No. 883,764. PATENTED APR. 7, 1908.

E. G. VOLANS.

COAL STORAGE PLANT.

APPLICATION FILED JAN. 29, 1906.

2 SHEETS—SHEET 1.

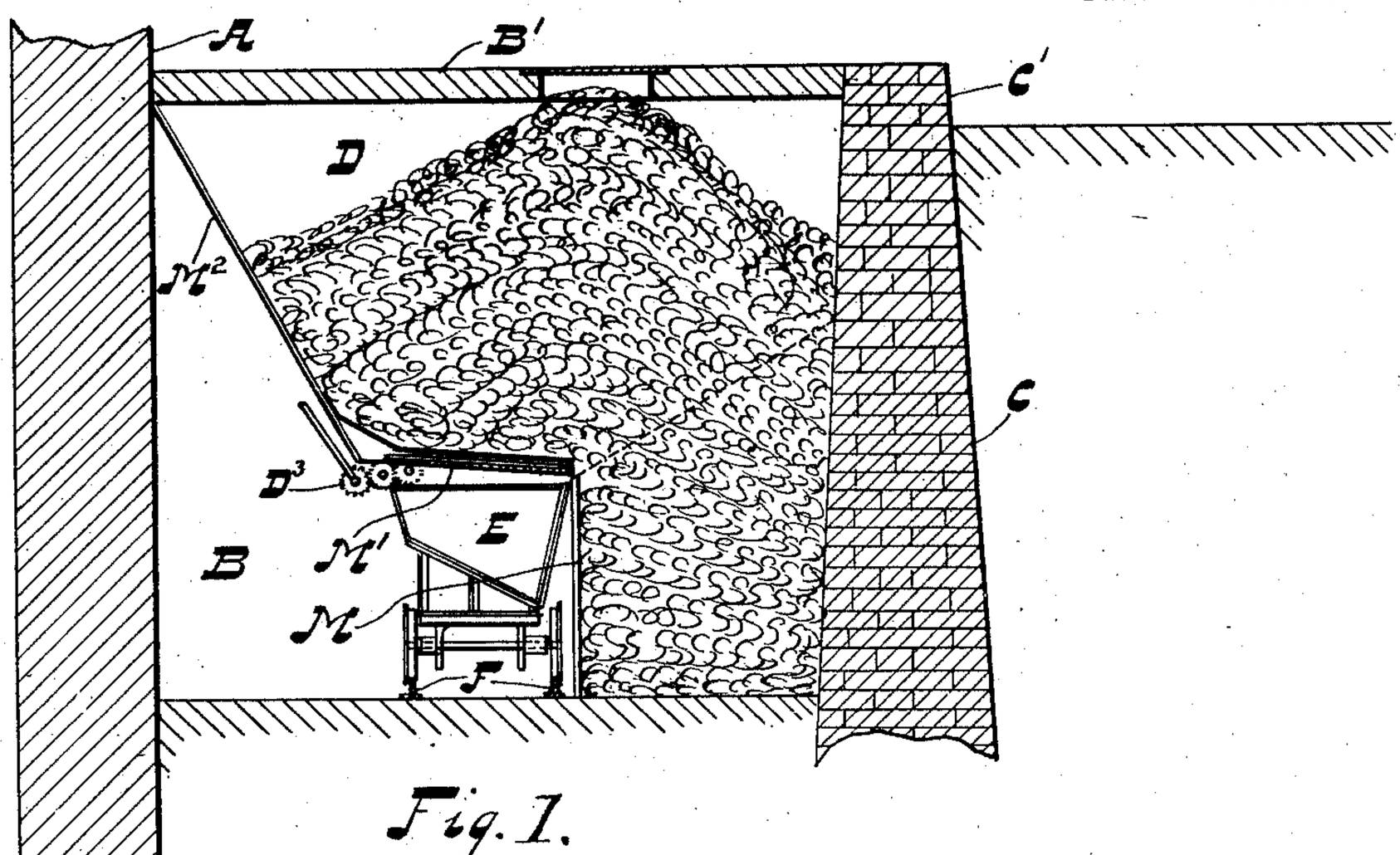

Fig. 1.

