Sept. 2, 1958 R. E. STOKES 2,850,215

PLASTERING MACHINE

Filed Oct. 21, 1955 6 Sheets-Sheet 1

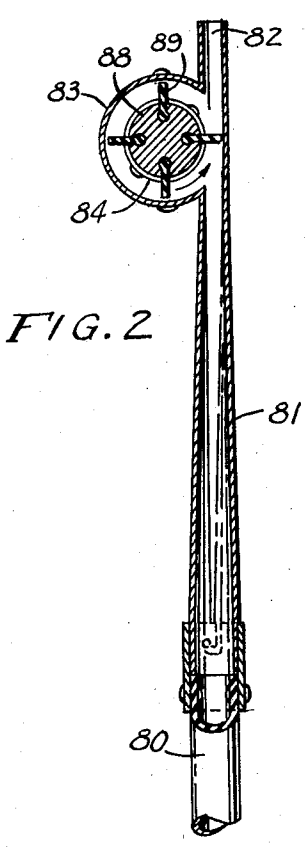

FIG. 2

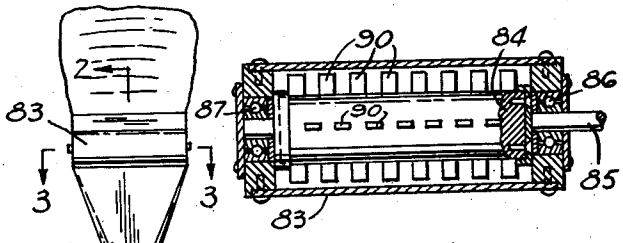

FIG. 3

FIG. 1

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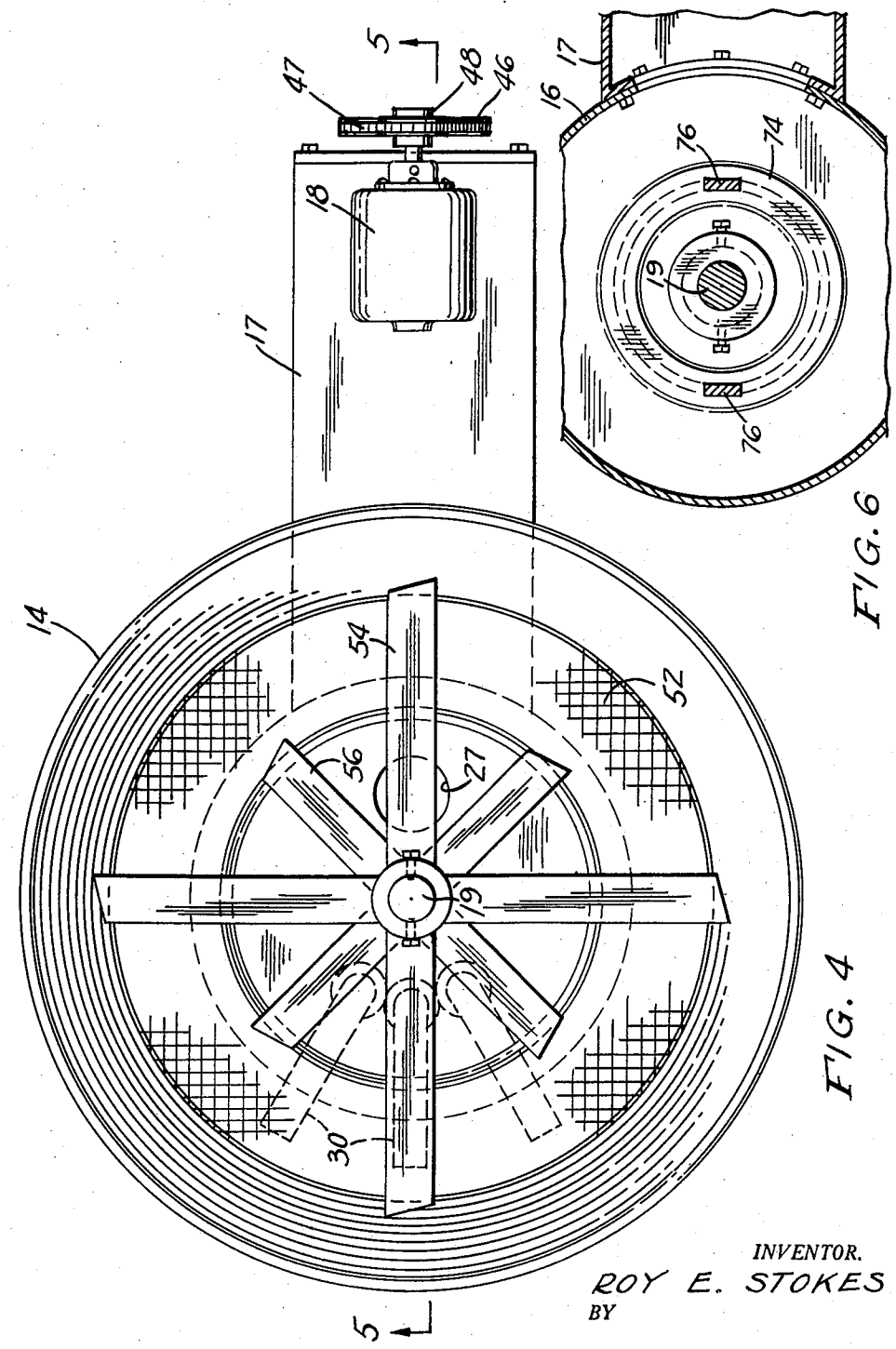

