May 11, 1926. 1,583,892

J. VER MEHR

MIXING MACHINE

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Fig. 1.

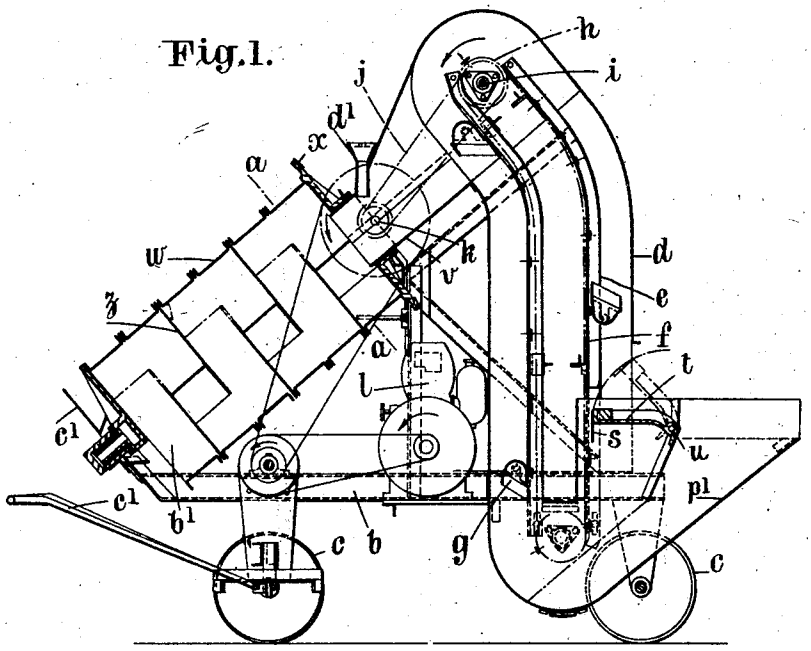
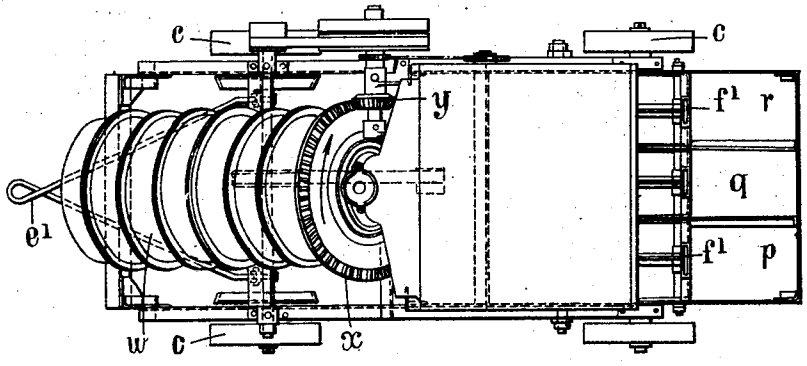


Fig. 2.



INVENTOR

J. ver Mehr

by

Langner, Parry, Card & Langner

Attys.

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J. VER MEHR

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Fig.3.

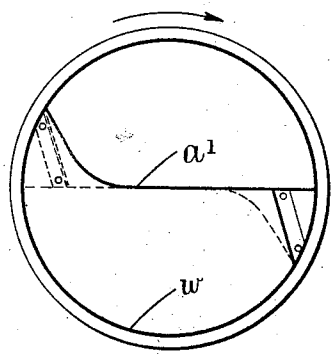
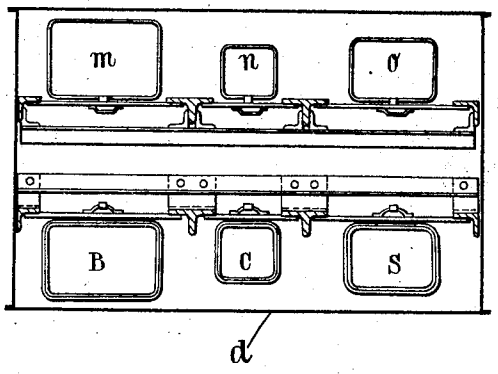


Fig.4.



INVENTOR
J. ver Mehr
by
Langner, Parry, Card & Langner
Att'ys.

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J. VER MEHR

MIXING MACHINE

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Fig.5.

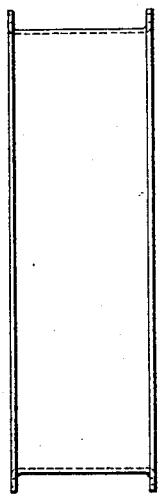


Fig.6.