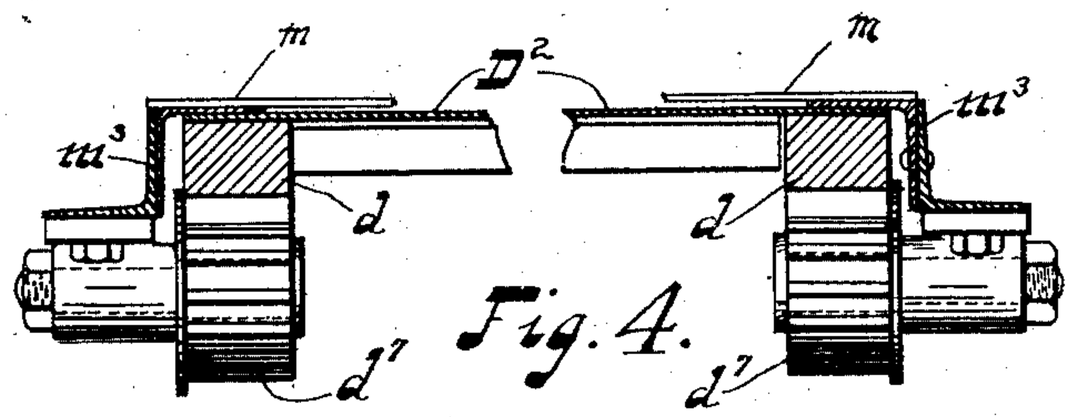

Fig. 4.

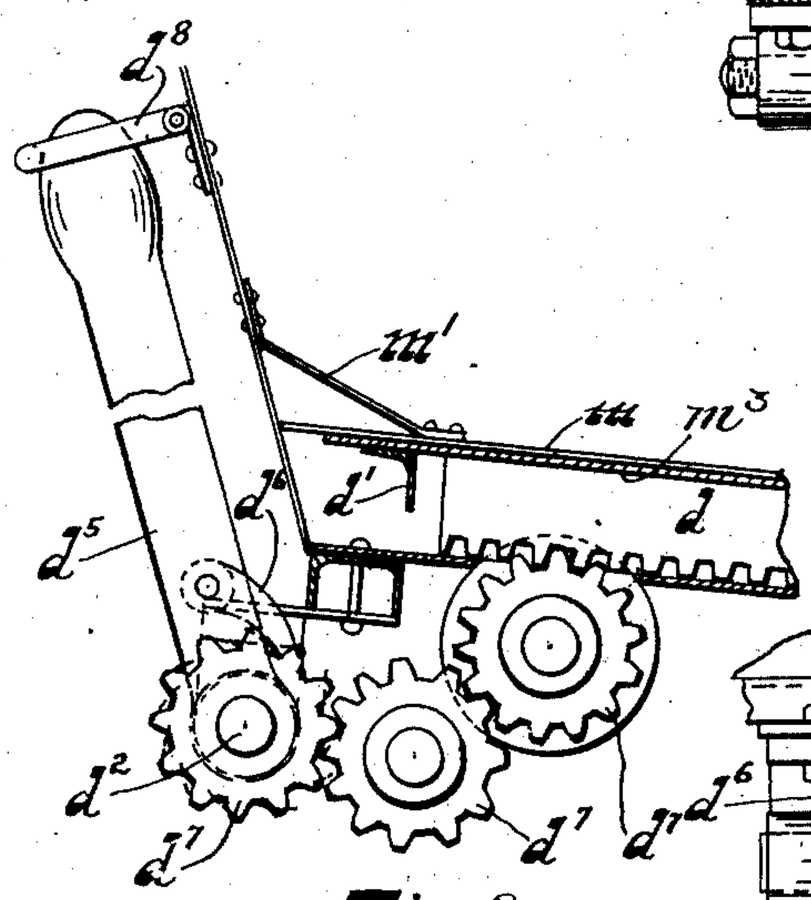

Fig. 3.

