Jan. 16, 1962 C. AYERS ET AL 3,017,164

PORTABLE CONCRETE MIXING, FOAMATING AND DISPENSING MACHINE

Filed July 15, 1959 6 Sheets-Sheet 1

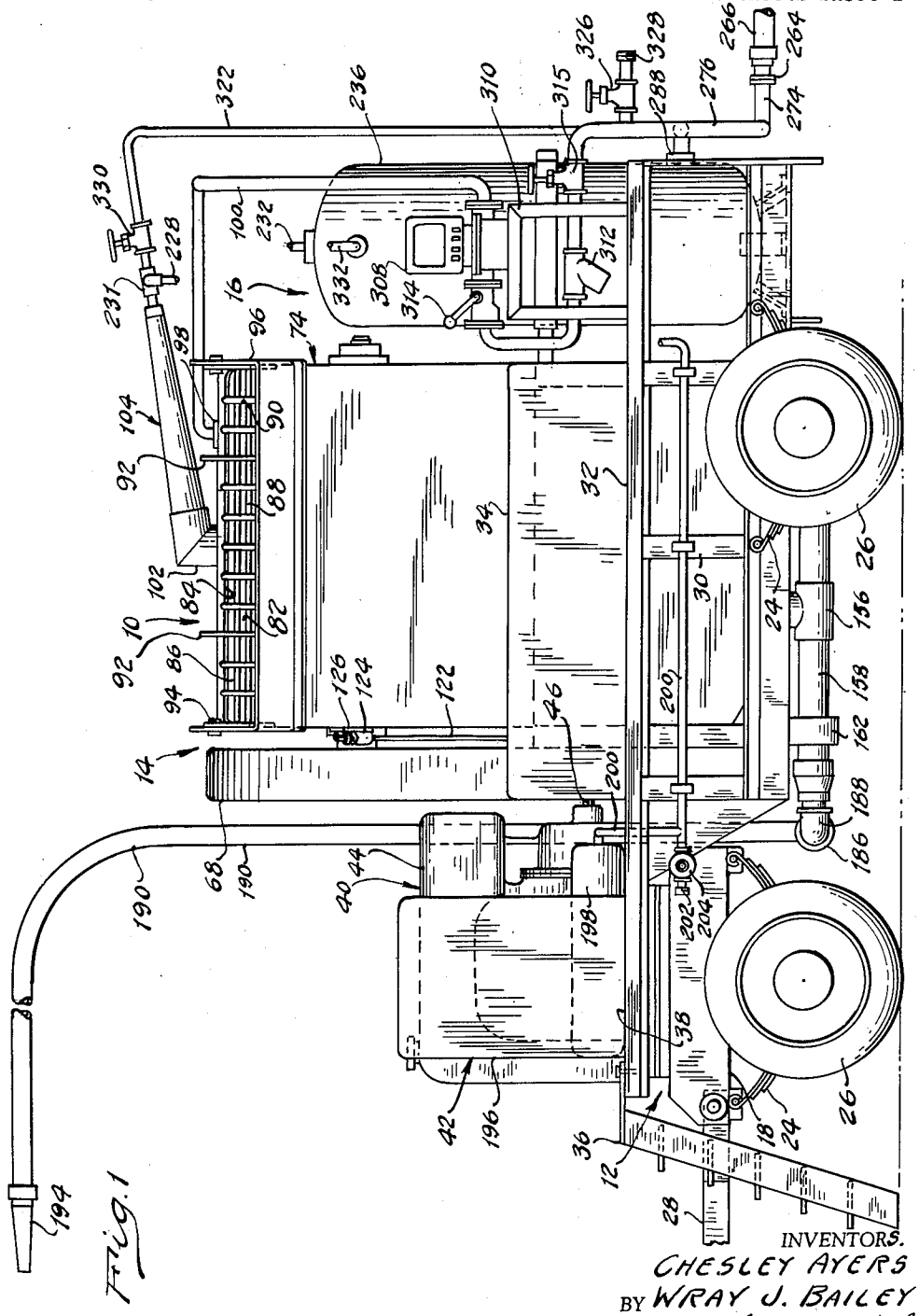


FIG. 1

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Filed July 15, 1959 6 Sheets-Sheet 2

