

No. 877,963.

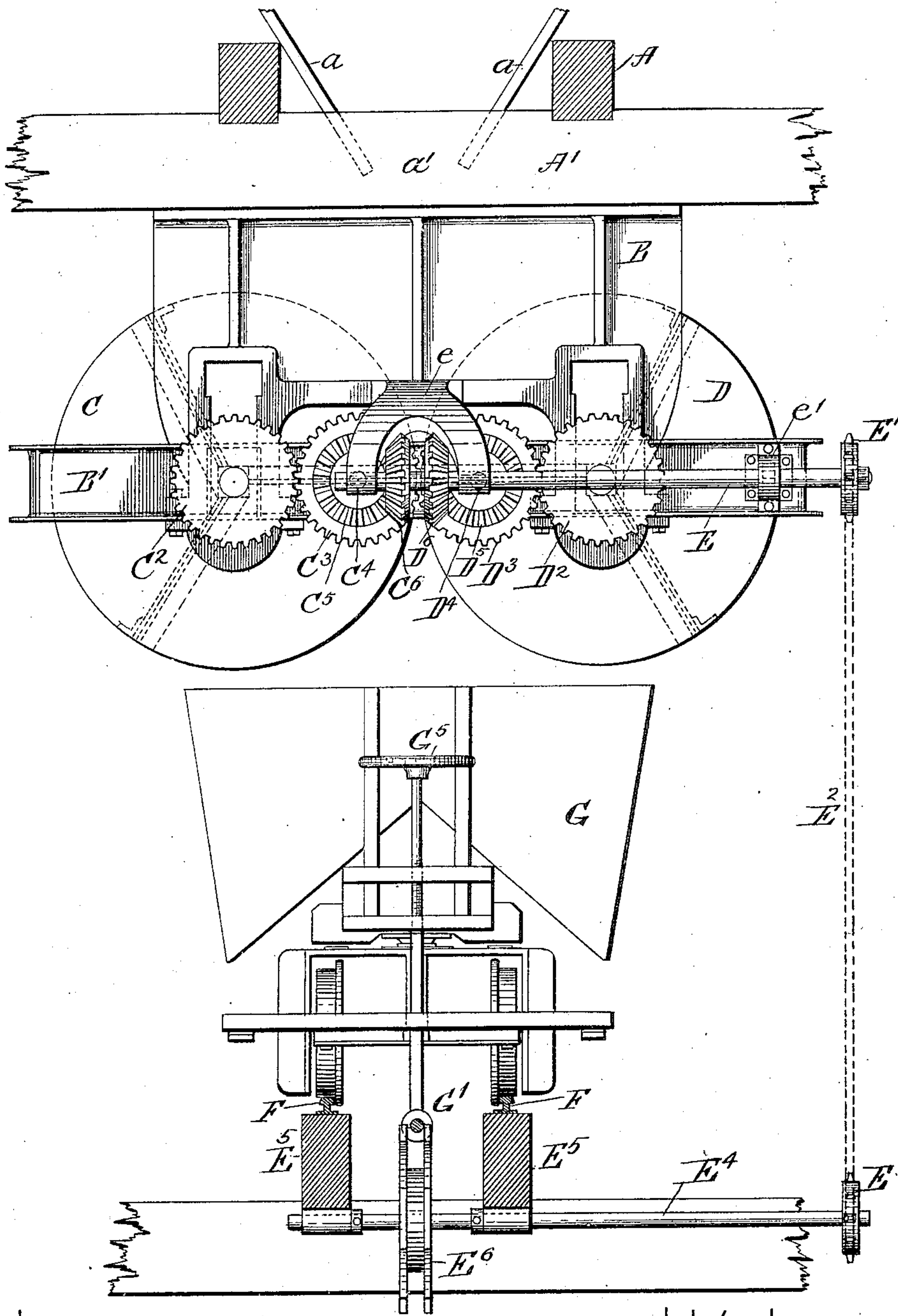
PATENTED FEB. 4, 1908.

A. SUCK,

VALVE GATE AND OPERATING MEANS THEREFOR.

APPLICATION FILED JUNE 11, 1906.

6 SHEETS—SHEET 1.



WITNESSES:

*W. E. Flaherty*  
*M. V. Foley*

FIG-1.

INVENTOR=

*Adolph Suck*

By

*Wm. H. Suck*  
his attorneys.

No. 877,963.

