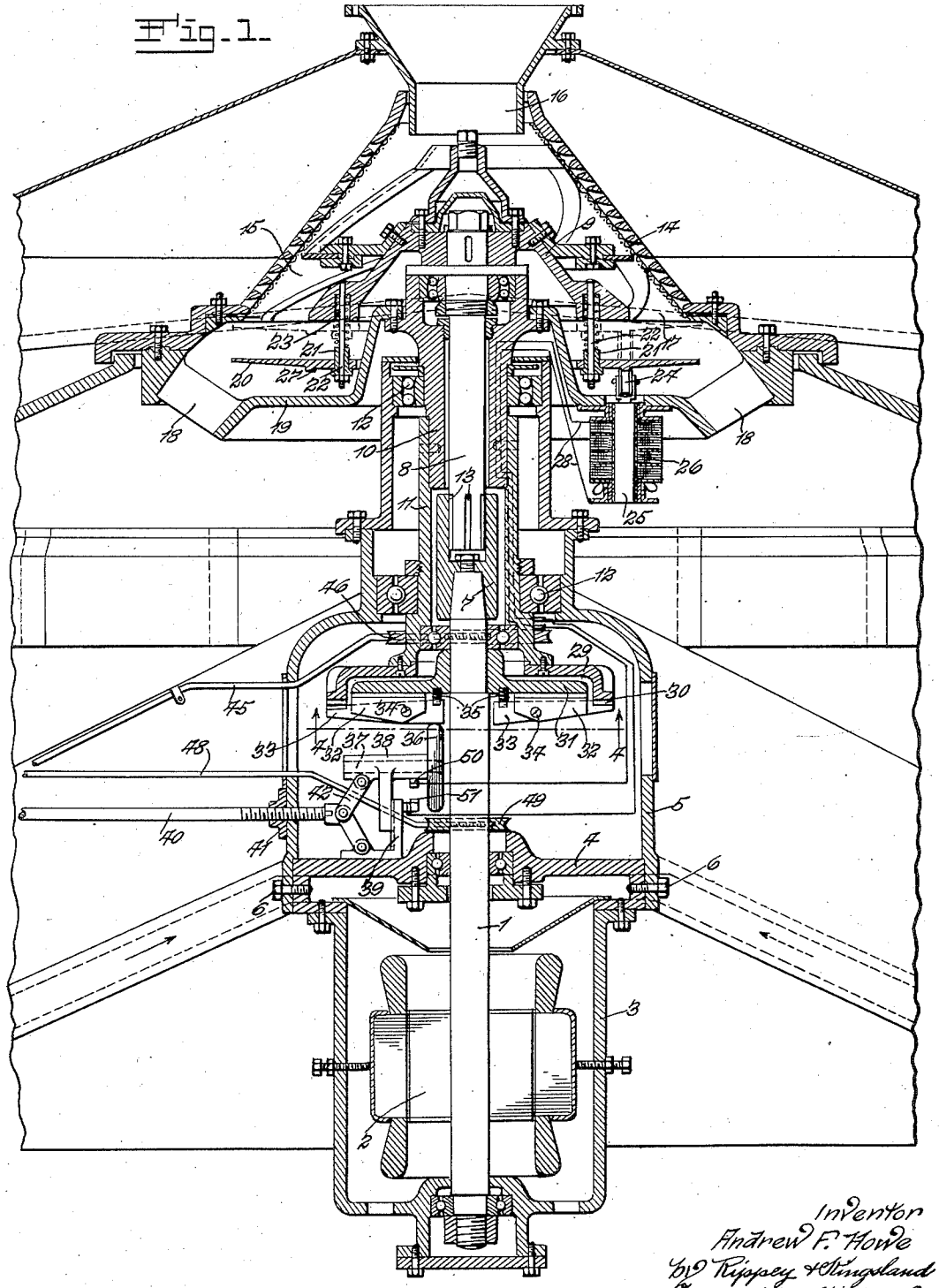
June 9, 1936. A. F. HOWE 2,043,662

CENTRIFUGAL DRIVING MECHANISM

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Fig. 1.



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Fig. 2.

