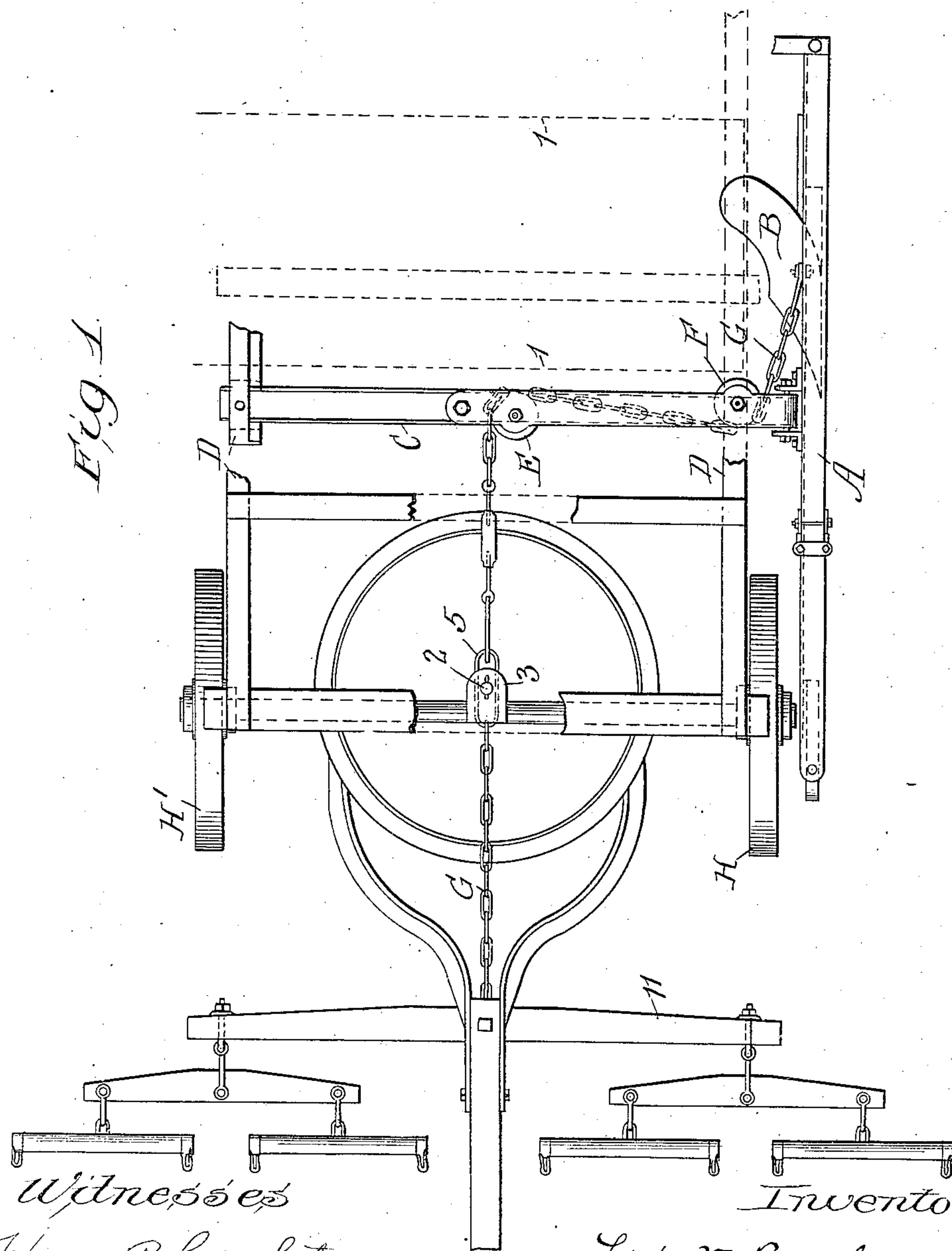


No. 843,662.

PATENTED FEB. 12, 1907.