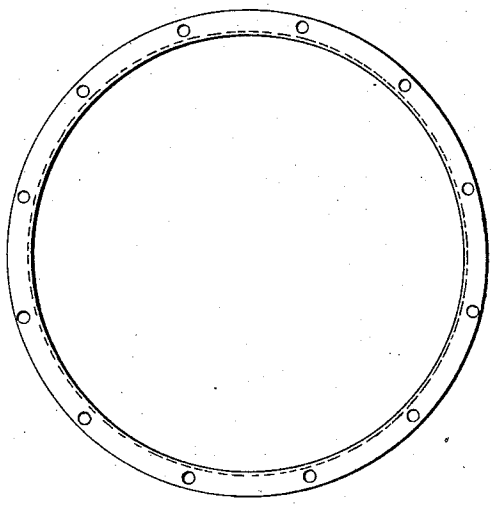
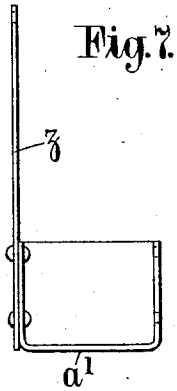


Fig.7.



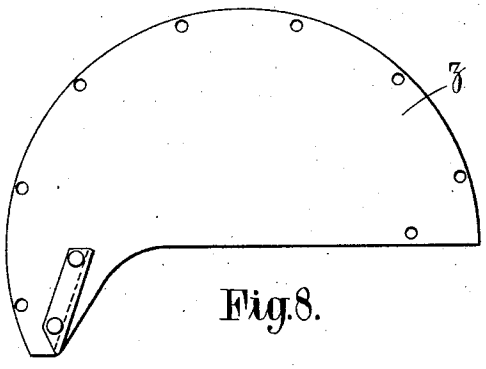


Fig.8.

INVENTOR
J. ver Mehr
BY
Lacy, Parry, Card & Lacy
ATTORNEYS.

Patented May 11, 1926. 1,583,892

UNITED STATES PATENT OFFICE.

JOHN VER MEHR, OF LONDON, ENGLAND.

MIXING MACHINE.

Application filed May 12, 1923. Serial No. 638,533.

This invention has reference to mixing machines whereby various ingredients or substances may be intimately admixed or commingled.

More particularly the invention is concerned with machines for mixing concrete or the like although it is to be understood that its sphere of usefulness is not to be considered as restricted to this specific purpose as apparatus according to my invention may be employed generally where it is desired to produce a thorough admixture of various ingredients or substances.

The primary object of my invention is to provide an improved mixing machine which will be capable of treating large quantities of materials expeditiously the mixtures delivered from the machine being of uniform quality.

Further objects of the invention are to provide an improved mixing machine which may be constructed cheaply and operated efficiently with a low power thus effecting considerable economy in running costs to provide for easy accessibility to the interior of the mixer whereby repair or renewal of any of the parts may be effected expeditiously and generally to provide an improved construction of mixing machine which shall be more efficient and convenient in operation than mixing machines as heretofore constructed.

With the aforesaid objects in view and such others as may hereinafter appear or are incidental thereto my invention in its broadest aspect may be said to be embodied in a mixing machine of the rotary drum type wherein the several ingredients to be mixed fed thereto in a substantially continuous manner are caused during their passage through the mixer to be thoroughly commingled in such a manner that the gauged proportions are maintained throughout the mixing operation the mixed ingredients being discharged intermittently from the mixer as this is rotated.

Stated another way the invention contemplates a mixing machine of the rotary drum type in which the several substances to be mixed charged or fed to the mixing drum proper in the correct proportions are thoroughly intermixed and commingled in said drum in a plurality of batches so that the gauged proportions are maintained throughout the mixing operation batches of mixed substances or ingredients being discharged intermittently from the mixing drum proper as this is rotated.

According to a further aspect of the invention the substances to be mixed are fed to the mixing drum proper by a combined elevating and automatic gauging device whereby the correct proportions of the several substances are introduced to a rotating drum and caused to pass through a plurality of chambers or compartments within said drum the substances being mixed in each of said chambers by means of blades or baffles mounted therein and in which a batch of completely mixed material is discharged at each complete revolution of the drum.