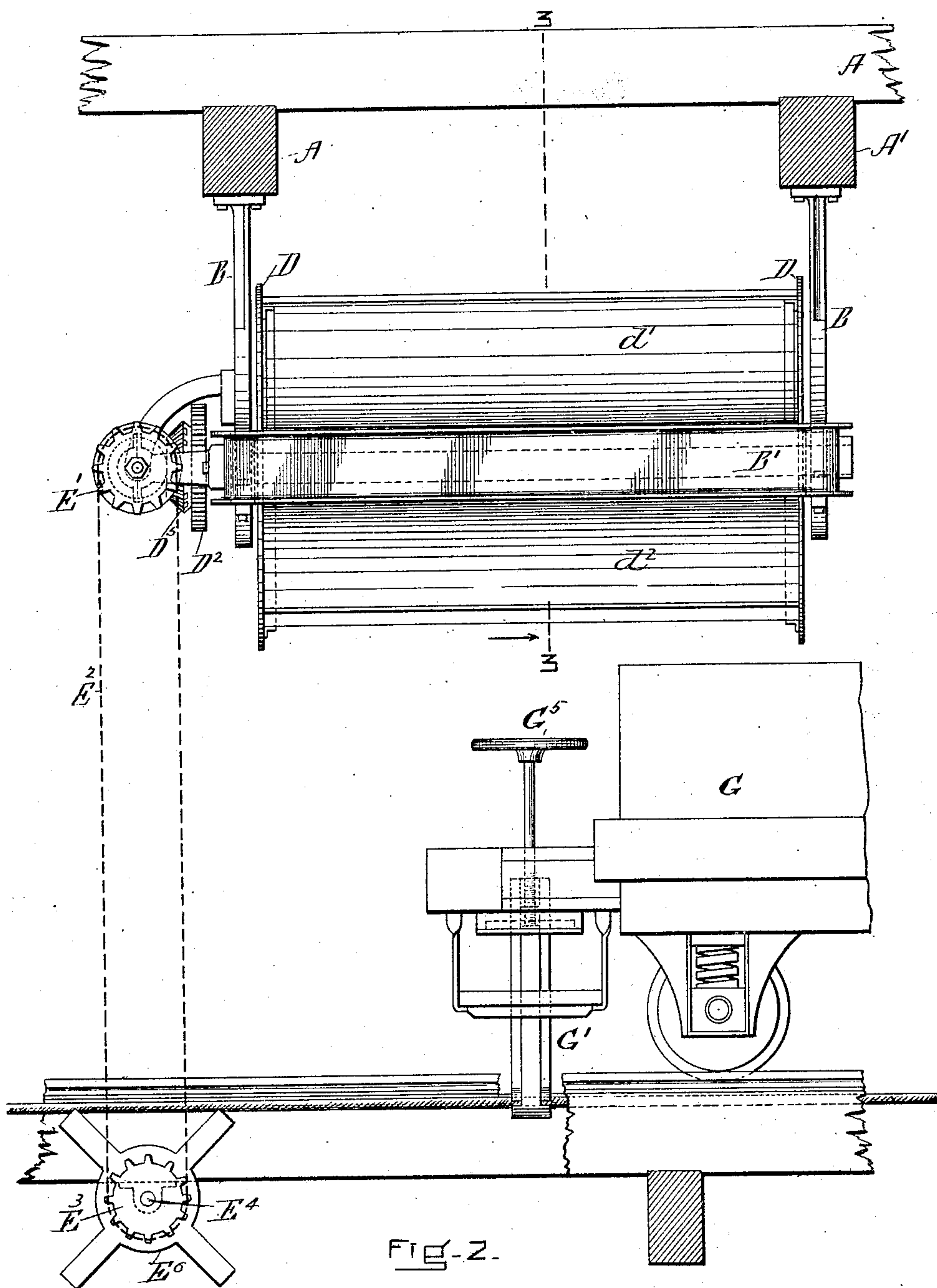
PATENTED FEB. 4, 1908.

A. SUCK.

VALVE GATE AND OPERATING MEANS THEREFOR.

APPLICATION FILED JUNE 11, 1906.

6 SHEETS—SHEET 2.



WITNESSES-

M. E. Flaherty  
M. V. Foley

INVENTOR=

Adolph Lueb.

By  
Charles E. Moore  
his attorney.

No. 877,963.

PATENTED FEB. 4, 1908.

A. SUCK.

VALVE GATE AND OPERATING MEANS THEREFOR.

APPLICATION FILED JUNE 11, 1906.

