

E. MOREAU.
 APPARATUS FOR FEEDING OR DISCHARGING GRAIN, &c.
 APPLICATION FILED JUNE 8, 1909.

955,606.

Patented Apr. 19, 1910.

5 SHEETS—SHEET 1.

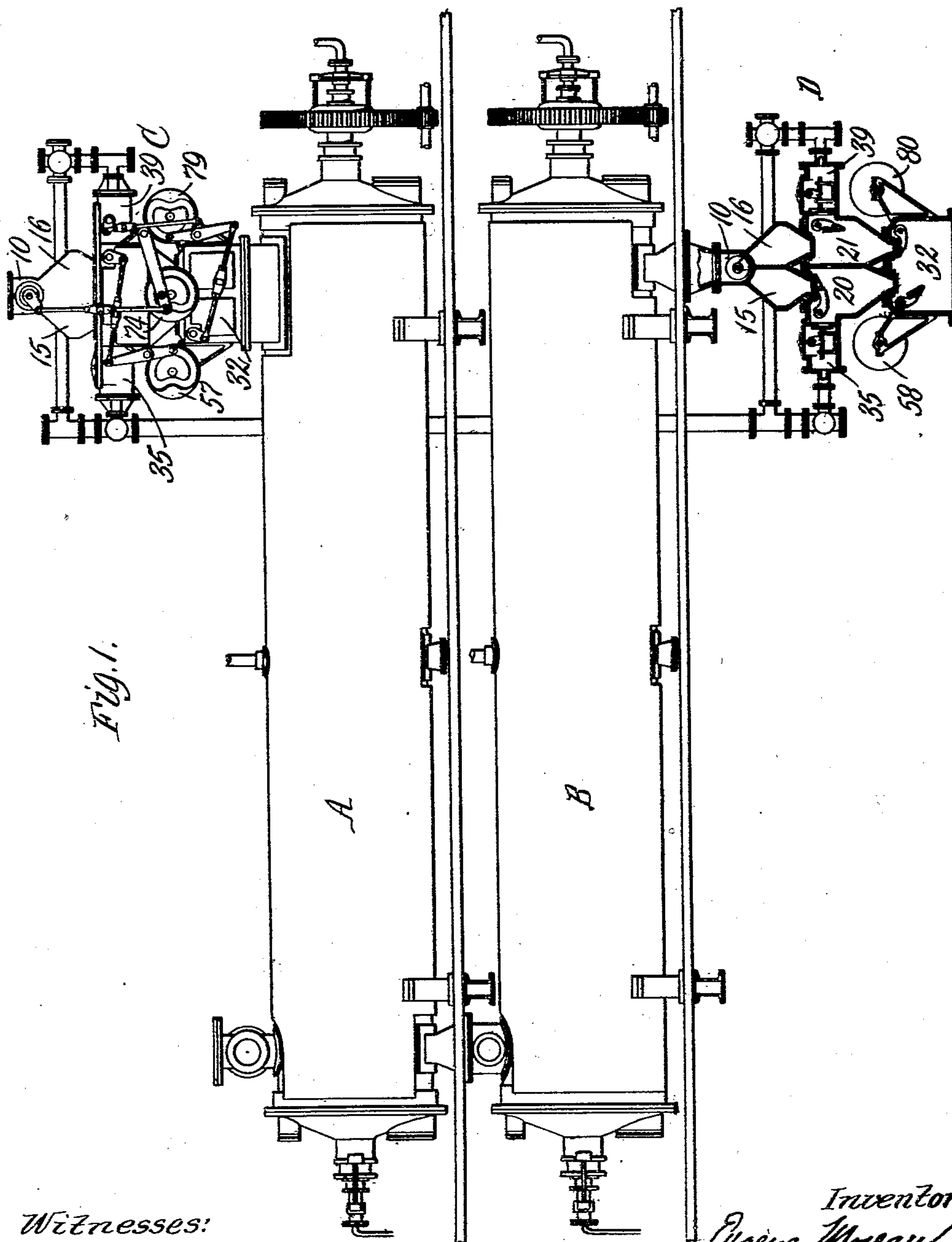


Fig. 1.

