PROPORTIONING, AGITATING AND POURING DEVICE
Jack O. Cherdtovf, 19 W. Franklin St., Baltimore, Md.
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This invention relates generally to blending machines, and more particularly it pertains to a device for adding and combining an aggregate material to a flow of slurry in a pipe line at the discharge end thereof.

Mixtures of cement, water, and periflue aggregate are most economically conveyed by force feed over pipe lines. However, it is necessary to limit the admixture of aggregate so that sufficient grout is formed to provide a slurry which can be pumped. Often, it is desirable to use higher percentages of aggregate with the consequence that other means of transportation of the mixture becomes necessary.

It is an object of this invention to provide a pouring device for the terminal end of a flowing pipe line of slurry which injects a desired proportion of additional aggregate to the slurry and thoroughly mixes it therewith and ejects the resultant thickened mixture.

Another object of this invention is to provide a screw mixer which successively proportions, agitates and then forces a flow of varying consistency of fluid materials at a mixing junction of conduits independently of the flow rate of these materials in their inlet conduits.

Yet another object of the invention is to provide an assist pump means in a conduit for forcing a thickened flow of a blend of two or more materials beyond the point of admixture.

Still another object of the invention is to provide a readily demountable and easily cleaned motor-driven mixer-pump combination.

These and other objects and attendant advantages of this invention will become more readily apparent and understood from the following detailed specification and accompanying drawings in which:

FIG. 1 is a side elevation of a proportionating, agitating and pouring device incorporating features of this invention.

FIG. 2 is a plan view of the device of FIG. 1;

FIG. 3 is a right end elevation thereof;

FIG. 4 is an enlarged longitudinal section taken along the line 4—4 of FIG. 2; and

FIG. 5 is a still further enlarged and sectioned detail view taken on the line 5—5 of FIG. 4.

Referring now to the drawings, FIGS. 1, 2, and 3 show a proportionating, agitating and pouring device incorporating features of this invention which is designated generally by reference numeral 10. This proportionating device 10 consists of a joined casing assembly 12 having a variable speed motor 16 which may be of the air driven type mounted on one end of a cylinder 18.

Near this end of the cylinder 18, and on its side there is provided a convergent inlet or slurry supply pipe 38. Also in this region but at the top of the cylinder 18, there is perpendicularly joined an aggregate supply coupling pipe 40.

A pair of spaced feet 20 are welded to the top of the cylinder 18 and are used to stabilize and support the weight of the casing assembly 12 by means of braces 22 below.

As shown in FIG. 4, a screw assembly 14 is arranged to revolve within the cylinder 18 and it consists of three sections 44, 46, and 48. In preferred embodiment of the invention, the section 44 of the cylinder 18 which controls the intake of aggregate volume is formed with closed screw flights 62 which are welded to a left hand section of tubular shaft 50.

The agitating section 46 of the screw assembly 14 consists of open screw flights 64 of the same pitch as the closed screw flights 62. These open screw flights 64 are secured to an intermediate section 52 of smaller diameter tubular shafting by means of spokes 66.

The right hand end of the intermediate shaft section 52 has directly welded to it closed screw flights 68 of greater pitch than flights 62 and 64, and it comprises the flow control section 48. It should be understood these flights 62, 64, and 66 of the screw assembly 14 are continuous worm-like extension one to the other in series named and have a conical outer diameter.

A stub shaft 58 is fitted within the end of the shaft 52 and secured thereto by bolts 60.

The discharge end of cylinder 18 is fitted with a journal support ring 32 which is provided with radial struts 36. A journal 34 is welded to these struts 36, and it receives the stub shaft 58 and rotatably supports the screw assembly 14 at its right end.

The left or intake end of cylinder 18 mounts a combination bearing and motor support or flanged journal 28. As best shown in FIG. 5, the intermediate shaft section 52 is secured by bolts and nuts 56 and a reducing sleeve 54 to the left hand shaft 50.

A thrust flange 76 is welded on the shaft 50 near its left end and it bears against an end flange 24 of cylinder 18. The flange journal 28 receives the end of the shaft section 50 and it is attached by bolts 50 to this flange 24 including an intervening gasket 26.

A tooted drive disc 72 is secured by cap screws 74 within the shaft section 50 to receive a mating toothed coupling 70 on the shaft of motor 16.

As best shown in FIGS. 1 and 2, the motor 16 is supported by a split clamping member 78 having tabs 80 welded to the diametrically opposite sides of the flanged journal 28.

Bolting tabs 82 embrace the motor 16 and are clamped thereto by means of bolts 84. The motor 16 thus is readily installed and removed from the casing assembly 12 for servicing by merely loosening the bolts 84. Further, the screw assembly 14 is easily extracted for cleaning by removing bolts 30 which hold the flanged journal 28 to cylinder 18.

In use, a slurry is mixed at a remote point and pumped to a relative point of discharge at a constant rate. At this discharge point, the slurry supply pipe 38 introduces the slurry to the proportioning device 10 and additional aggregate (such as periflue) is introduced through the aggregate supply coupling pipe 40 by means of a cut-off valve 42.

The required amount of aggregate to be added is in a range of 5% to 35% of the total depending on the distance the slurry is pumped, the fluidity of the slurry and type of aggregate used.

The first section 44 controls the volume added by the speed of its rotation and within this volume, since the slurry intake is constant, the amount of aggregate is proportionate to the speed of the flights 62 as they are driven by the variable speed motor 16.

When the aggregate is added, the fluidity of the mixture changes and the next section 46 of the proportioning device 10 serves as an agitating section which agitates, mixes and blends the aggregate with the slurry to the proper consistency through the means of the open screw flights 64 which work in a larger chamber area than occupied by the previous closed screw flights 62.

The next section 48 controls the flow so that the proper volume of material is retained in the previous section 46 and also to forcefully eject the thickened mixture from the discharge end of the cylinder 18.

It should be noted that these results are accomplished by the change of screw pitch and/or volume of the slurry.
in the holding section in comparison to the pitch and/or volume of the proportioning section.

The operations in the flights, as related for flights 64, with unchanged pitch give the same control and can be used for all three sections as required but this method is not as positive although found suitable for given mix proportions.

Obviously many modifications and variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:
1. A proportioning, agitating and controlling device for different materials, comprising, structure defining a cylinder having a first inlet supply line and a second input supply line at one end thereof to receive different materials to be proportioned, agitated, and controlled in said cylinder, said cylinder having a proportioning control section, an agitating section, and a controlling section all arranged respectively in tandem, screw means having a shaft extending throughout the length of said cylinder and including screw flights on said shaft, said proportioning control section and controlling section having closed screw flights positioned on said shaft, with said agitating section having opened screw flights positioned on said shaft, and means for rotating said screw means including said shaft and said screw flights.

2. A proportioning, agitating and controlling device for different materials, comprising, structure defining a cylinder having a first inlet supply line and a second input supply line at one end thereof to receive different materials to be proportioned, agitated, and controlled in said cylinder, said cylinder having a proportioning control section for said materials, an agitating section for agitating said different materials, and a controlling section for the agitated materials all arranged respectively in tandem, means for stabilizing and supporting said cylinder, screw means having a shaft extending throughout the length of said cylinder and including screw flights on said shaft, said proportioning control section and controlling section having closed screw flights positioned on said shaft, with said agitating section having opened screw flights positioned on said shaft, and means for rotating said screw means including said shaft.

References Cited in the file of this patent
UNITED STATES PATENTS

2,366,673  Poley ---------------- Jan. 2, 1945