6 SHEETS—SHEET 3.

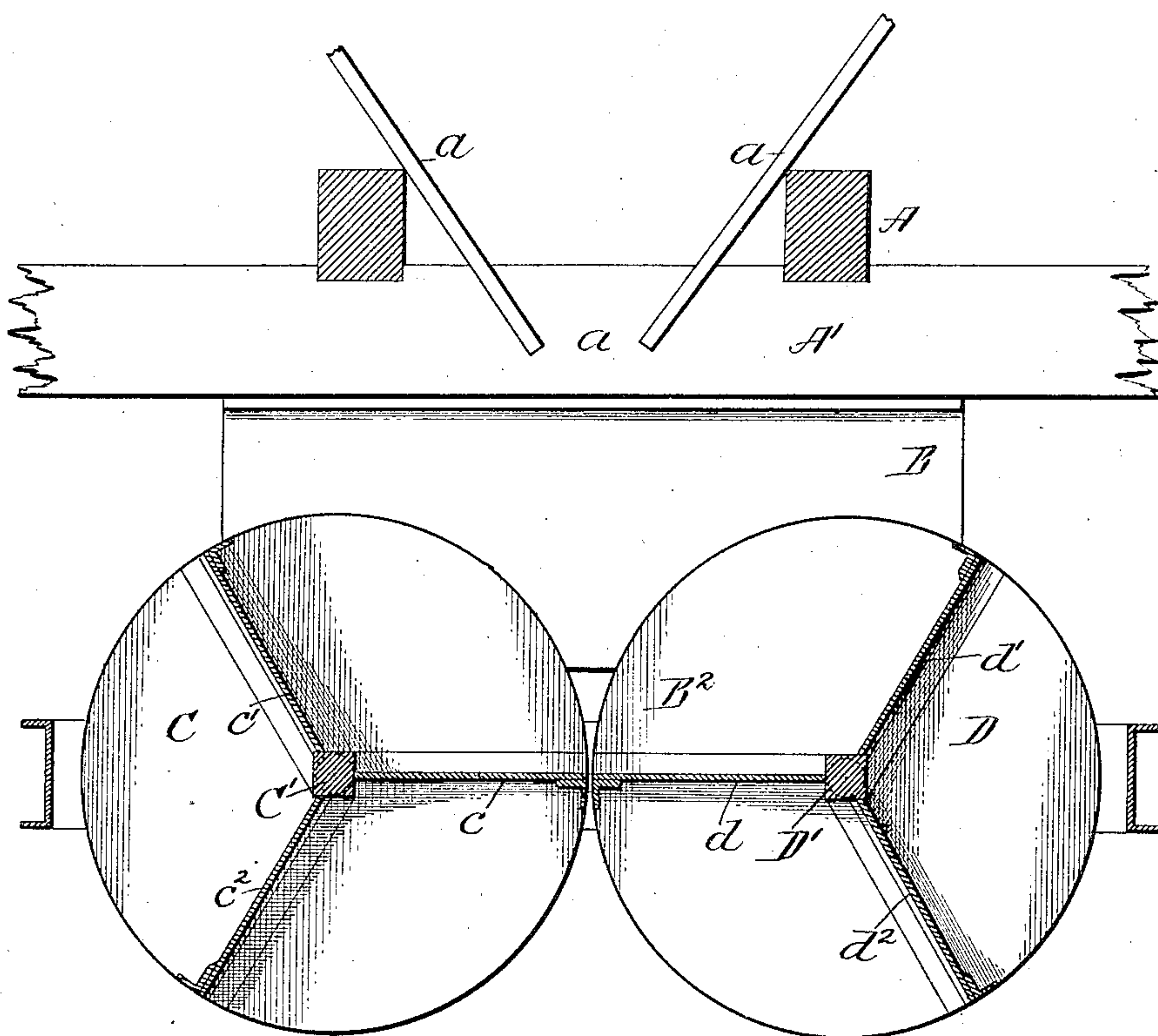


Fig. 3

WITNESSES=

M. E. Flaherty  
M. V. Foley

INVENTOR=

Adolph Suck.

By

Clarence E. Stone  
his attorney.



No. 877,963.

