Jan. 31, 1933. H. A. CONLEY 1,895,608

PLASTERING MACHINE

Filed June 16, 1930 2 Sheets-Sheet 1

Fig. 1.

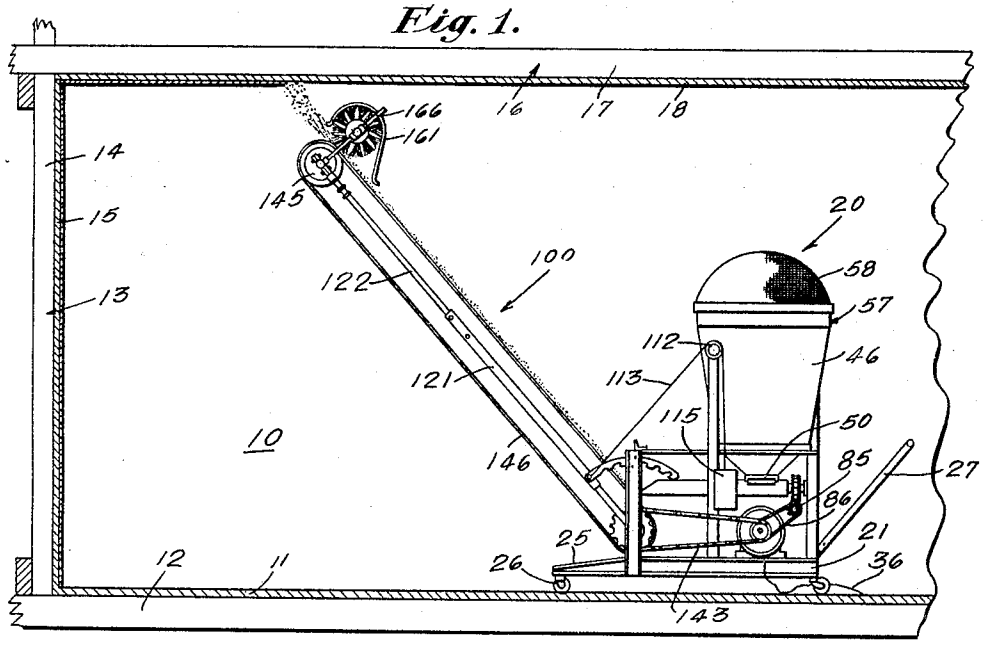
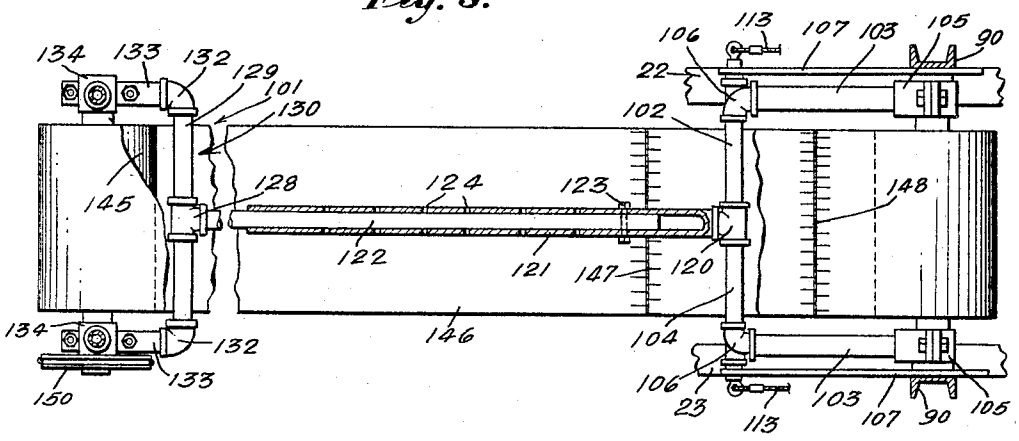


Fig. 5.



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Fig. 4.

