

Sept. 7, 1943.

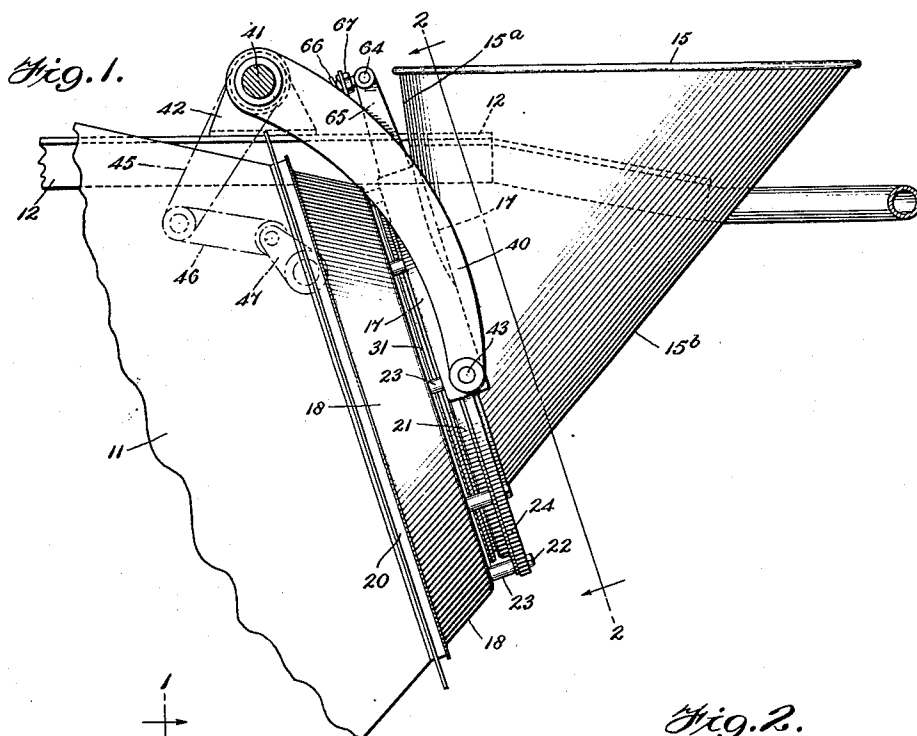
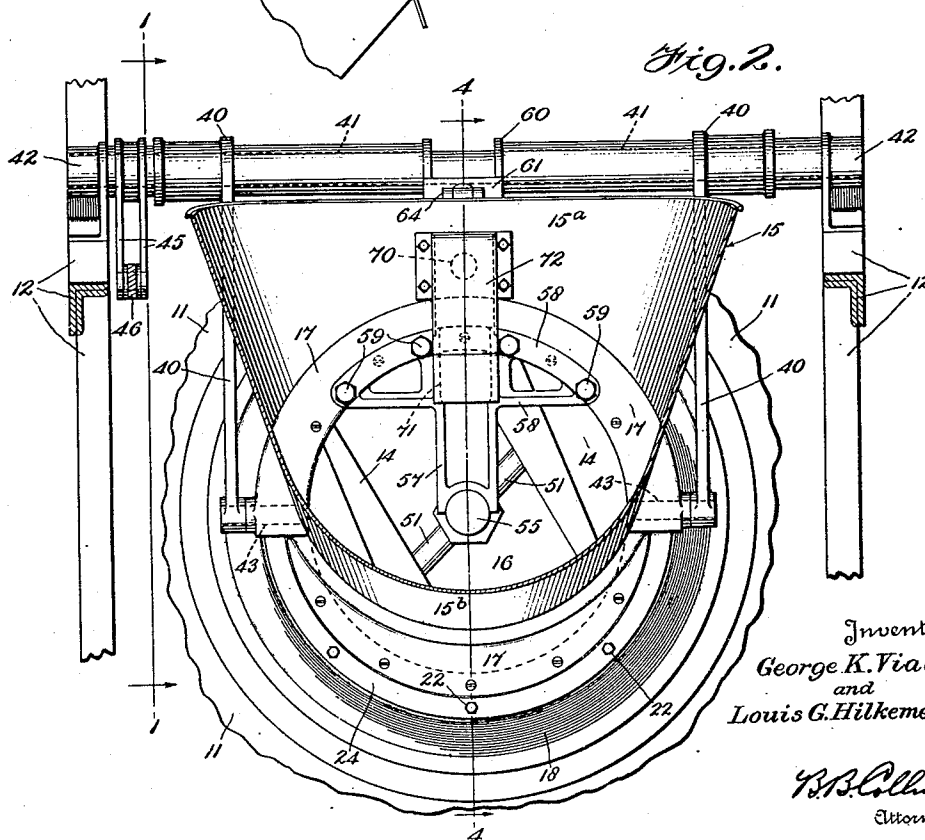
G. K. VIALL ET AL