L. V. BROPHY.
ELEVATING GRADER.
APPLICATION FILED DEC. 10, 1906.

3 SHEETS—SHEET 1.



Witnesses
Harry R. L. White
O. C. Kuehling

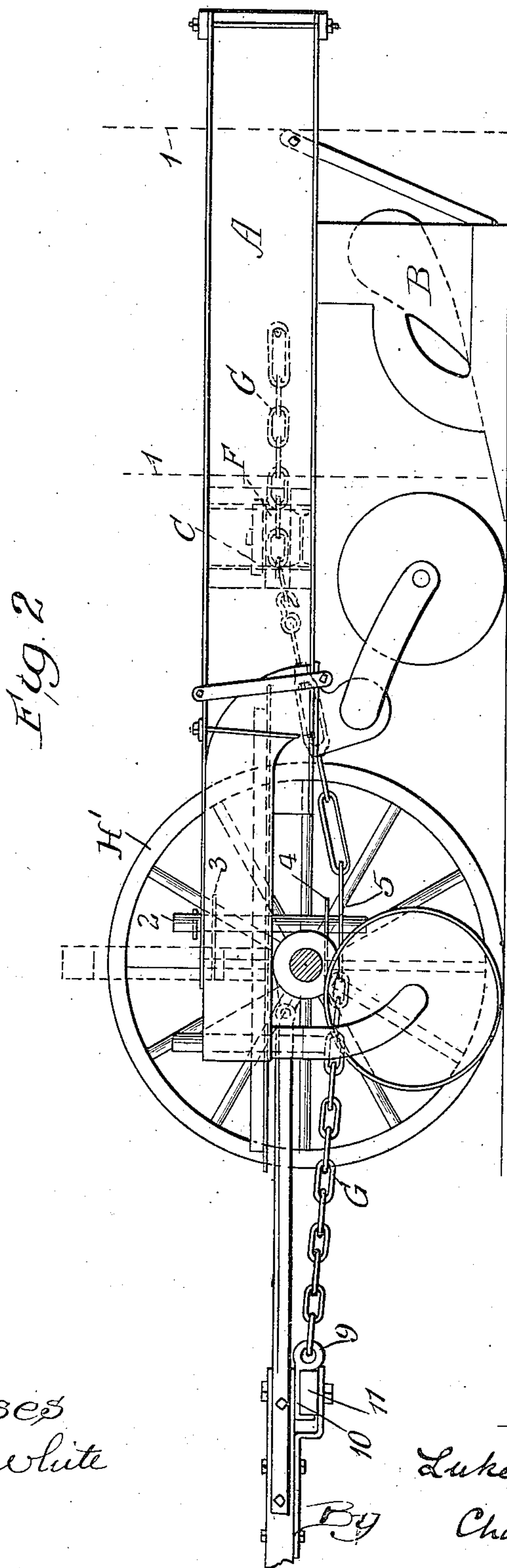
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3 SHEETS—SHEET 3.

