Feb. 28, 1967 R. H. UDEN 3,306,589

CONCRETE MIXING MACHINE

Filed June 16, 1965 2 Sheets-Sheet 1

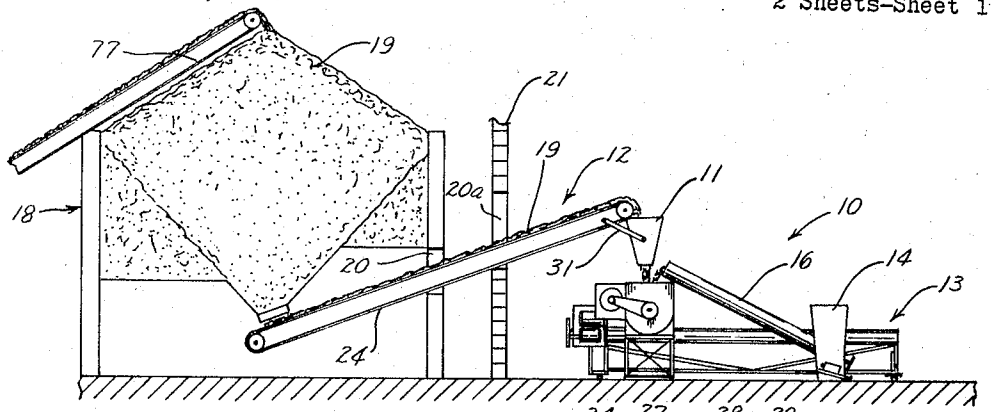


Fig. 1

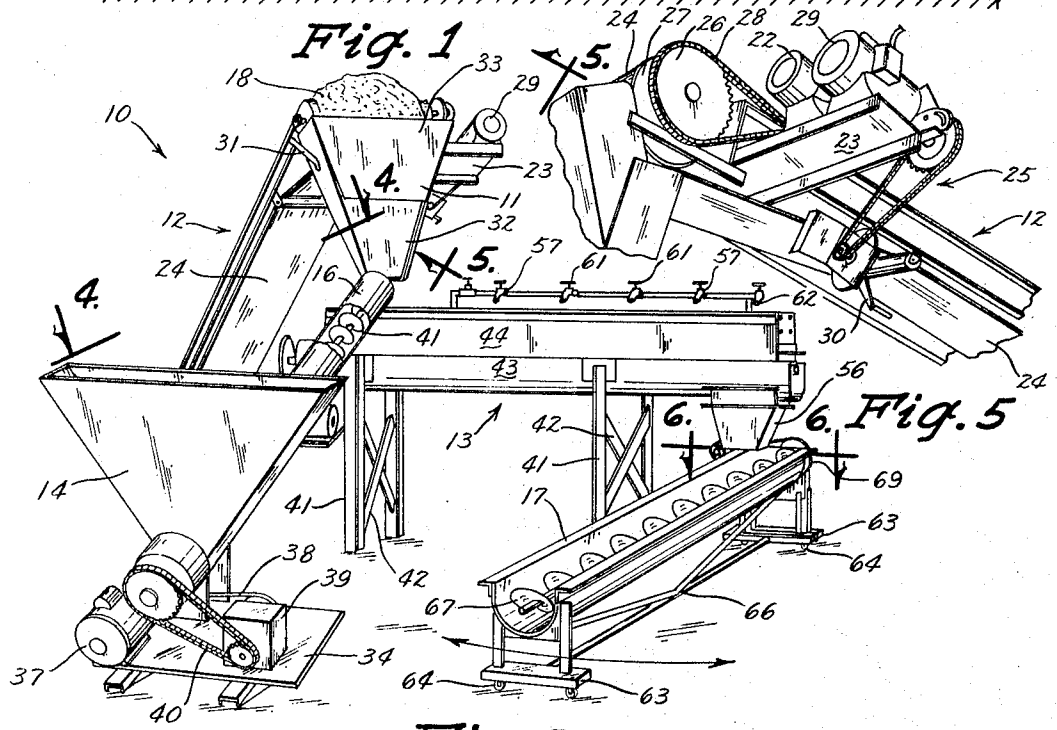


Fig. 5

Fig. 2