Witnesses:

E. A. Volk.

A. G. Diamond.

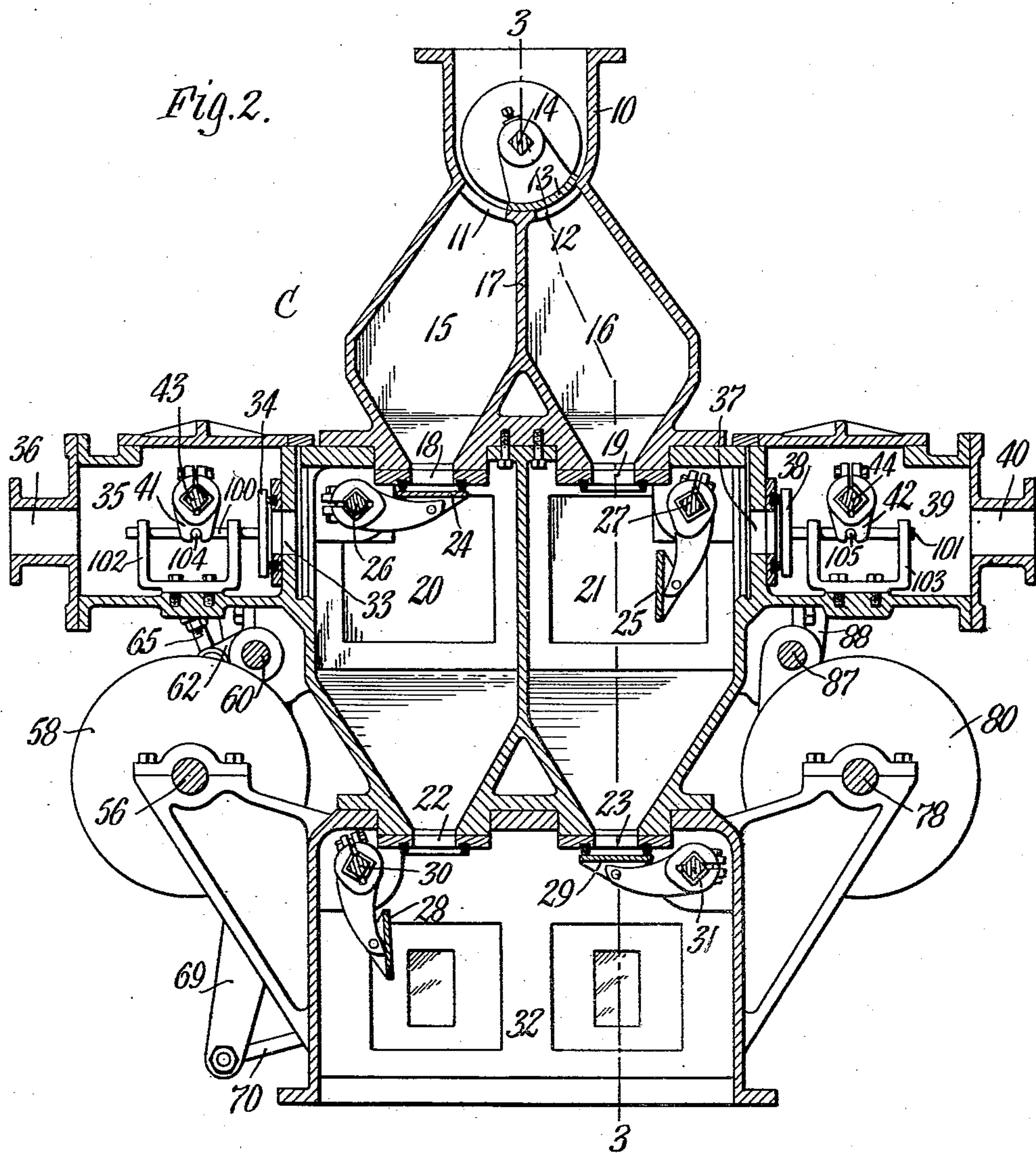
Inventor.
 Eugene Moreau
 by *William Parker Ward*
 Attorneys.

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Witnesses:
 E. A. Volk.
 A. F. Dimond.

