

**No. 675,637.**

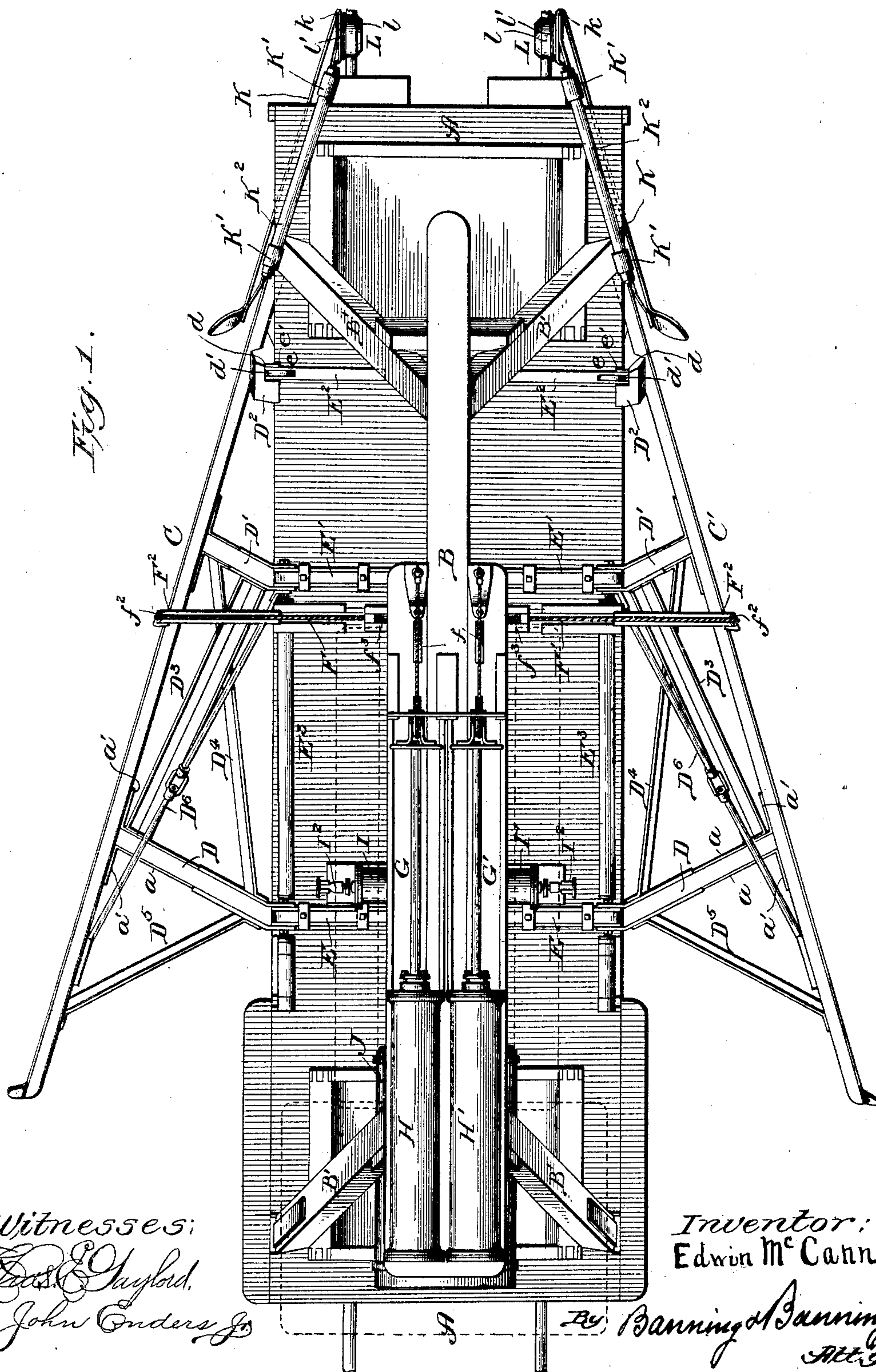
**Patented June 4, 1901.**

**E. McCANN.**  
**RAILWAY GRADER.**

(No Model.)

(Application filed Feb. 2, 1901.)

**4 Sheets—Sheet 1.**



Witnesses:  
E. G. Gayford.  
John Enders Jr.

*Inventor:*  
Edwin M<sup>c</sup> Cann.

By Banning & Banning  
Attys

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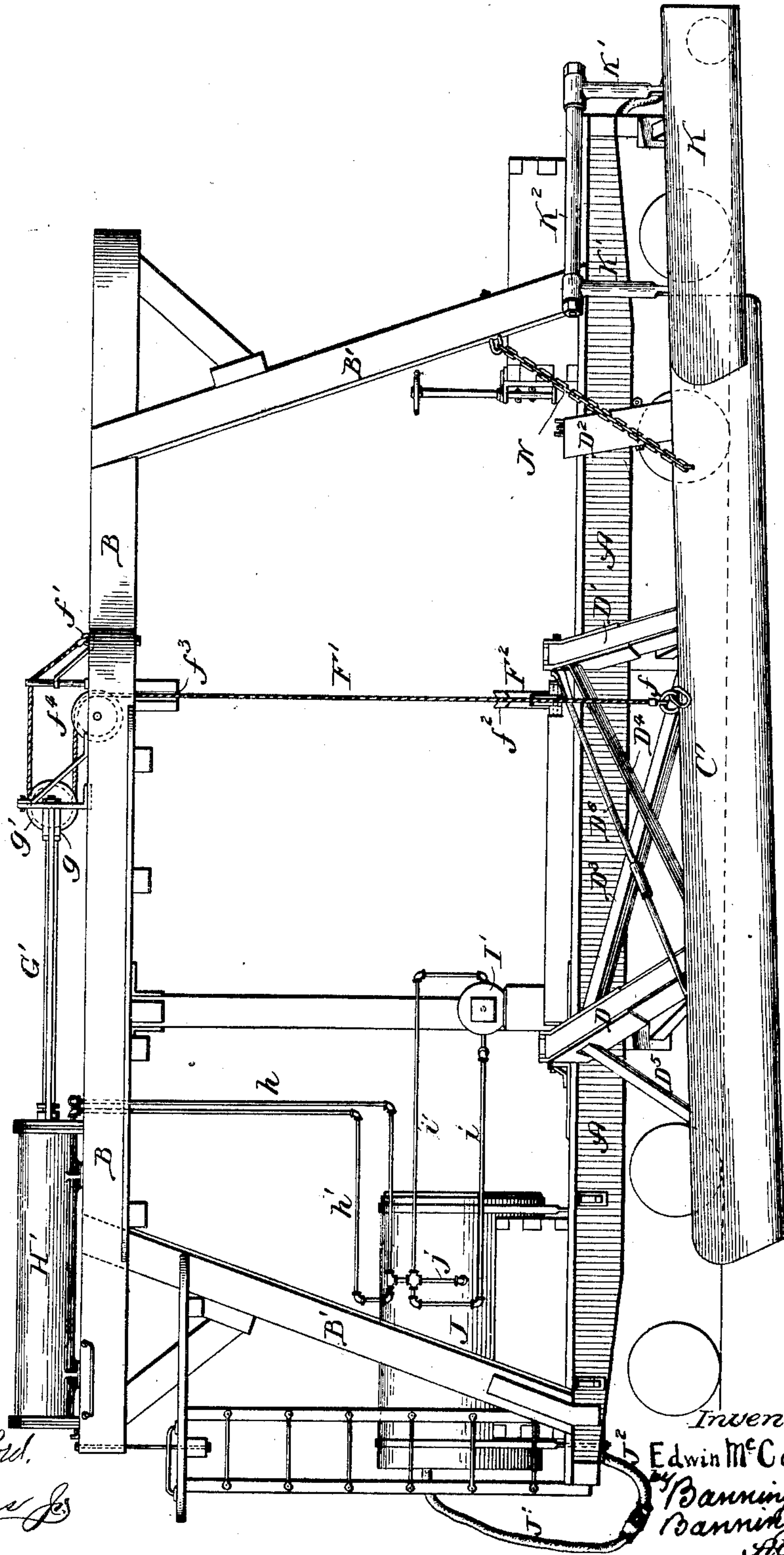
E. McCANN.  
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(No Model.)