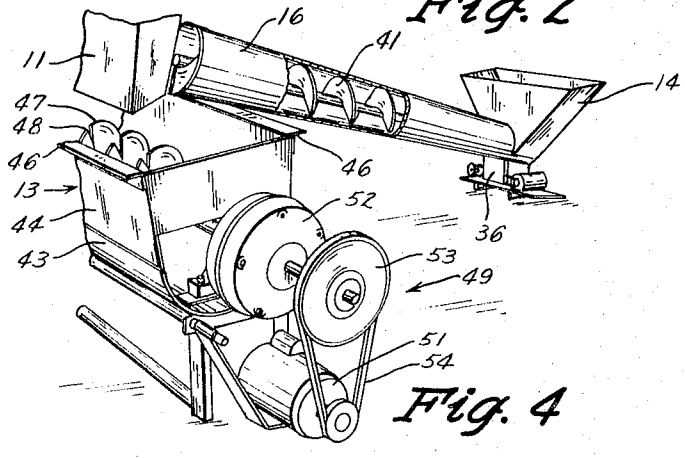


Fig. 4

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CONCRETE MIXING MACHINE

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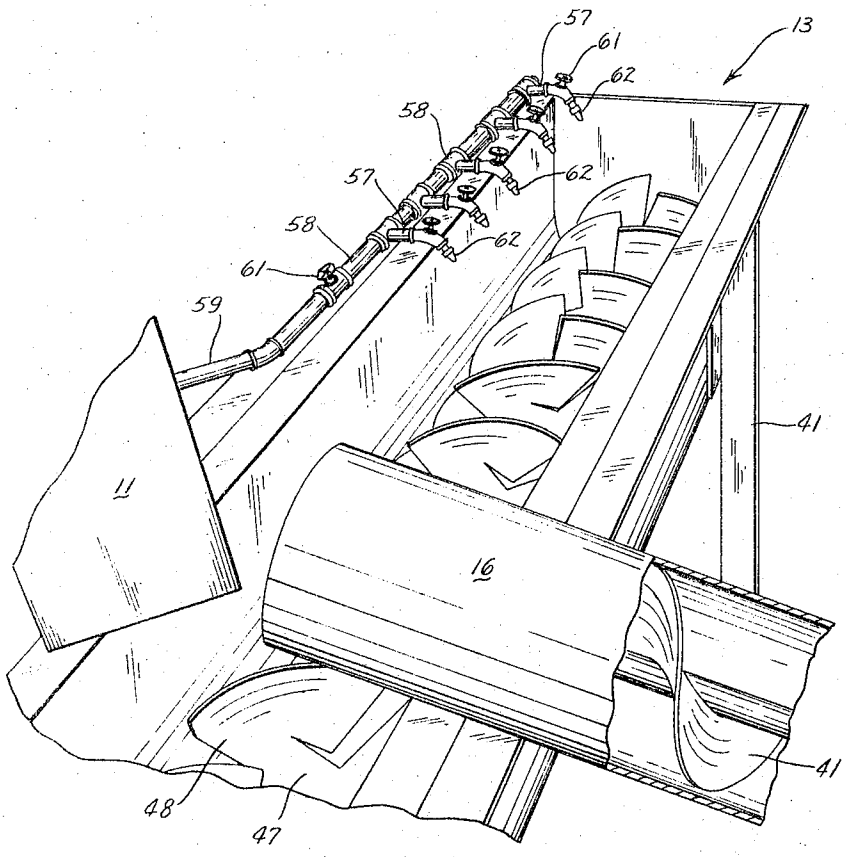


