May 9, 1933. J. F. ROBB 1,907,668

CONCRETE SPREADING MEANS

Filed July 20, 1931 3 Sheets-Sheet 1

Fig. 1.

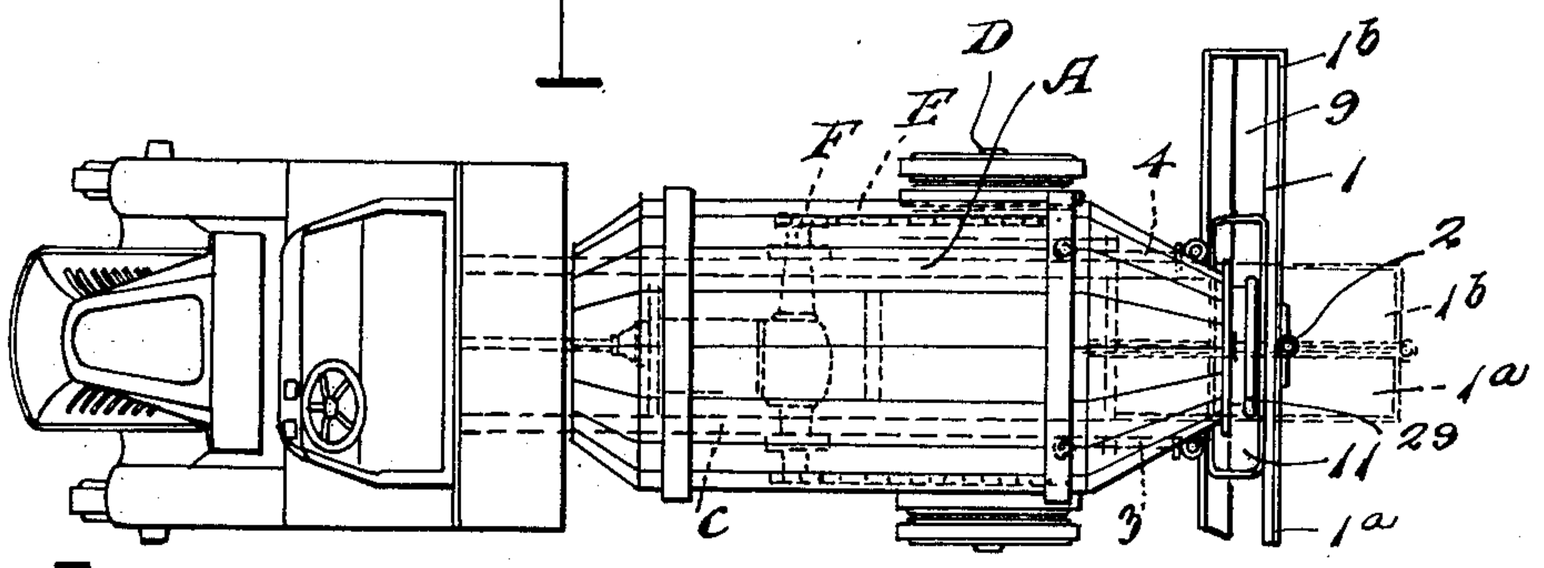


Fig. 2

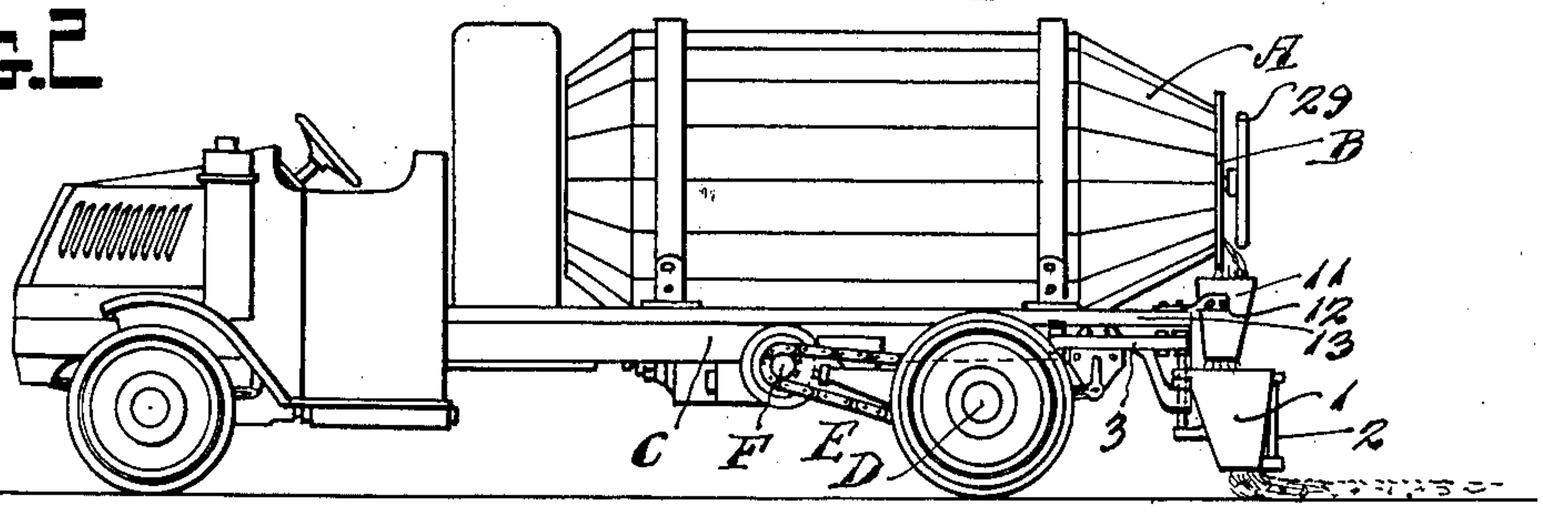


Fig. 3.

