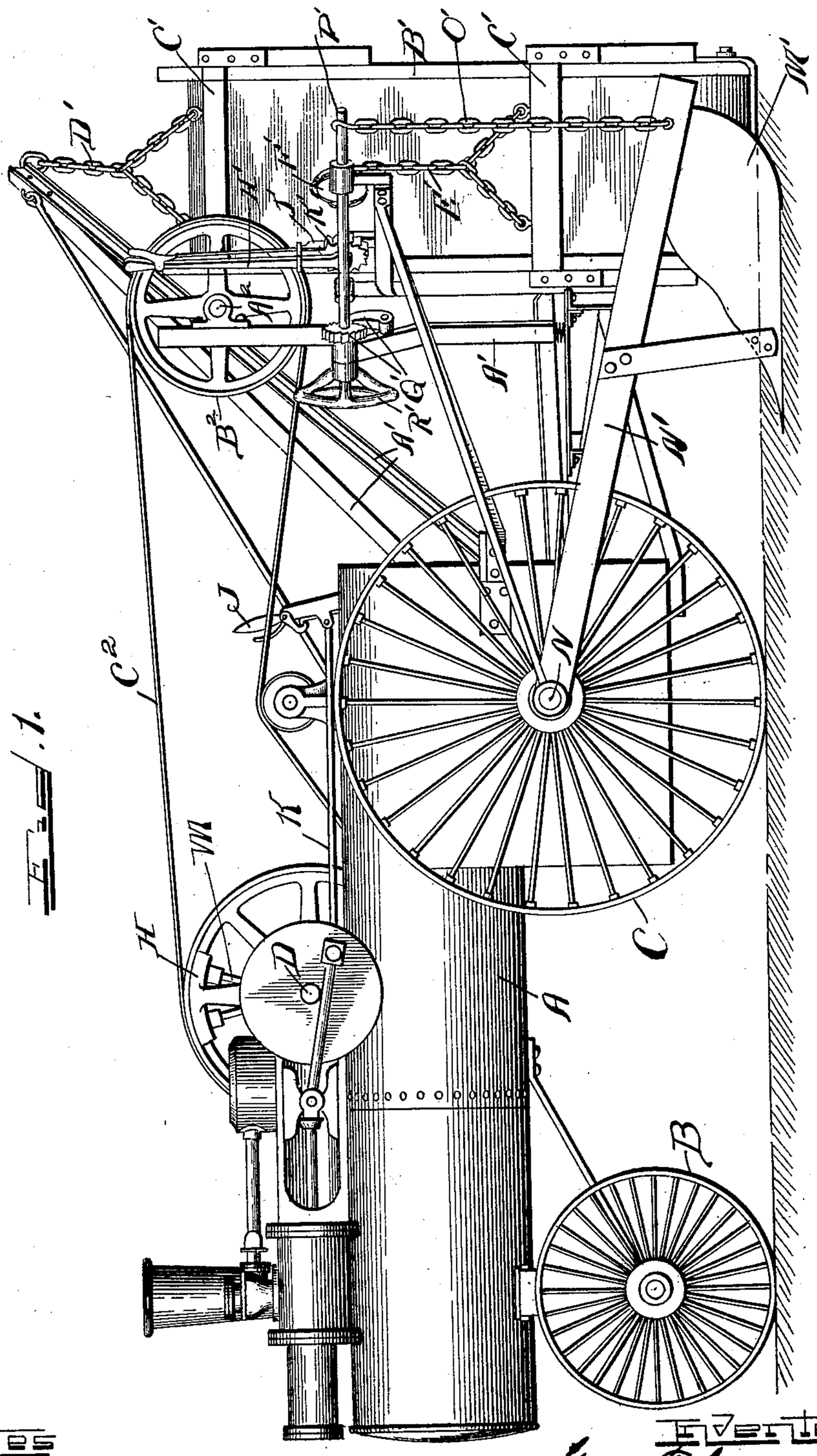
No. 689,638. Patented Dec. 24, 1901.

G. F. CONNER.

SELF PROPELLING GRADING AND DIRT LOADING MACHINE.

(Application filed Nov. 21, 1900.)

(No Model.) 5 Sheets—Sheet 1.