4 Sheets—Sheet 2.

Fig. 2.



Witnesses:

Chas. E. Gaylord,  
John Enders Jr.

Inventor

Edwin McCann  
Banning &  
Banning  
Atty



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**4 Sheets—Sheet 3.**

Page 3.

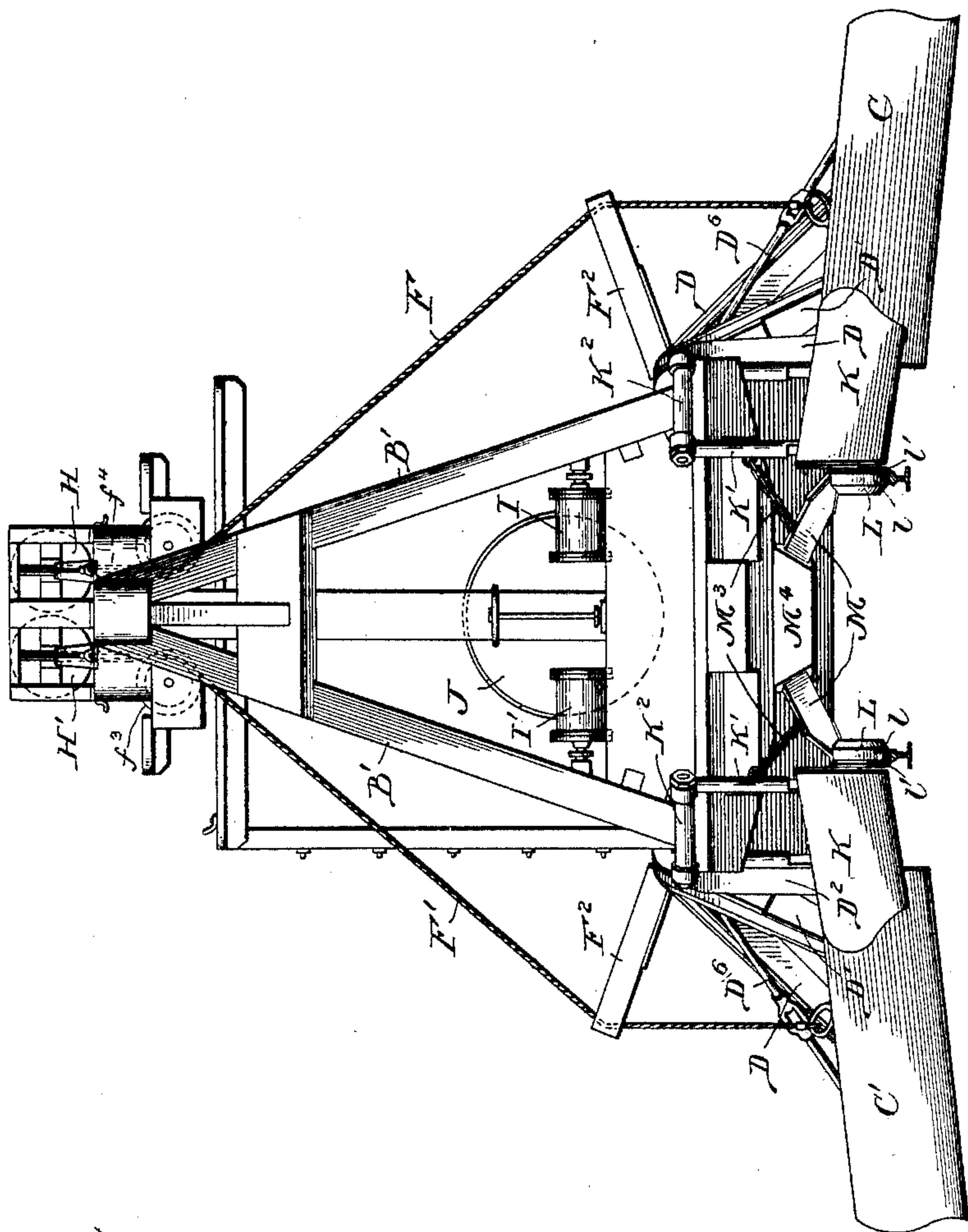
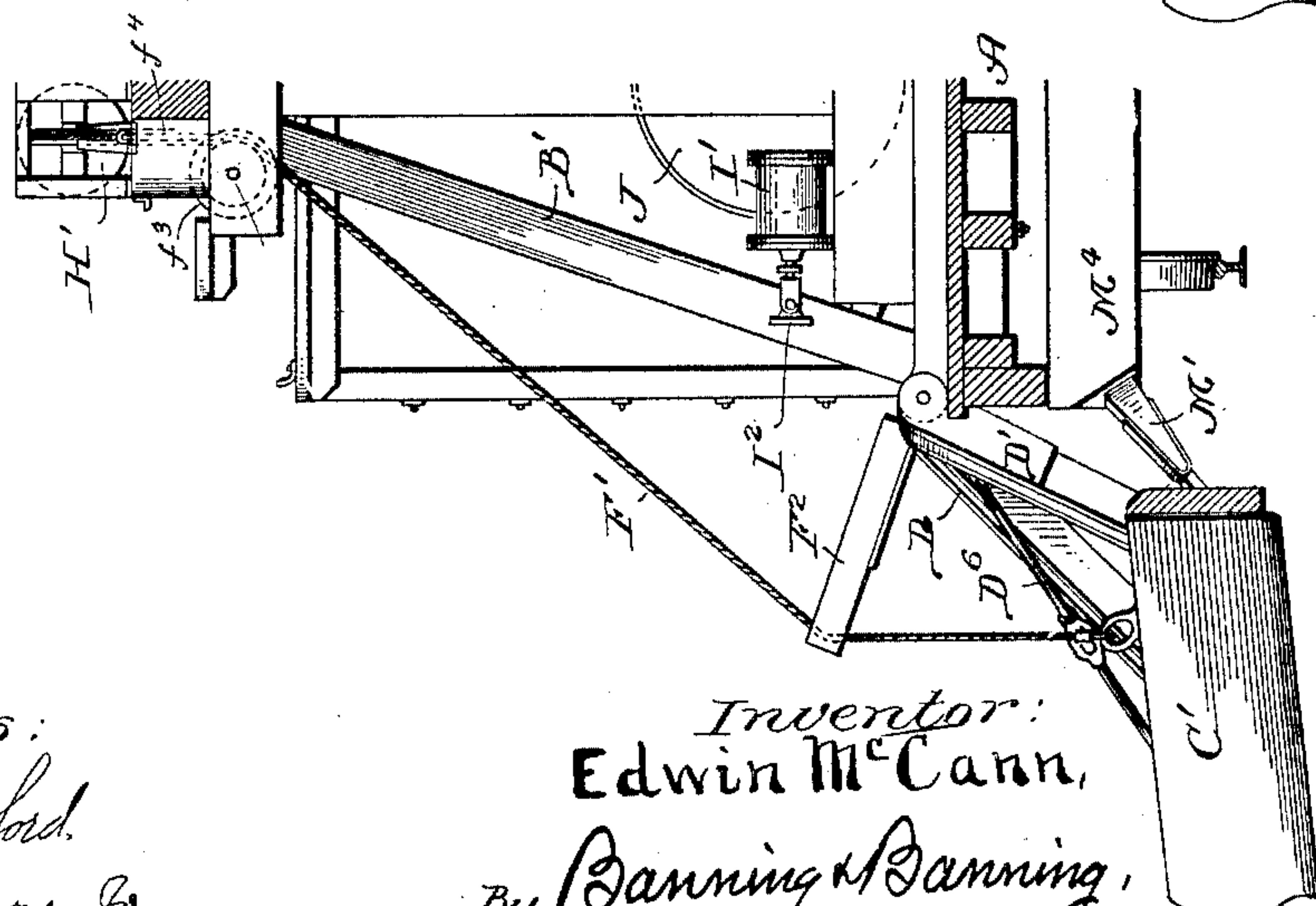