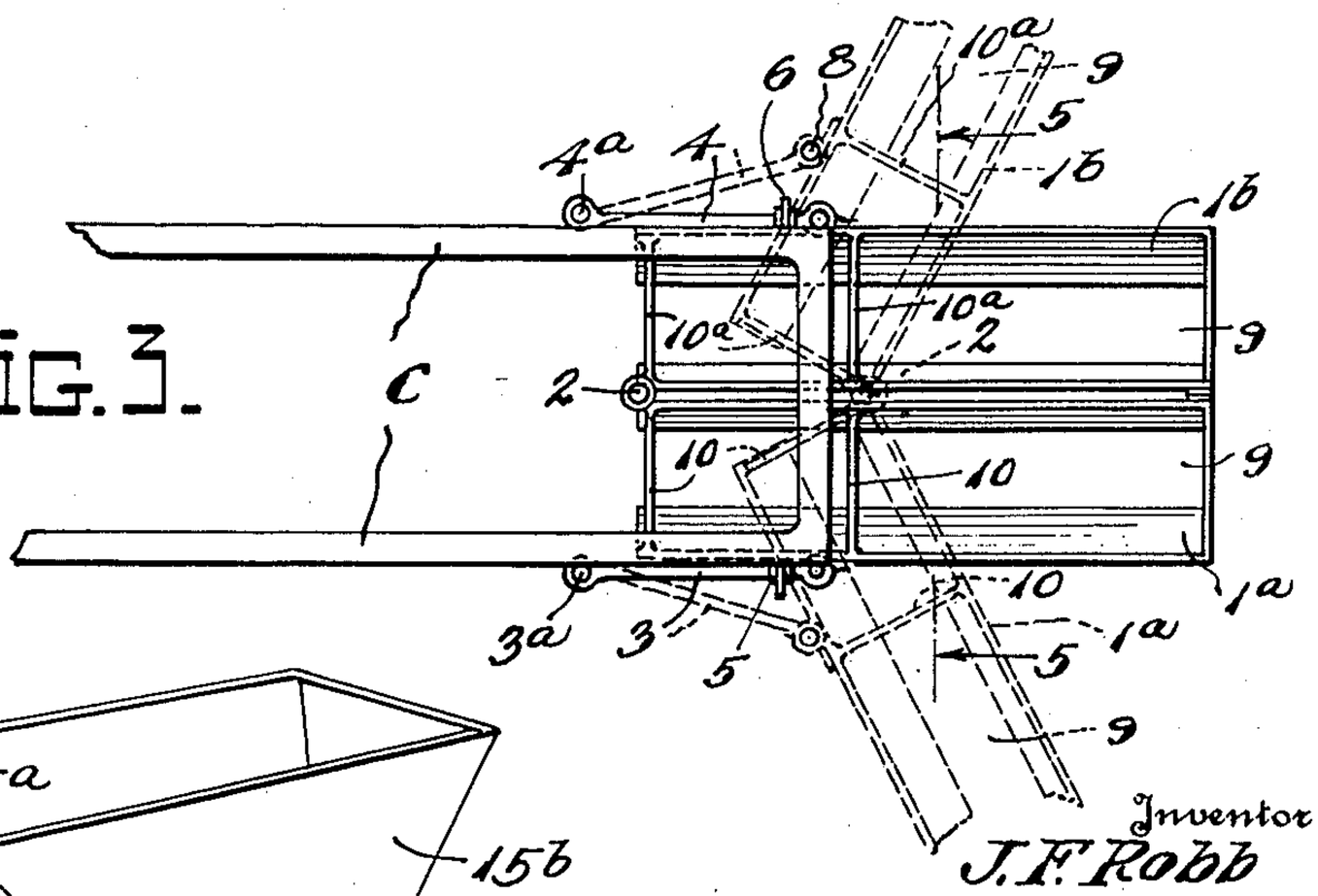
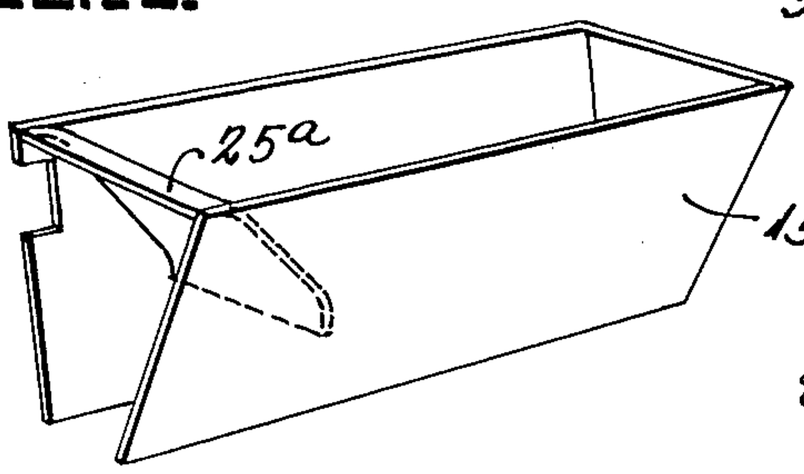


Fig. 13.



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May 9, 1933. J. F. ROBB 1,907,668

CONCRETE SPREADING MEANS

Filed July 20, 1931 3 Sheets-Sheet 2

Fig. 4.

