

Aug. 21, 1962

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3,050,211

INFLATABLE WASHING MACHINE DOOR SEAL

Filed Jan. 31, 1961

3 Sheets-Sheet 1

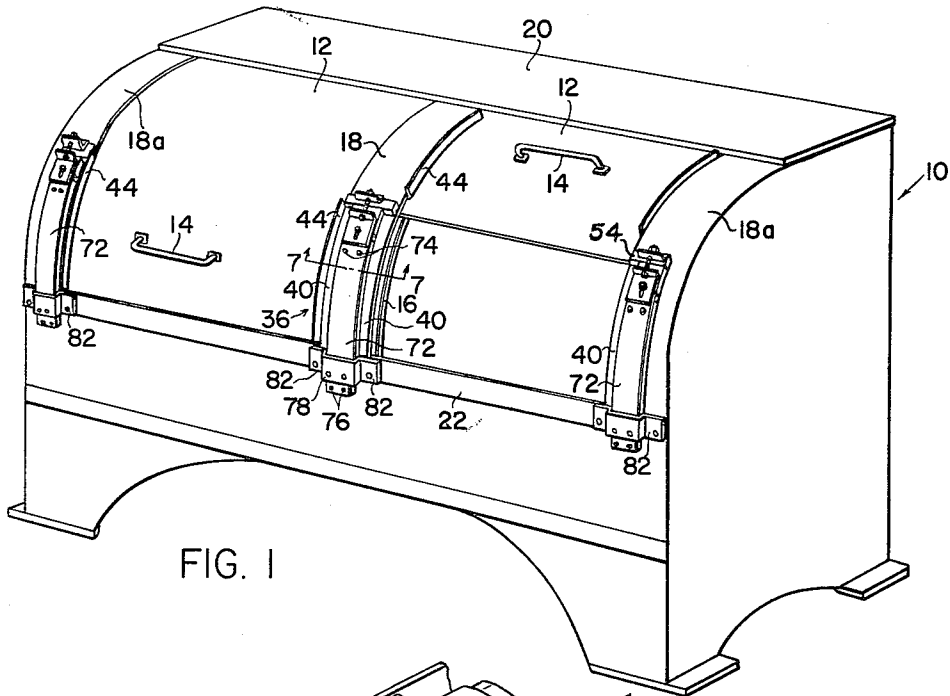


FIG. 1

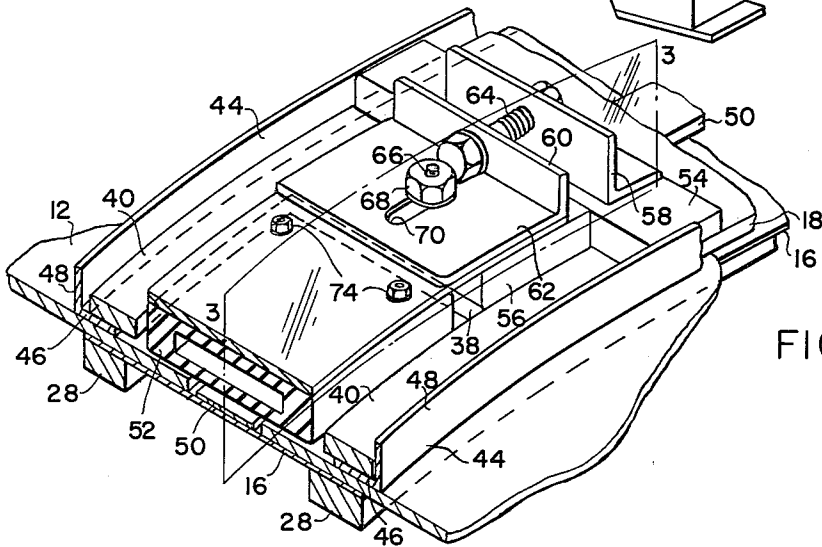


FIG. 2

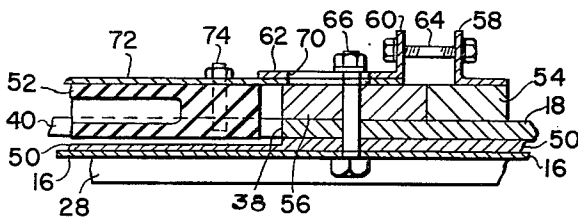


FIG. 3

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3 Sheets-Sheet 2

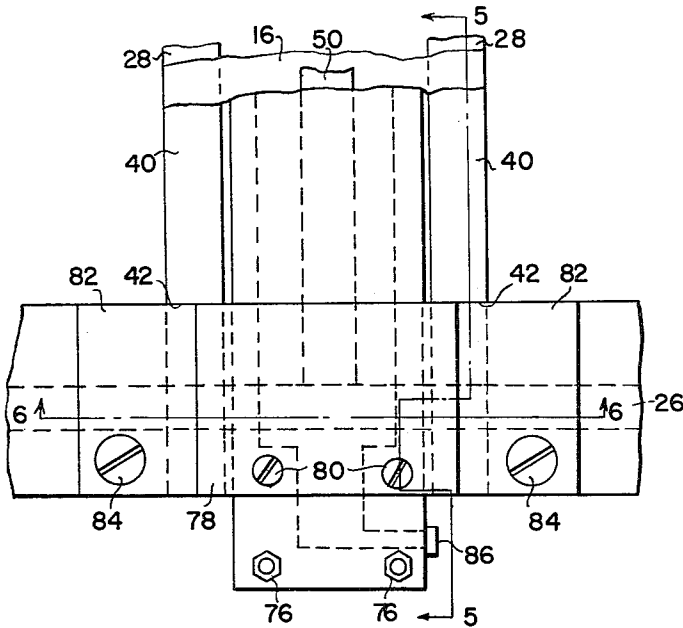