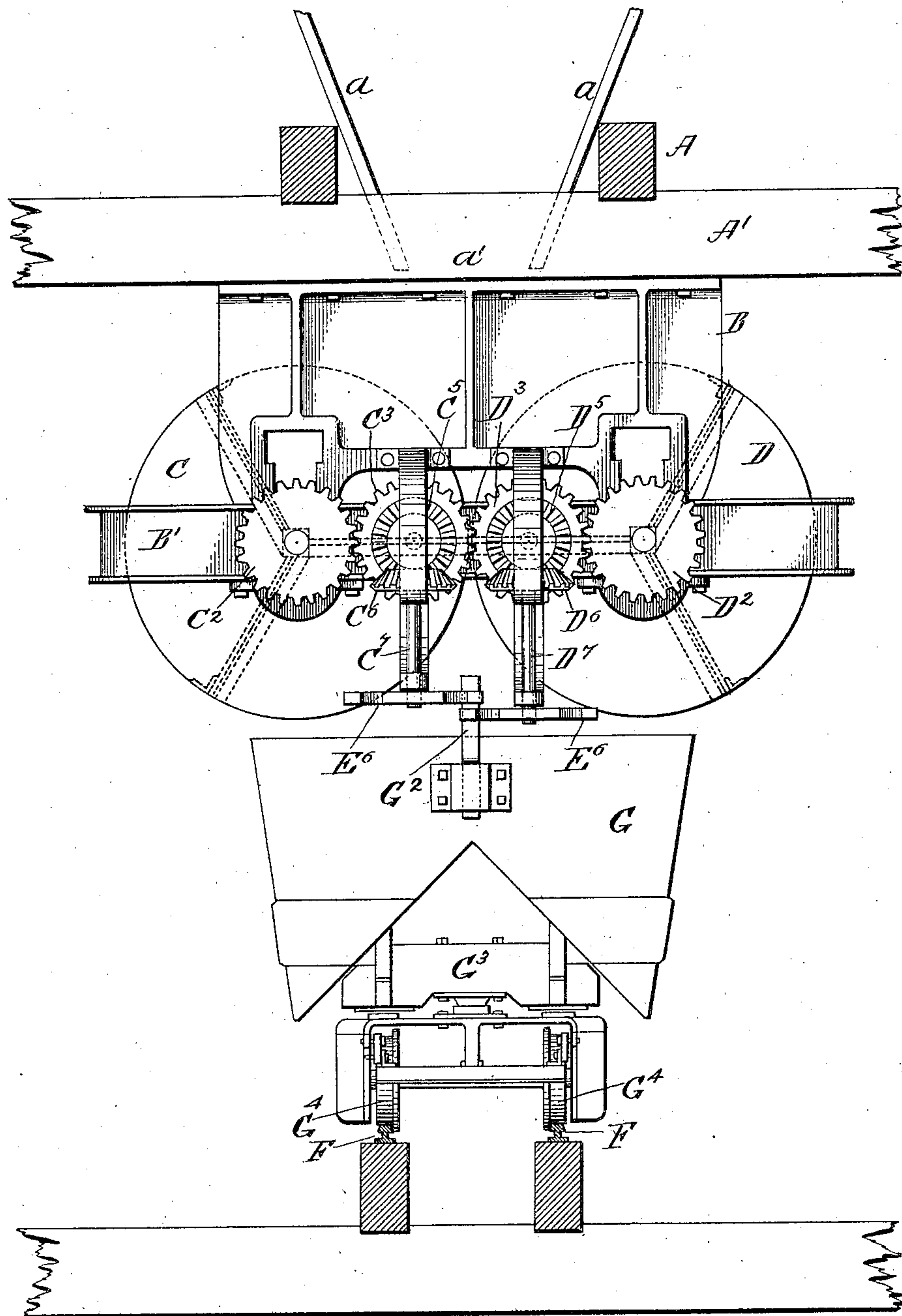
PATENTED FEB. 4, 1908.

A. SUCK.

VALVE GATE AND OPERATING MEANS THEREFOR.

APPLICATION FILED JUNE 11, 1906.

6 SHEETS—SHEET 4.



WITNESSES=

*M. E. Flaherty.*  
*M. V. Foley.*

FIG. 4.

INVENTOR=

*Adolph Suck,*  
By  
*Wm. H. Suck,*  
*his attorney.*

No. 877,963.

PATENTED FEB. 4, 1908.

A. SUCK.

VALVE GATE AND OPERATING MEANS THEREFOR.

APPLICATION FILED JUNE 11, 1906.

