Oct. 8, 1929. J. A. BRIED 1,730,912

APPARATUS FOR HANDLING CONCRETE MATERIALS

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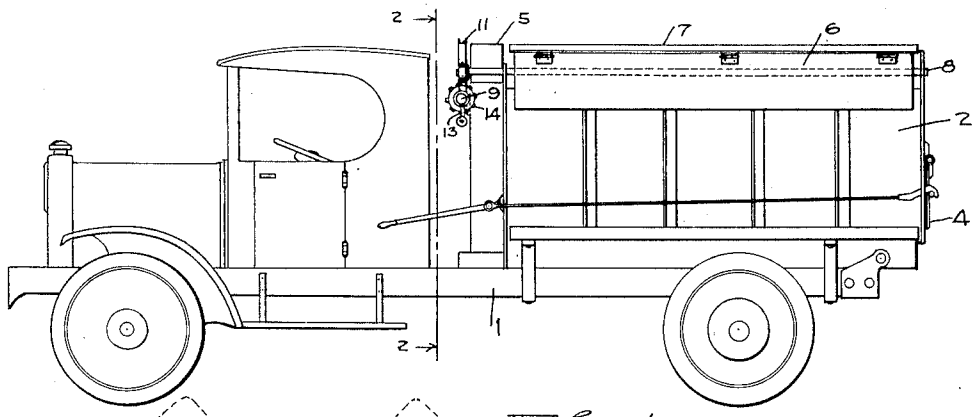


Fig. 1.

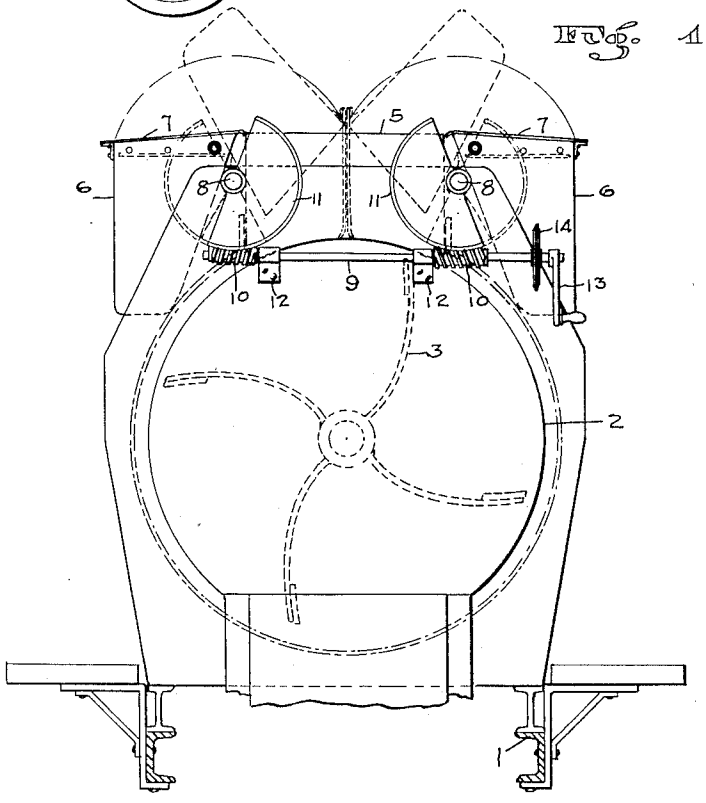


Fig. 2.

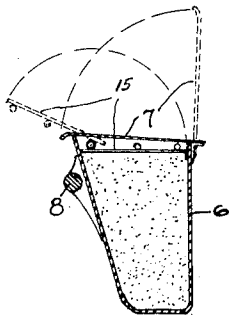


Fig. 3.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR HANDLING CONCRETE MATERIALS

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This invention relates to the preparation of concrete, or rather to the handling of the materials preparatory to the mixing of the concrete.

The objects of the invention are to provide an improved method of handling the materials from the bunkers or supply depots to the job or place where the concrete is to be used.

Before describing my invention a brief outline of the state of the art will be made so as to give by comparison a clear idea of the improvements.

Heretofore, in making any kind of a concrete structure the sand, gravel, rock and cement were hauled to the scene of operations or "job" as it is called, the sand usually being separately hauled from the rock, and the cement always in separate containers. At the job a mixer was installed and the above materials in proper portion together with water were introduced into the mixer, then mixed a batch at a time and discharged for immediate use.

