# United States Patent [19]

**Waltman**

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[54] **MORTAR MIXING SYSTEM**


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**Related U.S. Application Data**

[62] Division of Ser. No. 287,070, Sept. 7, 1972, Pat. No. 3,817,497.

[52] **U.S. Cl.** ..... **259/159 R;** 259/161; 259/165; 198/204

[51] **Int. Cl.** ..... **B28c 1/22**

[58] **Field of Search** ..... 259/161, 162, 164, 165, 259/169, 170, 148, 149, 154, 156, 159 R; 198/204



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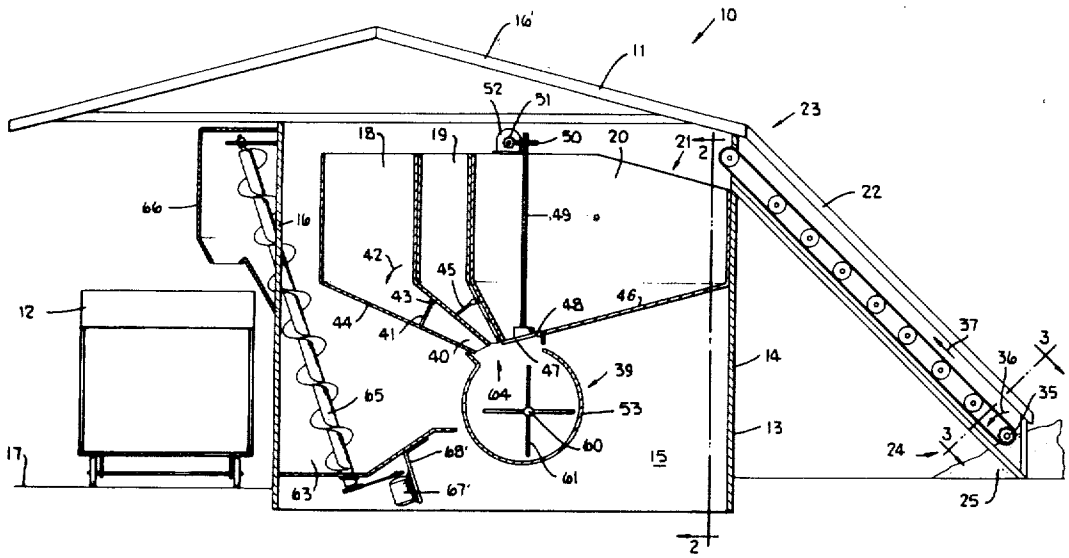
*Primary Examiner*—Robert W. Jenkins



[57] **ABSTRACT**

A system for producing dry mortar mix and at a remote location, transporting the dry mix to the construction site and then mixing the dry mix with water producing the mortar. The system includes a building having three separate compartments for mortar, additive and sand. An endless conveyor belt conveys sand from a sand dump to the sand compartment with the conveyor belt extending through a heat insulated tunnel with electrical coils positioned adjacent the length of the conveyor belt for heating the sand and reducing the moisture content in the sand. The three compartments exit into a drum pivotally mounted to the building which has a rotatably driven paddle for mixing the mortar, additive and sand. The drum is pivoted downwardly to dump the dry mix into a hopper mounted to the side wall of the building. A rotatably driven auger conveys the dry mix from the hopper upwardly into a chute which opens into a dry mix compartment of a vehicle therebeneath for transportation to the job site where dry mortar is augered into a job trailer. The trailer has a water storage tank and a dry mix compartment allowing the mortar to be prepared as needed in smaller quantities.


