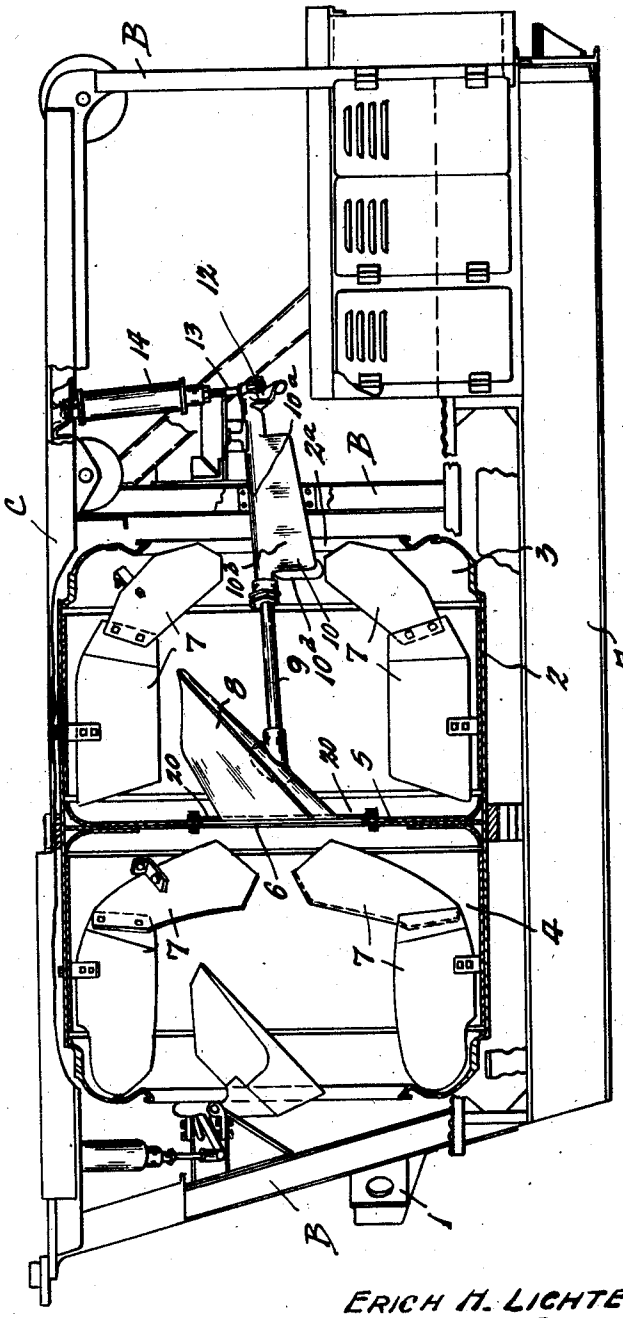
July 25, 1939. E. H. LICHTENBERG ET AL 2,167,243

DUAL DRUM MIXER

Filed Nov. 16, 1937 3 Sheets-Sheet 1

FIG. 1.



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DUAL DRUM MIXER

Filed Nov. 16, 1937 3 Sheets-Sheet 2

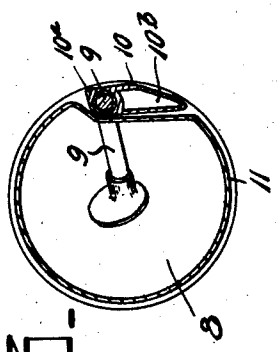


FIG. 3.

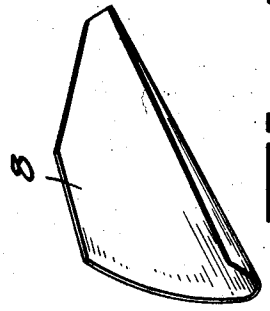


FIG. 4.