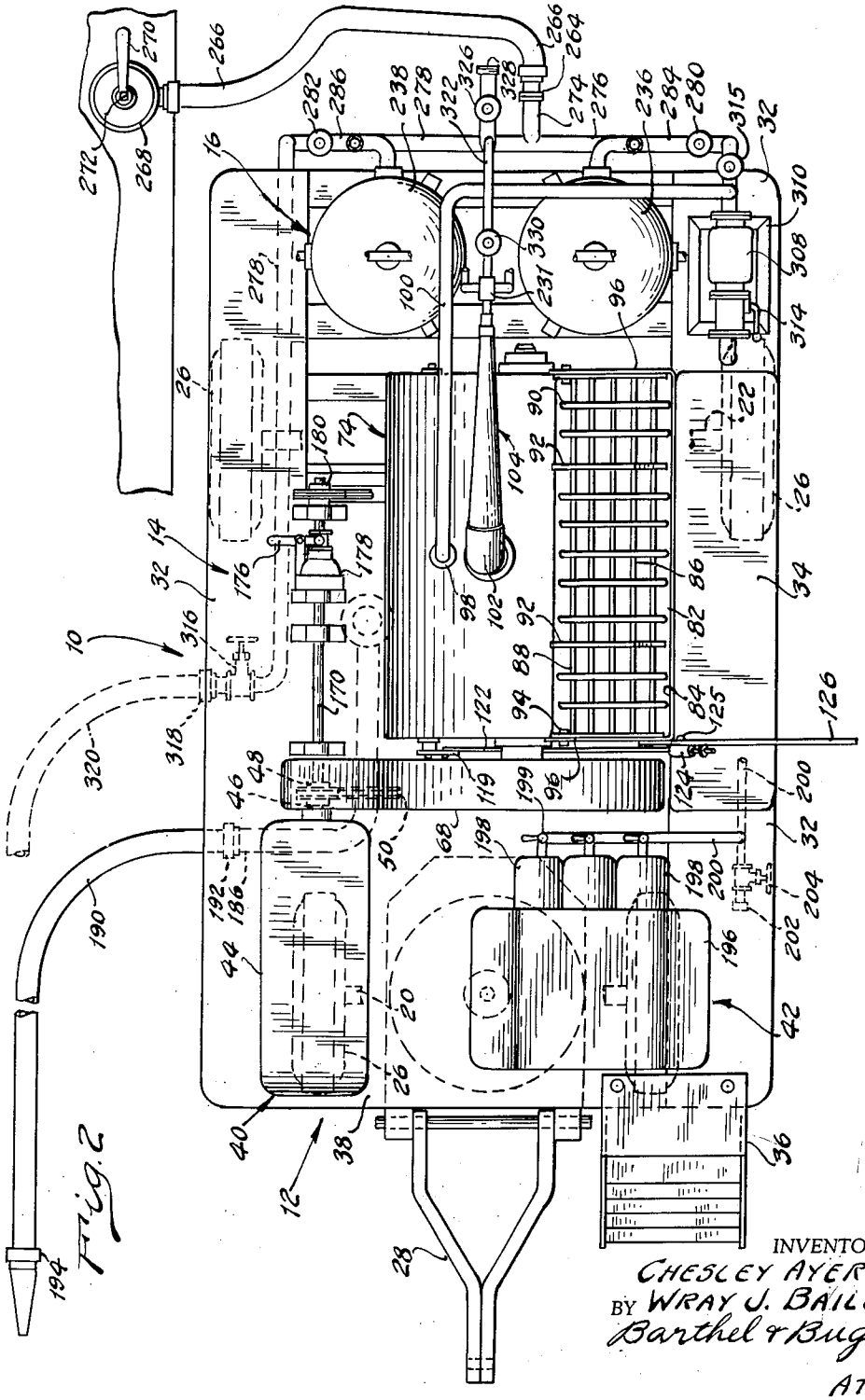


Fig. 2

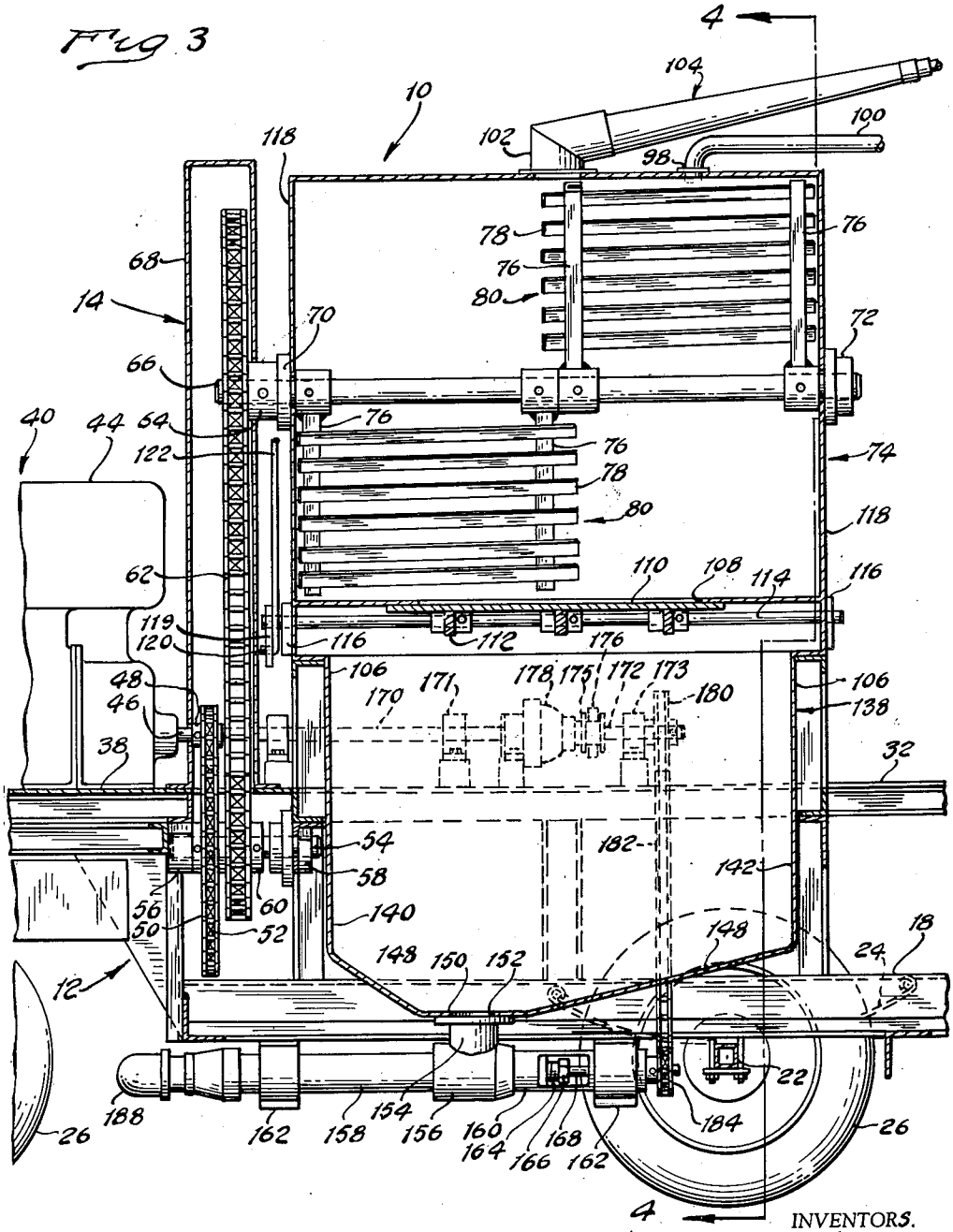
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PORTABLE CONCRETE MIXING, FOAMATING AND DISPENSING MACHINE