Fig. 4.



Witnesses:  
E. & Gaylord.  
John Enders, Jr.

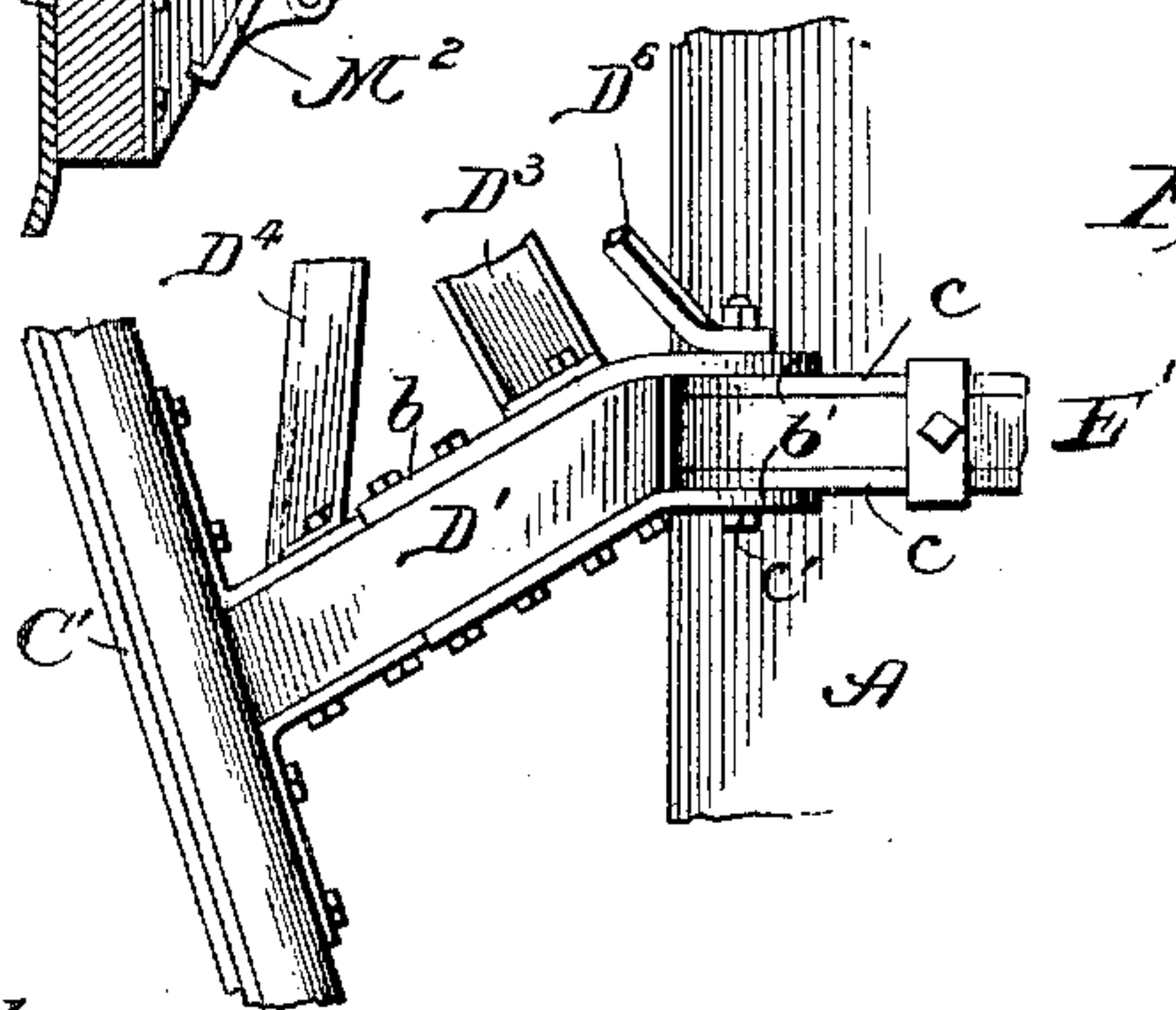
