(No Model.)

4 Sheets—Sheet 1.

O. E. MOATS.

ROAD SCRAPER.

No. 403,890. Patented May 21 1889.

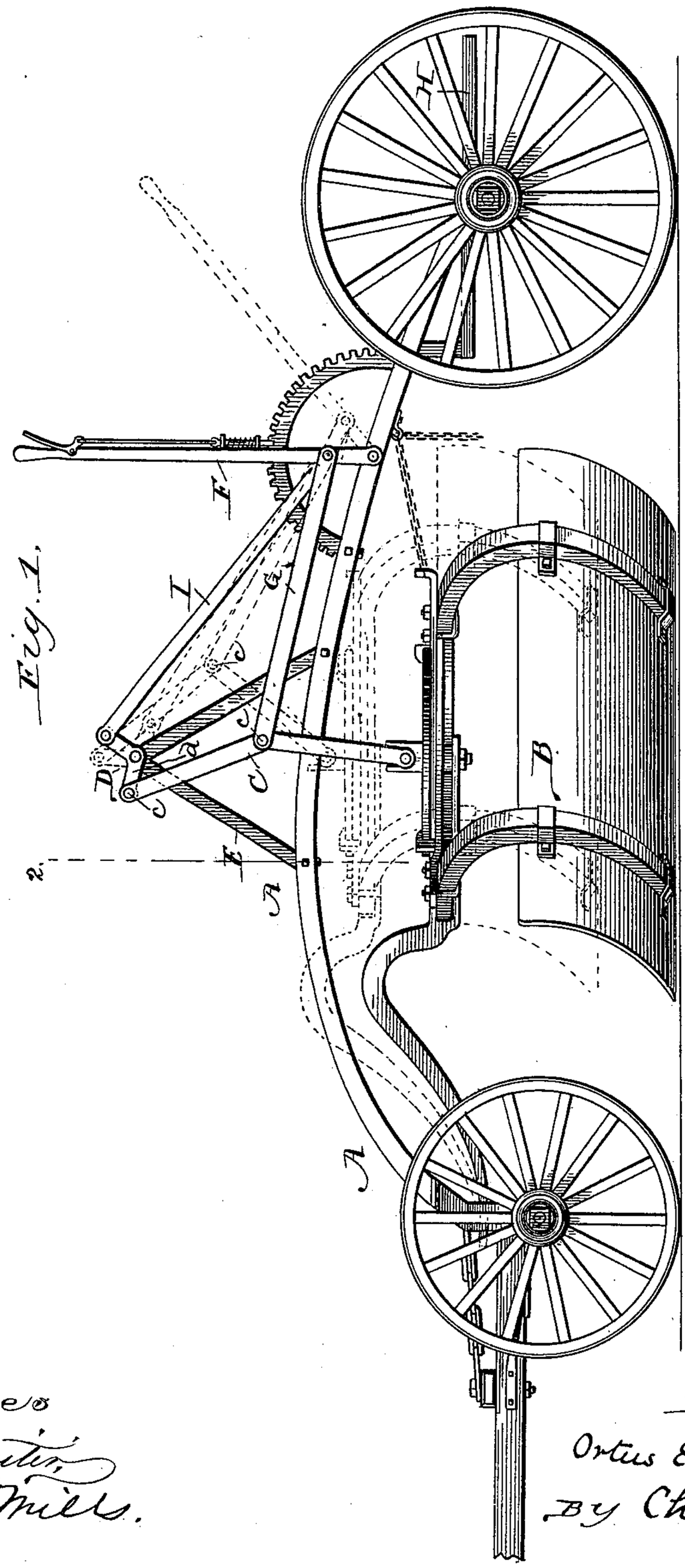

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