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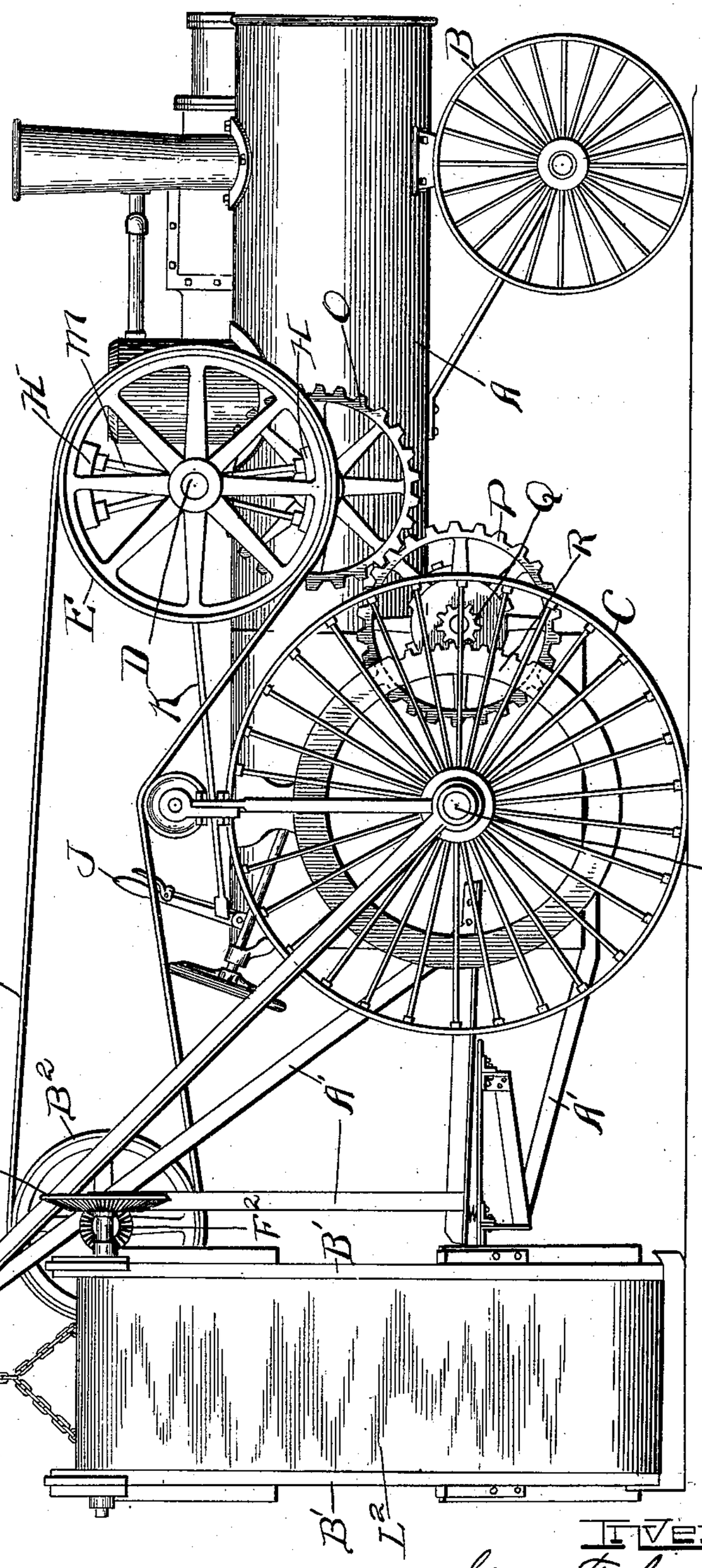

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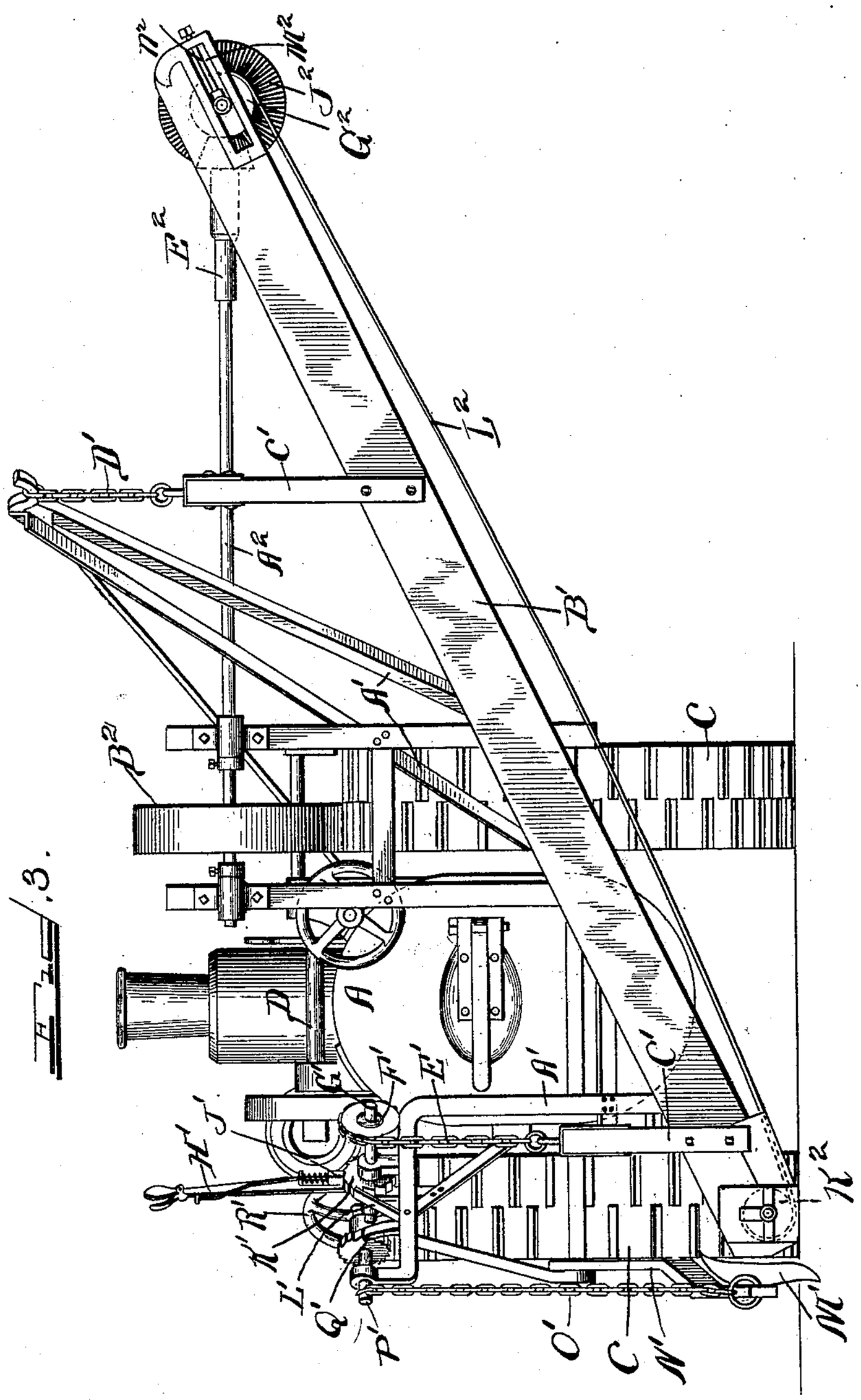