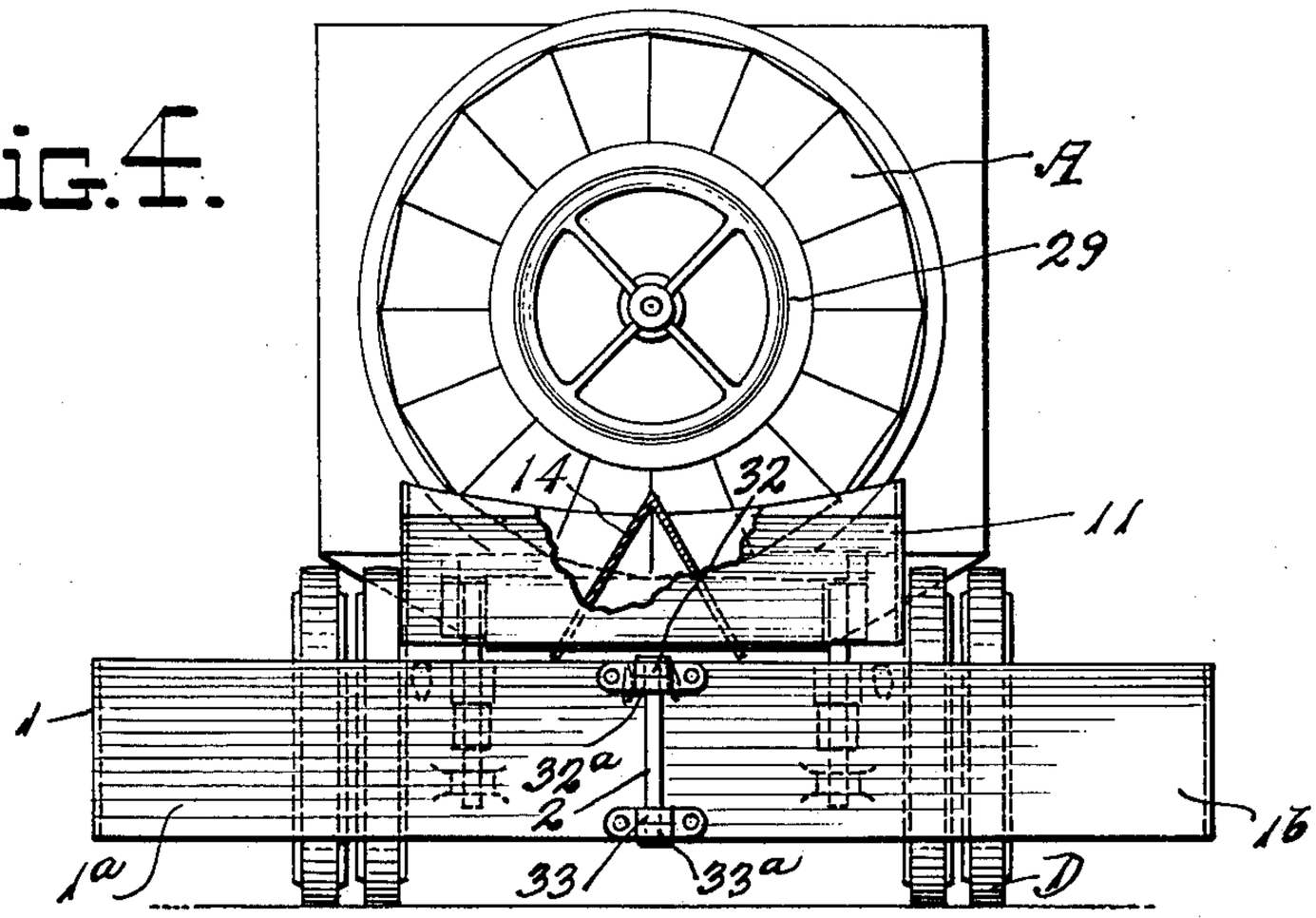


Fig. 5.

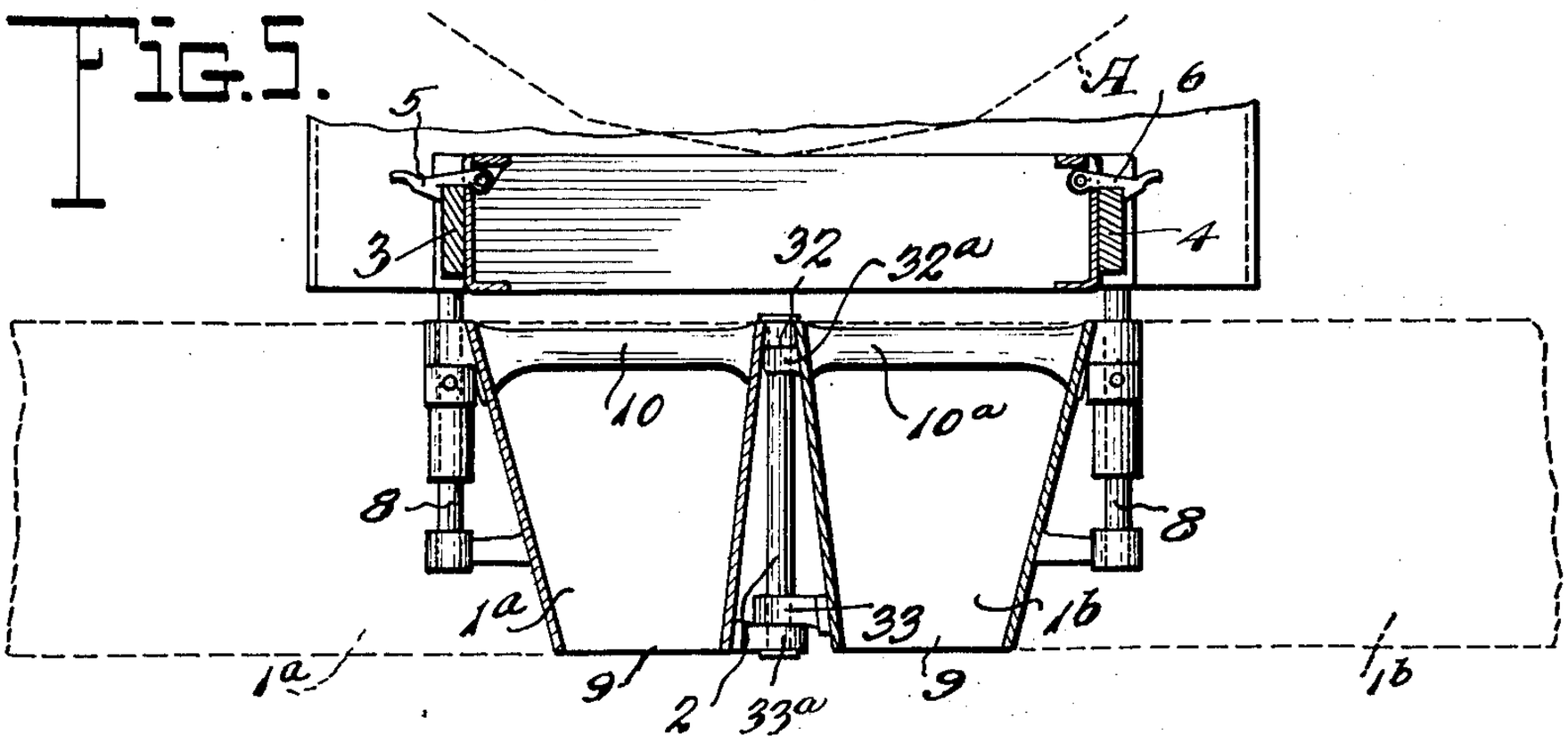


Fig. 11.

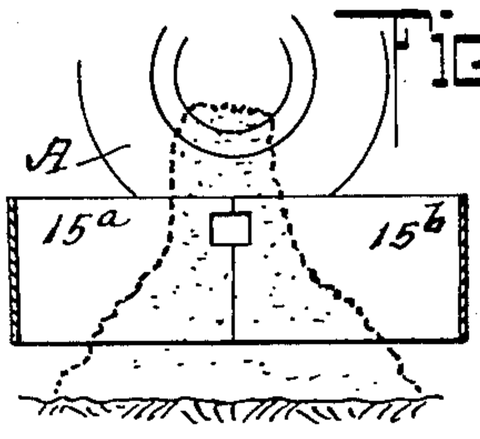
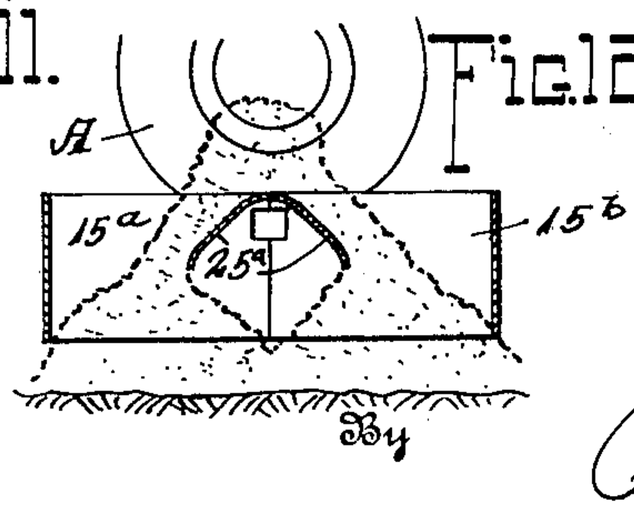


Fig. 12.



