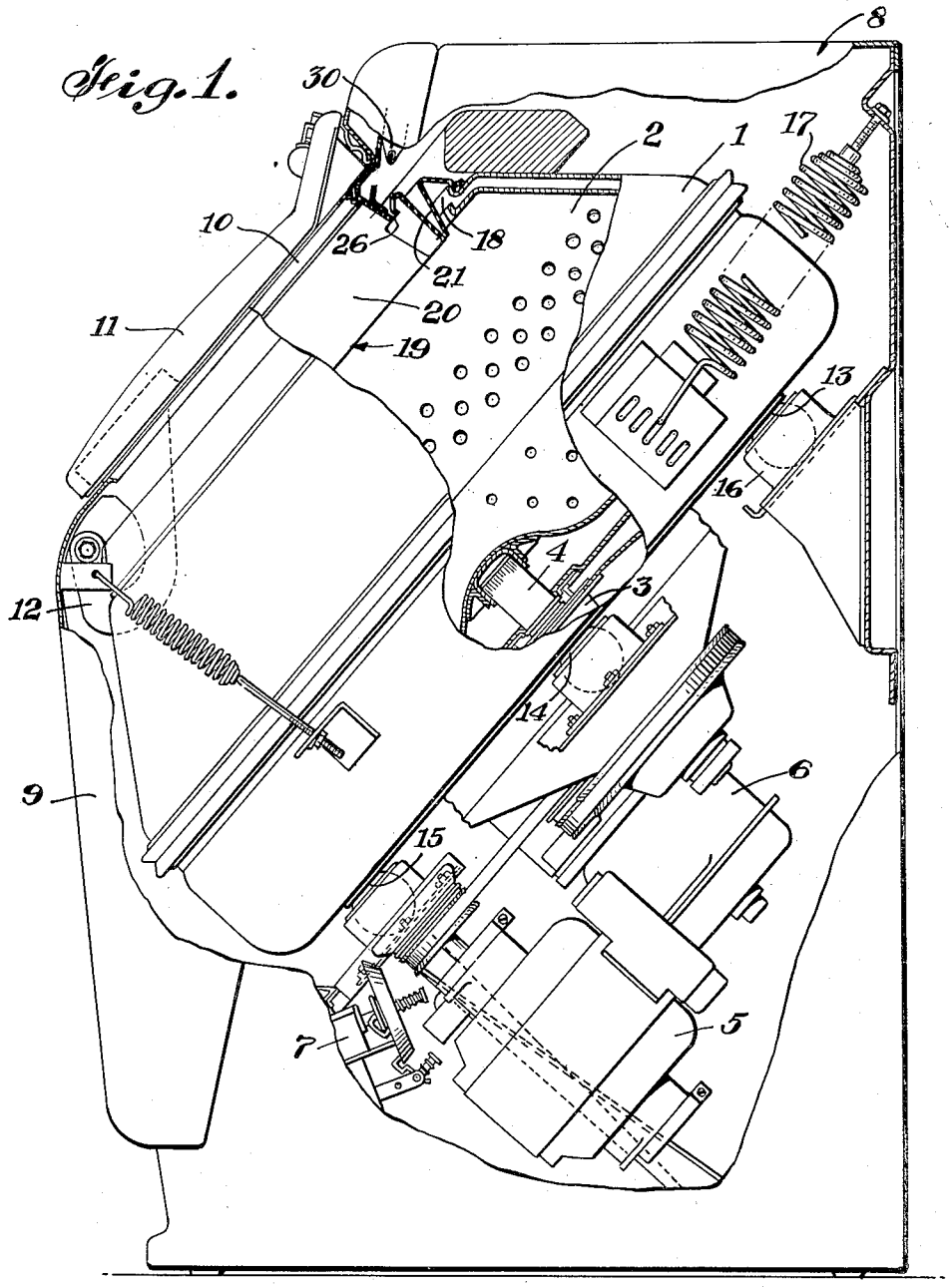
Jan. 13, 1953 M. A. KREITCHMAN 2,625,031

WASHING MACHINE PROVIDED WITH RESILIENT COLLAPSIBLE INLET

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Fig. 1.



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Fig. 2.