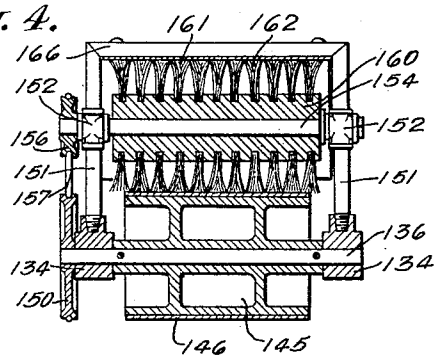
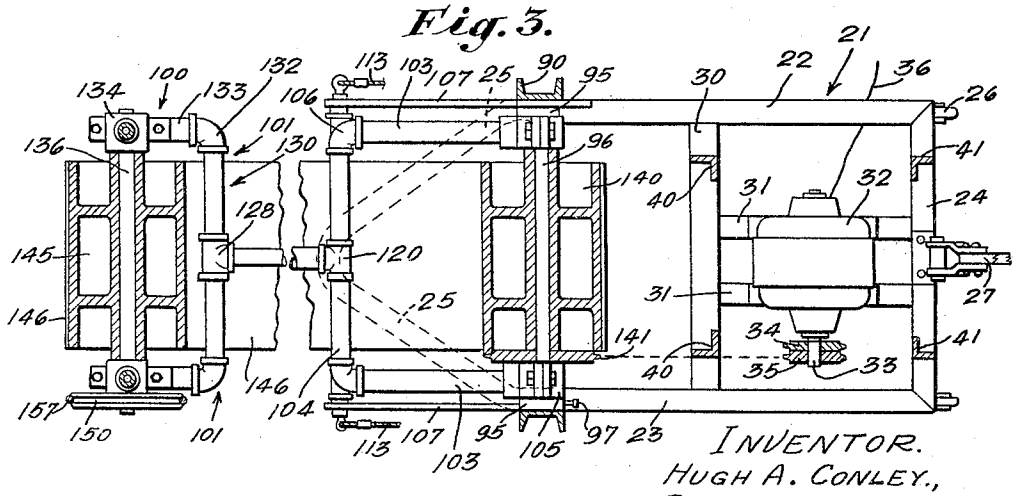


Fig. 2.

Fig. 3.



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UNITED STATES PATENT OFFICE

HUGH A. CONLEY, OF LYNWOOD, CALIFORNIA, ASSIGNOR TO CONLEY PLASTERING MACHINE COMPANY, INCORPORATED, OF BISBEE, ARIZONA, A CORPORATION OF ARIZONA

PLASTERING MACHINE

Application filed June 16, 1930. Serial No. 461,500.

My invention relates to apparatus for coating a surface with an adhering substance, and more particularly to a machine for mixing plaster and applying it to a surface.

It is a very common practice to finish the surfaces of many structures and particularly the walls and ceilings of buildings with plaster. The term "plaster" as used in this specification and in the appended claims includes not only lime and gypsum plasters and various kinds of stucco, but all similar substances which may be mixed and molded in a plastic state and which harden in a relatively short time to assume a lithoid nature.

The method of plastering in general use is to mix the dry and liquid ingredients of the plaster in batches in a large box on the ground level, each batch being carried in hods, upon the shoulders of hod-carriers, up ladders or stairs to the level at which the plasterers are working. The plaster is here dumped upon a plasterer's pallet from which the plasterer must transfer it, one trowel full at a time, to the walls and ceilings which he is plastering. After being thus mixed, transported and applied to the wall, the plaster is smoothed down by the plasterer into the desired shape and left to harden.

There are several disadvantages to this method. The work of the hod-carriers is so difficult that they demand high wages. Then much of the time and strength of the plasterers who are skilled and highly paid artisans is absorbed in transferring plaster from the pallet to the surface they are plastering.

It is consequently an object of my invention to provide a plastering machine which will obviate the work of the hod-carrier and relieve the plasterer of the labor of transferring the plaster to the surface to be plastered.

Another object of my invention is to provide a plastering machine which is simple in operation, easily cleaned, and which may be operated effectively by ordinary labor, thus decreasing the cost of plastering.

Considerable time elapses, in the present method of plastering, between the mixing of the plaster and the applying of it to a surface ready for the plasterer to work it into shape. This is a great disadvantage due to the fact that most plasters begin to set as soon as mixed so that the longer the time consumed in applying and shaping the plaster, the softer the plaster is after setting.