FIG. 4

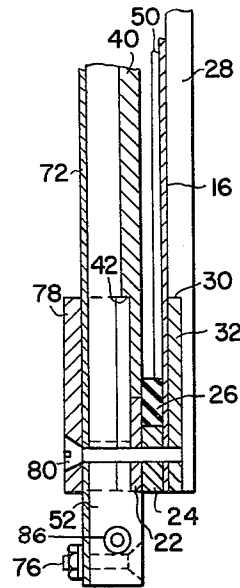


FIG. 5

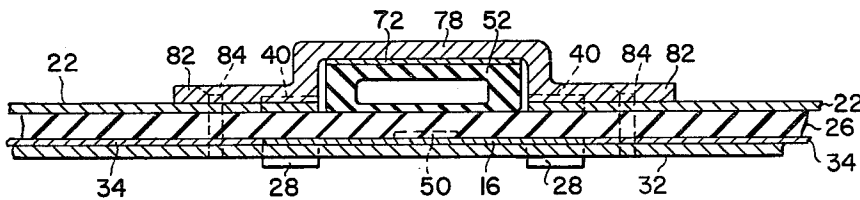


FIG. 6

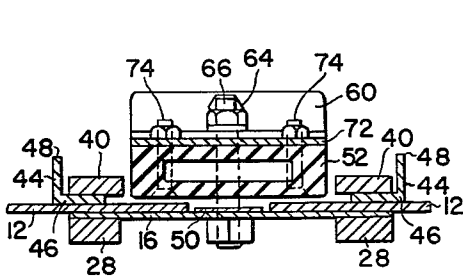


FIG. 7

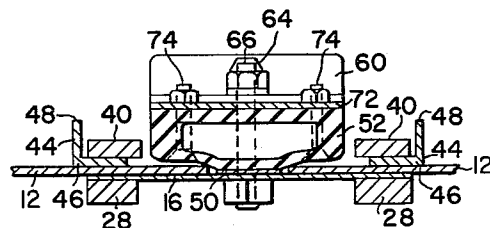


FIG. 8

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3 Sheets-Sheet 3

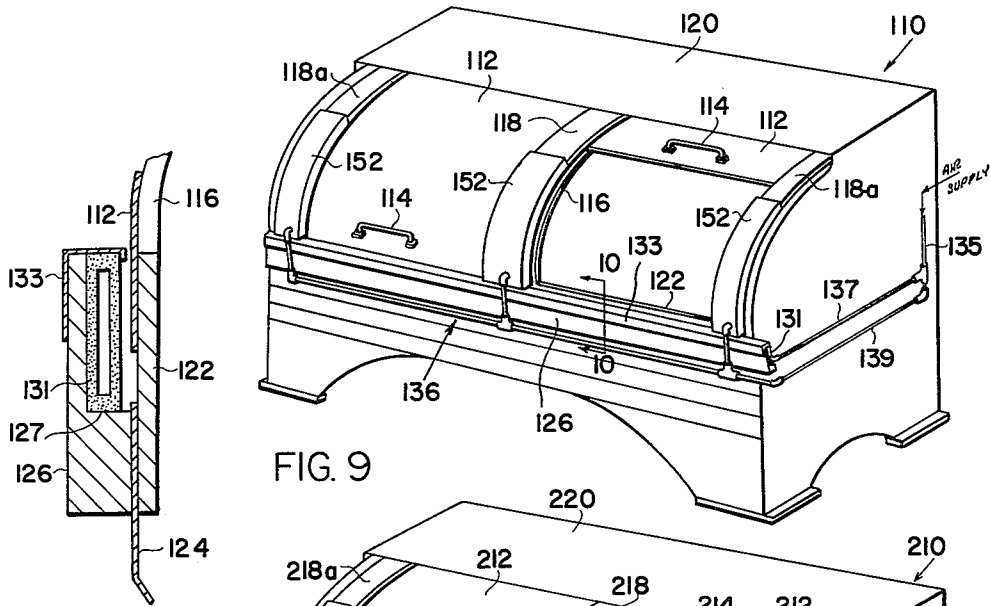
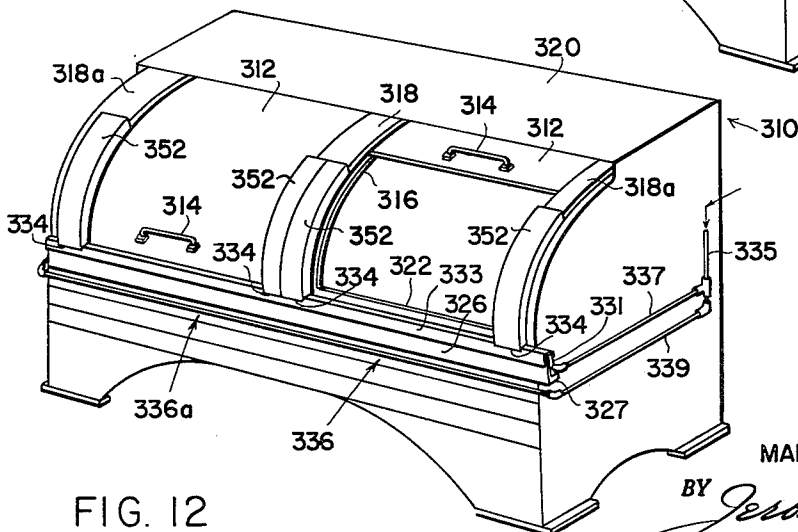
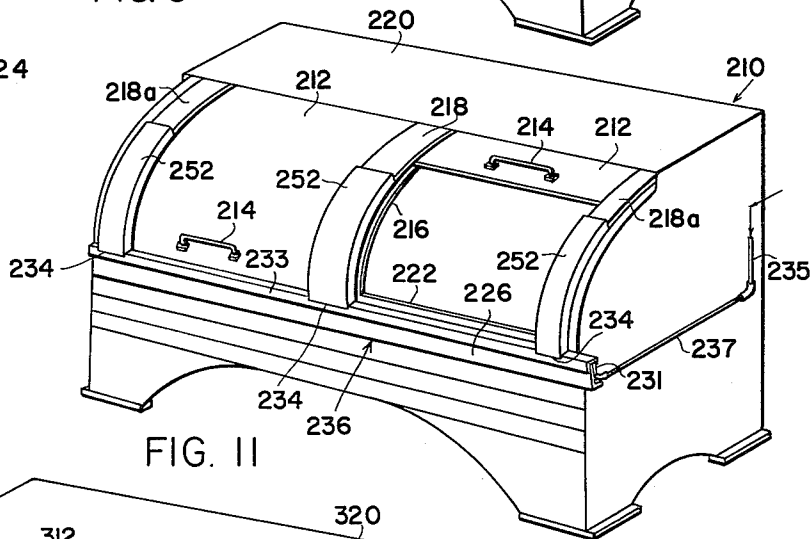


