

(No Model.)

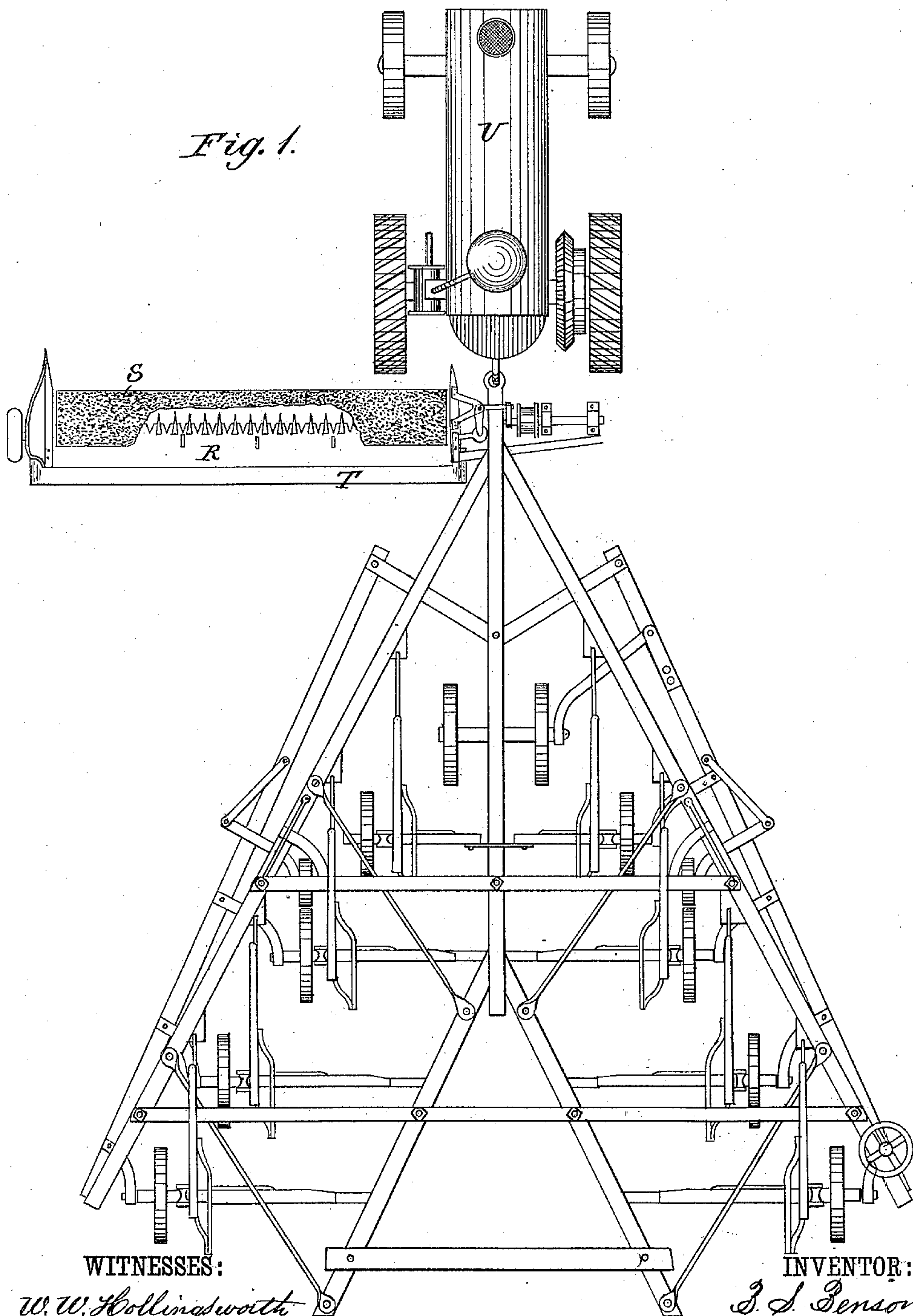
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B. S. BENSON.

STEAM PLOW.

No. 309,434.

Patented Dec. 16, 1884.



WITNESSES:

W. W. Hollingsworth
Edw. W. Ryan

INVENTOR:

B. S. Benson

BY

Munn & Co

ATTORNEYS.

(No Model.)

