P. L. BLYSTONE.

MORTAR MIXER.

APPLICATION FILED JAN. 15, 1912.

1,030,250.

Patented June 18, 1912.

2 SHEETS—SHEET 1.

FIG. 1.

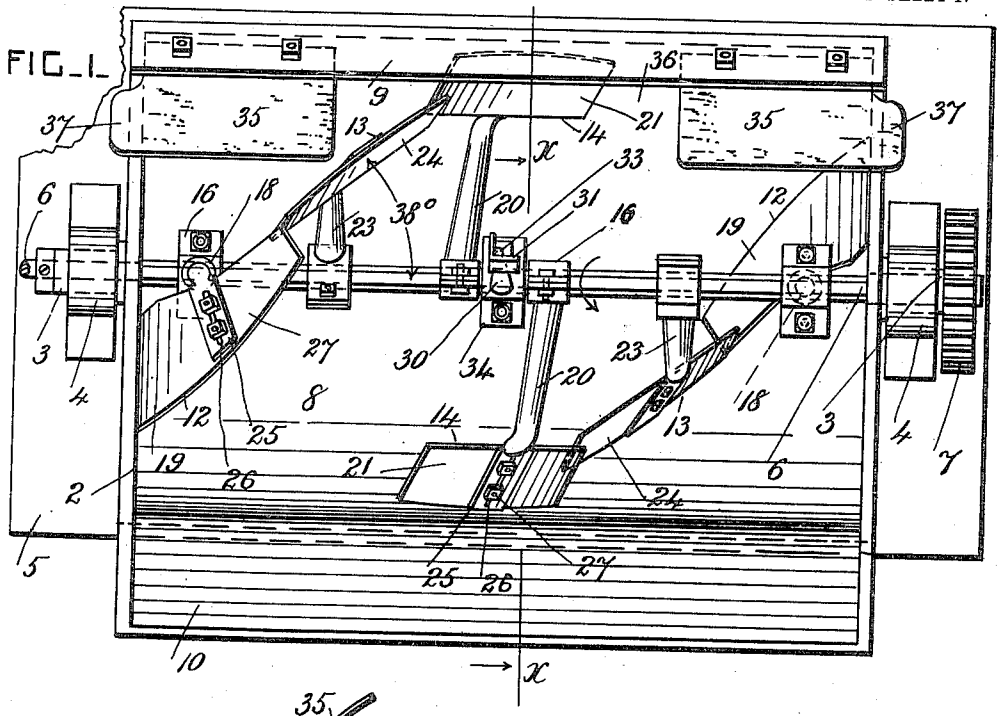
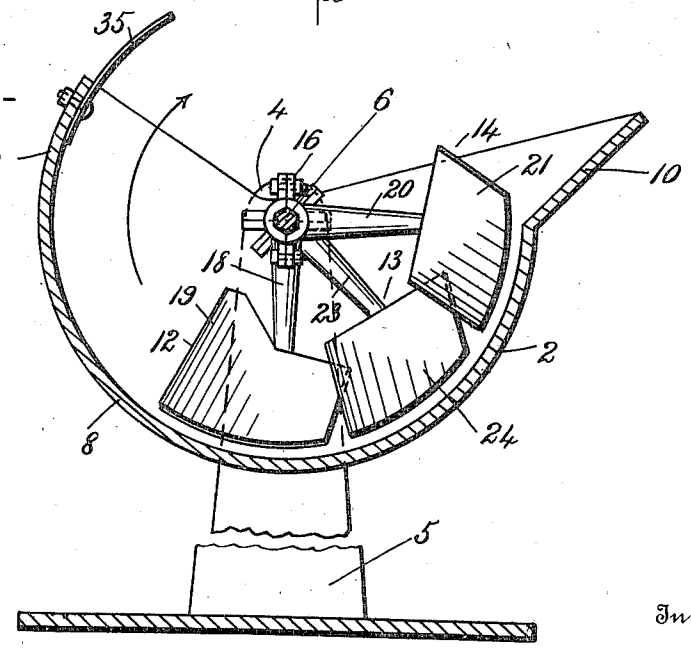


FIG. 2.



Witnesses

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2 SHEETS—SHEET 2.

FIG. 3.