FIG. 3.

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(No Model.) 5 Sheets—Sheet 4.

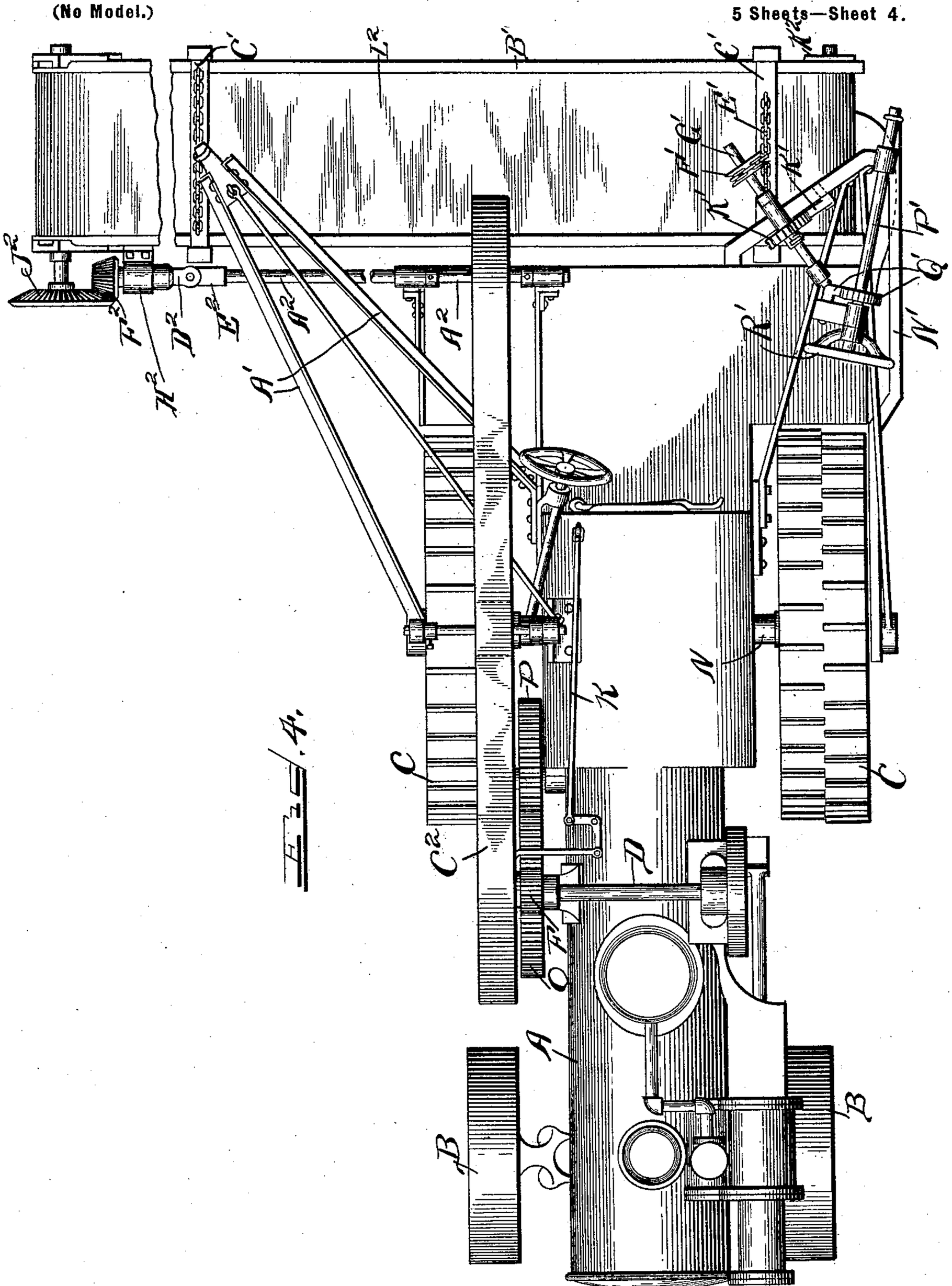

Fig. 4.