A very important object of my invention is to provide a plastering machine which mixes the plaster continuously and applies it immediately after it is mixed so that the long delay between the mixing and the application of the plaster in the present method is substantially eliminated. By the use of my machine I am able to use a plaster having Portland cement as one of its ingredients, which plaster produces a superior and harder surface but which cannot ordinarily be used on account of the speed with which it sets.

Machines for the same general purpose as the machine of my invention have been previously produced but none of these have come into general use due to their failure to provide a simple, adjustable, portable means for efficiently conveying the mixed plaster from the mixer to the surface to be plastered.

A further object of my invention is to provide a plastering machine having an adjustable conveyor upon the end of which a rotary plaster splattering element is mounted, the conveyor having different positions into which it can be easily moved to apply plaster to all portions of the walls and ceilings of a room.

A yet further object of my invention is to provide a plastering machine, the conveyor of which is adjustable in length.

It is an object of my invention to provide a plastering machine the conveyor of which can be manually directed to apply plaster to a surface.

Yet another object of my invention is to provide a plastering machine which both mixes plaster and applies it to a surface towards which it is directed.

A still further object of my invention is to provide a plastering machine in which a rotary splattering member receives the plastic mixture from the endless conveyor and transfers it to a surface to be plastered.

Additional objects and advantages will be made manifest in the following description

and in the accompanying drawings in which,

Fig. 1 is a diagrammatic illustration showing the preferred form of the plastering machine of my invention in operation.

Fig. 2 is a vertical medial sectional view illustrating the structure of the form of plastering machine shown in Fig. 1.

Fig. 3 is a horizontal sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 2.

Fig. 5 is a fragmentary horizontal sectional view taken substantially upon the line 3—3 of Fig. 2 and illustrating the extensible conveyor frame of my invention.

Referring to the drawings by numerals, Fig. 1 shows a vertical sectional view of a room 10 of a building under construction, the room 10 having a floor 11 supported upon joists 12, and walls 13 having studs 14, and lath or other primary surface backing members 15 secured to the studs 14. A ceiling 16 has beams 17 which are suitably supported upon the studs 14. Suitable surface members such as laths 18 are applied to the beams 17 so as to provide a continuous structure across the lower edges of these beams.

A preferred form of plastering machine of my invention is represented by the numeral 20, this machine having a carriage frame 21 having side members 22 and 23, a rear end cross member 24, and a V-shaped forward end member 25. Castors 26 are mounted upon the lower surface of the carriage frame 21 at the juncture of the side members 22 and 23 with the end member 24 and at the apex of the front V-shaped end member 25.

The various members of carriage frame 21 are preferably formed of channel iron and the castors 26 are secured to this channel iron by swivel connections which permit the carriage frame 21 to be rolled in any desired direction upon the floor 11. A maneuvering handle 27 is provided centrally upon the end member 24 for the purpose of manually maneuvering the carriage frame 21, which carries the plastering machine 20, as desired. A cross frame member 30 is interposed between the side members 22 and 23 and welded or otherwise rigidly connected at its ends to these side members. The cross member 30 and the rear end member 24 are connected by transverse motor beams 31, and an electric motor 32 is suitably mounted upon the beams 31. A shaft 33 of the motor 32 is provided with two sprocket wheels 34 and 35, as clearly shown in Fig. 3. A flexible cord 36 conveys electric energy to the motor 32 from any suitable source provided in or near the room 10.

Forward vertical struts 40 are welded or otherwise secured upon the upper surface of the cross member 30 so as to rise upwardly therefrom, equi-distant inwardly from the ends of the cross member. Vertical struts 41 are in a similar manner secured to the upper faces of the rear end member 24. Disposed within the vertical struts 40 and 41, so as to be substantially tangent to these struts and welded or otherwise secured thereto, is an annular angle band 45 in which a sheet metal shell 46 is supported, the shell 46 forming a plaster ingredient compartment 47. A frusto-conical hopper 48 is formed of sheet metal and connected at its upper end with the lower end of the shell 46 so as to extend the compartment 47 downwardly therefrom to the lower end of the hopper 48, which is provided with a suitable gate 50 slidable in a guideway 51, so as to regulate the downward flow of a body 52 of plaster ingredients contained within the compartment 47. For a purpose which will hereinafter be made clear the plaster ingredients 52 may be in dry or wet form. In case the plaster ingredients are in a dry form, these may be introduced into compartment 47 by means of a current of air passing through a hose 56 which connects with an inlet pipe 57 mounted in the upper end of the shell 46 to project inwardly into the compartment 47.