6 SHEETS—SHEET 5.

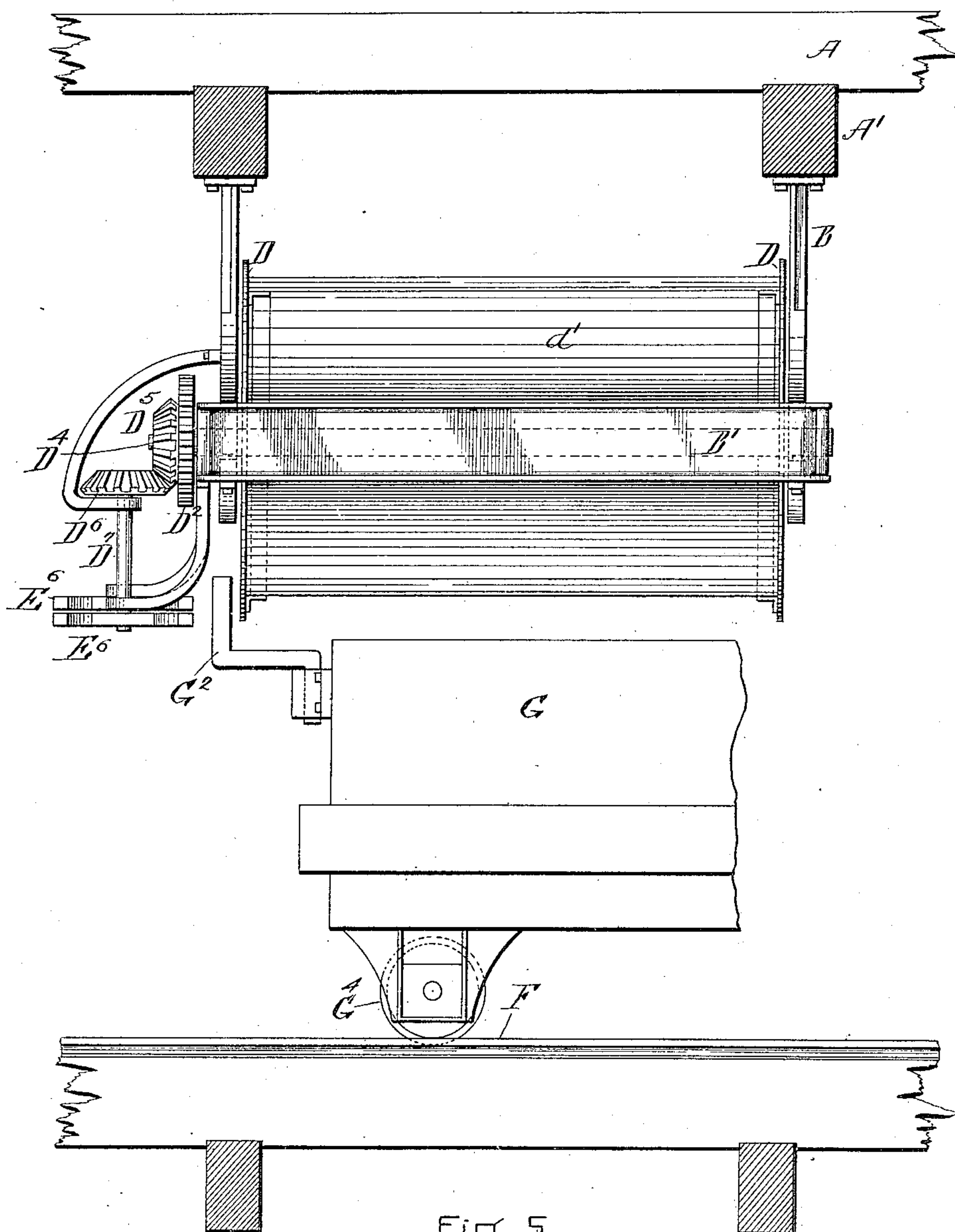


Fig. 5.

WITNESSES=

M. E. Flaherty  
M. V. Foley

INVENTOR=

Adolph Suck.  
By  
Charles J. Moore  
his attorney

No. 877,963.

PATENTED FEB. 4, 1908.

A. SUCK.

VALVE GATE AND OPERATING MEANS THEREFOR.

APPLICATION FILED JUNE 11, 1906.