Fig. 3

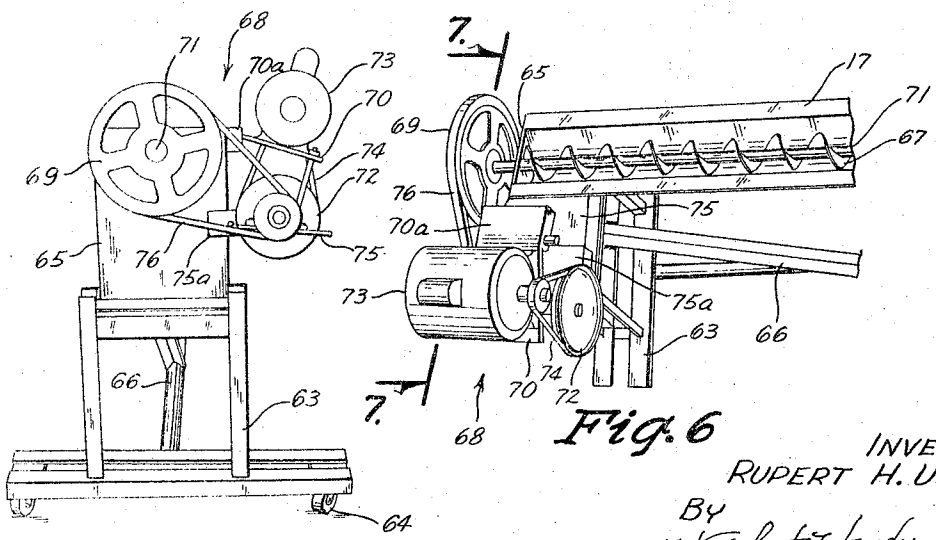


Fig. 7

Fig. 6

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CONCRETE MIXING MACHINE

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6 Claims. (Cl. 259—154)

This invention relates to a continuous concrete mixing and handling machine.

In the preparation of concrete from aggregate, cement and water considerable difficulty is encountered in providing an accurate charge of each of the ingredients, particularly in a continuous as opposed to a batch type concrete mixture. Most conventional operations require costly equipment and instrumentation and constant operating control and supervision to produce concrete which will meet present day rigid specifications.

It is therefore, an object of this invention to provide an improved apparatus which accurately controls the proportions of the materials used to make concrete.

Another object of this invention is the provision of an improved apparatus whereby first predetermining the proportions of materials, secondly presetting the openings in the handling equipment, and thirdly by setting the speeds of the various motors, concrete is supplied at a continuous and measured flow and yet will meet rigid specifications.

It is a further object of this invention to provide a continuous concrete mixing and handling machine which obviates constant attention by the operator, thus freeing him for other matters.

Yet another object of this invention is the provision of an improved apparatus which eliminates considerable instrumentation, while producing constantly a concrete of uniform composition.

Still another object of this invention is the provision of a continuous concrete mixing and handling machine which can be readily constructed in a relatively small area, and which can be operated by a person not necessarily adept at the art of making concrete.

A further object of this invention is the provision of a concrete mixer and handling machine capable of obtaining the above designated objectives which is economical to manufacture, simple in construction, and effective in use.

These objects, and other features and advantages of this invention will become readily apparent upon reference to the following description when taken in connection with the accompanying drawings, wherein:

FIG. 1 is an elevational view of a preferred embodiment of the invention shown in conjunction with a cross sectional view of an aggregate storage bin;

FIG. 2 is an enlarged perspective view of the concrete mixing and handling apparatus of this invention;

FIG. 3 is a further enlarged fragmentary perspective view of the top portion of the mixing tank;

FIG. 4 is a reduced perspective view of the rear of the mixing tank, the cement hopper and the auger tube taken along the line 4—4 in FIG. 2;

FIG. 5 is a fragmentary perspective view of the conveyor power assembly taken along the line 5—5 in FIG. 2;

FIG. 6 is a fragmentary top plan perspective view of the material receiving end of the trough assembly taken along the line 6—6 in FIG. 2;

FIG. 7 is a rear elevational view of the end of the trough assembly taken along the line 7—7 in FIG. 6.