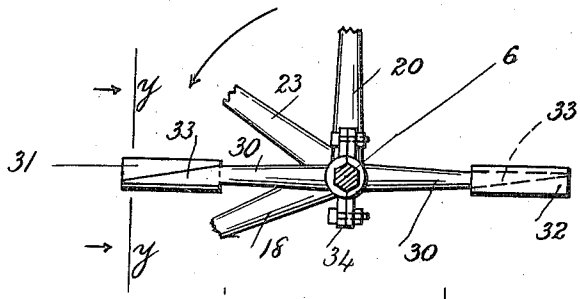


FIG. 4.

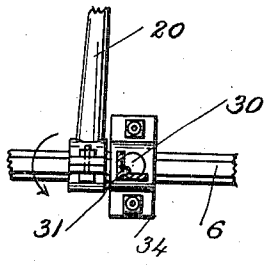
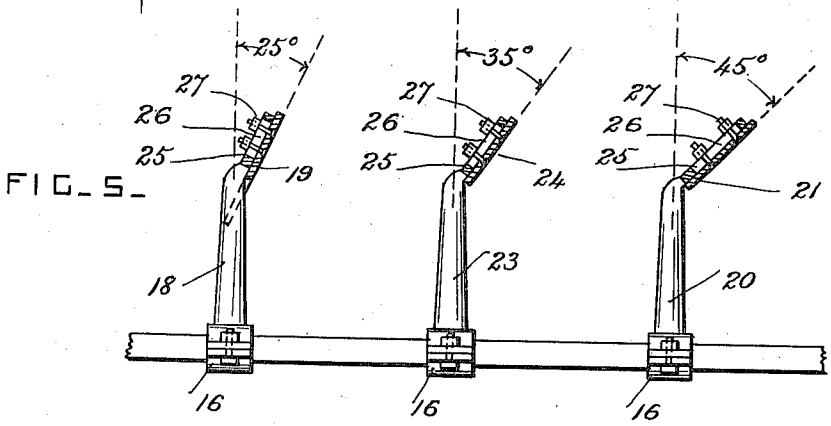


FIG. 5.



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UNITED STATES PATENT OFFICE.

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MORTAR-MIXER.

1,030,250. Specification of Letters Patent. Patented June 18, 1912.

Application filed January 15, 1912. Serial No. 671,195.

To all whom it may concern:

Be it known that I, PERRY L. BLYSTONE, a citizen of the United States, residing at Cambridge Springs, in the county of Crawford and State of Pennsylvania, have invented certain new and useful Improvements in Mortar-Mixers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to machines, for mixing mortar, concrete, and other similar substances, which are provided with paddles for working the material from the ends of the mixing vessel toward its middle part; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed, whereby the efficiency of the mixer is greatly increased.

In the drawings, Figure 1 is a plan view of a mortar mixer constructed according to this invention. Fig. 2 is a cross-section through the mixer, taken on the line x—x in Fig. 1. Fig. 3 is a detail view of the ejector or separator arms. Fig. 4 is a cross-section through one of the ejector blades, taken on the line y—y in Fig. 3. Fig. 5 is a diagram showing three paddles arranged side by side on a shaft, and partially in section, to show the different angles of the various blades to the arms which support them.

The mixing vessel or trough 2 is provided with trunnions 3 which are mounted to oscillate in the bearings 4 of a supporting frame 5, which is of any approved construction. The mixing trough 2 may be tilted by hand or in any other approved way. A driving shaft 6 is journaled in the trunnions 3, and is provided with a wheel or pulley 7 for revolving it in any approved way. The lower part 8 of the trough, which is normally below the axis of the shaft 6, is semi-cylindrical, and upon one side the trough is provided with a curved extension 9 of its lower part 8, which operates as a deflector. This extension 9 projects above the axis of the shaft, and the shaft is revolved in the direction of the arrow in Fig. 2. The other side portion of the trough is provided with an upwardly and outwardly projecting chute 10, upon which the materials to be mixed are deposited. This chute provides an inclined plane surface down and across which the materials slide into the lower part 8 of the trough, in which the materials are mixed. The materials are carried upwardly against the curved extension 9 at the other side of the trough to a point whence they fall backwardly by gravity into the bottom part of the trough, and behind the paddles which are used to mix them.