6 SHEETS—SHEET 6.

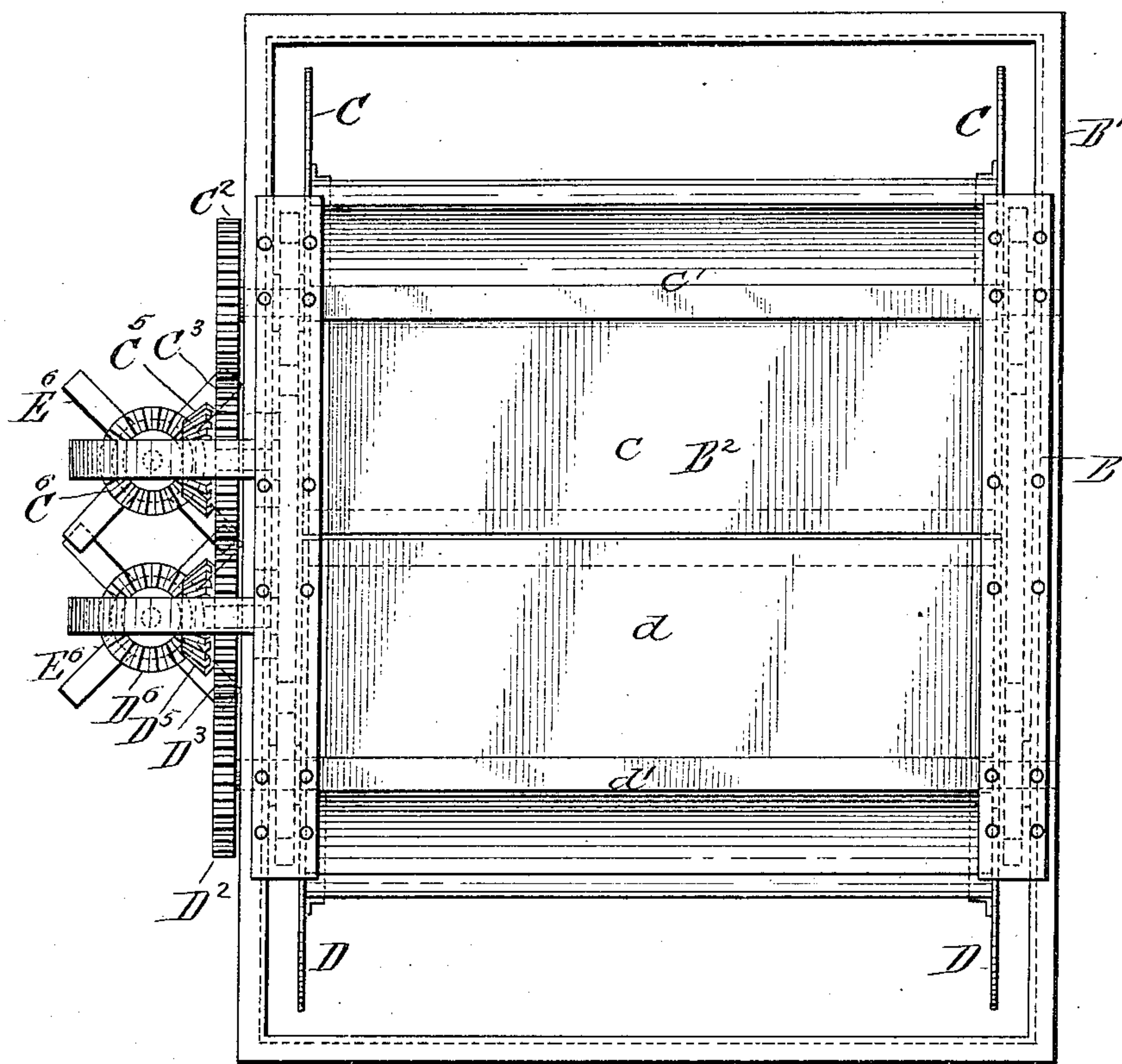


Fig. 6.

WITNESSES=

M. E. Flaherty  
M. V. Foley

INVENTOR=

Adolph Suck,  
By  
C. W. K. K. K. K. K.  
his attorneys.



# UNITED STATES PATENT OFFICE.

ADOLPH SUCK, OF BOSTON, MASSACHUSETTS.

## VALVE-GATE AND OPERATING MEANS THEREFOR.

No. 877,963.

Specification of Letters Patent.

Patented Feb. 4, 1908.

Application filed June 11, 1906. Serial No. 321,090.

*To all whom it may concern:*

Be it known that I, ADOLPH SUCK, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Valve-Gates and Operating Means Therefor, of which the following is a specification.

My improvement has to do with the means for closing the mouth of the hopper in a coal or ore hoisting plant and it relates especially to a gate which is automatically opened by the car as it takes its position to receive its load, and this gate not only closing the mouth of the hopper but also by its position in relation to the mouth of the hopper serving as part of a measuring means whereby a definite quantity of material will be dumped whenever the gates are opened.

My gate is preferably operated by the car which is to receive its load and I have shown two ways by which it is operated. In the one case it is operated by the grip on the car which engages the gate operating mechanism and in the other case by an arm which engages the gate operating mechanism. In the two cases the gate operating mechanism is substantially the same, the differences being only those which are necessary because of the different location on the car of the gate operating part. In both embodiments of my invention shown in the drawings the gate is formed of pairs of sections, one pair of which as they dump the load brings a second pair into action to close the opening after the dumping has taken place, the preferable arrangement of these sections being such as always to form a chamber of a certain size capable of holding a certain quantity of coal or ore when the parts are in their normal resting position, means being also provided whereby the size of the chamber may be adjusted according to the material contained in the hopper and fed to the chamber.

My invention will be understood by reference to the drawings, in which—

Figure 1 is a front elevation of a mechanism embodying my invention; Fig. 2 being a side elevation thereof. Fig. 3 is a vertical section on line 3—3 of Fig. 2. Fig. 4 is a front elevation of a modification. Fig. 5 is a side elevation thereof, and Fig. 6 is a plan of the rotary gates with the operating mechanism shown in Figs. 4 and 5.

