

E. F. CASSEL.
 WASHING MACHINE.
 APPLICATION FILED FEB. 28, 1914.

1,271,433.

Patented July 2, 1918.

Fig. 1.

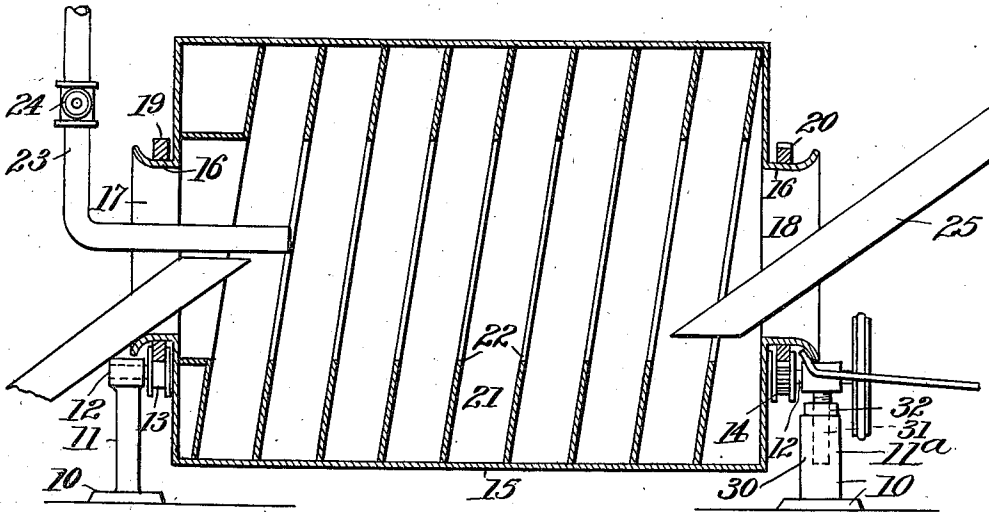


Fig. 2.

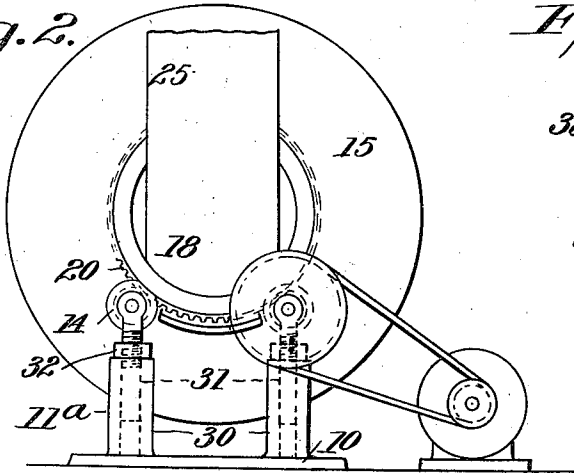


Fig. 4.

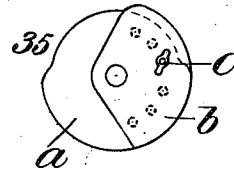
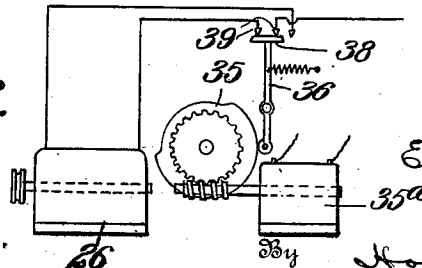


Fig. 3.



Witnesses
W. W. Walker
W. Johnson

Inventor
Elmer F. Cassel
Hodges & Hodges
 Attorney

UNITED STATES PATENT OFFICE.

ELMER F. CASSEL, OF NEW YORK, N. Y.

WASHING-MACHINE.

1,271,433.

Specification of Letters Patent.

Patented July 2, 1918.

Application filed February 28, 1914. Serial No. 821,695.

To all whom it may concern:

Be it known that I, ELMER F. CASSEL, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented new and useful Improvements in Washing-Machines, of which the following is a specification.

This invention relates to apparatus in which aqueous baths or solutions are employed for separating materials.

One of the objects of the invention is to provide an improved apparatus constructed to impart a desirable agitation to the materials being treated, tending to facilitate the separation thereof. A further object is to provide an apparatus provided with means for ejecting separated materials at different points. A further object is to provide means whereby the length of time of the agitation of the materials being separated, may be increased without changing the degree of agitation.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawing:—

Figure 1 is a longitudinal sectional view of a washing apparatus embodying my invention. Fig. 2 is an end view thereof. Fig. 3 is a diagrammatic view illustrating the mechanism for rotating the apparatus. Fig. 4 is a detail view illustrating a reversing cam.