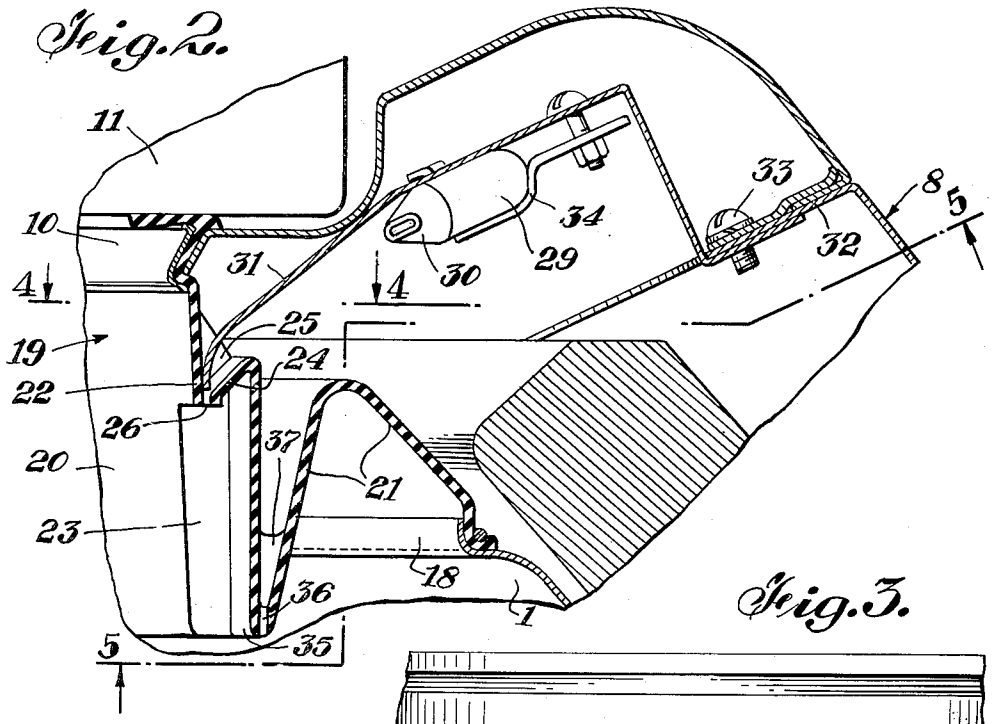


Fig. 3.

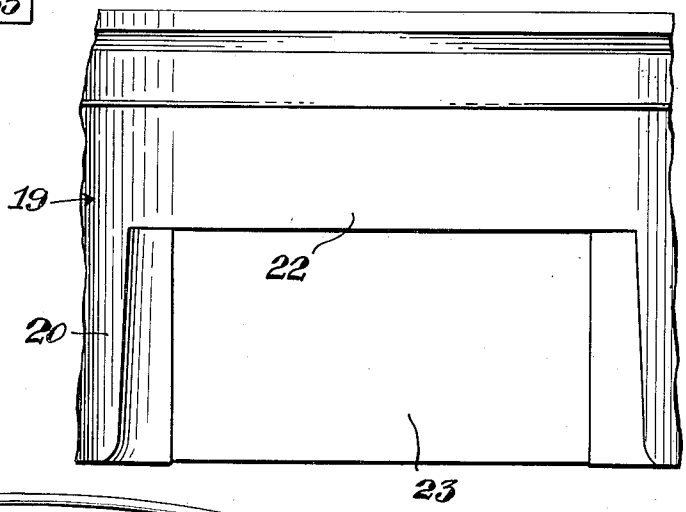
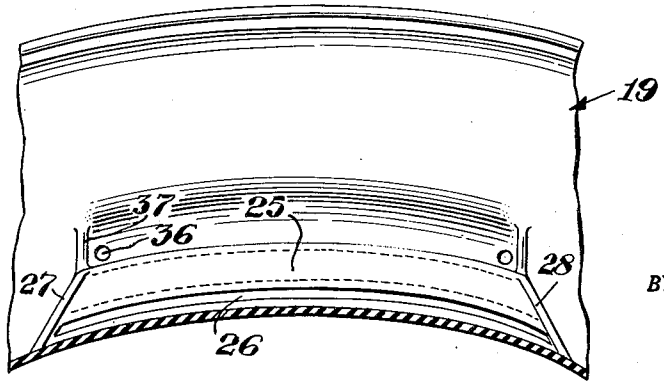


Fig. 4.



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Fig. 5.