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CONCRETE SPREADING MEANS

Filed July 20, 1931 3 Sheets-Sheet 3

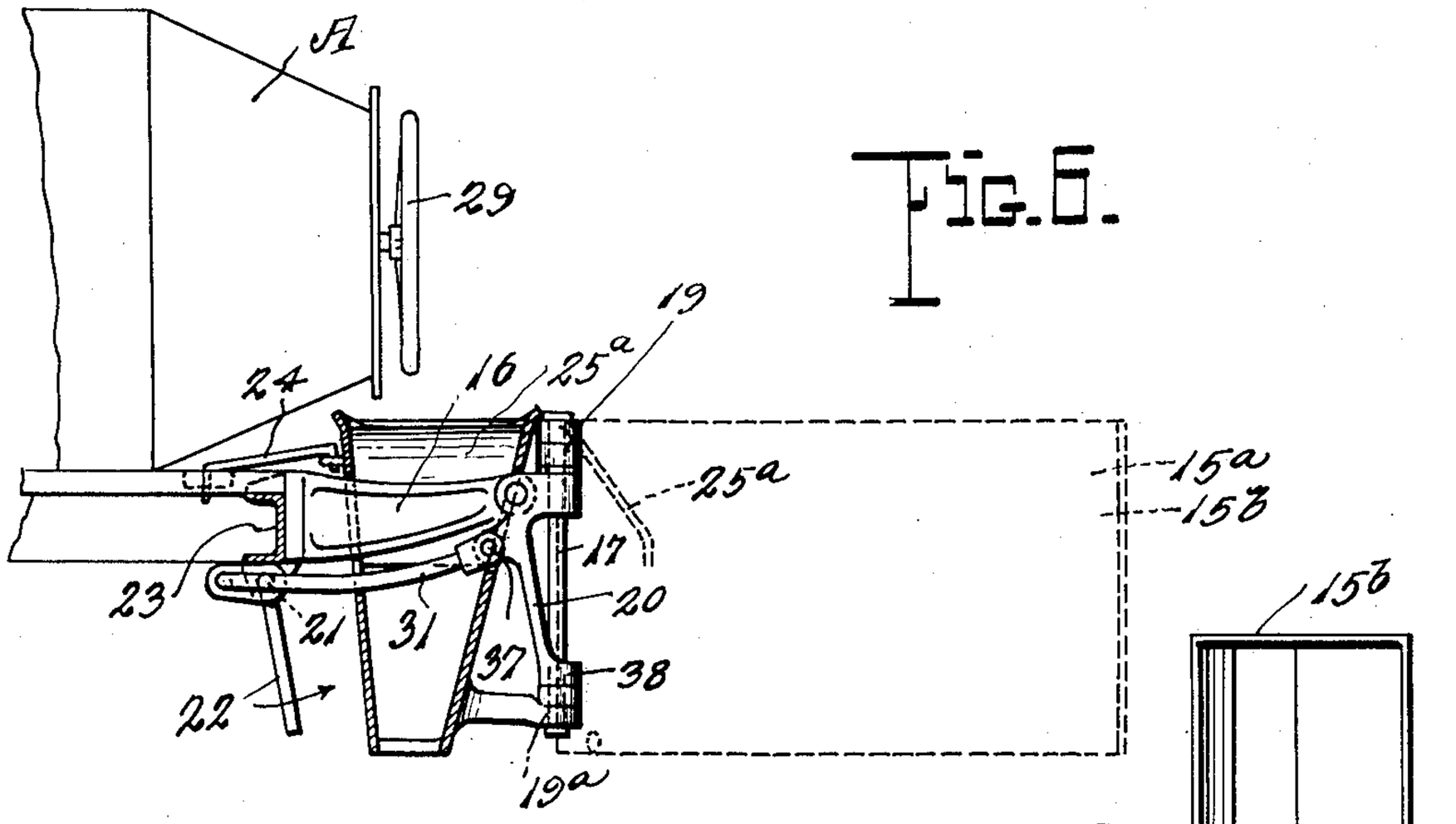


Fig. 6.

