Feb. 6, 1962 E. V. FEJMERT 3,020,029

CEMENT MIXING MACHINE

Filed Dec. 30, 1957 2 Sheets-Sheet 1

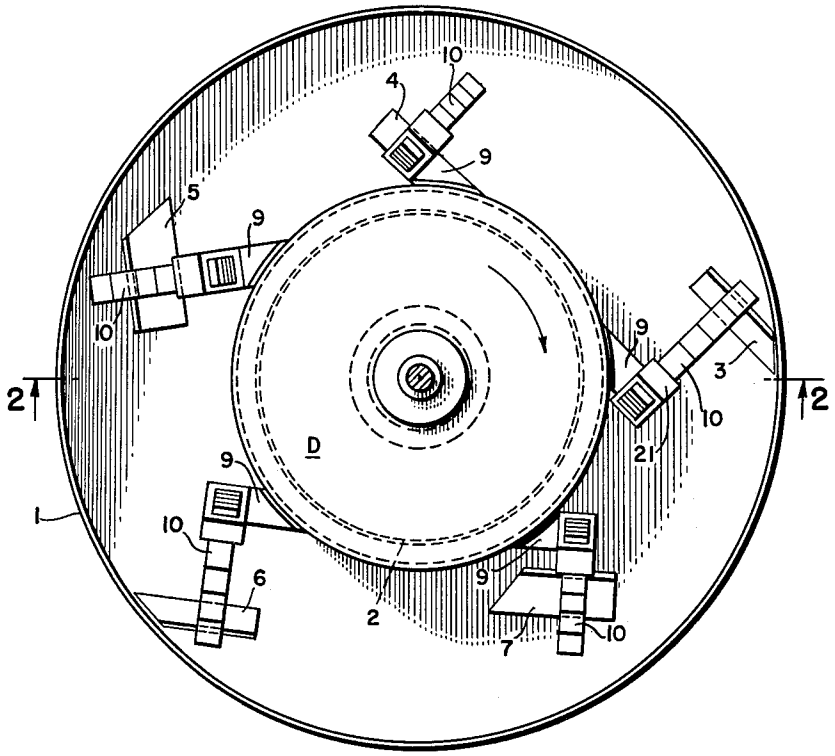


FIG. 1.

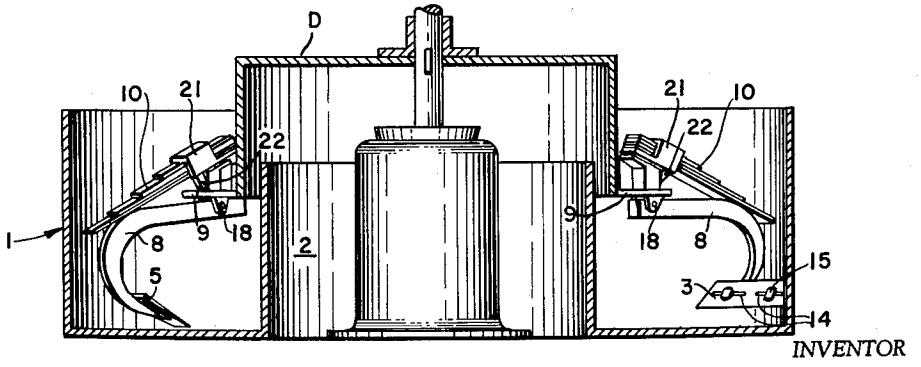


FIG. 2.

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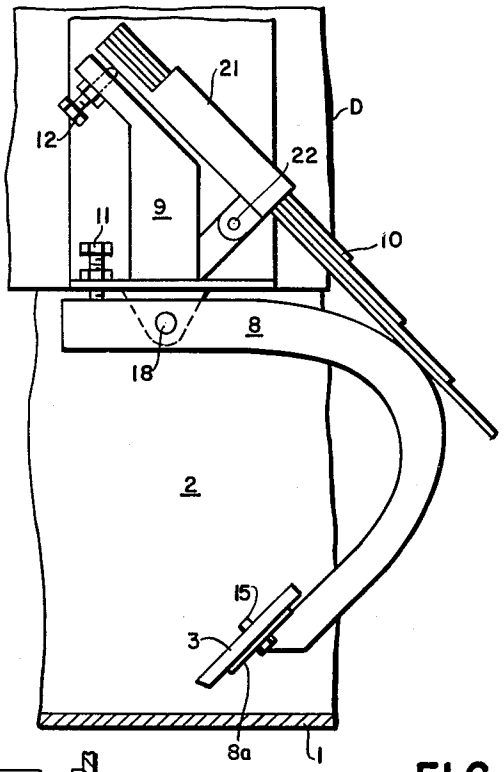


FIG. 3.