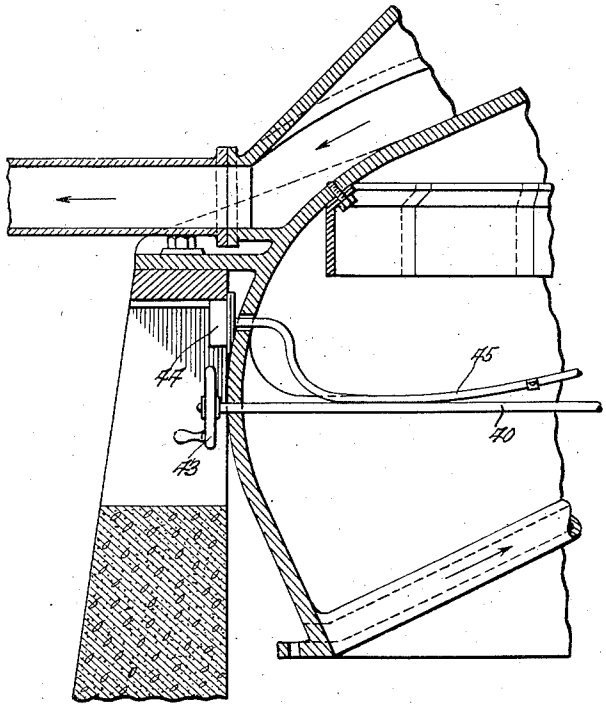


Fig. 3.

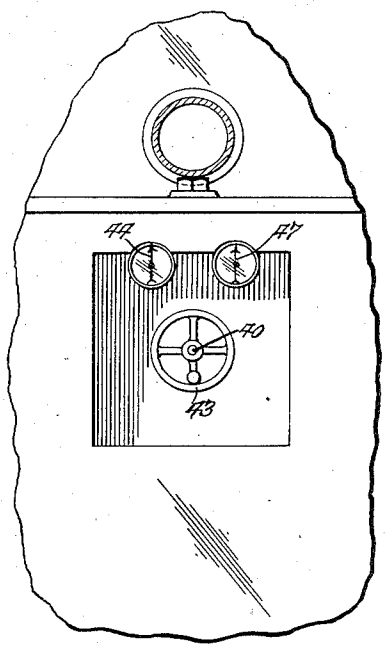
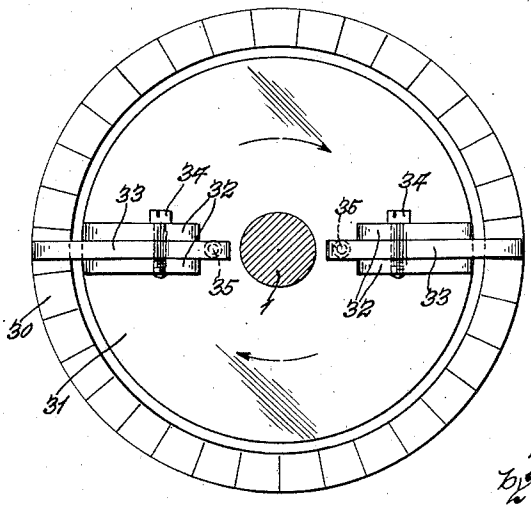


Fig. 4.



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CENTRIFUGAL DRIVING MECHANISM

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5 Claims. (Cl. 210—69)

This invention relates to centrifugal driving mechanism, and has special reference to mechanism for driving a centrifugal drier.

Objects of the invention are to provide an improved driving mechanism for rotating the distributing cone and the conical screen that surrounds the centrifugal cone at uniform or varying speeds as desired; to provide means for closing the outlet from the space between the cone and the screen automatically and as an incident to the rotation of the cone and the screen at uniform speed, and for opening said outlet automatically and as an incident to the rotation of the screen at a speed slower than the speed of rotation of the cone; and to provide means for indicating the relative speed of rotation of the screen and the cone.

Another object of the invention is to provide an improved centrifugal drier equipped with driving mechanism comprising a drive shaft rotated by a motor at any desired speed, and means for rotating the centrifugal cone of the drier by said shaft, in combination with a shaft for rotating the screen of the centrifugal drier, and mechanism for rotating said second shaft by said first shaft at variable speeds whereby the screen may be rotated at uniform speed with the cone or at slower speed than the cone as desired.

Various other objects and advantages of the invention will be readily apparent from the following description, reference being made to the annexed drawings, in which—

Fig. 1 is a vertical sectional view of a centrifugal drier equipped with the present invention.