Fig. 3

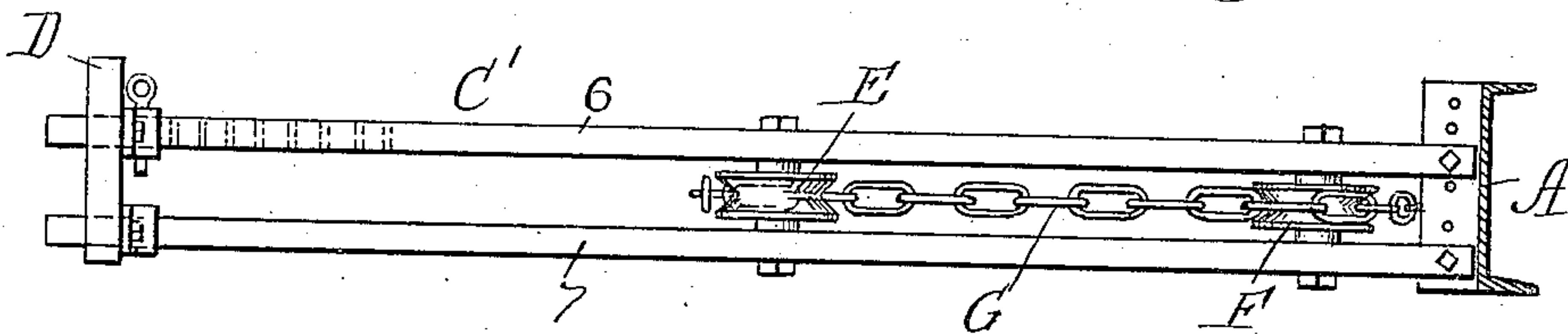


Fig. 4