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Fig 3



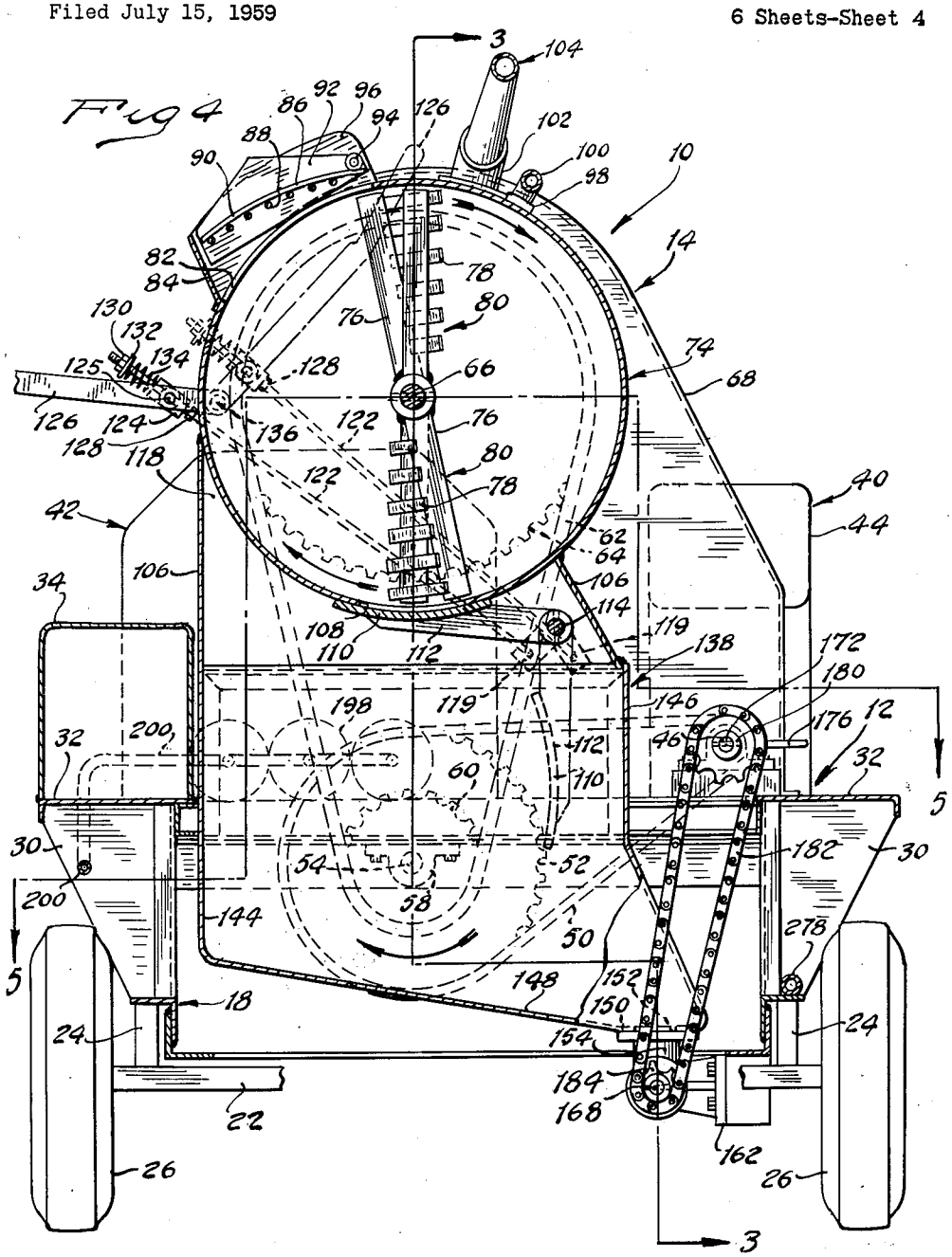
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PORTABLE CONCRETE MIXING, FOAMATING AND DISPENSING MACHINE

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Fig 4



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PORTABLE CONCRETE MIXING, FOAMATING AND DISPENSING MACHINE

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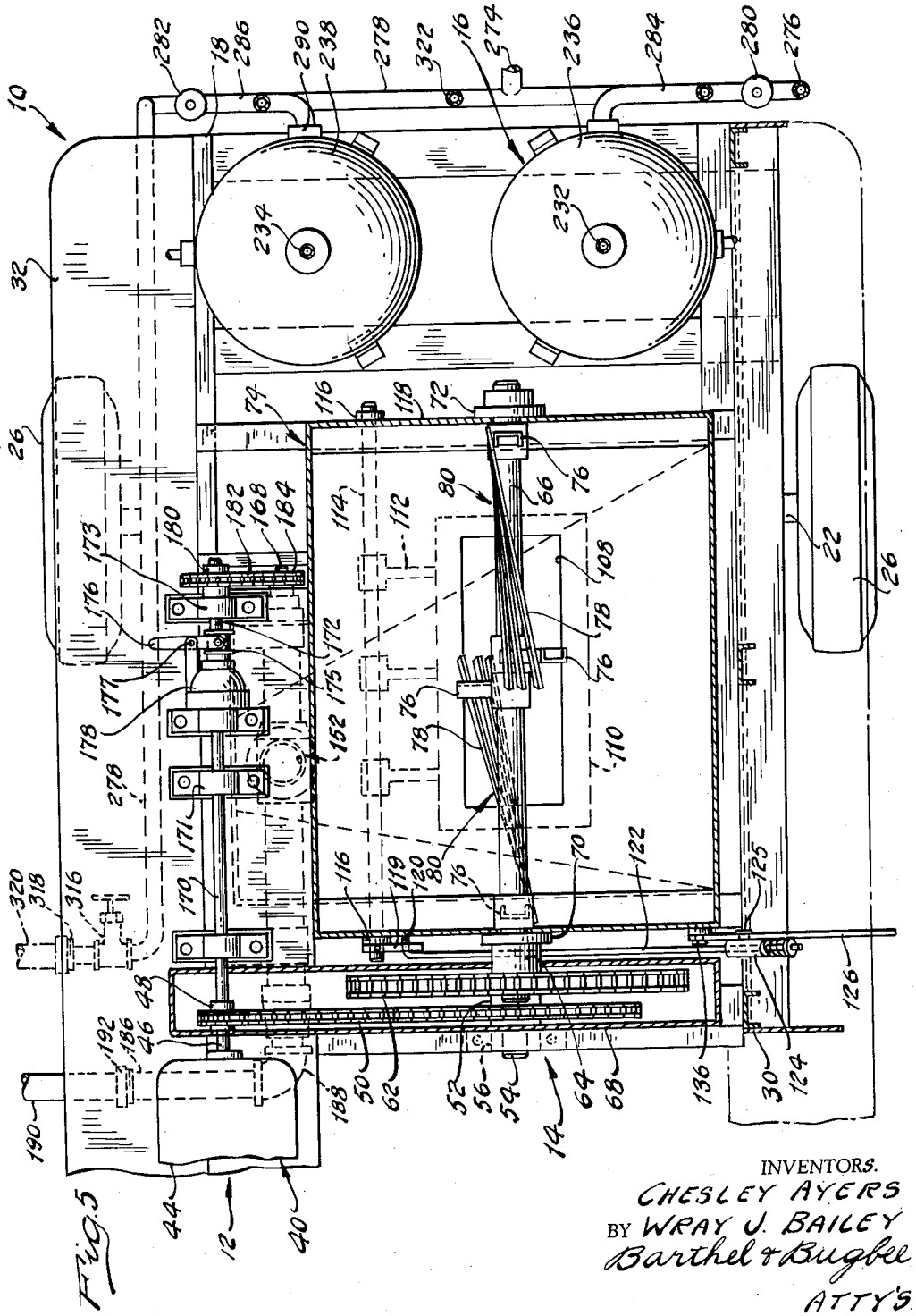