FIG. 10



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INFLATABLE WASHING MACHINE DOOR SEAL
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 mings-Landau Laundry Machinery Company, Inc.,
 Brooklyn, N.Y., a corporation of New York
 Filed Jan. 31, 1961, Ser. No. 87,484
 16 Claims. (Cl. 220-41)

This invention is a continuation-in-part of co-pending application Serial No. 813,559, filed May 15, 1959, and now abandoned, and relates to commercial laundry machines and is particularly concerned with structures for fluid-tightly sealing the doors thereof.

Commercial type laundry machines generally comprise a substantially water-tight framework within which there is a rotatable drum or cylinder. The rotatable drum is adapted to contain the garments to be cleaned and therefore must rotate within a washing or cleaning fluid. The machine framework within which the cylinder rotates retains the washing fluid and being fluid-tight, prevents its loss therefrom. Essentially, the washing machine framework is substantially closed about all of its sides, but is provided with doors that are slidably mounted to permit access to the rotating drum to allow for the insertion and removal of the garments therefrom. The mounting of the doors in the framework have created a problem of adequately sealing them to prevent the loss of washing fluid from about their surfaces.

Because it is necessary to provide quick and easy access to the rotating drums, the doors must be capable of rapid opening and closing movements. Consequently, it is generally the practice to mount the doors loosely between sets of guiding runners. However, this attempt to provide easier door manipulation by making them loose fitting results in the provision of openings about the guiding runners through which the washing fluid in the machine is actually pumped in little rivulets from the machine by the agitating drum therein.

It is the desideratum of this invention to overcome the aforementioned problems by providing an accurate reliable fluid-tight seal about portions of the machine doors to eliminate the leakage that results during the machine operation; to provide a sealing structure that is inexpensive to manufacture, easy to install and unusually simple in operation, and one that will have no perceptible wear.

In the past it has been the practice to provide door seals that frictionally bear against the door during its movement between open and closed positions. This manner of use resulted in reducing the life of the seal because of the wear thereon. Accordingly, it is another object and feature of the invention to provide a sealing structure in which the parts thereof are normally disengaged and spaced from the door thereby obviating the possibility of deleterious wear and resulting in a seal that had an unusually long and useful operative life.

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 perspective view of a commercial laundry machine incorporating the sealing structure constructed in accordance with the teaching of the invention,

FIG. 2 is an enlarged perspective sectional view of the upper portion of the sealing structure.

FIG. 3 is a section of FIG. 2 taken along the plane 3-3,

FIG. 4 is an enlarged section of the lower portion of the sealing structure,

FIG. 5 is a section of FIG. 4 taken along lines 5-5,

FIG. 6 is a section of FIG. 4 taken along lines 6-6,

FIG. 7 is a section of FIG. 1 taken along lines 7-7,

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FIG. 8 is a view similar to FIG. 7 showing the sealing structure in its operative condition,

FIG. 9 is a diagrammatic view of a further embodiment of the sealing structure constructed in accordance with the teaching of the invention,

FIG. 10 is a cross-section of FIG. 9 taken along lines 10-10,

FIG. 11 is a diagrammatic view of a modified sealing structure, and

FIG. 12 is a diagrammatic view of still another modification of the sealing structure.

Referring now to FIG. 1 of the drawings, the washing machine housing and shell construction is generally identified by the numeral 10. Enclosed within the washing machine shell is a rotatable drum (not shown) in which the garments are washed while the drum is rotated. A washing fluid contained in the shell of the machine 10 flows freely about and through the rotating drum as the garments tumble with the rotation of the drum to be thoroughly cleansed by the fluid. The garments are inserted into and removed from the rotatable drum through openings provided by one or more doors 12 that are mounted on the front of the shell and provide access to the rotatable drum.

Doors 12 are movable to and from their closed position as shown in FIG. 1 by an operator who manually grasps the handle 14 thereon. The doors are slidably upwardly from their closed position as shown in FIG. 1 to an open position (not shown) to expose the rotatable drum enclosed within the shell 10.

In washing machine constructions of this type, the shell door 12 generally is slidably guided between spaced inner and outer runner members 16 and 18 respectively. These runners 16 and 18 are arranged to conform substantially to the curvature of the shell door or doors 12 and extend for the full length of movement of the doors to sandwich the same therebetween and to guide them accurately throughout their sliding movement. In order that the shell doors are accurately guided during their movements, they are provided at each lateral edge thereof with guiding cooperating inner and outer spaced runners 16a and 18a. During its sliding movement, the door 12 moves along the upper surface of the inner runners 16.

When more than one door 12 is employed in the washing machine shell 10 as shown in FIG. 1, the center pair of runners 16 and 18 bridge the space between the adjacent edges of the shell doors 12 to provide for their proper running and guided movement. To one who is skilled in the art, it will be clear that the construction of the bridging inner and outer runners 16 and 18 and the sets of laterally disposed runners 16a and 18a are substantially the same, differing only in that the central bridging runners operate on opposite adjacent edges of both doors 12 while the laterally disposed runners 16a and 18a operate on their respective edges of the doors. For ease of explanation, reference hereafter will be made to the center set of bridging runners 16 and 18 and their related details of construction hereinafter shown in the drawings.