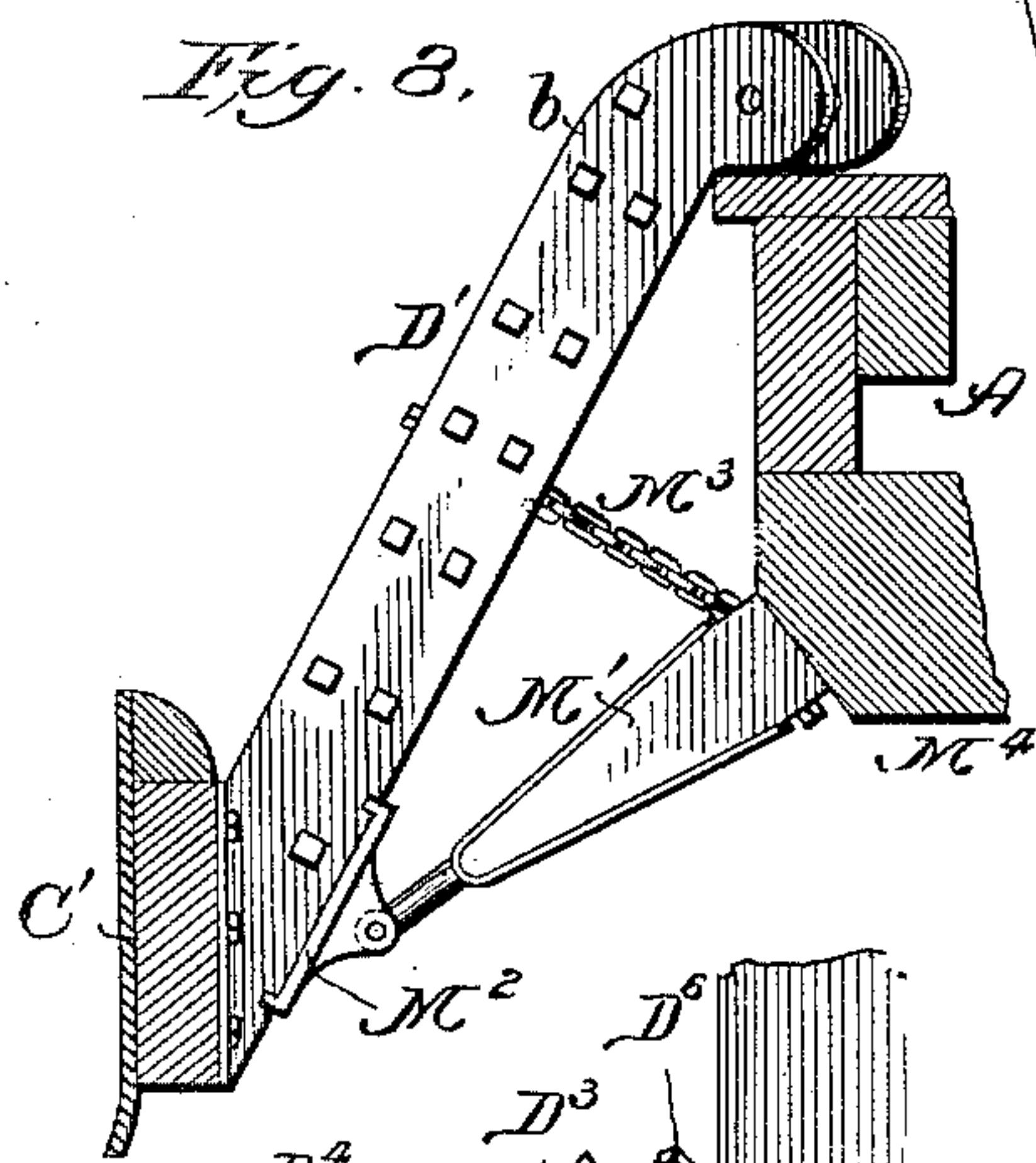
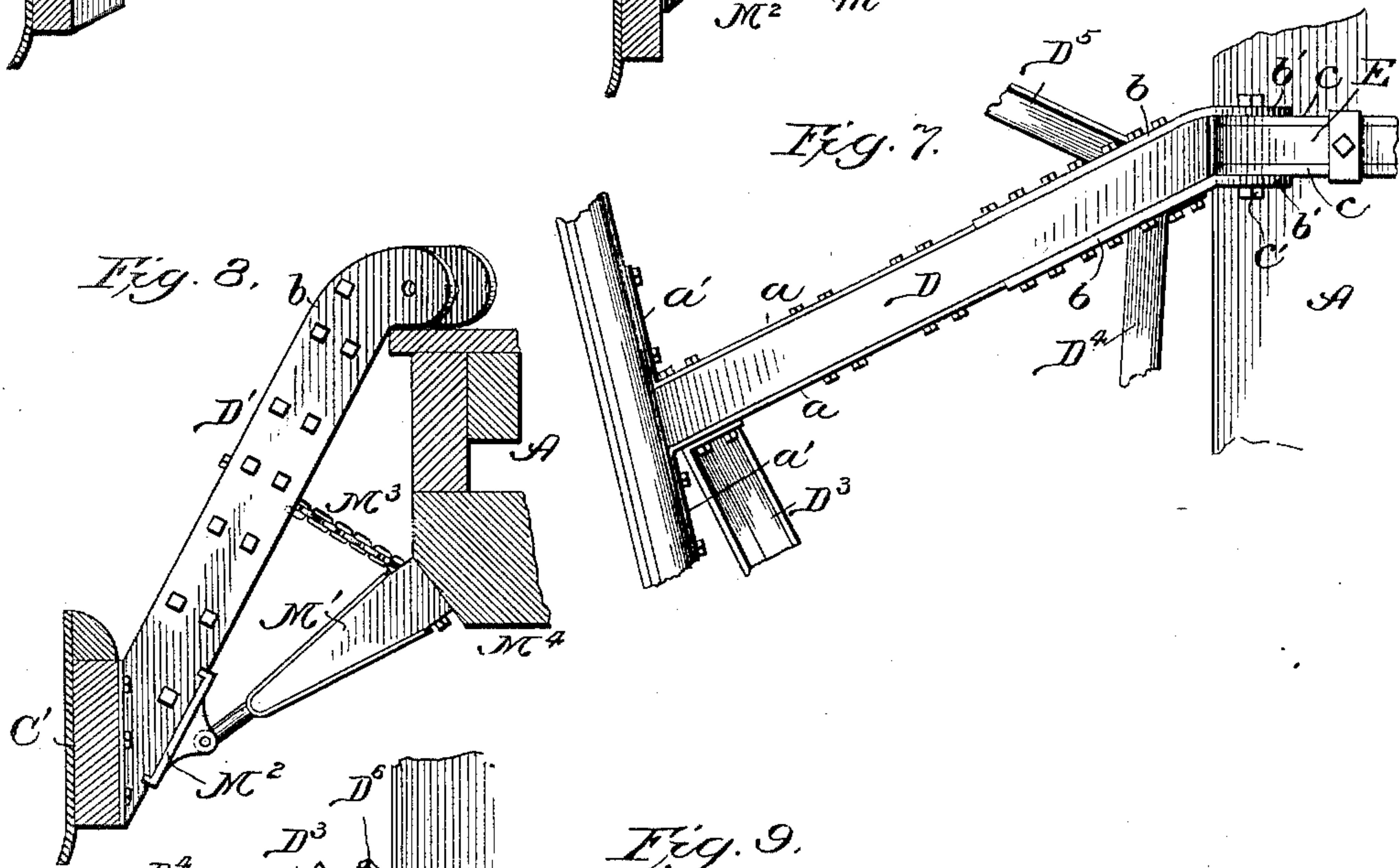
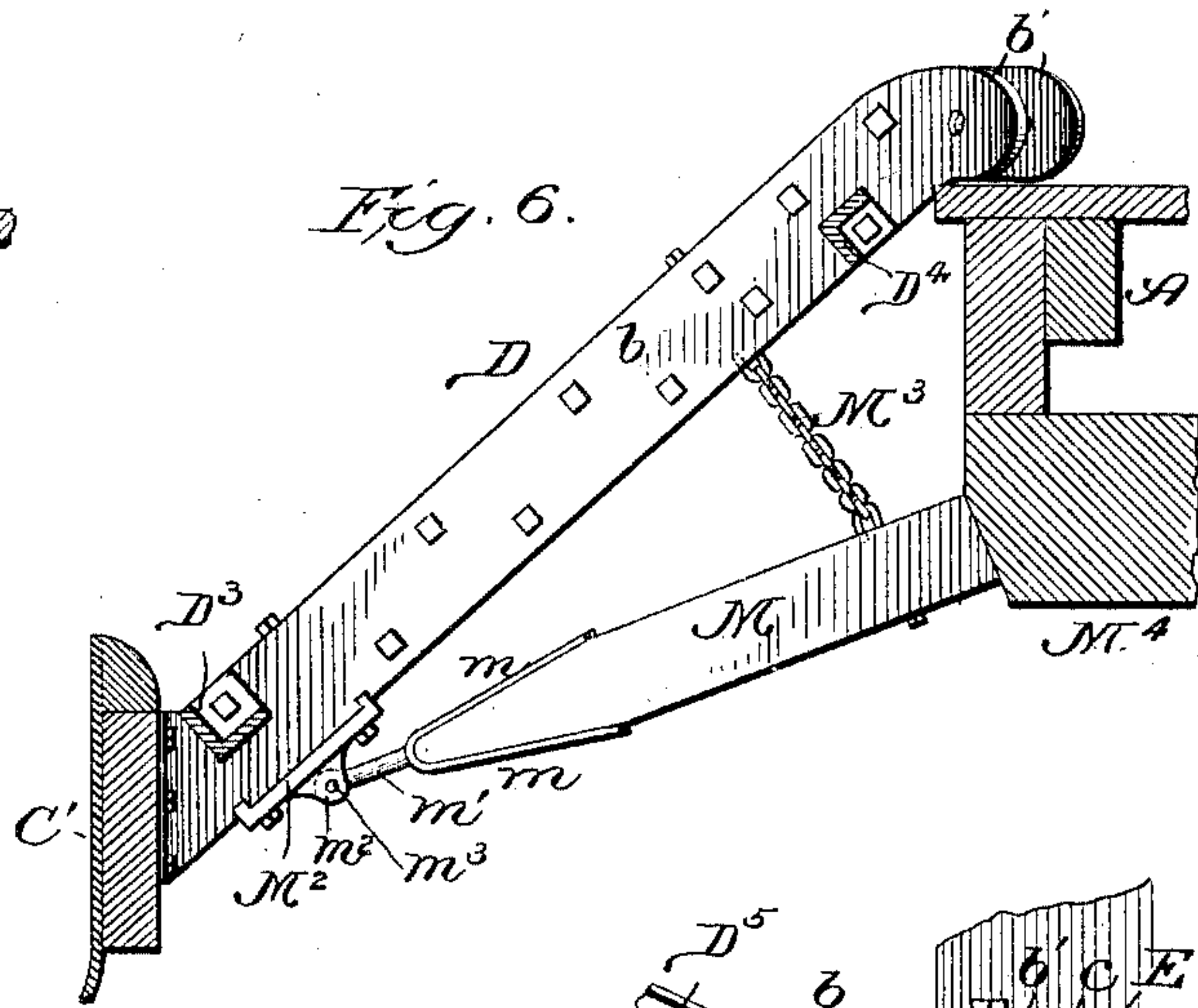