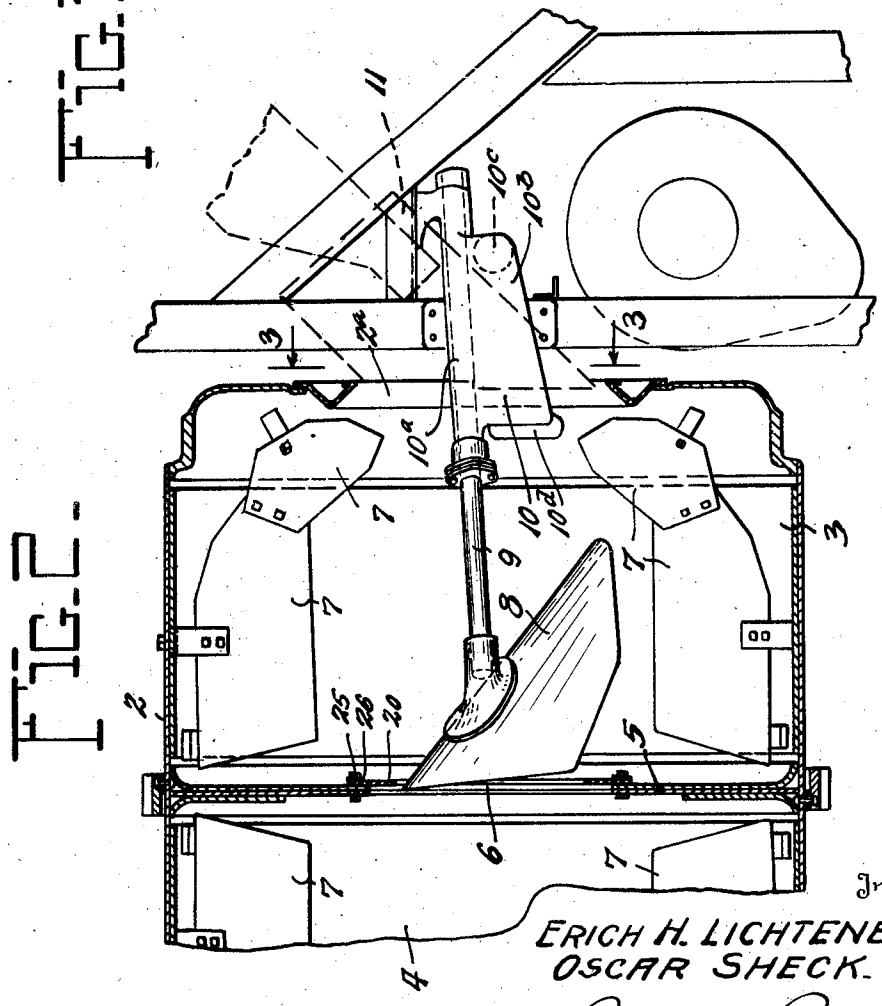


FIG. 2.