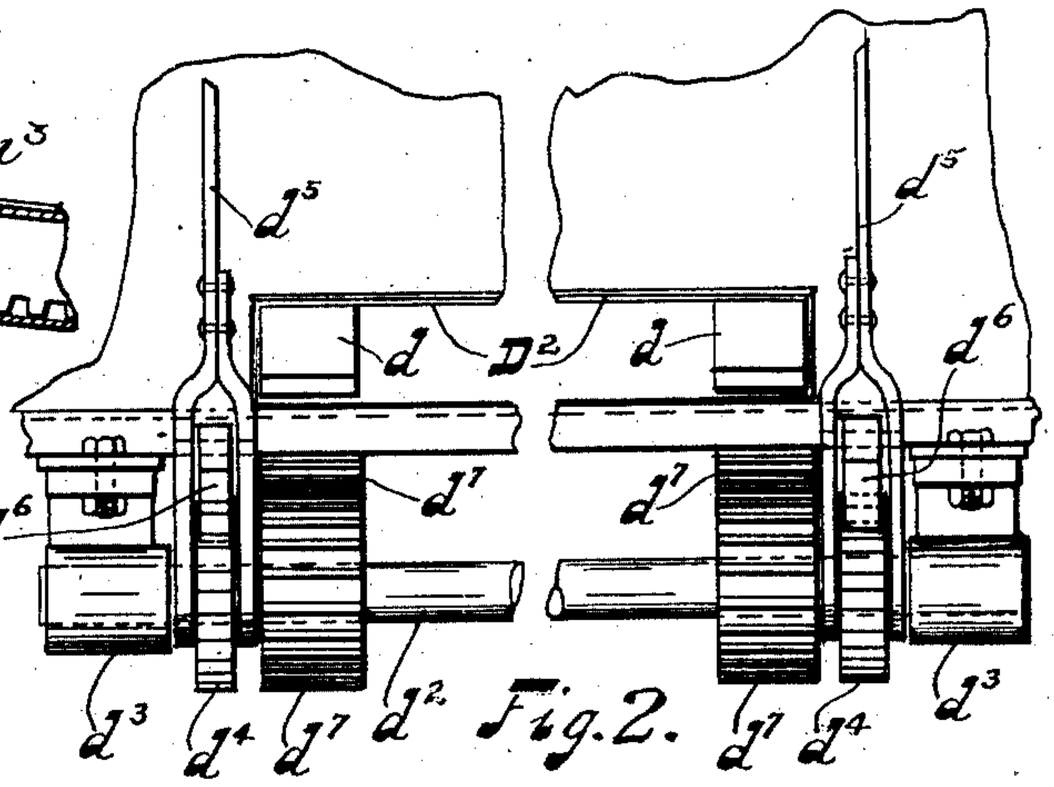

Fig. 2.

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2 SHEETS—SHEET 2.