**4 Claims, 4 Drawing Figures**



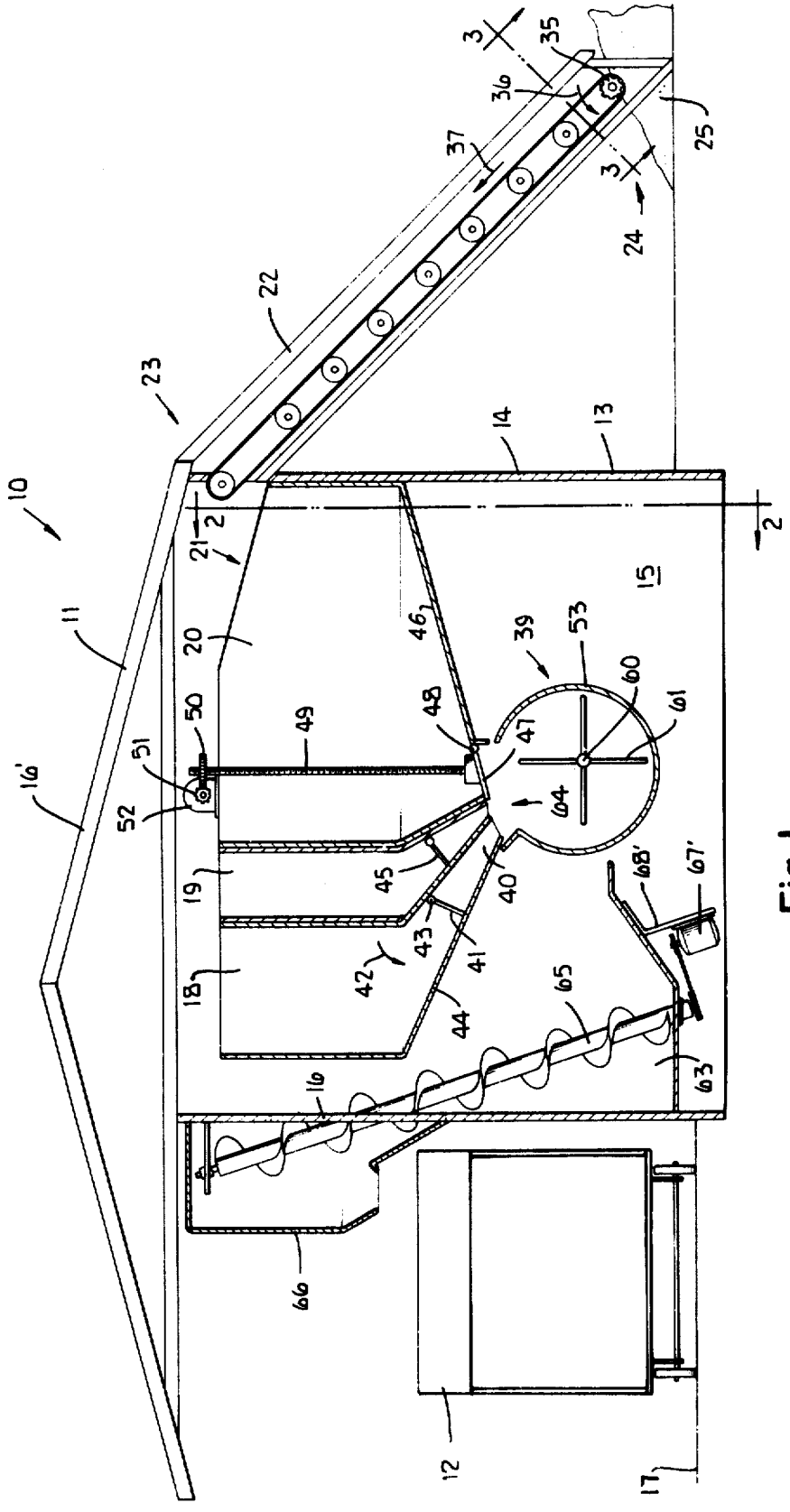

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Fig. 1

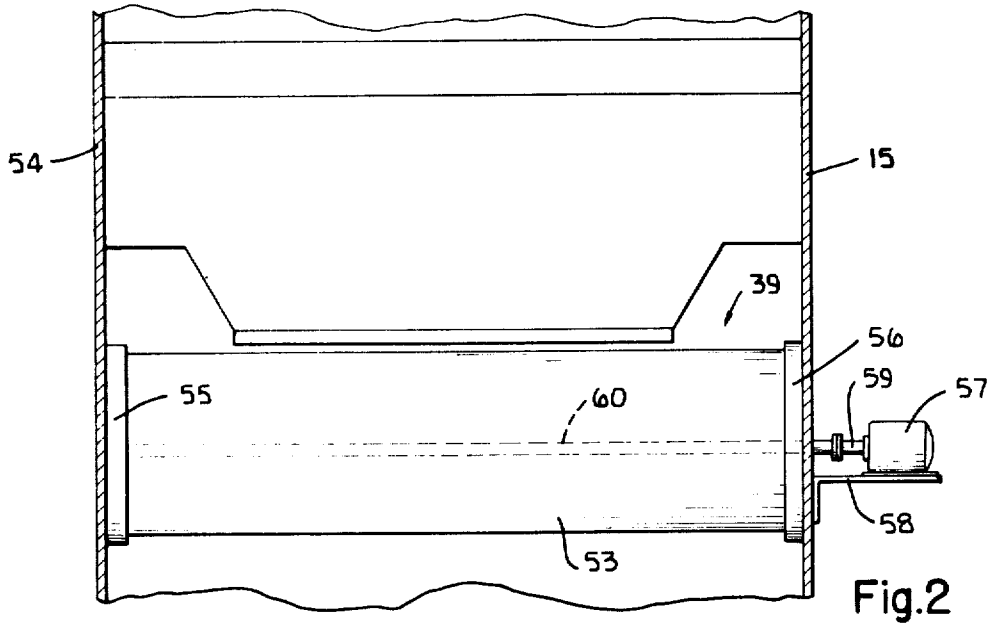



Fig.2

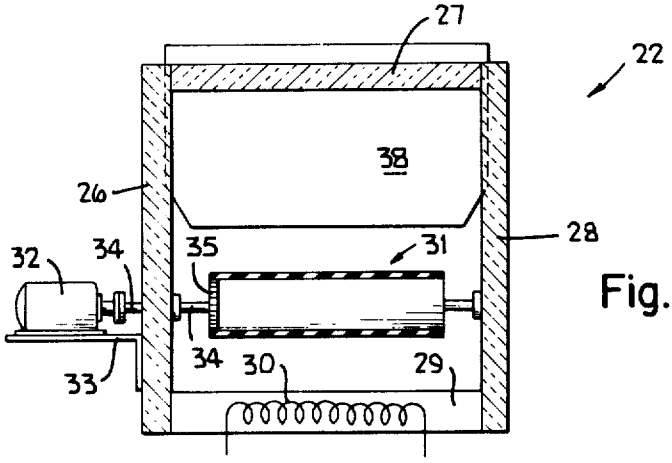