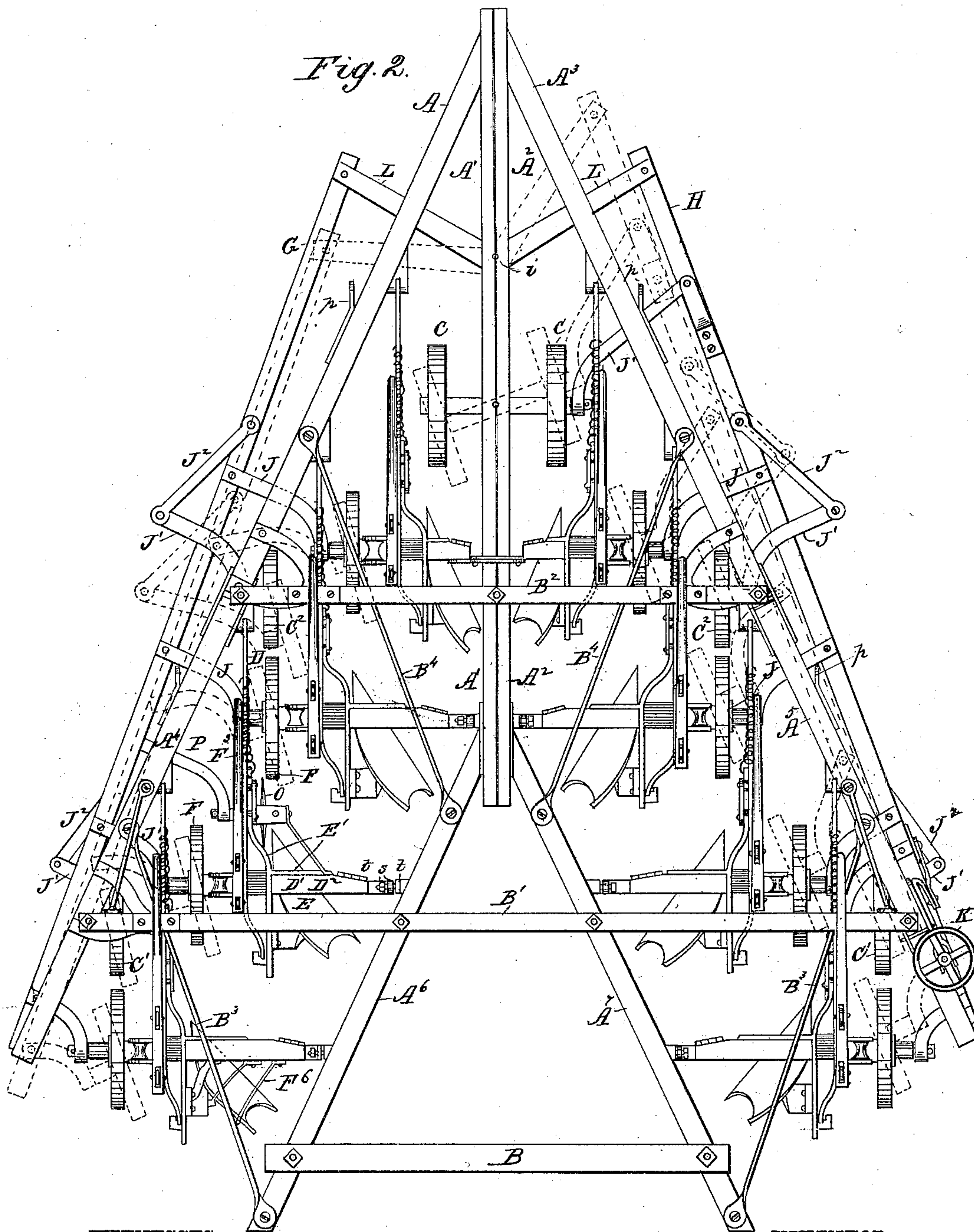
6 Sheets—Sheet 2.

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WITNESSES:

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6 Sheets—Sheet 3.

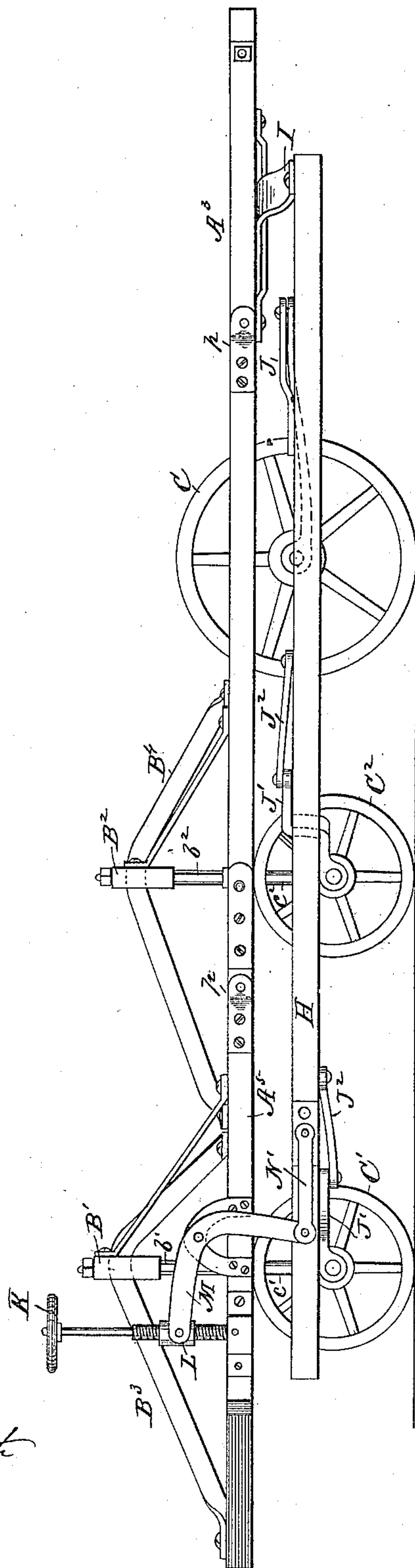
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Fig. 3.