A cover 58 formed of gauze or other finely woven material is adapted to be securely placed upon the upper end of the shell 46 so as to prevent any of the plastering ingredients injected into the compartment 47 through the pipe 57 rising out of the compartment 47 in the form of dust, but, on the other hand, permits the air to freely leave the compartment 47 through the interstices in the gauze cover 58.

A plaster conveying and mixing mechanism 60 is mounted upon the lower end of the hopper 48. The mechanism 60 comprises a cylindrical shell 61 which is provided with an intake opening 62 which communicates upwardly with the opening of the gate 50 in the lower end of the hopper 48. The shell 61 also has an outlet opening 64 which is disposed on the level of the lower portion of a mixing chamber 65 provided on the interior of the shell 61. The intake opening 62 is disposed substantially above one end of the chamber 65 and the outlet opening 64 is substantially at the opposite end of the chamber 65.

An end cap 66 is threadedly received upon the opposite end of the cylindrical shell 61 from the outlet opening 64 and is centrally apertured to provide a journal for a shaft 68 of an auger feeding and mixing element 69. A horizontal supporting member 70 may be connected at its opposite ends with the struts 40 so as to assist in the supporting of the cylindrical shell 61. A supporting member 75 is connected at its opposite ends to the struts 41 and is provided with a bearing 76 in which the outer end of the auger shaft 68 is journalled. A worm gear wheel 77 is secured upon the shaft 68 between the head 66

and the bearing 76. Suitable bearings 80 are provided upon the inner face of the supporting member 75. A worm shaft 81 is journalled in the bearings 80, a worm 82 being attached to the shaft 81 so as to mesh with the worm gear 77 whereby a rotation of the shaft 81 transmits a rotation to the conveying and mixing auger 69, so as to feed any plastering material dropping downwardly through the intake opening 62 along the mixing chamber 65 to the outlet opening 64 of this chamber. For the purpose of rotating the worm shaft 81, a sprocket 85 is provided thereon connected by a chain 86 with the sprocket 34 of the motor 32.

A water pipe 87 is connected to the shell 61, as shown in Fig. 2, so that water supplied by a hose 88 can be admitted under control of a valve 89 in the pipe 87 into the mixing chamber 65.

Conveying arm supporting standards 90, preferably formed of channel iron, are secured to the forward ends of the frame side members 22 and 23 and project vertically upward to substantially the level of the annular angle band 45 where they are connected respectively by straps 91 to the strut 40 nearest thereto. A cross member 94 preferably formed of angle iron is connected to the upper ends of the supporting members 90 so as to space and rigidify these members.

Suitable collars 95 are welded or otherwise secured to the inner surface of members 90 at opposite points near their lower ends, so that suitable apertures in the collars 95 will be co-axially aligned and may receive the ends of a driven pulley axle 96, these ends being retained in the collars 95 by set screws 97.

Pivotally mounted upon the shaft 96 is an adjustable plaster conveying and applying arm 100. The arm 100 has a frame 101 which is preferably formed of pipe fittings as shown. The frame 101 has a U-shaped hub member 102 which has arms 103 connected by a cross member 104. The arms 103 terminate at their ends in bearings 105 which surround and are journalled upon the axle 96 just within the collars 95. The cross member 104 is joined to the arms 103 by corner fittings 106, each of which has pivotally secured upon the outside thereof an arcuate retaining link 107 which is provided with notches 108 which are adapted to receive lugs 109 formed upon the interior surfaces of the supporting members 90, so as to retain the frame 101 in any of a given series of definite angular positions relative to the axle 96. Pulleys 112 are provided upon the upper ends of the struts 40 and cables 113 are also secured to the fittings 106 and, proceeding upwardly over the pulleys 112, are attached to counterbalance weights 115 upon their opposite ends, so that the weight of the arm 100 is substantially counter-balanced, thereby making the manual movement of the conveying arm 100 between any of its given positions an easy matter.