2,329,167

CONCRETE MIXER

Filed Jan. 28, 1942

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

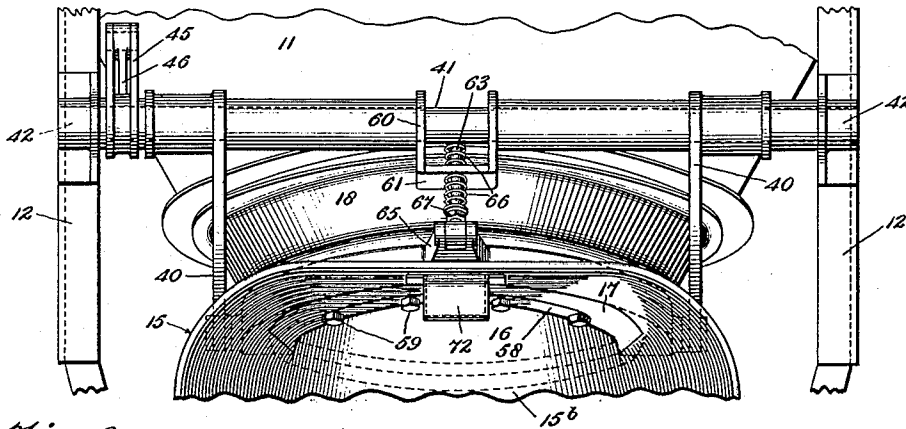


Fig. 3.

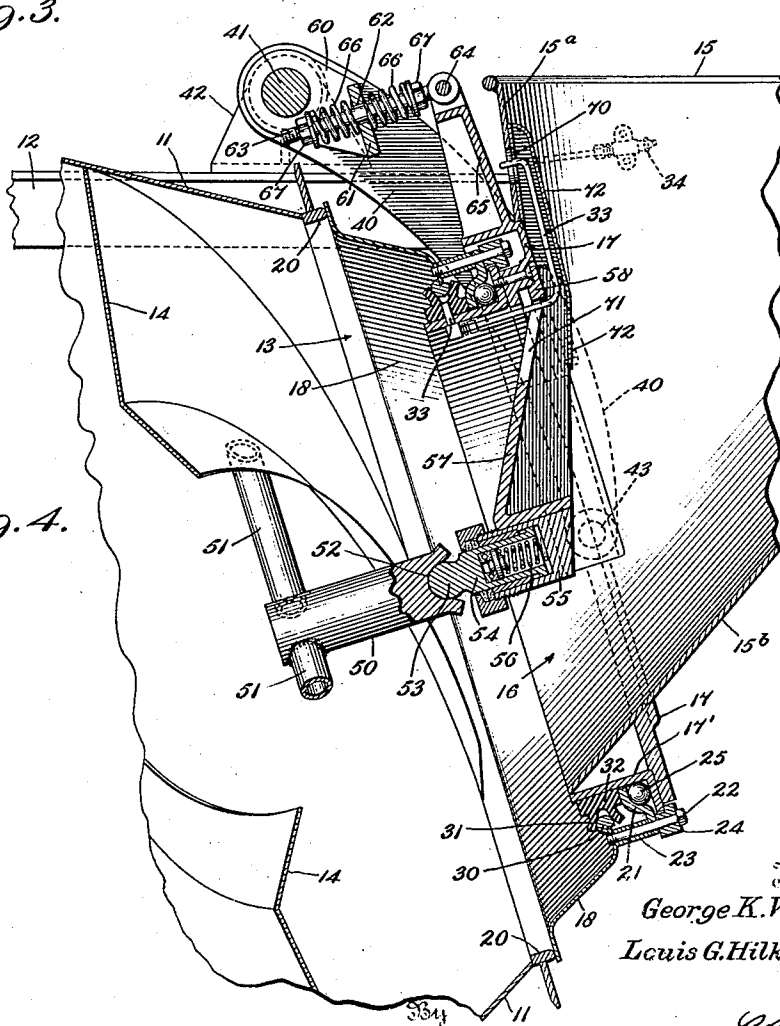


Fig. 4.