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Fig. 5.

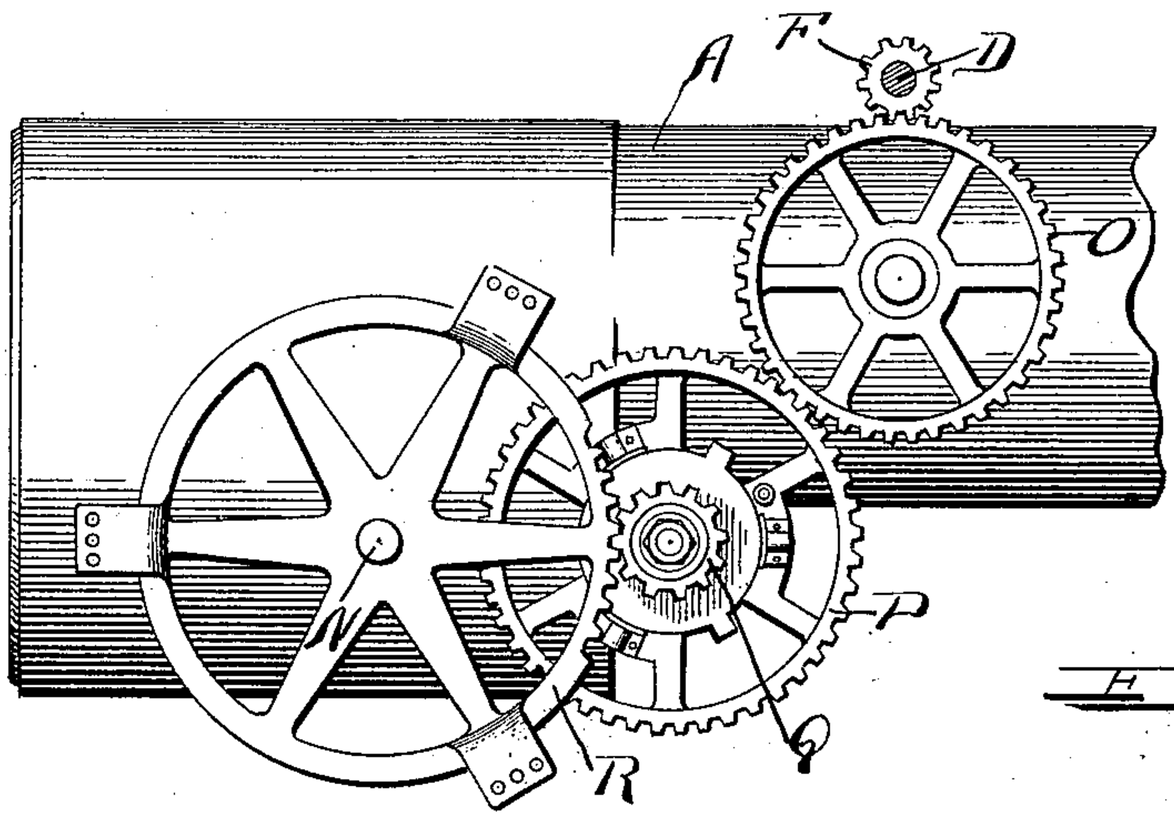


Fig. 7.

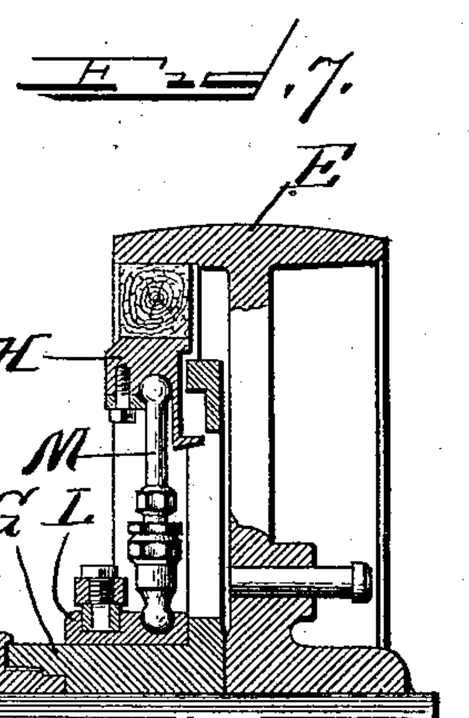


Fig. 6.