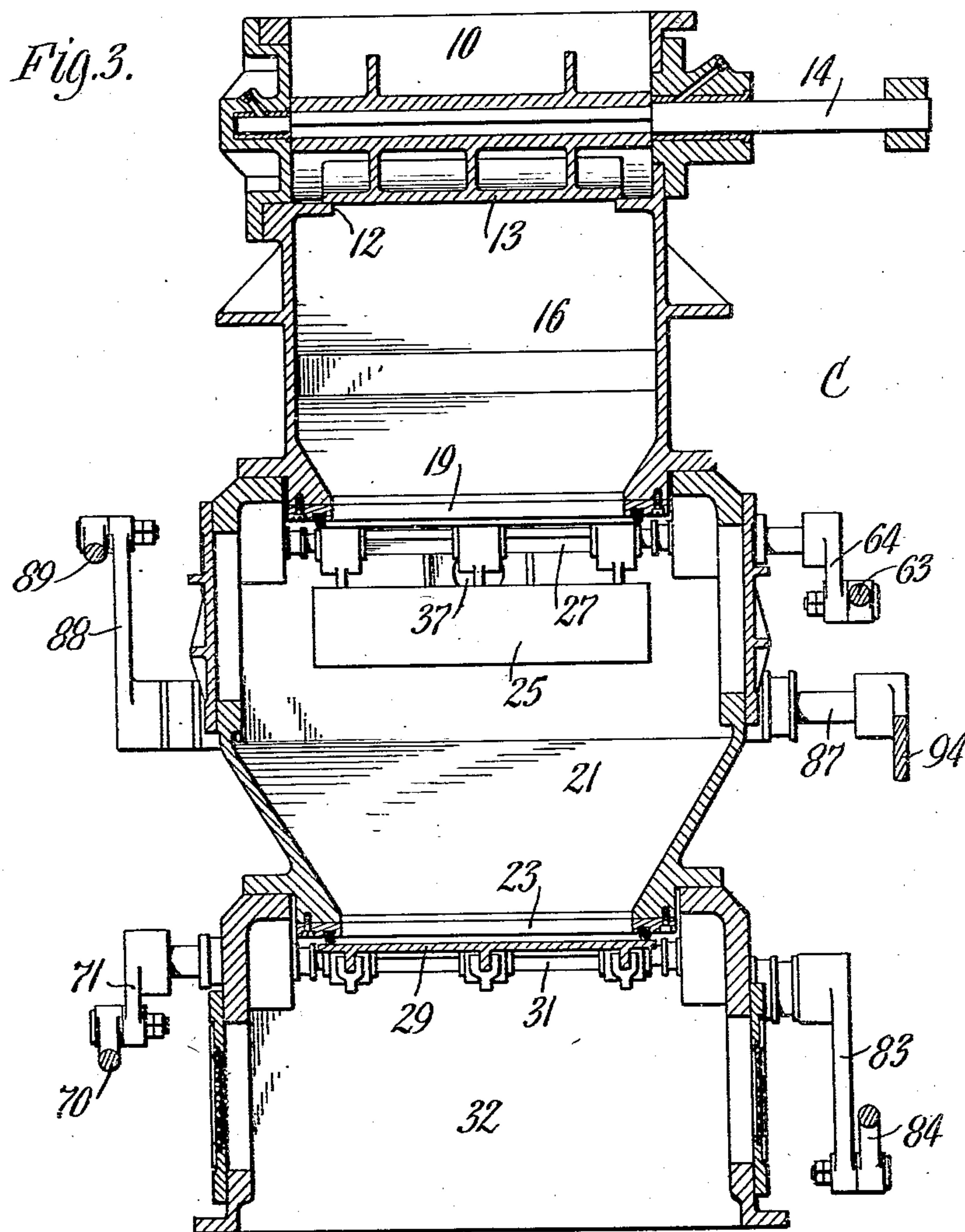
Inventor.
 Eugene Moreau,
 by Wilhelm, Parker & Hard,
 Attorneys.

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5 SHEETS—SHEET 3.



Witnesses:

E. A. Volk.

C. F. Diamond.

Inventor.

Eugene Moreau,
 by Wilhelm, Parker & Hard,
 Attorneys.

