No. 779,836. PATENTED JAN. 10, 1905.

T. J. BROUGH.

FILLING MACHINE.

APPLICATION FILED AUG. 5, 1904.

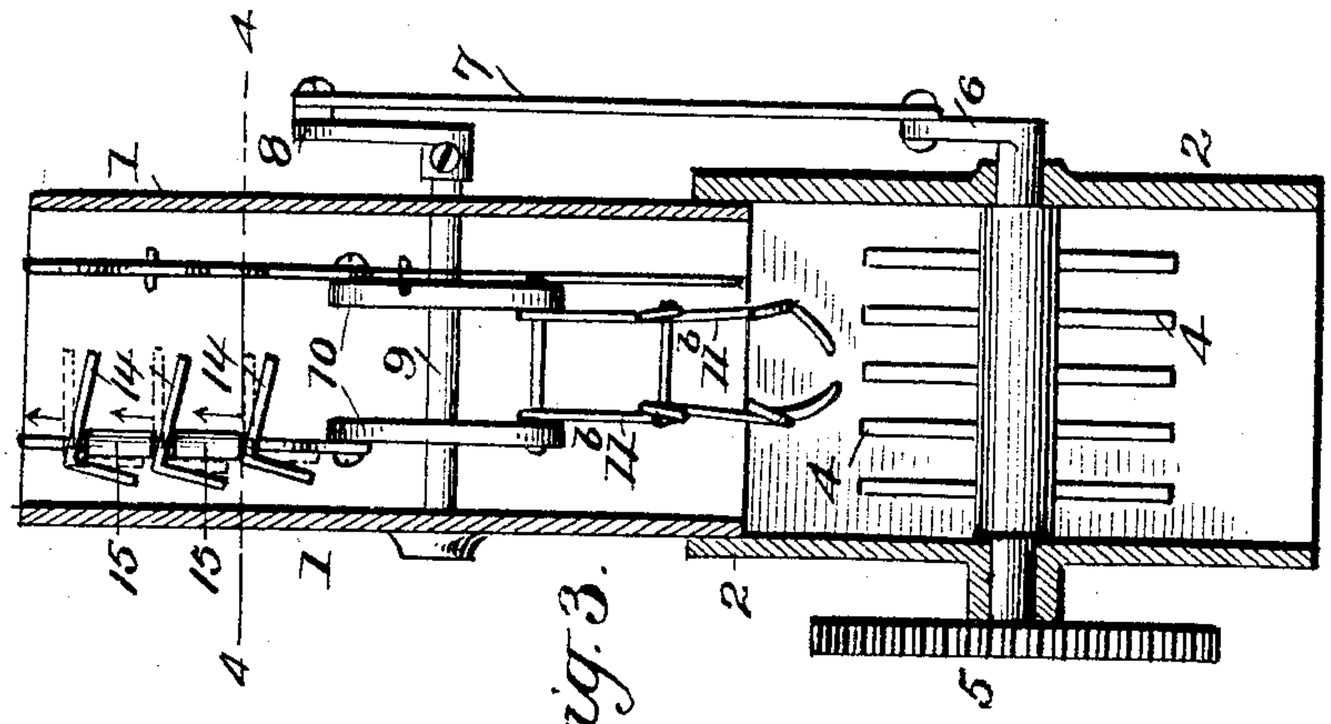

Fig. 3.

