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CLEANING MACHINE SHELL DOOR SEAL ASSEMBLY

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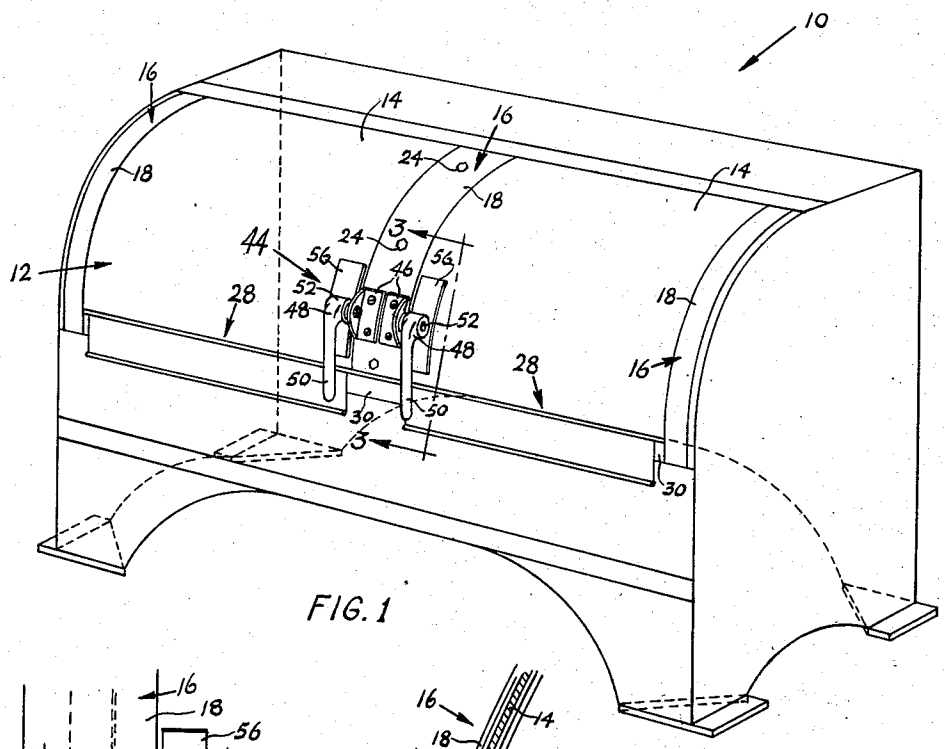


FIG. 1

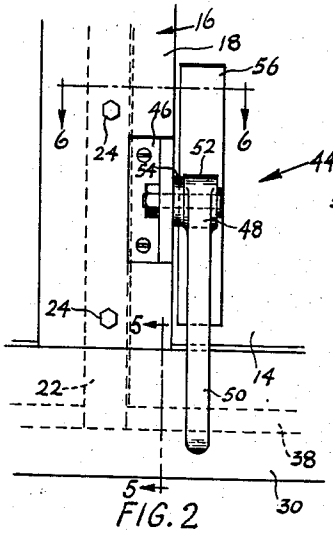


FIG. 2

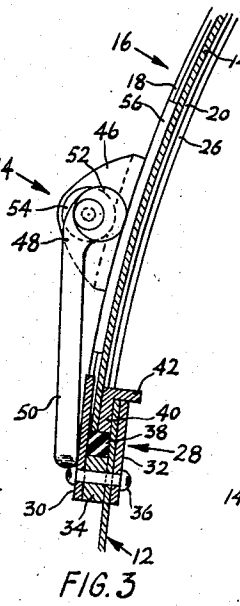


FIG. 3

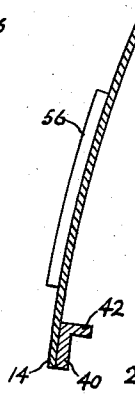


FIG. 4

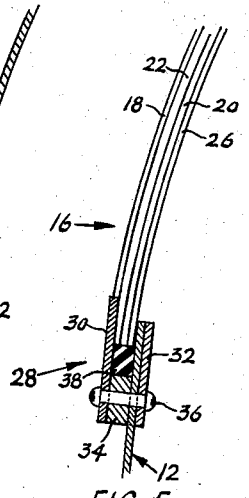


FIG. 5

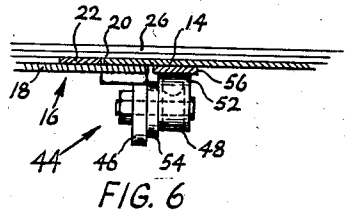


FIG. 6

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CLEANING MACHINE SHELL DOOR SEAL ASSEMBLY

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1 Claim. (Cl. 220—41)

The invention relates to cleaning machines and more particularly to the sealing structure for shell doors for such machines.