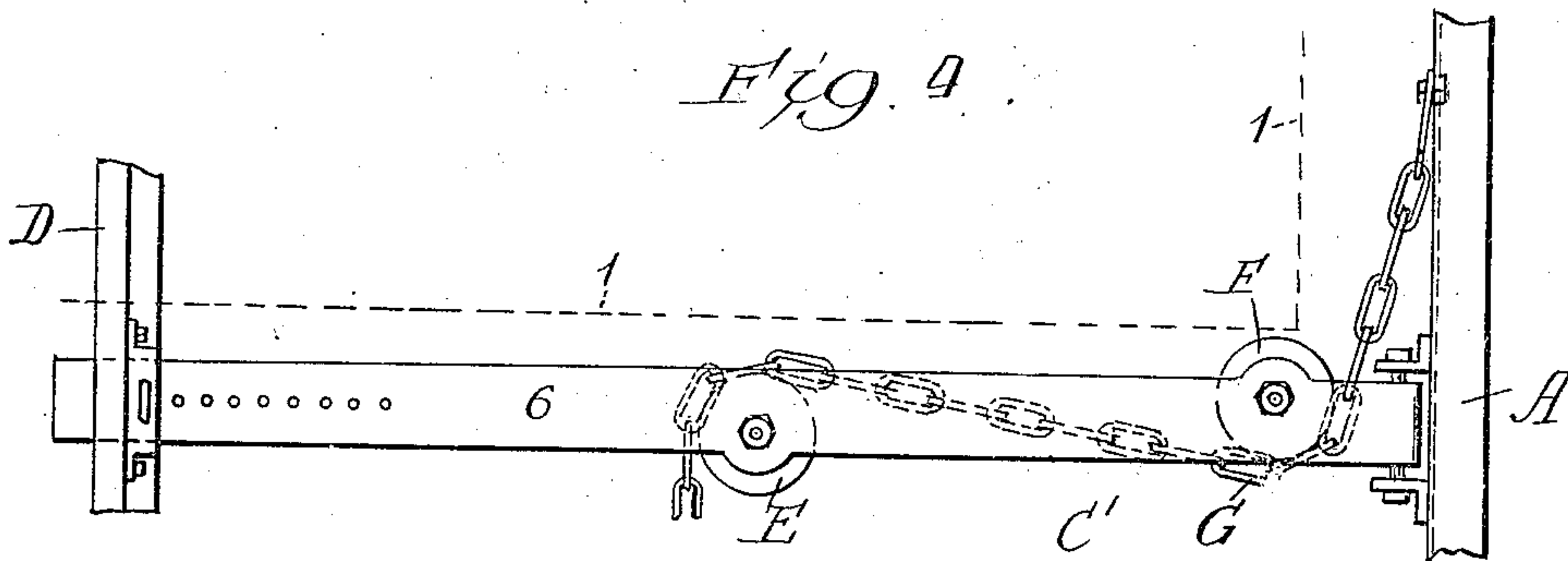
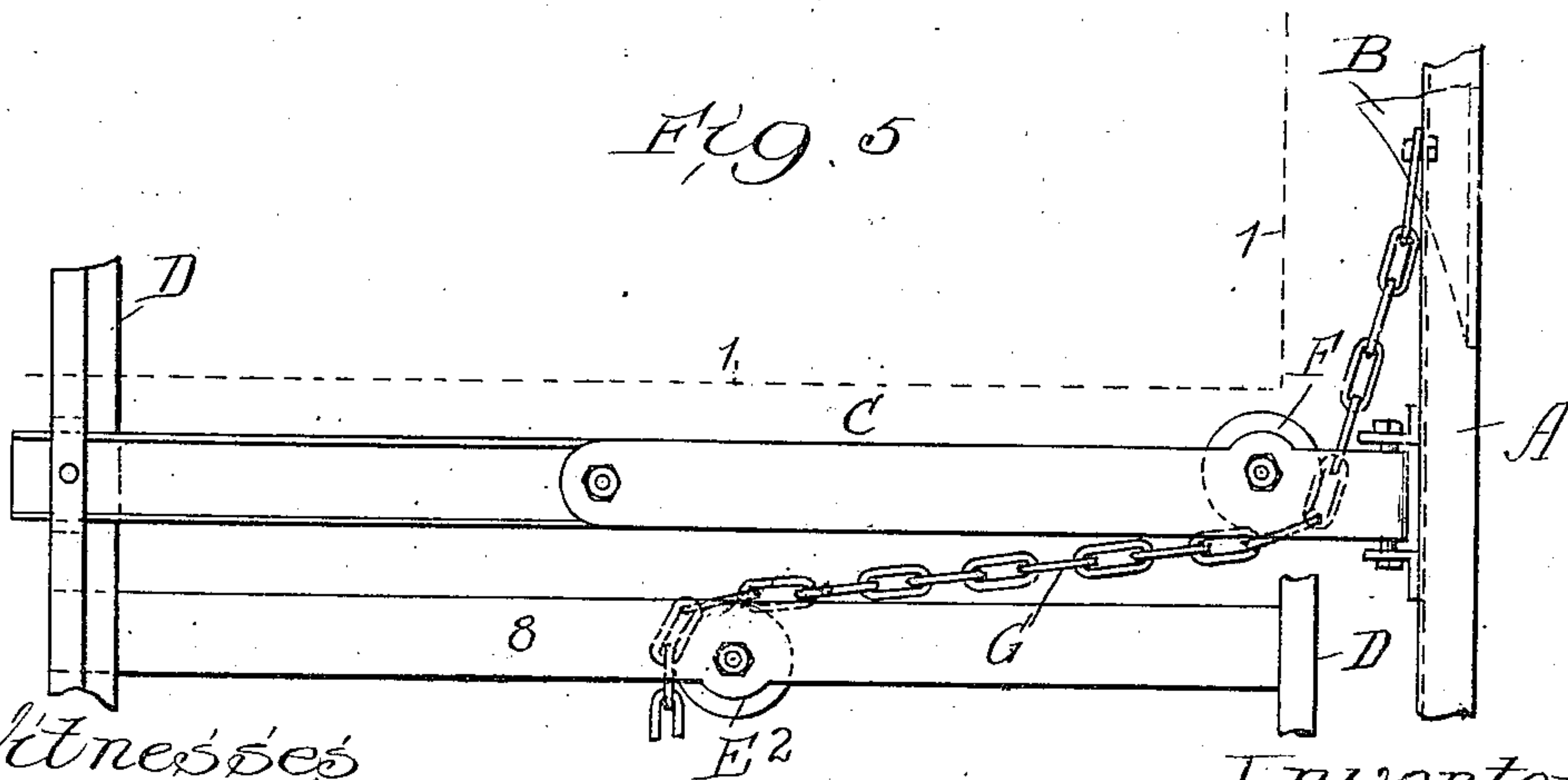