The inner and outer runners 16 and 18 generally guide the movement of the shell doors to and from their closed position. Hence, they extend under the top of the structural plate 20 for a distance that is sufficient to guide the doors to their full open position. The inner runner 16 continues downward in conformance with the curvature of the shell door to terminate at its lower-most end in spaced horizontal alignment with the lower edge of a front framing strip 22. The front framing strip 22 extends laterally for substantially the full width of the front edge of the door 12 and is connected at its inner surface with a reinforcing strip 24. The combination of the front strip 22, the reinforcing strip 24 and the upper surface of

the inner runner 16 defines a space within which there is mounted a resilient sealing strip 26 (FIGS. 5 and 6).

The inner runner 16 is reinforced throughout its length by lengthwise reinforcing runner strips 28 that also terminate at their lower ends in horizontal alignment with the lower-most edge of the front framing strip 22. They are cut away at 30 to accommodate a rear framing strip 32 that is substantially equal in height and width to that of the front framing strip 22. Filler plates 34 are positioned on either side of the inner runner 16 (see FIG. 6) and are of the same thickness as the runner to complete the details of a gap in which resilient seal 26 seats and in which the leading edge of the door 12 is accommodated.

When the door 12 is closed, its leading edge abuts against the upper-most surface of the resilient sealing strip 26 to define therewith a water-tight connection. The sealing member 26 yields to prevent the passage of fluid from the shell 10 about the leading edge of the door 12 when the same is seated thereagainst. Since details of this connection do not constitute any part of the present invention, they are briefly stated therein so that a clearer understanding can be had of the construction to be described.

With doors 12 closed and the washing drum rotating in the machine 10, the washing fluid is severely agitated. Agitation is so great that the washing fluid is actually pumped out of any openings that may be present in the machine 10. The leading edge of the door 12 is adequately sealed by its engagement with the strip 26. However, because the door is loosely guided between its sets of inner and outer runners 16 and 18, the agitated fluid will actually be forcefully pumped through a tortuous path to escape from between the runners and the shell door sandwiched therein. When once the fluid has found an outlet from the interior of the machine 10, the continued rotation of the drum forces the fluid in pulsating, surging streams out of the opening.

Consequently, it is necessary to provide an effective seal along a lengthwise extent of the sides of the doors that will prevent the occurrence of the pulsating streams of surging washing fluid. In the present invention there is provided a sealing structure generally identified by the numeral 36 (FIG. 1). The sealing structure 36 is adapted to be accommodated in a removed lengthwise extending portion of the outer runner member 18 so that it may form a continuation of the outer runner conforming to the curvature of the doors 12.

Outer runner 18 is formed with a removed lengthwise portion terminating at its upper end wall 38 and leaving a pair of laterally disposed guide surface members 40. The guide members 40 extend lengthwise from the wall 38 downward into horizontal alignment with the lower edge of the front framing strip 22. The guide surface members 40 extend downward like fingers or tines from the body of the outer runner 18, and are narrowed at 42 (FIGS. 4 and 5) to be equal in thickness with the front framing strips 22 positioned on either side thereof. Because they form fingers or tines of the body of the outer runner 18, they define continuous extensions thereof to guide the movement of the door 12 along their undersurfaces.

The under surface of each of the outer runners 18 and 18a are sufficiently spaced from the upper surface of the inner runners 16 and 16a respectively to accommodate the door 12 therebetween. Mounted on each door 12 is an L-shaped guide member 44 having a leg 46 that is guided by the conformingly shaped under surface of the runner 18 and its coextensive guide member 40. At the same time, the under surface of the door 12 is guided along the conformingly shaped upper surface of the inner runner 16. The upstanding leg 48 on each guide member 44 cooperates with the leading facing edge of the body of the outer runner 18 and its coextensive guide surface members 40. Since an L-shaped guide member 44 of similar detail is placed on each lateral side of each

door 12 for cooperation with the outer runners 18 and 18a and their respective guide surface members 40, the door 12 is thus guided at its laterally disposed edges for movement within predetermined tolerances during its opening and closing movements.

Positioned between the inner and outer runners 16 and 18 is a spacer element or member 50 that may be substantially equal to or less than the thickness of the doors 12 for the lengthwise distance extending from the upper end wall 38 of the outer runner 18 downward into abutment with the sealing strip 26. The spacer member 50 may be thicker than the door member 12 and the leg 46 of the guided member 44 beginning beyond the height of the end wall 38 and extending upward between the inner and outer runner, to adequately space them from each other for the remainder of their lengths in order that they may accommodate the door and the leg 46 for free movement therebetween. The spacer member 50 extending downward from beyond the wall 38 of the outer runner 18 in the centermost structure bridging the doors 12 serves to close the space therebetween and to cooperate with the sealing structure in the manner as depicted in FIG. 8 and subsequently to be described.

The sealing structure 36 previously mentioned is adapted to be securely fastened in place with respect to the outer runner 18. It has a resilient flexible sealing element or member 52 that is positioned over lengthwise edge portions of the doors 12 and the spacer member 50 that are exposed by the removed or cut away portion of the outer runner 18 (18a) defined between upper wall 38 and the side members 40. The effective sealing length of the member 52 is accommodated in the removed portion of the outer runner 18 (18a) to enable its sealing cooperation with the exposed lengthwise edge portions of the doors 12. The length of sealing cooperation between the seal member 52 and the doors 12 is sufficient to cover and prevent the start and subsequent loss of fluid from the interior of the washing machine 10 during the rotation of the washing drum therein.

