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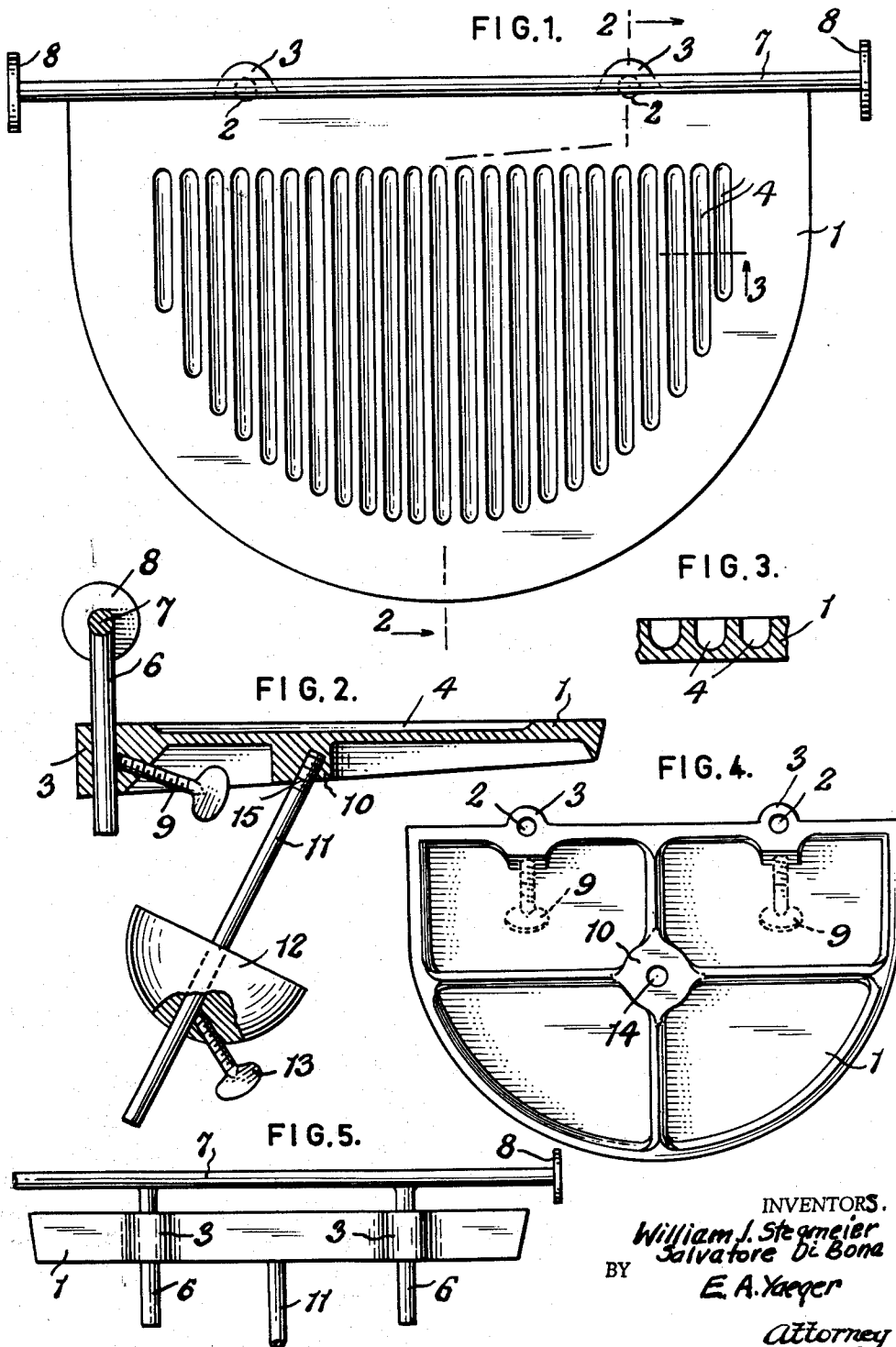
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3,068,981