Referring now to the drawings, the continuous concrete mixing and handling apparatus is indicated generally at 10 in FIGS. 1 and 2, and is shown comprising a container 11, a belt conveyor 12, a mixing tank 13, a cement hopper 14, an auger tube 16, and a trough 17. An

aggregate storage bin 18 is located outside the building in which the apparatus is located. One end of the belt conveyor 12 is located below the storage bin 18 and leads through an opening 20 formed in the storage bin wall, and an opening 20a formed in the wall 21 of the building in which the apparatus 10 is located.

A variable speed device 22 (FIG. 5) is mounted on the conveyor assembly 23, and regulates the movement of the belt 24. A sprocket wheel 26 is secured to a shaft (not shown) extending from the drive wheel 27 of the conveyor 12, and operably connected to the variable speed device 22, by a chain 28. The variable speed device 22 is driven by a motor 29, mounted on the conveyor assembly 23. Apparatus indicated generally at 25, and operated by a handle 30, is provided to adjust the output drive ratio of the power package to the sprocket 26. Mounted to the belt conveyor 12 (FIG. 2) by brackets 31 is the container 11, open at the top and with a smaller opening 32 of a predetermined size which can be varied by changing the position of the plate 33.

The inverted frusto-pyramidal shaped cement hopper 14 (FIG. 2), secured to the lower end of an elongated tube 16, is mounted to a base plate 34 by rectangular shaped support members 36. The hopper is in communication with the tube 16 through an opening (not shown), which opening is of a predetermined size. The size of the opening can be made variable by appropriate structural changes. On the base plate 34 is secured a motor 37 operably connected by a belt 38 to a speed reducer gear box 39.

An auger 41 (FIG. 4), axially mounted in the tube 16, is operably connected at one end, by a chain 40 (FIG. 2) to the gear box 39. The tube 16 is inclined upwardly from the hopper 14 to enable the upper extremity to be positioned adjacent to the base of the container 11 (FIGS. 2 and 4).

The upper extremity of the tube 16 (FIGS. 3 and 4) and the bottom of the container 11 are positioned over one end of the elongated U-shaped tank 13 which is closed at both ends. The horizontally disposed tank 13 (FIG. 2) is supported by a plurality of legs 41 that are given stability by X-shaped members 42. The base of the legs 41 are in the same horizontal plane as the base plate 34 of the hopper 14.

The tank 13 is comprised of a U-shaped trough 43 (FIG. 4), with substantially parallel sides 44 extended upwardly from the upper edges thereof. On the upper extremity of each side 44 is longitudinally welded an angle iron 46 which gives additional stability to the tank 13. Mounted axially within the tank 13 (FIG. 3) is a second auger 47 with broken flightings 48. A variable speed power assembly 49 (FIG. 4) operable to rotate the auger 47 is mounted on the end of the tank 13. The power assembly 49 (FIG. 4) is comprised of a motor 51 which is secured to the frame of the tank 13; a gear reduction unit 52, mounted outside of the tank on the shaft of the auger 47; and a pulley 53 which is mounted on the shaft of the gear reduction unit 52. The pulley 53 is operably connected by a belt 54 to the motor 51.

An opening is formed in the bottom of the tank 13 and a inverted frusto-pyramidal shaped member 56 (FIG. 2) is welded around the opening and to the tank 13 to direct the outward flow of material therefrom. The opening may be provided with an element (not shown) operable to vary the flow of material therethrough.

Fluid injection units 57 (FIG. 3) are mounted on a horizontally disposed pipe 58 which is fluid connected 59 to a fluid supply (not shown), and are comprised of valves 61 for the adjustment of the rate of flow therethrough, and nozzles 62 to direct and partially fog the flow therefrom.

