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APPARATUS FOR MIXING MINERAL OR OTHER DRY SUBSTANCES.

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WITNESSES.

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To all whom it may concern:

Be it known that I, CHARLES WILLIAM SPEIRS, of London, England, have invented new and useful Improvements in Apparatus for Mixing Mineral or other Dry Substances, of which the following is a specification.

This invention relates to apparatus for mixing materials for the formation of cement, pigments, different kinds of flour, and other materials in a dry condition and either in small pieces or in powdered form.

An apparatus constructed according to the said invention comprises two concentric spirals or conveyors rotating upon a common axis, one of the said spirals being adapted for moving the materials in one direction and the other for moving them in the opposite direction. In practice it is preferable that both spirals should be fixed to a single shaft, one of the said spirals having a right-hand thread and the other a left-hand thread.

To enable the invention to be fully understood, it is hereinafter described by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of the improved mixer and showing both signals mounted on one shaft and having threads of different hand. Fig. 2 is a transverse section on the line 2 2 of Fig. 1.

a is a box or chamber in which the mixing takes place, the said box or chamber being provided with an inlet-hopper b, which is preferably movable relatively with the box and with a discharge-aperture designed to be closed by a slide d.

e f are the two spirals, the former of which at its lower part approximately fits the lower part of the casing a, as shown in Fig. 2, and the latter of which is of a diameter to fit within the spiral e, the spiral e, as shown, being formed with a left-hand thread and the spiral f with a right-hand thread. Both of the said spirals are securely mounted on a shaft g, to which motion may be communicated by means of a belt running upon a pulley h or by any other suitable means.

In the drawings it will be noticed that at the points where the two spirals intersect clips i are fixed for the purpose of holding the two spirals in their proper position relatively with each other.

In using the apparatus the discharge-aperture c is closed during the mixing operation by the slide d, and the material to be mixed is introduced through the hopper b, so that it fills the mixing-chamber a for, say, one-third of its depth—that is to say, to a level somewhat below the shaft g. If now the double spiral is caused to rotate in the direction of the arrow 1, the material lying in the bottom of the casing a and which is acted upon by the spiral e will be moved in the direction of the arrow 2, while the material which is in contact with the lower portion of the spiral f will be moved in the reverse direction. As the material which is moved by the spiral e reaches the discharge end of the chamber and is crowded more or less into a heap, it is taken hold of by the spiral f and moved in the reverse direction, so that as long as the double spiral is kept rotating two layers of material will be kept constantly moving one over the other in opposite directions throughout the whole length of the machine, whereby thorough mixing will take place. When the mixing is complete, the slide d is drawn back, so that the mixed material will be discharged through the aperture c, the outer spiral e entirely cleaning the chamber.

A great advantage of the construction hereinbefore described is that the apparatus is equally efficient for mixing large or small quantities of materials. For instance, suppose a quantity of material is introduced into the apparatus which when spread near the bottom of the chamber would not have sufficient depth to be acted upon by the inner spiral f. When now the double spiral is rotated, this material will be moved in the direction of the arrow 2 and as it is crowded up at the discharge end will be taken hold of by the spiral f and moved in the reverse direction until it falls behind the part of the spiral e which is practically empty, when it will be again moved in the direction of the arrow 2, and so on—that is to say, the mixing will be performed by a number of convolutions of the spirals corresponding with the quantity of material to be mixed.

As the area of the spiral f in contact with...
the material to be mixed is considerably less than that of the spiral, it is necessary, as both spirals are rotated at the same speed, that the inner spiral should have a greater pitch than the outer spiral, so as to move the material of the upper layer more rapidly than that at which the lower layer is moved.

When the apparatus is used in connection with a series of bins from which the different materials to be mixed are obtained, I advantageously make the hopper so that it can be moved from point to point to bring it beneath the discharge-spouts of the different bins as required. It will also be obvious that, if desired, a series of hoppers may be made use of.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed,

I declare that what I claim is—

1. In an apparatus for mixing substances, the combination with a stationary horizontal inclosing casing having a curved bottom and a closed end, of a horizontal rotatable shaft extending through said casing, a spiral feeding device secured to said shaft and arranged to feed material toward said closed end, a spiral feeding device of smaller diameter secured to said shaft, within said larger spiral and having a reverse pitch, whereby the mixing of a small amount of material is insured, substantially as described.

2. In an apparatus for mixing substances, the combination with a stationary horizontal inclosing casing having a curved bottom and a closed end, of a horizontal rotatable shaft extending through said casing, a spiral feeding device secured to said shaft and arranged to feed material toward said closed end, a spiral feeding device of smaller diameter secured to said shaft, within said larger spiral and having a reverse pitch, said casing having a discharge aperture adjacent to said closed end, and means for closing said aperture, whereby by opening said aperture the material will be discharged without altering the speed or direction of rotation of said shaft, substantially as described.

Witnesses:

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