HINGED GATE DEVICE

Filed Sept. 9, 1959

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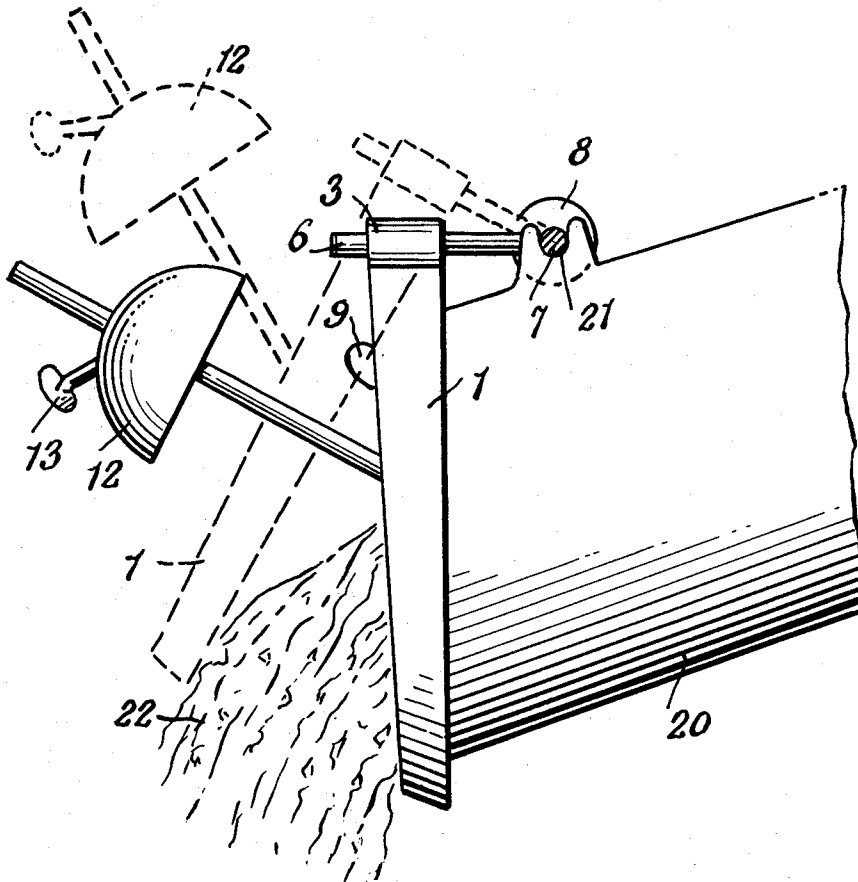


FIG. 6.

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HINGED GATE DEVICE

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This invention relates to control means for ready-mix concrete and more particularly to a hinged chute closure device for providing such control means when discharging ready-mix concrete from the rotating drum of the truck used for transporting the concrete to the job site.

It is well known by those skilled in the art that most concrete now being used is of the ready-mix type, i.e. produced at a central mixing plant and transported to the job site in large rotating drums mounted on a truck. The advantages of concrete so mixed and delivered are readily apparent to those persons working in this field. Concrete so produced is more uniform and of a superior quality than that produced at the job site. Also, such concrete can generally be made and delivered into the forms more cheaply than can concrete produced at the job site.