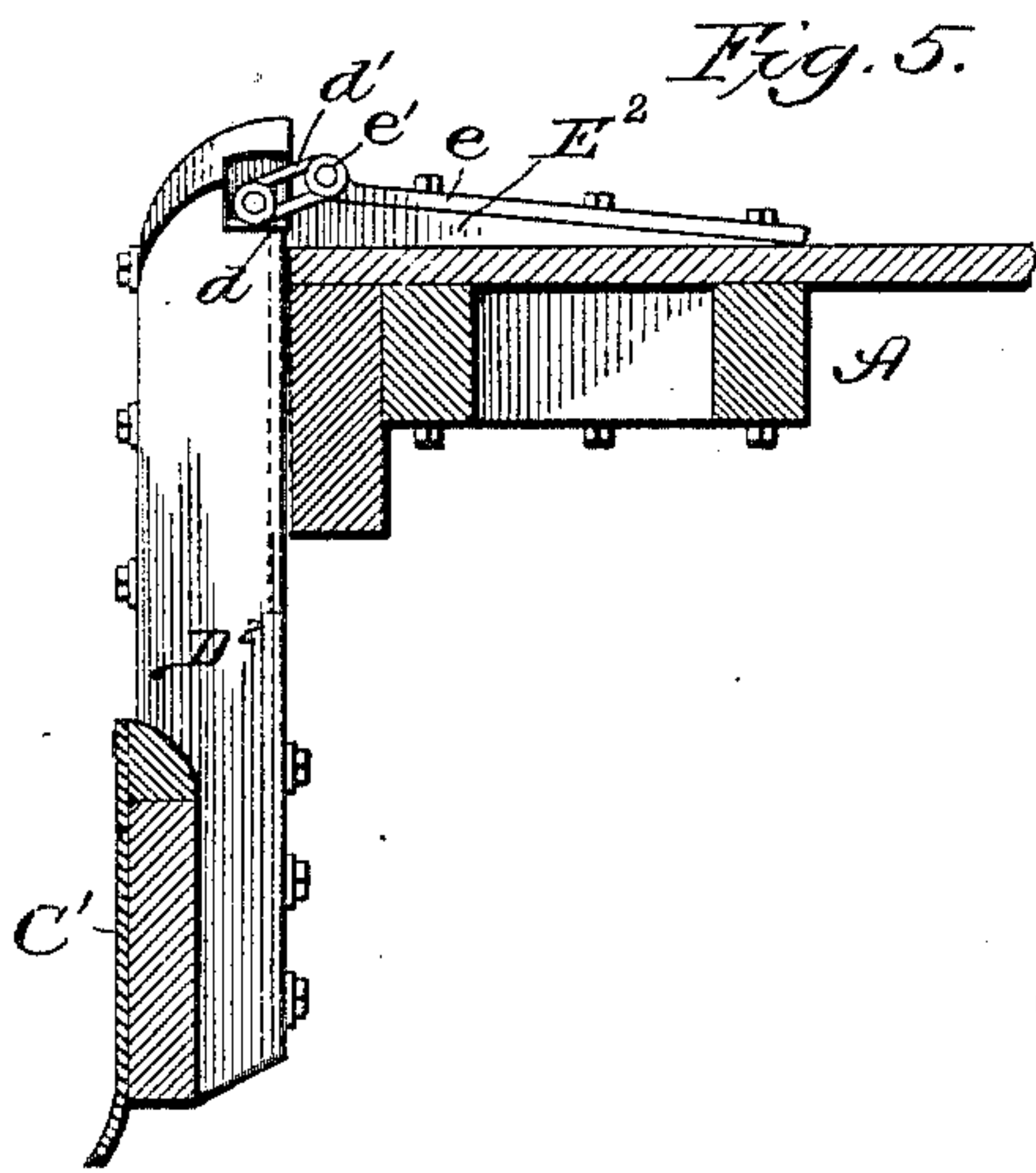
*Inventor:*  
Edwin McCann,  
*By* Danning & Danning,  
*Att'ys.*