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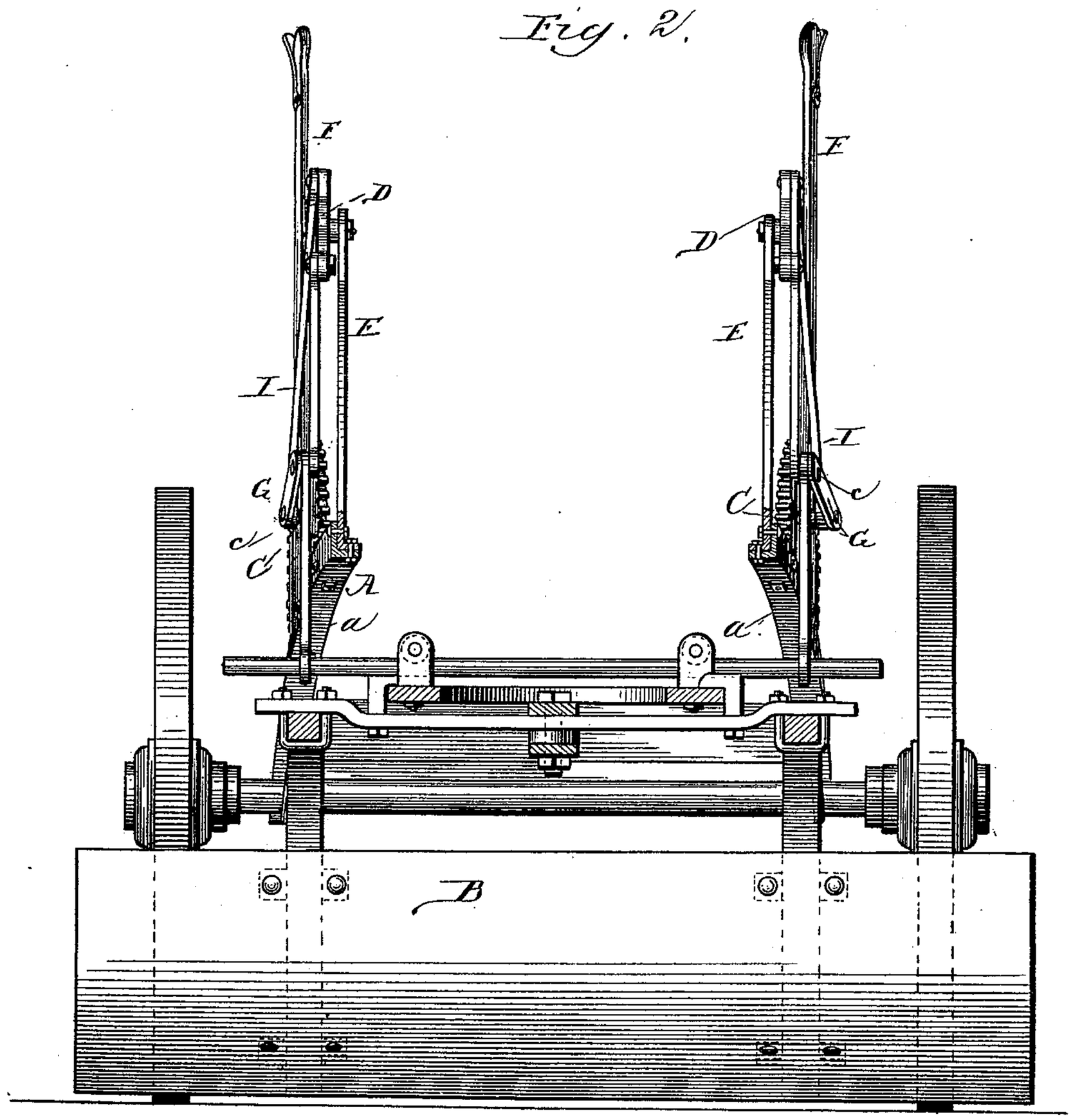
Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