FIG. 6

FIG. 4

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PLASTERING MACHINE

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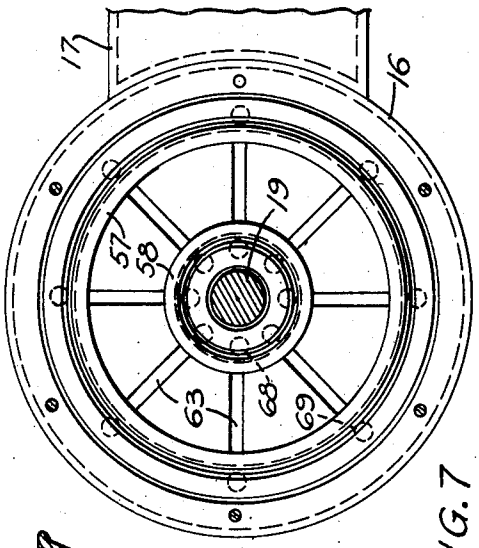

FIG. 7

FIG. 5

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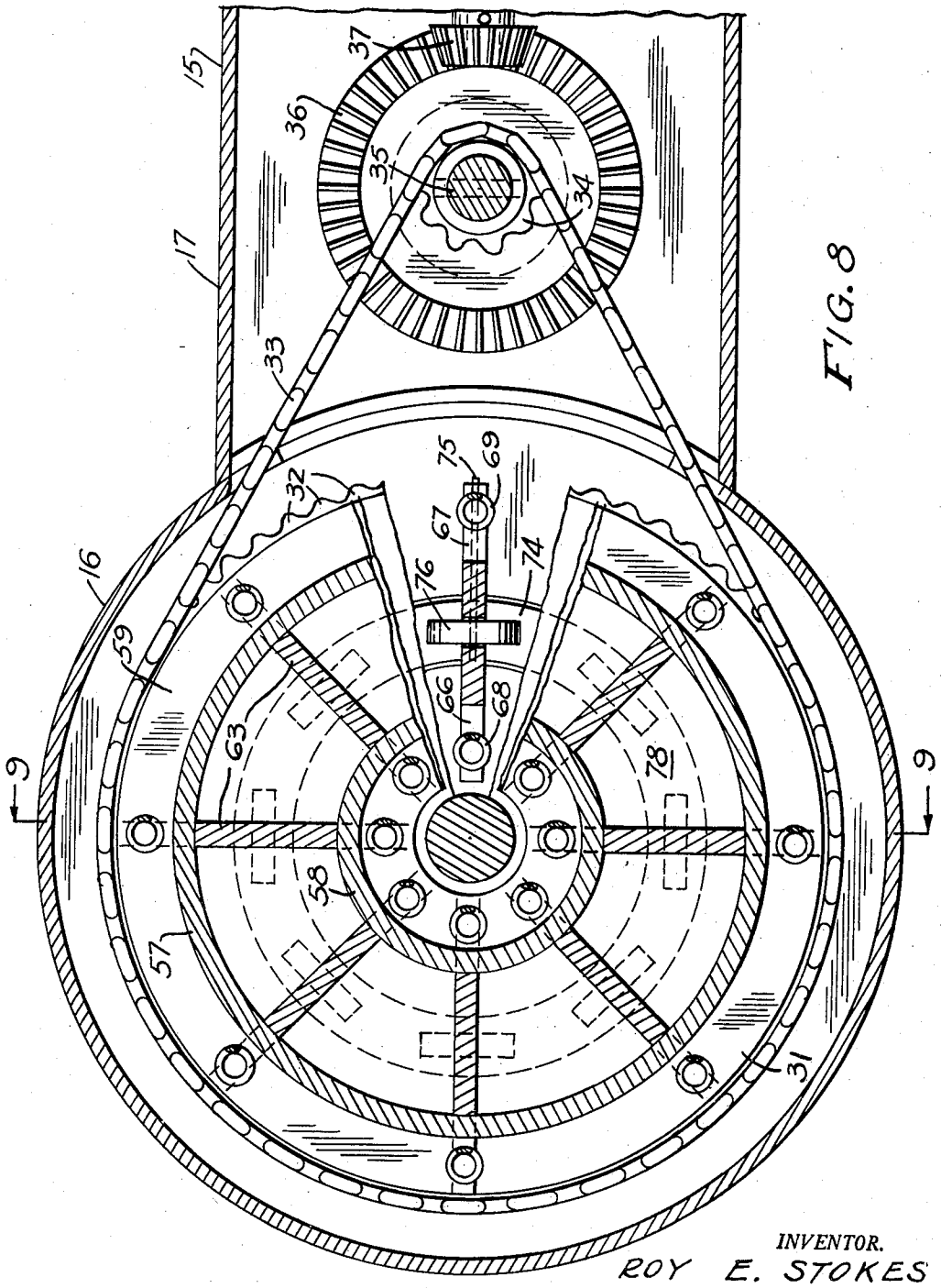