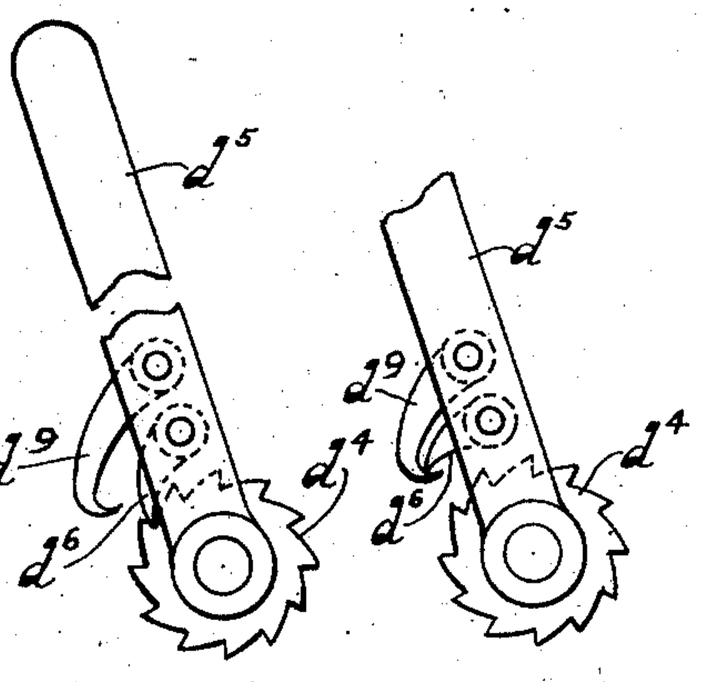

Fig. 7

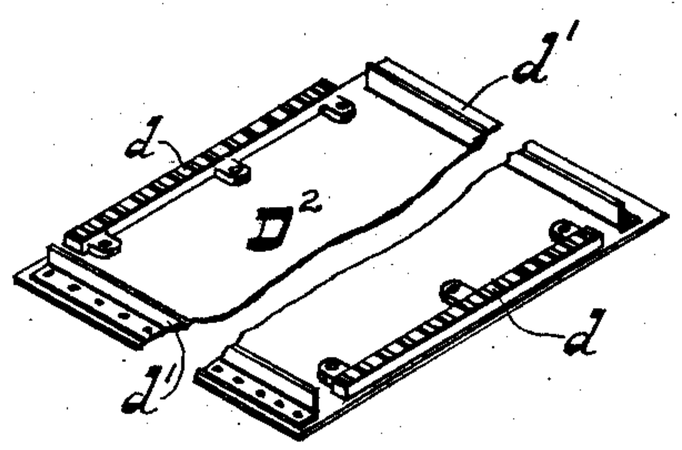

Fig. 5.

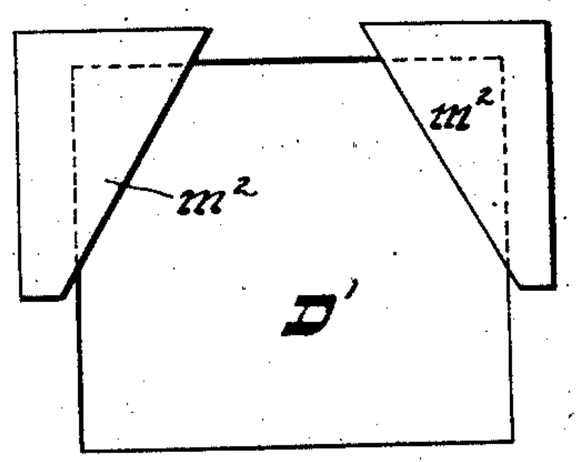

Fig. 6.

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UNITED STATES PATENT OFFICE.

ELMER G. VOLANS, OF CLEVELAND, OHIO.

COAL-STORAGE PLANT.

No. 883,764. Specification of Letters Patent. Patented April 7, 1908.

Application filed January 29, 1906. Serial No. 298,323.

To all whom it may concern:

Be it known that I, ELMER G. VOLANS, a citizen of the United States, and resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Coal-Storage Plants, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle so as to distinguish it from other inventions.

My invention relates to plants for storing and handling coal. It has particular reference to certain details of bin construction in a coal-handling system that is adapted for use in connection with the heating plants of office buildings and in analogous situations. Such system as here developed comprehends means both for storing the coal and for readily transferring it as needed from the place of storage to the furnaces, to which it may be supplied in turn, either by mechanical stokers or manually.

The object of my invention is to conserve space and avoid dust both of which are highly important desiderata especially in office buildings.