The cross member 104 is provided centrally with a fitting 120 into which is rigidly connected a large telescoping pipe 121, and a smaller telescoping pipe 122 is adapted to be slidably disposed within the larger pipe 121 and be secured thereto by a bolt 123, which passes through suitable holes in the pipe 122 and through any one of the pairs of holes 124 provided in the pipe 121 for adjustably securing the pipe 122 therein. The outer end of the pipe 122 is rigidly secured in a fitting 128 which is provided centrally in a cross member 129 of a U-shaped end member 130 of the conveying arm frame 101. The cross member 129 is connected by fittings 132 at its opposite ends to arms 133 which are provided with suitable journals 134 which are aligned to provide bearings for a driven pulley shaft 136 which extends therethrough.

Mounted for free rotation upon the shaft 96 is a conveyor belt drive pulley 140, this pulley being provided upon one end thereof with a sprocket 141 which is aligned with and connected by a chain 143 to the sprocket 35 of the motor 32, so that when the motor 32 is energized the rotation of the drive pulley will be caused.

Mounted between the journals 134 upon the shaft 136 and secured to this shaft is a driven pulley 145. A conveyor belt 146, which is provided with splices 147 and 148 for the purpose of adjusting the length thereof, is disposed about the drive and driven pulleys 140 and 145 so as to tightly engage these pulleys and to cause the rotation of the driven pulley 145 when the pulley 140 is rotated. On an outer end of the shaft 136 a narrow pulley 150 is securely mounted. Standards 151 are mounted upon the bearings 134 to project upwardly therefrom substantially at right angles with the arms 133, as clearly shown in Fig. 4. Journals 152 are provided at corresponding points in the arms 151 and journal a shaft 154 rotatably disposed therein. A pulley 156 is securely mounted upon an end of the shaft 154 which projects outwardly beyond one of the journals 152 so that the pulley 156 is aligned with the narrow pulley 150. A cross belt 157 is adapted to be placed around the pulleys 150 and 156 so that the rotation of the pulley 150 will cause a reverse rotation of the pulley 156.

A hub member 160 of a splatter brush 161 is rigidly secured upon the shaft 154 between the journals 152. The hub 160 is provided with stiff bristles 162 which may be formed of any well known material such as steel wire and the like, but which are preferably formed from bassien, a vegetable fiber particularly suitable for this purpose. The bristles 162

are mounted in the hub 160 in bunches, as shown, and are trimmed at their outer ends to form a cylinder, the outer surface of which is substantially tangent with the outer surface of the belt 146 at the point where this belt comes into contact with the upper surface of the driven pulley 145 when the belt 146 is being rotated in the direction of the arrow 165. A U-shaped hood support 166 extends upwardly from the bearings 152 and supports a hood 167 which has the conformation clearly shown in Figs. 1 and 2. When the belt 146 is rotated in the direction of the arrow 165, the splatter brush 161 will be rotated in the direction of the arrow 168.

The operation of the plastering machine 20 is as follows:

A supply of dry plaster ingredients is placed in the compartment 47 with the gate 50 closed. The plastering machine 20 is manipulated by the handle 27 upon the floor 11 so that the conveying arm 100 may be disposed substantially horizontally, so that the end of the conveying arm 100 is pointed at the lowermost corner spot in a given area of the wall 13. The motor 32 is now energized so as to cause the feed and mixing element 69 to be rotated in such direction as to feed plaster material, subsequently discharged downwardly through the opening 62, throughout the length of the chamber 65 and out of the outlet opening 64. At the same time the conveyor belt 146 will be rotated in the direction of the arrow 165 and the splatter brush 161 will be rotated in the direction of the arrow 168. The gate 50 is now opened a suitable distance so that dry plastering material 52 will be fed downwardly through the inlet opening 62 into the mixing chamber 65. The water valve 89 is now opened slightly so that a suitable stream of water will flow from the pipe 87 downwardly into the chamber 65 and be mixed into the dry plaster ingredients as these are fed by the mixing and conveying auger 69 toward the outlet opening 64. By the time the water and the plastering ingredients have reached the outlet opening 64 these are thoroughly mixed so as to form wet plaster. As the wet plaster pours from the outlet mouth 64, it falls upon the rapidly rotating conveyor belt 146 and is carried to the point where the splatter brush 161 is tangent with this belt. Due to the rapid rotation of the splatter brush 161 in the direction of the arrow 168, the wet plaster is whisked in a direction tangential with the brush 161 against the surface of the wall 13 at the point at which the conveying and applying arm 100 is directed.