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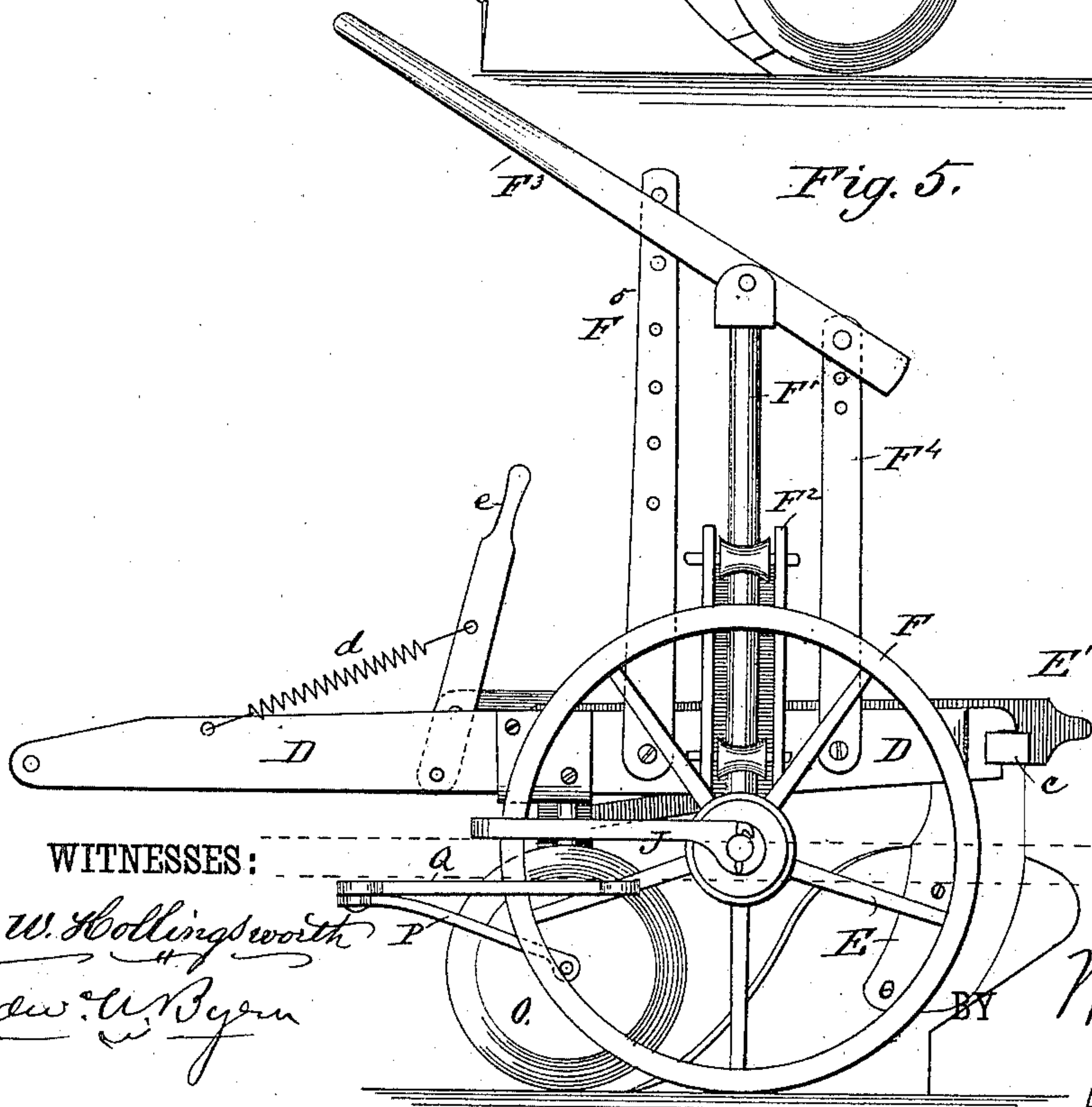
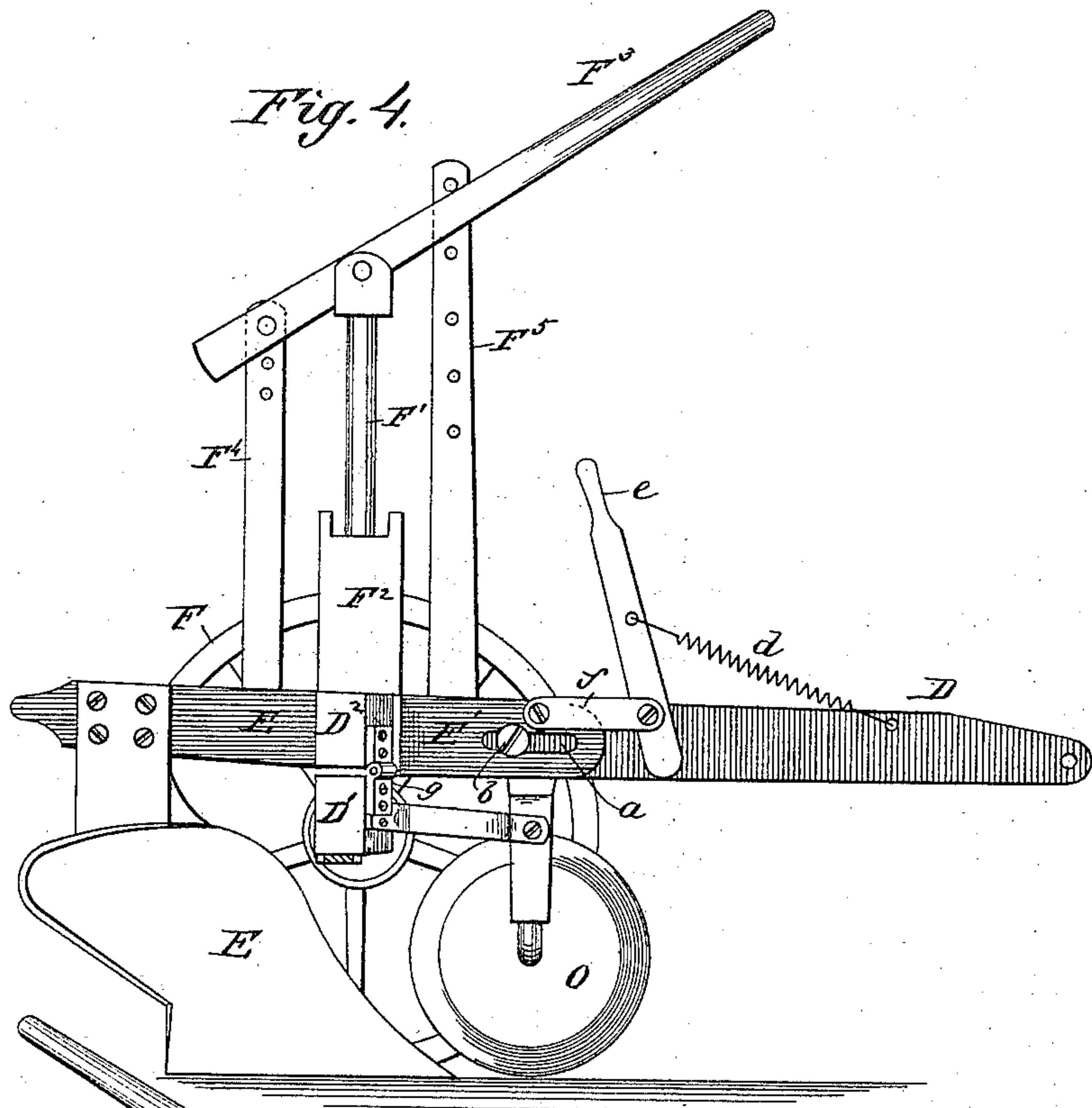