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UNITED STATES PATENT OFFICE

2,329,167

CONCRETE MIXER

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Application January 28, 1942, Serial No. 428,604

10 Claims. (Cl. 259-161)

The invention relates to concrete mixers, and more particularly to mechanism for charging the raw materials for a concrete mixture into the mixing drum or receptacle of a mixer of the type commonly known to the trade as a high-discharge mixer; and it represents a further development of charging mechanisms of the general type disclosed in the prior U. S. Patents Nos. 2,265,751, and 2,265,752, each granted December 9, 1941 on applications filed by Charles F. Ball.

In the constructions set forth in these said patents, a charging hopper is associated with the material-transfer opening of a mixing drum which is mounted for rotation about an axis inclined to the horizontal, said hopper itself being non-rotatable but mounted by the drum for reciprocatory movements toward and from said drum opening whereby, when in forward position, it may be co-operatively associated with the opening to charge at least the solids for the mixture into the drum, and when moved rearwardly away from the opening to permit the discharge of the mixture from the drum. In its forward position the hopper also serves, at least in part, to prevent undesired discharge of the constituent materials and/or the mixture during the mixing or agitating operation.

In contradistinction to such prior constructions the present invention provides a non-rotatable hopper structure which in its preferred form is carried by the framework in which the drum is mounted, the hopper mounting being such that the hopper may be oscillated toward and from the material-transfer opening of the drum to perform the functions accomplished by the prior constructions referred to above. The movements of the hopper structure may be secured by any suitable mechanism, such for example, as that described in the said Ball patents for moving their hoppers.

Since in the present instance, where the hopper structure is mounted on the frame rather than by the drum itself, misalignment of the two and consequent leakage of the materials or mixture might occur as a result of twisting or weaving movements of the frame, the invention also provides simple and effective means for preventing such misalignment.

In order that the invention may be more fully understood, reference is made to the following detailed description and to the accompanying drawings forming a part of this specification, wherein one exemplification of the invention is illustrated for purposes of disclosure only, and in

which drawings like reference characters designate like parts in all the views.

In the said drawings:

Figure 1 is a side elevational view, partly broken away and in section, of the upper rear end portion of a concrete mixer of the inclined-axis rotatable drum type, with one form of charging hopper structure constructed in accordance with the present invention mounted thereon;

Figure 2 is a transverse sectional elevational view of the parts shown in Figure 1, taken approximately on the plane indicated by the line 2-2 of the said figure, looking in the direction of the arrows;

Figure 3 is a top plan view of the parts illustrated in Figure 2; and

Figure 4 is a longitudinal sectional view, on a slightly enlarged scale, taken approximately on the plane indicated by the line 4-4 of Figure 2, looking in the direction of the arrows.

Referring more particularly to the said drawings, there is illustrated the essential portions of a well known commercial example of an inclined-axis rotatable drum truck-mounted concrete mixer having a mixing or agitating receptacle 11 suitably mounted in a framework 12 for rotation from any appropriate source of power, not shown. The said receptacle or drum is provided at its upper or rear end with a material-transfer opening 13 through which at least the solid constituents for a concrete mixture may be introduced into the drum for mixing by the usual helical mixing blades 14, and through which the finished mixture may also be discharged, all in a well known manner which is fully set forth in the aforesaid Ball patents.