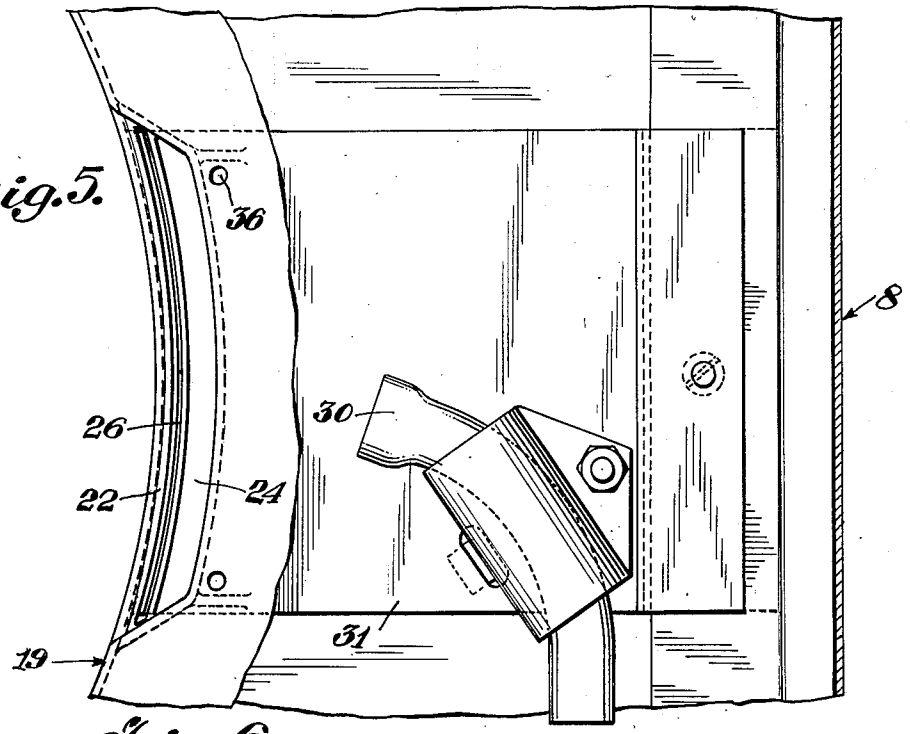
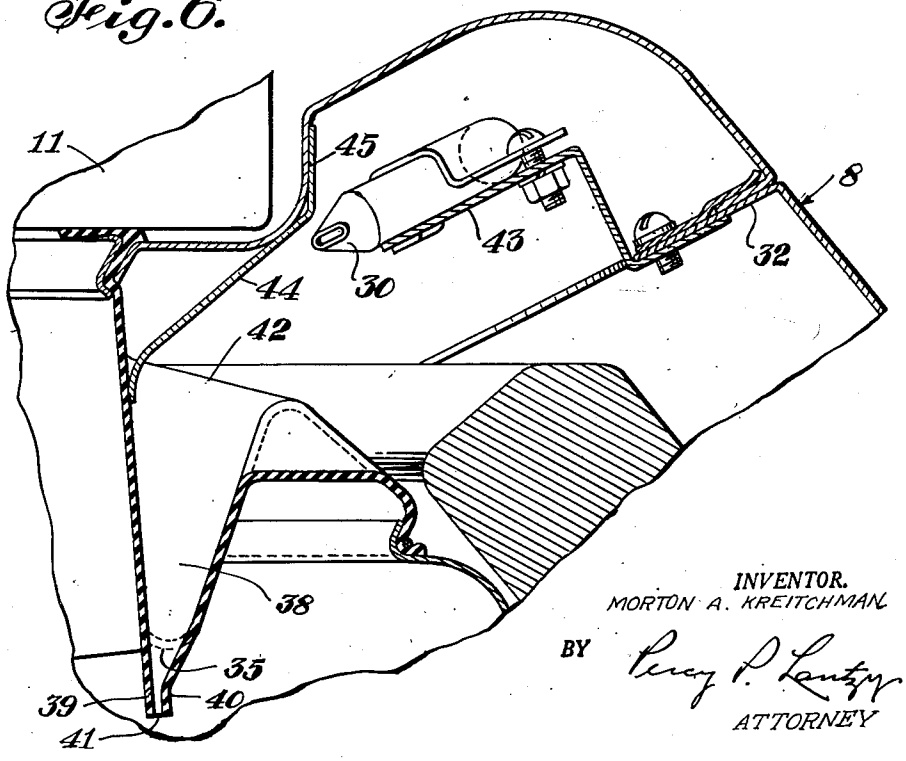


Fig. 6.



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UNITED STATES PATENT OFFICE

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WASHING MACHINE PROVIDED WITH RESILIENT COLLAPSIBLE INLET

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Application July 2, 1948, Serial No. 36,573

9 Claims. (Cl. 68—139)

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The present invention relates to washing machines of the type having a laundry container adapted to be rotated at washing and centrifugal fluid extraction speeds, and more particularly to a combination flexible tubular connector and fluid inlet arrangement disposed between the tub and cabinet openings thereof.