Sealing structure 36 includes at its upper end a mounting block structure which may be composed of a single unitary block, but is here shown for the purposes of illustration in the form of two blocks 54 and 56. Each block 54 and 56 is mounted to the outermost surface of the outer runner 18 and secured thereto against relative movement. A fixed bracket 58 is secured against relative movement on the mounting block 54.

An adjustable bracket having an upstanding leg 60 and a connecting leg 62 are adapted for adjustable movement relative to the bracket 58. The leg 60 is connected with the bracket 58 by an adjustment bolt 64 that is adapted to move the leg 60 toward or away from the bracket 58. The adjustment bracket is secured to the mounting block 56 by a bolt 66 and a nut 68 threadable thereon. The bolt 66 is permitted to pass through an elongated opening or slot 70 defined in the leg 62 to permit its adjustment relative to the block 56 therebeneath when the nut 68 is loosened.

The resilient sealing element 52 is accommodated within the removed portion of the outer runner 18 and to be positioned in overlying but spaced relationship from the spacer member therebeneath and the adjacent exposed lengthwise edges of the door or doors 12 therebeneath. The sealing element 52 may be said to be tubular in the sense that it has a hollow body portion substantially rectangular in cross-section and extending for substantially the full length thereof; however, its upper end is closed solid as is its lower end. Thus, the hollow portion of the member 52 is located intermediate the ends of the same to leave the ends closed and semi-rigid in nature.

The seal member 52 is connected with a cage structure which includes a back mounting member 72. Mounting member 72 is metallic and substantially rigid in nature conforming to the curvature of the door and having the

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flexible sealing member 52 fastened thereto at the upper solid portion thereof by suitable securing means 74 and to the lower portion thereof by suitable securing means 76. The extreme upper end of the back mounting member 72 is secured to the leg 62 in any suitable manner, as by welding, to continue the caging structure, and has slot or elongated opening (not shown) aligning with the slot 70 in the leg 62.

Bracket 58, the adjustable bracket including the legs 60 and 62, and the mounting blocks 54 and 56 comprise the upper part of the cage structure for the seal member 52. The lower part of the cage structure includes a substantially U-shaped clamp 78 that fits over the mounting member 72 at its central raised portion thereof and secured thereto by screws 80. The laterally disposed legs 82 overlap the narrowed portions of the guide surface members 40 to secure the same in position therebeneath when the same are fastened by screws 84 to the front framing strips 22.

Each resilient, flexible sealing member 52 is provided with an access nozzle 86. The access 86 connects the interior opening of the member 52 with a source or means of fluid supply, as air pressure, that will inflate the flexible member by introducing a fluid or air thereinto or to withdraw whatever fluid or air that may be therein to deflate the same.

Referring to FIGS. 7 and 8, it will be noted that the cage structure including the mounting member 72 serves to retain the under surface of the flexible sealing member 52 in its normal position wherein it is spaced from the upper exposed surface of the door or doors 12. This space between the sealing member and the doors permits sliding movement of the doors between their open and closed position without engagement with the flexible member. There is a frictionless relationship, which because of the absence of rubbing engagement, permits a long and useful operative life of the flexible sealing member 52.

When the seal member 52 is deflated, it is in its normal position. The space between its under surface and the upper surface of the door 12 is sufficient to permit free frictionless movement of the door; however, after the door is moved to its closed position as shown in FIG. 1 wherein its leading edge presses fluid tightly into the resilient sealing strip 26, a lengthwise portion of its edge will be exposed by the removed portion of the outer runner 18 (18a). It is this edge portion that will be sealed by inflation of the member 52 positioned thereover. This is depicted more clearly in FIGS. 7 and 8.

FIG. 8 depicts the relationship of the under side of the sealing member 52 after the same has been inflated into sealing engagement throughout the exposed lengthwise edge portions of the adjacent doors 12 positioned on either side of the spacer member 50. The cage structure to which the sealing member 52 is mounted delimits its direction of expansion downward into frictional fluid-tight sealing engagement, bridging between the one door 12, the spacer 50 and the opposite door 12. This downward inflation of the member 50 against the door moves the same into fluid-tight engagement with the inner runner 16 (16a) therebeneath while the mounting cage member 72 prevents the seal member from flexing upward during its expanding inflation.

The side walls of the seal member 52 are relatively thicker than its upper and lower walls and, therefore, restrict the sideward expansion of the same. In the past, side caging mounting members were utilized to prevent the sideward expansion of the member 52; however, with the present construction, the thickened walls obviate the need for such restrictive side cage members.

Referring now to FIGS. 9 and 10, the embodiment 110 of a washing machine housing and shell construction there shown is substantially the same in detail as the previously described embodiment 10, differing therefrom, however, in the details of the fluid sealing structure gen-

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erally identified by the numeral 136. In the instant embodiment 110, the two adjacently arranged doors 112, having handles 114, are slidably moved between open and closed positions and guided during such movement by a set of inner and outer runners 116 and 118 positioned intermediate the adjacent lengthwise edges of the two doors. The lateral outer lengthwise edges of the two doors are guided between similarly spaced sets of inner and outer runners 116a and 118a (not shown in the drawing).

The sets of inner and outer runners extend downward from the structural plate 120 and terminate in abutment with the top surface of an inner framing strip 122. The inner framing strip 122 may extend for the full length of the washing machine housing 110 in a position that is located behind the leading or closing edge of each of the two doors 112 when the same are closed. As will be seen in FIG. 10, the framing strip 122 may be secured to the inner side of a sheet member 124 that forms a part of the washing machine housing and the sheet member 124 can be sandwiched between the inner framing strip and an outer framing strip 126 (see FIG. 10). The outer framing strip 126 like the inner framing strip 122 extends for at least the full length of the machine housing 110 as can be seen more clearly in FIG. 9. It is provided with an L-shaped seat 127 in which is adapted to be mounted a horizontal fluid sealing element 131 that forms a part of the fluid seal structure 136.

