The invention provides systems for opening and closing access apertures in the outer walls of tannery paddle tumblers and the like. The system consists of a door which is slid in guides, the movement of the door being controlled by a fluid motor and fluid control. The movement of the door is effected by the fluid motor which moves a rack attached to the door. Means for providing a seal between the door and the access aperture are also described.

3 Claims, 7 Drawing Figures
This invention relates to systems for the closure and opening of access apertures in the peripheral walls of padder tumblers for tanneries or other hollow rotatable bodies.

SUMMARY OF THE INVENTION

The present invention provides a mechanized opening system for a door of a tannery paddle tumbler or the like comprising sliding guide means for the door and a fluid control to slide said door along said guide means between an open position and a closed position and vice versa including a rack control and a fluid motor. The present invention generally permits the manual operations required with such tumblers and the like to be reduced and such operations as are effected to be combined with increased machine production output. Furthermore, a good seal between the door and the rotatable container can be provided for easy discharge of the contents to be effected.

On the tumbler wall, sliding guide means for a door structure are provided with fluid control to slide the door along the said guides between an opening position and a closing position and vice versa. The fluid (hydraulic or preferably pneumatic) control can be operated from a stationary position through manifold means.

Control of the opening system according to the invention is effected by means of a rack and a fluid motor, the rack preferably being integral with the door and the fluid motor with a meshing pinion carried on the paddle tumbler wall.

According to a preferred embodiment of the present invention, the door sliding guides are provided in planes normal to the rotational axis of the tumbler and they are generally arcuate around the generally circular profile of the door section. The corresponding rack or racks are also arcuate, said racks extending on and/or from the door panel to mesh with the pinion or pinions operated by the fluid motor.

In order to provide a seal between the barrel wall and the door in the closed position, there is advantageously provided a resilient packing such as an inflatable enclosure wherein a pressurized fluid may be fed to deform the packing and press it against the inner surface of the door (slidable on the outside of the tubular wall) when the door is in the closed position. In this way, not only is the door provided with a seal but it is also stabilized in the closed position, in aid to braking or restraining means or to an action obtained by means of the motor kept fed in the closing conditions.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood with reference to the accompanying non-limiting drawings which illustrates an embodiment of the present invention. In the drawings:

FIG. 1 is a diagrammatic elevation of one embodiment of the present invention;
FIG. 2 is a diagrammatic partial cross-section along the line II—II of FIG. 1;
FIGS. 3 and 4 shows enlarged detail from a section along line III—III of FIG. 1 and from a section along the line IV—IV of FIG. 3;
FIG. 5 shows particularly enlarged detail from a section along the line V—V of FIG. 1;
FIG. 6 illustrates an operational diagram; and
FIG. 7 illustrates an embodiment with two racks.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, supports 1 and 3 serve to hold a rotor 5 for rotation, the rotor being in the form of a paddle tumbler for a tannery. In FIG. 3, 5A indicates one hub of the rotor 5 for support in rotation. A motor or drive unit for tumbler rotation is indicated generically at 7. An opening 9 in the cylindrical wall of the tumbler is provided with an edge or rim 9A which forms a seat for an annular inflatable packing or gasket 11 which is provided for the hereinafter described purposes. An arcuate panel 13 forming the closing door is the same shape as the tumbler wall and it may slide along arcuate guides 15 fixed onto the outside of the tumbler wall. The sliding of the door 13 along the guides 15 is obtained with the aid of an arcuate rack 17 integral with the door 13 and of a geared pinion 19 meshing therewith and operated by a fluid motor 21 attached to the tumbler wall and fed with fluid in the hereinafter described manner. By the rotation of the fluid motor 21, the door may be slid along the cylindrical wall in a direction normal to the rotational axis of the tumbler.

After the door 13 has been moved by the system of operating parts indicated by the reference numerals 21, 19 and 17 into the closed position (FIG. 5), a fluid (for instance air) may be supplied under pressure to the inflatable chamber of the packing or gasket 11, to deform and press against the door 13 thereby assuring both the desired seal and also a retaining effect. However, the door may be retained in the closed position (and also the open position) by maintaining the fluid feed to the motor so as to force the door against the attained position.

In order to feed fluid to the motor 21 and to the packing 11, it is possible to use a manifold coaxial to one of the hubs about which the tumbler rotates, for instance to the hub 5A shown in FIG. 3. A member 22 attached to the hub 5A forms the movable portion of a manifold. In this member are annular grooves 23 joined by channels, such as those denoted by 25 and 27, to the motor 21 and to the air chamber 11. The channels follow the structure of the rotor and they are provided in a sufficient number to allow the desired control operations to be provided. The rotary member 22 attached to the tumbler is surrounded by a member 29, to which are connected channels 31 fed with fluid, for instance from a power unit. The interior of the member 22 and of the hub 5A can be axially hollow for additional purposes.

The operation of the motor 21 can also be controlled by limit switches, for example those indicated at 35, (see a highly diagrammatic representation in FIG. 6 where the diagram of the circuits is extremely simplified for clarity in drawing). The limit switches may serve, for example, to stop the motor 21 or to arrange for the switching of programs.

In FIG. 7 an embodiment is shown including two racks 43 on the panel 41 of the cover which mesh with coaxial pinions 45 operated by a motor 47.
The described arrangement may be provided with locking means for the panel, for example a hydraulic or pneumatic latch or the like. A locking effect may also be provided using the same fluid motor as is used to open the panel.

It is intended that the drawings should only illustrate an embodiment of the invention and they are given only as a practical demonstration of the invention and not to provide a limitation thereof. The invention may be varied from the illustrated embodiment, for example in the forms and arrangements without departing from the scope of the concept which forms the present invention.

We claim:
1. A tannery paddle tumbler or the like comprising a generally cylindrical rotatable member having an opening formed in the peripheral wall thereof for gaining access to the interior of the tumbler, arcuate guide means mounted on the outer wall of the tumbler adjacent said opening, an arcuate closure member, means for opening and closing movement of said closure member along said arcuate guide means including an arcuate rack attached to the outer surface of said closure member and a motor-driven pinion meshing with said rack and mounted on the outer wall of the tumbler a fluid inflatable elastic gasket around the periphery of the opening in the wall of the tumbler forming a resilient seal between said closure member and the wall of the tumbler, a fluid motor for driving said pinion, and means for introducing fluid from a common source to said motor and to said seal.

2. The apparatus of claim 1 wherein said means for introducing fluid includes an axially extending hub and a member rotatable about said hub defining a plurality of annular grooves through which fluid is permitted to flow in a selective manner.

3. A tannery paddle tumbler or the like comprising a generally cylindrical rotatable member having an opening formed in the peripheral wall thereof for gaining access to the interior of the tumbler, arcuate guide means mounted on the outer wall of the tumbler adjacent said opening, an arcuate closure member, means for moving said closure member along said arcuate guide means for opening and closing said opening, said moving means comprising an arcuate rack attached to the outer surface of said closure member and a motor driven pinion meshing with said rack and mounted on the outer wall of the tumbler, a fluid inflatable elastic gasket around the periphery of the opening in the wall of the tumbler forming a resilient seal between said closure member and the wall of the tumbler, a fluid motor for driving said pinion, an axially extending hub, a rotary member attached to said hub having a plurality of annular grooves formed therein and channels causing selective communication between said grooves whereby fluid can be introduced to said gasket and to said motor, and an enclosure member surrounding said rotary member having radial openings therein for receiving fluid at one end and in selective communication with said annular grooves at their other end.

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