With a view to overcoming the necessity of maintaining a pile of material at the job, keeping the cement in fit condition, and also with a view toward reducing the labor of rehandling all of the material in getting it from the job storage to the mixer, several inventors devised concrete mixers mounted on motor trucks so that the dry mixture of sand, rock and cement could be hauled directly from the supply bunkers to the job in the mixer itself, and at the job the proper amount of water added and the mass mixed while still on the truck and then dumped directly into the place where wanted or into wheel-barrows, conveyors or hoists for immediate discharge to the forms.

Some of these mixing trucks carried tanks of water sufficient for the batch, and which was emptied into the dry material just before mixing, and others were arranged to slowly mix while the truck was proceeding with the load to the job, the materials, cement, water and all being placed in the mixer before leaving the bunkers.

Still another idea was to have a central mixing plant for the concrete and quickly haul the pre-mixed finished mass to the job in an ordinary dump truck.

Owing however to the quick loss of strength in concrete if not poured as soon as mixed the method of supplying the finished mix from a central mixing plant, or of mixing it in transit on a motor truck mixer was not found practicable and some localities have laws limiting the distance such pre-mixed material may be hauled, so as to avoid the danger of failure of concrete structure made therefrom.

The above condition of affairs has resulted in more attention being given to auto truck mixers which carried the load dry and in which the water was added and mixing started at the job or just before reaching the job—and the use of this type has already become extensive, bidding fair to supplant the old method of storage piles at the job with local handling and mixing by the job workmen.

However, a serious fault is found in the method of dry hauling to the job on power truck mixers due to the fact that the sand is frequently anything but "dry" for owing to its propensity for holding moisture, and the common necessity of washing the sand before hauling from the sand beds to the supply bunkers, or by reason of wet weather, it frequently happens that there is enough moisture in the sand or gravel so that when the cement is dumped into the mixer together with the rock and sand at the bunkers, usually turned over a few times before starting, and then hauled to the job, a partial hydration of the cement takes place in transit from this contained water.

This is a very serious state of affairs as in case of a long haul the batch will become much impaired and yield a concrete of reduced strength, dangerous to use in a building. Or if the job should not be quite ready for it the batch will be completely spoiled even before adding the regular quantity of water and starting the mixer, or hardened to an extent that the mixer if of the revolving shaft and paddle type could not be started, or if of the drum type the material would not fall in the revolving of the drum.

Also, should any contingency hold up a load over night it would be so hard as to re-

quire removal with picks, and probably would result in serious injury to the mixer.

My invention comprises a method or sequence of steps in handling concrete material from the supply bunkers to the job in a manner which at once overcomes all of the difficulties above mentioned, and meets the modern construction requirements at every point, and which consists in loading the inert aggregates sand, and rock or gravel preferably with the required amount of water for the batch all into a motor truck mixer and of carrying along the cement for the batch in a separate container on the truck so that it will not become impaired by contact with moist sand, then at or shortly before reaching the job of emptying the dry cement into the inert materials and rotating the mixer.

By this means the load may be transported any distance, or let stand overnight if necessary and the cement not introduced and mixer started until the job was ready to pour.

It is of course possible to leave out the water until the cement is added, by carrying a tank of water as at present done with these motor truck mixers, or getting the water from a local supply at the job, the main feature of the invention being centered around transporting the inert aggregate in a motor truck mixer from the bunkers to the job and having the necessary cement for that batch in dry form in a separate container on the mixer arranged for emptying thereinto just before or at the time of mixing.

A specially arranged motor truck mixer is required to carry out this invention as it must have a separate container or containers for the cement adapted for controlled emptying into the mixer preferably while rotating the same.

In the drawings hereto I show a special mixer for carrying out the purposed method, Fig. 1 of the drawing being a side elevation of my special motor truck mixer, Fig. 2 an enlarged sectional elevation as seen from the line 2—2 of Fig. 1, an Fig. 3 is an enlarged detail of the cement bin lid and grill arrangement.