FIG. 8

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PLASTERING MACHINE

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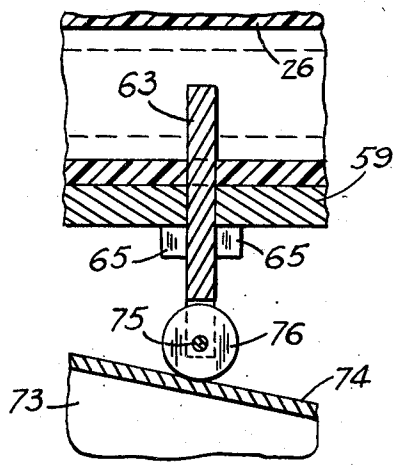

FIG. 10

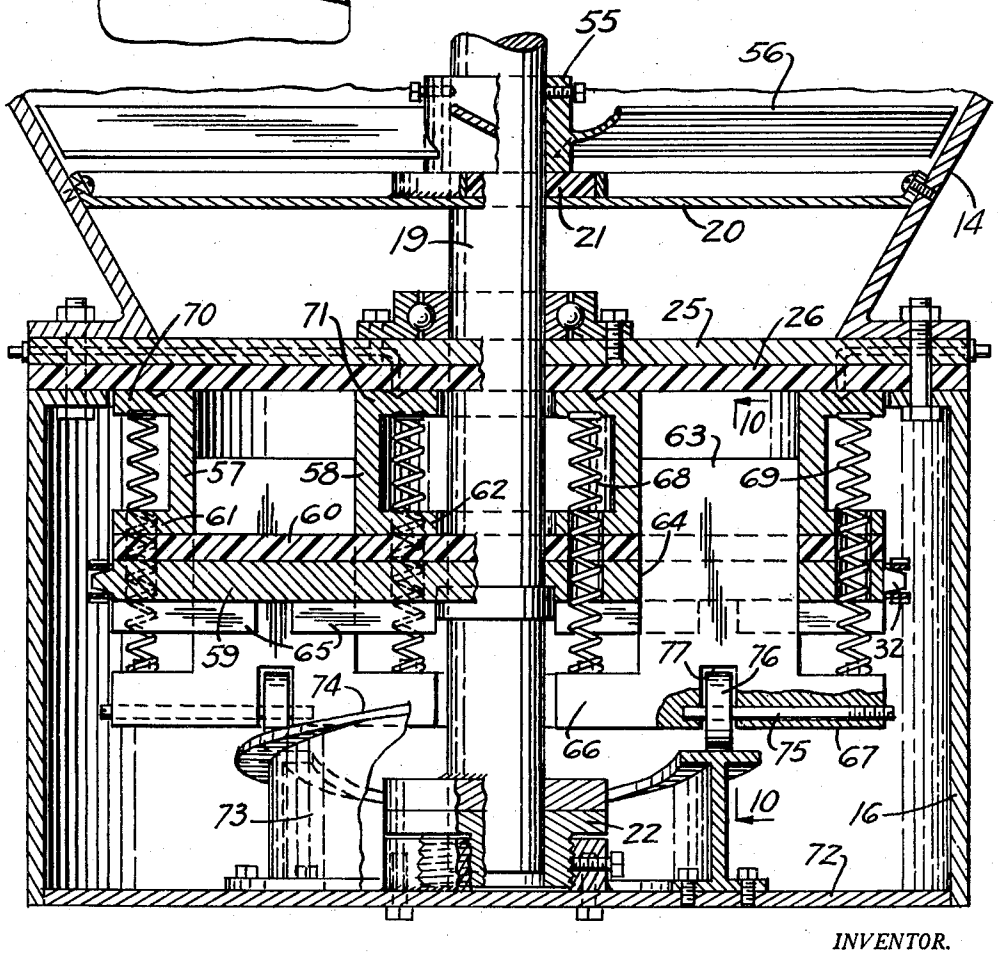

FIG. 9

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PLASTERING MACHINE

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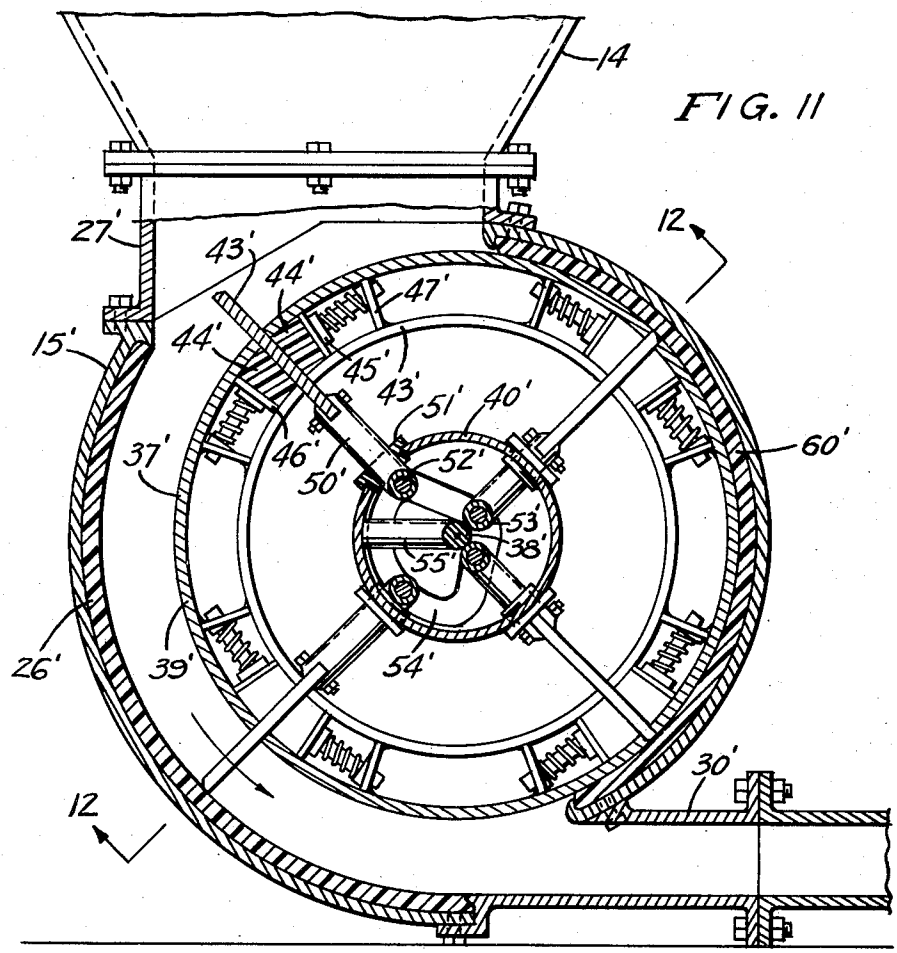

FIG. 11

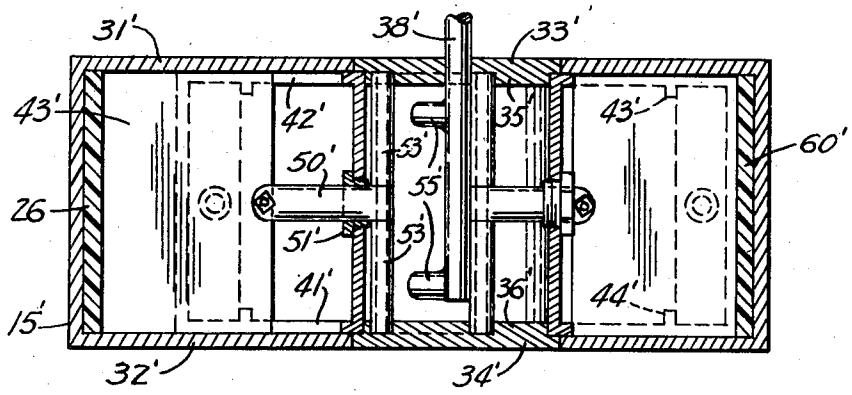

FIG. 12

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United States Patent Office 2,850,215 Patented Sept. 2, 1958

2,850,215

PLASTERING MACHINE

Roy E. Stokes, Blythe, Calif., assignor of one-tenth percent to Robert E. Ogden and /or Lillian E. Ogden, Los Angeles, Calif.

Application October 21, 1955, Serial No. 542,011

6 Claims. (Cl. 222—242)

This invention relates to apparatus for mixing and distributing plaster material, and more particularly to an improved mechanical plastering machine for use in distributing plaster material to walls, ceilings and similar surfaces in a rapid and economical manner.

A main object of the invention is to provide a novel and improved mechanical plastering machine which is simple in construction, which is relatively compact in size, which is easy to operate, and which provides a smooth and continuous flow of plaster material to the outlets thereof.