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DUAL DRUM MIXER

Filed Nov. 16, 1937 3 Sheets-Sheet 3

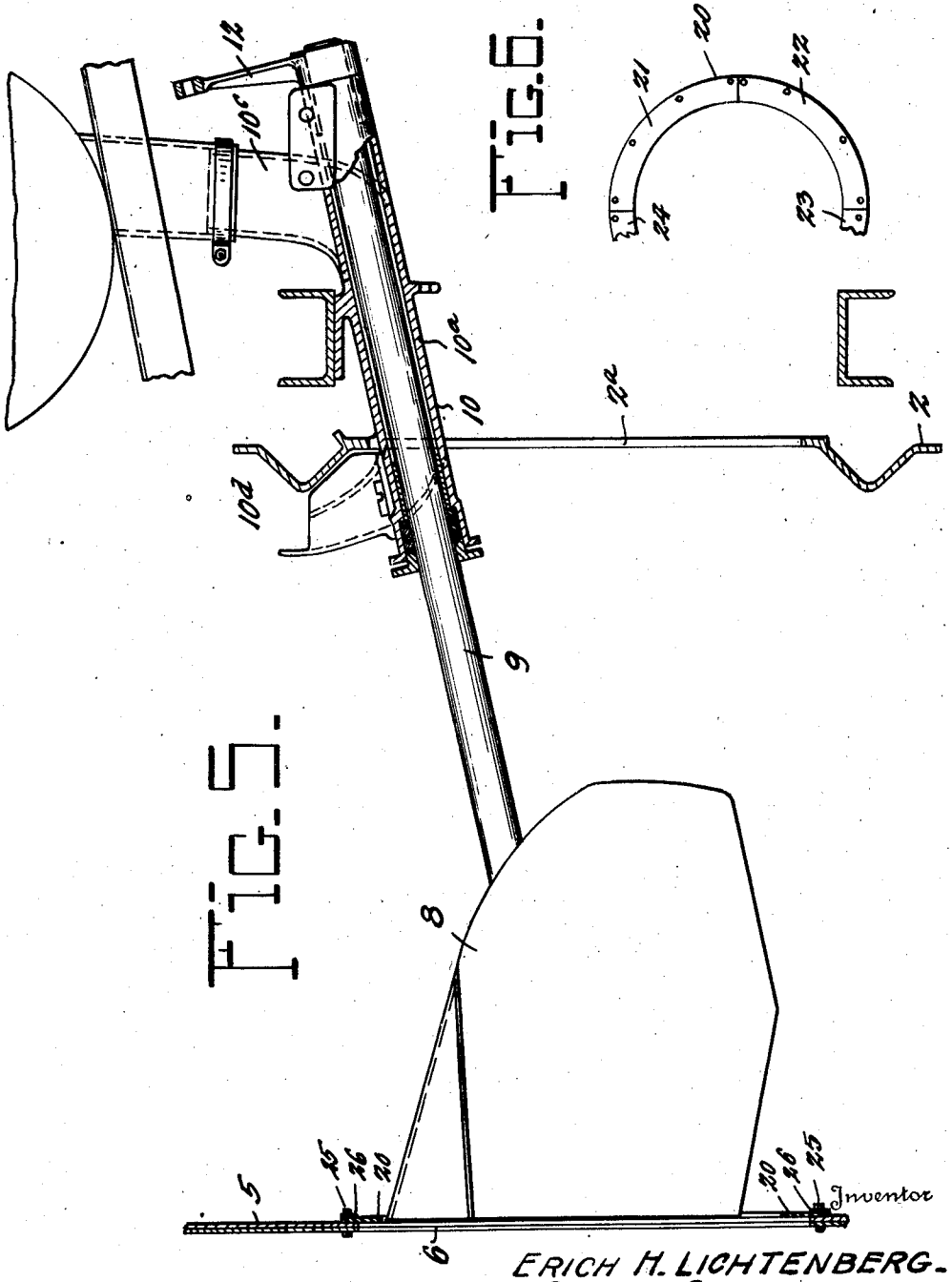


FIG. 5.

FIG. 6.

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Patented July 25, 1939 2,167,243

UNITED STATES PATENT OFFICE

2,167,243

DUAL DRUM MIXER

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Application November 16, 1937, Serial No. 174,902

6 Claims. (Cl. 259—165)

The present invention appertains to a special type of concrete mixing machine known in the art as of dual drum construction by reason of the fact that the concrete aggregates submitted to agitation thereby are first led into a primary mixing drum compartment or chamber wherein they are mixed, and then transferred from said first mixing chamber to a second mixing chamber of the drum, from which latter they are ultimately discharged. This type of mixer is advantageously employed today in conjunction with paving or like machines, and is found of high efficiency by reason of the increased capacity afforded by the dual mixing chambers of the drum and the ability to overlap the mixing actions performed in said chambers or compartments.

The improvements of the present invention lie in the provision of a special type of transfer chute designed to be supported adjacent to the partition which separates the drum mixing compartments from each other, said chute being movable from a position in which it will discharge or transfer the aggregates agitated in the first mixing chamber to the second mixing chamber, and also adjustable to a position in which the chute will be inactive or prevent the passing of the agitated material from the first chamber to the second chamber. The means for supporting this transfer chute is novel in respect to the invention, in that the said means, in the first place, is so mounted and arranged in respect to the supply or charging opening of the drum as not to interfere with the charging of aggregates into the drum through said opening. In the second place, the said supporting means for the transfer chute, so called, is designed so as to comprise a combined bracket and water inlet means for the first or primary mixing chamber of the drum, as will be more fully pointed out hereinafter.