In the drawings:—A is a portion of the framework of the hopper. The hopper is of

ordinary construction and hence is not otherwise illustrated. It is supported on the framework in the ordinary way so that its mouth may discharge into a car running on a track below it. It need not be further described except to say that its mouth is narrow as shown by the walls *a*. These walls are preferably arranged in an angular position to each other as shown so that they may be adjusted up and down to make the opening *a*<sup>1</sup> larger or smaller as may be thought best for purposes to be described below. Below the hopper and attached to the cross-beam A<sup>1</sup> is the gate mechanism which comprises two plates B which may be strengthened by ribs or otherwise as thought best and in which are journaled two revolving gates, these parts being further braced by the frame B<sup>1</sup>. Each gate section in the form of my invention shown comprises two disks C, C, D, D, which are connected by radial webs *c*, *c*<sup>1</sup>, *c*<sup>2</sup>, *d*, *d*<sup>1</sup>, *d*<sup>2</sup>. There are an equal number of these webs upon each gate and they extend substantially to the periphery of the disks, C, C, D, D, and the gates are so arranged with relation to each other that two of these webs, say *c*, *d*, one upon each gate, may be brought at the same time into the same horizontal plane to form the bottom or floor of a chamber B<sup>2</sup> which is located below the mouth of the hopper, the side walls of which are formed by the plates B and disks C, C, D, D, and the end walls of two of the webs *c*<sup>1</sup>, *d*<sup>1</sup>. The chamber thus formed by the hopper is of predetermined size depending upon the bulk of the coal to be dumped at one time, or to state the matter differently, by adjusting the mouth of the hopper and the size of the chamber in designing the apparatus, a predetermined amount of coal, weighing substantially a ton, will be contained within this chamber so formed at all times, and in dumping the contents of this chamber into a car, it will be loaded with approximately a ton, thus affording an approximate method of handling the coal by weight. In order to dump the contents of this chamber B<sup>2</sup> I prefer the following means: The gate sections are similar in all respects. One gate section is mounted upon a shaft C<sup>1</sup> and the other upon the shaft D<sup>1</sup>. The shaft C<sup>1</sup> carries at its outer end a gear C<sup>2</sup> and the shaft D<sup>1</sup> carries at its outer end a gear D<sup>2</sup>. These gears C<sup>2</sup>, D<sup>2</sup> mesh, respectively, with the gears C<sup>3</sup>, D<sup>3</sup>, one of which is on the shaft C<sup>4</sup> and the other on the shaft D<sup>4</sup>, both these shafts being carried in bear-



ings mounted on the plates B. The shaft C<sup>4</sup> carries a beveled gear C<sup>5</sup> and the shaft D<sup>4</sup> carries a beveled gear D<sup>5</sup>, these beveled gears meshing, respectively, in the beveled gears C<sup>6</sup>, D<sup>6</sup>, both mounted on a shaft E carried in bearings *e*, *e*<sup>1</sup>. The bearings *e* are supported from the plates B and the bearings *e*<sup>1</sup> are carried on a frame B<sup>1</sup> which forms a brace for the plates B.

The shaft E carries at its outer end a sprocket E<sup>1</sup> around which passes a chain E<sup>2</sup> which also passes over a sprocket E<sup>3</sup> located on the end of a shaft E<sup>4</sup> which as shown is supported in bearings under the beam E<sup>5</sup> on which are laid the rails F. The bearings for the shaft may, however, be supported in any other desired way. Upon this shaft E<sup>4</sup> is also located an armed wheel E<sup>6</sup>, its arms being sufficiently long to project upward some distance above the platform so that an arm will be engaged by a portion of the car G; for example,—the grip G<sup>1</sup>, and as the car moves into position will be turned one quarter of a revolution so as to leave the next arm in place to be engaged by the next car.

The form of gate shown in Figs. 4, 5 and 6 is similar in all respects to that shown in Figs. 1, 2 and 3, the means of operating it, however, while the same in principle differs somewhat in the two constructions. In the form shown in Figs. 1, 2 and 3 the beveled gears C<sup>6</sup>, D<sup>6</sup> instead of being mounted upon a single shaft E are mounted upon separate shafts C<sup>7</sup>, D<sup>7</sup>, each of which carries at its end an armed wheel E<sup>6</sup> in all respects like the corresponding wheel E<sup>6</sup> referred to above in connection with the description of Figs. 1, 2 and 3. In this case an arm of each wheel is in line with a part of the car so that as the car moves to its place both wheels are turned as above described.

In the form of my invention shown in Figs. 1, 2 and 3, the armed wheel E<sup>6</sup> is engaged by the grip G<sup>1</sup> which is a part well known for temporarily connecting the car with the endless cable by means of which the car is moved. In the form of my invention shown in Figs. 4, 5 and 6 a special arm G<sup>2</sup> carried by the top of the car engages the armed wheels E<sup>6</sup>.

It is unnecessary to describe the details of the car itself as they are well known to those skilled in the art, but I will say that G<sup>3</sup> is the truck having the wheels G<sup>4</sup> which run upon the rails F which are suitably supported upon the beam E<sup>5</sup>. In Figs. 1 and 2 G<sup>5</sup> is the hand wheel by which the grip mechanism is operated.