Positioned below the discharge member **56** (FIG. 2) is an elongated trough **17**, closed at the end directly under the tank **13** and open at the other extremity, comprised of support members **63** at the ends thereof which are mounted on rollers **64** to facilitate the movement thereof, and braced **66** to give additional stability thereto. Axially mounted within the trough **17** is an auger **67** (FIGS. 2 and 6) operable to move the contents dumped therein from the tank **13** and to discharge same from the opposite end thereof. The auger **67** is powered by a variable speed mechanism **68** mounted on the closed end of the trough **17**.

The mechanism **68** (FIGS. 6 and 7) is comprised of a pulley **69**, mounted outside the trough **17** on the shaft **71** of the auger **67**; a gear reduction unit **72** mounted on the trough **17**; and a motor **73** mounted above the unit **72** and secured to the trough **17**. The motor **73** is operably connected by a belt **74** to the gear reduction unit **72** which in turn is communicable with the shaft **71** by a second belt **76**. Both the motor **73** and the unit **72** are mounted on plates **70** (FIG. 7) and **75**, each of which is pivotally connected to a bracket **70***a* and **75***a*, respectively mounted on the closed end **65** of the trough **17**.

In the operation of the concrete mixing and handling apparatus **10** (FIG. 1), prescreened aggregate is brought to the site of the plant and carried by conveyor **77** into the aggregate storage bin **18**. The aggregate **19** is fed by gravity onto a second belt conveyor **12** where it is carried, at a predetermined rate, through the opening **20** of the storage bin wall and the opening **20***a* in the wall **21**, into the container **11**. The aggregate then flows by gravity through the container **11** at a measured flow, as determined by the size of the opening **32** (FIG. 2), and into the mixing tank **13**.

The hopper **14** (FIG. 2) is filled with cement that flows into the tube **16** at a measured rate of flow as established by the size of the opening (not shown) between the hopper **14** and the tube **16**. The auger **41**, axially mounted in the tube **16**, is caused to rotate at a given revolution per minute by the motor **37** operably connected by a belt **38** to a variable speed, gear reduction box **39** which is operably connected to the auger **41** by a chain **40**. The cement is carried by the auger **41** through the tube **16** and dumped into the mixing tank **13** adjacent to or downstream of the aggregate.

Aggregate and cemnet are mixed together in the tank **13** by the action of the broken flighting **48** (FIG. 3) of the auger **47** and moved toward the discharge opening **56** by the rotational movement of the auger. Water is added to the mixture from the continuously acting fluid injection units **57** which are supplied from the fluid supply (not shown) through the pipe **59**. The rate of flow of the fluid is controlled by valves **61** and sprayed into the mixture by action of the nozzles **62**. The water is mixed with the aggregate by the action of the broken flighting **48** of the auger **47**.

The mixture of aggregate, cement and water is carried axially through the mixing tank to the discharge opening (not shown) with the rate of flow therethrough regulated by the rotation of the auger **47** which is controlled by the variable speed power assembly **49**. The combined mixture is gravity fed through the discharge member **56** and into the trough **17** (FIG. 2).

Concrete is carried axially through the trough **17** (FIG. 6) by the rotation of the helical auger **67**. The rate of flow is controlled by a variable speed mechanism **68** in operable communication with the shaft of the auger **67**. The trough **17**, mounted on rollers **64**, is horizontally rotatable about the discharge member **56** of the mixing tank **13** to deliver the concrete to various receiving units or molds. The open end of the trough **17** can also be vertically movable by telescoping the front legs thereof to enable the operator to deliver concrete at various heights.

Although a preferred embodiment of this invention has been described and disclosed hereinbefore, it is to be remembered that various modifications and alternate constructions can be made thereto without departing from the true spirit and scope of the invention as defined in the appended claims.