Fig. 2 is a view showing the manually operative connections for controlling the speed of rotation of the screen whereby said screen may be caused to rotate at uniform speed with the distributing cone of the drier, or to rotate slower than the cone as desired.

Fig. 3 is an outer end elevation of the mechanism shown in Fig. 2.

Fig. 4 is an enlarged sectional view on the line 4—4 of Fig. 1.

The vertical drive shaft 1 is rotated by a motor 2 mounted within a housing 3 attached to a removable and replaceable support 4. The support 4 is attached to a housing 5 by removable and replaceable screws 6. A coupling sleeve 7 is attached to the upper end of the shaft 1 and is slidable on and withdrawable from the lower end of a vertical shaft 8 which is in axial alinement with the shaft 1 and supports and rotates the distributing cone 9 of a centrifugal drier.

A tubular shaft comprising two attached members 10 and 11 is rotatively supported in bearings 12 mounted in an upwardly extended portion of the housing 5. The shaft 8 extends into and is coaxial with the tubular shaft. The coupling 7 has tongue-and-groove connection 13 with the shaft 8, so that the shaft 1 will rotate said shaft 8.

A conical screen 14 surrounds and is separated from the cone 9 by an intervening space 15 provided with an inlet passage 16 at its upper end and with an outlet passage 17 at its lower end. The screen 14 is supported by webs 18 rigid with an annular member 19 attached to the upper end of the tubular shaft member 10.

An annular closure member 20 is supported by sleeves 21 mounted for sliding movements along vertical rods 22 attached to and projecting downwardly from the lower marginal portion of the cone 9. Springs 23 act against the lower portion of the cone 9 and against the upper ends of the sleeves 21 and cooperate with gravity and with the material supported in the space 15 to move the member 20 from closed position to open position.

A roller 24 supported by the armature 25 of a solenoid magnet 26 operates against an annular rib 27 on the underside of the closure member 20, and is effective to raise the closure member 20 to position to close the outlet opening 17 when the magnet is energized by electrical energy supplied through wires 28.

A disc 29 is attached to the lower end of the tubular shaft member 11 and is integral with an annular rack 30 concentric with the axis of the shaft 1. A supporting disc 31 is rigidly attached to the shaft 1 and has two pairs of downwardly extended spaced flanges 32 in rigid connection therewith. An arm 33 is mounted on a pivot 34 between each pair of flanges 32, and the outer ends of said arms are actuated in a direction to engage the teeth 30 by springs 35. The arrangement of the rack teeth 30 is such that, when one of the arms 33 is engaged between any of said teeth, the other arm 33 is engaged with the lower end of one of said teeth. Thus, it is impossible for both arms 33 to be engaged between teeth 30 at the same time.

A roller 36 is mounted on an axle member 37 journalled in a vertically movable bracket 38. The bracket 38 is mounted for vertical sliding movements along a supporting bracket 39. By moving the bracket 38 upwardly, the roller 36 may be located in the path of the inner ends of the arms 33, so that said arms 33 will be alternately engaged between and disengaged from between teeth 30 when the machine is in operation. This mechanism constitutes a species of escapement whereby a lost motion on the part of the screen 14 may be brought about to permit said screen to be rotated slower than the cone 9. By moving the bracket 38 downwardly to position in which the roller 36 will not be engaged by the arms 33, the screen 14 and cone 9 will continue to be rotated at the same speed because there

will be no disengagement of the arms 33 from the teeth 30.

A rod 40 is screwed through a threaded support 41 which includes the wall of the housing 5. The threaded engagement of the rod 40 with the support 41 constitutes means for moving said rod 40 longitudinally inwardly and outwardly when said rod is rotated. The inner end of the rod 40 is pivotally connected with one end of a link 42, the opposite end of which link is pivotally connected with the bracket 38. Consequently, when the rod 40 is moved inwardly, the bracket 38 will be moved upwardly and will carry with it the roller 36, thereby locating said roller in position to be engaged by the inner ends of the arms 33 to effect differential rotation of the screen 14 with respect to the cone 9. And, when the rod 40 is moved outwardly, the bracket 38 will be moved downwardly and will carry with it the roller 36, thus locating the parts so that said roller will not operate the arms 33. This mechanism constitutes means for optionally rotating the screen 14 at the same speed as the cone 9 rotates or at slower speed as desired. The outer end of the rod 40 is equipped with a crank device 43 whereby said rod may be manually rotated.