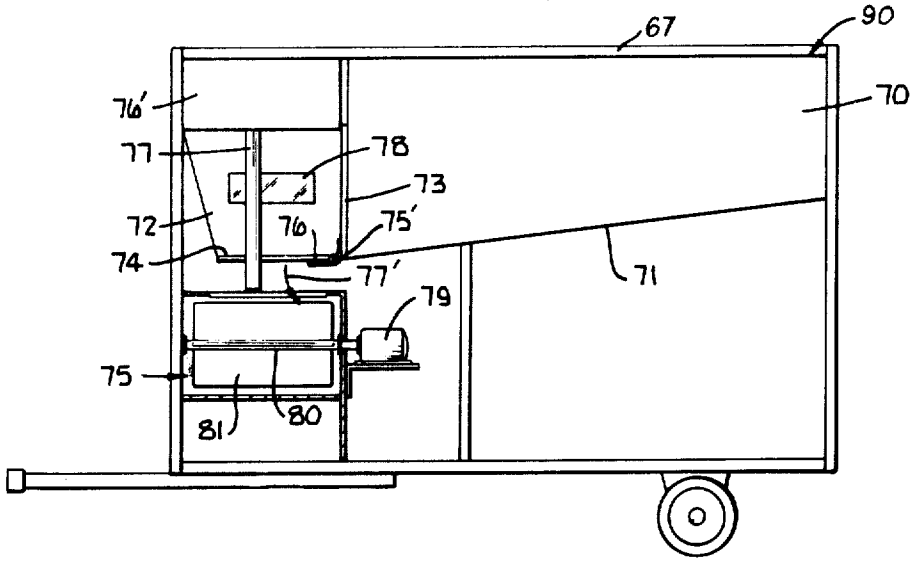



Fig.3

Fig.4



# MORTAR MIXING SYSTEM

## CROSS REFERENCE TO RELATED APPLICATION

This application is a divisional application of my copending application Ser. No. 287,070, filed Sept. 7, 1972, now U.S. Pat. No. 3,817,497.