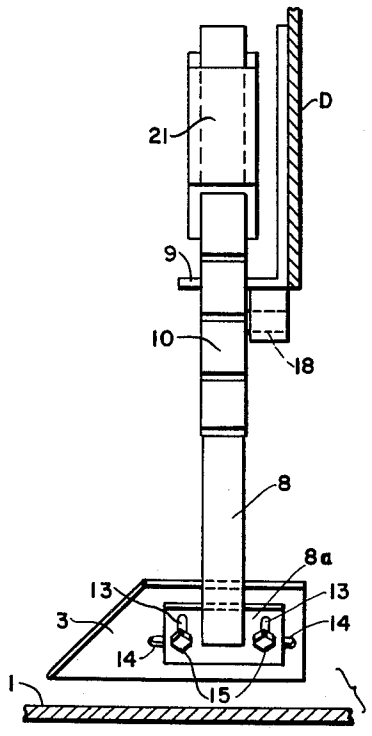


FIG. 4.

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CEMENT MIXING MACHINE

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4 Claims. (Cl. 259—178)

This invention refers to apparatus for mixing materials (e.g., for making concrete, mortar or the like) in a standing, cylindrical receptacle (hereinafter called the "mixing-tank") within which is coaxially arranged a vertical, cylindrical wall. In the annular space between these walls is arranged a number of paddles, fitted on spring-loaded arms, which are arranged and adjusted in such a way that the effect of the mixing process at high speed of the mixing device will increase above what is hitherto known.

It is a fact that the mixing effect increases with the speed of the mixing device, but in order to fully utilize the speed-moment it is necessary to arrange the paddles in a way that will facilitate the contact between the different particles in the mixing mass better than in hitherto known mixing methods, where the mass is stirred by slowly rotating paddles which drive the mass in a random fashion (i.e., in arbitrary directions).

The arrangement shown in United States Patent 2,717,-147 wherein Bernhardt Valdemar Fejmert and I are joint inventors have made it possible to use high peripheral, paddle speeds (i.e., over 2 meters per second), even in materials of the coarsest consistency used in common concrete work. The diameter of the cylindrical wall inside the mixing-tank should therefore be relatively large in order to obtain high average speed of the paddles.

The principal object of this invention is to provide for the functioning of the paddles which utilizes the factor of high speed in the very best way.

The invention involves arranging the paddles at suitable angles, relatively to the direction of the rotation, such that the materials are thrown in the direction of rotation backwards and inwards, backwards and outwards, and backwards and upwards.

Preferably, the paddles are arranged in succession in such a way that each throws the material into the furrow formed by the paddle next in front of it.

As the materials are thrown with the movement and into the furrows the mixing process will be facilitated, and the power required will be a minimum.

The paddles are rotated mainly close to the bottom of the mixing-tank. If required a desired number of paddles can be arranged to rotate at a certain distance above the bottom by adjusting the pressure of springs acting on pivoted arms supporting the paddles in such a way that the paddles automatically rise when rotated at high speed.

The minimum distance of each paddle from the bottom may be adjusted by means of an adjustable stop for the upper part of the pivoted paddle-arm.

The vertical position of the paddle may be adjusted by forming vertically-lengthened holes in a plate fitted at the lower end of the paddle-arm, and locating the paddle by bolts engaging in the said holes.

The position of the paddle in a horizontal direction may be adjusted in a similar way by forming horizontally-lengthened holes in the paddle for the said bolts.

For the purpose of illustrating the invention one form thereof is shown in the accompanying drawings, in which:

FIGURE 1 is a diagrammatic plan view showing an annular mixing tank or receptacle and a preferred arrangement of the associated paddles and conventional part means for rotating such paddles around said mixing tank;

FIGURE 2 is a vertical section taken on the line 2—2 of FIGURE 1;

FIGURE 3 primarily shows one paddle means in side elevation, and fragments, partly in section, of its rotating means and the mixing tank, and

FIGURE 4 is an edge view of the parts of FIGURE 3 primarily showing the paddle means from the right-hand side of FIGURE 3.