Referring to the drawings, 10, 10, designate bases provided with pedestals 11, 11^a, arranged in pairs and provided with bearings for short shafts 12 which carry bearing wheels 13, 14, respectively. A cylinder 15 is provided at each end with neck-like portions 16 provided with orifices 17, 18, respectively said necks being surrounded by bearing collars 19, 20, respectively, said collars resting upon the wheels 13, 14, whereby the cylinder is rotatably supported. The bearing wheels 14 may be in the form of toothed pinions and the bearing ring 20 in the form of a toothed gear meshing therewith. By this means the cylinder may be rotated by the rotation of the bearing wheel 14, to which power is applied in any suitable manner. The interior of the cylinder is provided with a continuous channel 21 formed by a helically arranged flange 22, a cylindrical space being formed in the middle of the cylinder by the edges of said flanges. A pipe 23 leads into the orifice 17

and is controlled by a suitable valve 24. A chute or similar device 25 leads into the orifice 18. The cylinder 15 may be rotated in any suitable manner, but for the purposes of illustration I have disclosed an electric motor 26 receiving its current from any suitable source and operatively connected with one of the wheels 14.

In the operation of the apparatus, the progressive forward and reverse rotation of the cylinder, causes the helical channel 21 to conduct certain particles of the materials which have been introduced through the orifice 18 by means of chute 25, normally in a forward direction toward the orifice 17. The aqueous bath or washing fluid is introduced through the pipe 23, or any other suitable means, and its flow causes other particles to be conducted toward a different orifice 18. It is also desirable to have the axis of the plane of the cylinder adjustable. For this purpose I have illustrated the pedestals 11^a with sleeve-like portions 30 in which are loosely inserted threaded shafts 31 which support bearing members for the shafts 12 of the bearing wheels 14. The nut 32 resting on top of the sleeve 30 permits the bearing to be elevated or depressed as may be desired. The tendency therefore is to cause a separation of the particles of the material being treated, certain particles being deposited in the said helical channel, and other particles remaining in suspense in the flowing liquid, thereby causing one class of particles to be propelled toward one discharge point of the apparatus, by the progressive movement of the helical channel, and another class of particles to be propelled toward a different discharge point, by the flow of the liquid, as is well known in the art of separation of particles by agitation in a flowing liquid. In said art it is well known that different materials contain particles having settling qualities of different characteristics when subjected to agitation in a flowing liquid, a given degree of agitation in combination with a given rate of flow of liquid, producing the most desired result in the separation of the particles of a given class of material. This applies to minute particles, to particles of great magnitude, and to all intermediate gradations and mixtures of particles. In an apparatus for the practice of this art, it is further desirable that a definite degree of agitation may be maintained, in combina-

tion with different lengths of time of agitation, thus making the apparatus adjustable to the definite characteristics of settling qualities of the particles, where the time of agitation requires to be varied, without varying the degree of agitation, in order to secure the desired result. The progressive and reverse revolutions of the helical channel 15 furnish a desirable agitation, tending to facilitate the separation of the particles being treated, and the means, described in the following paragraph, for varying the rate of progression of the progressive forward and reverse revolutions, provides a means for adjusting the apparatus to the time of agitation best suited to a given material, without changing the degree of agitation.

Means for varying the length of time of agitation with respect to the degree of agitation may be provided by the following or any other suitable means. In the drawing I have shown for the purpose of illustration a segment 35 driven by suitable means, such as motor 35^a, which segment may be of any desired length. In the illustration this segment acts as a cam to operate an arm 36 pivotally supported in any suitable manner and provided with contacts 38 arranged to engage current contacts 39 in the well known manner of a reversing switch in the electrical art, whereby the direction of rotation of the motor is periodically reversed. By means of this arrangement the cylinder 15 may be rotated in a forward direction for a time and then in the reverse direction for a different length of time *i. e.*, by this means the cylinder may be rotated in a progressive direction with relation to the action of the spiral channel 21, say for two revolutions, and then be rotated in a retrogressive direction, say for one revolution, the result being that with the same speed of rotation, which determines the degree of agitation of the materials within the cylinder, the materials having only progressed in the direction of the orifice 17 the distance due to one revolution of the cylinder 15, and have at the same time been subjected to the agitation due to three revolutions of said cylinder. It is obvious that this differential rotation of the cylinder may be varied as desired by suitably varying the length of the segment 35. If desired the cam segment 35 may be made adjustable as illustrated in Figs. 4 and 5, in which the cam is formed of two relatively adjustable cam members *a*, *b*, held in adjusted relation by a pin *c*. The length of the cam may be varied by rotating one cam member relatively to the other and locking the same in adjusted position by pin *c*.