## BACKGROUND OF THE INVENTION

1. Field of the Invention:

This invention is in the field of devices for producing mortar.

2. Description of the Prior Art:

Mortar is typically mixed at a remote location and then transported in a wet stage to the construction site. As a result, the mortar must be used as soon as it arrives at the construction site or else the mortar will set up and solidify. Likewise, the interior of the vehicle which transports the wet mortar must be periodically cleaned to prevent excess build up of mortar. An apparatus which mixes wet mortar and then conveys the mortar by means of tubing is disclosed in U.S. Pat. No. 3,011,414 issued to H. A. Stein. A transportable container for carrying and dispensing motor is disclosed in the U.S. Pat. No. 2,793,788 issued to K. M. Lysne. Other devices for producing wet mortar are disclosed in the U.S. Pat. Nos. 2,491,194 issued to R. M. McShea and 2,648,206 issued to C. H. Carr. An apparatus for moving dry mix mortar is disclosed in the U.S. Pat. No. 3,062,522 issued to V. R. McCoy.

An advantage of the system disclosed herein is the ability to produce dry mix at a remote location, and then transport the dry mix to the construction site where just the amount of wet mortar required is then produced. Another problem occurs with the prior art devices during winter when the sand must first be heated. A customary practice is to dig tunnels into the sand pile and to then insert a heating device into the tunnel for the heating of the sand. As the result, only the sand which is adjacent to the tunnel is selected by the hod carrier since the remaining sand is unheated. Therefore, the remaining sand is wasted along the patent mortar and any additives which are positioned in piles are left from time to time as the mixing location changes.

## SUMMARY OF THE INVENTION

One embodiment of the present invention includes a system for mixing mortar comprising a building including a mortar compartment, an additive compartment and a sand compartment with each including an exit opening, the sand compartment having a sand entrance opening, an elongated construction having a top end mounted to the building at the sand entrance and having a bottom end extending into a sand dump, the construction including heat insulated walls with one of the walls having a source of heat therein, the construction further including an endless conveyor belt mounted to the walls and extending along with the source of heat from the sand dump to the sand entrance, a dry mixer mounted in the building beneath the exit opening of the mortar compartment, the additive compartment and the sand compartment receiving mortar, additive and sand respectively therefrom, a dry mix chute mounted to the building, and a dry mix storage hopper mounted to the building to receive dry mix from the dry mixer and having a rotatably driven auger mounted thereto extending upwardly into the chute.



It is an object of the present invention to provide a new and improved system for mixing mortar.

It is the further object of the present invention to provide an apparatus for producing dry mortar mix at a remote location, to then transport the dry mix to the construction site where the dry mix is mixed with water to produce the wet mortar.

It is an object of the present invention to provide an apparatus for automatically heating sand as the sand is conveyed from a sand pile into the mixing device.

Related objects and advantages of the present invention will be apparent from the following description.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross sectional view of a building incorporating the present invention with a vehicle shown positioned adjacent to the building.

FIG. 2 is a fragmentary cross sectional view taken along the line 2—2 of FIG. 1 and viewed in the direction of the arrows.

FIG. 3 is an enlarged cross sectional view taken along the line 3—3 of FIG. 1 and viewed in the direction of the arrows.

FIG. 4 is an enlarged side view of a job trailer.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring now more particularly to the drawings, there is shown a system **10** (FIG. 1) for mixing mortar. The system includes a building **11** for mixing dry mortar and a vehicle **12** which transfers the dry mortar to the construction site. Building **11** includes a main frame **13** with four walls connected together. Walls **14**, 15 and **16** are shown with the remaining wall removed from FIG. 1 to more clearly illustrate the interior of the building. The building is provided with a conventional roof **16'** which extends out over a platform **17** onto which vehicle **12** may be moved. Three compartments **18, 19** and **20** are formed between the side walls of building **11.** Mortar compartment **18** is provided for receiving patent mortar whereas compartment **19** is provided to receive various types of additives such as coloring, or iron filings which when mixed with patent mortar, sand and water will provide for the water proofing of the final product. Compartment **20** is provided for receiving sand and has an entrance opening **21** for receiving sand from an enlongated construction **22** having an endless conveyor belt mounted therein.