The invention also involves other details of construction and operation, an understanding of which will be had upon reference to the accompanying drawings and following description.

In the accompanying drawings:

Figure 1 is a side elevation of the framework of a paving machine of the dual drum type, the usual boom and bucket or other type of distributor mounted on the left-hand end of the framework, the traction supporting means and the loading skip being omitted and the drum being shown in section.

Figure 2 is a fragmentary enlarged sectional view vertically and longitudinally through the primary agitating chamber of the drum, illustrating more fully the mounting means for the transfer chute and the arrangement of the charging chute in the charging opening of the drum, dotted lines showing such charging chute and a portion of the loading skip by which the aggregates to be mixed are supplied to said charging chute.

Figure 3 is a vertical sectional view bringing out more clearly the combined supporting bracket and water inlet structure that carries the turning shaft for the transfer chute.

Figure 4 is a detail perspective view of the transfer chute alone.

Figure 5 is a horizontal sectional view of the transfer chute showing its disposition in relation to the partition separating the dual mixing chambers of the drum, and bringing out clearly the manner in which the supporting shaft of the chute is disposed at one side only of the charging opening for the dual drum structure; also showing the water inlet construction of the supporting bracket for the transfer chute shaft.

Figure 6 is a detail view of the flexible apron member illustrating especially its compositive structure.

Describing the invention specifically, reference is first made to Figure 1 in which the general framework of the mixing machine is seen to comprise the base frame or chassis A and the upper framework including upright members B and the top frame members C. This framework may be mounted upon a traction base comprising so-called crawlers or endless traction belt, and at one end of the framework, as upon a bracket 1, may be carried a boom and bucket distributing means such as commonly used in paving machines, or any other distributing means, adapted to receive mixed aggregates from the dual drum 2. The dual drum 2 includes a primary or charge receiving chamber or compartment 3 and a secondary or charge delivery chamber or compartment 4. Compartments 3 and 4 are separated by a partition 5 having a central opening 6 for the passing of the aggregates being agitated, from the chamber 3 to the chamber 4. The drum 2 is longer than the ordinary single drum used in mixing machines of this type, so as to afford a larger volume or capacity for the aggregates to be agitated, and said drum is equipped in both of the compartments 3 and 4 with mixing blades and buckets generally designated at 7.

The agitating means 7 is adapted to raise the aggregate materials being mixed in a particular

chamber 3 or 4, so that said materials may be deposited in the transfer chute 8, as respects the materials in the chamber 3, or deposited in the discharge chute which is located at the discharge end of the drum or the outflow end of the chamber 4.

The transfer chute 8 comprises a chute-like body adapted to assume a position inclining from its upper end to its lower end, with its lower end opposite the opening 6 when the chute is adjusted for transfer of materials from the mixing chamber 3 to the mixing chamber 4. When, however, the chute 8 is turned to a position as illustrated in Figure 2, for instance, the materials being agitated in the chamber 3 will pass backwardly or away from the opening 6 instead of being discharged by the chute into the chamber 4.

The chute 8, which is somewhat curved in cross section, so as to retain and convey agitated materials dropping into the same for transfer purposes, is carried by a shaft 9 which is normally inclined in relation to the longitudinal axis of the drum 2, the inner end of the shaft 9 being disposed approximately opposite to the center or axis of the opening 6 and the outer end of the shaft passing through the charging opening 2a of the drum 2 near the periphery of the opening and preferably at one side thereof, as distinguished from the upper and lower portions of the opening. Said shaft 9 is carried for free rotation by means of a bracket 10 which is seen best in Figures 2 and 5, said bracket comprising a bearing portion 10a, through which the shaft 9 passes, and a water inlet section 10b. The section 10b is formed with a water inlet end 10c, see Figure 5, having lateral disposition, and the lower portion of the section 10b is hollow, so that water may pass freely therethrough below the bearing portion 10a. At the portion of the section 10b within the drum chamber 3 the casting or body from which the member 10 is made has a horizontally and outwardly curved water outlet portion 10d.