FIG. 5

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PORTABLE CONCRETE MIXING, FOAMATING AND DISPENSING MACHINE

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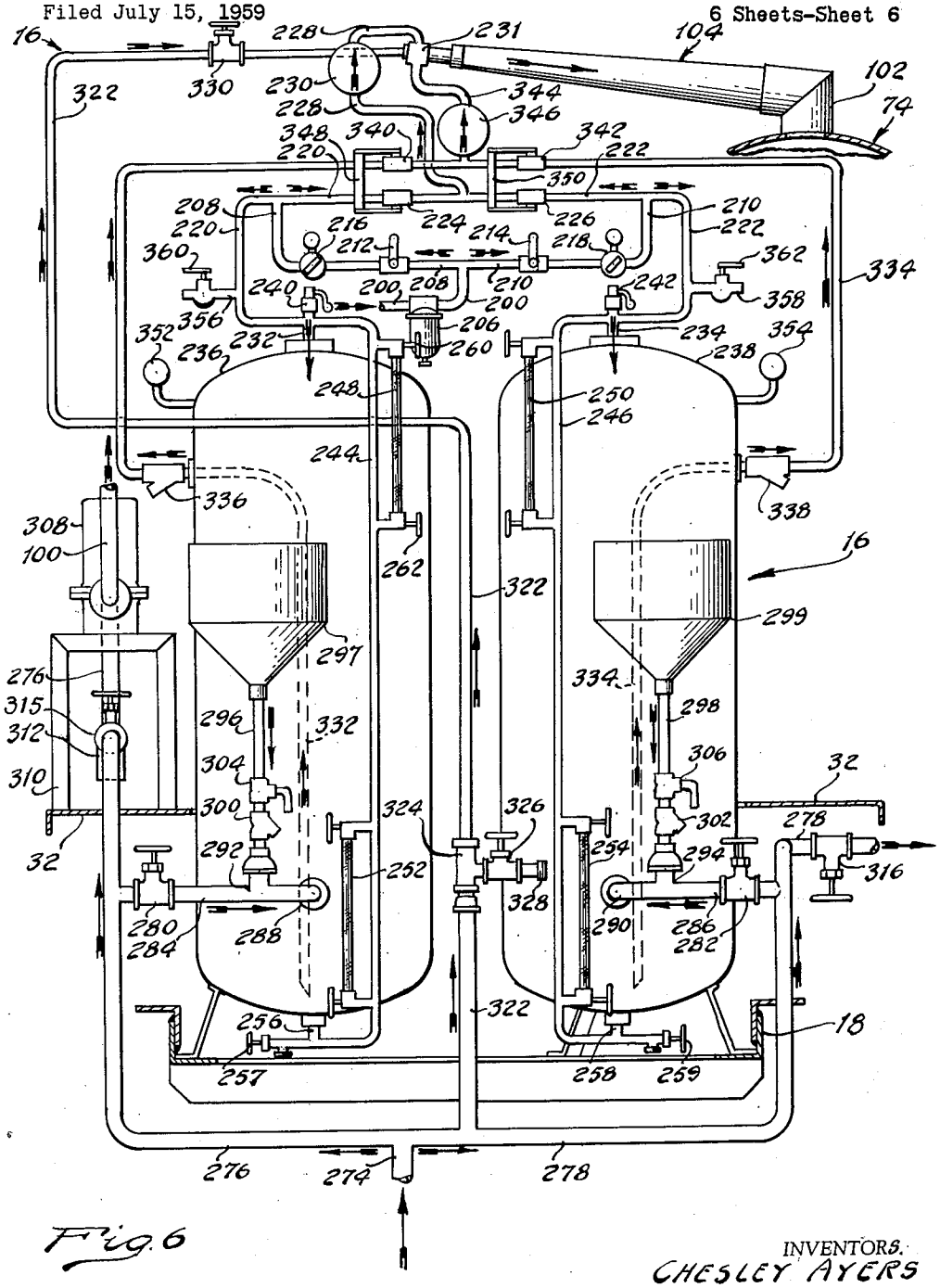


Fig. 6

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3,017,164

PORTABLE CONCRETE MIXING, FOAMATING AND DISPENSING MACHINE

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Filed July 15, 1959, Ser. No. 827,254
2 Claims. (Cl. 259—151)

This invention relates to foam concrete and, in particular, to machines for the preparation and application of foam concrete.

Foam concrete is a cellular concrete, the cells of which contain air mechanically entrained in the concrete mix. This is done either by whipping air into the concrete mix by the shearing action of the blades of a high speed mixing machine or by adding to the concrete mix a temporarily-stable air-containing foam produced by combining a foam-producing compound with water in the presence of compressed air. The density of the resulting product can be varied from about 120 lbs. per cubic foot for neat concrete to about 20 lbs. per cubic foot for foam concrete.

Hitherto, such foam concrete has been made by one of the methods just described and then separately applied by hand to the surface on which it is to rest or impelled pneumatically from the container to the point of delivery. When the foam concrete has been produced in large volume, it has ordinarily been mixed at a central mixing station from which it is distributed to the point of application. This prior procedure, however, has resulted in a loss of time between the start of mixing the batch and the completion of application of the foamated mix, with consequently high labor and operating costs, as well as involving costly breakdowns where there is a failure of any element in the chain of production and distribution. The prior procedure, moreover, has not been continuous but intermittent, and has entailed halts and stoppages in the operations both of production, distribution and application of the foam concrete.

The present invention provides a portable machine wherein the foamating liquid is mixed with water while the concrete batch or mix is also being prepared, the foam being generated and applied to the concrete mix in the same machine and the foamated concrete mix then dumped by gravity into a hopper in the machine from which it is pumped through a hose to a nozzle at the point of utilization. In this manner, the foam concrete mix can be applied rapidly, inexpensively and continuously since one batch of foam-producing liquid is being generated into foam and then applied to the concrete mix while another batch thereof is being prepared in the machine.