The top end **23** of construction **22** is fixedly attached to wall **14** at the entrance opening **21** of compartment **20.** The bottom end **24** of the construction extends into a sand dump **25.** Construction **22** is hollow thereby allowing the sand to be conveyed upwardly from the sand dump. Construction **22** (FIG. 3) includes heat insulated walls **26** through **29** with a source of heat mounted in at least one of the heat insulated walls. In

the embodiment shown in FIG. 3, a plurality of electrical coils 30 are mounted within wall 29. The coils extend the length of the construction immediately beneath conveyor belt 31 thereby heating the sand as the sand is conveyed upwardly and reducing the moisture within the sand. Endless conveyor belt 31 is received by a plurality of rollers which are rotatably mounted to walls 26 and 28. The end rollers of the conveyor belt are provided with sprockets for engaging the belts. Various means may be utilized for driving the conveyor belt. For example, in the embodiment shown in FIG. 3, an electric motor 32 is mounted to bracket 33 fixedly attached to wall 26. The output shaft 34 of electrical motor 32 extends through wall 26 and is connected to sprocket 35 which is in driving engagement with the conveyor belt. Thus, as sprocket 35 rotates in the direction of arrow 36, the sand will move upwardly in the direction of arrow 37.

A leveling gate 38 is movably mounted to construction 22 and is movable downwardly above conveyor belt 31 for leveling the sand thereon. Grooves may be provided in walls 26 and 28 for receiving the vertically extending edges of gate 38 with the gate extending through the top wall 27. Thus, the operator may position the gate downwardly or upwardly depending upon the level of sand desired upon the conveyor belt.

Each compartment 18 through 20 includes an exit opening which extends downwardly into a dry mixer 39. The amount of material flowing from the compartments is controlled by movable doors. The movable doors are mounted to the compartments at the exit openings. For example, compartment 18 is provided with an exit opening 40 with door 41 pivotally mounted to the compartment. By pivoting wall 41 in the direction of arrow 42, the flow of patent mortar from compartment 18 will be increased. Door 41 may be mounted to axle 43 which extends through the side walls of the exit chute 44 of compartment 18. Axle 43 may then be provided with a handle allowing the operator to control the positioning of door 41. Door 45 of compartment 19 may be controlled in a similar manner. While a variety of structures may be utilized to control the flow of material from compartment 20, one particularly useful structure is shown in FIG. 1. Door 47 is pivotally mounted by axle 48 to chute 46. A threaded rod 49 is rotatably connected to door 47 and extends upwardly through an internally and externally threaded ring 50 which is in meshing engagement with sprocket 51 of electric motor 52. Thus, by rotating output sprocket 51, rod 49 is thereby rotated causing upward or downward pivotal motion of door 47 thereby controlling the flow of material from compartment 20. Many variations are contemplated and included in the manner in which the material flows from the compartments and the embodiment shown in the drawing is only one example and does not limit the invention disclosed herein.

Dry mixer 39 includes a cylindrical drum 53 (FIG. 2) which is pivotally mounted to side walls 54 and 15 of building 11. Bearings 55 and 56 are respectively mounted to walls 54 and 15 to receive the cylindrical edges of drum 53. An electric motor 57 is mounted to wall 15 by means of bracket 58 and has an output shaft 59 connected to axle 60 extending centrally through drum 53. Axle 60 includes a plurality of paddle drums 61 fixedly mounted thereto which extend with the axle through the drum. Thus, by activating motor 57, axle 60 and paddle wheel 61 may be rotated thereby mixing the mortar, additive and sand within the drum. The pivotal mounting of drum 53 is provided to enable the operator to empty the dry mix into storage hopper 63. Drum 53 may be pivoted from a first position wherein the opening 64 of drum 53 is aligned with the exit openings of compartments 18 through 20 to a second position wherein opening 64 is aligned with hopper 63 for the dumping of the dry mix into the hopper.

