Jan. 21, 1930. G. W. ADAMS 1,744,294

MIXING MACHINE

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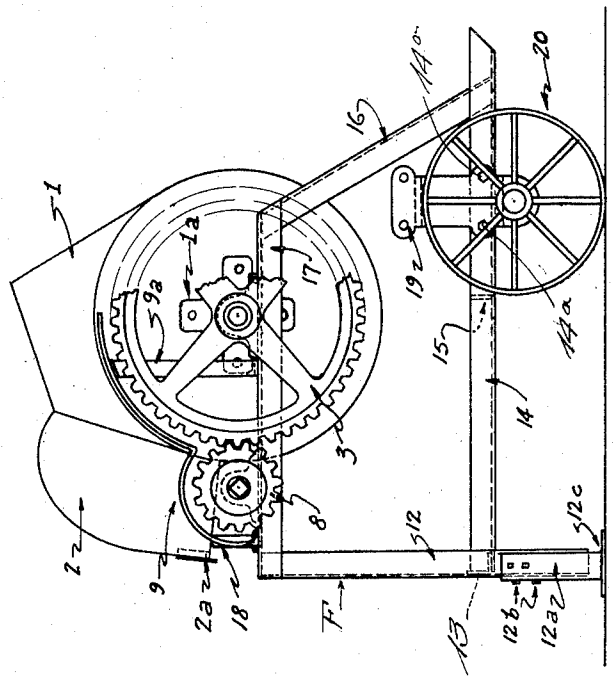