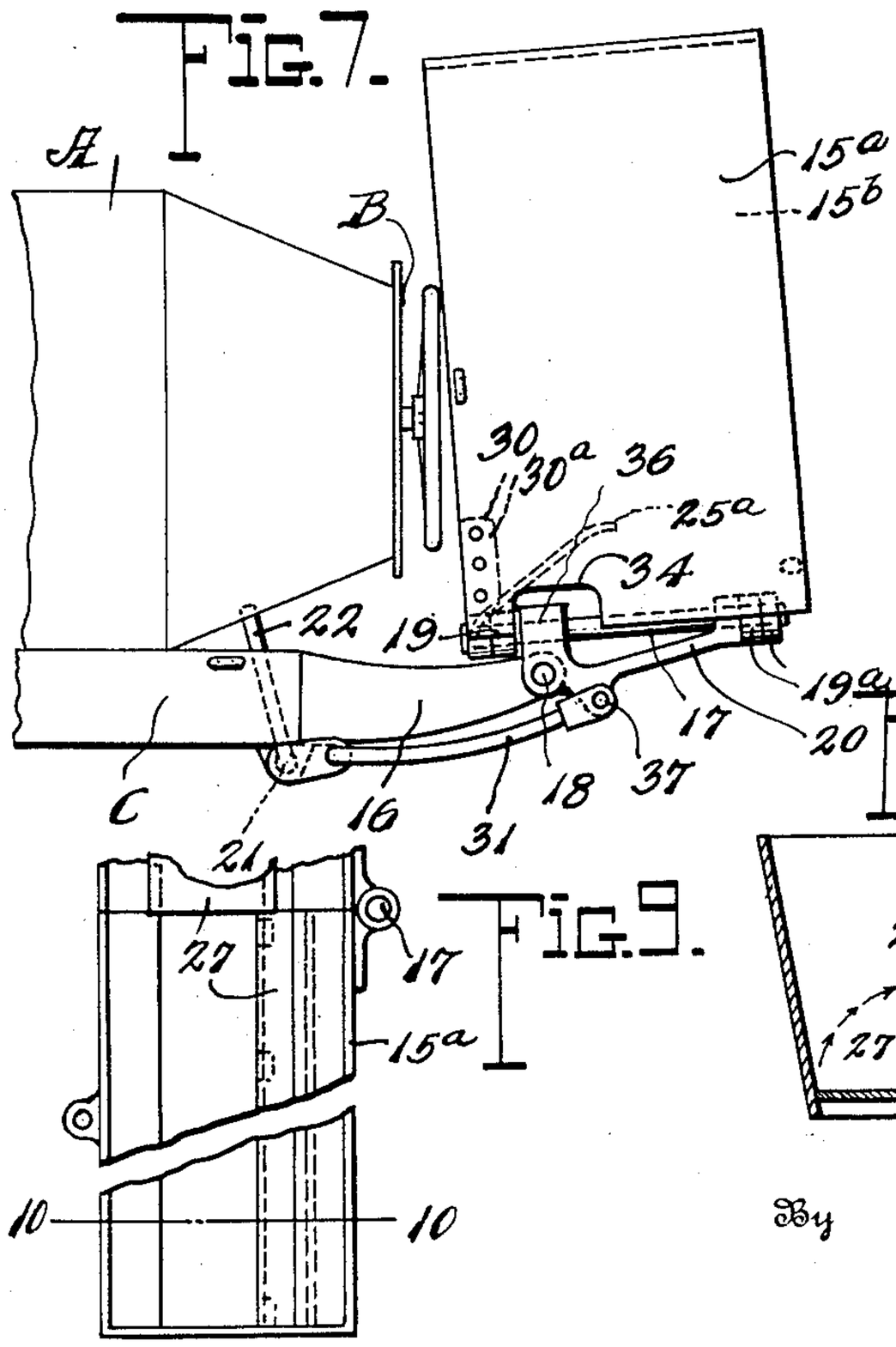


Fig. 7.

Fig. 9.

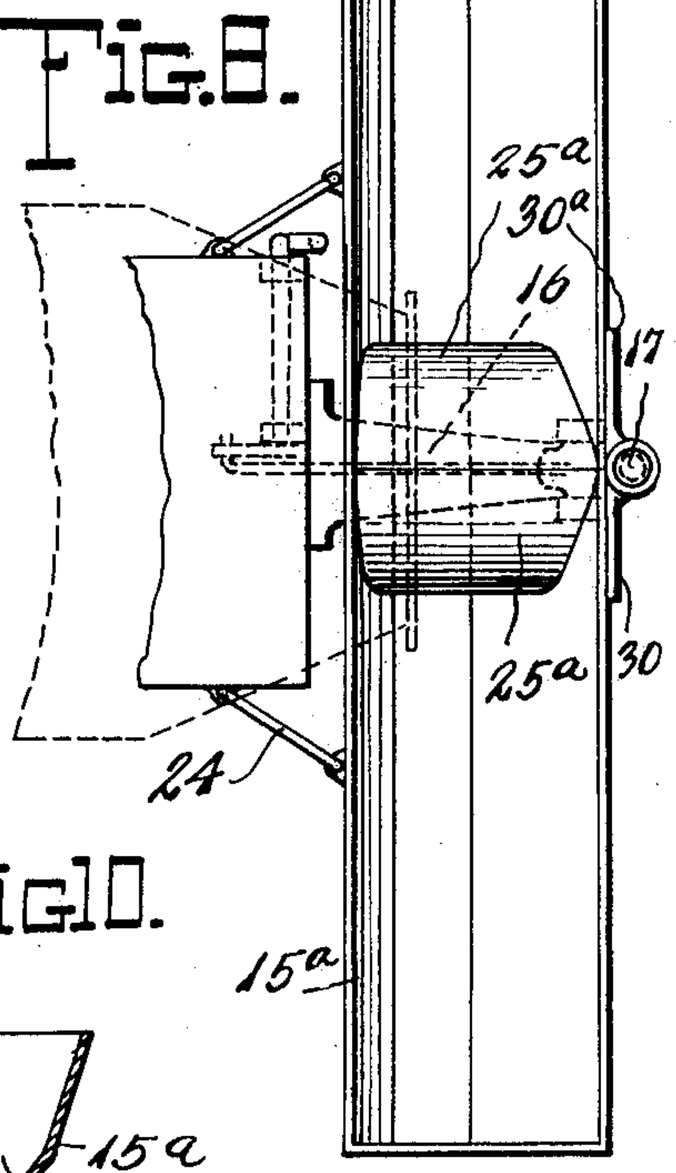


Fig. 8.

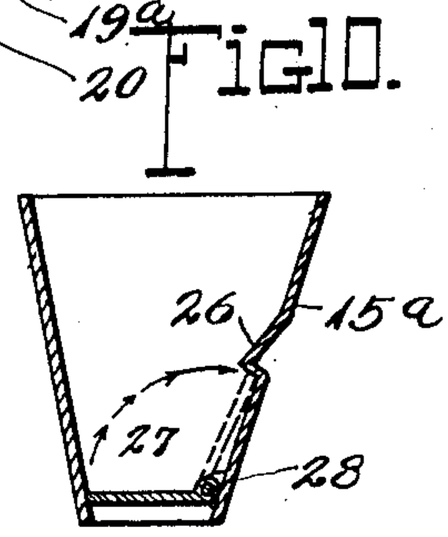
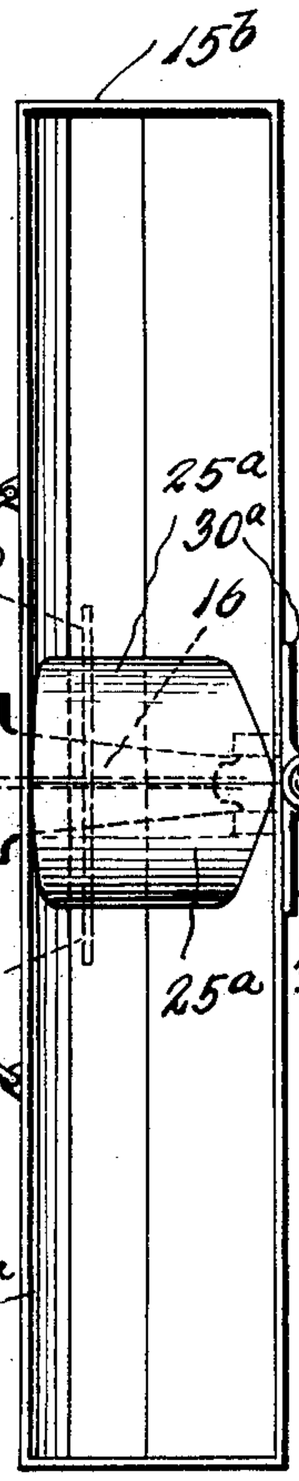


Fig. 10.



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Patented May 9, 1933 1,907,668

UNITED STATES PATENT OFFICE

JOHN F. ROBB, OF CLEVELAND HEIGHTS, OHIO

CONCRETE SPREADING MEANS

Application filed July 20, 1931. Serial No. 552,026.

In concrete road building operations, it is desirable that the mixed concrete be laid upon the subgrade in as evenly distributed a manner as is practicable in order to expedite the completion of the road as rapidly as possible. Mechanical devices for spreading the concrete as it is discharged from the mixers have already been employed with noteworthy increase in the efficiency of the road building operations and a marked saving of the time and labor required for the manual carrying out of such operations, in addition to there being obtainable a more even distribution of the mixed concrete when mechanical spreaders are employed.