Accordingly, one object of the invention is to provide a portable foam-concrete producing and dispensing machine which mixes the foam-producing liquid with water while the concrete mix is being prepared in another part of the machine, generates temporarily stable foam in the presence of compressed air, applies the foam to the concrete mix, which, after further mixing, is deposited by gravity in a hopper from which it is pumped in a fluid condition through a hose to the point of utilization where it is deposited by means of a suitable nozzle.

Another object is to provide a portable foam-concrete producing and dispensing machine of the foregoing character wherein means is provided for compounding one batch of foam-producing liquid with water while an already compounded batch is being impelled through a foam generator by means of compressed air into a concrete mix and there subjected to the mixing action of paddle blades.

Another object is to provide a portable foam-concrete producing and dispensing machine of the foregoing character wherein means is additionally provided for running water under pressure through the portions of the machine carrying or containing the foam and the concrete mix after the use of the machine has ceased, in order to clean out the foam generator and flush out the concrete before it has an opportunity to harden, thus eliminating the difficult and costly manual operation of removing hardened foam concrete from the machine.

Other objects and advantages of the invention will become apparent during the course of the following description of the accompanying drawings, wherein:

FIGURE 1 is a side elevation of a portable foam concrete producing and dispensing machine, according to one form of the invention;

FIGURE 2 is a top plan view of the machine shown in FIGURE 1;

FIGURE 3 is a longitudinal section through the central portion of the machine of FIGURE 1 wherein the concrete mix batch is mixed, foamated and dispensed, taken along the line 3—3 in FIGURE 4;

FIGURE 4 is a cross-section, looking forward, taken along the line 4—4 in FIGURE 3;

FIGURE 5 is a horizontal section, taken along the zigzag line 5—5 in FIGURE 4, showing details of the mixing paddle drive and mixing paddles; and

FIGURE 6 is a diagrammatic view, roughly in rear elevation, of the machine of FIGURES 1 to 4 inclusive, showing the foam liquid compounding and generating circuit.

Referring to the drawings in detail, FIGURES 1 to 3 inclusive show a portable foam-concrete producing and dispensing machine, generally designated **10**, according to one form of the invention as consisting generally of a trailer wheeled chassis **12** upon which is mounted a power-driven concrete mixing and foamating unit **14** mounted in the central portion of the trailer **12**, and a foam liquid mixing and generating unit **16** mounted on the rearward end of the trailer **12**.

The trailer **12** is a heavy commercial type of trailer having a frame **18** on which front and rear axles **20** and **22** are mounted by means of suitable springs **24** and carry the usual rubber-tired wheels **26**. The trailer **12** at its forward end is provided with a conventional draft bar **28** by which it is attached to and towed by a conventional tractor or truck (not shown). Mounted on the frame **18** and extending upwardly therefrom are approximately triangular struts **30** (FIGURE 4) which in turn support longitudinal running boards or walkways **32** of steel or other suitable material upon which the operator can stand or move about, as required during operation of the machine. On one side of the machine **10**, the running board **32** carries an elongated raised platform **34** of inverted box-shaped construction by means of which the operator can mount to a higher level in order to perform certain operations upon the central or mixing and foamating unit **14**, as described below. A portable and detachable ladder **36** enables the operator to ascend to the level of the running board **32** on the left hand side of the machine **10**.

Mounted forward of the trailer **12** and interconnecting the longitudinal walkways **32** is a cross platform **38** upon which are mounted a power unit, generally designated **40**, and an air compressor unit, generally designated **42**. The power unit **40** includes an internal combustion engine **44** having a crankshaft or output shaft **46** (FIGURE 3). Keyed or otherwise drivingly secured to the crankshaft **46** is a sprocket **48** which drives a sprocket chain **50**, the latter in turn driving a large sprocket **52** keyed or otherwise drivingly secured to a countershaft **54**. Also keyed or otherwise drivingly secured to the countershaft

54, which is rotatably supported upon bearings 56 and 58 beneath the walkways 32 is a sprocket 60 which meshes with a sprocket chain 62 driving a large sprocket 64 keyed or otherwise drivingly secured to a rotary paddle shaft 66. A guard housing 68 covers the sprockets and sprocket chains just mentioned, for safety purposes.

The paddle shaft 66 is rotatably supported in bearings 70 and 72 at the opposite ends of a concrete mixing cylinder or casing, generally designated 74, and carries the hubs of two pairs of oppositely-extending arms 76 pinned or otherwise drivingly secured to the shaft 66. Extending between each pair of arms 76 are mixing slats or blades 78 extending in a generally longitudinally direction. The arms 76 of each pair are disposed in slightly different positions circumferentially of the shaft 66 (FIGURE 5) and are of channel cross-section, with the result that they form, with their slats or blades 78, a pair of oppositely-extending paddles, generally designated 80, the slats 78 of which are disposed in a skew position relatively to the shaft 66 so as to urge the concrete batch or mix toward the center of the mixing cylinder or housing 74 while mixing is taking place. In this manner, the paddles 80 possess a roughly screw-like action (FIGURES 4 and 5).

The mixing cylinder 74 on its upper side toward the platform 34 is provided with an elongated approximately rectangular hatchway or inlet 82 having an inlet passageway 84 closed by a grating 86 composed of longitudinal bars 88 and arcuate cross bars 90 welded to one another and carrying roughly triangular bag-splitting bars 92. The grating 86 is pivoted to pivot bolts or pins 94 mounted on the end members 96 of the inlet 82. The grating 86 is of coarse formation so that bags of cement can be thrown directly down upon the bag-splitting bars 92 and broken apart, the cement passing through the grating 86 but the paper or other material of which the broken bag is composed remaining behind, as explained in connection with the operation of the invention.

Also mounted on the upper side of the mixing cylinder 74 (FIGURES 3 and 4) is a water inlet connection 98 for a water supply pipe 100 and a foam inlet connection 102 to which is connected the forward end of a foam-generator, generally designated 104, forming the terminal portion of the foam liquid compounding and foam generating unit 16 described in more detail below.