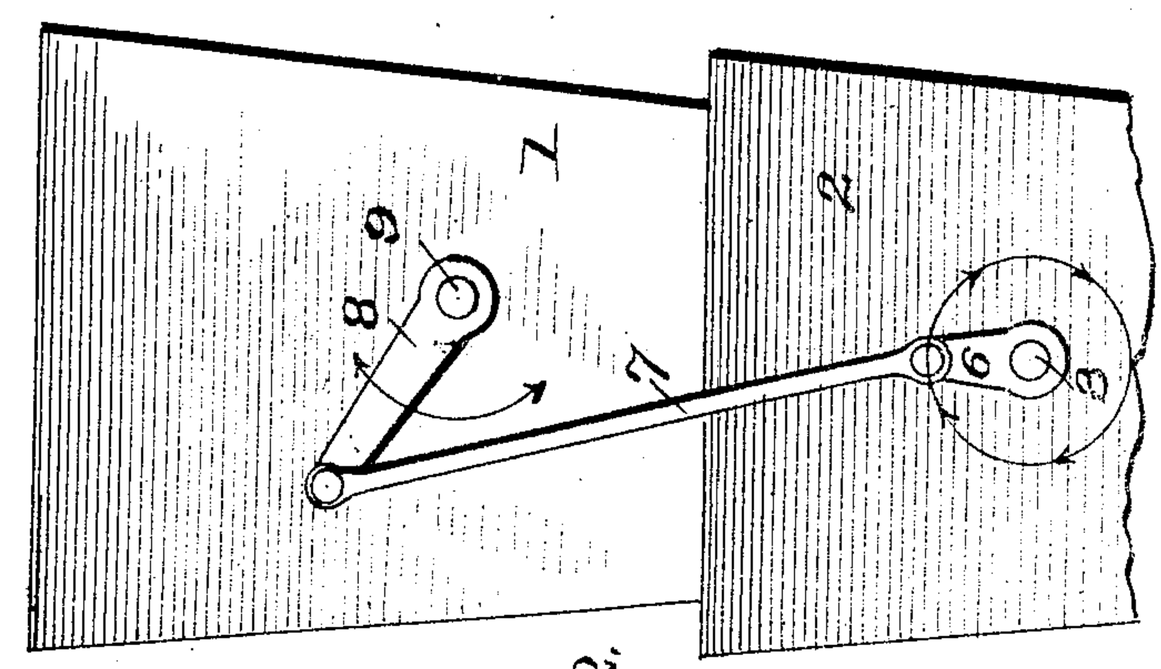

Fig. 2.

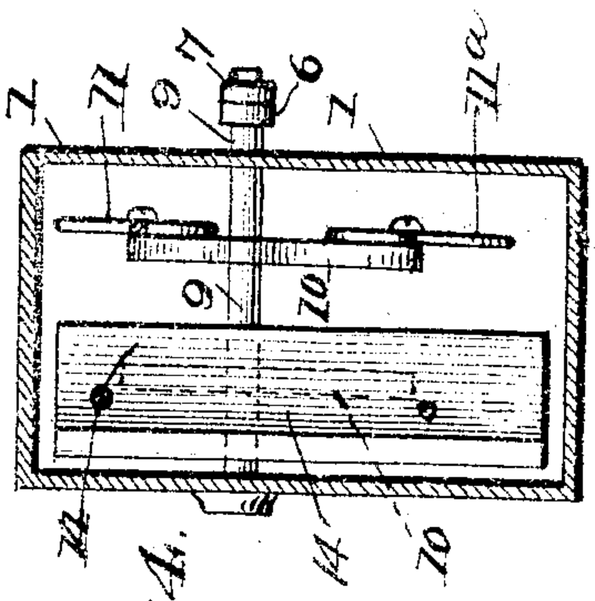

Fig. 4.