The dry mix storage hopper 63 is mounted to wall 15 of building 11 and has a rotatably driven auger 65 mounted thereto which extends upwardly into dry mix chute 66 mounted externally to wall 16. An electric motor 67' is mounted to hopper 63 by bracket 68' and is in engagement with the bottom end of auger 65 by means such as a pulley and belt combination. Thus, by rotating auger 65, the dry mix is caused to move through an opening in wall 16 and into the dry mix chute eventually emptying into vehicle 12. The vehicle 12 is then moved to the transportation site whereat the dry mix is transferred to job trailer 90.

Trailer 90 includes a main frame which is mounted atop an axle having wheels secured thereto. Trailer 90 may be provided with self-propulsion or may be towed by another vehicle to the construction site. Mounted to the top of the frame is a dry mix storage tank 70 which receives the dry mix. The bottom wall 71 of storage tank 70 is inclined downwardly to a dry mix measuring compartment 72. Compartment 72 is completely enclosed having four side walls joined to a top wall and bottom wall. Wall 73 of compartment 72 may be opened to allow the dry mix from compartment 70 to enter compartment 72. wall 73 may be either manually or electrically opened. In the embodiment shown in FIG. 4, wall 73 is received in vertically extending grooves of the side walls of compartment 70. Wall 73 may therefore be moved upwardly thereby allowing the dry mix to pass through the bottom edge of wall 73 and bottom wall 71 into compartment 72. The bottom wall 74 of compartment 72 is mounted to axle 75' secured to the side walls of compartment 72. Spring 76 is mounted to axle 75' and normally urges bottom wall 74 to a horizontal position; however, when a sufficient amount of dry mix is positioned atop wall 74, then the weight of the dry mix will cause wall 74 to pivot downwardly in the direction of arrow 77 thereby allowing the dry mix within compartment 72 to enter box 75 positioned immediately beneath compartment 72.

A water storage tank 76 is mounted to frame 67 of vehicle 12 and includes a hose 77 extending downwardly from the water storage tank to box 75 thereby allowing the operator to place an appropriate amount of water into box 75 along with the dry mix from compartment 72. Compartment 72 may be provided with a transparent window 78 in the side wall of the compartment to allow the operator to observe the dry mix within the compartment.

An electric motor 79 is mounted to the side of box 75 and has an output shaft connected to axle 80 extending into the box. A plurality of paddle wheels 81 are fixedly mounted to axle 80. Therefore, activation of motor 79 will result in the rotation of the axle and paddle thereby mixing the dry mix with the water within box 75 producing the final mortar product.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not

restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention are desired to be protected.

The invention claimed is:

1. A system for mixing mortar comprising:

a building including a mortar compartment, an additive compartment and a sand compartment with each including an exit opening, said sand compartment having a sand entrance opening;

an elongated construction having a top end mounted to said building at said sand entrance and having a bottom end extending into a sand dump, said construction including heat insulated walls with one of said walls having a source of heat therein, said construction further including an endless conveyor belt mounted to said walls and extending along with said source of heat from said sand dump to said sand entrance;

a dry mixer mounted in said building beneath said exit opening of said mortar compartment, said additive compartment and said sand compartment receiving mortar, additive and sand respectively therefrom;

a dry mix chute mounted to said building;

a dry mix storage hopper mounted to said building to receive dry mix from said dry mixer and having a rotatably driven auger mounted thereto extending upwardly into said chute.

2. The system of claim 1 wherein:

said construction includes a leveling gate movably mounted to at least one of said heat insulated walls and is movable downwardly above said conveyor belt for leveling sand thereon.

3. The system of claim 2 wherein:

said mortar compartment, said additive compartment and said sand compartment each include a separate movable wall mounted thereto at said exit opening of each compartment to control flow of material therethrough.

4. The system of claim 3 wherein:

said dry mixer includes a drum pivotally mounted to said building with a dry mix opening, said drum is pivotable from a first position aligning said dry mix opening with said exit opening to a second position with said dry mix opening is aligned with said hopper for dumping dry mix therein, said mixer further includes a rotably driven axle with a plurality of paddle arms fixedly mounted to said axle and positioned within said drum.

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