The horizontally disposed sealing element or leg 131 extends for the full length of the outer framing strip 126 within the L-shaped seat 127 and is formed of a resilient flexible sealing material that is hollow intermediate the ends thereof and is substantially of the same construction as the flexible sealing elements or members 52 described with respect to the embodiment 10. The horizontally disposed sealing element 131 differs in construction from the members 52 previously described only in that its position and length along the washing machine housing 110 is horizontal rather than lengthwise as was described with respect to the elements 52 in the previous embodiment. The horizontal sealing element or leg 131 of the fluid seal structure 136 forms the base or body of a substantially E-shaped seal structure provided in the instant embodiment 110 wherein the three-lengthwise legs 152 of the E-shaped sealing structure comprise the sealing elements or members that may be likened to and be of the same construction as the previously described sealing elements 52 of embodiment 10.

It will be recognized that the illustration of FIG. 9 is diagrammatic and merely shows that the embodiment 110 distinguishes over that of the embodiment 10 (FIGS. 1 to 8) to the extent of the sealing structure 136. The present embodiment 110 permits the complete fluid-tight sealing of not only both of the opposite lengthwise edge portions of the doors 112 when the same are closed, but also the full horizontal or leading edge of each one of the doors. Hence, it distinguishes over the prior described embodiment 10 wherein the same provides a fluid-tight seal of both of the opposite lengthwise edge portions of the doors 12 by the flexible sealing elements or members 52 positioned in overlying relationship therewith when the same are closed, but not of the leading edges of the doors.

Referring again to FIG. 9, it will be noted that the legs 152 of the fluid sealing structure 136 may be mounted to the washing machine housing 110 in any convenient manner, such for example, similar to that taught by the adjustable cage structure in connection with the previously described embodiment 10. A repetitious showing and description of such adjustable cage structure would, therefore, be superfluous since reference may be made to the construction shown in FIGS. 1 to 8 and to the description with respect thereto. The horizontally disposed hollow resilient flexible sealing member 131 is maintained in its L-shaped seat 127 by a bracket 133 (FIG. 10),

that retains the same in overlying spaced relationship with the leading edge portions of each of the door 112 when the same are closed in the manner as shown in FIG. 10.

As in the prior embodiment 10 (FIGS. 1 to 8), a supply of fluid, such as air, is provided and introduced to the hollow members 152 and 131 by way of a main passage or conduit 135 that is divided at 137 and 139. The passage 137 connects the horizontally disposed fluid sealing element 131 with the supply at 135 while the passage 139 serves to connect each of the lengthwise sealing elements 152 with the fluid supply. Thus, each fluid sealing element 152 and 131, comprising the fluid sealing structure 136, is connected with the same source of supply and is simultaneously inflatable and deflatable into and out of fluid-tight sealing engagement with their respective lengthwise and leading edge portions of the doors 112 when the doors are closed. Those who are skilled in the art will readily recognize that the operation of the fluid sealing elements 152 and 131 comprising the sealing structure 136 is substantially the same as that described with respect to the operation of the sealing elements or members 52 of the embodiment 10.

The washing machine housing and shell construction generally identified by the numeral 210 is diagrammatically illustrated in FIG. 11. Its details of construction are substantially the same as that disclosed with respect to the embodiment 110 illustrated in FIGS. 9 and 10. It differs from the embodiment 110 solely in the details of construction of the fluid sealing structure generally identified by the numeral 236. For that reason, therefore, it is believed redundant to repeat and redescribe each of the like details of construction. The details of construction of the present embodiment 210 will be identified by numerals in the 200 series with the last two digits thereof corresponding to the last two digits used to identify like details of elements in the previously described embodiment 110.

In the present embodiment 210, the fluid sealing structure 236 is of unitary, substantially E-shaped construction, wherein the horizontally disposed leg or hollow flexible fluid sealing element 231 is mounted in an L-shaped seat 227 provided in an outer framing strip 226, the construction of which is substantially the same as that shown in previously described FIG. 10. The horizontally disposed leg 231 of the sealing structure is maintained in the seat 227 by a bracket 233 that extends for the full length of the outer framing strip 226.

The bracket 233 is cut-away at 234 to accommodate the legs or lengthwise extending hollow resilient flexible sealing elements 252 that are unitarily molded integral with the horizontal leg 231. Thus, the leg 231 forms the base of the E-shaped seal structure 236 while the elements 252 form the lengthwise legs thereof. The horizontal portion 231 is retained in overlying but spaced relationship for expansible and retractable engagement with the leading edge of each of the doors 212 when the same are closed while the legs 252 are positioned in overlying relationship with the lengthwise edge portions of the doors 212 when the same are closed. The legs 231 and 252 are adapted to be inflated and expanded into and deflated and contracted out of engagement with such respective portions of the doors.

The manner of mounting the legs 252 of the seal structure 236 may be the same as that as disclosed with respect to the embodiment 10 (FIGS. 1 to 8). They may be adjusted by means of a cage construction similar to that described with respect to the prior described embodiment 10. Because the lengthwise portion 231 of the seal structure 236 and the leg portions 252 of the same sealing structure are integrally formed, the hollow portions thereof (not shown) are in constant communication. The hollow portions define communicating passage means by which fluid introduced into the passage 235 from the fluid source will be communicated to all portions of the structure 236 for simultaneous inflation

of the portions thereof as the fluid enters the leg 231 by way of the passage 237 and for simultaneous deflation when the fluid is withdrawn therefrom by way of their communicating hollow passages and the passageway defined by the conduits 235 and 237.

Thus, it will be seen that the present embodiment provides a construction wherein a single sealing structure 236 will properly fluid-tightly seal the leading and lengthwise edge portions of a washing machine door when the same is closed by being expansibly inflated into engagement therewith. In like manner, the fluid-tight seal structure 236 may be deflated as a whole out of frictional engagement with their respective edge portions of the door to permit frictionless and uninterrupted sliding movement of the door.