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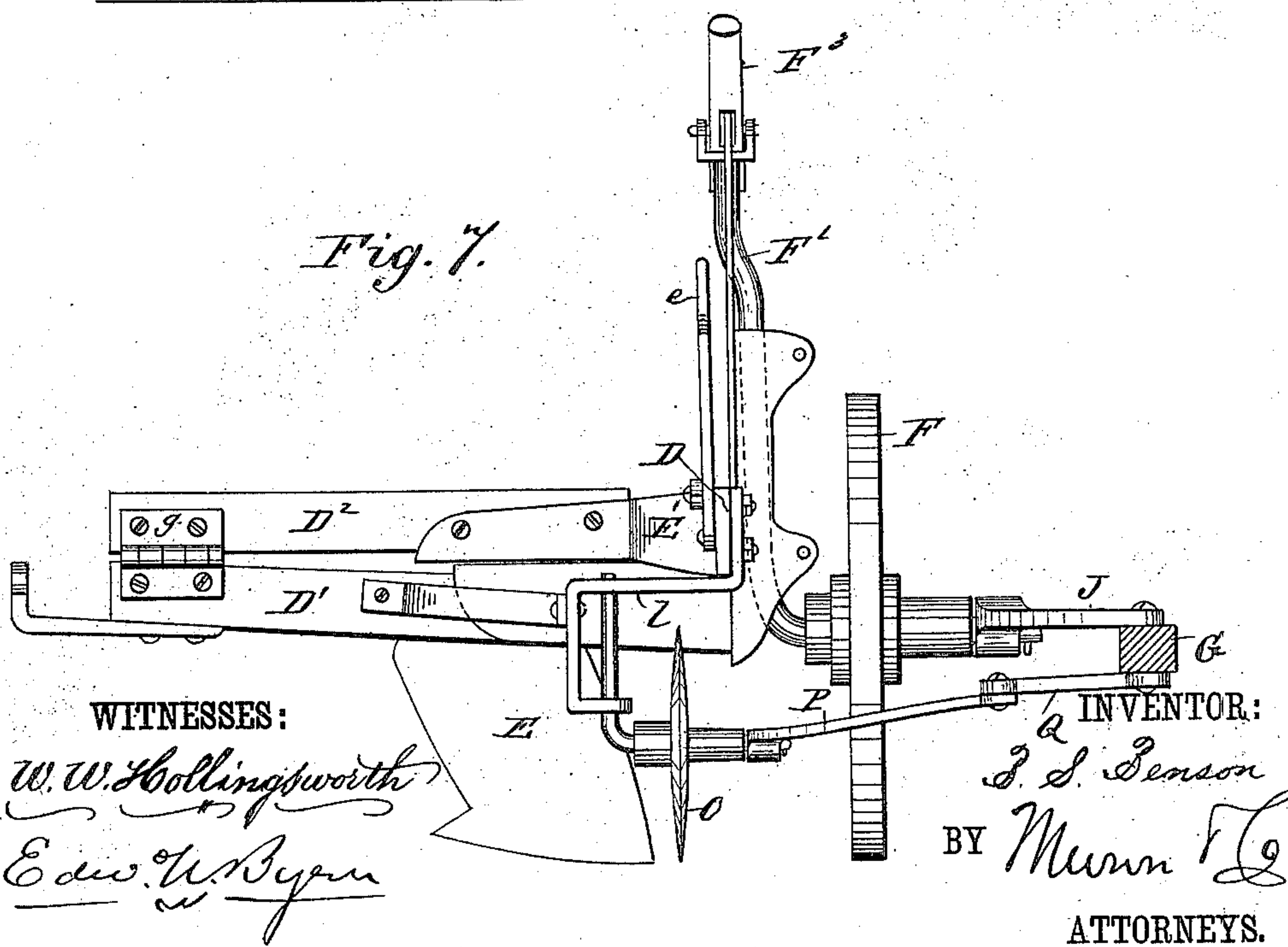
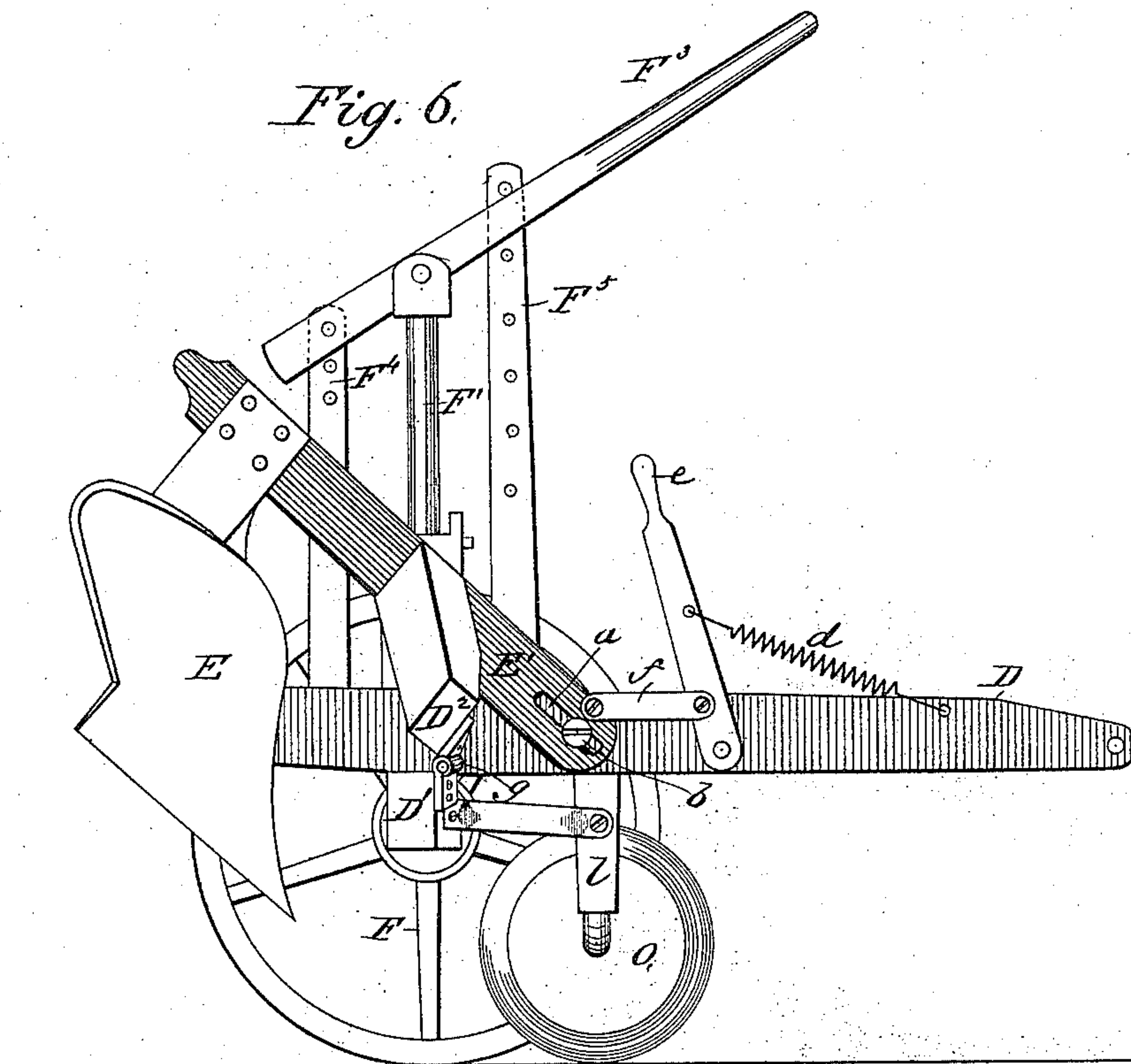