Thus it will be seen that the bracket structure 10 includes not only supporting means for the shaft 9, but a water inlet structure to the inlet 10c, to which may be supplied the water from a suitable tank, at the proper time, for mixing with the dry aggregates introduced into the drum 3 by means of a chute 11, shown dotted in Figure 2.

According to Figure 5, it will be apparent that because of the arrangement of the shaft 9 diagonally to the axis of the charging opening 2a of the drum 2 and manner of supporting the said shaft 9 at one side of the opening 2a, the main space of the opening 2a may be occupied by the chute 11, and there is no interference between the mounting means for the transfer chute 8 and the charging chute 11 by reason of the above arrangement of parts.

For the operation of the shaft 9 to shift the transfer chute 8 from the position of Figure 1 to an inoperative position in which the materials will not be delivered or transferred through the opening 6, any suitable power device may be employed. In the drawings I have illustrated a crank arm 12 carried by the outer end of the shaft 9, which crank arm is connected with the operating piston rod 13 of an air ram or similar operating device designated 14. By the admission of pressure fluid into the cylinder of the ram 14, or the controlling of the fluid in said member 14, it is obvious that a rocking movement may be imparted to the crank arm 12, and in this manner the shaft 9 may be partially rotated to correspondingly impart a half-revolution, more or less, to the chute 8, whereby to shift the latter to and from inoperative and operating transfer positions.

The operation of the invention, according to the above described construction, is very simple. By the use of the loading skip, concrete aggregates in dry condition are hoisted and caused to enter the chamber 3 by means of the chute 11. When mixed a certain period of time in the chamber 3, the shaft 9 is turned to shift the transfer chute 8 to the position of Figure 2. In this way the materials being agitated and elevated in the chamber 3 will be dropped upon the inclined upper curved portion of the chute 8 and will pass through the transfer openings 6 into the chamber 4. When the materials are in the chamber 4 they will be mixed or agitated in the customary way by means similar to the means 7 in chamber 3, and, after being mixed in the said secondary chamber 4 a sufficient time, by the operation of the discharge chute at the discharge end of the drum 2 to assume a discharge position, the contents of the chamber 4 may be discharged therefrom.

On the introduction of the dry aggregates into the chamber 3, a suitable water valve will be operated to cause water to pass into the chamber 3 through the water inlet passage 10c of the bracket 10 and the dry aggregates will thus be moistened at the proper time in the operation of agitating and mixing.

It is notable that the chute 8 is so mounted that during its rotation it moves only in the space of the chamber 3 and never protrudes through the outflow or transfer opening 6. In no position assumed by the chute 8 is there any engagement of the chute with the partition 5 which is equipped with the transfer opening 6.

As previously indicated, the chute 11 may occupy substantially the entire width of the charging opening 2a of the drum 2 and thus the operative charging area of the chute is reduced very slightly only by the supporting and actuating shaft 9 and its supporting bracket.

It is also notable that the inclination of the chute 8 is such that it is designed to transfer the agitated materials in the chamber 3 to the chamber 4 at an inclination substantially in line with the direction of agitation or movement of the materials being agitated in the chamber 4 by the lifting blades and buckets of the latter. On this account resistance by said materials to the movement of the drum, incident to the transfer charging of the chamber 4 is reduced to a minimum. Furthermore, when the transfer chute 8 is inoperative, that is, reversed from its position of Figure 2, it inclines downwardly and away from the transfer outlet or opening 6 in the partition 5. Under these conditions the agitated materials elevated in the chamber 3 will fall downwards upon the reversed transfer chute 8 and are scattered or splattered in opposite directions off the curved surface of the chute 8 with a certain degree of inclined movement backwardly toward the charging opening 2a.