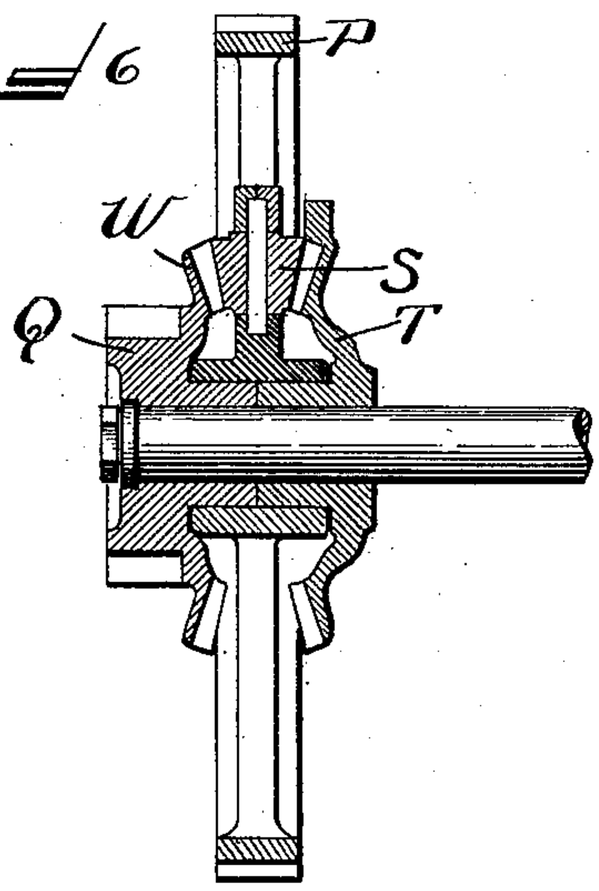
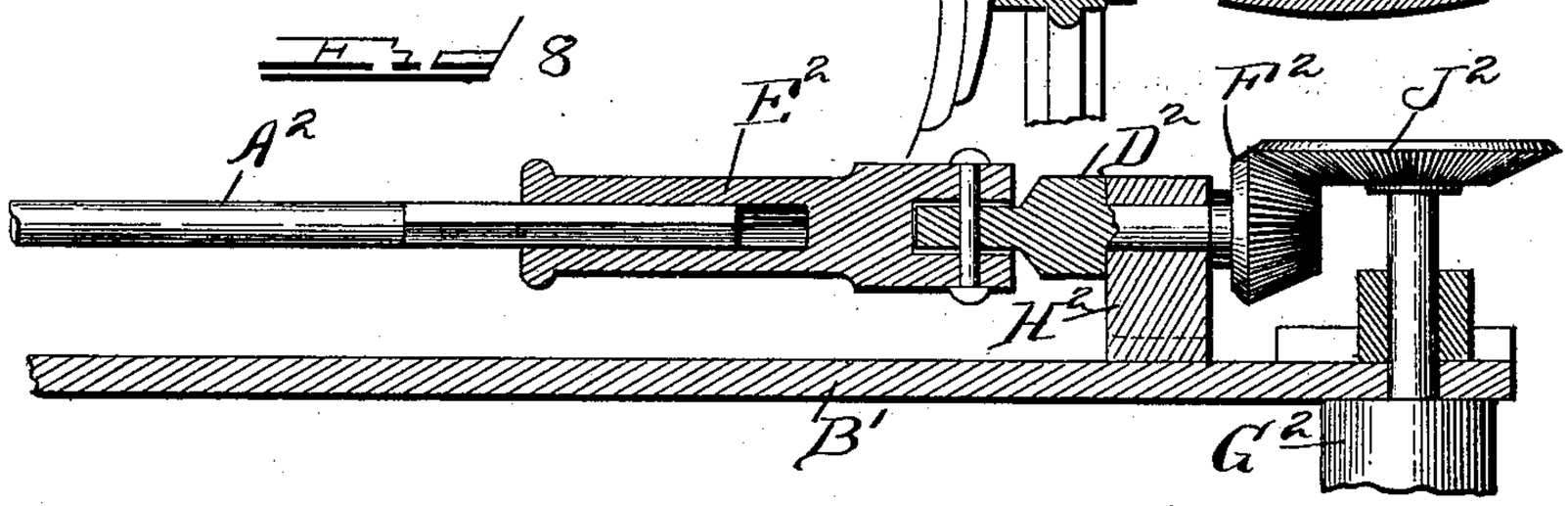


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE F. CONNER, OF PORT HURON, MICHIGAN.

SELF-PROPELLING GRADING AND DIRT-LOADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 689,638, dated December 24, 1901.

Application filed November 21, 1900. Serial No. 37,251. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. CONNER, a citizen of the United States, residing at Port Huron, in the county of St. Clair and State of Michigan, have invented a new and useful Self-Propelling Grading and Dirt-Loading Machine, of which the following is a specification.

This invention relates to self-propelling grading and dirt-loading machines.

The object of the invention is to provide a construction and arrangement of self-propelling grading and dirt-loading machine which is simple and efficient.

A further object of the invention is to provide a construction wherein the dirt-loading apparatus may be operated independently of the traction driving mechanism of the propelling devices.

A further object of the invention is to provide a construction for efficiently supporting and adjusting the dirt-loading devices.