E. MOREAU.

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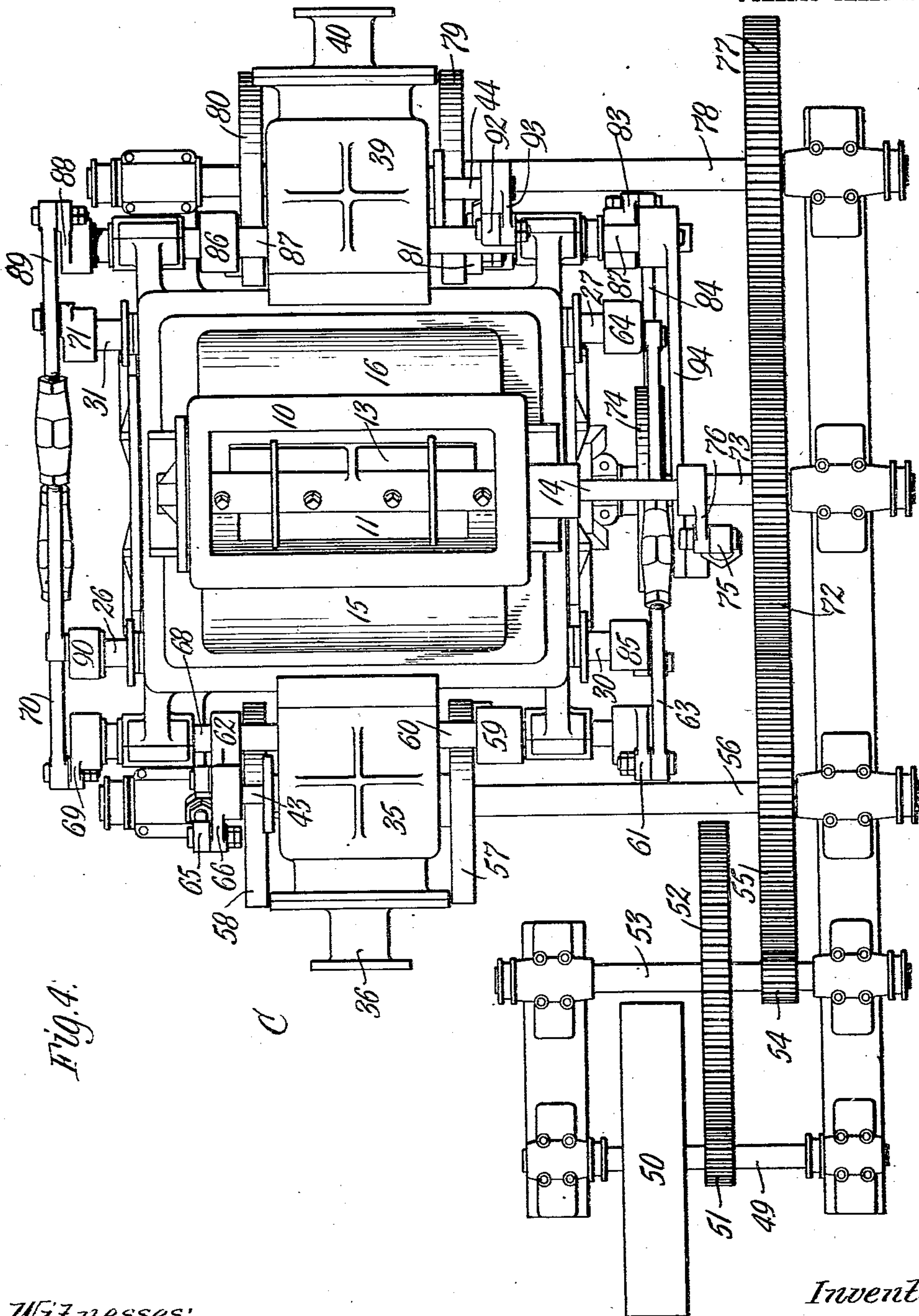


Fig. 4.

Witnesses:

E. A. Volk.

A. G. Diamond.

Inventor.