There are, however, certain problems inherent in the use of ready-mix concrete. For example, to deliver the concrete from the rotating drum positioned on the truck transporting means, it is necessary to provide a chute extending from the opening in the rotating drum. This chute is normally not long enough, nor is there sufficient slope to place the concrete from the rotating drum directly into the forms. It is, therefore, generally necessary to discharge the concrete coming off the chute into a wheelbarrow or other type container, which in turn must be moved to the place where the concrete is required. This is normally accomplished by the truck driver discharging from the rotating drum the quantity of concrete which he estimates will be required to fill the wheelbarrow, or other container. It is extremely difficult for the truck driver to shut off the flow of concrete to the exact amount required to fill the wheelbarrow or other container, and normally a small quantity of concrete is left in the chute. As the wheelbarrow or other container is filled it is necessary to swing the concrete delivery chute away from its loaded position so as to enable the person moving the concrete to the form to gain access thereto. Thus, any concrete left in the chute after it has been swung from its loading position, is discharged out onto the ground and is thus lost. It is not uncommon for as much as a quarter to one-half yard of concrete to be so lost during the unloading of a single truckload of material. Not only does this represent a serious loss of valuable material, but it also creates a subsequent disposal problem for the builder, since after each truck unloading there remains one or more hardened masses of concrete which must be cleaned up from the job site at some later time.

Also, when the concrete mixture is being discharged from the rotating drum into the chute and travels down the chute, there is a tendency for the coarse aggregate to float on top of the sand and cement so that the mixture being discharged into the wheelbarrow or other container is not uniform when poured into the forms.

It is, therefore, an object of our invention to provide an improved flow control device for use in discharging concrete from ready-mix concrete delivery trucks.

It is a further object of our invention to provide an improved flow control device which will eliminate spillage and waste of concrete which is inherent in equipment now in use.

It is a still further object of our invention to provide an improved flow control device which will improve the quality of the concrete being delivered into the forms, by

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forcing the coarse aggregate down into the sand and cement at the point of discharge from the chute.

Other objects and advantages of our invention will be readily apparent from the following description referring to the accompanying drawings and the features which characterize our invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

The foregoing objects are accompanied in our invention by attaching to the end of the chute leading from the rotating drum of a ready-mix concrete truck the following described elements in combination: a chute closure plate larger than the end of the chute leading from the rotating drum and capable of sealing off the end thereof, said chute having grooves or flutings in the face of the plate, a pivot rod capable of being attached to the end of the concrete chute leading from the rotating drum, said pivot rod having legs attached thereto, which legs are slidable in bosses made integral with the chute closure plate and having means for securely locking said chute closure plate to the legs of the pivot rod and a slidable weight supported on a weight-carrying rod, one end of which is fastened into a boss positioned in a chute closure plate, and means for locking said slidable weight on the weight-carrying rod.

The accompanying drawings illustrate a preferred embodiment of my invention.

FIG. 1 is a top plan view of the chute closure;

FIG. 2 is a sectional view, taken substantially on the line 2—2 of FIG. 1, looking in the direction of the arrows and while the closure plate is disposed horizontally in respect to the chute to which it may be attached.

FIG. 3 is a sectional view, taken on the line 3, looking in the direction of the arrow;

FIG. 4 is a view in a reduced scale of the outer side of the closure plate;

FIG. 5 is a top view of the plate, and

FIG. 6 is a view, partly in section, showing the closure plate as applied to a chute.

Referring to FIG. 1 of the drawings, our new and improved hinged chute closure device will be seen to comprise a chute closure plate 1 having the approximate shape of the concrete chute 20 (FIG. 6) leading from the rotating drum of a ready-mix concrete truck, but slightly larger than the end of the chute, so that when the chute closure plate is in its closed position, it is flush with the end of the chute, thus making a tight seal so that the concrete in the chute will be confined therein.

The chute closure plate 1 is of sufficient thickness and strength so that it will not be easily broken. In order to provide additional strength and rigidity ribs may be employed, thus permitting the use of a thinner section of metal for the chute closure plate. In the embodiment of our invention shown in the drawing, the chute closure plate is constructed of cast aluminum; however, a steel plate, or other suitable metal, may be used.

Cast into the top edge of the chute closure plate and made integral therewith are bosses 3 in which holes 2 are formed. The bosses are centrally positioned in each panel along the top edge of the chute closure plate and have internally threaded holes formed therein and into which set-screws 9 may be inserted. Holes 2 are sized to receive the legs of the pivot rods 6, so that the chute closure plate 1 is slidable thereon.