Fig. 5



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UNITED STATES PATENT OFFICE.

LUKE VINCENT BROPHY, OF FORT WAYNE, INDIANA, ASSIGNOR TO INDIANA ROAD MACHINE COMPANY, OF FORT WAYNE, INDIANA, A CORPORATION OF INDIANA.

ELEVATING-GRADER.

No. 843,662.

Specification of Letters Patent.

Patented Feb. 12, 1907.

Application filed December 10, 1906. Serial No. 347,083.

To all whom it may concern:

Be it known that I, LUKE VINCENT BROPHY, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Elevating-Graders, of which the following is a specification.

My invention relates to excavating-machines of the class commonly known as "elevating-graders," and comprising a wheeled carriage, a plow having its beam suspended for desired adjustments at one side of the wheeled carriage, a transversely-positioned elevating-conveyer for receiving the plowed-up soil from the plow, and transversely-arranged stay devices positioned, respectively, fore and aft of the elevating-conveyer and having articulated connections with the plow-beam and one side of the body-frame of the wheeled carriage. In some of these machines the forward stay device consists of a transversely-arranged bar having one end hinge-connected with one side of the body-frame and having its opposite end hinge-connected with the plow-beam at a point forward of the plow, the stay-bar being also connected with some selected forward member or part of the machine by a draft-chain, which has its rear terminal secured to the stay-bar at a point between the hinged ends of the latter, and in such case the back pull of the plow is directly on the stay-bar, which is therefore a combined stay and draft bar, an illustration of such arrangement being afforded by Letters Patent No. 393,467, to W. J. Edwards, dated November 27, 1888. In another instance—patent to T. J. Gray, No. 743,487, dated November 10, 1903—the draft-chain in place of being secured to the stay-bar is connected with the evener and extended back to the middle of the front axle or bolster and thence laterally deflected so as to extend back to the plow or plow-beam at a point adjacent to the plow to which it is attached, and in this way there is a direct draft between the plow and member to which the forward end of the draft-chain is attached, and thereby the stay-bar is relieved of strain and liability of becoming broken or otherwise injured. In such case, however, the laterally-deflected or oblique portion of

the draft-chain induces or exerts a side draft on the plow and its beam.

Objects of my invention are to reduce or altogether avoid such side draft without dispensing with the stay-bar and draft-chain; to avoid the objectionable shocks and strain to which the stay-bar has been subjected in machines in which the rear terminal of the draft-chain has been secured to the stay-bar; to provide between the plow at one side of the machine and a forward point along the longitudinal middle line of the machine an extremely simple and flexible draft connection involving a draft-chain as a means for direct draft and avoiding undesirable side draft on the plow, and to provide certain improved features of construction and arrangement.

In the accompanying drawings, Figure 1 is a top plan view of as much of an elevating-grader as is necessary for the purpose of illustrating my invention, parts of the body-frame portion shown being broken away for convenience of illustration and the position of the elevating-conveyer being indicated by dotted lines. Fig. 2 is a side elevation of Fig. 1. Fig. 3 shows, on a larger scale, a front elevation of the stay-bar composed of upper and lower bars or sections which have forward bearings for the two sheaves. Fig. 4 is a top plan view of Fig. 3. Fig. 5 is a top plan view of a portion of the machine and illustrating one of the two sheaves on the stay-bar and the remaining one of said sheaves on a cross-bar which forms a portion of the body-frame of the wheeled carriage.

In the portion of the elevating-grader illustrated, A indicates the plow-beam provided with a plow B and arranged alongside the wheeled body-frame of the carriage. The plow-beam is understood to be suspended for movements or adjustments, such as in the prior patented elevating-graders hereinbefore referred to, and it is also laterally stayed by a transversely-arranged stay-bar C, positioned forward of the elevating-conveyer, the general relative position of the elevating-conveyer being indicated by dotted lines 1 1. It is understood that the plow-beam is further stayed by a transversely-arranged stay device arranged in rear of the elevating-conveyer, as in said prior patents. The swinging stay-bar C has its opposite ends

respectively connected with one side of the body-frame D and the plow-beam by the usual or any suitable articulated connections, whereby the plow may be permitted to have its usual movements.

In Fig. 1 the stay-bar C is provided with two pulleys or sheaves E and F, the sheave E being at or near the middle portion of such bar and the sheave F being toward or adjacent to the end thereof which is hinge-connected with the plow-beam. The draft cable or chain G is attached at its forward end to a suitable forward member or part of the machine, and from this point of attachment it extends back to and connects with the plow, its rear terminal portion being preferably connected with the plow through the medium of the plow-beam to which it is attached within the vicinity of the plow portion B. This draft-chain extends from its attached forward end back to the sheave E, which is supported intermediate of the longitudinal sides of the body-frame, whereby the line of chain portion between such forward attached end of the chain and the sheave E is midway or substantially midway of the front wheels H H' of the carriage. When the draft-chain meets the sheave E, it passes about the same and thence deflects laterally and extends to and about sheave F, which is adjacent to the plow-beam, and thence said draft-chain extends back to the point where its rear terminal portion is attached to the plow or plow-beam. The sheaves E and F are supported as idlers, and the back pull of the plow incident to operation causes a direct strain on the draft-chain, which latter in turn exerts a back pull or strain on the part or member to which its forward end is attached, and hence during the operation of plowing the entire length of draft-chain between its attached forward end and its rear end, which is directly attached to the plow or its beam portion, is subject to tensile strain caused by opposition of the ground to advancement on the part of the plow. With this arrangement the comparatively short portion of the draft-chain between sheave F and the plow may be made either parallel or nearly parallel with the line of progression of the machine, it being obvious that the nearer the sheave F is set to the plow-beam the less will be any lateral deflection of such short portion of the draft-chain from the line of progression, and hence that side draft on the plow-beam is practically or materially avoided. The transverse bar C operates as a stay-bar; but in place of operating as a draft-bar subject to all of the draft strain, as in machines in which the draft-chain has its rear end portion terminating at and secured to the transverse stay and draft bar, it is relieved of such strain by extending the draft-chain from its attached forward end back to the plow-beam at a point adja-