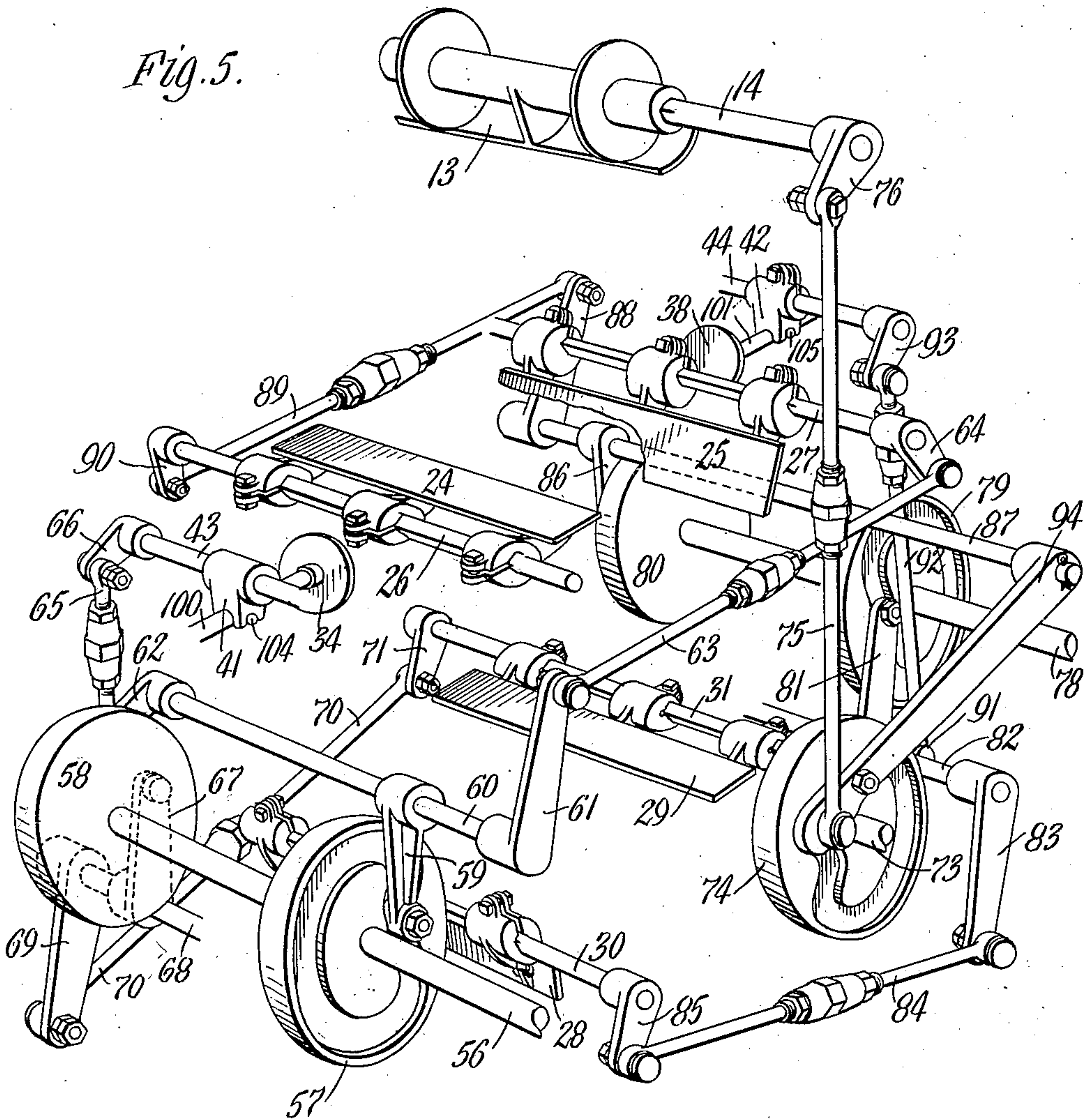
Engine Moreau
by Wilhelm Parker & Co.
Attorneys.

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5 SHEETS—SHEET 5.



Witnesses:
 E. A. Volk.
 A. G. Diamond.

Inventor:
 Eugene Moreau,
 by Wilhelm Parker & Nord,
 Attorneys.

UNITED STATES PATENT OFFICE.

EUGÈNE MOREAU, OF NEW YORK, N. Y., ASSIGNOR TO J. P. DEVINE COMPANY, OF
BUFFALO, NEW YORK.

APPARATUS FOR FEEDING OR DISCHARGING GRAIN, &c.

955,606.

Specification of Letters Patent.

Patented Apr. 19, 1910.

Application filed June 8, 1909. Serial No. 500,854.

To all whom it may concern:

Be it known that I, EUGÈNE MOREAU, a citizen of the Republic of France, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in Apparatus for Feeding or Discharging Grain, &c., of which the following is a specification.