Fig. 2

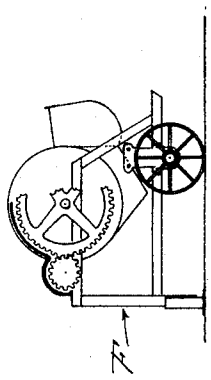


Fig. 3

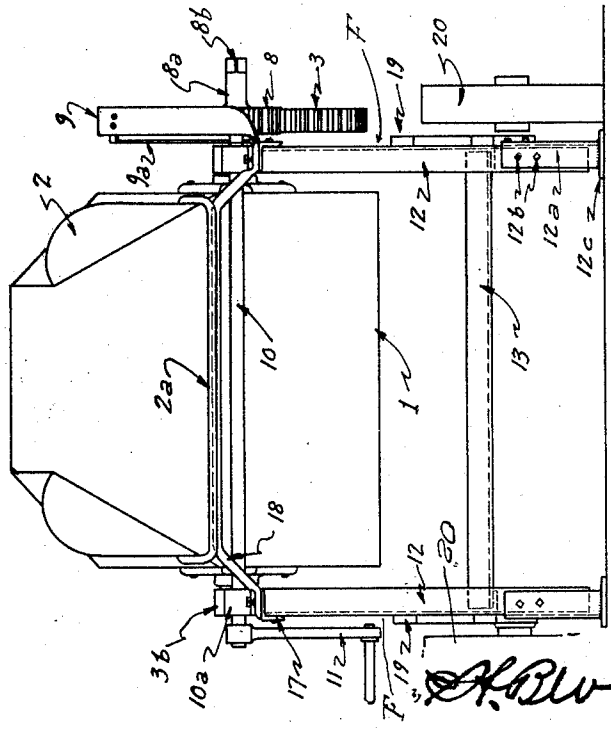


Fig. 1

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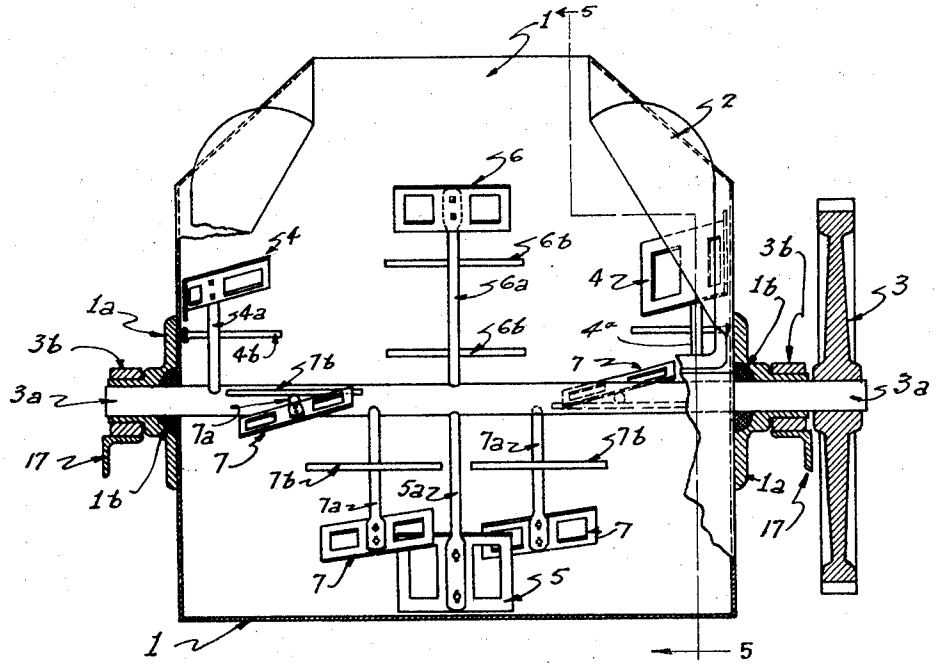



Fig. 4

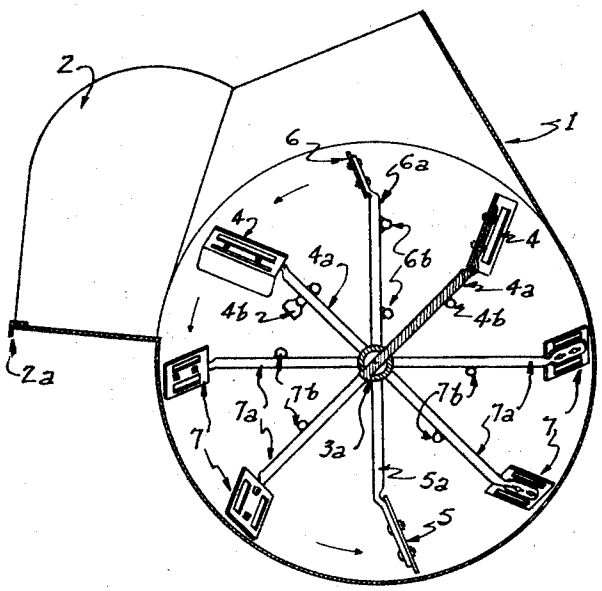



Fig. 5

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MIXING MACHINE

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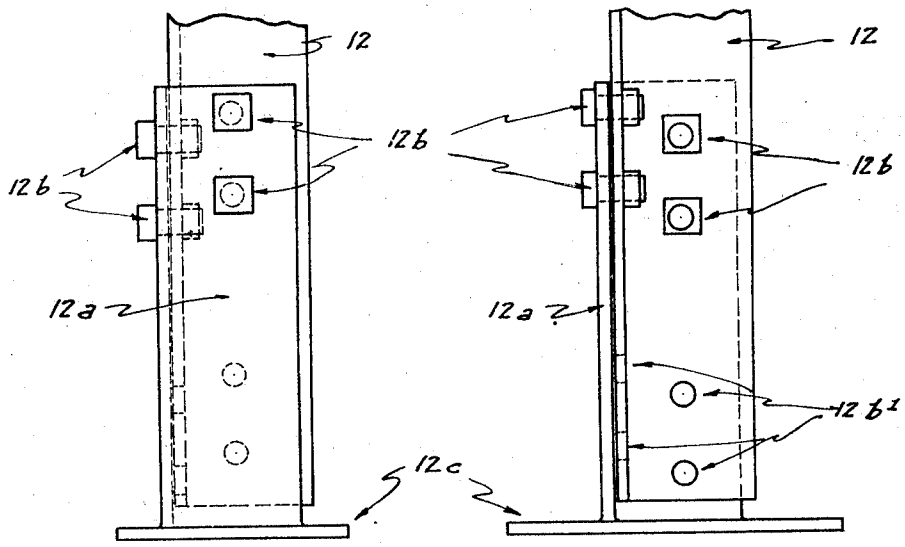