A further object of the invention is to provide an improved mechanical plastering machine which is relatively light in weight, which is easy to transport to the location where its use is required, which is rugged in construction, and which provides a great saving in time, labor and material.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is an elevational view of an improved mechanical plastering machine constructed in accordance wiht the present invention.

Figure 2 is an enlarged cross sectional view taken on the line 2—2 of Figure 1.

Figure 3 is an enlarged cross sectional view taken on the line 3—3 of Figure 1.

Figure 4 is an enlarged horizontal top plan view taken on the line 4—4 of Figure 1.

Figure 5 is a vertical cross sectional view taken on the line 5—5 of Figure 4.

Figure 6 is a fragmentary horizontal cross sectional view taken on the line 6—6 of Figure 5.

Fig. 7 is a horizontal cross sectional view taken on the line 7—7 of Figure 5.

Figure 8 is an enlarged horizontal cross sectional view taken on line 8—8 of Figure 5.

Figure 9 is a vertical cross sectional view taken on line 9—9 of Figure 8.

Figure 10 is a fragmentary vertical cross sectional view taken on the line 10—10 of Figure 9.

Figure 11 is a fragmentary vertical cross sectional view taken through a pump portion of a modified form of plastering machine according to the present invention.

Figure 12 is a cross sectional view taken on the line 12—12 of Figure 11.

Referring to the drawings, and more particularly to Figures 1 to 10, 13 generally designates a plastering machine according to this invention, said machine comprising a generally conical vertical hopper 14 which flares upwardly in diameter, as shown, said hopper being mounted on a base 15. The base 15 comprises a generally circular main portion 16 which merges with a rectangular housing portion 17 on the top wall of which is mounted an electric motor 18.

Designated at 19 is a vertical shaft which is journaled centrally in the circular housing portion 16 and which

extends upwardly a substantial distance into the conical hopper 14.

As shown, the hopper 14 is provided with a bottom wall 20 through which the shaft 19 rotatably extends, a sealing element 21 being provided to seal the aperture through which the shaft 19 extends. The lower end of the shaft is rotatably supported on a bearing bushing member 22 provided on the bottom wall of the base housing 15.

As shown, the hopper 14 is provided with the bottom flange 23 which is secured to the top wall of the circular portion 16 of the base housing, as by bolts 24, a rigid disc 25 and a sealing disc 26 of resilient deformable material being interposed between flange 23 and the top wall of the circular housing portion 16.

The bottom wall 20 of the hopper is formed with a depending vertical outlet conduit 27 which registers with respective outlet apertures 28 and 29 in discs 25 and 26. A plurality of discharge conduits 30 are provided in the lower portion of hopper 14, said conduits extending through the space beneath wall 20 and being in communication with the space beneath disc 26 by suitable apertures provided in the discs 25 and 26, similar to the apertures 28 and 29.

Secured on the shaft 19 below disc 26 is an annular pump body 31 which is formed on its periphery with sprocket teeth 32 engaged by a sprocket chain 33, said chain being arranged horizontally in the base housing 15 and engaging a relatively small sprocket wheel 34 mounted on a vertical shaft 35 journaled in the rectangular base housing portion 17 adjacent the circular housing portion 16, as is clearly shown in Figure 5.

Mounted on the shaft 35 is a relatively large bevel gear 36 which is meshingly engaged by a smaller pinion gear 37 carried on a horizontal shaft 38 journaled on a vertical bracket member 39 secured in the rectangular housing portion 17, as shown in Figure 5. The shaft 38 is connected by a flexible coupling 40 and a clutch assembly 41 to the output shaft 42 of a conventional adjustable gear ratio unit 43, providing a selected speed reduction with respect to the speed of the input shaft 44 of the gear ratio unit 43.

As shown, the input shaft 44 of the gear reduction unit 43 extends through a bearing sleeve 45 and through the end wall of the rectangular base housing portion 17, the shaft 44 being provided with a relatively large sprocket wheel 46 which is coupled by a sprocket chain 47 to a small sprocket wheel 48 mounted on the shaft 49 of electric motor 18.

The circuit of motor 18 includes a conventional circuit breaker 50 which is coupled by a connecting bar 51 to the clutch assembly 41, the clutch assembly 41 being of a conventional type arranged to react to the jamming of the driven apparatus connected to shaft 38, whereby to operate the circuit breaker 50 and to deenergize the motor 18 in the event of such jamming or of the imposition of an excessively heavy load on shaft 38, whereby to prevent damage to the motor 18 or to the gearing in the gear unit 43.