This invention relates to the mechanisms which are employed in connection with vacuum grain driers and similar apparatus for feeding the grain or other material to be dried or treated to a vacuum tank or chamber and removing it therefrom without interfering with the maintenance of the vacuum therein. Feeding and discharging mechanisms of this general character comprise, as shown, for instance, in Patent No. 748,414, Dec. 29, 1903, to Emil Passburg, a receiving chamber or receptacle for the material, an inlet valve which controls the admission of the material to this receptacle, and an outlet valve which controls the exit of the material therefrom. The valves shown for that purpose in said patent are rotary disks, each having a pocket for receiving the material and conveying it from the inlet opening, through which the material passes to the valve, to another opening through which the material escapes from the valve.

The object of this invention is to provide feeding and discharging mechanisms of this general character in which swinging or pivoted valves are employed, whereby the frictional resistance of the valves and the power required for actuating the apparatus are greatly reduced and the apparatus is rendered more efficient and satisfactory in its operation.

In the accompanying drawings, consisting of five sheets: Figure 1 is an elevation, partly in section, of a grain drying apparatus embodying this invention. Fig. 2 is a sectional elevation of the feeding or discharging apparatus, on an enlarged scale. Fig. 3 is a sectional elevation at right angles to Fig. 2, in line 3—3, Fig. 2. Fig. 4 is a top plan view of the feeding and discharging apparatus. Fig. 5 is a perspective view of the mechanism by which the valves are operated.

Like reference characters refer to like parts in the several figures.

The accompanying drawings illustrate the invention as applied to a vacuum grain drying apparatus and for the sake of brevity the description will be confined to such drying apparatus, although the invention may also be applied to apparatus which operates upon other materials or substances which are dried or treated in an exhausted chamber or tank.

A and B represent two horizontal drying chambers or tanks arranged one above the other and constructed in any suitable manner and connected with any suitable exhaust apparatus for maintaining the desired vacuum therein. The upper tank A receives the grain at one end from the feeding apparatus C and delivers the grain at its opposite end to the lower tank B which in turn delivers the grain at its opposite end to the discharging apparatus D. The feeding apparatus and the discharge apparatus are alike in construction but differ in their relation to the tanks, the feeding apparatus having its inlet open to the atmosphere and its outlet connected with the exhausted tank, while the discharging apparatus has its inlet connected with the exhausted tank and its outlet open to the atmosphere. The drying or treating apparatus may comprise a single tank or a number of connected tanks, as may be preferred. For convenience in making the connections the feeding apparatus and the discharging apparatus may be arranged one above the other, as shown.

Each apparatus for feeding or discharging the grain is constructed as follows: 10 represents an inlet trough having a semi-cylindrical bottom provided on opposite sides of its longitudinal center line with feed openings 11, 12, which are alternately opened and closed by a rock valve 13 secured to a rock shaft 14. This trough receives the grain in the case of the feeding apparatus C from a feed spout, (not shown), and in the case of the discharge apparatus D from the discharge opening of the vacuum tank. 15, 16, represent two preliminary receiving or measuring chambers arranged respectively below the feed openings 11, 12, and separated by a partition 17 which is arranged between these openings. These chambers are provided in their preferably hopper-shaped bottoms with discharge openings 18, 19, respectively. 20 and 21 repre-

sent two main receiving chambers arranged respectively beneath the preliminary chambers 15, 16, and somewhat larger than the former. These main chambers are provided in their hopper-shaped bottoms with outlet openings 22, 23, respectively. The openings 18, 19, leading from the preliminary chambers 15, 16, to the main chambers 20, 21, are controlled by swinging or pivoted valves 24, 25, mounted on transverse shafts 26, 27, respectively, so as to swing upwardly against their seats in closing. These valves are arranged within the chambers 20, 21, and the latter are made so large that the charge of material in the main chamber does not extend in the same so high as to interfere with the free movement of the valve. The outlet openings 22, 23, of the main chambers are controlled by similar swinging or pivotal valves 28, 29, mounted on transverse shafts 30, 31, respectively, and arranged in a chamber 32 beneath these openings. In the case of a feeding mechanism this chamber opens into the inlet opening of the vacuum tank and in the case of a discharge mechanism it opens into a discharge spout or conveyer which is open to the atmosphere. The main receiving chamber 20 is provided with a suction opening 33 which is arranged in the side of the chamber and is controlled by a valve 34 arranged in a chamber 35 connected with the exhaust apparatus by a pipe 36, so that the valve chamber 35 is exhausted and the receiving chamber 30 is placed in communication with the exhaust by opening the valve 34. The main receiving chamber 21 is similarly provided with a suction opening 37 controlled by a valve 38 in a chamber 39 having an exhaust pipe or passage 40. The exhaust valves 34 and 38 are actuated respectively by arms 41, 42, on transverse shafts 43, 44.