The truck is of the open trough body variety so that it can be driven under the rock and sand bunkers for deposit of the required amount of material therein, it has power-driven mixing blades mounted in the trough arranged for driving by the motor of the truck, and the trough body is arranged to be tilted, preferably by the power of the truck motor to discharge the mixed batch out of a rear door on the trough, all as well known in the art, the principal novel apparatus features of my invention being one or more cement carrying receptacles adjacent the trough arranged so as to empty evenly into the trough.

In the drawings 1 is the motor truck, 2 the rearwardly dumping trough body, 3 the mixing paddles within the trough, 4 the tight fitting rear door which may be swung open by the driver to discharge the mixed batch, 5 is a water tank mounted transversely at the forward end of the trough arranged for controlled discharge of water to the trough in the well known manner not detailed, and along opposite sides at 6—6 are two long sheet metal bins adapted to hold the required amount of cement for the batch capacity of the mixing trough.

These bins are provided with hinged lids 7 on top and the bins themselves are pivoted to the trough each on a longitudinal axis 8 so that they may be tipped and emptied into the mixer trough, the hinged lids swinging open to permit discharge of the cement.

The means for dumping the cement bins is best shown in Fig. 2 and comprises a transverse shaft as at 9 provided with worms 10 of opposite hand at opposite ends, meshing worm wheels 11 secured to shafts 8 in turn fixed to the bins. Shaft 9 is rotatably supported in bearings 12 mounted on the end of the mixer structure so that revolution of the shaft by means of the hand crank 13 or sprocket 14, will draw the upper ends of the bins together and tip both into the mixer, until they stop by coming together with lids hanging open, as shown in the dotted position of the bins.

If desired the shaft 9 may be operated by power through the sprocket 14 or through any desired well known transmission hook-up to the truck power, not detailed as not involving any invention.

Since it requires about 1 part of cement to 6 of inert aggregate to give the proportions of cement the bins 6 should hold at least this proportion of the load and preferably more so that a concrete of any required richness may be obtained. Also it is desirable that the cement containers be marked with graduations to indicate the capacity to different points so that an inspector at the job can check the cement before the batch is mixed and thus insure the concrete coming up to specifications.

The cement containers or bins are preferably equipped with hinged or removable grilles 15 to separate the cement as it is discharged and insure an even layer running into the mixer. Also it should be noted that the hinged lids 7 are slanted slightly and overlap the sides and ends of the cement bins so as to form rain-proof covers for these receptacles, thus permitting operation in rainy weather, an additional cover such as of canvas being thrown over the space between the bins in case of a downpour to keep excess water from the trough.

While it is contemplated that the proper amount of water be poured into the trough together with the sand and rock, it is purposed to also carry the extra small tank 5 of water so as to be able in an emergency to add

more when an abnormally wet mix is desired.

Also it should be observed that one of the bins may be made large enough to carry all of the cement and the other all of the water if for any reason it was not desired to mix the water with the inert aggregate at the supply bunkers.

In contemplating the invention as set forth it will be evident that the variations of handling mentioned do not change the fundamental method steps involved, and which comprise, transporting the concrete materials for one batch in a motor truck mixer from the bunkers to or near the job, and with the cement dry and separate from the other materials, and of introducing the cement to the other materials at the time of mixing. Also the above whether or not the water be premixed with the inert aggregate.

I therefore claim:

1. In a concrete mixer, a mixing trough, a cement bin pivotally mounted adjacent the upper part of the trough arranged for tipping to discharge thereinto, said bin provided with a hinged lid adapted to shed rain and to swing open upon the tipping of the bin.

2. In a concrete mixer, a mixing trough, a cement bin pivotally mounted adjacent the upper part of the trough arranged for tipping to discharge thereinto, said bin provided with a grille for evening up the discharge of material carried in said bin when the same is tipped.

3. In a concrete mixer, a mixing trough, a pair of longitudinally extending cement bins at opposite sides of the trough pivotally mounted for tipping to discharge into the trough, and means arranged for simultaneously tipping the bins.

4. In a concrete mixer, a mixing trough, a cement bin pivotally mounted adjacent the upper part of the trough arranged for tipping to discharge thereinto while the mixer is being operated.

5. Apparatus for handling concrete materials comprising a mixer mounted on a motor truck and arranged for operation by the truck motor, a cement bin pivotally mounted adjacent the upper part of the trough arranged for tipping to discharge thereinto while the mixer is being operated said bin provided with a hinged lid adapted to shed rain, and to swing open upon the tipping of the bin.

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