Secured in the upper portion of the hopper 14 is a screen 52 through which the top portion of shaft 19 projects, and secured on shaft 19 above and immediately adjacent the screen 52 is a collar 53 provided with a plurality of radially extending agitator blades 54, said blades terminating closely adjacent the inside wall surface of hopper 14. As shown in Figure 5, the blades 54 are inclined so as to provide substantially a scraping and crushing action of material on the screen 52 and to insure the downward passage of the material through the screen. The arrangement of the blades 54 also insures that the material will be properly crushed and will be spread over

the screen as it is swept therearound responsive to the rotation of the blades.

Secured on the shaft **19** above and adjacent to the sealing element **21** is a second collar member **55** to which are secured a plurality of agitator blades **56** extending radially from the collar and terminating closely adjacent the inside surface of the hopper **14**. The blades **56** are inclined in the same manner as blades **54** and provide an agitating and crushing action of the plaster material in the lower portion of hopper **14** located adjacent the bottom wall **20** of the hopper, the blades **56** further providing a distributing action insuring the passage of the plaster material into the outlet conduit **27**.

As shown in Figure 8, the annular pump body **31** comprises an annular outer wall **57** which is concentric with an annular inner wall **58** suitably fastened to the horizontal main disc **59**, a sealing disc **60** being provided between the main disc **59** and the bottom flanges **61** and **62** of the annular walls **57** and **58**, as shown in Figure 9. The sprocket teeth **32** are provided on the periphery of the main disc **59**, as shown.

Designated at **63** are respective radial vertical valve plates extending slidably through suitable slots **64** provided therefor in the main disc **59** and being in sliding contact at their opposite end edges with the surfaces of the annular outer wall **57** and inner wall **58**. Radially arranged pairs of guide blocks **65** are provided on the bottom surface of the disc **59** adjacent the slots **64** therein to guide the valve plates **63** vertically. Said valve plates are formed at their bottom ends with the respective lug elements **66** and **67** which are engaged by the lower ends of vertical biasing springs **68** and **69**, said springs extending upwardly and engaging the top flanges **70** and **71** of the annular outer and inner walls **57** and **58**, to bias the valve plates **63** downwardly.

Mounted on the bottom wall **72** of the circular base housing portion **16** concentric with the shaft **19** is a cylindrical body **73** formed on its top edge with a cam track **74**, said cam track being inclined upwardly toward the point beneath the outlet conduit **27**, as shown in Figure 5. Secured in the lower portion of each valve plate **63** and extending through the lug **67** thereof is a roller shaft **75** on which is mounted a follower roller **76**, said roller being received in a notch **77** formed in the bottom end of the plate **63**, the roller **76** engaging the cam track **74**, whereby to control the movement of the respective valve plates **63** in accordance with rotation of the pump body **31**.

It will be seen from Figure 8 that the valve plates **63** define respective chambers **78** therebetween, the chambers **78** being closed by the movement of the valve plates **63** to their uppermost positions when the chambers are located beneath the hopper outlet passage **27**, whereby each chamber is filled with plaster material as it passes beneath said hopper outlet passage. The valve plates **63** are allowed to move downwardly by the cam track **74** as they move away from the hopper outlet passage **27**, whereby the material in the pump body **31** is then free to discharge through the conduits **30**, sufficient pressure being developed in the space beneath disc **26** by the valve plates to force the material into said conduits **30** which all communicate with said space, as previously described.

As will be readily apparent, the pump body is driven simultaneously with the shaft **19**, whereby the plaster material in the hopper **14** is simultaneously agitated and worked downwardly into the outlet passage **27** while it is being pumped out through the discharge conduits **30** by the action of the radial valve plates **63** above described.

Connected to each of the discharge conduits **30** is a flexible hose **80** provided at its end with a plaster distributing nozzle **81**. Each nozzle **81** comprises a relatively flat conduit flaring forwardly in width and tapering in thickness towards its straight discharge end **82**, as shown in Figure 2. Formed transversely on one wall of each nozzle **81** adjacent the straight discharge end **82** thereof is a generally cylindrical housing **83** in which is journaled a radial bladed rotary impeller **84**, said impeller being mounted on a shaft **85** which projects outwardly through one end wall of the housing **83**, said shaft being suitably journaled in said end wall as well as in the opposite end wall of the housing, as by bearings **86** and **87** shown in Figure 3. Shaft **85** is driven by suitable power means, for example, by a flexible shaft connected to a suitable motor.

Each impeller **84** comprises a cylindrical main body **88** formed with a plurality of longitudinal grooves in which are secured respective outwardly projecting blades **89** of any suitable material, for example, of rubber, steel, or the like. Each of the blade strips **89** are formed with the spaced impeller teeth **90**, the teeth **90** of the successive blades **89** being staggered, in the manner shown in Figure 3.

The rotary impeller **84** is driven counterclockwise, as viewed in Figure 2, whereby to urge the plaster material delivered to the nozzle **81** in a direction toward the straight outlet end **82** of the nozzle, the impeller being almost coextensive in width with the discharge end of the nozzle, whereby the plaster material is deposited smoothly and continuously from the discharge end of the nozzle as the nozzle is held adjacent the surface to be plastered.