Fig. 6

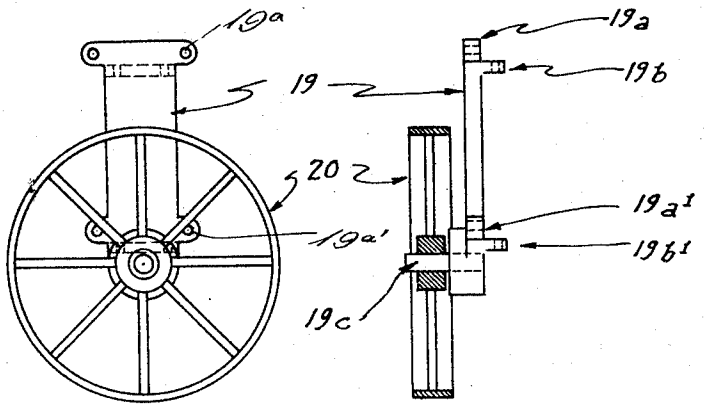



Fig. 7

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Patented Jan. 21, 1930

1,744,294

# UNITED STATES PATENT OFFICE

GEORGE W. ADAMS, OF SAN ANTONIO, TEXAS

## MIXING MACHINE

Application filed January 5, 1928. Serial No. 244,695.

The invention relates to improvements in mixers for cement, mortar, plaster, etc., and one object is to provide a simple, inexpensive and efficient machine of this character which may be advantageously used for mixing of material, whether plaster, mortar, concrete, etc., without the necessity of making any changes in the agitating or mixing means.

A further object is to provide a mixing machine in which novel provision is made to permit dumping of a mixed batch either at a high or a low point, as occasion may demand.

A still further object is to provide a readily portable machine which is wheel-supported at one end and leg-supported at its other end, the construction being such that upon the wheels, the machine may be readily rolled astride a mold, such as a block mold, or may be easily rolled to any other desired point, and when permitted to rest both upon the legs and the wheels, will be stationarily held while either loading or dumping.

A further object is to provide a machine in which all parts are compactly and advantageously arranged, to not only insure easy and inexpensive manufacture, but to produce an unusually practical machine.

Yet another aim is to provide novel agitating or stirring means which will effectively mix a batch of material in a mixing drum, with the expenditure of a small amount of power.

With the foregoing in view, the invention resides in the novel subject matter hereinafter described and claimed, description being accomplished by reference to the accompanying drawings.

Fig. 1 is a front elevation.

Fig. 2 is a side elevation, the mixing drum being in its normal or loading position.

Fig. 3 is a small side elevation showing the mixing drum moved to dumping position.

Fig. 4 is a longitudinal sectional view through the mixing drum, partly in elevation, showing the agitating means and associated parts.

Fig. 5 is a vertical sectional view on line 5—5 of Fig. 4.

Fig. 6 discloses details of extensible and retractable leg structure.

Fig. 7 discloses by side elevation and vertical section, a wheel-supported bracket which in turn supported portions of the frame.

The frame structure of the machine, embodies two substantially vertical side frames F, each consisting of an upper longitudinal bar 17, a lower longitudinal bar 14, a vertical leg 12 connected to one end of said bars and projecting below the bar 14, and an inclined bar 16 connected to the other ends of said bars 17—14. The two frames F are connected with each other by transverse bars 13—15 secured to the bars 14, and a transverse bar 18 secured to the bars 17, at or near one end of the latter, the body portion of this bar 18 being upwardly offset from said bars 17.