In cleaning machines there is generally a shell which houses a rotatable, clothes receiving washing cylinder and a washing fluid. Access to the washing cylinder and the fluid enclosed in the shell is afforded by a door or doors movable on the shell. In machines of this kind, due to the rotation of the washing cylinder the washing fluid is caused to surge in a pumping manner against the inner walls of the shell. Naturally, in structures of this sort it is desirable that when the shell door is closed it will seal the surging fluids in the shell to prevent unnecessary seepage.

The purpose of the present invention is, therefore, to provide a sealing assembly which will effectively seal shell doors of cleaning machines from leakage or seepage of the cleaning fluid enclosed therein when the same is caused to surge in the shell by the pumping rotation of the washing cylinder. However, because of the continuous opening and closing sliding movement of the shell door or doors to enable access to the washing cylinder, the same tend to wear along their sides and about the leading edges to sharp knife surfaces. As a consequence, the wearing and the resultant knife edges have made it difficult in the past to provide an effective, long lasting seal. The instant invention overcomes this difficulty by the provision of a novel means which is included in the sealing assembly to move the door to sealing position to effectively seal the same fluid tightly. It is also an object of the invention to provide compressible sealing means to cooperate with the door when the same is in its closed position, while means are provided on the door to obviate a mutilation of the compressible means by the aforementioned knife surface which eventually forms on the leading edge of the door.

Other and further objects of my invention reside in the structures and arrangements hereinafter more fully described with reference to the accompanying drawings in which:

Fig. 1 is a front perspective view of a cleaning machine and showing a portion of the sealing assembly constructed in accordance with the principles of the invention.

Fig. 2 is an enlarged view of the portion of the sealing assembly shown in Fig. 1.

Fig. 3 is a partial section of Fig. 1 taken substantially along lines 3—3.

Fig. 4 is a partial sectional view of the slidable shell door.

Fig. 5 is a partial sectional view of Fig. 2 without the shell door, taken along lines 5—5, and

Fig. 6 is a partial sectional view taken of Fig. 2 along lines 6—6.

Referring to the drawings, and more particularly to Fig. 1 wherein there is shown a cleaning machine 10 in which there is supported a portion of a shell 12 having sliding doors 14, the shell 12 houses a rotatable washing cylinder (not shown) and a washing fluid (not

shown). Inasmuch as the washing cylinder and fluid do not form any part of the invention they have been omitted from the drawings. However, when the shell doors 14 are slid open they afford access to the housed washing cylinder and fluid.

The shell doors 14 are slidably movable from their open positions wherein they afford access to the inside of the shells to their closed positions as shown in Figs. 1, 2, 3 and 6. The doors 14 are guided in their movement by guiding runway structures 16 included in the shell 12. The guiding runways 16 are provided on both sides of the two doors 14 shown in Fig. 1 and because the doors 14 and the structures 16 are identical, a description for any one of them should suffice for both.

The sides of the door 14 are guided along its sides in the runways 16 between an upper runner 18 and a lower runner 20 thereof. The upper and lower runners 18 and 20 are spaced from each other by a spacer 22 of a thickness substantially greater than the thickness of the door 14 to enable smooth and rapid sliding movement of the door. All three members are in turn secured, as by bolts, rivets or other suitable securing means 24 (Figs. 1 and 2) to a shell bridge member 26. The shell bridge member 26, being secured at its ends to the shell 12, provides a securing or backing for the guiding runway structure 16 whereby the same is made integral with the shell and included as a part thereof.

At the bottom of the guiding runways 16 there is a seal housing generally identified by the numeral 28 (Figs. 1, 3 and 5) and made integral with the shell 12 to be included as a part thereof. The seal housing comprises a face plate 30, a stop 32 and a base 34 all secured together and to the shell 12 by some suitable means, such as the rivet 36. Positioned within the confines of the housing 28 and seated on the base 34 is a compressible sealing member 38. The sealing member 38 may be a removable insert of foam rubber or other resilient and compressible material suitable for sealing purposes.

Referring now to Figs. 3 and 4 it will be noted that, at the base of the door 14 there is provided a limiting member 40 which is secured to the inside of the door and has an angular leg 42 adapted to cooperate with the stop 32. The purpose of the cooperating limit means 40 and the stop 32 is to limit the extent to which the compressible seal 38 will cooperate with the leading edge of the door 14. That is, the limit leg 42, when in abutting cooperation with the stop 32, will predeterminately limit the extent to which the seal 38 will be compressed.