A further object of the invention is to provide a construction wherein the grading appliances are efficiently supported and braced.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings, and to the various views and reference-signs appearing thereon, Figure 1 is a view in side elevation showing a construction of traction-engine and grading and dirt-loading attachment embodying the principles of my invention. Fig. 2 is a view similar to Fig. 1, taken from the opposite side of the machine. Fig. 3 is a rear end elevation. Fig. 4 is a top plan view. Fig. 5 is a broken detail view, in side elevation, showing the arrangement of traction-gearing. Fig. 6 is a broken sectional detail view of an equalizing-gear employed in connection with the traction driving-gearing. Fig. 7 is a broken detail view, in longitudinal section, of the fly-wheel, friction-clutch, and main drive-gear. Fig. 8 is a broken detail view, in longitudinal section, of the universal gearing for driving the dirt-loading apron.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

In carrying out my invention I employ a traction-engine, which may be of any well-known, suitable, or convenient type of construction and arrangement, and upon the frame of such engine I mount an auxiliary frame, upon which is supported a carrier or loader, and I also support upon the traction-engine frame a plow or other suitable or convenient grading device adapted to deliver to the carrier or loader. In connection with the traction-engine I employ a main drive-shaft adapted to be driven from the traction-engine and upon which is mounted a fly or balance wheel, and I employ such fly or balance wheel as the driver for the actuating devices of the loading attachment. I also mount upon said main shaft a main drive-gear adapted to be clutched in a suitable and convenient manner to the main drive-shaft and from which main drive-gear the traction-wheels of the engine are driven. I also make provision in the actuating devices for the loading mechanism for the proper raising and lowering or adjustment of said loading mechanism without disturbing the efficient engagement and relation of such actuating devices. In machines of this class it is also desirable to provide means whereby a suitable equalizing effect is secured in the driving mechanism for the traction-wheels in order to enable the machine to readily turn at corners. My invention therefore includes provision for accomplishing this result. It is also desirable to so support the grader or plow as to efficiently brace the same. My invention therefore includes provision whereby this result is also secured.

As an illustrative construction embodying the principles of my invention, but to which, however, the invention is not to be limited or restricted, I have shown a traction-engine A, suitably supported upon supporting-wheels B and traction-wheels C. The traction-engine may be driven in any suitable or convenient manner. In the illustrative form shown a steam-engine is employed, which may be of the usual or any ordinary construction and arrangement adapted to drive a main shaft D. Upon this shaft is keyed or otherwise suitably supported to rotate there-

with a belt-wheel E, which may also serve as a fly or balance wheel. The main drive-pinion F and clutch-sleeve G engaging therewith are loosely sleeved upon said shaft D.

H designates a clutch device, through which clutch-sleeve G and main drive-pinion F may be clutched to rotate with belt or fly wheel E and shaft D. This clutch device may vary in the specific details of construction thereof without departure from the spirit and scope of my invention. As an illustrative form embodying a preferred construction a friction-clutch is used, a handle or lever J serving to effect the clutching or unclutching operation through a rod K in a well-understood manner through a sliding sleeve L and clutch-arms M.

The traction-wheels C are mounted upon an axle N, said axle being driven from main drive-pinion F by any suitable or convenient train of gearing. In practice, however, I prefer to interpose in this train of gearing from the main drive-pinion F to the axle N an equalizing-gear in order to enable the machine to readily and easily turn corners or the like. In Figs. 2, 5, 6, and 7 I have shown such arrangement of gearing comprising a gear-wheel O, meshing with and driven from pinion F. Gear O meshes with and drives a gear P and through which is rotated a pinion Q, which meshes with and drives a gear R on the axle N. The differential or compensating gear mechanism is included in this train of gearing, and a convenient arrangement is shown in Figs. 5 and 6, wherein the gear P carries pinions S, which intermesh with and drive the bevel-gears T W. The construction of differential or compensating gear, however, may be of the usual or any well-known construction and in the specific details thereof forms no part of the present invention, the essential idea being the interposition of such a mechanism in the train of gearing which drives the traction-wheels from the main shaft of the engine.

Suitably supported upon the frame of the engine is an auxiliary frame A′, upon which is supported a carrier-frame B′, extending transversely the line of travel of the engine and arranged at the rear of the engine and of the traction-wheels, as shown. This carrier-frame may be supported upon the auxiliary frame A′ in any suitable manner. I have shown a convenient arrangement wherein the carrier-frame B′ is provided at points adjacent to the respective ends thereof with hangers C′ C′. To the upper hanger C′ is connected a chain D′, forming means for suspending the same from suitable brackets of the auxiliary frame A′. Similarly the lower bracket C′ may be suspended by a chain E′ from a convenient part of the auxiliary frame. If desired, either or both ends of the carrier-frame B′ may be adjusted vertically to vary the inclination of the carrier-frame. In the drawings I have shown the lower end of the carrier-frame vertically adjusted by suspending the connection E′ over a pulley F′, carried upon a shaft G′. The shaft G′ may be rotated by means of a lever H′, carrying a pawl J′, arranged to engage the teeth of a ratchet-disk K′, also mounted on shaft G′. By suitably manipulating the handle H′ and pawl J′, carried thereby, the supporting connection E′ may be readily wound upon or unwound from the pulley F′, thereby raising or lowering the lower end of the carrier-frame. A pawl L′ may serve to hold the ratchet-disk K′ at any desired point.

Reference-sign M′ designates the grading device or plow. This device is supported upon a beam N′, which is journaled upon the outer end of axle N, (see Figs. 1 and 4,) said beam extending rearwardly from the axle in position for the grader or plow M′ to be locked adjacent to the lower end of the carrier and to deliver to said carrier. Any particular or desired form of plow or grading device may be employed. The outer or free end of beam N′ may be supported in any suitable or convenient manner. I have shown a preferred arrangement which permits the beam N′ to be adjustably raised or lowered, and with this object the outer or free end of said beam is suspended by a chain or other suitable connection O′ from a shaft P′, upon which, if desired, said chain may be wound or from which it may be unwound, a pawl-ratchet device (indicated at Q′) serving to hold shaft P′ in any desired position of rotative adjustment. The hand-wheel R′ affords means for conveniently operating shaft P′ to raise or lower the grading device.