Said invention consists of means hereinafter fully described and specifically set forth in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—Figure 1 is a vertical transverse cross section of a bin in which is incorporated my improved construction; Fig. 2 represents a rear elevation of the mechanism whereby the gate controlling the discharge openings of the bin are operated; Fig. 3 represents a side elevation of the same mechanism; Fig. 4 is a vertical transverse cross section of one of the gates; Fig. 5 is a perspective view of the same on a smaller scale and turned bottom side up; Fig. 6 is a plan view of one of the discharge openings showing a detail of the construction involved therein; and Fig. 7 shows a detail of construction of the gate opening mechanism.

As has been indicated my system of storing and handling coal is designed principally to meet the requirements of the heat and power plant of a modern office building. This usually involves the utilization of the sidewalk cellar on one or more sides of such building as a storage compartment both for the storage of such amount of fuel as it is deemed wise to hold in reserve and for the current supply; it further involves the transport of the coal from such compartment to the boiler furnaces which are as a rule more or less distant therefrom, inasmuch as they are placed near the center of the building or else in its rear, for obvious reasons. This is the situation illustrated in Fig. 1. In such figure, the line A represents the outside of the wall of the building which forms the inner wall of sidewalk-cellar B. The outer earth-retaining wall C of the building forms the outer wall of the cellar, and ordinarily is on a line with the curb C′ as there appears. Cellar B is roofed over by the sidewalk B′ of which a portion only is shown in this figure. In such sidewalk-cellar B are disposed as many compartments or bins D, one such bin only appearing in the figure in question as the size of the plant, or the uncertainties of the fuel supply, determine to be necessary. Coal from bins D is designed to be received in cars E running on a track F and thereby conveyed to the furnaces.

The storage compartment or bin D, as appears in the cross-sectional view thereof shown in Fig. 1, occupies the major portion, but not all, of sidewalk cellar B, a passage way being left along the inner cellar wall. The outer wall of the bin is the substantially vertical outer wall C of the cellar; the inner wall of the bin is a partition erected between the outer wall C and the main building wall A. This partition comprises three sections, a lower vertical section M, an intermediate substantially horizontal section M′, and an upper outwardly inclining section M^2 extending from the outer edge of such intermediate section to wall A. The height of lower, vertical section M is such as to bring horizontal section M′ approximately on a level with the top of the cars E which serve to convey the coal away. The widths of such intermediate section and of such car are further about the same. Accordingly, the tracks F being disposed alongside the bin and beneath the overhanging portion thereof formed by the inner wall structure of the bin as just set forth, it is evident that a car standing upon the track will fit quite closely up against section M′ which forms the lateral projection of the wall.

For the purpose of removing the coal

from the bin D a series of discharge openings D′ are formed in wall section M′. In fact this section is actually constructed by joining at regular intervals the bottom of section M² with the top of section M by means of straight plates *m*. Along the junction line of these plates with section M² is secured another plate *m′*, Fig. 4, that is disposed at an angle to both plates *m* and such wall. Across the corners at the forward end of each opening D′ formed in the manner just described are secured triangular plates *m²*, Fig. 6, that serve as sheer plates in the operation of closing the openings, as will be presently described. Through these openings D′ the bulk of the coal in bin D, when the same has been filled, will be automatically discharged by mere force of gravity. The dotted line in Fig. 1 is intended to indicate approximately the line of separation between the part of the mass that will thus discharge of itself through openings D′ and the part that will remain behind. Under ordinary circumstances this last part, *i. e.* that which lies below the dotted line referred to, remains untouched; in other words it constitutes the reserve supply to be used only in case, for some reason or other, the current supply fails. Such current supply is brought weekly or oftener, depending upon the size of the bin which in turn depends upon the size of the cellar, is dumped into the bin through the side-walk until such bin is filled, and is then drawn off as needed through openings D′ as long as it feeds down of itself. In case of an emergency requiring the use of the reserve stock, the coal has to be shoveled out of the bin by hand through openings D′.