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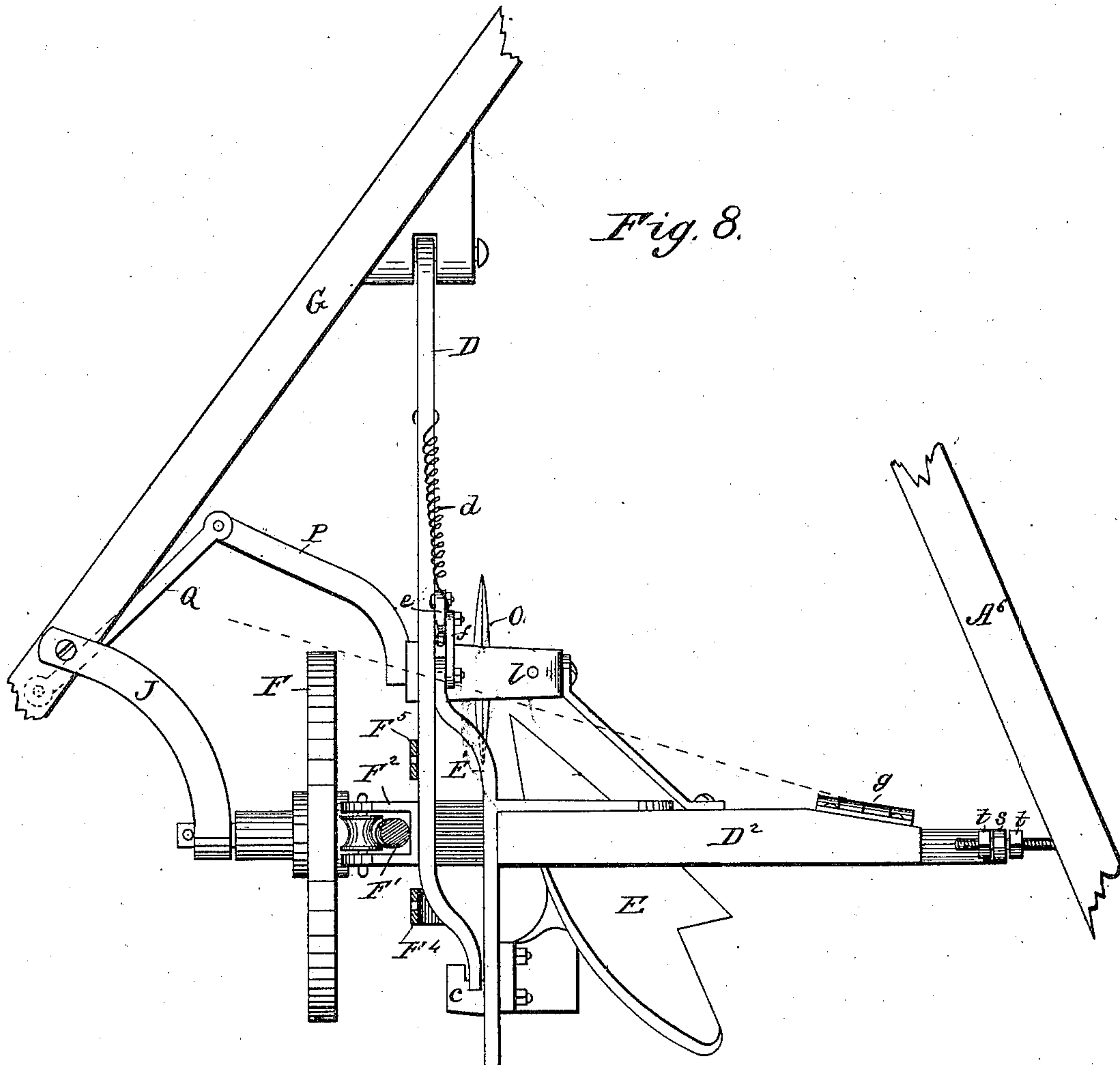
6 Sheets—Sheet 6.