The operation of this apparatus is as follows: Assuming the feed valve 13 to stand in the position shown in Fig. 2, in which this valve uncovers the feed opening 11 and covers the feed opening 12, the preliminary chamber 15 is in communication with the feed trough 10 and receives grain therefrom until it is filled, the discharge opening 18 in the bottom of the preliminary chamber being closed by the valve 24. The suction valve 34 of the chamber 20 is closed and the discharge valve 28 is open, so that the grain passes from the chamber 20 into the bottom chamber 32 and thence to the vacuum tank, in the case of a feeding apparatus, or to the discharge spout in the case of a discharging apparatus. At the same time the preliminary chamber 16 is cut off from the feed trough 10 by the feed valve 13, the grain in the preliminary chamber 16 is discharged through the opening 19 into the main chamber 21, the upper valve 25 being

open and the lower valve 29 closed and the exhaust valve 38 being also closed. The feed valve 13 is next shifted so as to close the opening 11 and uncover the opening 12. The lower valve 28 of the chamber 20 is closed, the upper valve 24 of this chamber is opened and the grain flows from the preliminary chamber 15 into the main chamber 20. The upper valve 24 is then closed and the exhaust valve 34 opened, whereby the main chamber 20 is placed in communication with the exhaust and the air is removed, which has entered with the grain from the preliminary chamber, in the case of a feeding apparatus. The exhaust valve is then closed and the discharge valve 28 opened, whereby the grain is discharged from the chamber 20 into the vacuum tank. In the case of a discharging apparatus, the air enters the main chamber from the chamber 32 when the bottom valve of the main chamber is open and this air is removed from the main chamber when the valves of the latter have been closed, thereby preventing this air from entering the vacuum tank.

The feed valve may be a rocking valve, as shown, or of any other suitable construction. The valve operates mainly as a cut-off for breaking the communication between the preliminary and the main receiving chambers and can work freely without forming an air-tight closure.

By duplicating the preliminary and main receiving chambers and accessories and operating the two sets alternately, a practically continuous operation of the apparatus is produced. A single set may be employed, however, if desired.

The pivoted or swinging valves which are employed in connection with each main receiving chamber move freely in the chambers in which they are arranged, their movement upwardly to their seats and downwardly from their seats is not retarded or rendered difficult by grain, dust or grit which may adhere to the valves and they seat themselves tightly when closed.

The mechanism for actuating the different valves at the proper time may be of any suitable construction, that which is shown in the drawings being constructed as follows: 49 represents the main drive shaft of the valve mechanism arranged horizontally and driven by means of a pulley 50. This shaft is provided with a pinion 51 meshing with a gear wheel 52 on a horizontal counter shaft 53 carrying a pinion 54. The latter meshes with a gear wheel 55 on a horizontal shaft 56 carrying two cam disks 57 and 58. The cam disk 57 actuates an arm 59 on a rock shaft 60 carrying arms 61 and 62. The arm 61 is connected by a rod 63 with an arm 64 on the shaft 27 of the pivoted valve 25, while the arm 62 is connected by a rod 65