The discharge of material from the nozzle can be controlled by the individual using the same by controlling the energization of the motor employed to drive the associated rotary impeller **84**. Thus, a number of plasterers may operate simultaneously from the same plaster source by employing respective hoses **80** provided with respective nozzles **81** for the respective plasterers. While one or more of the plasterers may discontinue operations, the other plasterers may still continue, since each plasterer has individual control over his nozzle and over the discharge of plaster material therefrom.

Referring now to the form of the invention illustrated in Figures 11 and 12, the hopper **14** is mounted on a base housing **15'** which is generally circular in shape and which is vertically arranged, as shown. The base housing **15'** has the top feed conduit portion **27'** communicating with the bottom of the hopper **14**, and said base housing is provided with the discharge conduit portion **30'** located at its bottom, as shown. Secured to the interior wall of the housing **15'** between the feed conduit portion **27'** and the discharge conduit portion **30'** is a lining of resilient deformable sealing material **26'**, and at the opposite side of the housing **15'** a similar lining **60'** of resilient deformable material is provided. Secured in the opposite side walls **31'** and **32'** of the base housing **15'** are opposing circular bearing plates **33'** and **34'**, said plates being formed with inwardly projecting circular portions **35'** and **36'** defining bearings on which is rotatably mounted a hollow annular body **37'** comprising the outer shell **39'** and the concentric inner shell **40'**. The inner shell **40'** engages the peripheries of the circular bearing portions **35'** and **36'**.

The outer shell **39'** is connected to the inner shell **40'** by the respective side walls **41'** and **42'**, said side walls being formed with the inwardly projecting circular ribs **63'** and **64'** concentric with the shells **40'** and **39'**.

The body **37'** is formed with a plurality of radial slots through which slidably extend respective radial valve plates **43'**, said plates passing between respective sealing blocks **44'**, **44'** of suitable deformable sealing material arranged on opposite sides of the plates **43'**, the blocks being urged into sealing engagement with the plates by suitable spring-biased follower members **45'** engaging rigid bearing plates **46'** disposed adjacent the surfaces of the sealing blocks, the shank portions of the follower members **45'** passing through abutment plates **47'** secured to the walls **31'** and **32'** and extending transversely there-

between, the plates 47' being located between the ribs 63', 64' and the outer shell 39'.

Secured to the inner end of each valve plate 43' is an arm 50' which extends slidably through a bushing element 51' provided in the inner shell 40'. Connected to the inner end of each arm and extending perpendicularly thereto is a roller shaft 52' on which are mounted respective rollers 53', 53', the ends of the rollers engaging in respective cam grooves 54' formed in the circular bearing portions 35' and 36'. As shown in Figure 11, the cam grooves 54' are formed to extend the valve plates 43' as soon as the plates move past the top end of the sealing lining 60', assuming counterclockwise rotation of the annular body 37', the valve plates being extended as they sweep through the plaster supply conduit 27', the plates remaining extended and moving along the lining element 26', urging the plaster material downwardly toward the discharge conduit 30'. As each plate approaches the lower end of the sealing element 60', the cam grooves 54' elevate and retract the valve plates so that said valve plates are retracted as they move adjacent the lining element 60'.

A shaft 38' extends axially and rotatably through the circular bearing plate member 33', the shaft 38' being connected to the inner shell 40' in any suitable manner, as by a plurality of radial connecting arms 55'. Thus, the body 37' is rotated counterclockwise, as viewed in Figure 11, by the shaft 38', which is driven from a suitable motor through a suitable clutch assembly cooperating with a motor circuit breaker, such as that employed in the form of the invention previously described, whereby the plaster material from the hopper 14 is moved downwardly through the passage defined between outer shell 39' and the sealing lining 26', said plaster material being discharged through the outlet conduit 30' with sufficient pressure to assure the movement of the plaster material through the flexible hoses, such as the hoses 80 employed in the previously described form of the invention, to the distributing nozzles associated with the hoses.

While certain specific embodiments of an improved plastering machine have been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In a plastering machine, a vertical hopper adapted to receive plaster material, a vertical shaft journaled axially in said hopper, a plurality of horizontal agitator blades secured on said shaft, means defining an outlet passage in the bottom wall of said hopper, an annular hollow pump body rotatably mounted subjacent said bottom wall, concentric with and secured to said shaft, a plurality of vertically slidable radial valve plates carried by said pump body and defining therebetween respective plaster-receiving chambers in said pump body sequentially registrable with said outlet passage, each chamber being bordered by a pair of valve plates, a discharge conduit extending through the hopper bottom wall and communicating with said pump body, means holding the pair of valve plates adjacent said outlet passage in sealing contact with said bottom wall on opposite sides of said outlet passage while the other valve plates are spaced downwardly from said bottom wall, and means simultaneously rotating said pump body and shaft.