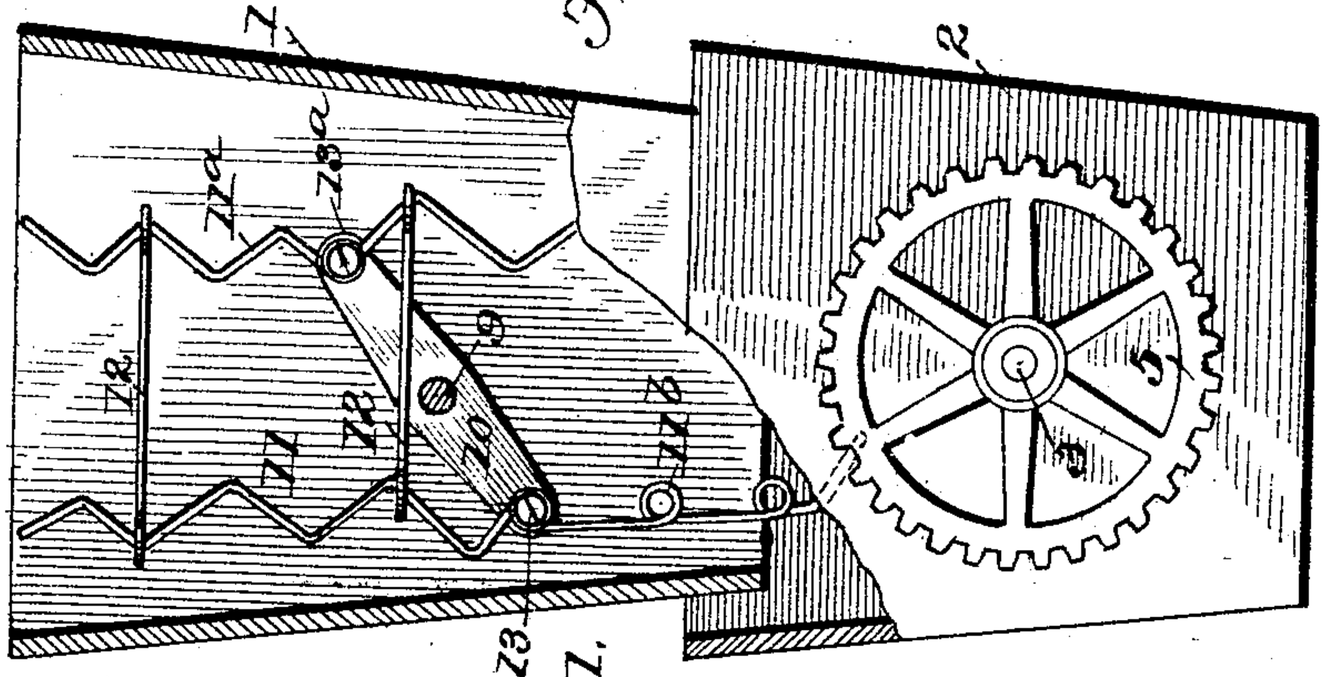

Fig. 1.

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No. 779,836. Patented January 10, 1905.

UNITED STATES PATENT OFFICE.

THOMAS J. BROUGH, OF BALTIMORE, MARYLAND.

FILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 779,836, dated January 10, 1905.

Application filed August 5, 1904. Serial No. 219,659.

To all whom it may concern:

Be it known that I, THOMAS J. BROUGH, a citizen of the United States, residing at Baltimore, in the State of Maryland, have made certain Improvements in Filling-Machines, of which the following is a specification.

In packaging granulated and pulverulent substances—such as tea, flour, and sulfur—and also in bottling liquids which are sticky and thick much difficulty is experienced owing to the material becoming packed or sticking in the hopper, so that it fails to deliver with sufficient freedom and rapidity. I have devised an improved and highly-efficient means for agitating the material and causing it to flow from the hopper with due freedom, rapidity, and uniformity.

The details of construction, arrangement, and operation of parts are as hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1 is in part a side view and in part a vertical section of a hopper provided with my improved agitator. Fig. 2 is a side view of the same. Fig. 3 is a longitudinal section. Fig. 4 is a cross-section on the line 4 4 of Fig. 3.