Three pairs of paddles 12, 13 and 14, are provided and are secured upon the shaft 6. Each paddle consists of a radial arm clamped to the shaft by clamping devices 16, and a blade secured to the free end portion of the arm and arranged at an angle of 38° to the axis of the driving shaft. Each blade is flat, and all the blades are arranged at the same angle with respect to the axis of the driving shaft. This angle of 38° may be varied slightly, but 38° is found to give the best results in practice. The two end paddles 12 have radial arms 18 and mixer and scraper blades 19 secured to the said arms and arranged to scrape the ends of the trough.

The arms 18 are arranged at the end portions of the trough and at diametrically opposite points. Each blade 19 is arranged at an angle of 25° to the axis of its arm 18. The two middle paddles 14 have radial arms 20 and blades 21 secured to the arms 20. The arms 20 are arranged at diametrically opposite points and at a right angle to the end arms 18, and each blade 21 is secured to its arm 20 at an angle of 45° to the axis of its arm 20. The two intermediate paddles 13 have radial arms 23 and blades 24, and these arms are arranged at diametrically opposite points, and intermediate spirally between the arms 18 and 20. Each blade 24 is arranged at an angle of 35° to the axis of its arm 23.

All the blades are flat and their outer edges are curved so as to correspond with the curvature of the bottom part of the trough. Each arm has a lug 25 at its free end having a longitudinal slot 26 in it, and the various blades are secured to these lugs by bolts 27. The slots 26 permit the distance between the blades and the trough to be regulated.

The three paddles at one end portion of the trough are arranged in a series with their adjacent ends arranged in close proximity to and overlapping each other so as to form

a spiral conveyer of one direction, and the paddles at the other end portion of the trough are arranged in a series in a similar manner so as to form a spiral conveyer of the opposite direction, and thereby work the materials from the ends of the trough toward its middle part. The two middle paddles are arranged so that the adjacent end portions of their blades overlap each other in the same circular path at the middle part of the trough. The end blades are secured at an angle of 25° to their arms, and the angles of the blades 24 and 21 increase in regular order as they approach the middle part of the trough. More than three paddles at each end portion of the trough can be used if desired, and when more than three paddles are used the angles of their blades are correspondingly modified, but the angle 38° of the blades with the axis of the driving shaft is kept the same irrespective of the number of paddles, and the paddles are otherwise arranged as hereinbefore described.

Two ejector or separator arms 30 are secured to the middle part of the driving shaft by clamping devices 34. These arms 30 are arranged at diametrically opposite points, radial to the shaft, and parallel to the end arms 18. The arms 30 project between the middle paddles and at a right angle to their arms 20. The two arms 30 have ejector or separator blades 31 and 32 at their ends, and each ejector blade is angle-shaped in cross-section. The ejector blades are both alike, but they are arranged right and left, so that one face of each blade is in front in the direction of its motion with its face parallel to the axis of the shaft, and its other flange is on the side of it farthest from the middle of the trough. The ejector arms 30 have conical portions 33 in the angles at the back of the ejector blades which stiffen the said ejector blades and connect them to the arms. Two similar guard plates 35 are secured to the end portions of the curved extension 9 of the trough. These guard plates are curved similar to the extension, and a discharge gap 36 for the material is formed between them. These guard plates can be changed as required, to vary the size of the gap, and their opposite ends 37 preferably project beyond the ends of the trough. When the trough is tilted the mixed material is discharged through the gap 36, into any suitable receiving vessel, and the guard plates prevent it from being spilled. The materials to be mixed are dumped onto the receiving chute 10, and they slide into the bottom of the trough without being dumped against the paddles, which is apt to injure the blades and cause the material to be jammed in a mass between the paddles and the side portions of the trough. The paddles are revolved by their shaft and they mix the materials in the trough, working them constantly from each end toward the middle of the trough where the mass is broken up and parted by the ejector or separator blades and is allowed to move backwardly toward the ends of the trough. The materials are in this manner mixed very thoroughly, and when the mixing operation is complete, the trough is tilted so that the mixture is discharged through the gap 36 by gravity and by the action of the ejector blades. The difference in the angularity of the mixing blades causes the material to start at each end of the trough at moderate speed and increase in speed as it approaches the middle of the trough. In this way the material can be mixed more rapidly and with less resistance than when all the blades are arranged at the same angle to their arms. It is important that the adjacent end portions of the middle blades should overlap each other in the same circular path, as the mixing action is then much better, especially when the material has been started comparatively slowly at the ends of the trough and worked up gradually to a considerably greater speed at the middle of the trough, and when the blades are all arranged at the preferred angle of 38° with the axis of the driving shaft.