In one constructional form of the invention the improved mixing machine includes in its embodiment an elevator device comprising belts or chains provided with buckets which are adapted during operation of the apparatus to pick up material from a hopper and convey it to the elevated end of an inclined mixing drum. The hopper is divided into an appropriate number of compartments one for each of the several substances to be mixed and means are provided for levelling the material in each bucket as it emerges from the hopper so that an approximately predetermined quantity of material is extracted from the hopper by each bucket. The buckets are so arranged that the contents are introduced—such as by the aid of an appropriate chute or hopper—into the mixing drum proper which consists of a preferably cylindrical shell or drum revolvably mounted about an inclined axis and having a plurality of compartments communicating with each other each of said compartments having one or more mixing blades or baffles whereby the substances are lifted and turned over as the drum rotates and transferred to the next following compartment by the combined action of gravity and the aforesaid blades or baffles means being provided whereby the contents of the final compartment of the drum may be discharged at each complete revolution of the drum. The mixing drum is revolvably mounted at such an inclination as to ensure that substances introduced at one end will travel by the combined action of gravity and the aforesaid blades or baffles toward and be discharged from the opposite end of the drum as this latter is rotated.

The aforesaid drum is divided into a plurality of compartments by transverse partitions having a portion or portions cut away whereby material under treatment may pass from one compartment to the other the opening or openings in adjacent partitions preferably being staggered relatively to each other that is to say the opening in one partition is opposed diametrically to the opening in the adjacent partition.

The interior of each of the aforesaid compartments is provided with a lifting blade or blades preferably extending parallel with the axis of rotation of the drum although they may be arranged in angular direction relatively thereto.

A suitable framing is provided adapted to support the aforesaid elevator and the mixing drum which latter may be mounted by means of trunnions or by means of a spindle passing through the drum and suitable mechanism is provided for rotating said drum and actuating the elevator.

In order that the invention may be clearly understood reference will now be had to the accompanying drawings wherein a preferred embodiment of the invention is illustrated by way of example.

Fig. 1 is an elevation of one form of apparatus.

Fig. 2 is a plan view thereof.

Fig. 3 is a section on the line *a*—*a*, Fig. 1, drawn to a large scale.

Fig. 4 is a section through the elevating device.

Fig. 5 illustrates one of the drum sections.

Fig. 6 is an end view thereof.

Fig. 7 is a side view of a division plate and

Fig. 8 is a front view thereof.

Referring to the drawings wherein the same reference letters indicate the same or similar parts, *b* represents a frame on which the apparatus is mounted said frame being supported on wheels *c*.

Mounted on the frame *b* near one end thereof is a trunk or casing *d* within which are supported the guide rails *e* serving to guide an endless conveyor or elevator *f* to which the buckets *g* are attached. The elevator is operated by a gear *h* mounted on a spindle *i* driven by a chain belt or the like *j* from a spindle *k* the latter being driven by a belt or other transmission from an engine *l* carried by the frame *b*.

The buckets *g* are arranged in series or sets on the elevator *f* and each set in the present embodiment and as applied to a concrete mixer comprises three buckets *m*, *n* and *o*, Fig. 4, the bucket *m* being adapted to convey ballast to the mixing drum, the bucket *n* cement, and the bucket *o* sand.

A hopper *p'* is supported on the frame *b* at the bottom of the elevator trunk or casing *d* and is provided with three compartments *p*, *q*, *r* to which ballast, cement and sand are fed respectively. The hopper *p'* is preferably capable of being easily detached from the frame *b*.

The buckets *m*, *n*, *o* when the elevator *f* is operated pass through the compartments in the hopper and become filled with the respective ingredients and in order to remove the superfluous material from said buckets scrapers *s* are provided said scrapers being carried on arms *t* mounted on a spindle *u* carried by the hopper *p'*. The buckets when passing through the compartments in the casing come into contact with the scraping device which removes the surplus material from the buckets whereby as they emerge from the casing they will each contain a predetermined quantity of material which is then discharged as the buckets are elevated into a chute *v* and are thus introduced into the mixing drum *w*.

The mixing drum *w* is revolvably mounted on the frame *b* and at one end thereof is an annular gear *x* which meshes with a pinion *y* mounted on the shaft *k*. The drum is divided into a plurality of compartments by transverse partitions *z* and it will be seen from Figure 1 that each partition has a portion cut away whereby the material under treatment can pass from one compartment to the other. The openings in adjacent partitions are opposed that is to say the opening in one partition is diametrically opposed to the opening in the adjacent partition.

The interior of each compartment is provided with a lifting blade *a'* Fig. 3 which extends parallel with the axis of the drum.

As shown in Fig. 1 the drum is built up of a number of sections, each of which comprises a cylindrical shell having flanges whereby it may be bolted or otherwise secured to other similar sections, one end of each section being provided with the aforementioned partition while the other end is open, the interior of each section having mounted therein the lifting blades *a'* so that by securing a number of such sections together a drum containing any desired number of chambers or compartments may be constructed. Such a construction facilitates manufacture, and repairs and renewals of the parts within the drum may readily be effected.

One end of the drum has a discharge opening *b'* through which the concrete is intermittently discharged and a splash guard *c'* is arranged at the end of the drum.