Openings D′ are controlled by means of slide-gates D², Figs. 5 and 6. To accommodate these gates a guideway is provided on each side of the respective openings. Such guideway, I form, Figs. 3 and 4, by securing angle bars *m³* to the bottom of plates *m*. The slide - gates accordingly lie beneath sheer plates *m²* in front as beneath plate *m* in the rear while the top guide formed by the upper of angle bars *m³* prevents upward springing or displacement of the gate racks *d*, Fig. 5, attached to the bottom of the gate, one on each side. Additional stiffness is given the gate by angle bars *d′* secured transversely across each end of the same. Racks *d* are designed to be engaged by the pinions of a gate-actuating mechanism D³, Fig. 1, whereby the gate is opened and closed. Such mechanism D³ comprises, Figs. 2 and 4, a shaft *d²* mounted transversely of the gate in suitable bearings *d³* provided along the rear edge of partition member M′, two ratchet wheels *d⁴*, having oppositely disposed teeth, mounted upon such shaft; levers *d⁵* provided with pawls *d⁶* adapted to operatively engage the respective ratchet wheels; and two sets of gearing, each including two or more pinions *d⁷*, one of which is mounted on the shaft *d²*, the other of which turns on a fixed axis and engages the rack *d* on the corresponding side of slide-gate D². It is preferable to employ at least one intermediate pinion *d⁷* in order that ample clearance may be allowed for the passage of the gate above actuating mechanism D³, while still allowing such mechanism to be placed where it can be easily reached. Ratchet levers *d⁵* when not in use are secured close against wall section M² in the usual way by means of links *d⁸*, Fig. 4, pivotally attached to such wall section and adapted to drop over the outer end of the lever. Similarly, in order to retain the pawl of the lever not in use from engaging its ratchet and so locking shaft *d²* against rotation, I provide on each lever *d⁵*, Fig. 7, a hooked member, or catch *d⁹*, adapted to secure such pawl in an inoperative position.

Having thus described the several parts that go to make up my improved coal-handling plant, I shall now proceed to indicate its general scheme of operation, as well as to more fully explain the operation of the parts than was possible in the structural description given above. It has been explained how the storage bin D is designed to contain both the reserve stock and the current supply of coal. Assuming, then, that the current supply is in, to transfer such supply to the furnaces a car E is brought on track F beneath one of the discharge openings D′ of the bin. The car section being slightly larger than the opening, and its top fitting closely beneath the overhanging portion of the bin, it is evident that upon withdrawing slide gate D² from such opening the car will be at once filled but not overflooded even if the gate be not immediately closed again. In closing the gate which, it is seen, has to cut its way directly through the mass of coal that has discharged into the car and is continuous with that still in the bin, the efficacy of the gate construction previously described becomes manifest. The rack being on the underside of the gate is not clogged up, and the heavier the load on the gate the better the engagement of the rack with the actuating pinion; further, the use of sheer plates in the forward corners of the opening D′ lessens the resistance to the movement of the gate as it approaches its closed position and obviates the difficulties attendant upon lumps of coal becoming caught between the gate and the edge of the opening. As soon as the gate is closed the car is ready to be removed. By virture of the arrangement just described such car is filled level full without any coal spilling over its sides. The car is then run upon tracks F to the dumping station where it is dumped of its load.

Having thus described my invention in

detail, that which I particularly point out and distinctly claim, is:—

1. The combination with an overhead storage bin having a discharge opening on its under side, of a straight plate bounding each side of said opening, and a sheer plate fitted in each of its two forward corners, angle bars secured to the under side of said side plates and forming guideways, and a gate slidably mounted in said guideways and adapted to close said opening.

2. The combination with an overhead storage bin having a discharge opening on its under side, of a straight plate bounding each side of said opening, and a sheer plate fitted in each of its two forward corners, angle bars secured to the under side of said side plates and forming guideways, a gate slidably mounted in said guideways and bearing a rack, a pinion engaging said rack, and a ratchet connected to rotate said pinion.

Signed by me this 27th day of January, 1906.

ELMER G. VOLANS.

Attested by—
D. T. DAVIES,
JNO. F. OBERLIN.