As the plaster is thus whisked from the splatter brush 161, the operator of the plastering machine 20 maneuvers the machine by means of the handle 27 and by means of manually changing the angle of the conveying arm 100 so that its end moves upwardly and applies a vertical path of plaster to the area of the lath 15 intended to be covered during the operation of the machine 20. When this path has been covered with plaster, the machine 20 is shifted a slight distance so that when the end of the arm is now moved downwardly it will coat a second vertical path adjacent to the first. As the plastering machine automatically functions, the operator thus maneuvers the machine upon the floor 11 so that the entire area of all the wall spaces requiring plaster are coated with plaster. The operation of the machine 20 is so simple that cheap unskilled labor may be used for the operation and manuevering the machine as just described. Moreover, the applying of the plaster to the wall is thus taken entirely out of the hands of the plasterer, who must necessarily be a skilled workman for the purpose of properly finishing the wall and who is thus enabled by following the plastering machine to finish a much greater area of wall surface in a given time than previously possible.

As clearly illustrated in Fig. 1, the coating of the ceiling 16 with plaster is carried out without changing the elevation of the arm 100, but merely by maneuvering the machine 20 so as to coat the area of the ceiling progressively in a given direction so that the plasterer can work steadily behind the machine with as little delay after the mixing of the plaster as possible.

If for any reason it is desired to mix the wet plaster before introducing it into the compartment 47, this is accomplished by removing the cover 58. When wet plaster is thus used, the water valve 89 is kept closed.

In spite of the previous work done in this art, there is not, to the knowledge of the inventor, any machine for the mixing and applying of plaster which may thus be operated by unskilled labor so as to mix and apply plaster quickly to large wall and ceiling areas.

I claim as my invention:

1. In an apparatus of the class described, the combination of: means for mixing dry ingredients with a liquid ingredient to continuously form a plastic mixture; an endless belt for conveying said plastic mixture as it is formed to a point adjacent to a surface upon which it is desired said plastic mixture be applied; and a rotary brush for receiving said plastic mixture as it reaches said point and applying it to said surface.

2. In an apparatus of the class described the combination of: means for mixing dry ingredients with a liquid ingredient to continuously form a plastic mixture; an endless belt for conveying said plastic mixture as it is formed to a point adjacent to a surface upon which it is desired said plastic mixture be applied; and a rotary brush for receiving said plastic mixture as it reaches said point and applying it to said surface, said rotary

brush being rotated through said endless belt.

3. In an apparatus of the class described, the combination of: a portable frame; means mounted on said frame for mixing ingredients to form a plastic mixture at a uniform rate; an arm pivotally mounted upon said frame; a driven pulley pivotally mounted upon the free end of said arm; a drive pulley mounted upon said apparatus in spaced relation to said driven pulley; an endless belt adapted to rotate about said pulleys to convey said plastic mixture, as it is mixed, to the outer end of said arm; means for rotating said drive pulley; and rotary transferring means mounted upon the end of said arm for transferring said plastic mixture from said belt to a surface adjacent thereto.

4. In an apparatus of the class described, the combination of: a portable frame; means mounted on said frame for mixing ingredients to form a plastic mixture at a uniform rate; an arm pivotally mounted upon said frame; a driven pulley pivotally mounted upon the free end of said arm; a drive pulley mounted upon said apparatus in spaced relation to said driven pulley; an endless belt adapted to rotate about said pulleys to convey said plastic mixture, as it is mixed, to the outer end of said arm; means for rotating said drive pulley; and rotary transferring means mounted upon the end of said arm and operatively connected to said driven pulley to be rotated thereby for transferring said plastic mixture from said belt to a surface adjacent thereto.