An open-topped charging hopper 15 of substantially inverted-coniform shape is provided adjacent the drum opening 13, which hopper has a discharge port 16 disposed to register with the said opening when the parts are in the charging and mixing position shown, whereby concrete making materials introduced into the hopper 15 through its open top may be transferred into the drum through its opening 13. As here shown the hopper port 16 may be surrounded by a collar structure 17 similar to that more fully described in the companion application of Louis G. Hilkemeier, filed January 28, 1942, Serial No. 428,603, which collar, among other things, serves to journal an intermediate ring member 18 similar to and functioning in the same manner as the corresponding member disclosed in the said Ball Patents Nos. 2,265,751 and 2,265,752. That

is to say, in the normal or charging position of the parts illustrated, the ring member 18, which is carried by and oscillates longitudinally with the hopper 15, as will appear more fully below, engages with the drip-ring 20 which defines the material-transfer opening 13 of the drum, so as to be rotated by the latter. Such rotation is permitted by the journal bearing provided between the members 17 and 18, which bearing as here shown may be of the anti-friction ball type, one race of which is constituted by the angular element 17' of the collar structure 17 while the companion race 21 is secured to the ring member 18 by the bolts 22 and spacing sleeves 23, as shown in Figures 1 and 4, which bolts also fasten a retaining ring 24 to the member 18, as will be readily understood from the drawings. Anti-friction balls 25 are interposed between the races 17' and 21 to complete the bearing.

In this position the intermediate ring 18 functions to bridge the gap between the hopper port 16 and the drum opening 13 to prevent leakage of the materials as they are charged into the drum, as well as unintentional discharge of the mixture during and subsequent to the mixing period. To seal the running joint between the ring 18 and the collar structure 17 a suitable running seal is provided. As here shown such seal is of substantially the construction disclosed in the co-pending application of Charles F. Ball, filed August 28, 1940, Serial No. 354,521, comprising a bead ring 30 rigidly carried by the ring member 18 and received between two longitudinally spaced circumferential flanges 31 of a resilient sealing ring 32 which is carried by the race member 17' of the collar structure 17. Provision may be made, in the form of suitable piping 33 and fittings 34, for introducing grease into the annular space defined by the bead ring 30 and resilient flanges 31, as indicated in Figure 4.

As above indicated, instead of being mounted upon the drum as in the aforesaid Ball patents, the hopper structure, according to this invention, is carried by the framework 12 for oscillatory movements from and back to the position shown, whereby the completed mixture may be discharged through the opening 13 when desired. In the illustrated exemplification the hopper mounting is provided by a pair of transversely spaced arms 40 carried by a shaft 41 mounted in bearings 42 fixed upon the frame 12, which arms are pivotally connected at their lower ends, as by trunnions 43, to diametrically opposite points of the collar member 17. The shaft 41 may be oscillated by any appropriate means, for example, one similar to that disclosed in the aforesaid Ball patents, including an arm 45 carried by the shaft and connected by a link 46 or other non-rigid connection to a crank arm 47.

As above indicated, the mounting of the hopper structure upon the framework 12 instead of upon the drum 11 introduces the possibility of misalignment of the drum and hopper, due to twisting or weaving movements of the said framework induced by similar movements of the chassis of the vehicle upon which the mixer unit is mounted, which misalignment might result in a bad joint between the intermediate ring member 18 and the drip-ring 20 which would permit leakage of the drum contents. To eliminate or at least minimize the effects of such possible misalignment a readily separable axial guide or bearing is provided between the hopper structure and drum. As best shown in Figure 4, this guide or bearing may take the form of a separable ball

and socket joint, provided by a stub member 50 rigidly supported axially of the drum opening 13 by arms 51 secured to the helical mixing blades 14, and having a socket 52 adapted to readily receive the ball or knob 53 of a plunger 54 which is slidably carried by and retained in a housing member 55 and resiliently urged toward the said socket by a spring 56. The housing member 55 is rigidly carried by the lower end of the depending arm 57 of a bracket 58 which is secured as by bolts 59 to the collar 17. It will be readily appreciated that the structure just described provides a bearing or guide for the hopper structure which, while being readily separable to permit the hopper to be swung away from the drum for the discharge of the mixture, at the same time centers the hopper 15 and the intermediate ring member 18 relative to the drum as the hopper is moved to charging position. This insured concentricity of the said ring and drum is of value in that it causes the pressure applied through the arms 40 upon the ring member to be exerted uniformly about its periphery against the drip ring 20 of the drum; and since the ring 18 rotates with the drum when in this position, undue wear which might result from eccentricity of the members 18 and 20 is prevented.