B. S. BENSON.

STEAM PLOW.

No. 309,434.

Patented Dec. 16, 1884.



WITNESSES:

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UNITED STATES PATENT OFFICE.

BENJAMIN S. BENSON, OF BALTIMORE, MARYLAND.

STEAM-PLOW.

SPECIFICATION forming part of Letters Patent No. 309,434, dated December 16, 1884.

Application filed August 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN S. BENSON, of Baltimore city, State of Maryland, have invented a new and useful Improvement in Steam-Plows; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of the plow-gang, cutter-bar, and traction-engine connected. Fig. 2 is an enlarged plan view of the gang-frame. Fig. 3 is a side view of the gang-frame with the plows removed. Figs. 4 and 5 are side views of a plow and its attachments, taken from opposite sides. Fig. 6 is the same view as Fig. 4, but with the plow raised out of the ground. Fig. 7 is a front view of a plow and its attachments, and Fig. 8 is a plan of the same.

After having provided a traction-engine that will draw a great width of plows, my next object is to provide a gang of plows that will efficiently co-operate with the same; and to this end my present invention consists, principally, in the construction and arrangement of such plow-gang for neutralizing the thrust of the plows and steering the same, and for giving a free independent up-and-down motion to each plow in adapting itself to hollows and ridges on the surface of the ground.

My invention also consists in combining a plow-gang, a cutter-bar, and a traction-engine as a co-operating organization, whereby the stubble standing in the field is made to assist in plowing the ground by being cut off by the cutter-bar in advance of the plow and fed to the traction-engine, where, as fuel, it is converted into motive force and rendered available for pulling the plows, all as will be fully described hereinafter.

I will first describe my plow-gang in the form in which it is adapted for plowing the widest series of furrows, or in which the said gang is employed, with its two corresponding halves used as an entirety.

A A' A² A³, Fig. 2, represent four beams converging at the front end, and of which the two beams A' A² of the two halves are disposed flat and parallel against each other.