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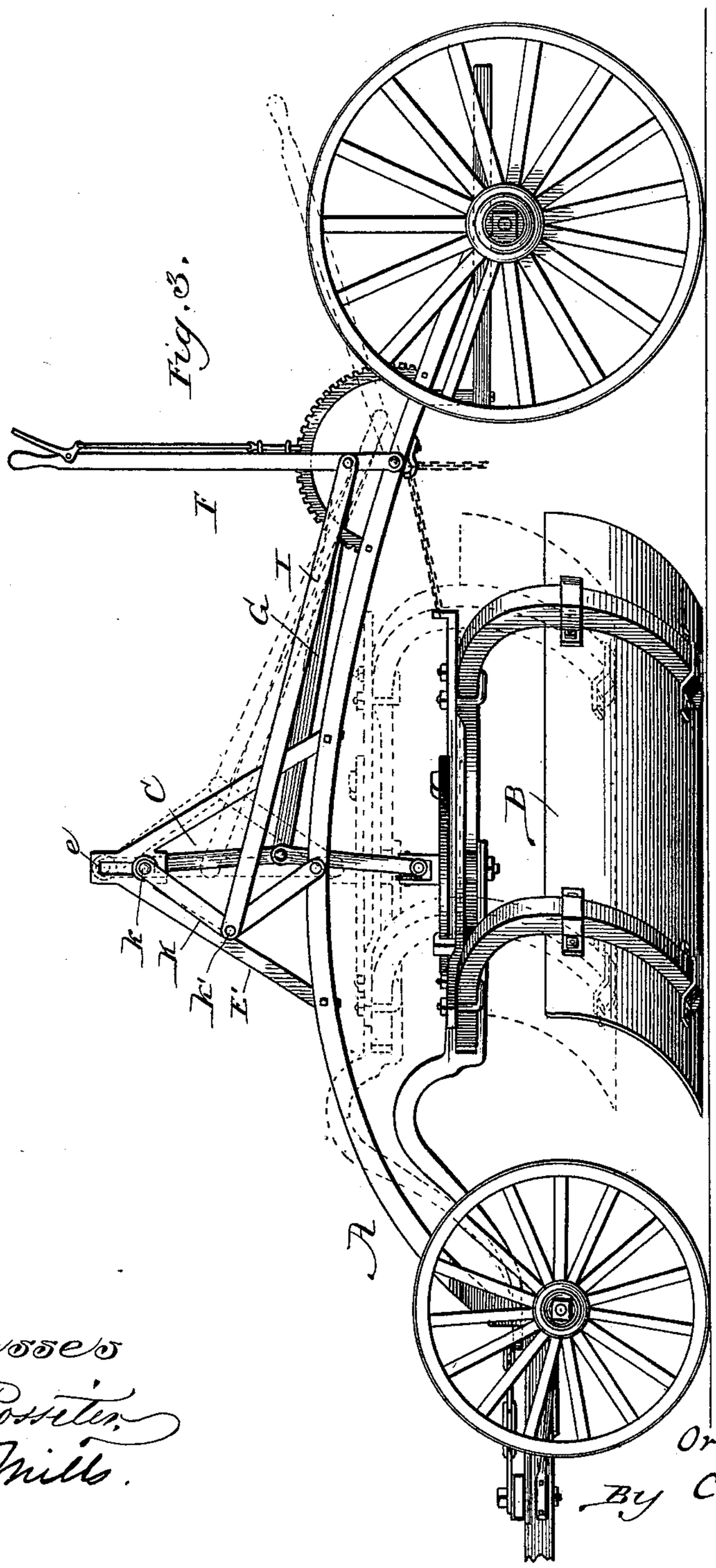
ROAD SCRAPER.

No. 403,890. Patented May 21 1889.

Fig. 3.



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ROAD SCRAPER.