Referring to the drawings, **1** is a standing, cylindrical receptacle (mixing tank) which is furnished with a cylindrical vertical wall **2** around its center. In the annular space between this wall and the outer wall of the mixing tank are arranged a number of paddles **3**, **4**, **5**, **6**, **7**, fitted on arms **8**, which latter are pivoted horizontally at **18** to the adjacent member or part **9** rotatable around the annular space, all being on a conventional part or drive transmitting means D such for instance as shown in my Swedish Patent 152,874 (part 11); my Swedish Patent 153,524 (parts 6 and 8), and that disclosed at 27 of previously mentioned Fejmert et al. Patent 2,717,147. Arms **8** are pressed downwards by blade springs **10** mounted in holders **21** which are also pivoted on a horizontal axis at **22** from the adjacent member **9**, and when rotated move the paddles and their mountings around the annular mixing tank. Each arm **8**, with its paddle, may be adjusted to the desired angle and a desired minimum distance from the bottom of the mixing-tank by means of the associated stops or adjusting screws **11** threaded to its adjacent member **9**, and the spring-pressure on the paddle-arms **8** can be adjusted by the screw **12** in such a way that the arm **8**, with its paddle, rises at a high speed rotation to a desired height above the bottom of the mixing tank, the arm having a sliding contact with the said spring. Screws **12** are threaded to the members **9** and bear against said holders **21** and which holders are pivoted as previously stated at **22** to the members **9** and accordingly broadly to any drive transmitting means D or rotatable part.

One of the paddles has been shown particularly in FIGURE 4 to illustrate how it is adjustably mounted from a plate 8^a fast with the associated arm **8**. Each plate 8^a is provided with a pair of parallel enlarged slots **13** and each paddle has a pair of horizontally aligned enlarged slots **14**. Bolts **15** extend through the slots **13** and **14** of associated plates and paddles and thus permit the paddles to be adjusted universally in its own plane relatively to the plates to accordingly adjust the horizontal and vertical positions of the paddles relatively to the bottom of the mixing tank as necessary according to the axis of rotation and inclination in the direction of rotation. It will be seen that the paddles are arranged in sequence after one another in such manner that they are inclined with respect to the direction of rotation and also with respect to the axis of the drive transmitting means D so that during rotation the concrete or mass is thrown at the same time into the furrows formed behind the paddles advancing in the direction of movement.

When rotated at high speed the paddles positioned as shown throw the materials as follows:

Paddle **3** throws backwards and inwards.

Paddle **4** throws backwards and outwards, and into the furrow formed behind paddle **3**.

Paddle **5** is arranged at a maximum 45° angle to the bottom of the mixing-tank, and throws the materials backwards and upwards.

Paddle **6** is adjusted as paddle **3**, and throws the materials backwards and inwards and into the furrow formed behind paddle **5**.

Paddle **7** throws the materials backwards and outwards, and into the furrow formed behind paddle **6**.

What I claim as my invention and desire to secure by Letters Patent of the United States is:

1. A machine for mixing materials (e.g., concrete) comprising

(*a*) a standing cylindrical receptacle which has its axis vertical,

(*b*) a cylindrical wall of relatively large diameter coaxially within said receptacle and defining with it an annular mixing space,

(*c*) rotatable part means,

(*d*) a plurality of arms,

(*e*) pivotal supports for said arms carried by said rotatable part means for vertical swinging movement of said arms,

(*f*) said arms extending downwardly into the annular mixing space,

(*g*) paddles respectively supported from the lower ends of said arms, each paddle extending only part way across said annular mixing space,

(*h*) respective blade spring devices carried by said rotatable part means and bearing against said arms,

(*i*) said blade spring devices biasing said arms and paddles downwardly about the pivotal supports of said arms from said rotatable part means,

(*j*) whereby said spring devices exert a sliding pressure on said arms when said paddles are urged upwardly by the material in said receptacle during mixing, and said paddles are radially arranged in said annular mixing space such that each paddle describes a path at one side of the path described by the paddle in front and is arranged at such an angle to the direction of rotation around said annular mixing space and relative to the axis of the drive that some of them throw the material backwards and inwards, and

(*k*) some backwards and outwards and

(*l*) so that each throws the material into the furrow formed by the paddle ahead of it.

2. A machine, according to claim 1 wherein

(*a*) said blade spring devices have holder means pivoted from the rotatable part means,

(*b*) springs held adjacent their tops by said holder means, and

(*c*) screws supported by said rotatable part means bearing on said springs for adjusting their efforts.

3. A machine, according to claim 1 having

(*a*) paddle-mounting plates at the lower ends of said arms,

(*b*) said paddles having slots enlarged horizontally,

(*c*) bolts extending through said slots securing the paddles to the plates, and

(*d*) said slots being enlarged horizontally to permit the paddles to be adjusted in their planes in the horizontal direction relatively to said plates.

4. A machine, according to claim 1 having

(*a*) paddle-mounting plates at the lower ends of said arms,

(*b*) said plates having slots enlarged vertically,

(*c*) bolts extending through said slots securing the paddles to the plates, and

(*d*) said slots being enlarged vertically to permit the paddles to be adjusted in their planes in the vertical direction relatively to said plates.

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