At the rear ends of the two outside beams, A' A³, are other beams, A⁴ A⁵, which are jointed

to A and A³, so as to be flexible in vertical direction, but which beams A⁴ A⁵ are otherwise straight continuations of A and A³.

From the rear end of A' and A² are other beams, A⁶ and A⁷, which diverge from each other in a path parallel with the outer rear beams, A⁴ and A⁵. The rear ends of these two beams A⁶ and A⁷ are coupled by a cross-bar, B. All the beams are also connected to elevated frame-bars B' and B², Figs. 2 and 3, which cross the gang parallel to each other and at right angles to the line of draft, the said frame-bars being adjustably connected to the lower beams by vertical screw-standards b' and b². There are also upwardly-curved metal braces B³ B⁴, extending from the outer beams, A A³ and A⁴ A⁵, to the beams A⁶ and A⁷.

The parts so far described constitute the main frame of the gang. This frame is sustained upon running wheels, as follows: the front part upon a pair of coupled wheels, C C, connected to the opposite ends of an axle, which is connected by a vertical pivot-bolt to the two inner front beams, A' A². The rear part of said main frame is sustained upon wheels C' C', which turn upon the lower and cranked ends of vertical standards c' c', swiveled in the ends of the rear transverse frame-bar, B. The middle of the main frame is sustained on wheels C² C², which turn upon the lower cranked ends of vertical standards c² c², swiveled in the front transverse frame-bar, B².

I will now proceed to describe the means for mounting and hanging the plows, and then describe the relation in which they are arranged in the frame.

I have found much difficulty in arranging my plows in gangs so that they will have a free up-and-down motion to conform to and follow the irregular contour of the ground, dropping down into sinks and depressions, and rising upon ridges. This I accomplish by using a side beam projecting nearly at right angle to the draft-beam. Thus in Figs. 2, 4, 5, 6, 7, D is the draft-beam, which is jointed to the main frame-beam A in the line of draft, and D' D² is the side beam, which is made double, and projects from the draft-beam nearly at right angles, and is jointed loosely to the inner beams of the main frame, being connected thereto adjustably by screw-stems and nuts t, Fig. 2, so as to regulate the dis-

tance between the plows. The plow E is located at or near the junction of these two beams D and D' D², and it is connected to the draft-beam in a peculiar manner, which permits it to yield and turn back whenever it strikes a stone or unyielding body in the ground. Thus the plow-standard is bolted to the three-pronged metal plate E', Fig. 8, whose forward end is slotted at *a*, and moves over a stud or screw, *b*, projecting from the side of the draft-beam, and the rear end of which three-pronged plate is provided with a lateral hook, *c*, Fig. 5, that catches beneath the overhanging end of the draft-beam D. The middle prong of said plate is fastened to the upper section, D², of the side beam, and the upper section is hinged to the lower section, D', at *g* on a line with the stud or screw *b*, so that the plow with the three-pronged plate and beam D² can rock about these centers.

For holding the three-pronged plate normally forward, a spring, *d*, is attached at one end to the draft-bar and at the other to a hand-lever, *e*, which, through a link, *f*, connects with the three-pronged plate. Now, when a strain comes upon the plow greater than it should bear, the three-pronged plate moves slightly back by reason of its slot and draws back the spring *d*. This backward movement of the three-pronged plate throws its hook *c*, Fig. 5, beyond the overhanging rear end of the draft-beam, and the plow with the three-cornered plate and beam D² are then free to move as a whole about the stud *b* and hinge *g*, allowing the plow to turn and rise, as shown in Fig. 6. To restore the plow to the locked position the hand-lever *e* is pushed to the rear.

Each plow is provided with a supporting or gage wheel, F, which turns upon the lower cranked end of a vertical standard, F', and which standard passes up through a roller guide-frame, F², and is attached to a lever, F³, which is fulcrumed at one end to a support, F⁴, and upon the opposite side of the standard moves over an adjusting-bar, F⁵, which has a series of holes in it, to any of which the lever may be held by a pin. By this means the depth to which the plow enters the ground may be definitely regulated.

For imparting greater strength to the mold-board to prevent the shin from being twisted off, one or more braces, F⁶, Fig. 2, may be bolted to the wing of the mold-board and extend to the side beam, D²; also one to the shin and bolted to the swiveling beam.

For guiding the plow-gang I make all of the wheels that run upon the ground, including both the supporting-wheels C C' C² and the plow-wheels F, to be capable of changing their vertical plane to the right or left, as may be required, in turning the gang. For giving this adjustment I arrange just below the outer converging beam of the gang-frame and nearly parallel with it two long bars, G and H, (see Fig. 2,) which at their front ends are jointed to a horizontally-rocking lever, I, piv-

oted at *i*, and so arranged that when the bar G on one side is pushed forward the other, H, on the other side, is pushed backward. The axles of the plow-wheels F are connected to these bars G and H by swinging arms J, and the axles of the supporting-wheels C C' C² for the main frame are connected to these bars by arms J' and links J².