Since the hopper structure is pivotally mounted by the arms 40 through the trunnions 43, means are provided to resiliently maintain a substantially constant relationship between the arms and hopper. The pivotal mounting of the hopper by the arms is desirable to enable the intermediate ring 18 to accommodate itself to the drum drip-ring 20 in cases of misalignment between the drum and hopper, but if some restraint were not imposed on relative movement between the hopper and supporting arms 40 the hopper would not maintain its proper position. Therefore, a stirrup 60 is mounted upon the shaft 41, the web 61 of which stirrup is provided with an aperture 62 through which a rod or bolt 63 freely passes, one end thereof being pivotally connected as at 64 to a standard 65 rigidly carried by the collar 17. Coiled springs 66 encircle the bolt 63 to either side of the web 61 and their compression may be adjusted by nuts 67 threaded upon the said bolt. Since the arms 40, shaft 41 and stirrup 60 are rigidly interconnected, the arrangement just described maintains a normally constant but yieldable relationship between the hopper structure and the arms.

The forward portion 15^a of the hopper wall, above the discharge port 16, may be provided with an aperture 70 and the web of the bracket 58 may be provided with an aperture 71, which apertures are spanned by a box-like shield member 72 affording a vent through which air may escape from the drum 11 during charging, when the rest of the hopper port 16 is filled with materials passing to the drum. It will also be noted that the present construction maintains the rear inclined portion 15^b of the hopper wall free from obstructions, and since materials in the hopper naturally tend to gravitate toward this portion and move it along on their way to the port 16, a minimum of interference is afforded to their passage to the drum, in substantially the same way as is disclosed in the said Hilkemeier application Serial No. 428,603.

While one form of the invention has been illustrated and described, it is obvious that those skilled in the art may vary the details of construction as well as the precise arrangement of

parts without departing from the spirit of the invention, and therefore it is not wished to be limited to the above disclosure except as may be required by the claims.

What is claimed is:

1. In a concrete mixer unit for vehicular mounting, having a frame, and a fixed-axis mixing receptacle rotatably mounted thereby which is provided with a material-transfer opening, said frame being subject to weaving or twisting movements tending to disturb the normal relationship of the frame and receptacle: means for charging concrete-making materials into the receptacle, comprising a hopper for receiving said materials and discharging them through said transfer opening; means mounting said hopper on the frame for longitudinal oscillating movements from and toward said opening; means for moving said hopper; and means for preventing leakage-producing displacement of the hopper relative to the receptacle when in charging position, due to said frame movements, comprising co-operating elements carried by the hopper and receptacle respectively, disengageable with each movement of the hopper away from the opening and re-engageable solely through reverse movement of the hopper toward the receptacle.

2. In a concrete mixer having a frame and a mixing receptacle mounted thereby which is provided with a material-transfer opening, said frame being subject to weaving or twisting movements tending to disturb the normal relationship of the frame and receptacle; means for charging concrete-making materials into the receptacle, comprising a hopper for receiving said materials, normally disposed to discharge them through said transfer opening; means mounting said hopper on the frame for movements from and toward said opening; means for moving said hopper; and a readily separable ball and socket device, one element of which is carried by the receptacle and another element of which is carried by the hopper, said elements tending through co-operative engagement when the hopper is positioned adjacent the receptacle opening, to prevent leakage-producing displacement of the hopper relative to said opening due to said frame movements.

3. Apparatus according to claim 2, wherein one of the elements of said ball and socket device is resiliently mounted for yieldable engagement with its companion element.

4. In a concrete mixer having a frame and a rotatable mixing drum mounted thereby which drum is provided with a material-transfer opening at one end, said frame being subject to weaving or twisting movements tending to disturb the normal relationship of the frame and mixing drum: means for charging concrete-making materials into said drum, comprising a hopper for receiving said materials, having a port normally co-axially disposed adjacent said transfer opening to discharge the materials therethrough; means non-rotatably mounting said hopper on the frame for movements from and toward said opening; means for moving said hopper; and a readily separable ball and socket device disposed axially of said transfer opening and hopper port, one element of said device being carried by said drum and the other element thereof being carried by the hopper, said elements through co-operative engagement when the hopper is positioned adjacent the drum opening for the charging of materials therethrough, tending to prevent leak-

age-producing displacement of the hopper relative to said opening due to said frame movements.