2. In a plastering machine, a vertical hopper adapted to receive plaster material, a vertical shaft journaled axially in said hopper, a plurality of horizontal agitator blades secured on said shaft, means defining an outlet passage in the bottom wall of said hopper, an annular hollow pump body rotatably mounted subjacent said bottom wall, concentric with and secured to said shaft, a plurality of vertically slidable radial valve plates carried by said pump body and defining therebetween respective plaster-receiving chambers in said pump body sequentially registrable with said outlet passage, each chamber being bordered by a pair of valve plates, a discharge conduit extending through the hopper bottom wall and communicating with said pump body, an inclined circular cam track mounted below the pump body concentric with said shaft, follower means on the valve plates engaging said cam track, said cam track being formed and arranged to hold the pair of valve plates adjacent said outlet passage in sealing contact with said bottom wall on opposite sides of said outlet passage while the other valve plates are spaced downwardly from said bottom wall, and means simultaneously rotating said pump body and shaft.

3. In a plastering machine, a vertical, generally conical hopper adapted to receive plaster material, a vertical shaft journaled axially in said hopper, a plurality of vertically spaced sets of horizontal agitator blades secured on said shaft, said blades extending radially from said shaft and terminating closely adjacent the inside wall surface of said hopper, means defining an outlet passage in the bottom wall of said hopper, an annular hollow pump body rotatably mounted subjacent said bottom wall, concentric with and secured to said shaft, a plurality of vertically slidable radial valve plates carried by said pump body and defining therebetween respective plaster-receiving chambers in said pump body sequentially registrable with said outlet passage, each chamber being bordered by a pair of valve plates, a discharge conduit extending through the hopper bottom wall and communicating with said pump body, an inclined circular cam track mounted below the pump body concentric with said shaft, follower means on the valve plates engaging said cam track, said cam track being contoured so that its highest portion is subjacent said outlet passage and being formed and arranged to hold the pair of valve plates adjacent said outlet passage in sealing contact with said bottom wall on opposite sides of said outlet passage while the other valve plates are spaced downwardly from said bottom wall, and means simultaneously rotating said pump body and shaft.

4. In a plastering machine, a hopper adapted to receive plaster material, a vertical shaft journaled axially in said hopper, means defining an outlet passage in the bottom wall of said hopper, an annular hollow pump body rotatably mounted subjacent said bottom wall concentric with and secured to said shaft, a plurality of vertically slidable radial valve plates carried by said pump body and defining therebetween respective plaster-receiving chambers in said pump body sequentially registerable with said outlet passage, each chamber being bordered by a pair of valve plates, a discharge conduit extending through the hopper bottom wall and communicating with said pump body, means holding the pair of valve plates adjacent said outlet passage in sealing contact with said bottom wall on opposite sides of said outlet passage while the other valve plates are spaced downwardly from said bottom wall, and means simultaneously rotating said pump body and shaft.

5. In a plastering machine, a hopper adapted to receive plaster material, a vertical shaft journaled axially in said hopper, means defining an outlet passage in the bottom wall of said hopper, an annular hollow pump body rotatably mounted subjacent said bottom wall concentric with and secured to said shaft, a plurality of vertically slidable radial valve plates carried by said pump body and defining therebetween respective plaster-receiving chambers in said pump body sequentially registerable with said outlet passage, each chamber being bordered by a pair of valve plates, a discharge conduit extending through the hopper bottom wall and communicating with said pump body, an inclined circular cam track mounted below the pump body concentric with said shaft, follower means on the valve plates engaging said cam track, said

cam track being formed and arranged to hold the pair of valve plates adjacent said outlet passage in sealing contact with said bottom wall on opposite sides of said outlet passage while the other valve plates are spaced downwardly from said bottom wall, and means simultaneously rotating said pump body and shaft.

6. In a plastering machine, a hopper adapted to receive plaster material, a vertical shaft journaled axially in said hopper, means defining an outlet passage in the bottom wall of said hopper, an annular hollow pump body rotatably mounted subjacent said bottom wall, concentric with and secured to said shaft, a plurality of vertically slidable radial valve plates carried by said pump body and defining therebetween respective plaster-receiving chambers in said pump body sequentially registerable with said outlet passage, each chamber being bordered by a pair of valve plates, a discharge conduit extending through the hopper bottom wall and communicating with said pump body, an inclined circular cam track mounted below the pump body concentric with said shaft, follower means on the valve plates engaging said cam track, said cam track being contoured so that its highest portion is subjacent said outlet passage and being formed and arranged to hold the pair of valve plates adjacent said outlet pasage in sealing contact with said bottom wall on opposite sides of said outlet passage while the other valve plates are spaced downwardly from said bottom wall, and means simultaneously rotating said pump body and shaft.

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