As is well known, mixing drums mounted upon trucks and adapted to mix a charge of concrete aggregates and to maintain such charge in a thoroughly mixed condition while being transported to the location of operations, are becoming widely employed; and the present invention contemplates the provision of a simple and convenient form of distributor readily attachable to such trucks or "transit mixers" for assuring an even laying of the mixed concrete as it is discharged from the mixing drum of the transit mixer.

More specifically, the present invention deals with such a distributor in the form of a hopper mounted upon such a truck as aforesaid under the discharge end of the mixing drum, which hopper is foldable or collapsible so as to be brought out of the way when not in use, there being means provided for firmly supporting the hopper from the truck frame in both operative and inoperative positions.

The invention also includes instrumentalities associated with the discharge hopper for producing an even distribution of the mixed concrete into the hopper as it is discharged therein from the mixing drum, and the invention further provides instrumentalities within the hopper for adjustably controlling the discharge of concrete from the hopper, as will become apparent from the detailed description of the construction hereinafter set forth.

Further objects and advantages of the new and improved construction of this invention will become apparent as the description proceeds. The invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a top plan view of a concrete mixing truck having applied thereto a distributor constructed in accordance with the present invention.

Figure 2 is a side elevation thereof.

Figure 3 is a fragmentary plan view of the rear of the truck frame without the mixing drum, showing the foldable or collapsible mounting of the distributing hopper and the position taken by the hopper as it assumes its inoperative and operative positions.

Figure 4 is a rear elevation of the mixer of Figures 1 and 2, showing the distributing hopper in its open, or operative, position, and illustrating also a form of means for directing the batch, as discharged from the mixing drum, towards the ends of the hopper.

Figure 5 is a sectional view along the line 5—5 of Figure 3, looking in the direction of the arrows, and showing the hopper in folded position.

Figure 6 is a fragmentary side elevation of the rear end of a mixer truck showing in vertical section, a somewhat different form of distributing hopper mounted thereon, and indicating in dotted lines the position assumed by the hopper as it is swung from operative to inoperative positions.

Figure 7 is a view similar to Figure 6, but showing the distributor in its inoperative position.

Figure 8 is a top plan view of the construction of Figures 6 and 7, showing the hopper in operative position and also showing a deflector shield employed for directing the batch from the mixing drum into the hopper.

Figure 9 is a top plan view of a modified form of hopper provided with an adjustable control door or gate for controlling discharge of material from the distributing hopper.

Figure 10 is a sectional view along the line 10—10 of Figure 9.

Figure 11 is a longitudinal vertical section through the modified form of hopper in extended position, the deflecting shield being omitted, showing the effect of the omission thereof.

Figure 12 is a view similar to Figure 11, illustrating the shield and the effects of the use thereof, and

Figure 13 is a perspective view of one of the modified forms of hopper sections.

The form of the distributor illustrated in Figures 1 to 5 is especially adapted for use on the type of truck illustrated in Figures 1 and 2, this type of truck having a solid axle, the rear wheels being chain driven from a jack shaft axle which is mounted in front of the rear wheels.

Referring first to the form of apparatus illustrated in Figures 1 to 5, it will be seen that the hopper for distributing the concrete batch is secured to the frame of a transit mixer of any desirable type, of which the reference character A designates the mixing drum having the discharge end B and mounted upon the truck frame C. In the mixer shown in Figures 1 and 2 the truck has solid axles D, the rear wheels being driven by a chain E from a jack shaft axle F. This construction is a standard form of mixing drum and truck, as previously indicated.

Secured to the rear end of the truck frame C is the distributing hopper, which forms the subject matter of this invention. This hopper designated generally at 1 is made up of the cooperating sections 1*a* and 1*b* hinged together vertically at 2, the hinge 2 being suitably located intermediate the ends of the hopper 1.

Each of the sections of the hopper 1*a* and 1*b* are pivotally supported on the frame C in the truck at two spaced points by the links 3 and 4 pivoted to the frame channels C at the points 3*a* and 4*a* respectively. The links 3 and 4 are adapted to lie against the frame channels C in both the operative and inoperative positions of the hopper. Latch members 5 and 6 are provided on the sides of the frame channels C to engage the links 3 and 4 respectively so as to firmly hold the hopper in its collapsed position as well as its extended position.

It will be seen from Figures 1, 2, and 3 that as the hopper is moved from its extended to its collapsed position the central portion is actually moved forward until it occupies a position partly under the truck frame C, as shown in full lines in Figure 3. The relative forward movement under the truck frame is of course determined by the position of the pivotal connection between each link and the hopper sections, these pivotal connections being indicated at 7 and 8 respectively. If these pivotal connections 7 and 8 were disposed farther toward the outer ends of the hopper sections, obviously the hopper in its folded position would be disposed a greater distance under the truck frame. As previously indicated, the full lines of Figure 3 indicate the position of the hopper when in its folded or inoperative position, the dotted lines indicating a position which the hopper takes intermediate its collapsed and extended positions. It will be observed that the hopper 1 is provided with an open bottom indicated at 9, the sections 1*a* and 1*b* being suitably braced as indicated at 10 and 10*a*.

It will be seen, also, that the distributor 1 is mounted beneath the discharge end of the mixing drum A, and for guiding the discharged material into the hopper 1 from the discharge port B of the drum A, there may be provided a stationary hopper 11, secured by brackets 12 and standards 13 to the frame channels C. This auxiliary hopper 11 has also an open bottom, and is designed simply to guide the materials from the mixing drum into the folded distributing hopper 1.

To prevent any tendency of undue concentration of discharged materials at the middle of the distributor 1 when this distributor is extended, there may be provided a deflector 14 in the auxiliary hopper 11, this deflector 14 being in the shape of an inverted V, and it is provided for the purpose of guiding the discharged material away from the center of the folding hopper 1, thereby giving a more even distribution of concrete in this distributing hopper as the concrete is discharged therein from the mixing drum.

Figures 6, 7, and 8 show a somewhat modified form of mounting for the foldable distributing hopper, in this modified form the hopper being swingably mounted on a vertical axis, as will be seen from Figure 6, for the folding or collapsing operation, after which it is pivoted on a horizontal axis, as will be seen from Figure 7.

In Figures 6, 7, and 8 the folding distributing hopper is indicated at 15*a* and 15*b*, and is carried on the frame channels C of the truck by the bracket 16, the distributing hopper being mounted for rotation on a vertical axis, as indicated at 17, and also on a horizontal axis, as indicated at 18, the hinge connection between the hopper sections being indicated at 17, and works in bearing members 19 and 19*a*, the construction being suitably braced as indicated at 20, the member 17 being a vertical hinge pin passing through the bearing members to complete the hinge.