The legs of the pivot rod 6 are permanently fastened to the pivot rod 7 by welding or some other means, and the chute closure plate 1 is adjustable by sliding the chute closure plate along the legs of the pivot rods 6. The normal position of the chute closure plate on the legs of the pivot rod 6 is such as to provide a tight seal between the end of the concrete chute leading from the

rotating drum of the ready-mix concrete truck and the grooved or fluted face of the chute closure plate. After such adjustment has been made for each chute of the ready-mix concrete truck set-screws 9 are tightened, thus placing the hinged chute closure plate for this chute in proper operating position. However, should it become necessary to remove the chute closure plate for repairs, cleaning and/or for any other reason, same can be readily accomplished by loosening the set-screws 9 and sliding the chute closure plate 1 off the legs of the pivot rod 6.

The face of the chute closure plate 1 has formed therein grooves or flutings 4, as shown in FIG. 1 and FIG. 3. In the embodiment of the invention shown herein the flutings, or grooves, are spaced approximately $1\frac{3}{4}$ " from the outer edge of the face of the chute closure plate and the grooves are spaced on centers of $\frac{3}{8}$ " and are $\frac{3}{8}$ " deep. It has been found that the mixture of cement, sand, and coarse aggregate being delivered down the concrete chute for discharging into a wheelbarrow or other container separates into layers, the sand and concrete at the bottom and the coarse aggregate at the top. This is objectionable, since the full strength of the concrete is obtained when the cement, sand, and coarse aggregate are uniformly dispersed throughout the form. We have found that when the concrete flowing down the chute leading from the concrete truck strikes against the grooves or fluted surface of the chute closure plate, thorough mixing takes place between the sand, cement, and the coarse aggregate, so that the concrete flowing into the wheelbarrow or other container is uniform in composition and not stratified as is the case when no grooves or fluting surface are used on the chute closure plate. Such concrete when supplied to the forms requires less tamping and further provides a finished structural member less subject to honeycomb, is easier to finish and gives maximum strength for the sand, cement, aggregate ratio employed.

The chute closure plate 1 is fastened to the chute 20 of the concrete truck through the legs of the pivot rod 6 and the pivot rod 7, which pivot rod fits into recesses 21, one on either side of the concrete chute. Discs 8 are provided at the end of the pivot rod so as to prevent the pivot rod from sliding out of the ends of the recesses of the concrete chute. The pivot rod 7 is free to swing in the recesses 21 of the concrete chute leading from the rotating drum of the ready-mix concrete truck.

The chute closure plate 1 has formed therein a central boss 10 provided with an internally threaded hole 14. A weight-carrying rod 11, one end of which is threaded as shown by 15, is attached to the chute closure plate 1 by threadable insertion into hole 14. Weight 12 is slidable on the weight-carrying rod 11 and the amount of force to be exerted by the chute closure plate against the end of the concrete chute is regulated by set-screw 13.

In certain instances the chute leading from the concrete ready-mix truck may not be equipped with our new and novel hinged chute closure device, but the builder purchasing the ready-mix concrete may have acquired same for his individual use so as to obtain the advantages set forth herein. In such case, the builder adjusts the hinged chute closure device as hereinbefore described and after the concrete has all been discharged from the truck, he removes the pivot rod from the recesses on either side of the concrete chute and thoroughly washes the sand and cement therefrom.