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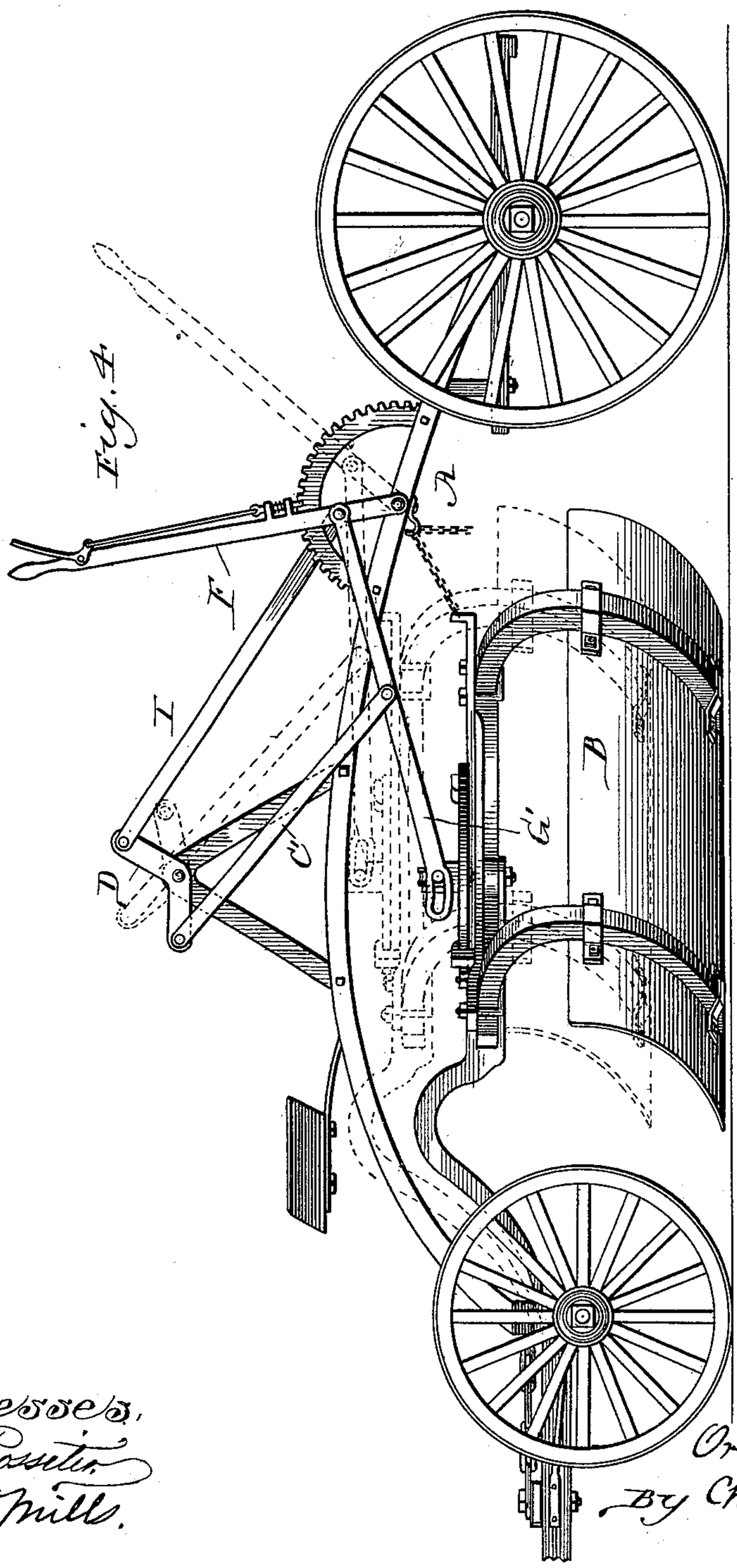

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UNITED STATES PATENT OFFICE.

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ROAD-SCRAPER.

SPECIFICATION forming part of Letters Patent No. 403,890, dated May 21, 1889.

Application filed January 2, 1889. Serial No. 295,239. (No model.)

To all whom it may concern:

Be it known that I, ORTUS E. MOATS, 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 or road-scraping machines comprising a wheeled carriage carrying a scraper-blade, and provided with means for raising and lowering the same.