Any desirable means may be used to swing the folded hopper about its horizontal axis 18, such as a power operated member or a crank shaft, as designated at 21 and 22. The "dead center" position of the crank 22

locks the hopper in either its horizontal or vertical position.

As previously mentioned, the bracket 16 is carried by the frame channels C, this bracket being mounted upon an angle member 23 interconnecting the ends of the frame channels C, and bracket 16 forming the supporting member for the front portion of the hopper when the hopper is in extended position.

Since it is necessary to first fold the hopper on its vertical axis 17, the handle 22 is disposed so that it cannot be operated until the hopper is first folded, the front sides of the hopper being disposed under these conditions in the way of the handle 22 to prevent the operation of the handle until the hopper is swung into the dotted line position of Figure 6, which will free the handle for operation in the direction of the arrow, which will thus cause the hopper to move around the horizontal pivot 18 to raise it into the position shown in Figure 7.

It will be understood that any interlocking means may be provided for holding the free ends of the parts of the hopper together, and, if desired, a pair of pivoted hook members 24 may be provided between the hopper and the truck frame. Such hook members will serve as grips and will also prevent any independent oscillation of the extended hopper member around its vertical axis 17 when in use.

As in the form of the invention previously described, there is provided an inverted V shaped shield 25 at the center of the hopper, one half of the shield being disposed at the inner end of each hopper section 15*a*, 15*b*, so that when the sections are moved into the extended or operative position the upper portions of the shield sections abut one another and thus form a complete shield. It will therefore be understood that in this form the shield member is made up of a pair of corresponding separate sections which register with one another when the distributing hopper is expanded so as to guide or direct the discharge from the mixing drum A properly into the extended distributor hopper. This shield member 25 also incidentally forms a shield for the supporting bracket 16, and also forms a tie for the inner ends of the trough sections 15*a*, 15*b* holding these ends together when the hopper is extended, and preventing any tendency of the sections to separate when in use.

Since the distributing hopper is provided with an open bottom, it may be desirable to provide instrumentalities for controlling or regulating the discharge of concrete from the hopper. For this purpose, in the modified form of hopper shown in Figures 9 and 10, one of the interior walls of the hopper is proivded with an inwardly extended flange 26 beneath which is adapted to be placed a gate, or door 27, hingedly mounted on a rod or other suitable hinge 28, the door 27 being adapted to close the bottom of the hopper for the prevention of delivery of concrete when so desired. In view of the fact that it may frequently be desirable to spread the concrete from only a portion of the length of the distributing hopper, if the gate 27 be made shorter than the total length of the hopper and be made slidable along the rod 28, as well as being pivotally mounted thereon, it will be apparent that the discharge of the material from the hopper can be controlled to whatever extent may be desired. If it be desired to distribute concrete from the whole length of the hopper, the gate 27 is raised to the position shown in Figure 10, thus exposing the entire open bottom of the distributor; but if it be desired to spread only from either end of the hopper or from both ends thereof while preventing distribution from the central area intermediate the ends, the appropriate control of the distribution can be effected by simply sliding the gate 27 to the appropriate position on the rod 28 and then closing the gate over the area of the bottom of the hopper which it is desired to shut off. The flange 27 prevents material from falling behind the gate and thus interfering with the operation thereof.

It will be apparent from the drawings that any convenient type of mixing drum may be employed, the form of the drum illustrated having a discharge port indicated at B which is controlled by a closure member actuated by a hand wheel 29.

It will be apparent that each section 15*a* and 15*b* of the foldable hopper carries corresponding parts or bracket members 30 and 30*a*, which register with one another when the sections are extended, thus forming the bearing members 19 and 19*a* for the vertical hinge 17 upon which these sections fold. A link 31 is suitably carried by the crank shaft 21 and handle 22 forming the operating connection between the crank and the pivoted bracket 20.

It will be apparent from the above description that there is provided by this invention a simple mechanism for distributing concrete or other analogous material directly from a mixer upon the surface intended to receive the material so being distributed; and it will be clear that the invention provides a simple construction of this make which is readily positioned in operative and inoperative positions relative to the mixer, the inoperative position being such as not to interfere in any way with the mixing operation taking place in the mixing device, or in movement of the mixing device from place to place.

As will be seen from Figure 4, the hopper

sections 1*a* and 1*b* each carry cooperating hinge bearing members 32, 32*a*, and 33 and 33*a*, through which bearing members the pin 2 is passed to form the vertical hinge about which the distributing hopper is folded. A similar arrangement is provided for the modified form of hopper illustrated in Figures 6, 7, and 8, as more clearly shown in Figures 6 and 13, wherein the bearing members for the vertical hinge pin mounted upon the distributing hopper 15*b* are indicated at 19 and 19*a*, it being understood that similar members are provided on the corresponding hopper member 15*a*.

The previously described details of construction of this modified form of hopper are somewhat more clearly illustrated in Figures 11, 12, and 13, particularly with reference to the manner in which the hopper sections are mounted on the bracket 16, and in the manner in which the shield 25 is formed and the results obtained through the use thereof. From these figures, it will be seen that the walls of each hopper section are notched, or cut away in corresponding manner as indicated at 34, 34*a* and 35 to provide for the passage of the bracket 16 through the hopper at each adjoining end of the hopper sections. This bracket 16 has the bearing member 36 pivoted at 18 to the end thereof, this bearing member cooperating with the member 19 for the reception of the vertical hinge pin 17. The bearing member 36 carries the brace arm 20, pivotally connected at 37 with the connecting link 31, the brace 20 terminating at its lower end in the bearing member 38, which, together with the members 19, 19*a*, and 36 receives the vertical hinge pin 17. This arrangement gives a sturdy construction for raising the folded hopper to the position shown in Figure 7.

If the shield 25 were omitted, the charge of concrete would tend to concentrate at the middle of the extended distributing hopper, as indicated in Figure 11, while with this deflecting shield, the charge of concrete is deflected more to the ends of the hopper, as will be apparent from Figure 12, thus causing a more efficient spreading action. As will be seen from Figures 8, 12 and 13, the shield 25 is formed of corresponding sections, each one being disposed in each half of the hopper, so that when the hopper sections are extended, each half-shield will come into registration to form the complete deflector. These sections, indicated at 25*a*, when in registration, meet above the bracket 16, and form also a shield to protect this bracket from the concrete being discharged into the distributing hopper, and also serves to keep the hinges free from obstruction through accumulation of concrete therein. As previously set forth, also, the shield members hold the free ends of the hopper sections together and tie-in these inner ends to prevent accidental spreading thereof while the hopper is in use. Furthermore, the registration of the notches 34, 34*a* and 35 with the bracket 16 when the hopper is extended produces additional support for the hopper during the distributing operation.