The washing machine housing and shell construction generally identified by the numeral 310 is diagrammatically illustrated in FIG. 12. Once again, the details of construction of the washing machine housing are substantially the same as that described with respect to the embodiment 110 (FIGS. 9 and 10) and, therefore, a repetitious disclosure of such like details would be superfluous. Those skilled in the art will readily recognize that the details of construction of the present embodiment are identified by numerals in the 300 series wherein the last two digits thereof correspond to like details of construction as identified by the last two digits contained in the numerals of previously described embodiment 110.

The instant embodiment 310 differs from that of the embodiment 110 in that there are a plurality of door sealing structures each of which is substantially U-shaped and adapted to be operated independently of the other. FIG. 12 of the drawings diagrammatically shows two door sealing structures generally identified by the numerals 336 and 336a respectively. For purposes of description, the two fluid sealing structures 336 and 336a may be said to be exactly alike in detail. Each comprises a base or horizontally disposed hollow resilient flexible fluid sealing element or member 331 that is molded as a unitary part of and integrally formed with a hollow resilient flexible sealing element or member 352 at each of its ends.

The hollow passages of the leg 331 and the connected legs 352 of each structure 336 and 336a are in constant communication with each other. Therefore, fluid introduced into the leg 331 by way of a passage or conduit 337 or 339, as the case may be, receives its supply of fluid from a source by way of the passageway 335 will immediately communicate the same to its connected sealing elements 352. When the proper amount of fluid is supplied to the leg 331, it and its connected legs 352 will be caused to expand from a normally spaced overlying relationship with the leading and lengthwise edge portions respectively of the slidable washing machine door 312 into fluid-tight sealing engagement therewith, pressing the door simultaneously thereat into fluid-tight sealing engagement with the inner runners 316 on which the same are slidably moved.

In like manner, when the fluid supply is withdrawn from the sealing structure 336 or 336a, the withdrawal of the fluid from the legs 352 and 331 is afforded by the communicating hollow passages and the passageway defined by the conduits 337 or 339 and 335 to deflate and retract such fluid sealing elements out of engagement with their respective edge portions of the closed door 312. When the legs 331 and 352 of the fluid sealing structure 336 or 336a are returned to their normally deflated spaced relationship with their respective edge portions of the door associated therewith, the door is then permitted to be slidably moved unobstructed and free of frictional restraint by the sealing structure.

In the present embodiment 310 as shown in FIG. 12, the base resilient flexible sealing elements 331 of each structure 336 or 336a may be positively retained in an L-shaped seat 327 in the manner as disclosed in previ-

ously described FIG. 10 by a restraining bracket 333 that is secured to an outer framing strip 326. The fluid sealing structure 336a may receive its supply of inflating fluid from a passage 339 that is commonly connected at 335 with a passage 337 that supplies fluid to the sealing structure 336. If desired, valve structures (not illustrated) may be interpositioned in either one or both of the passages 337 or 339 to independently control the operation of the respective fluid sealing structures 336 or 336a.

The legs 352 of the respective fluid sealing structures 336 and 336a may be mounted on their respective outer runners 318 and 318a by an adjustable cage structure in the manner similar to that described with respect to embodiment 10 and illustrated in FIGS. 1 to 8.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to several preferred embodiments thereof, it will be understood that various omissions and substitutions and changes in the form and details of the devices illustrated and in their operations 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 claims appended hereto.

I claim:

1. In a washing machine comprising a door slidable between open and closed positions, spaced inner and outer runners to guide the sliding movement of the door therebetween, spacer means between said inner and outer runners and positioned adjacent an edge of said door when the same is closed, said outer runner having a portion thereof removed to expose adjacent edges of said spacer means and said door when the same is closed, an inflatable seal extending in overlying relationship with said exposed adjacent edges for at least the lengths thereof, means to inflate said seal throughout its overlying length to expand the same into fluid-tight sealing engagement with said exposed adjacent edges, and means to retain said inflatable seal in said overlying relationship with said exposed adjacent edges to prevent the same from expanding in a direction opposite from that of said exposed adjacent edges.

2. A washing machine comprising a slidable door, inner and outer runners spaced to guide the door for open and closed sliding movement therebetween, said outer runner having a portion thereof terminating short of the full length of said inner runner, a spacer member between said inner and outer runners to space the same from each other, a portion of said spacer member and a portion of the closed door being exposed beyond the terminating portion of said outer runner, and inflatable seal means extending lengthwise along the exposed portions of said closed door and spacer member and being normally spaced therefrom, cage means to inflate said seal means along its length to move the same into physical engagement with the exposed portions of the closed door and spacer member to move the door into fluid-tight engagement with said inner runner and to fluid-tightly seal the exposed portions of said door and spacer member and to deflate said seal to return the same to its normally spaced position.

3. A washing machine comprising a door slidably movable between open and closed positions, an inner member secured to and forming an integral part of the machine frame and having a lengthwise portion thereof defining an inner runner to guide said door during its sliding movement, an outer guide runner secured from movement and spaced relative to said inner runner, said outer runner having an opening defined therein to leave a lengthwise portion of said door exposed when the same is closed, a spacer member between and positioned along the lengths of said inner and outer runners, a lengthwise portion of said spacer member being exposed by said opening, a fluid seal structure positioned over said exposed lengthwise portions of said door and spacer

member and including an inflatable seal normally spaced from said exposed portion of said door and a cage having an upper member to prevent the upward inflation of said seal, and means to inflate and deflate said seal into and out of engagement respectively with said exposed portions of said spacer member and door to form and remove a fluid-tight seal therebetween.

4. In a washing machine having a door slidable between open and closed positions, an inner runner on which said door is slidably movable, a fluid seal structure positioned over a lengthwise edge portion of said door and including a flexible inflatable member normally spaced from and expansibly engageable with said door when the same is closed to move the same into engagement with said inner runner along said edge portion and to flexibility conform to said engaged edge portion of said door to fluid-tightly seal the same, and means to inflate said flexible member to expand the same from its normally spaced position into engagement with said door and to deflate the same to its position normally spaced from said door to frictionlessly allow the same to slide to its open position.