1 indicates a receiving-hopper, and 2 a delivery-hopper, the same being arranged substantially as illustrated in my Patent No. 749,659, dated January 12, 1904. Within the lower or delivery hopper is arranged a rotary agitator comprising a horizontal shaft 3, having a series of radial teeth 4. One end of such shaft is provided with a spur-gear 5, which in practice is geared with any suitable motor for rotating it. The other end of said shaft is provided with a short crank 6, which is connected by a rod or pitman 7 with the crank 8 of rock-shaft 9, which is arranged horizontally in the receiving-hopper 1. This shaft 9 has two cross-arms 10, which are spaced apart and arranged parallel. To the ends of said arms the agitator proper is attached. As shown best in Fig. 1, the agitator is composed of zigzag bars or rods or stout wires 11 and 11^a, the same being bent alternately to the right and left, so as to form practically a series of right angles. The two sets of rods or wires 11 11^a stand vertical and practically parallel to each other. They are connected by cross and tie rods 12, the same being located at suitable intervals or distances apart. It is apparent that if the shaft 3 be rotated a rocking or oscillating movement will be imparted to the shaft 9, and thereby to its fixed arms 10, and therethrough a vertical reciprocating movement will be in turn imparted to the zigzag rods 11 11^a, one set, 11, going down as the other, 11^a, goes up. It is further apparent that the two sets of rods 11 11^a have also a lateral movement in addition to the vertical one, although this is limited, corresponding to the arc in which the arms 10 vibrate. By this means the material deposited in the receiving-hopper 1 is very thoroughly agitated and loosened or broken up, so that it flows downward with due rapidity and uniformity. As shown in Fig. 1, the zigzag rods 11^a are continued below the pivotal point 13^a. From the other pivot, 13, depends a pivoted agitator 11^b, which is composed of parallel wires having transverse connections and bent to form eyes, their lower ends preferably converging toward each other and extending downward into close proximity to the teeth 4 of shaft 3. This pendent and supplemental agitator 11^b swinging free, as will be understood, takes a wider range of movement than would be practicable if it were a rigid continuation of the rods 11.

Another feature of the agitator is the provision of one or more oscillating plates 14, which are preferably right angular in form and applied to the rods 11, as indicated in Figs. 3 and 4—that is to say, the said plates extend in length nearly the width of the hopper and are held spaced apart by means of sleeves or ferrules 15. Their shorter arms are pendent on the outer side of the rods, while the longer side projects into the middle portion of the hopper or the passage-way through which the material must flow. The holes through which the rods 11 pass are made quite large or of sufficient diameter to permit the plates 14 to oscillate with considerable freedom. When the rods 11 are ascending, as indicated by the arrow in Fig. 3, the said plates 14 will assume the angles represented by full lines; but when the rods descend the

plates 14 will assume the horizontal position indicated by dotted lines. In other words, the plates 14 oscillate within a narrow arc, as indicated by the full and dotted lines, respectively. By this means the material fed into the hopper is thoroughly agitated in the central portion and is forced downward as the plates 14 descend.

Taken as a whole my improved agitator has proven highly efficient for its purpose, not only for use with finely-powdered material, such as flour and sulfur, which tends to pack and "bridge" in the hopper, but also for promoting the flow of viscid liquids, such as thick molasses.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a receiving-hopper, of an agitator arranged therein and comprising a transverse shaft having arms projecting in opposite directions, and devices connected with the opposite ends of said arms whereby, as the shaft rocks, the rods alternately ascend and descend and are moved laterally, substantially as described.

2. The combination, with a hopper, the agitator arranged therein and comprising a transverse rock-shaft having radial arms, the rods pivoted to the ends of the same and extending upward and tie rods or braces connecting and supporting the same, substantially as described.

3. The combination, with a hopper, and a rock-shaft having radial arms, of a pendent agitating device which is pivotally connected with the outer ends of said arms, the device comprising wires arranged practically parallel and provided with projecting portions, substantially as described.

4. The combination, with a hopper, of an agitator comprising rods arranged vertically in the hopper, means for reciprocating said rods, and plates secured loosely to rods and projecting horizontally, substantially as described.

5. The combination, with the hopper, of an agitating device comprising a vertical support and means for reciprocating it within the hopper, and a plate loosely attached to said support and constructed in right-angular form, one portion or arm projecting horizontally and the other vertically, substantially as described.

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