The object of my invention is to lift the scraper-blade with greater rapidity than heretofore, whereby an attendant on the machine can raise the blade in time to clear large obstructions, and also readily and quickly lift the blade at the instant it is desired the scraping action shall stop, or lift it to an extent to vary the depth of penetration; also, to lift the scraper-blade to the highest desired limit by a comparatively short stroke of a hand-lever, whereby the attendant can manipulate the hand-lever with ease and comfort and without objectionably bending his body; also, to attain the foregoing ends and at the same time raise the scraper-blade by a substantially direct upward lift, whereby, when a toggle-hanger such as is shown in Letters Patent No. 393,434 is employed, the back pull incident to the back pull of a link therein will be counteracted, and hence all undue bending or cramping be avoided.

In carrying out my invention I provide a device by which the scraper-blade is suspended, and adapt said suspending device to have an individual lift, an illustration of a suspending device capable of such individual lifting action being afforded by said Letters Patent. In connection with said blade-suspending device having an individual lift, I provide an auxiliary lifting device, from which said suspending device is hung or suspended, whereby, when both of such devices are simultaneously operated the scraper-blade can be raised to an extent equal to the sum of the combined individual lifting actions or movements of said two devices. By such arrangement a quick and high lift of the scraper-blade can be attained, it being of course understood that it is lowered by the reverse actions of said two lifting devices.

As a further and important matter of improvement I operate both of said lifting devices simultaneously from a hand-lever that is common to both, the operation of the hand-lever serving to give to each lifting device its allotted individual action, whereby by one movement of the hand-lever the sum of the two lifting actions can be attained.

As hereinafter set forth, the foregoing principles of operation can be attained by various constructions, and also certain further improvements attained by certain special constructions and arrangement of parts.

In the accompanying drawings, Figure 1 represents in side elevation a road-scraper embodying my invention, the auxiliary lifting-lever therein shown being a bell-crank. Fig. 2 is a transverse section taken through Fig. 1 on line 2 2. Fig. 3 represents the road-scraper in side elevation, and illustrates an elbow or toggle-jointed lever arranged to serve as an auxiliary lifting-lever. Fig. 4 represents the road-scraper in side elevation, and shows the bell-crank link connected with the hand-lever by a link directly connecting the two, and a lever connecting the hand-lever with the scraper and link connected with the bell-crank.

In said drawings, A indicates the wheeled body-frame and B the scraper-blade, which latter is preferably, though not necessarily, of the reversible type—that is to say, it is preferably arranged whereby either of its ends can be placed forward and its horizontal angle relatively to the line of progression varied at will.

In Figs. 1 and 2 I provide a toggle or elbow-jointed hanger, C, similar to the hanger in Patent No. 393,434, and connect the lower end of this hanger with the scraper-blade through the medium of any suitable or convenient connection.

The hanger C is pivotally connected with a bell-crank lever, D, arranged upon a suitable stand, E, that rises from the body-frame of the machine, in which way, while the elbow-jointed or toggle hanger C can be operated to lift the scraper-blade, as a result of its indi-

vidual lifting action the bell-crank can be operated simultaneously therewith, so as to cause the pivot *c*, by which the hanger is suspended from the bell-crank, to rise during the individual lifting action of the toggle or elbow-jointed hanger. By such means, therefore, the bell-crank D may act conjointly with the toggle C, and since each of said members is capable of being operated to lift the scraper-blade to a certain extent their conjoint action serves to lift the scraper-blade to a distance equal to the sum of their said individual lifting actions.