5. In a washing machine as in claim 4, an outer runner normally spaced from said inner runner, said inner and outer runners defining a guideway between which said door slides, said outer runner having a portion thereof removed to accommodate said seal structure within the confines thereof and having a door guide surface to guide said door during its sliding movement beneath said seal structure, and means on said door cooperating with said guide surface.

6. A seal for a washing machine door slidably movable between open and closed positions comprising a plurality of runners between which said door is slidable, one of said runners having an opening, an inflatable member over said opening and normally spaced from a lengthwise portion of the edge of said door when the same is closed, means connected with said inflatable member to direct the inflation thereof into fluid-tight conforming engagement with said lengthwise edge portion of said door and to close the space therebetween when said door is closed, and means to inflate and deflate said inflatable member.

7. A seal as in claim 6, means having a mounting member on which said inflatable member is mounted, means to fasten said mounting member to the washing machine, means to adjust said mounting member to vary the space of said inflatable member with respect to the edge portion of said door.

8. A washing machine comprising a door slidable between open and closed positions, inner and outer runners defining a guideway for the sliding movement of said door therebetween, said outer runner having a lengthwise portion thereof removed to expose a lengthwise edge portion of said door when the same is closed, surface guide means on said outer runner and said door cooperable to guide said door to expose said edge portion thereof when the same is closed, a fluid seal structure in the confines of said removed portion having a flexible member normally spaced from said exposed door edge portion and inflatable to expand into conforming engagement therewith to fluid-tightly seal the same, a mounting member on which said flexible member is fastened, means to fasten said mounting member to said machine to secure said flexible member in its normally spaced position, adjustable means to adjustably vary the position of said flexible member with respect to said edge portion of said door, and means to inflate said flexible member to expand the same from its normally spaced position into conforming engagement with said door and to deflate the same to its position normally spaced from said door to frictionlessly allow the same to slide to its open position.

9. A washing machine as in claim 8, a spacer member

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between said spaced inner and outer runners and having a lengthwise portion thereof exposed by said removed portion of said outer runner and positioned adjacent said edge portion of said door when the same is closed, said flexible member being expansible into fluid-tight engagement with said exposed lengthwise portions of said spacer member and door simultaneously to bridge the same and form a fluid-tight seal therebetween.

10. A seal for a lengthwise portion of a slidable washing machine door comprising runner means to guide said door and providing an access therethrough to said door, a flexible hollow member having a sealing surface normally spaced from said lengthwise portion of said door and expansible into frictional fluid-tight engagement therewith through said access of said runner means, means to mount said flexible member in said normally spaced relation from said door portion and for expansion into frictional fluid-tight sealing engagement with said door portion, means to adjust said member to vary the space between said sealing surface and said door portion, and means to inflate said flexible member to expand said sealing surface from its normally spaced position into frictional engagement with said door and to deflate the same to its position normally spaced from said door to frictionlessly allow said door to slide to its open position.

11. In a washing machine, a door slidably movable between open and closed positions, runner means to guide the sliding movements of said door, a hollow inflatable fluid seal structure normally spaced from the lengthwise and leading edge portions of said door when the door is closed and inflatably expansible into engagement therewith to engage the same with said runner means, means to supply fluid to said seal structure to inflate the same into engagement with said edge portions of the door, and fluid passage means connecting said inflatable fluid seal structure with said fluid supply means.

12. In a washing machine, a door slidably movable between open and closed positions, means to guide the sliding movements of said door, a fluid seal structure including a plurality of hollow flexible inflatable fluid seal members each normally spaced from a respective lengthwise and leading edge portion of said door when the door is closed, passage means connecting said hollow fluid seal members, and means to supply fluid to said passage means to inflate said hollow fluid seal members into engagement with their respective lengthwise and leading edge portions of the door when the door is closed to conform the same to the shape of said engaged edge portions and move the door into non-sliding engagement with said guide means.

13. In a washing machine, a slidable door, runner means

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to guide the sliding movements of said door, a fluid seal structure including a substantially U-shaped hollow flexible inflatable fluid seal member having the legs and base thereof normally spaced from and inflatable into engagement with respective lengthwise and leading edge portions of said door when the same is closed, means to supply fluid to said hollow seal member to move the lengthwise edge portions of said door into non-sliding engagement with said runner means, and passage means to connect said hollow seal member with said fluid supply means.

14. In a washing machine, a plurality of adjacently arranged doors each slidably movable between open and closed positions, runner means on which said doors are movable, a seal structure for said doors including a substantially E-shaped hollow flexible inflatable seal member having the legs and base thereof respectively in normal overlying spaced relationship with lengthwise and leading edge portions of said adjacently arranged doors, the center leg of said E-shaped seal member simultaneously overlying the adjacent lengthwise edge portions of said doors in normal spaced relationship therewith, means to supply fluid to said hollow seal member to move the lengthwise edge portions of said door into non-sliding engagement with said runner means, and passage means to connect said hollow seal member with said fluid supply means.

15. A fluid seal structure for a slidable door of a washing machine movable along runner means, said seal structure comprising a plurality of hollow inflatable fluid seal members, means to mount said members on said washing machine in overlying spaced relationship with a respective one of the longitudinal and leading edge portions of said door, passage means connecting said hollow inflatable fluid seal members, and means connected with said passage means to supply fluid to said hollow inflatable fluid seal members to inflate the same into fluid-tight sealing engagement with their respective edge portions of said door when the door is closed to move said edge portions into non-sliding engagement with said runner means and to deflate said members to space the same from their respective edge portions of the door to enable sliding engagement of said door with said runner means.

16. In a seal structure as in claim 15, said hollow inflatable fluid seal members being uninterruptedly connected with each other.

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