Suitably journaled in the auxiliary frame A′ is a shaft A^2, upon which is mounted a pulley B^2, adapted to be driven from the balance or fly wheel E in any suitable manner—as, for instance, by means of a belt connection C^2. Mounted to slide longitudinally upon shaft A^2, but constantly connected to rotate therewith, is a sleeve E^2, (see Fig. 8,) to which sleeve is pivotally connected a section D^2, carrying a bevel-gear F^2. The section D^2 is journaled in a bearing H^2, formed on or carried by carrier-frame B′. Suitably journaled in carrier-frame B′, at the upper end thereof, is a roller or other suitable actuating device G^2, upon the shaft of which is mounted a bevel-gear J^2, arranged to mesh with gear F^2, as clearly shown. A roller or actuating device K^2 is suitably journaled in the lower end of carrier-frame B′, and over the rollers or actuating devices G^2 K^2 operates a belt or carrier L^2, said rollers G^2 K^2 constituting driving-rollers, one of which through the actuating-gearing above described is positively driven. If desired and in order to adjust the tautness of the carrier-belt, one or the other of the rollers G^2 K^2 may be adjusted lengthwise of the carrier-frame. In Fig. 3 I have shown the upper roller G^2 journaled in a box, which operates in a longitudinal slot M^2 in the side bars of the carrier-frame, a bolt N^2 serving to effect the adjustment thereof.

From the foregoing description it will be observed that I provide a construction of self-propelling loader and grader wherein the plow is drawn by the engine, and the carrier or elevator to which the plow delivers is driven or actuated independently of the traction-gearing, and hence the power required for actuating the carrier or elevator is not transmitted through the traction-gearing, and hence such traction-gearing is relieved of the increased load and wear incident to the operation of the carrier through such gearing. It will also be seen that the elevator or carrier may be actuated without actuating the traction-wheels, and hence while the engine is standing still. This is desirable for the reason that I am thereby enabled to continue the operation of the elevator or carrier to free the same of any dirt or other material being hoisted thereby after the engine stops, this being accomplished by merely throwing the traction-gearing out of operation by securing the clutch H without arresting the action of the elevator or carrier actuating mechanism. By avoiding the transmission of power to the elevator-actuating devices through the traction-gearing I provide an exceedingly strong and durable machine, wherein the wear on the traction-gearing is reduced to a minimum. It will also be observed that in the construction of actuating-gearing for the elevator or carrier I am enabled to raise or lower both ends of the carrier without disturbing the operation of such actuating mechanism.

It will be readily understood that many variations and changes in the details of construction and arrangement would readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited to the exact details shown and described; but,

Having now set forth the object and nature of my invention and an illustrative construction embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent of the United States, is—

1. In a self-propelling loading and grading machine, a traction-engine including a main crank-shaft and means for actuating the same, in combination with traction-wheels, an endless carrier arranged to operate transversely with respect to said engine, a grading implement arranged adjacent to the lower end of said elevator and operating in the plane of movement of the engine, direct driving connections between said crank-shaft and said elevator, and independent gearing between said crank-shaft and traction-wheels, as and for the purpose set forth.

2. In a self-propelling loading and grading machine, a traction-engine including a crank-shaft, means for actuating the same, a fly or balance wheel carried by said shaft and traction-wheels, in combination with an endless elevator operating transversely with respect to the line of travel of the machine, a plow arranged adjacent to the lower end of said elevator and arranged to deliver thereto, direct driving connections between said fly or balance wheel and said endless elevator, and independent gearing between said crank-shaft and traction-wheels, as and for the purpose set forth.

3. In a self-propelling loading and grading machine, a traction-engine including a main crank-shaft and means for operating the same and a fly or balance wheel carried by said shaft, in combination with traction-wheels, an endless elevator arranged to operate transversely with respect to the line of travel of the machine, a grading-plow connected to the machine to operate in the direction of the line of travel of the machine and arranged adjacent to the lower end of said elevator to deliver thereto, gearing actuated by said main crank-shaft and interposed between said shaft and traction-wheels for driving the latter, and independent gearing actuated by said fly or balance wheel and directly connected to said elevator for actuating the same and means for detachably clutching said traction-wheel-actuating gearing from said crank-shaft whereby the operation of said elevator may continue after the engine stops, as and for the purpose set forth.

4. In a self-propelling loading and grading machine, a traction-engine including a main crank-shaft and a fly or balance wheel mounted thereon, in combination with traction-wheels, an endless elevator arranged to operate in a plane transverse to the line of travel of the machine, a grading implement arranged adjacent to the lower end of said elevator to deliver thereto, gearing interposed between said crank-shaft and said traction-wheels for driving the latter from said crank-shaft, a clutch for throwing said gearing out of operation, and a belt connection from said fly or balance wheel for operating said elevator, as and for the purpose set forth.