Water is introduced in predetermined quantities through a funnel *d'* supported on the chute *v*. The water may be sprayed on to the materials or it may be introduced into the chute *v* in any other convenient manner.

A drawbar *e'* is provided to facilitate

transport of the apparatus from one place to another and if desired the frame *b* may be supported on caterpillar tracks.

If it is desired to change the proportions of the various ingredients this can easily be effected by removing the buckets from the elevator and substituting buckets of such sizes as to give the proportions desired or the buckets may be provided with movable partitions which can be adjusted as and when desired.

The compartments in the hopper may be provided with means such as name plates *f'* for indicating the contents thereof.

In operating a mixing machine constructed in accordance with this invention the several substances to be mixed are fed into the separate compartments of the elevator hopper in bulk and after the machine has been started the operation is automatic in the sense that the elevator picks up a predetermined quantity of each of the ingredients and introduces them at the elevated end of the mixing drum where they are mixed in the first compartment thereof. As this drum is rotated the contents pass to the second compartment of the drum where they are submitted to a further mixing and while this is occurring a fresh charge is introduced to the drum by the elevator. It will be seen that the materials are mixed in batches each complete batch travelling through the compartments of the drum until it is ejected at the discharge end thereof. By this means the gauged proportions of the several ingredients are accurately maintained throughout the whole of the mixing operation.

It will be appreciated that various modifications may be effected without departing from the scope of the present invention for example the elevating gear and buckets whereby the ingredients to be mixed are introduced into the mixing drum may be dispensed with as it is feasible with small mixing machines to feed the ingredients to the drum by hand in the usual way.

I claim:

1. In a mixing machine a rotary mixing drum, comprising, a plurality of cylindrical sections detachably connected together, a partition located between each pair of adjoining sections, adjacent partitions having diametrically positioned apertures to permit the material being mixed to pass from one section to the next at each complete rotation of the drum, and a mixing blade in each section.

2. A mixing machine comprising a mixing drum formed of a number of sections detachably secured together, a partition between the adjoining faces of each pair of sections whereby the drum is divided into a series of separate batch mixing compartments, said partitions each having an opening therein, the opening in one partition being in staggered relation to the opening in each adjacent partition, an endless conveyor, separate batch-groups of buckets thereon, a hopper, separate batch constituent compartments therein through which the buckets are arranged to pass, means for removing surplus material from the buckets, a chute for directing the contents of the buckets into the mixing drum, and drive means to rotate the drum and conveyor.

3. A mixing machine comprising a mixing drum formed of a number of sections detachably secured together, a partition between the adjoining faces of each pair of sections whereby the drum is divided into a series of separate batch mixing compartments, said partitions each having an opening therein, the opening in one partition being in staggered relation to the opening in each adjacent partition, an endless conveyor, separate batch-groups of buckets thereon, a hopper, separate batch constituent compartments therein through which the buckets are arranged to pass, means for removing surplus material from the buckets, a chute for directing the contents of the buckets into the mixing drum, and drive means to rotate the drum and conveyor, the drive means rotating the drum one complete revolution while advancing the conveyor a distance of one group of buckets, the openings in the compartment partitions being diametrically spaced to permit transfer of material from one compartment to the next upon each complete rotation of the drum.

4. A mixing machine comprising a mixing drum formed of a number of sections adapted to be secured together, a partition between the adjoining faces of each pair of sections whereby the drum is divided into a series of compartments said partitions having each an opening therein the opening in one partition being diametrically opposed to the opening in each adjacent partition, an endless conveyor, buckets detachably secured to said conveyor, a hopper, compartments therein through which the buckets are caused to pass, pivoted scrapers for removing surplus material from said buckets and a chute for directing the material from the buckets into the mixing drum.

5. A mixing machine comprising a mixing drum, means for rotating said drum, partitions in said drum whereby the drum is divided into a series of compartments, said partitions having each an opening therein the opening in one partition being in staggered relation to the opening in each adjacent partition an endless conveyor, buckets thereon, a hopper, compartments therein through which the buckets are caused to pass, pivoted scrapers for removing surplus material from said buckets, and a chute for directing the contents of the buckets into the mixing drum.

6. A mixing machine comprising a mixing drum, means for rotating said drum, partitions in said drum whereby the drum is divided into a series of compartments, said partitions having each an opening therein the opening in one partition being diametrically opposed to the opening in each adjacent partition an endless conveyor, buckets detachably secured to said conveyor, a hopper, compartments therein through which the buckets are caused to pass, pivoted scrapers for removing surplus material from said buckets and a chute for directing the material from the buckets into the mixing drum.

JOHN VER MEHR.