Each leg 12 is provided at its lower end with an extension $12^a$ having a foot $12^e$ and secured in place by bolts $12^b$. Openings $12^{b'}$ are provided to receive the bolts $12^b$, permitting extensibility and retractability of each leg 12—$12^a$.

Each bar 14 is secured by bolts $14^a$ to a vertical bracket plate 19 having an upper horizontal ledge $19^b$ and a lower ledge $19^{b'}$, upon either of which, bar 14 may rest. Plate 19 is provided with upper openings $19^a$ and with lower openings $19^{a'}$, either set of which may receive the bolts $14^a$.

The frame structure so far described, supports the mixing means hereinafter explained, and when it is desired that mixed batches shall be dumped at a rather low point, for instance, directly into a mold straddled by the two frames F, or into a mortar box, the parts are assembled so that the bars 14 rest upon the

lower ledges $19^{b'}$ and the leg extensions $12^a$ are retracted, thus giving the entire frame structure a comparatively low height. When it is desired to dump at a higher point, as into a wheelbarrow, the bars 14 are supported upon the ledges $19^b$ and the leg extensions $12^a$ are extended, thus increasing the height of the frame and consequently raising the mixing means supported by the upper portion thereof. In either condition of the frame structure, the feet $12^c$ of the extensions $12^a$, and wheels 20 which support the bracket plates 19, support the entire machine in a manner to stationarily hold it while loading or dumping, but to permit it to be readily moved from one point to another when desired.

A mixing drum 1 extends transversely between the side frames F and is mounted at its axis upon the bars 17, by appropriate bearings $3^b$, which bearings embody suitable packings $1^b$ to prevent escape of fluid. The drum 1 is provided with a loading spout 2 reinforced by a metal bar $2^a$ and is provided also with an appropriate discharge spout. The loading spout 2 rests normally upon the transverse bar 18 and is hence solidly supported. The material to be mixed may either be shoveled into the drum 1 through this spout, or if the material is to be discharged into the drum from a wheelbarrow, a plank may be supported at its upper end upon the cross member of frame 13, and used as a runway up which to push the load.

A drive shaft 10 extends transversely of the machine, between the drum 1 and the bar 18 and is mounted in appropriate bearings $10^a$, said shaft being normally disposed under and hence protected to a large extent by the loading spout 2, this arrangement being also desirable on account of its compact nature. The shaft 10 is provided with a pinion 8 meshing with a driving gear $3^a$ on a preferably tubular shaft 3 which extends along the axis of the drum 1, said shaft carrying agitating means. When the shaft 10 is driven in one direction, to operate the agitating means, the latter tends to rotate the drum 1, but rotation of said drum in this direction, is prevented by contact of the loading spout 2 with the transverse bar 18. The drum however is free to turn in the other direction to dump a mixed batch whenever desired.

Shaft 10 may be driven in any desired manner. On one of its ends, I have shown a hand crank 11 for this purpose. The pinion 8 on the other end of the shaft however, may be provided with an extension $8^a$ having a squared end $8^b$. A pulley may be connected to the extension $8^a$ if it be desired to drive the machine by power, or a crank may be connected with the squared end $8^b$. Whether the machine be power-driven or hand-driven, the gears 3—8 are preferably provided with appropriate guards 9.

Welded in openings of or otherwise rigidly secured to the drum-contained portion of the shaft $3^a$, are a number of slender rods or arms which are disposed in substantially helical order. At the ends of the drum-contained portion of the shaft, are the rods or arms $4^a$ which carry comparatively large agitating plates 4, said plates having openings through which the material may readily pass and being pitched to feed the material toward the center of the drum. At the center of the above-named drum-contained portion of the shaft $3^a$, is another rod $5^a$ having an agitating plate 5 formed with openings through which the material may pass. This plate 5 is of about the same size as the plates 4 but it is not pitched, that is, it is disposed in a plane extending parallel with the shaft $3^a$. The portions of the shaft between the arm $5^a$ and the arms $4^a$, carry additional arms or rods $7^a$ which are provided with relatively small apertured plates 7, which plates are pitched to feed the material toward the center of the drum 1. In this central portion of the drum, the material is further acted upon and agitated by the non-pitched plate 5 and by a similar plate 6 if desired, said plate 6 being carried by an additional rod or arm $6^a$ and being similar to the plates 7. All of the plates 4, 5, 6 and 7 are preferably disposed in planes which diverge from truly radial lines extending along the length of the arms $4^a$, $5^a$, $6^a$ and $7^a$, the outer ends of these arms being angled to so dispose the plates. By so positioning the plates, they have a greater tendency to cut through the material and less tendency to lift it, and hence, the operation of the machine is easier than otherwise.