Our invention operates in the following manner:

When the concrete truck arrives at the job site to unload its material, the driver discharges the concrete into the concrete chute in the usual manner, gaging the amount thereof necessary to fill the wheelbarrow or other container. The slidable weight is so positioned on the weight-carrying rod as to cause the concrete to back up into the chute until the weight of the concrete against the chute closure plate is greater than the force applied against the end of the chute by the slidable weight. When

this happens the chute closure plate slowly opens as shown in dotted lines in FIG. 6 and the concrete 22 is discharged from the chute, dropping almost vertically into the wheelbarrow or other container. As the concrete leaves the chute it is no longer separated into two layers, as the grooves, or flutes of the chute closure plate force the coarse aggregate back down into the sand and cement mixture as it is being discharged from the chute. When the force of the concrete in the chute is less than the amount necessary to overcome the resistance of the slidable weight, the chute closure plate closes tight against the end of the chute and no further concrete is discharged therefrom. It may be necessary to initially adjust the position of the slidable weight on the weight-carrying rod until the proper position can be obtained, but with a little experience such adjustment will be easily made by those skilled in the use of our new and novel device. It is also possible to regulate the amount of pressure the chute closure plate exerts against the end of the concrete chute by manually raising or lowering the slidable weight on the weight-carrying rod.

By the use of our invention no concrete will be lost at the job site and the purchaser is able to use in his forms the quantity of material he has ordered and paid for. Furthermore, there are no large masses of concrete left at the job site, which must later be broken up and removed prior to the time of completion of the work.

Although we have shown and described a particular embodiment of our invention, we do not desire to be limited thereto and we intend in the appended claims to cover all modifications which do not depart from the spirit and scope of our invention.

What we claim is new and desire to cover by Letters Patent of the United States is:

1. A hinged chute closure device for attachment to a concrete-mixing truck having a concrete chute leading from a rotating drum on said truck comprising in combination a chute closure plate larger than the end of the concrete chute for sealing off the concrete flowing down the chute, said chute closure plate having grooves formed in the face thereof, means for swingably attaching the chute closure plate to the end of the concrete chute, and a slidable weight supported on a weight-carrying rod, one end of which is fastened into a boss positioned in the chute closure plate, and means for locking said slidable weight at various points along the length of the weight-carrying rod.

2. A hinged chute closure device for attachment to a concrete-mixing truck having a concrete chute leading from a rotating drum on said concrete truck and having a discharge end comprising in combination a chute closure plate larger than the discharge end of the concrete chute for sealing off the end thereof, said chute closure plate having flutings formed in the face thereof so as not to destroy the tight sealing of the end of the concrete chute, means for swingably attaching the chute closure plate to the end of the concrete chute, and a slidable weight supported on a weight-carrying rod, one end of which is fastened into the chute closure plate, and means for locking said slidable weight at various points along the length of the weight-carrying rod.

3. A hinged chute closure device for attachment to the end of a concrete chute leading from a rotating drum as provided on a ready-mix concrete truck and having a discharge end comprising in combination a chute closure plate larger than the discharge end of the concrete chute for tightly sealing off the end thereof, said chute closure plate having a series of grooves formed in the face therein so as not to destroy tight sealing of the end of the concrete chute, means for slidably attaching the chute closure plate to the legs of a pivot rod, which legs are permanently attached to a pivot rod, means for fastening said chute closure plate to the legs of the pivot rod, means for swingably attaching said pivot rod to the end of the concrete chute and a slidable weight supported on a weight-carry-

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ing rod, one end of which is fastened into the chute closure plate, and means for locking said slidable weight on the weight-carrying rod.

4. A hinged chute closure device for attachment to the end of a concrete chute leading from a rotating drum as provided on a ready-mix concrete truck and having a discharge end comprising in combination a chute closure plate larger than the discharge end of the concrete chute for tightly sealing off the end thereof, said chute closure plate having a series of grooves formed in the face thereof so as not to destroy the sealing of the end of the concrete chute, said chute closure plate further having bosses formed on the top thereof having a hole therethrough, into which is slidable the legs of a pivot rod, which legs are attached to a pivot rod, means for fastening said chute closure plate to the legs of the pivot rod, means for

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swingably attaching said pivot rod to the end of the concrete chute, and a slidable weight supported on a weight-carrying rod, one end of which is fastened into the chute closure plate, and means for locking said slidable weight on the weight-carrying rod.

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