bar, the suspended cross-bar K, ar-

ranged over the circle and connected with the hanger, and a rigid connection between said cross-bar and the draft-bar, substantially as set forth.

11. The combination, substantially as hereinbefore set forth, of the draft-bar, the suspended bar K, rigidly connected with the draft-bar, the circle carrying a scraper-blade, and a pivot F rigid with the bar K and pivotally connecting the circle with the draft-bar.

12. The combination, substantially as hereinbefore set forth, of the circle pivotally attached to the draft-bar, the segment secured to the circle and attached to a scraper-blade and having along its horizontal portion a set of notches, and a vibratory latch M, pivoted to the draft-bar and arranged to engage said notched portion of the segment.

13. The combination, substantially as hereinbefore set forth, of the segment D, attached to a scraper-blade and pivotally supported from a draft-bar, the bar G, secured to the draft-bar and provided with a guide g', and the vibratory latch M, pivoted to the draft-bar and engaging said guide.

14. The combination, substantially as hereinbefore set forth, with a jointed hanger and a scraper-blade suspended therefrom, of the links S and S′, constituting a jointed connection between the hanger and an operating-lever, and a vibratory lever pivotally connected with the links and arranged between the hanger and said operating-lever, for the purpose described.

15. The combination, with a bell-crank P, a jointed hanger N, suspended therefrom, and a scraper-blade suspended from the hanger, of an operating-lever from which the bell-crank and the hanger are actuated, a link connecting the bell-crank with the operating-lever, a couple of links S and S′, constituting a jointed connection between the operating-lever and the hanger, and a vibratory lever T, pivotally connected with the links at a point between the hanger and the operating-lever, for the purpose described.

16. The combination, with the swinging reversible scraper-blade, of a reversing device therefor, consisting of a reversing-gearing for turning the blade about a vertical axis midway of its ends, and a rotary jointed shaft which is supported upon a bearing on the main frame of the machine and connected with one of the reversing-gears, substantially as set forth.

17. The combination, with the swinging reversible scraper-blade, of a reversing device for turning the blade about a vertical axis midway of its ends, and a rotary swinging shaft connected with one of the reversing-gears and supported upon a bearing on the main frame of the machine, substantially as set forth.

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