It is preferable to arrange the arms 20 of the middle paddles at diametrically opposite points, with the arms 30 midway between them circumferentially, but the exact position of these parts may be varied slightly, and each series of arms may be spread around rather more than one-quarter of the circumference of the shaft, if desired, and as shown in Fig. 3.

What I claim is:

1. In a mixer, the combination, with a mixing vessel, and a driving shaft journaled therein; of a spiral conveyer secured on the said shaft and provided with a series of blades arranged at an angle to the axis of the said shaft, each blade being also arranged at an angle to a line drawn radially of the said shaft, with its outer edge projecting forwardly in the direction of its motion, and each blade being arranged at a different angle to the radial line in regular order, whereby the motion of the material is accelerated as it is moved longitudinally in the said vessel.

2. In a mixer, the combination, with a mixing vessel, and a driving shaft journaled therein; of a series of paddles secured in spiral form to the said shaft and provided with blades and radial arms, all the blades being arranged at an angle to the axis of the driving shaft, and each blade being also arranged at an angle to the arm which supports it, with its outer edge projecting forwardly in the direction of its motion, each blade being arranged at a different angle to its arm in regular order, whereby the mo-

tion of the material is accelerated as it is moved longitudinally in the said vessel.

3. In a mixer, the combination, with a mixing vessel, and a driving shaft journaled therein; of two series of paddles arranged in the opposite end portions of the said vessel, and operating to work the material in reverse directions, said paddles being secured to the said shaft and provided with blades and radial arms, all the said blades being arranged at an angle to the axis of the shaft, and the blades of each series of paddles being arranged at different angles to their arms in regular order, whereby the motion of the material is accelerated as it is moved by the paddles from the ends of the said vessel toward its middle part.

4. In a mixer, the combination, with a mixing vessel, and a driving shaft journaled therein; of two series of paddles arranged in the opposite end portions of the said vessel, and operating to work the material in reverse directions, each series of paddles being secured spirally to the said shaft, and ejector or separator arms secured on the middle part of the said shaft between the two series of mixing paddles and provided with angle-shaped blades the side faces of which are arranged right and left.

5. In a mixer, the combination, with a mixing vessel, and a driving shaft journaled therein; of two series of paddles arranged in the opposite end portions of the said vessel, and operating to work the material in reverse directions, each series of paddles being secured spirally to the said shaft and the paddles at the middle part of the said vessel being arranged to overlap each other in the same circular path, and ejector or separator arms secured to the said shaft and working in the same circular plane at the overlapping portions of the middle paddles.

6. In a mixer, the combination, with a mixing vessel, and a driving shaft journaled therein, said vessel having a semi-cylindrical portion below the axis of the shaft and a curved extension of the said portion above the axis of the shaft on one side of the vessel; of two series of paddles arranged in the opposite end portions of the said vessel, and operating to work the material in opposite directions, said paddles being secured to the said shaft and arranged spirally and adapted to raise the material against the said curved extension, guard plates arranged at the end portions of the said curved extension and forming a discharge gap for the material, and a support for the said vessel which permits it to be tilted upon the axis of its driving shaft.

7. In a mixer, the combination, with a mixing vessel, and a driving shaft journaled therein; of two spiral conveyers secured on the shaft and arranged right and left so that the material is worked from the ends of the vessel to its middle part, guard plates secured to one side of the vessel parallel to the said shaft and projecting above its top edge and forming a discharge gap at the middle part of the vessel of less length than the length of the vessel, and a support for the said vessel which permits it to be tilted upon the axis of its driving shaft to discharge the material through the said gap.

In testimony whereof I have affixed my signature in the presence of two witnesses.

PERRY L. BLYSTONE.

Witnesses:
J. A. BOLARD,
H. J. LE FEVRE.