The concrete mixing cylinder 74 is supported by a supporting structure, generally designated 106, extending upwardly from the chassis 18 (FIGURES 3 and 4) and holding the cylinder 74 in a fixed position. The bottom of the cylinder 74 is provided with an outlet or discharge opening 108 extending longitudinally thereof and of rectangular outline. The discharge opening 108 is closed by an overlapping bottom door or discharge gate 110 of arcuate cross-section swingably supported on three arms 112, the opposite ends of which are keyed or pinned to a pivot shaft 114. The pivot shaft 114 is supported in bearings 116 secured to the opposite end plates 118 of the mixing cylinder 74. The forward end of the shaft 114 (FIGURE 3) projects from its respective bearing 116 and carries an operating arm 119 pinned or otherwise drivingly secured thereto.

The arm 119 is drilled to pivotally receive the bent lower end 120 of an operating link or connecting rod 122, the upper end of which passes through a suitably drilled block 124 which in turn is rockably mounted at 125 upon a manual dumping lever 126. The upper end portion of the rod 122 is threaded to receive an adjustable stop nut 128 by which the point of contact of the block 124 with the rod 122 can be varied. The upper end of the rod 122 is also threaded to receive a spring abutment nut 130, the abutment washer 132 of which engages one end of a compression spring 134, the other end of which engages the rocking block 124 as an abutment. The manual dumping lever 126 is pivotally mounted upon the pivot shaft or pin 136 (FIGURE 4) which in turn is supported in the end plate 118 of the concrete mixing cylinder 74. The arm 119 is mounted in such a position on the gate shaft 114 and the manual dumping lever 128 and connecting rod or link 122 so constructed and arranged that the rod 122 swings across "dead center" of the pivot shaft 114 when the lever 126 is between the gate-closing and gate-opening positions, as shown in FIGURE 4 by the solid line and dotted line positions thereof, thus providing a toggle action for these parts.

The discharge gate 110 and opening 108 (FIGURES 3 and 4) are disposed directly above and open into a receiving bin or concrete dispensing casing or hopper, generally designated 138, of open-topped box-like construction with forward and rearward end walls 140 and 142 respectively interconnected by side walls 144 and 146, all of which are interconnected by a shallow funnel-shaped bottom wall 148 of approximately pyramidal form terminating in an outlet plate 150 with an outlet opening 152. Connected to the outlet plate 150 is the intake conduit 154 of a conventional liquid concrete pump 156 adapted to receive the foamated concrete mix from the hopper 138 by the combined action of gravty and its own suction, and discharge the foamated concrete mix through the outlet or dischrage conduit 158. The opposite end of the pump 156 is provided with a tubular support 160 coaxial with the outlet conduit 158 and like the latter is supported in brackets 162 secured to and depending from the chassis 18 (FIGURES 3 and 4). The tubular support 160 has an access opening 164 to enable the operator to reach the packing gland 166 around the pump drive shaft 168.

Mounted coaxial with the engine shaft 46 on the opposite sides of the sprocket 48 is an extension shaft 170 (FIGURE 3) mounted in bearings 171, and beyond it is a separate coaxial shaft 172 mounted in a bearing 173. A clutch 178 with a shift collar 175 and yoked shift lever 176 connects the extension shaft 170 to the shaft 172. The shift lever 176, pivotally mounted at 177 (FIGURE 5) enables the driving connection therebetween to be connected or disconnected as is necessary to operate the pump 156 or not. Keyed or otherwise drivingly secured to the shaft 172 is a sprocket 180 driving a sprocket chain 182 which in turn drives a sprocket 184 drivingly connected to the outer end of the pump drive shaft 168. The pump 156 itself discharges into the discharge conduit 158 and this in turn discharges into a transverse hose connection pipe 186 (FIGURE 5) connected thereto through an elbow fitting 188. A flexible fluid concrete delivery hose 190 is coupled at 192 to the hose connection pipe 186 and at its outer end carries a concrete application nozzle 194 (FIGURES 1 and 2).

Also mounted on the cross platform 38 beside the power unit 40 is the air compressor unit 42 (FIGURES 1 and 2) which consists of a casing 196 containing an auxiliary internal combustion engine (not shown) and air compressor driven thereby (also not shown), together with three compressed air storage tanks or bottles 198, each having an outlet control valve 199. A compressed air supply pipe 200 extends from the compressed air tanks 198 forwardly to a compressed air service takeoff coupling 202 preceded by a shutoff valve 204 (FIGURE 2) and rearwardly to the upper part of the foam liquid mixing and foam generating unit 16 on the rearward end of the trailer 12, shown in the upper central portion of FIGURE 6.

Connected to the rearward end of the compressed air supply line 200 (FIGURE 6) is a conventional air cleaner 206, continuing to a T-junction with a pair of compressed air lines 208 and 210 containing shutoff valves 212 and 214 and pressure gauges 216 and 218 before reaching T-connections with two lines 220 and 222 containing lower control valves 224 and 226 between which a single line 228 runs through an air meter 230 of the type known commercially as a rotameter to a rearward end connecting fitting 231 of the foam generator

104. The opposite ends of the lines 220 and 222 run to connections 232 and 234 in the upper ends of foam liquid mixing tanks 236 and 238 respectively. The connections 232 and 234 contain pressure relief valves 240 and 242 and also are connected to the upper ends of liquid lines 244 and 246 containing upper sight gauges 248 and 250 as well as lower sight gauges 252 and 254. The lower ends of the liquid lines 244 and 246 extend to connections 256 and 258 at the lower ends of the mixing tanks 236 and 238 respectively, and terminate in drain valves 257 and 259 respectively. Each sight gauge 248, 250, 252 and 254 has upper and lower valves 260 and 262 which may be opened or closed in order to permit or terminate the flow of liquid from the tank 236 or 238 into the particular sight gauge.

Water is supplied to the foam-liquid mixing and generating unit 16 through a connection 264 (FIGURE 2) to which a hose 266 is coupled, the opposite end of the hose 266 being coupled to an ordinary fire hydrant 268, the valve of which is controlled by the usual hand lever or wrench 270 on the squared valve shaft 272. The connection or coupling 264 is located on the outer or rearward end of a pipe 274 leading to opposite branch pipes 276 and 278 which in turn lead through valves 280 and 282 and pipes 284 and 286 to connections 288 and 290 with the tanks 236 and 238 near the bottoms thereof. The pipes 284 and 286 contain eductors 292 and 294 respectively operating on the ejector principle to create a suction in the vertical pipes 296 and 298 containing the check valves 300 and 302 and the shutoff valves 304 and 306 when water flows through the pipes 284 and 286 into the mixing tanks 236 and 238 respectively. Receiving funnels 297 and 299 for concentrated foam-forming liquid are mounted on the upper ends of the vertical pipes 296 and 298.