A tachometer instrument 44 has a connection 45 operatively engaging a gear member 46 on the tubular shaft element 11 in a known manner to indicate the speed of rotation of said shaft member 11, which is the speed of rotation of the screen 14. A similar tachometer instrument 47 has an operating connection 48 with a gear member 49 attached to the shaft 1 for indicating the speed of rotation of said shaft 1. Thus, the operator may easily observe the relative speeds of rotation of the cone 9 and the screen 14.

One of the electric circuit wires 28 leads to a contact member 50 on the bracket 38, and the other wire 28 leads to a contact member 51 on the supporting bracket 39. When the bracket 38 is moved downwardly to place the roller 36 in ineffective position, the contact member 50 is automatically engaged with the contact member 51, thereby closing the circuit to the magnet 26 and energizing said magnet. When the magnet is energized, the armature 25 is moved upwardly and the closure member 20 is thereby supported in position across the outlet opening 17 and supports the material in the space 15. In this way, the drier is transformed into a batch drier automatically and as an incident to an operation and adjustment of parts effecting uniform rotation of the cone 9 and screen 14. When the parts are operated and adjusted to effect slower rotation of the screen 14 in comparison with the speed of rotation of the cone 9, the contact members 50 and 51 are out of engagement with each other, the magnet 26 is deenergized, and the weight of the closure member 20 assisted by the springs 23 and the material passing through the space 15 moves said member 20 downwardly to open the outlet opening 17 so that there may be a continuous flow of material through the drier.

The foregoing description of the construction, arrangement and operation of the various parts should be sufficient to enable any one skilled in the art to understand the operation of the complete machine without repetition. The mechanisms may be varied as widely as the scope of equivalent limits will permit without departure from the nature and principle of the invention.

I claim:—

1. In a machine of the character described, the combination of a distributing cone, a rotary shaft supporting said cone, a screen surrounding and separated from said cone by an intervening space which is adapted to receive material, a rotary tubular shaft supporting said screen and enclosing said first shaft, a support attached to said first shaft, an annular rack attached to said tubular shaft, arms pivoted to said support and movable into and out of engagement with said rack, means for holding said arms in engagement with said rack, and means for disengaging said arms from said rack intermittently during rotation of said first shaft.

2. In a machine of the character described, the combination of a distributing cone, a rotary shaft supporting said cone, a screen surrounding and separated from said cone by an intervening space which is adapted to receive material, a rotary tubular shaft supporting said screen and enclosing said first shaft, an annular rack attached to one of said shafts, a support attached to the other shaft, arms pivoted on said support for engagement with said rack to rotate said tubular shaft by said first shaft, means for engaging said arms with said rack, and means for alternately and intermittently disengaging said arms from said rack during rotation of said first shaft.

3. In a machine of the character described, the combination of a distributing cone, a rotary shaft supporting said cone, a screen surrounding and separated from said cone by an intervening space which is adapted to receive material, a rotary tubular shaft supporting said screen and enclosing said first shaft, an annular rack attached to one of said shafts, arms pivotally supported by the other shaft for engaging said rack to rotate said tubular shaft by said first shaft, and means for alternately and intermittently engaging said arms with said rack during rotation of said first shaft.

4. In a machine of the character described, the combination of a distributing cone, a rotary shaft supporting said cone, a screen surrounding and separated from said cone by an intervening space which is adapted to receive material, a rotary tubular shaft supporting said screen and enclosing said first shaft, an annular rack attached to one of said shafts, arms supported by the other shaft and movable into and out of engagement with said rack to rotate said tubular shaft by said first shaft, and mechanism for alternately and intermittently engaging said arms with and disengaging said arms from said rack during rotation of said first shaft.

5. In a machine of the character described, the combination of a distributing cone, a rotary shaft supporting said cone, a screen surrounding and separated from said cone by an intervening space which is adapted to receive material, a rotary tubular shaft supporting said screen and enclosing said first shaft, an annular rack attached to one of said shafts, arms supported by the other shaft for alternate engagement with and disengagement from said rack to rotate said tubular shaft by said first shaft, and means for effecting alternate and intermittent engagement and disengagement of said arms with said rack or leaving one of said arms in permanent engagement with said rack as desired.

ANDREW F. HOWE.