5. In a self-propelling loading and grading machine, a traction-engine including a main crank-shaft, a fly or balance wheel mounted thereon, a drive-pinion also mounted on said shaft, traction-wheels, gearing actuated by said pinion for driving said wheels, an elevator mounted on and operating transversely of said machine, a plow arranged adjacent to the lower end of said elevator and to one side of the machine and arranged to deliver to said elevator, and gearing actuated by said fly or balance wheel for driving said elevator, as and for the purpose set forth.

6. In a self-propelling loading and grading machine, a traction-engine including a main crank-shaft, a fly or balance wheel mounted on said shaft, a pinion also mounted on said shaft, traction-wheels, gearing actuated by said pinion for driving said wheels, means for detachably clutching said pinion to said shaft, an elevator extending transversely across the line of travel of said machine, a plow arranged adjacent to the lower end there-

of and to one side of said machine and arranged to deliver to said elevator, and a belt operating over said fly or balance wheel and arranged to actuate said elevator, as and for the purpose set forth.

7. In a self-propelling loading and grading machine, a traction-engine including a main crank-shaft, a fly or balance wheel keyed to said shaft to rotate therewith, a drive-pinion loosely sleeved upon said shaft, means for detachably clutching said pinion to said fly or balance wheel, traction-wheels, gearing actuated by said pinion for driving said wheels, an elevator arranged to extend transversely of the line of travel of said machine, a grading implement connected to the machine and arranged to one side thereof and at the lower end of said elevator, and gearing actuated by said fly or balance wheel for driving said elevator, as and for the purpose set forth.

8. In a self-propelling loading and grading machine, a traction-engine including a crank-shaft forming the main drive-shaft of the machine, a fly-wheel keyed thereto, a driving-pinion loosely sleeved upon said shaft, a clutch for detachably connecting said pinion to said fly-wheel, compensating gearing driven by said pinion, traction-wheels actuated by said compensating gearing, an elevator arranged at the rear of said machine and operating transversely thereof, a grading implement also mounted at the rear and to one side of said machine and arranged adjacent to the lower end of said elevator to deliver thereto, and means for operating said elevator from said fly-wheel, as and for the purpose set forth.

9. In a self-propelling loading and grading machine, including a main drive-shaft, an axle, traction-wheels mounted upon said axle, gearing driven from said main drive-shaft for actuating said traction-wheels, grading mechanism connected to said axle, a loading-carrier to which said grading mechanism delivers, and gearing actuated by said main shaft for driving said loading-carrier, as and for the purpose set forth.

10. In a self-propelling grading and loading machine, a traction-engine including a main drive-shaft, an axle, traction-wheels mounted upon said axle, gearing intermediate said main shaft and axle for driving said wheels, a beam suspended upon said axle and carrying a grading device, an elevator or carrier to which said grading device delivers, and gearing driven from said main drive-shaft for actuating said elevator or carrier, as and for the purpose set forth.

11. In a self-propelling grading and loading machine, a traction-engine including a main drive-shaft, an axle, traction-gears mounted thereon, gearing intermediate said axle and main shaft for driving said traction-wheels, a supporting-beam journaled at one end upon said axle and a grading device carried by the other end of said supporting-beam, means for raising and lowering the free end of said supporting-beam, an elevator or carrier to which said grading device delivers and gearing actuated by said main shaft for driving said elevator or carrier, as and for the purpose set forth.

12. In a self-propelling grading and loading machine, a traction-engine, traction-wheels and gearing for driving the latter, in combination with a grading and loading machine mechanism including an elevator or carrier, a sprocket-roll over which said elevator or carrier operates, driving mechanism operated by the traction-engine for actuating said sprocket-roll and including a universal compensating joint connection, and means for changing the angle of inclination of said elevator or carrier, as and for the purpose set forth.

13. In a self-propelling grading and loading machine, a traction-engine including a main shaft and traction-wheels driven therefrom, in combination with an auxiliary frame, loading mechanism mounted on said auxiliary frame including an elevator or carrier, a shaft journaled in said auxiliary frame, gearing for actuating said elevator or carrier, flexible connections between said shaft and gearing, and means for driving said shaft from the main shaft of the traction-engine, as and for the purpose set forth.

14. In a self-propelling loading and grading machine, a traction-engine, a main shaft, traction-wheels, gearing for driving the latter from said shaft, a loading-carrier, a drive-shaft therefor, a sleeve connected to rotate with said drive-shaft but capable of longitudinal movement thereon, a section pivotally connected to said sleeve, gearing actuated by said section for driving said carrier, and means actuated by said main shaft for independently rotating said drive-shaft, as and for the purpose set forth.

15. In a self-propelling grading and loading machine, a traction-engine, a main drive-shaft, a fly or balance wheel mounted thereon to rotate therewith, traction-wheels, gearing actuated by said main shaft for driving said traction-wheels, an elevator mounted on said machine at the rear end thereof and operating transversely of the line of travel of such machine, a grading implement also carried by said machine at the rear end and to one side thereof and adjacent to the lower end of said elevator, a driving-pulley for said elevator, and a belt operating over said driving-pulley and said fly or balance wheel, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 17th day of November, 1900, in the presence of the subscribing witnesses.

GEORGE F. CONNER.

Witnesses:
H. B. HOYT,
G. R. HAIGH.