with an arm 66 on the shaft 43 of the exhaust valve 34. The cam disk 58 actuates an arm 67 on a rock shaft 68 carrying an arm 69 which is connected by a rod 70 with an arm 71 on the shaft 31 of the lower pivoted valve 29. The gear wheel 55 on the rotary shaft 56 meshes with a gear wheel 72 on a horizontal shaft 73 which is provided with a cam disk 74 which actuates the feed valve 13 by means of a rod 75 and arm 76. The gear wheel 72 on the shaft 73 meshes with a gear wheel 77 on a shaft 78 carrying cam disks 79 and 80. The cam disk 79 actuates an arm 81 on a rock shaft 82 provided with an arm 83 connected by a rod 84 with an arm 85 on the shaft 30 of the lower pivoted valve 28. The cam disk 80 actuates a rock arm 86 on a rock shaft 87 which is provided with an arm 88 connected by a rod 89 with an arm 90 on the shaft 26 of the upper pivoted valve 24. The exhaust valve 38 is actuated from the cam disk 79 and rock shaft 82 by means of an arm 91 on said shaft which is connected by a rod 92 with an arm 93 on the shaft 44 of this valve. The lower end of the rod 75 actuated by the cam disk 74 may be guided by a rock arm 94 loosely mounted on the rock shaft 87. The exhaust valves 34, 38 have their stems 100, 101, guided in frames 102, 103, and provided with projections 104, 105, which are engaged by the rock arms 41, 42, respectively.

I claim as my invention:

1. An apparatus for feeding or discharging material to or from a vacuum tank comprising a preliminary receiving chamber, a valve which controls the inlet to said chamber, a main receiving chamber which receives the material from said preliminary chamber, a valve which controls the communication between said chambers, a valve which controls the outlet of said main chamber, means for exhausting said main chamber, and means for actuating said valves, substantially as set forth.

2. An apparatus for feeding or discharging material to or from a vacuum tank comprising a preliminary receiving chamber, a valve which controls the inlet to said chamber, a main receiving chamber which receives the material from said preliminary chamber, a valve which controls the communication between said chambers, a valve which controls the outlet of said main chamber, an exhaust passage in said main chamber, a valve which controls said passage, and means for actuating said valves, substantially as set forth.

3. In an apparatus for feeding or discharging material to or from a vacuum tank, the combination of a receiving chamber having an exhaust passage, an inlet valve which controls the inlet of said chamber, and an

outlet valve which controls the outlet of said chamber, one of which valves is exposed to the atmosphere while the other valve is exposed to the vacuum, an exhaust valve which controls said exhaust passage, and mechanism for opening and closing each of said valves periodically, and operating to open said exhaust passage when said inlet and outlet valves are closed, substantially as set forth.

4. In an apparatus for feeding or discharging material to or from a vacuum tank, the combination of a receiving chamber having an exhaust passage, an inlet valve which controls the inlet of said chamber, and an outlet valve which controls the outlet of said chamber, one of which valves is exposed to the atmosphere while the other valve is exposed to the vacuum, an exhaust chamber which incloses said exhaust passage, an exhaust valve which is arranged within said chamber and controls said passage, and mechanism for opening and closing each of said valves periodically and operating to open said exhaust passage when said inlet and outlet valves are closed, substantially as set forth.

5. An apparatus for feeding or discharging material to or from a vacuum tank comprising a preliminary receiving chamber, a valve which controls the inlet to said chamber, a main receiving chamber which receives the material from said preliminary chamber, and a swinging valve which controls the communication between said chambers and is arranged within said main chamber and closes upwardly against its seat, substantially as set forth.

6. An apparatus for feeding or discharging material to or from a vacuum tank comprising a preliminary receiving chamber, a valve which controls the inlet to said chamber, a main receiving chamber which receives the material from said preliminary chamber, a swinging valve which controls the communication between said chambers and is arranged within said main chamber and closes upwardly against the seat, and a swinging valve which controls the outlet of said main chamber and closes upwardly against its seat, substantially as set forth.

7. An apparatus for feeding or discharging material to or from a vacuum tank comprising a preliminary receiving chamber, a valve which controls the inlet to said chamber, a main receiving chamber which receives the material from said preliminary chamber, a swinging valve which controls the communication between said chambers, a swinging valve which controls the outlet of said main chamber, and means for actuating said valves, substantially as set forth.

8. An apparatus for feeding or discharging material to or from a vacuum tank com-

prising a plurality of preliminary receiving chambers and main receiving chambers, a common feed device, a valve adapted to alternately place said feed device in communication with one of the preliminary chambers, valves which control the communication between said preliminary and main receiving chambers, and valves which con-

trol the outlets of said main chamber, substantially as set forth.

Witness my hand in the presence of two subscribing witnesses.

EUGÈNE MOREAU.

Witnesses:

EDWARD C. HARD,
C. B. HORNBECK.