From what has been said it will be readily understood that my improved washing apparatus is very simple in construction and ef-

ficient in operation. It is also capable of wide and varied application. For instance by constructing the spiral channel 21 of suitable width and making the flanges 22 of proper height the apparatus may be utilized for laundry purposes, the clothes being introduced by the chute 25, and the washing fluid through the pipe 23. The agitation effected by the rotation of the cylinder, and particularly by the reversal thereof, will effect a thorough cleansing of the clothes as they progress through the cylinder. It will be noted also that the process is practically continuous as long as the supply of clothing is maintained, the soiled clothing entering the cylinder at one end and being discharged at the other end in a thoroughly cleansed condition, the dirt, or separated material flowing out the other end. By slightly changing the width and depth of the spiral channel the machine may be readily adapted for washing coal and the like, the materials to be washed being introduced by the chute 25 and discharged through the orifice 17, the water being introduced through pipe 23. By making the spiral channel 21 of a different width and proper relative depth the machine may be utilized for separating materials of various kinds. These changes are such variations as would at once suggest themselves to persons skilled in the art and being changes in degree have not been illustrated.

Having thus explained the nature of my invention and described an operative manner of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the forms of its use, what I claim is:—

1. An apparatus for separating material comprising a rotatably mounted helical channel, means for automatically imparting alternate opposite rotations to said channel, with periods of rotation in one direction of longer duration than the periods of rotation in the other direction.

2. An apparatus for separating material comprising a rotatably mounted helical channel, means for automatically imparting alternate opposite rotations to said channel, with periods of rotation in one direction of longer duration than the periods of rotation in the other direction, the bottom portions of said channel being in the same plane.

3. An apparatus for separating material comprising a rotatably mounted helical channel, means for automatically imparting alternate opposite rotations to said channel, with periods of rotation in one direction of longer duration than the periods of rotation in the other direction, and means whereby the relative periods of rotation may be varied.

4. An apparatus for separating material comprising a rotatably mounted helical channel, means for automatically imparting alternate opposite rotations to said channel, 5 with periods of rotation in one direction of longer duration than the periods of rotation in the other direction, the bottom portions of said channel being in the same plane, and means whereby the relative periods of rotation may be varied. 10

5. An apparatus for separating material comprising a rotatably mounted helical channel, and means for automatically imparting alternate forward and reverse rotations to said channel, with periods of forward rotation of longer duration than the periods of reverse rotation. 15

6. An apparatus for separating material comprising a rotatably mounted helical channel, means for automatically imparting alternate opposite rotations to said channel, with periods of rotation in one direction of longer duration than the periods of rotation in the other direction, and means for subjecting material in said channel to the action of an aqueous solution traveling in a direction opposite to the direction of rotation of greatest amplitude. 25

7. An apparatus for separating material comprising a rotatably mounted helical channel, and means for automatically imparting alternate forward and reverse rotations to said channel, with periods of forward rotation of longer duration than the periods of reverse rotation, and means for subjecting material in said channel to the action of an aqueous solution traveling in a direction opposite to the forward rotations of said channel. 30

8. An apparatus for separating materials comprising a horizontally disposed rotatably supported cylinder open at each end and provided with an internal helical channel, and means for automatically imparting alternate opposite rotations to the said channel, with periods of rotation in one direction of longer duration than the periods of rotation in the other direction. 40

9. An apparatus for separating materials comprising a horizontally disposed rotatably supported cylinder open at each end and provided with an internal helical channel, and means for automatically imparting alternate opposite rotations to the said channel, with periods of rotation in one direction of longer duration than the periods of rotation in the other direction. 45

bly supported cylinder open at each end and provided with an internal helical channel, and means for automatically imparting alternate opposite rotations to the said channel, with periods of rotation in one direction of longer duration than the periods of rotation in the other direction, and means for controlling the relative periods of rotation in either direction. 55

10. An apparatus for separating materials comprising a rotatably supported cylinder open at both ends and provided with an internal helical channel, means for rotating said cylinder, automatic controlling means for periodically changing the application of power by said rotating means to impart alternate forward and reverse rotations to said cylinder, and means governed by said controlling means for causing the movements in the forward direction to be of longer duration than the movements in the reverse direction. 60

11. An improvement in washing machines comprising a rotatably supported cylinder open at each end and provided with an internal helical channel, and means for alternately rotating said cylinder in forward and reverse directions, the periods of forward rotation of longer duration than the periods of reverse rotation. 75

12. An improvement in washing machines comprising a rotatably supported cylinder open at each end and having its inner surface provided with means for causing the material to be treated to travel from one end of the cylinder to the other, a motor for rotating said cylinder in a normally forward direction, and automatic means for temporarily reversing said motor for relatively short periods, the periods of reverse rotation being shorter than the periods of forward rotation. 80

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses. 85

ELMER F. CASSEL. 90

Witnesses:

WM. S. HODGES,
CHAS. E. RIORDON.