In utilizing my invention, when embodied in either of the forms shown, it is to be presumed that the hopper is filled with coal or other material to be dumped and conveyed away, which coal finds an outlet at the mouth of the hopper through the opening *a* into the chamber formed by the gates. It is known approximately how many cubic feet of coal

will weigh a ton and upon that basis the size of the chamber formed by the sides and floor of the gates is approximately calculated and any adjustment necessary because of the size of the coal to be dumped may be made by enlarging the opening *a* at the bottom of the hopper or making it smaller as may be required. It will be seen that this chamber formed by the gates is always full. The car being brought up into position under the gates its grip G<sup>1</sup> (in the form of my invention shown in Figs. 1 and 2) or its arm G<sup>2</sup> (shown in the form of my invention in Figs. 4, 5 and 6) will engage one of the arms of the armed wheel E<sup>6</sup> and will turn it one quarter of a revolution which should be sufficient owing to the proportioning of the gears to secure a third of a revolution of each gate section as will be readily understood, thus causing the bottom of the chamber formed by the webs *c*, *d* to drop forming an opening in the bottom of the chamber by means of which the coal falls into the car, this same operation bringing the next pair of webs *c*<sup>1</sup>, *d*<sup>1</sup>, which up to that time had formed the ends of the chamber, into position to form its floor and the next webs *c*<sup>2</sup>, *d*<sup>2</sup> in series to form the ends. While during this operation a small amount of coal is falling from the hopper because of the dropping of the floor of the chamber and the consequent release of pressure below, this amount will not be sufficient to form any material change in the weight of the pile being dumped, and when the gate is closed by the bringing together of the ends *c*<sup>1</sup>, *d*<sup>1</sup> to form the new floor the coal will continue to fall thereon until the chamber is filled again up to the mouth of the hopper when the dumping process will again take place on the opening of the gate by the next car.

It is evident that my invention may be carried out in a number of ways, its essentials being a measuring chamber having discharging means adapted to be engaged and operated by the car or other vessel into which the material is to be dumped when such car reaches a position to receive its load, and in this connection it is desirable in order that time may be saved, that the hopper shall continue to discharge so that when a closed chamber next extends below the hopper to receive the charge, it may immediately begin to fill up. The action of discharging from the chamber and re-forming the chamber is so rapid under ordinary conditions that no substantial amount of material is lost by this action.

I have used the bin as a measuring chamber, but of course if it is not desired to measure the load which is dumped into the car the dimensions of the chamber will be immaterial. Moreover, instead of the gate a series of revolving gates may be used and they may of course be placed with their axes at right angles to the track instead of parallel



thereto as shown and in this case projections from one of the disks may serve the purpose of one of the arms E to be engaged by the moving car and the car to receive its load may move under a series of such gates each of which will discharge into it in turn. All such constructions would embody my invention.

What I claim as my invention is:—

1. In a hopper gate, a chamber formed in said gate and comprising two parallel shafts each carrying a pair of disks mounted axially thereon, webs extending from disk to disk between each pair of disks, said web forming the floor and ends of the chamber, and means whereby said shafts are rotatable in opposite directions, as described.

2. In a hopper gate, a chamber comprising two pairs of pivoted disks forming the ends of the chamber and having webs extending between each pair of disks to form the side walls of the chamber, and means whereby said disks are rotated, said means comprising a train of gears, and means whereby said gears are turned to open the floor of said chamber.

3. In a hopper gate, two pairs of disks, each connected by a series of webs, each pair of disks also being mounted upon a shaft, a train of gears connecting said shafts, an armed wheel, and means connecting said armed wheel with said gears, said armed wheel being adapted to be turned and cause the rotation of said disks towards each other to dump the load, as described.

4. A hopper gate, comprising two rotary sections, each comprising two disks and a

plurality of webs each extending from one disk to the other, and means connected with said disks whereby said sections may be rotated towards each other, as described.

5. A hopper gate, comprising two rotary sections, each comprising an axis, means for closing the ends of the section, and means for dividing it into a plurality of chambers parallel with its axis each chamber extending from end to end of the section, said sections being located in such relation to each other that the chambers of one will in turn supplement the chambers of the other, and means whereby said sections may be rotated in unison towards each other, as described.

6. A hopper gate, comprising two cylindrical sections each partitioned longitudinally into chambers, each section being mounted on a shaft, a gear mounted on each shaft, a train of gears connecting said shaft carried gears, and means for operating said train of gears to rotate said sections and dump their load, as described.

7. A hopper gate comprising a pair of rotatable cylindrical sections, each connecting a plurality of chambers, and each mounted on a shaft, a horizontal frame, each shaft being mounted therein, in combination with a gear mounted on the end of each shaft, a train of gears connecting said shaft carried gears to give reversed motion thereto, and means adapted to move said train of gears and operate said hopper gate, as set forth.

ADOLPH SUCK.

Witnesses:

M. E. FLAHERTY,  
M. V. FOLEY.