5. In an apparatus of the class described, the combination of: a portable frame; means mounted on said frame for mixing ingredients to form a plastic mixture at a uniform rate; an arm pivotally mounted upon said frame; a driven pulley pivotally mounted upon the free end of said arm; a drive pulley mounted upon said apparatus in spaced relation to said driven pulley; an endless belt adapted to rotate about said pulleys to convey said plastic mixture, as it is mixed, to the outer end of said arm; means for rotating said drive pulley; and rotary transferring means mounted upon the end of said arm for transferring said plastic mixture from said belt to a surface adjacent thereto, said arm and said belt being extensible in length.

6. In an apparatus of the class described, the combination of: a portable frame; means mounted on said frame for mixing ingredients to form a plastic mixture at a uniform rate; an arm pivotally mounted upon said frame; a driven pulley pivotally mounted upon the free end of said arm; a drive pulley mounted upon said apparatus in spaced relation to said driven pulley; an endless belt adapted to rotate about said pulleys to convey said plastic mixture, as it is mixed, to the outer end of said arm; means for rotating said drive pulley; rotary transferring means mounted upon the end of said arm for transferring said plastic mixture from said belt to a surface adjacent thereto; and counter-balance means for counter-balancing said arm in its various positions.

7. In an apparatus of the class described, the combination of: a portable frame; means mounted on said frame for mixing ingredients to form a plastic mixture at a uniform rate; an arm pivotally mounted upon said frame; a driven pulley pivotally mounted upon the free end of said arm; a drive pulley mounted upon said apparatus in spaced relation to said driven pulley; an endless belt adapted to rotate about said pulleys to convey said plastic mixture, as it is mixed, to the outer end of said arm; means for rotating said drive pulley; rotary transferring means mounted upon the end of said arm for transferring said plastic mixture from said belt to a surface adjacent thereto; counter-balance means for counter-balancing said arm in its various positions; and latching means for retaining said arm in any one of a plurality of positions.

8. In an apparatus of the class described, the combination of: a portable frame; means mounted on said frame for mixing ingredients to form a plastic mixture at a uniform rate; an arm pivotally mounted upon said frame; a driven pulley pivotally mounted upon the free end of said arm; a drive pulley mounted concentric with said frame and said arm; an endless belt adapted to rotate about said pulleys to convey said plastic mixture, as it is mixed, to the outer end of said arm; means for rotating said drive pulley; and rotary transferring means mounted upon the end of said arm for transferring said plastic mixture from said belt to a surface adjacent thereto.

9. In an apparatus of the class described, the combination of: a portable frame; means mounted on said frame for mixing ingredients to form a plastic mixture at a uniform rate; an arm pivotally mounted upon said frame; a driven pulley pivotally mounted upon the free end of said arm; a drive pulley mounted concentric with said frame and said arm; an endless belt adapted to rotate about said pulleys to convey said plastic mixture, as it is mixed, to the outer end of said arm; means for rotating said drive pulley; and rotary transferring means mounted upon the end of said arm and operatively connected to said driven pulley to be rotated thereby for transferring said plastic mixture from said belt to a surface adjacent thereto.

10. In an apparatus of the class described, the combination of: a portable frame; means mounted on said frame for mixing ingredients to form a plastic mixture at a uniform rate; an arm pivotally mounted upon said

frame; a driven pulley pivotally mounted upon the free end of said arm; a drive pulley mounted concentric with said frame and said arm; an endless belt adapted to rotate about said pulleys to convey said plastic mixture, as it is mixed, to the outer end of said arm; means for rotating said drive pulley; rotary transferring means mounted upon the end of said arm for transferring said plastic mixture from said belt to a surface adjacent thereto; counter-balance means for counterbalancing said arm in its various positions; and latching means for retaining said arm in any one of a plurality of positions.

11. In an apparatus of the class described, the combination of: a portable frame; means mounted on said frame for mixing ingredients to form a plastic mixture at a uniform rate; an arm pivotally mounted upon said frame; a driven pulley pivotally mounted upon the free end of said arm; a drive pulley mounted concentric with said frame and said arm; an endless belt adapted to rotate about said pulleys to convey said plastic mixture, as it is mixed, to the outer end of said arm; means for rotating said drive pulley and operating said mixing means; and rotary transferring means mounted upon the end of said arm for transferring said plastic mixture from said belt to a surface adjacent thereto.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 10th day of June, 1930.

HUGH A. CONLEY.