The toggle-jointed hanger C can be connected with the hand-lever F by any suitable power-transmitting connection, although by preference it is connected with said lever by a link, G. Said hand-lever is fulcrumed upon some suitable part of or fixture on the main body-frame, and is desirably arranged to be within convenient reach of an attendant standing upon the rear platform, H. The bell-crank D is also connected with the hand-lever F by a link, I, whereby the toggle C and bell-crank D can be synchronously operated by the action of a single hand-lever. When the hand-lever is swung in a direction to close the jointed hanger C, the closing action of the hanger will serve to lift the scraper, as in the aforesaid patent; but simultaneously with such operation the connection between the hand-lever and the bell-crank will cause the latter to turn in a direction to elevate the pivot by which the hanger is suspended from the bell-crank. By such arrangement the pull of link I on the bell-crank will obviously elevate the point from which the hanger C is suspended, and hence, as a result of the combined lifting actions of the bell-crank and the jointed hanger, the scraper-blade will be raised not only more rapidly than heretofore, but furthermore, by a comparatively short stroke of the hand-lever, the scraper can be lifted much higher.

By proportioning the bell-crank so as to give its arm *d*, from which the hanger C is suspended, a radius of sweep proportional to the extent of lifting action which it is desired may be attained by said bell-crank, the scraper-blade can be lifted to the highest limit by a stroke or swing of the hand-lever not over or less than one-half the extent of stroke which it would be required to perform were the jointed hanger suspended from a fixed pivot, as in said patent.

The advantage of raising the scraper-blade by a short swing or stroke of the hand-lever will be understood by reference to said Fig. 1, wherein the position of the hand-lever when thrown in a direction to lift the scraper-blade to or proximately to the highest desired point is indicated in dotted lines. The hand-lever in said position rises from its fulcral support and stands at such angle that it can be grasped by an attendant standing on platform H without necessitating his stooping down, it being further observed that if the extent of stroke or swing on the part of the hand-lever were such as to bring it back to nearly a horizontal position the attendant would be compelled to stoop in order to retain control of the lever, and that the frequent operation of stooping or bending down his body would prove laborious and fatiguing. It will be also noted that with the foregoing arrangement the link C can be attached to the hand-lever much nearer the fulcrum of the latter than heretofore, whereby greater leverage can be attained.

When the hand-lever is swung back for the purpose of lifting the scraper-blade as aforesaid, the pivot by which the jointed hanger is suspended from the bell-crank will describe an arc reverse to the arc which the pivot *c*, that connects the links or members of the jointed hanger, will, by reason of the back pull of link C, be caused to describe, and hence during the operation of lifting the scraper-blade the tendency of the link G to pull back the scraper-blade through the medium of the jointed hanger will be counteracted by the action of the bell-crank, which serves to throw forward the pivot or support from which the jointed hanger is suspended. By such arrangement unnecessary and undesirable back pull upon the scraper-blade is obviated, since it will be practically raised by a direct upward lift, whereby the scraper-blade can be more readily raised and all objectionable binding at such joints as may be involved in the devices with which it is connected be avoided. The quick lift of the scraper-blade herein attained is also desirable, since the attendant can with greater certainty raise it clear of any obstruction—such, for example, as a large stone embedded in the road.

The foregoing-described raising and lowering mechanism is to be duplicated in the road-scraper, and to such end I have indicated such duplication in Fig. 2, wherein the two hand-levers F are respectively fulcrumed upon opposite sides of the body-frame. The scraper-blade can be either drawn or pushed, as heretofore proposed in the art, although I prefer a draft attachment comprising a draft or draw bar, which can be hinged or flexibly supported at its forward end, so as to permit either a bodily rise on the part of the scraper-blade or a rise of one end on the scraper-blade independently of the other end, or if preferred the scraper-blade-suspending devices can be connected therewith by joints adapted to permit such movement.