It will be apparent that the device of this invention will assure an even spread of the concrete upon the desired surface, which spread is under strict control at all times. It will also be apparent that while the form of the invention herein specifically illustrated and described constitutes a very convenient and easily applied form, yet the details of this specifically described and illustrated form of the invention may be varied within relatively wide limits without departing from the inventive concept; and that such variations can be made readily by those skilled in this art. It will accordingly be understood that it is intended and desired to embrace within the scope of this invention, such modifications and changes as may be necessary to adapt it to varying conditions and uses.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is—

1. A concrete spreader comprising, the combination with a truck frame and concrete holding drum mounted thereon, of a foldable distributing hopper mounted on the frame and adapted to directly receive material discharged from the drum, and means for folding and expanding the hopper into inoperative and operative positions, the hopper when folded occupying a space substantially the width of the truck frame, and when unfolded becoming operative to a length greater than the width of the said frame.

2. A spreading device of the character described, comprising a container formed of a plurality of sections hingedly mounted together and cooperating when in operative position to form a continuous distributing hopper, and means for operating the sections about the hinged mountings thereof for folding and expanding the sections into inoperative and operative positions, combined with a concrete carrying vehicle, a part on the vehicle to supply concrete therein to the hopper when the latter is unfolded, the hopper when folded being within a space equal to the lateral confines of the vehicle, and when expanded being of a length greater than the vehicle width.

3. A spreading device of the character described, comprising a container formed of a plurality of sections adapted to cooperate to form a continuous distributing hopper when in operative position, and a vertically disposed hinge member connecting each pair of sections and adapting the sections to be

folded together into a side-by-side inoperative position and expanded into an end-to-end operative position.

4. A spreading device of the character described, comprising the combination with a supporting frame, of a distributing hopper carried by the frame, and pivotally mounted instrumentalities interconnecting the hopper and frame, the hopper comprising a plurality of sections foldable along a vertical axis from operative to inoperative positions, and conversely.

5. A spreading device of the character described, comprising the combination with supporting instrumentalities including a concrete conveying and discharging vehicle, of a distributing hopper carried by the said instrumentalities, the hopper comprising a plurality of sections foldable from operative to inoperative positions, and conversely, so that when in operative position relatively wide distribution will be had, and when folded to inoperative position the hopper will occupy a space not greater than the width of the said vehicle.

6. A spreading device of the character described, comprising the combination with mixing instrumentalities, of a distributing hopper for receiving material discharged from the mixing instrumentalities, the hopper comprising a plurality of sections foldable from operative to inoperative position, and conversely, and means for distributing the discharged materials into the said hopper sections remote from adjacent ends thereof when the said hopper is in operative position.

7. A spreading device of the character described, comprising an open-bottom distributing hopper comprising a plurality of sections foldable from operative to inoperative positions, and conversely, and adjustable instrumentalities within the hopper for controlling discharge thereof through predetermined areas of the open bottom.

8. A spreading device of the character described, comprising an open bottom distributing hopper made up of a plurality of sections, foldable from operative to inoperative positions, and conversely, and a gate hingedly mounted within the hopper for controlling discharge thereof through the open bottom, the said gate being also slidably mounted within the hopper to close predetermined portions of the open bottom for regulation of discharge therethrough.

9. A spreading device of the character described, comprising an open-bottom distributing hopper made up of a plurality of sections foldable from operative to inoperative positions, and conversely, a flange projecting inwardly from one side of the hopper, and a gate hingedly mounted within the hopper and opening adjacent to the flange, the gate being adapted to close at least a portion of the open bottom of the hopper, the said gate being also slidably mounted within the hopper to close predetermined portions of the bottom for regulation of discharge therethrough.

10. A spreading device of the character described, comprising, in combination, a distributing hopper made of a plurality of sections foldably interconnected for movement from operative to inoperative positions, and conversely, a stationary hopper adapted to discharge into the foldable hopper, and a deflector mounted in the stationary hopper for directing material discharged therefrom away from the central portion of the foldable hopper, thereby more evenly distributing the material in the foldable hopper as the said material is discharged therefrom.

11. A spreading device of the character described, comprising the combination with mixing instrumentalities, of a stationary hopper for receiving material discharged from the mixing instrumentalities, a foldable hopper receiving the materials from the stationary hopper for distributing the materials over a surface, and an inverted V-shaped deflector mounted in the stationary hopper for directing the materials discharged therefrom into the foldable hopper away from the central portion of the foldable hopper, thereby effecting an even distribution of the material in the foldable hopper as the said material is discharged therefrom.

12. A spreading device of the character described, comprising the combination with supporting instrumentalities, of a foldable container mounted upon the instrumentalities and comprising a plurality of sections foldable vertically from an end-to-end operative position to a side-by-side inoperative position, and conversely, the folded sections being then rotatable along a horizontal axis to an inoperative carrying position, and instrumentalities for moving the sections from inoperative to operative positions, and conversely.

13. A spreading device of the character described, comprising the combination with supporting instrumentalities including a concrete transporting drum having a discharge, of a distributing hopper carried by the said instrumentalities to receive concrete from said discharge, the hopper comprising a plurality of sections foldable from an expanded operative position to a folded inoperative position, and means interlocking the sections with the supporting instrumentalities, the said means preventing independent oscillation of the sections when in expanded position.

14. A spreading device of the character described, comprising the combination with a supporting frame, of a distributing hopper carried by the frame, the hopper being composed of a plurality of sections adapted

to register with each other to form a continuous distributing hopper, vertically disposed hinge instrumentalities foldably interconnecting the sections for displacing the sections from an operative end-to-end position to an inoperative side-by-side position, a supporting bracket interconnecting the sections with the supporting frame, a horizontal hinge interconnecting the sections with the bracket, and instrumentalities for swinging the folded sections about the said horizontal hinge for transportation of the device from place to place of use.

15. A spreading device of the character described, comprising the combination with supporting instrumentalities, of a distributing hopper carried by the said instrumentalities, the hopper being formed of a plurality of sections adapted to register with each other to form a continuous distributing hopper, vertical hinge means foldably interconnecting the sections for displacing the said sections from an operative end-to-end position to an inoperative side-by-side position, each hopper section being provided with a deflecting shield member adapted to interengage each other when the hopper sections are in expanded operative position to deflect material entering the hopper away from the central part thereof, the interengaging shield sections holding the adjacent ends of the hopper sections together to prevent accidental spreading thereof during use.

16. A concrete spreader comprising, in combination, a truck frame, a concrete mixing drum mounted thereon and provided with discharge instrumentalities at the rear end of the drum, a foldable distributing hopper mounted on the frame and beneath the discharge instrumentalities of the drum, the said distributing hopper being adapted to directly receive material discharged from the drum, and means for folding and expanding the hopper into inoperative and operative positions, the said hopper when folded occupying a space substantially the width of the truck frame and when unfolded becoming operative to a length greater than the width of the said frame.

In testimony whereof I affix my signature.

JOHN F. ROBB.