The left-hand branch water pipe 276 (FIGURE 6) also leads to a water meter 308 mounted on the stand 310 which in turn rests upon the walkway 32. The water meter 308 is preceded by a check valve 312 and shutoff valves 314 and 315 (FIGURE 1) located in the upper portion of the pipe 276. From the opposite side of the water meter 308 the water discharge pipe 100 runs to the connection 98 on the top of the mixing cylinder 74, whereby water is supplied to the latter for mixing with the cement. The right-hand branch pipe 278, in addition to connection with the pipe 286 leading to the mixing tank 238, also extends forwardly through a valve 316 (FIGURES 5 and 6) and hose connection coupling 318 located in the approximate midportion of the trailer 12 (FIGURES 2 and 3). Connection to the coupling 318 is made either by the concrete delivery hose 190 after use, for flushing it out, or by a flushing hose 320 which is used to flush out other portions of the apparatus after use.

A flushing pipe 322 for flushing out the foam generator 104 after use is connected to the water pipe 278 near its junction with the water pipes 274 and 276 and runs upward past a T fitting 324 with a shutoff valve 326 and a hose coupling 328 for the connection of another flushing hose (not shown). The pipe 322 runs through a shutoff valve 330 to the rearward end of the foam generator 104. The foam generator 104 is of elongated conical form containing plastic beads which assist in bringing about the foam-producing action of the foam generator 104. Mixed or diluted foamating liquid is delivered from either of the mixing tanks 236 or 238 through vertical feed pipes 332 and 334, through check valves 336 and 338 and upper control valves 340 and 342 to a common junction with a foamating liquid supply line 344 also leading through a foamating liquid meter 346 commercially known as a rotameter to the rearward end fitting 231 of the foam generator 104. The lower control valves 224 and 226 and the upper control valves 340 and 342 are interconnected for simultaneous actuation by handles 348 and 350 respectively, so that swinging of the handle 348 simultaneously opens or closes the air valve 224 and mixed foamating liquid valve 340, whereas swinging of the handle 350 similarly and simultaneously opens or closes the corresponding valves 226 and 342. Each mixing tank 236 or 238 near its upper end is provided with a pressure gauge 352 or 354. The compressed air pipes 220 and 222 are provided with branch pipes 356 and 358 containing shutoff valves 360 and 362 respectively.

In the operation of the invention, let it be assumed that the power unit 40 and the air compressor unit 42 have both been started in operation so that the former rotates the paddles 80 in the concrete mixing cylinder 74 and the latter supplies compressed air to the tanks or bottles 198, the outlet valves 199 being closed, for the moment, in order to accumulate compressed air in the tanks 198. Let it also be assumed that the shift lever 176 of the clutch 178 has been shifted in a direction opening the clutch 178 so as to disconnect the driving connection between the shafts 170 and 172 and consequently to render the pump 156 inoperative for the time being. Let it be further assumed that the machine 10 has been moved to a location where the foam concrete is to be deposited near where a fire hydrant 268 is conveniently located and that a hose 266 has been run from the fire hydrant to the water connection 264 of the machine 10. Let it finally be assumed that the gate 110 at the bottom of the concrete-mixing cylinder 74 has been closed by suitable manipulation of the hand lever 126 and that a supply of Portland cement and concentrated foam-producing liquid is on hand.

To prepare the foam-liquid mixing and generating unit 16 for operation, the operator fills the tanks 236 and 238 to a suitable level as indicated in the sight glasses 248 and 250 (FIGURE 6) by opening the valves 280 and 282, having previously deposited in the receiving funnels 297 and 299 a suitable quantity of the concentrated foam-producing liquid. The valves 304 and 306 below the receiving funnels 297 and 299 are opened when the water supply valves 280 and 282 are opened, so that as the water flows from the fire hydrant 268 through the hose 266 and pipes 274, 276, 278, 284 and 286 into the mixing tanks 236 and 238 respectively, the eductors 292 and 294 by this water flow are caused to exert suction in the vertical pipes 296 and 298, drawing the concentrated foam-producing liquid in the receiving funnels 297 and 299 through the valves 304 and 306 and the check valves 300 and 302 and the eductors 290 and 294 into the tanks 236 and 238, thereby causing the tanks 236 and 238 to be filled with a diluted water solution of the concentrated foam-producing liquid previously deposited in the receiving funnels 297 and 299. When both tanks 236 and 238 have thus become filled to the proper levels with the foam-producing solution, as indicated in the sight glasses 248 and 250, the water valves 280 and 282 are closed, together with the foam liquid control valves 304 and 306.

Compressed air is now admitted to the pipe 200 (FIGURES 1 and 2) by opening one of the compressed air bottle valves 199, and permitted to enter the spaces above the liquid levels in the mixing tanks 236 and 238 (FIGURE 6) by opening the air control valves 212 and 214, thereby permitting compressed air to flow through the pipes 208 and 210 into the pipes 220 and 222 and thence through the tank connections 232 and 234 into the upper ends of the tanks 236 and 238. Meanwhile, the control valve handles 348 and 350 have been kept in their closed positions.

Having filled the foam-liquid mixing tanks 236 and 238 with foam-producing liquid solution, in the manner just described, the operator now prepares the concrete batch by dumping the necessary ingredients through the grating 86 and opening 84 into the concrete-mixing cylinder 74. The bars 88 and 90 of the grating 86 break up chunks of material, and enable paper bags of Portland cement to be thrown downward onto the members 92. The paper bags rupture, releasing the cement to pass through the inter-

stices of the grating 86, whereas the bags themselves remain behind without entering the mixing cylinder 74. The operator, having deposited the cement and other ingredients for the concrete batch or mix in the concrete mixing cylinder 74, admits a metered amount of water thereto by opening the valve 314 (FIGURE 1), causing water to flow through the water meter 308 and pipe 100 into the top of the concrete mixing cylinder 74 and thence into the batch. The rotation of the paddles 80 by their connection through the sprockets 64, 60, 52 and 48 and sprocket chains 62 and 50 (FIGURE 3) to the internal combustion engine 44 of the power unit 40 mixes the ingredients of the concrete batch with the water.