E. McCANN.  
RAILWAY GRADER.

(Application filed Feb. 2, 1901.)

(No Model.)

4 Sheets—Sheet 4.



Witnesses:  
Edw. Gaylord,  
John Enders, Jr.

Inventor:  
Edwin McCann,  
By Banning & Banning,  
Att'ys.



# UNITED STATES PATENT OFFICE.

EDWIN McCANN, OF TOPEKA, KANSAS.

## RAILWAY-GRADER.

SPECIFICATION forming part of Letters Patent No. 675,637, dated June 4, 1901.

Application filed February 2, 1901. Serial No. 45,700. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN McCANN, a citizen of the United States, residing at Topeka, Shawnee county, Kansas, have invented certain new and useful Improvements in Railway-Graders, of which the following is a specification.

The object of the present invention is to construct a grader adapted for use on the road-beds of railways for the purpose of leveling the bed outside of the ties to any desired shape and removing and disposing of the grading and ballasting material and by the use of which the top of the embankment on each side of the rails can be brought into the proper shape and condition for the reception and distribution of the ballast, and by the use of which also the ballast will be uniformly and evenly distributed, so as to leave the road-bed of a standard formation, with the ballast properly distributed thereon by the operation of the grader, which will remove any surplus ballast at one point and deposit the same at other points where the ballast is not sufficient; and the invention consists in the employment of two wings, one on each side of a car-body and connected in such manner as to be adjustable to any height and angle desired and manipulated or operated through the medium of compressed air, by which the wings can be readily and quickly raised and lowered, so that when raised they will clear bridges or other obstructions and when lowered will be so braced as to be held perfectly rigid and firm in the operation of grading and disposing of the ballast; and the invention further consists in the features of construction and combinations of parts hereinafter described and claimed.

In the drawings illustrating the invention, Figure 1 is a top or plan view showing the side wings and the front templets or shares lowered in position for use; Fig. 2, a side elevation with the wings and shares as in Fig. 1; Fig. 3, a front end elevation with the wings and shares as in Fig. 1; Fig. 4, a cross-sectional elevation with the wings and shares as in Fig. 3; Fig. 5, a detail showing the hanger for securing the forward end of each wing to the car-body; Fig. 6, a detail, partly in section, showing the hanger for the rear end of each wing in side elevation; Fig. 7, a detail

showing the hanger for the rear end of each wing in plan; Fig. 8, a detail, partly in section, showing the intermediate hanger for each wing in side elevation; and Fig. 9, a detail showing the intermediate hanger for each wing in plan.

The wings and the appliances and mechanism for operating the wings are to be mounted and carried on a suitable car, which may be a flat-car of the ordinary construction, having a body A, with the usual trucks and wheels for cars. The supporting-framework for carrying the wings and their operating appliances and mechanism, as shown, is constructed with a central longitudinal upper beam B, supported from the bottom or body of the car A by diagonal standards or posts B', so as to give the central beam or riser a solid and firm support and bracing; but the frame can be of any suitable construction so long as it is adapted for the purpose intended.

The leveling and grading wings are located one on each side of the car, and each wing, as shown, is formed of a body or back and a metal face-plate; but the construction of the wings can be changed, so long as the construction is one to furnish a wing of the requisite strength and rigidity for the operation. A wing C is located on one side of the car, and a wing C' is located on the opposite side of the car, each wing having a rearward divergence, so as to have a wide spread between the wings at the rear end. Each wing is suspended and supported from the platform or body of the car by a rear hanger D, an intermediate hanger D', and a front hanger D<sup>2</sup>, each hanger being rigidly attached at its outer end to the wing and pivotally mounted at its inner end on the body or platform of the car. The rear hanger and the intermediate hanger are braced and connected by diagonal bars D<sup>3</sup> and D<sup>4</sup>, and the rear hanger is further braced by a diagonal bar D<sup>5</sup>, running from the inner end of the hanger to the rear end of the wing, and in addition the rear end of each wing is tied or connected with the support for the intermediate hanger by a brace or tie-rod D<sup>6</sup>, made in two sections and united by a turn-buckle in the construction shown. It will thus be seen that the wings and hangers are thoroughly and effectually braced, so as to furnish a strong support for the wings from



their suspending and connecting hangers, which is a necessity for the operation of the wings in leveling, grading, and ballasting.

The inner ends of the rear hangers D on each side are connected with a cross beam or sill E, and the inner ends of the intermediate hangers D' are connected to a cross sill or beam E', and the cross sills or beams E and E' are firmly secured to the platform or body of the car by straps or bolts or in any other suitable manner. The inner ends of the hangers D<sup>2</sup> are connected to supports E<sup>2</sup>, which supports are bolted or otherwise fastened firmly to the platform or body of the car. Each intermediate and rear hanger has a center, bolted to the sides of which at the outer end are metal plates *a*, and each plate has its ends *a'* turned at an angle to the body of the plate, so that the body of the plates can be bolted to the center of the hanger and the turned ends of the plate can be bolted to the body of the wing, firmly attaching the hangers to the wing. The center of each hanger, at the upper end on each side, has bolted thereto a plate *b*, the ends of the plates projecting beyond the end of the center and forming ears *b'*, between which is located the end of the cross sill or beam by which the hanger is attached to the platform or body of the car. Each cross sill or beam in the construction shown has metal side plates *c*, and the ears *b'* are pivotally connected to the end of the cross sill or beam by a bolt *c'*, passing through the side plates *c* and the end of the cross sill or beam, and the ears *b'* are turned so as to lie parallel with the sides of the cross sill or beam and at an angle in relation to the hanger, so that the hanger is suspended from its supporting beam or sill at an angle of inclination forward, furnishing a more effective bracing effect and also enabling the raising and lowering of the wing to be accomplished under the best conditions possible and without any liability of twisting or binding in the operation of raising and lowering the wing. The front hanger D<sup>2</sup> has at its inner end a plate *d*, terminating in ears, between which is pivotally connected a link *d'* by a suitable pin or pivot passing through the ears and through the outer end of the link, and the inner end of the link is pivotally connected by a suitable pin or pivot between ears *e'* on a plate *e*, attached to the support E, so that the support D<sup>2</sup> at its attached end has the requisite form of swing through the link connection by which it will clear the platform or body of the car as the wing is raised and lowered. The construction and connection of the front hanger to the platform or body of the car and the wing are shown in Fig. 5. The construction and connection of the rear hanger to the body of the car and to the wing are shown in Figs. 6 and 7, and the construction and connection of the intermediate hanger to the body of the car and the wing are shown in Figs. 8 and 9. It will thus be seen that the wings are each