Slender transverse rods are secured to most of the above described arms or rods, providing rigid lateral fingers which assist materially in thoroughly agitating and mixing the batch. The rods on the arms $4^a$ are denoted at $4^b$, those of the arm $6^a$ are denoted at $6^b$ and those of the arms $7^a$ are shown at $7^b$. In the present illustration, arm $5^a$ is free of such rods, but may carry them if desired.

Preferably, all of the plates 4, 5, 6 and 7 are connected with their carrying arms by bolt and slot connections, permitting adjustment of said plates toward and from the wall of the drum 1, according to the size or type of aggregates being mixed.

The agitating means above described, is unusually rapid, is easy to operate, and is highly efficient. Not only do the plates between the central portion of the shaft 3 and the ends of the drum 1, and the parts movable with said plates, serve to effectively agitate the material, but said plates also feed it toward the central portion of the drum, in which it is more thoroughly agitated and mixed by the non-pitched central plate or plates and associated parts. The various arms, rods, plates, and the shaft $3^a$ are of

such small size that very little of the material being mixed, may cling to them and hence great weight will not be added to the mixing means, as is very often the case with other types of mixing means. Moreover, by having these parts rather slender, they may readily pass through the material, mixing it by a stirring or agitating process, rather than by a lifting and dropping process, assisting materially in easy operation.

Excellent results are obtainable from the various features herein disclosed and they are therefore preferably followed. However, within the scope of the invention as claimed, variations may be made.

I claim:—

1. In a mixing machine, a drum, a driven shaft passing therethrough, slender arms rigidly secured to said shaft and radiating therefrom at the center, the ends and intervening portions of its drum-contained reach, relatively large agitating plates secured to the endmost and central arms, and comparatively small agitating plates secured to the intervening arms.

2. In a mixing machine, a drum, a driven shaft passing therethrough, slender arms rigidly secured to said shaft and radiating therefrom at the center, the ends and intervening portions of its drum-contained reach, agitating plates secured to said arms, the endmost of said plates and the plates between them and the central plate being pitched to urge the batch toward the central portion of the drum, the central plate or plates being free of such pitch.

3. A structure as specified in claim 2; said central and endmost plates being of greater size than the other plates.

4. A structure as specified in claim 2; all of said plates being formed in their opposite ends with large openings through which the material may readily flow, said openings being spaced apart to provide a central solid portion at which point the plates are attached to said arms.

5. In a mixing machine, a drum, a driven shaft passing therethrough, slender arms rigidly secured to said shaft and radiating therefrom at the center, the ends and intervening portions of its drum-contained reach, agitating plates secured to said arms, the endmost of said plates and the plates between them and the central plate being pitched to urge the batch toward the central portion of the drum, the central plate or plates being free of such pitch, and slender agitating fingers rigidly secured to and projecting laterally from said arms.

6. In a mixing machine, a drum, a driven shaft passing therethrough, slender arms rigidly secured to said shaft and radiating therefrom at the center, the ends and intervening portions of its drum-contained reach, agitating plates secured to said arms, the endmost of said plates and the plates between them and the central plate being pitched to urge the batch toward the central portion of the drum, the central plate or plates being free of such pitch, all of said plates being formed with large openings through which the material may readily flow, and slender agitating fingers rigidly secured to and projecting laterally from said arms.

In testimony whereof I have hereunto affixed my signature.

GEORGE W. ADAMS.