To foamate the concrete batch in the mixing cylinder 74, the operator now swings one of the handles 348 and 350 (FIGURE 6) to the right opening one pair of the valves, say the valves 340 and 224 while leaving closed the other pair 342 and 226. Impelled by the pressure of the compressed air in the top of the foam liquid mixing cylinder 236, the mixed foam liquid solution therein is forced upward through the pipe 332, check valve 336, upper valve 340, liquid rotameter 346 and pipe 344 and connection fitting 231 into the foam generator 104. Simultaneously therewith, compressed air flows from the compressed air supply pipe 200 (FIGURE 6) through the now-open compressed air valve 212 (the similar valve 214 being closed), through the pipes 208 and 220 and lower control valve 224, thence through the pipe 228 and air rotameter 230 through the connection fitting 231 into the foam generator 214. The interaction of the compressed air upon the foam liquid solution passing between the plastic beads in the horn-shaped foam generator 104 causes a temporarily stable foam to be generated and passed through the connection 102 into the concrete mixing cylinder 74 where it becomes thoroughly mixed with the concrete batch by the action of the rotating paddles 80.

When the concrete batch in the mixing cylinder 74 has been thoroughly foamated, the operator shifts the dumping control lever 126 from its upper position (FIGURE 4) to its lower position, thereby swinging the link or rod 122 across dead center of the pivot shaft 114 while causing the arm 119 to rotate the pivot shaft 114 in a counterclockwise direction so as to swing the gate or door 110 downwardly to open the discharge outlet 108 and permit the foamated concrete batch to drop into the hopper 138 beneath it. The batch is in a fluid condition, due to the presence of the water and foam in the batch, hence the operator now shifts the clutch lever 176 (FIGURES 2 and 5) to close the clutch 178 and drive the pump 156. As a result, the fluid foamated concrete batch in the hopper 138 is drawn by gravity and the suction of the pump 156 into the latter and thence impelled through the outlet conduit 158 and pipe 186 (FIGURE 2) through the discharge hose 190 and nozzle 194 onto the wall, roof, piping or other surface to be coated with foam concrete.

Meanwhile, after mixing tank 236 has become emptied of its contents, as indicated by the level of the liquid shown in its lower sight glass 252, the operator shifts the valve handles 348 and 350 (FIGURE 6) so as to simultaneously close the upper and lower valves 340 and 224 and simultaneously open the corresponding upper and lower valves 342 and 226. This action shifts the supplying of foamating liquid solution from the empty tank 236 to the filled tank 238 and causes the contents of the latter to be discharged into the foam generator 104. The operator, having closed the dumping gate 110 in the bottom of the concrete mixing cylinder 74, places a new batch of concrete ingredients therein, including dry materials through the grate 86 and water through the pipe 100, then opens the valves 342 and 226 simultaneously by swinging the handle 350 into its open position, thereby causing foam-producing liquid to flow through the pipes 334 and 344 into the foam generator 104 while compressed air flows through the pipes 222 and 228 into the foam generator 104, the resulting foam flowing through the connection 102 into the top of the concrete mixing cylinder 74 while the paddles 80 convert these ingredients into fluid foamated concrete.

In the meantime, the operator refills the emptied mixing tank 236 in the manner previously described, readying it for the next batch, and by shifting from one tank 236 to the other tank 238 and back again, the process is rendered substantially continuous, each foamated batch of concrete being dumped into the hopper 138 below the concrete mixing cylinder 74 as soon as it has become fully processed. Thus, a continuous flow of fluid foamated concrete is enabled to be supplied through the hose 190 and nozzle 194 to the work.

At the end of the day, or when operations have been concluded, the concrete mixing tank 74 and hopper 138 are emptied, and the system flushed out with water by means of the pipes described below. The foam generator 104 is flushed out by opening the valve 330 (FIGURE 6), thereby permitting water under pressure to flow through the flushing pipe 322 and foam generator 104 into the concrete mixing cylinder 74. The hopper 138 and other parts of the machine may be flushed out or washed off by means of the flushing hose 320 (FIGURE 2). The concrete delivery hose 190 and its connected pipes 158 and 186 are flushed out by operating the pump 156 to pump water from the hopper 138 instead of fluid concrete.

When the liquid-mixing tanks 236 and 238 are empty, they too can be flushed out by passing water alone through the pipes 284 and 294, with the valves 280 and 282 opened, while the drain valves 257 and 259 at the bottom are opened to permit the flushing water to run out. In this manner, the cylinder 74, hopper 138 and foam generator 104 are flushed out immediately after the conclusion of operations so as to prevent any concrete or foam remaining in the machine and thus prevent the accumulation of hardened concrete therein. This hardened concrete, even foam concrete, is otherwise difficult and expensive to remove after it has hardened.

What we claim is:

1. A portable concrete mixing, foamating and dispensing machine comprising a wheeled chassis, a concrete mixing casing mounted on said chassis intermediate the opposite ends thereof and having an inlet opening in the upper portion thereof and an outlet opening in the lower portion thereof, a concrete mixing device movably mounted in said casing, a closure member movably mounted adjacent said outlet opening, a concrete dispensing casing mounted below said mixing casing in communication with said outlet opening, a fluid concrete pump disposed adjacent said dispensing casing and having an intake passageway communicating therewith and also having a discharge passageway, a fluid concrete dispensing conduit connected to said discharge passageway, means for generating and delivering concrete foamating material to said mixing casing including foamating material mixing apparatus mounted on one end of said chassis and a foamating material generator mounted adjacent the upper part of said concrete mixing casing and connected to said foamating material mixing apparatus, and a prime mover drivingly connected to said mixing device and pump, said foamating material mixing apparatus including a pair of foam solution mixing tanks mounted at said one end of said chassis and having foam liquid and water inlets connected thereto, said foamating material generator having an outlet connected to said mixing casing and also having an inlet, an air compressor, air piping including tank air valves for selectively connecting said air compressor to said tanks, said air piping also including foamating air valves for connecting said air compressor to said foam generator inlet, and a liquid piping system connecting said tanks to said foam generator inlet and including liquid valves for alternatively connecting one only of said tanks to said foam generator while disconnecting the other tank from said foam generator.

2. A portable concrete mixing, foamating and dispensing machine, according to claim 1, wherein said foamating air valves and liquid valves are disposed in pairs and have operating handles operatively interconnecting each pair for simultaneous actuation thereof, each interconnected pair of valves including a foamating air valve and a liquid valve.

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