Secured to the partition member 5 adjacent its opening 6 is a flexible apron 20 extending toward the transfer chute 8 and forming an auxiliary partition member. The apron 20 may be preferably constructed from a plurality of sections 21, 22, 23, and 24 made from heavy rubber sheeting or like resilient material. The

individual sections of the apron are connected to the portion 5 by means of bolts and clamping plates 25 and 26, respectively. The apron 20 prevents the accumulation of coarse materials between the transfer chute 8 and partition 5, which would otherwise interfere with the proper operation of said chute.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States, is;

1. In a mixing machine of the class described, in combination, a mixing drum having a charging opening at the axis thereof and an outflow opening or passage opposite to the charging opening, a chute for charging materials into the drum, extending from a point exterior to the drum, through said charging opening, and occupying in cross section substantially the whole area in said charging opening, a transfer chute in the drum having a concave upper surface and associated with the outflow opening or passage, said chute being adapted in an operative position with said concave surface uppermost to cause materials in the drum chamber to pass through said outflow opening, and a rotatable actuating part for said transfer chute extending through the charging opening of the drum for revolving said chute to inverted position in which the under surface of the chute serves as a mixing member, and means to support the said transfer chute wholly upon said rotatable part.

2. In a mixing machine of the class described, in combination, a mixing drum having an opening at one end and adjacent to the axis thereof for passage of materials through such opening, and having an outflow opening or passage opposite to the first mentioned opening for permitting outflow or transfer movement of materials mixed in the drum, an invertible chute for transferring mixed materials in the drum through said outflow opening, and operating means for said chute consisting of a shaft extending through said first mentioned opening of the drum, and bearing means for supporting said shaft in its proper position relatively to said first mentioned opening, said bearing means comprising a bracket in which the shaft is movably mounted, said bracket being provided with water inlet means including a passage leading from a point exterior to the drum to a point within the same.

3. In a mixing machine, in combination, a mixing drum having an opening at one end for passage of aggregate materials therethrough, a relatively stationary chute at said opening, said drum being formed with an outflow opening remote from said first mentioned opening, and the two openings being disposed approximately in line with the axis portion of the drum, a transfer chute for causing passing of the aggregate materials through the outflow opening and disposed to operate adjacent to said outflow opening, means for supporting and operating said transfer chute comprising a single rotative shaft extending through the first opening and attached to said transfer chute at the inner end thereof while its outer end extends to a point exterior to the drum through said first opening of the drum, the said operating shaft extending past said stationary chute and supporting the transfer chute, the stationary chute occupying substantially the entire area of said first opening and the said shaft being dimensioned so as to occupy a relatively small portion of the area of said first drum opening and therefore not materially interfering with the passage of the materials through the stationary chute, and means external to the drum cooperating with the outer projecting end of the shaft for operating the latter.

4. A mixing machine substantially as claimed in claim 3, wherein the operating shaft connected with the transfer chute and supporting it, projects through the first opening of the drum substantially at the peripheral portion thereof and at one side of the stationary chute.

5. In a dual drum mixing machine, the combination with a drum having a continuous body providing first and second mixing chambers arranged end to end, a partition separating the chambers, the drum having an opening at one end communicating with one of the mixing chambers, and the partition having an opening establishing communication between the two mixing chambers, of a transfer chute adjacent to the opening of said partition, an aggregate directing chute at said opening and an operating device reaching from a point exterior to the drum through said end opening and connected to the transfer chute to move the same to and from a position for effecting transfer of the aggregates mixed in one chamber to the other, said device being positioned with respect to said end opening so as to be substantially clear of the flow stream of aggregates in the aggregate directing chute to thereby prevent a retarding of the mixing operation.

6. In a dual drum mixing machine, the combination with a drum having a continuous body providing first and second mixing chambers arranged end to end, a partition separating the chambers, the drum having a charging opening at one end communicating with one of the mixing chambers, and the partition having an opening establishing communication between the two mixing chambers aforesaid, of a transfer chute adjacent to the opening of said partition, an aggregate directing chute at the charging opening in the end of the drum, and an operating and supporting device for said transfer chute reaching from a point exterior to the drum through said charging opening and connected to the transfer chute to move the same to and from a position for effecting transfer of the aggregates mixed in the first chamber to the second chamber, said operating and supporting device being supported adjacent to the periphery of the charging opening in a position substantially clear of the flow stream of the aggregates charged into the drum by said aggregate directing chute and the flow stream of the aggregates in the first chamber.

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CERTIFICATE OF CORRECTION.

Patent No. 2,167,243. July 25, 1939.

ERICH H. LICHTENBERG, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 29, claim 5, before the word "opening" insert end; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 19th day of September, A. D. 1939.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)