From the foregoing it will be seen that the bell-crank D serves as an auxiliary lifting-lever, which may be operated to raise the pivot from which the jointed hanger C is suspended, and that in addition to such function it has certain other improved functions hereinbefore described. While I prefer to employ the said bell-crank in connection with the jointed hanger and the links C and I, I have illustrated in Fig. 3 an auxiliary lifting-lever, which may also be operated for the

purpose of raising the point or pivot from which the hanger is suspended. In said Fig. 3 the general arrangement of the machine shown is similar to that of the preceding figures; but in place of the bell-crank D, I provide an elbow-jointed or toggle lever K, which at its lower end is pivotally supported upon the body-frame of the machine, and at its joint-connection with the hand-lever F by the link I, which latter corresponds to the link I shown in Fig. 1.

The toggle-lever K carries at its upper end a pivot, *k*, from which the elbow-jointed hanger C is suspended, and this said pivot is arranged to rise and fall in a guideway, *e*, with which the stand E′ is provided at its upper portion. By said arrangement when the scraper is lowered, as shown in full lines, the jointed hanger C will be straight, or approximately so, while the toggle K will be bent or partially closed, so as to bring the pivot *k* in such case at the lower portion of the guideway *e*. When, however, the hand-lever F is thrown back, as shown in dotted lines, the back pull of link G upon the jointed hanger will tend to close the same, so as to raise the scraper, and simultaneously therewith a back pull of the link I upon the middle pivot or joint, *k′*, of the toggle K will tend to straighten out the toggle, and thereby cause the pivot *k*, that is at the upper end of said toggle to rise within the guideway *e*, and in so doing to facilitate the raising of the scraper and, further, permit a comparatively short stroke on the part of the hand-lever to lift the scraper to its highest desired position. The toggle, therefore, while possessing certain advantages in common with the bell-crank, involves also a different feature of arrangement; and hence, while for certain purposes of this invention I desire to cover certain matters common to both the bell-crank and the toggle, I have, as a matter of special construction and arrangement, made the toggle K and certain adjuncts thereto the subject-matter of the claim in an application for Letters Patent of the United States which I have made, of even date herewith.

While in Fig. 3 I have represented but one side of the machine, it is herein understood that the lifting device shown in said figure will be duplicated at the opposite side of the machine.

While I have herein elected to make a special claim for the bell-crank and toggle-jointed hanger as a preferred special construction, it is understood that for the broader purpose of my invention the simultaneous double lift attained by the sum of the individual lifting actions of the bell-crank and toggle-hanger can also be attained by substituting for said toggle-hanger other forms or constructions of hangers or scraper-blade-suspending devices. This I have illustrated in Fig. 4, wherein one arm of the bell-crank D is connected with the hand-lever F by the link I, substantially as in Fig. 1, while the remaining arm of the bell-crank is, by a link, C′, connected with a link or bar, G′, which latter serves as a connection between the scraper-blade and the said hand-lever F, it being of course understood that any suitable means for connecting the scraper-blade with the bar G′ can be employed. The link or hanger C′ connects at its lower end with the link or bar G′ at a point between the ends of the latter, and when the scraper-blade is down the several members aforesaid will be substantially in the position indicated in full lines in said Fig. 4. When, however, the hand-lever is thrown back, as indicated in dotted lines, the scraper-blade will be lifted by two synchronously-operating lifting actions, it being seen, first, that the action of the bell-crank elevates the point or pivot from which the link or hanger C′ is suspended, and, secondly, that the back swing of the hand-lever, while thus serving, through the medium of link I, to operate the bell-crank, also pulls back the bar G′, and thereby causes the point of connection between link C′ and said bar to rise, as shown in dotted lines, it being observed that during such operation the pivot by which link C′ is connected with bar G′ serves as a movable fulcrum about which said bar will, by reason of the back swing of the hand-lever, turn as a lever and lift the scraper-blade, while simultaneously therewith the said fulcrum will be raised. It is understood that the raising and lowering device shown in Fig. 4 at one side of the machine will be repeated at the opposite side thereof, and that such arrangement will be readily comprehended without further illustration.