5. Apparatus according to claim 4, wherein the hopper is mounted for oscillatory movements from and toward the drum opening, and one element of the ball and socket device is resiliently mounted for yieldable engagement with its companion element.

6. In a concrete mixer having a frame and a rotatable mixing drum mounted thereby which is provided with a material-transfer opening at one end, said frame being subject to weaving or twisting movements tending to disturb the normal relationship of the frame and mixing drum; means for charging concrete-making materials into said drum, comprising a hopper structure including a non-rotatable hopper for receiving the materials, having a port normally co-axially disposed adjacent said drum opening to discharge materials therethrough, said hopper structure also including an intermediate ring member rotatably mounted adjacent said port and engageable with portions of the drum surrounding its opening; means non-rotatably mounting said hopper on the frame for longitudinal movements from and toward said drum opening; means for moving said hopper; a socket member carried by the drum axially of its transfer opening; a bracket carried by said hopper having an arm extending to the axis of the hopper port; and a ball member carried by said bracket arm for readily separable engagement with said socket member when the hopper structure is in charging position, whereby to prevent leakage-producing displacement of said intermediate ring member relative to the drum due to said frame movements.

7. Apparatus according to claim 6, wherein the hopper is provided with an inclined wall leading to its port, toward and along which wall the materials tend to travel; and the bracket arm is disposed out of the line of flow of such materials, whereby to offer a minimum of interference to charging of the drum.

8. In a concrete mixer having a frame and a mixing drum mounted thereby which is provided with a material-transfer opening at one end: means for charging concrete-making materials into the drum, comprising a hopper for receiving the materials, having a port normally positioned to discharge them through said drum opening; means mounting said hopper upon the frame for movements from and toward the drum opening, in the plane of the axis of the drum, comprising at least one arm journaled upon the frame and having a pivotal connection with the hopper; resilient means for restraining relative movement between said hopper and arm about said pivotal connection, whereby to yieldably maintain a predetermined relationship between the two; and means for moving said arm.

9. In a concrete mixer having a frame and a rotatable mixing drum mounted thereby which is provided with a material-transfer opening at one end; means for charging concrete-making materials into said drum, comprising a hopper for receiving the materials, having a port normally disposed to discharge them through said drum opening; means non-rotatably mounting said hopper upon the frame for movements longitudinally of the drum axis from and toward said opening to provide for discharge of the concrete mixture, comprising a pair of arms journaled upon the frame and pivotally connected to the hopper; a resilient connection between said hop-

per and arms tending to yieldably maintain a predetermined relationship between them; and means for moving said arms.

10. In a concrete mixer having a frame and a rotatable mixing drum mounted thereby which is provided with a material-transfer opening at one end: means for charging concrete-making materials into said drum, comprising a hopper for receiving the materials, having a port normally disposed to discharge them through said drum opening; means non-rotatably mounting said hopper upon the frame for oscillatory movements longitudinally of the drum axis from and

5 toward said opening to provide for discharge of the concrete mixture, comprising a pair of transversely spaced arms journaled on the frame and pivotally connected to the hopper at opposite sides thereof; a stirrup movable with said arms; an adjustable resilient connection between the hopper and said stirrup tending to yieldably maintain a predetermined relationship between the hopper and arms; and means for moving said arms.

GEORGE K. VIALL.
LOUIS G. HILKEMEIER.

DISCLAIMER

2,329,167.—*George K. Viall and Louis G. Hilkemeier, Milwaukee, Wis.* CONCRETE MIXER. Patent dated September 7, 1943. Disclaimer filed October 23, 1944, by the assignee, *Chain Belt Company*.

Hereby enters this disclaimer to claims 8 and 9 in said specification.

[*Official Gazette November 21, 1944.*]

CERTIFICATE OF CORRECTION.

Patent No. 2,329,167.

September 7, 1943.

GEORGE K. VIALI, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 66, for "it along" read --along it--; 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 23rd day of November, A. D. 1943.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.