supported on the sides of the car, so as to have a perfect freedom of movement in raising and lowering and so as to be firmly braced by the intermediate and rear hangers against the resistance of the material in the operation of leveling, grading, and ballasting the road-bed.

The wing C has attached thereto by a ring or link *f* or otherwise one end of a cable or rope F, and the wing C' has attached thereto in a similar manner one end of a rope or cable F'. Each rope or cable from its point of attachment to the wing passes up between the forked end *f*<sup>2</sup> of a guide F<sup>2</sup>, over a pulley *f*<sup>3</sup>, and over a pulley *f*<sup>4</sup> and is connected at its other end to an eyebolt *f'* or other attachment on the upper sill or beam of the frame. Each rope or cable after leaving its guide-pulley *f*<sup>4</sup> passes to and around a pulley *g'*, carried by a cross-head *g* on the end of a piston-rod, and a piston-rod is provided for each rope or cable, so that each rope or cable has its own independent means for raising and lowering its wing. The piston-rod G for the rope or cable F is operated from a compressed-air cylinder H, in which cylinder a piston on the end of the rod is located and operates, and the piston-rod G' for the rope or cable F' is operated from a compressed-air cylinder H', in which cylinder a piston on the end of the rod is located and operates, so that with the recession of the piston in each compressed-air cylinder the rod of such cylinder will be receded, carrying with it the pulley *g* and drawing the rope or cable inward or toward the cylinder, raising the wing into its elevated position.

The two cylinders H and H' are supplied with compressed air by pipes *h* and *h'*, running to the respective cylinders from a compressed-air reservoir J, having an outlet-pipe *j*, to which the pipes *h* and *h'* are connected, and a suitable valve is provided between the supply-pipe *j* and connecting-pipes *h* and *h'*, by which compressed air can pass from the reservoir J through the pipes to the cylinders when required to move the pistons in the cylinders in a direction to raise the wings to their elevated positions. The reservoir J can be charged by a hose J', connected with the hose J<sup>2</sup> of a train-pipe for compressed air, or the hose J' can be connected with a compression-pump and the reservoir charged independent of the train-pipe and compression-pump on the engine, or, if desired, the hose J' can be connected direct with the valve controlling the supply of compressed air to the cylinders, and such air can be forced direct into the cylinders from the train-pipe and compression-pump on the engine, it being immaterial how the compressed air is supplied to the cylinders so long as the supply is under a control by which the piston-rods can be actuated as required to raise the wings and the pressure released for the wings to drop or descend into position for use.

The wings when raised or elevated stand in



a folded condition above the body or platform of the car and at an inclination, from which they will not drop or fall until the pivotal center of the hangers to the body of the car has been outwardly passed by the wing, and to furnish a means for initially starting the wing on each side, so that it will descend by its own weight from a raised position, an air-cylinder is provided for each wing. The wing C has a compressed-air cylinder I, and the wing C' has a compressed-air cylinder I', and each compressed-air cylinder has a bumper or head I<sup>2</sup>, carried by a piston-rod operated from a piston in the respective cylinders, so that with the outward movement of the piston-rod the bumper or head will engage with the rear hanger D of the wing and turn the hanger and the wing to a position where the wing is outside of the pivotal points of the hangers, and its weight will complete the descent of the wings to operative position, at which time the cylinders H and H' exhaust, so as to permit the wings to descend gradually until the operating-point for the wings has been reached. The cylinder I is supplied with compressed air from a tank or reservoir J by a pipe *i*, and the cylinder I' is supplied with compressed air from the tank or reservoir by a pipe *i'*, both pipes *i* and *i'* having a connection with the supply-pipe *j*, and a suitable valve is provided for controlling the admission of pressure to the pipes *i* and *i'* as required for moving the pistons in the respective cylinders outward to advance the heads I<sup>2</sup> and have the heads engage the hangers and move the wings outward, so as to descend by their own weight. The valve controlling the admission of pressure to the cylinders H and H' and the valve controlling the admission of pressure to the cylinders I and I' are under the control of an operator, who by turning the valves in the proper direction admits air to the respective cylinders for raising and lowering the wings, so that a single operator easily controls the movements of the wings in raising and lowering, and such control by a single operator is had without any trouble or inconvenience, and the wings are operated easily and quickly through the medium of compressed air, requiring no exertion on the part of the operator in moving the wings.

The side wings do not extend forward to the full extent necessary for operating adjacent to the rails, and to complete the operation from the terminal point of the wings on each side to the track-rails independent templets or shares K are provided. Each templet or share is suspended by hangers K' from a support K<sup>2</sup> on the platform or body of the car and is suspended so that it hangs when down and in operative position outside of the line of the wing, but overlapping at its rear end the front end of the wing, as shown in Fig. 1. The forward end of each templet or share K is turned, so as to have an end *k*, which stands parallel with the rail of the

track, and to this end *k* is journaled a wheel L, having a tread *l* to run on the rail with a flange *l'*, which lies against the outside of the rail, so that the flange furnishes a support against the rail for the inward pressure at the forward end of the templet or share, as shown in Figs. 1 and 3. The front templets or shares on each side are raised with the upward movement of the wings, through the engagement of the front end of the wing with the under side of the templet or share at the rear end, and when raised to the full limit the templets or shares will be folded and pass the pivotal point, and will be held in their raised position. The templets or shares can be dropped by hand or otherwise, when required.