The hand-levers in the foregoing figures can be locked in any suitable way—as, for example, by a latch on the hand-lever arranged for engaging a segment-rack on the main frame of the machine. It will also be noted that while in certain of the arrangements herein shown flexible connections—such as chains, for example—would to a certain extent subserve the purpose of links or connecting-rods, such flexible connections could not be utilized for forcing down the scraper-blade—as, for example, while in Fig. 1 the back pull of link G could be attained by a chain the forward thrust thereof could not be accomplished by such flexible connection—and also that while a chain could be made to attain the back pull of link I, it could not be made to attain the desirable forward thrust of said link.

Links I and G can, if desired, be made extensible by any known or suitable extensible joint, or the same end can be attained by adjusting their pivotal connection with the hand-lever, it being observed that as a matter of course the pivotal connection of the links with the hand-lever can be adjusted along the latter in any suitable mechanical way.

It will be obvious and is herein understood that I may substitute for the hand-lever F a wheel having either a crank-handle or a han-

dle consisting of a radially-extending arm, and that if desired such link or links as I have herein shown attached to the hand-lever could be either attached directly to such wheel or indirectly thereto through the medium of some suitable power-transmitting connection—as, for example, the link or links could be attached to a shifting rack-bar engaging a cog either upon the axle of said wheel or otherwise attached to the latter. While I prefer the hand-lever as the simpler form of lever, it will be obvious that the principle involved in the said hand-lever would also be involved in the said wheel.

What I claim as my invention is—

1. The combination, substantially as hereinbefore set forth, with the scraper-blade, of a suspending device therefor having an individual lift, and an auxiliary lifting device arranged for operation conjointly with said suspending device and adapted for raising the point from which the latter is suspended, whereby during the conjoint action of said two lifting devices the scraper-blade may be raised to a distance equal to the sum of their respective lifting movements, for the purpose described.

2. The combination, with the scraper-blade, of a suspending device therefor having an individual lift, an auxiliary lifting device for raising the point from which said suspending device is hung, and a single hand-lever connected with and arranged for simultaneously operating said two lifting devices, substantially in the manner set forth, whereby the individual actions of said lifting devices are primarily caused from one operation of the hand-lever.

3. The combination, substantially as hereinbefore set forth, with the scraper-blade, of a suspending device therefor having an individual lift, and an auxiliary lifting device consisting of a bell-crank, from which said suspending device is hung, whereby the point from which the said suspending device is hung can be raised by the action of the bell-crank, and at the same time the said suspending device be actuated to raise the scraper-blade to the extent of its individual lifting action.

4. The combination, substantially as hereinbefore set forth, with the scraper-blade, of a suspending device therefor having an individual lift, an auxiliary lifting device for raising the point from which said suspending device is hung, and a hand-lever connected with said two lifting devices, whereby their individual lifting actions can be simultaneously caused by the one hand-lever.

5. The combination, substantially as hereinbefore set forth, of the scraper-blade, a scraper-blade-suspending device consisting of the elbow or toggle jointed hanger, and auxiliary lifting-lever from which said elbow or toggle jointed hanger is suspended, said auxiliary lifting-lever being arranged to swing in a direction to permit the rise and fall of the point from which the hanger is suspended from said auxiliary lifting-lever, for the purpose described.

6. The combination, substantially as hereinbefore set forth, of the scraper-blade, the elbow-jointed hanger, an auxiliary lifting-lever from which the elbow or toggle jointed hanger is suspended, a hand-lever, and links respectively connecting the hand-lever with said elbow or toggle jointed hanger and auxiliary lifting-lever, for the purpose described.

7. The combination, substantially as hereinbefore set forth, of the scraper-blade, the elbow-jointed hanger C, and the bell-crank from which said elbow or toggle jointed hanger is suspended, for the purpose set forth.

8. The combination, substantially as hereinbefore set forth, of the scraper-blade, the elbow or toggle jointed hanger, the bell-crank from which the elbow or toggle jointed hanger is suspended, the hand-lever, and link-connections between the hand-lever and said jointed hanger and bell-crank, for the purpose described.

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