I claim:

1. A continuous concrete mixing and handling machine comprising in combination:
- container means open at the top to receive aggregate and having a smaller opening of predetermined size to regulate the discharge therefrom;
- conveyor means operable to supply aggregate to said container means;
- power means operable to drive said conveyor means;
- hopper means open at the top to receive cement and having an opening formed in the bottom thereof to regulate the flow of cement from said hopper means;
- tube means in communication with said bottom opening of said hopper means and positioned at the other end adjacent to said container means;
- auger means mounted within said tube means for transporting therethrough the contents of said hopper means;
- variable speed means operable to rotate said auger means;
- elongated tank means with one end stationed below said container means and said tube means;
- means for supplying fluid at a predetermined rate into said tank means; and
- rotatable helical auger means mounted in said tank means for moving the materials dumped therein and simultaneously mixing the materials and fluid added thereto, and for discharging them therefrom.

2. A continuous concrete mixing and handling machine comprising in combination:
- elongated tank means having an opening formed at one end thereof;
- container means open at the top and bottom for transmitting aggregate to said tank means;
- conveyor means operable to supply aggregate to said container means;
- variable speed power means operable to drive said conveyor means at a predetermined rate;
- hopper means for holding a supply of cement;
- adjustable discharge means secured to said hopper means for varying the discharge of cement therefrom;
- tube means having one end communicable with said discharge means and with the opposite end positioned over said tank means;
- auger means mounted within said tube means for transporting therethrough the contents of said hopper means;
- means operable to drive said auger means at variable speeds;
- means for supplying fluid at a predetermined rate into said tank means; and
- rotatable helical auger means mounted in said tank means for mixing the materials received by said tank, and for discharging the materials therefrom.

3. A continuous concrete mixing and handling machine comprising in combination:
- container means open at the top to receive aggregate and having a smaller opening formed therein below the top to discharge the contents therefrom;
- conveyor means operable to supply aggregate to said container means;
- variable speed power means operable to drive said conveyor means;
- hopper means for holding a supply of cement;
- discharge means secured to said hopper means and operable to vary the discharge of cement therefrom;
- tube means with one end communicable with said discharge means and with the opposite end positioned adjacent to said container means;

auger means mounted within said tube means for transporting therethrough the contents of said hopper means;

elongated tank means with one end stationed under said container means and said tube means and having an opening formed in the other end;

means for discharging fluid at a predetermined rate into said tank means;

rotatable helical auger means mounted in said tank means for moving materials dumped therein, and for simultaneously mixing the materials and fluid therein;

variable speed power means to operate said helical auger means; and

trough means having one end stationed under the opening of said tank means to receive material discharged therefrom, with the opposite end thereof rotatable about said opening formed in said tank means.

4. A continuous concrete mixing and handling machine as defined in claim 3, and further wherein is provided means to vary the size of the discharge opening in said container means.

5. A continuous concrete mixing and handling machine comprising in combination:

container means open at the top to receive aggregate;

belt conveyor means operable to supply aggregate to said conveyor means;

variable speed power means operable to drive said conveyor means;

means mounted on said container means to provide a variable discharge of the aggregate therefrom;

hopper means for holding a supply of cement;

discharge means secured to the bottom of said hopper means and operable to vary the flow of cement therefrom;

tube means with one end communicable with said discharge means and with the other end positioned adjacent to said container means;

auger means mounted within said tube means for transporting therethrough the contents of said hopper means;

means operable to drive said auger means at variable speeds;

an elongated, trough-like tank closed at both ends, with one end stationed under said container means and said tube means;

means secured to the bottom of said tank means at an end opposite said one end to discharge the contents thereof;

means mounted above said tank means for supplying fluid at an adjustable rate thereto;

rotatable helical auger means mounted axially in said tank means for moving the contents longitudinally therein, and simultaneously mixing the materials and fluid therein;

variable speed power means operable to rotate said helical auger means;

trough means positioned at one end under said tank discharge means to receive the contents of said tank means, said trough means horizontally rotatable about said discharge means and vertically movable at the opposite end; and

auger means mounted axially in said trough means, said auger means operable to move the contents in said trough means from said one end and to discharge same from the opposite end thereof.

6. A continuous concrete mixing and handling machine as defined in claim 5, and further wherein said fluid means includes a plurality of nozzles.

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