cent to the plow, and by the arrangement of sheaves side draft on the plow is modified or avoided. The portion of the draft-chain between sheave E and the point to which the forward end of the chain is attached extends along a line midway of the front wheels and is prevented from lateral deflection at the point where it crosses the front axle by any suitable or convenient means—such, for example, as a vertical pin 2, supported by bearings 3 and 4 on the front bolster or axle and extending through a long link 5, forming a portion of the draft-chain. It will also be seen that tendency on the part of the short chain portion between sheave F and the plow to draw back the end of the stay-bar which is attached to the plow-beam is opposed by the forward chain portion passing about sheave E at the rear part thereof and thence extending forward to the point where it is attached to a forward part or member of the machine and also that in this way the draft is so equalized as to relieve the stay-bar from strain which frequently breaks or injures such bar in machines where the plow is solely drawn by such bar having secured thereto the rear terminal of the draft-chain at a point between the ends of the bar. It will also be observed that the draft-chain is not positively tied at any point or points to the stay-bar and that, to the contrary, it has, as in Fig. 1, a relatively shifting connection with such stay-bar at two points, one of which is forward of the plow and the other at or near the longitudinal middle line of the machine. When, therefore, the plow is pulled back—that is to say, when its advancement is opposed by the soil—the back pull of the plow on the draft-chain cannot relatively swing back the stay-bar without causing the sheaves E F to turn and relatively traverse the draft-chain.

In Figs. 3 and 4 the stay-bar C' generally corresponds with the stay-bar C in Fig. 1. The stay-bar C', however, is composed of two parts or sections 6 and 7, arranged one above the other and providing bearings for the spindles or axles of the sheaves E F, it being understood that these two parts 6 and 7 are connected with the body-frame at one side of the machine and with the plow-beam at the opposite side of the machine by suitable articulated connections and that the draft-chain is arranged and extended to pass about sheaves E and F, as in preceding figures.

In Fig. 5 the stay-bar C is provided with sheave F, as in Fig. 1; but in place of supporting sheave E of Fig. 1 on the stay-bar a like sheave E² is supported upon a middle portion of the wheeled body-frame—as, for example, it is supported on a cross-bar 8, which is secured to the body-frame. The effect of this arrangement is also to equalize the draft and relieve the stay-bar and secure the effect of a direct draft on the plow

through the medium of the draft-chain G. In both Figs. 1 and 5 the draft-chain is attached to a forward part or member of the machine and thence extends back to and about a sheave supported upon the machine between the sides thereof and thence laterally to and about a sheave F, supported near the plow-beam, and thence back to the plow.

While the forward end of the draft-chain can be attached to any suitable forward part or middle of the machine, I prefer to connect its forward end with the evener, and for such purpose I have shown in Fig. 2 its forward end attached to the eye portion 9 of a hook 10, which is understood to engage the evener or doubletree 11 at the middle of the latter. The draft-chain can be attached to other forward parts or members, as in patents hereinbefore mentioned, without departing from the spirit of my invention; but I preferably connect it with the evener or doubletree at a point midway of the ends of the latter and maintain the chain portion between the front axle and the sheave E or E² in or substantially in a middle line by means of some suitable device on the front axle or bolster—such, for example, as by the pin 2 and the long link 5. The remaining portion of the machine (not herein shown and particularly described) may be of any suitable or desired construction—for example, such as is shown in said Patent No. 743,487.