The hangers D and D' will ordinarily furnish sufficient bracing for the wings, but additional bracing is furnished by braces M for the rear end of each wing and intermediate braces M' for each wing. Each rear and intermediate brace is pivotally connected with a supporting-plate M<sup>2</sup> on the main rear and intermediate braces and hangers D and D', and, as shown, the outer end of each brace M and M' has a forked plate *m* bolted thereto, extending out from which is a stem *m'*, connected by a pin or pivot *m*<sup>2</sup> between ears *m*<sup>3</sup> on the attaching-plate M<sup>2</sup>, and the inner end of each additional brace M and M' is suspended from its rear or its intermediate hanger by a chain M<sup>3</sup>, so that as the hanger to which the additional brace is connected descends the additional brace will go therewith for its inner end to abut against a stop-block or beam M<sup>4</sup> on the platform or body of the car, as shown in Figs. 6 and 8. It will thus be seen that each wing has a brace from its suspending hangers, and at the same time an additional brace is furnished, so that the wing is capable of resisting the strain required for its operation in moving the material in the formation of the embankments and sides of the road-bed and distributing and disposing of the material and ballast for the bed. As shown, the forward end of each wing is supported by a chain N, running from the wing to the diagonal supporting beam or sill B' of the framework on the platform or body of the car.

The wings and the templets or shares on each side are raised by the admission of compressed air into the cylinders H and H' for the air to move the piston-rods G and G' in the cylinders and have the ropes or cables raise the wings, and this raising of the wings is facilitated through the hangers by which they are suspended from the sides of the platform or body of the car. The wings can be quickly and easily raised, as required for the purpose of clearing bridges or other obstructions or for the purpose of moving the grader from place to place on the railway, as required for use. The wings when down operate to level the road-bed outside of the ties and to remove and dispose of the material deposited on the bed, and the operation will be from the outside of the rail to the width de-



sired through the action of the wings and the templets or shares which coöperate therewith. The grader enables the top of embankments to be formed into the proper shape ready for the reception of ballast and also enables the ballast to be distributed evenly and uniformly over the bed, and each operation is performed through the wings and the coöperating templets or shares. The wings are braced and held firmly when down in position for use and can be dropped and raised whenever required through the operation of compressed air in the cylinders, and the compressed air can be admitted by an operator riding on the platform or body of the car, so that a single operator is all that is necessary to maintain full and complete control of the operation of the wings, and consequently the operation of the grader as a whole.

20 What I regard as new, and desire to secure by Letters Patent, is—

1. In a railway-grader, the combination of a side wing hung or suspended from a car platform or body and having a divergence or spread rearwardly and free to be raised and lowered and when lowered operate to level the embankment on the side of the track, a series of hangers suspending the wing, each hanger at each outer end having a rigid and fixed attachment to the wing and the rear and intermediate hangers at their inner ends having a fixed rigid extension standing in right-angle relation to the car platform or body and all the hangers at their inner ends having a horizontal pivotal connection to the car platform or body, and means for raising and lowering the wing on the pivotal connections of the inner ends of the hangers, substantially as described.

2. In a railway-grader, the combination of a side wing hung or suspended from a car platform or body and having a divergence or spread rearwardly, a rear hanger and an intermediate hanger carrying the wing, each hanger at its outer end having a rigid and fixed attachment to the wing and each hanger at its inner end having a fixed rigid extension standing at right-angle relation to the car platform or body and both hangers at the inner end having a horizontal pivot connecting the hanger to the car platform or body, and means for raising and lowering the wing on the horizontal pivots of the hangers, substantially as described.

3. In a railway-grader, the combination of a side wing hung or suspended from a car platform or body and having a divergence or spread rearwardly, a front hanger having a direct connection to the car platform or body by a horizontal pivot, a rear hanger and an intermediate hanger suspending the wing from the car platform or body, each hanger at its outer end having a rigid and fixed attachment to the wing and each hanger at its inner end having a fixed extension standing in right-angle relation to the car platform or body and

connected by a horizontal pivot with the car platform or body, and means for raising and lowering the wing on the horizontal pivots of the hangers to the car platform or body, substantially as described.

4. In a railway-grader, the combination of a side wing hung or suspended from a car platform or body and having a divergence or spread rearwardly, hangers for suspending the wing from the car platform or body, a rope or cable attached to the wing, a piston-rod carrying a pulley over which the rope or cable runs, and a fluid-pressure cylinder for operating the piston-rod to raise and lower the wing by fluid-pressure, substantially as described.

5. In a railway-grader, the combination of a side wing hung or suspended from a car platform or body, hangers for suspending the wing from the car platform or body, a fluid-pressure cylinder, a piston-rod actuated by the fluid-pressure cylinder, a connection between the piston-rod and the wing for raising the wing, a fluid-pressure cylinder, and a piston-rod actuated by the last-named fluid-pressure cylinder for its end to engage the wing and initially start the descent thereof, substantially as described.

6. In a railway-grader, the combination of a side wing hung or suspended from a car platform or body and having a divergence or spread rearwardly, a series of hangers for suspending the wing from the car platform or body, each hanger at its outer end having a rigid and fixed attachment to the wing and each hanger at its inner end having a horizontal pivotal connection to the car platform or body, a templet or share at the forward end of the wing and independent thereof, suspended by swinging hangers and when lowered and in operative position having its rear end overlap the forward end of the wing and raised by the raising of the wing and lowered independent of the lowering of the wing, means for raising and lowering the wing and means for lowering the templet or share independent of the wing, substantially as described.

7. In a railway-grader, the combination of a side wing hung or suspended from a car platform or body and having a divergence or spread rearwardly, hangers for suspending the wing from the car platform or body, a templet or share at the forward end of the wing and independent thereof, a carrying-wheel at the forward end of the templet or share running on the track-rail, and fluid-pressure cylinders for raising and lowering the wing and the templet or share, substantially as described.

8. In a railway-grader, the combination of a side wing hung or suspended from a car platform or body, a front hanger, an intermediate hanger and a rear hanger for suspending the wing from the car platform or body, the intermediate hanger and the rear



hanger having a forward inclination, and an intermediate brace and a rear brace, each pivotally connected at its outer end to the wing for its inner or front end to engage with  
5 the car platform or body, substantially as described.

9. In a railway-grader, the combination of a side wing hung or suspended from a car platform or body, a front hanger, an intermediate hanger and a rear hanger for suspending the wing from the car platform or body, the intermediate hanger and the rear hanger having a forward inclination, supports on the car platform or body to which  
10 the inner ends of the hangers are pivotally attached and an intermediate and rear brace pivotally connected at the outer end with the intermediate and rear hanger for the inner  
15

end of each brace to engage the car platform or body, substantially as described. 20

10. In a railway-grader, the combination of a side wing, hung or suspended from a car platform or body and having a divergence or spread rearwardly, a fluid-pressure cylinder having a piston-rod connected with the wing  
25 for raising and lowering the wing, a fluid-pressure cylinder having a piston-rod engaging the wing and a fluid-pressure storage tank or reservoir having connection with both fluid-pressure cylinders for supplying fluid-  
30 pressure to the cylinders to raise and lower the wing, substantially as described.

EDWIN MCCANN.

Witnesses:

H. W. MATTAIEL,

J. E. BURGE.