At the rear end of one side of the main frame there is swiveled a vertical screw-rod, K, Figs. 2 and 3, having a hand-wheel at the top for turning it and a screw-thread throughout the greatest part of its length. Upon this screw-rod is a threaded sleeve or nut, L, held by trunnion-joints in the end of a curved lever, M, which is fulcrumed to a support on the main frame, and whose lower end is connected by a link, N, to the adjusting-bar H. Now, when the screw-rod is turned, the sleeve L is raised or lowered, and the lever M being deflected thereby, the bar H and the attached bar G are adjusted longitudinally. When the bar H is adjusted forward, the planes of all the wheels will be deflected so as to run toward the left, as shown in dotted lines, Fig. 2, and when the bar H is drawn back the planes of all the wheels will be deflected in the opposite direction, so as to run to the right. By this means, it will be seen, I am enabled to simultaneously control all of the wheels, and thus guide the gang of plows.

To still further assist in guiding the gangs, I provide a rolling colter, O, for each plow, which is hung upon the cranked lower end of a short vertical shaft which is carried in bearings *l*, Fig. 7, attached to the plow-beams D and D'. The cranked axles of these colters are connected by arms P and links Q to the adjusting-bars G and H, so that by the same movement of these bars that adjusts the wheels in turning the colters are also correspondingly adjusted.

In making the proper adjustment of plows in a gang each plow must set in the rear of the preceding plow a sufficient distance to allow of its turning its furrow and tipping back to free itself from any unyielding substance in the furrow. If sixteen-inch plows are used, they must be spaced twenty-six inches apart, and in case twelve plows are used it will make a gang twenty-six feet long. In some cases I want to use twenty-four plows in width, and then it is necessary to make a double-gang plow, as has been just described, one half with right-hand plows and the other half with left-hand plows, the two gangs being joined in the middle, as shown at the beams A' A², in which case the first two furrows are thrown together. With such arrangement of gangs I am enabled to plow at one pass a break of twenty to fifty feet in width, and as the thrust of one half of the gang neutralizes the thrust of the other half, no landsides are necessary, the strain being carried by the cross-bar B and traverse-frames or bridge-bars B' B², which prevent the two gangs from swinging apart. Instead, how-

ever, of using the two gangs together, the two gangs may be separated by separating the beams A' and A'' and drawing each gang by the eyes or special draft-connection $p p$, Figs. 2 and 3, on the front of the side beams. When thus used, the rolling colters, by entering the ground, serve the useful purpose of neutralizing the side-thrust of the plows, and tend to hold them straight in the line of draft. At the front part of the plow-gang is secured the cutter-bar R , Fig. 1, which may be of any approved construction, and which extends at right angles to the line of draft. Just above it is arranged a revolving brush, S , which throws the cut stubble onto the endless apron T , which conveys it to a conveyer, that in turn carries it to the furnace of the traction-engine. The cutter-bar, brush, and endless apron are all driven by the traction-engine which draws the plow. By this organization of parts it will be seen that I cause the high stubble standing in the field to actually assist in the plowing of the ground by causing it to be converted into a fuel and rendered available in this way as a motive power.

I do not claim, broadly, a traction-engine and a reaper with means for carrying the stubble to the furnace of the engine, as this is set forth in my prior patent of July 17, 1883.

Having thus described my invention, what I claim as new is—

1. The combination, with the draft-frame in a gang-plow, of a plow having a draft-beam arranged in the line of draft, and a laterally-projecting beam, both being loosely connected to the draft-frame, so as to steady the plow and still permit it to rise and fall, as set forth.

2. The combination, with a draft-frame, of a mold-board plow having a draft-beam, and also a laterally-projecting beam, both loosely connected to the draft-frame, and a supporting-wheel arranged at or near the angle of the two beams, as set forth.

3. The combination, with a mold-board plow having both a draft-beam and a laterally-projecting beam, of a vertically-swiveling shaft with a lower bent arm, a wheel carried by said arm, and means for raising and lowering said plow, substantially as shown and described.

4. A plow having a double side beam, D' D'' , one of which, D' , is attached to the draft-beam and the other to the plow, the said side beams being hinged together, as described.

5. The combination, with the plow, of the draft-beam D , having laterally-projecting stud, the side beam, D' , the hinged side beam, D'' , and the three-pronged plate having a slot at its front end and a catch at its rear end, as and for the purpose described.

6. The combination, with the gang-frame, of the plows having laterally-projecting beam, the screw-rods s , and nuts $t t$, for adjusting the distance between the plows, as set forth.

7. The combination, with a mold-board plow, of a rolling colter carried by a vertically-swiveling shaft, upright stud, lateral and fore-and-aft braces, and means, substantially as described, for altering the plane of said rolling colter.

8. The combination, with the plows of a gang, of a rolling colter for each, carried by a vertically-swiveling shaft, and means, substantially as described, for altering the plane of said rolling colter.

9. The combination, with the vertically-swiveled running wheels of a gang-plow, of the two side bars, $G H$, the lever I , means for connecting the side bars to the wheel-axes, and means for adjusting the said side bars, substantially as set forth.

10. A mold-board plow connected to a laterally-projecting and rocking beam, D'' , and combined with the same and with braces F^6 , connecting said mold-board and shin to the beam, to prevent the side-thrust from twisting the shin off, as set forth.

11. The combination, with a gang of plows, of a cutter-bar attached to the forward end of the same, as shown and described.

12. The combination of a gang of plows, a traction-engine, and a cutter-bar interposed between them, for causing the stubble to be directly utilized for plowing the ground, as set forth.

BENJAMIN S. BENSON.

Witnesses:

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JOSEPH B. CLAYTON.