While I have thus far described the plowing implement as consisting of a plow-beam A and plow B, it is understood that, broadly considered, the members A and B combine to form a plow and that while the rear end of the draft-chain can be directly attached to either of such members at a point back of the transversely-arranged stay member C it is broadly considered attached to a plow. It is also understood that the stay member is supported for a desired extent of horizontal and vertical swing, as is usual in machines of this class, and that the plow is arranged at or toward one side of the machine, so as to permit the provision of a transversely-arranged elevating-conveyer, which delivers at its high end at the opposite side of the machine, it being usual in practice to drive a wagon alongside the machine while the latter is in operation, so as to collect the soil delivered from the elevating-conveyer. It is also desirable to attach the forward end of the draft-chain at a point coincident with the end of the pole or middle of the evener for well-known purposes.

With further reference to Figs. 1 and 5, it will be seen that in each case the chain or cable G passes about an inner sheave E or E², which is supported upon the machine, and that it also passes about an outer sheave F, which is supported for bodily movement in unison with the general movements of the plow or stay-bar.

What I claim as my invention is—

1. In an excavating-machine of the class set forth, a plow; a transverse stay member connected with the plow; a draft chain or cable attached to a part or member of the machine forward of the stay member and extended back to and connected with the plow at a point back of the connection between the plow and stay member; a sheave supported ahead of the connection between the draft chain or cable and the plow, and a sheave supported relatively nearer the longitudinal middle line of the machine, the draft chain or cable being extended back to and about the sheave which is relatively nearer the middle longitudinal line of the machine, and thence extended laterally to and about the sheave which is relatively nearer the plow, and thence extended back to its point of connection with the plow in rear of the connection between the plow and stay member.

2. In an excavating-machine of the class set forth, a plow; a transverse member connected with the plow; a draft chain or cable attached to a part or member of the machine forward of the stay member and extended back to and connected with the plow at a point back of the connection between the plow and stay member; a sheave supported upon the stay member adjacent to the plow and ahead of the connection between the plow and draft chain or cable, and a sheave supported relatively nearer the middle longitudinal line of the machine, the draft chain or cable between its attached ends being arranged to pass about the two sheaves.

3. In an excavating-machine of the class set forth, a plow supported at one side of the machine; a transversely-arranged stay-bar having hinge connections with the body-frame and the plow; a draft chain or cable attached to a part or member of the machine ahead of the middle portion of the stay-bar and extended back and connected with the plow in rear of the connection between the plow and stay-bar; a sheave supported for bodily movement in unison with the stay-bar and arranged ahead of the connection between the plow and the chain or cable, and a second sheave supported upon the machine relatively toward the middle longitudinal line thereof, the chain or cable being arranged to pass about the two sheaves and thereby having its portion between the sheaves deflected laterally with relation to the line of progression of the plow.

4. In a machine of the class set forth, a wheeled carriage provided with an elevating-conveyer; a plow arranged at or toward one side of the wheeled carriage; a transversely-arranged hinged or pivoted stay-bar for laterally staying the plow; a pair of sheaves supported upon the stay-bar, one of said sheaves

being supported upon the stay-bar adjacent to the plow and the other being supported upon the stay-bar relatively nearer the longitudinal middle line of the machine, and a
5 draft chain or cable attached to a part or member of the machine ahead of the sheave which is relatively nearer the middle longitudinal line of the machine, said draft chain or cable being arranged to pass about the
10 sheave last mentioned and thence to and about the sheave which is nearer the plow, and thence rearwardly to a point where it is secured to the plow.

5. In a machine of the class set forth, a
15 wheeled carriage; a plow supported at or toward one side of the carriage; a transversely-arranged stay-bar having hinge connection with the plow at one side of the machine and

with the body-frame of the carriage toward the opposite side of the machine; a sheave 20 supported on the draft-bar adjacent to the plow; a sheave supported on the draft-bar toward the longitudinal middle portion thereof; and a draft chain or cable connected with the evener and extending back there- 25 from to and about the sheave which is arranged at or toward the middle of the stay-bar, and thence extending laterally to and about the sheave which is adjacent to the plow, and thence extending back to and con- 30 nected with the plow.

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