This novel combination of cooperating stop and limit means 32, 40 prevents the door 14 from closing down on the insert 38 to the extent wherein the insert is compressed to its limit each time the door is closed. Although the insert 38 does absorb a part of the force as the door 14 is closed, thereby serving in part as a shock absorber, still its function as a sealing means is primary. Hence, if, as in prior structures, the door were permitted to slam shut on the sealing member 38 to compress the same to its limit each time it were closed, the resilient qualities of the seal would soon be lost and more importantly, it would be torn and ruptured by the leading edge of the door in a very short time.

Moreover, because the edges of the door 14 tend to wear to knife sharp surfaces after a period of use, the sharp surface which would eventually result on the leading edge of the door 14 would soon render the seal 38 worthless. However, with the member 40 secured to the door, there is now provided a double thick surface on the leading edge of the door thereby providing a wider seal engaging and cooperating surface. The thicker cooperating surface forms an effective fluid tight seal with the partially compressed seal 38 and because its extent of

cooperation with the seal is limited by the limit and stop means **42**, **32** the seal is long-lasting and effective.

Included in the shell door sealing assembly, of which the aforementioned seal housing **28** and associated elements form a part, are pressure means generally identified by the numeral **44** (Figs. 1, 2, 3 and 6) which function to provide an effective seal about the remainder of the door. The pressure sealing means **44** comprises a bracket **46** secured to each of the guiding structures **16**. In Fig. 1 it will be noted that the brackets **46** for both doors **14** have been secured to the runway structures **16**; this arrangement is one of choice since it is to be understood that the position of the bracket is not material as long as it is positioned somewhere on the shell **12** or some other similar stationary structure. A pressure exerting member **48** is mounted on the bracket **46** for pivotal movement relative thereto.

The member **48** comprises a handle **50** which forms an actuator and an extension of an eccentrically mounted head **52**. The eccentric head **52**, spaced from the bracket **46** by a washer **54**, has an eccentric surface (not numbered) of substantial width and capable of exerting progressively increasing pressure on a pressure plate **56** as the handle is moved downwardly toward the shell **12** and as shown in the drawings.

Because fluid seepage takes place about the lower parts of the door **14** the pressure plates **56** are secured to the shell door in the lower regions thereof to absorb the pressure exerted by the eccentrics **52** and to distribute the same throughout the lower area of the door. In this way, when the door is closed and the handles **50** are moved downwardly the heads **52** will, by the pressure exerted on the members **56**, move the door fluid-tightly against the lower runner **20** to provide a seal therebetween.

In an effort to provide a clear understanding of the construction of the invention only one pressure means **44** has been shown associated with each door **14**. However, it will be understood that there may be more than just one of the pressure means cooperating with each door depending upon the width of the door and the amount of pressure necessary to apply thereagainst to afford an effective seal. When more than the one pressure means **44** is needed for each door, another may be added to cooperate between the runway structure **16** on the other side of the door to operate in the same manner as described above.

It is believed that from the foregoing the operation of the shell door sealing assembly will be clear. When the door **14** is moved to its closed position the extent to which it will compress the seal **38** will be predeterminately limited by the cooperation of the limit leg **42** with the stop **32**. Once the door is closed, the downward operation of the handle **50** will, by virtue of the progressively increasing pressure applied on the pressure distributing means **56**, cause the door to move into fluid-tight, sealing engagement with the lower runner **20**.

It will be recognized that the combined function of the parts of the novel sealing assembly cooperate to provide a compressible seal at the leading edge of the door **14** which will effectively seal the same and function materially longer than prior known seals, while the eccentric operation of pressure means **44** moves the door into sealing cooperation with the lower runners **20**.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment thereof, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the claim appended hereto.

I claim:

In a shell door fluid sealing assembly wherein the door is guided for sliding movement in upper and lower runners of a cleaning machine shell between open and closed positions, pressure distributing means on said shell door, securing means on said upper runner, pressure exerting means movable on said securing means to cooperate with said pressure distributing means to move the door fluid tightly against the lower runner, said securing means comprising a bracket, and said pressure exerting means comprising a handle pivoted to said bracket and including an eccentric pressure exerting surface progressively movable into engagement with said pressure distributing means, said shell having a housing including a face plate, a base plate and a back plate, the upper edge of said back plate constituting a stop means, seal means in said housing cooperable with the leading edge of said door and partially compressible thereby when the same is closed, said door having a double thick leading edge including a member having limit means cooperable with said edge of said stop means to limit the compression of the sealing means to said partial compression.

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