A typical washing machine to which this invention is applicable comprises a tub, laundry container or basket, a motor and a speed change transmission assembled as a unitary structure and supported by balls, springs or other vibration dampening supports to permit movement during fluid extraction speed. While such means of mounting the tub may minimize transmission to the cabinet of vibratory forces, provision must also be made in the structural arrangement of the tubular connection sometimes provided between the door opening of the cabinet and the rim of the tub in order to avoid undesirable transmission of vibratory forces through the connection to the cabinet. In the copending application of W. C. Bruckman, M. A. Kreitchman and W. J. Olson, Serial No. 32,116, filed June 10, 1948, assigned to the same assignee of the present application, a flexible tubular connection is disclosed that satisfactorily meets this requirement.

One of the objects of the present invention is to utilize a flexible connector of the type disclosed in the aforementioned copending application modified to include a fluid inlet arrangement in association with a fluid inlet nozzle for introducing fluid into the tub which is also capable of impeding effectively any tendency of suds or fluid to flow, splash or otherwise work outwardly therethrough and contaminate the inlet nozzle.

Another object of the invention is to provide a fluid inlet arrangement which will act as a trap to fluid and other media exerting force on the inlet in the reverse direction.

One of the features of the invention is the provision of a deflector for the fluid inlet arrangement whereby water or cleaning fluid is sprayed into the tub so as to effect a thorough and consistent soaking or rinsing action.

The above-mentioned and other features and objects of this invention and the manner of attaining them will become more apparent and the invention itself will be best understood, by reference to the following description of an embodiment of the invention taken in conjunction with the accompanying drawings, wherein:

Fig. 1 shows a sectional view in elevation with certain parts removed or broken away of an

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automatic washing machine embodying a preferred form of the present invention;

Fig. 2 is an enlarged sectional view of the fluid inlet arrangement of the present invention shown in Fig. 1;

Fig. 3 is a view in elevation of the fluid inlet arrangement of Fig. 2 taken from the left hand side thereof;

Fig. 4 is a plan view of the inlet arrangement contained in the flexible connector as viewed substantially along line 4—4 of Fig. 2;

Fig. 5 is a bottom plan view of the fluid inlet arrangement taken substantially along line 5—5 of Fig. 2; and

Fig. 6 is a vertical sectional view of a modified fluid inlet arrangement.

Referring particularly to Fig. 1, a washing machine is shown supported in the cabinet in accordance with the disclosure of a copending application of W. C. Bruckman and M. A. Kreitchman, Serial No. 12,983, filed March 4, 1948, and assigned to the assignee of this application, the machine comprising a water supporting tub 1, approximately frusto-conical in shape, and a perforated fabric container or basket 2 of similar shape inside and closely spaced with respect to the tub. A centrally located bearing 3 carried by the tub 1 supports the basket by means of spindle 4. A motor 5 drives the basket through a variable speed transmission 6, two speeds being sufficient for the usual washing and spinning operations. Solenoid-operated valves (not shown) are provided for admitting water to and draining water (with aid of pump 7) from the tub, and when energized sequentially with the speed changing means of the transmission 6, also solenoid-operated, may automatically soak, wash, drain, rinse and spin a charge of clothing or other fabrics the desired number of times and in the desired order to provide complete laundry service. The basket, tub, motor, transmission, and smaller elements are assembled as a unitary structure and are so mounted within a cabinet 8 as to permit a freedom of movement without objectionably vibrating the cabinet.

The cabinet 8 disclosed in detail in the copending application of M. A. Kreitchman and W. J. Olson, Serial No. 28,473, filed May 21, 1948, and assigned to assignee of this application, has a front removable panel portion 9, the upper part of which is provided with an opening 10 and a door 11 whereby clothes and other fabrics may be introduced and removed from the basket 2, the door being supported when open in a horizontal position by hinges 12.

In this machine the tub is mounted on balls so that the tub may have a free movement within limits during the washing and fluid extraction operations.

As shown in Fig. 1, the tub together with the driving mechanism for the basket are mounted on three balls, 13, 14 and 15 carried on bearing surfaces disposed substantially in a common plane. Each bearing surface over which a ball may roll is defined by an annular abutment 16 which is engaged by the ball should the tub be caused to gyrate or nutate beyond a predetermined amount. The balls being of rubber or a rubber substitute such as "butyl" provide considerable snubbing resistance to the slippage of the tub across the balls when the balls are stopped by abutments 16. This condition, however, only occurs for a very short length of time during acceleration and de-acceleration of the basket when bringing the speed of the basket up to and down from the fluid extraction speed, and then only when passing through a critical range of speed determined by the tub-basket mass. The tub is normally centered upon the balls by springs 17 which are suspended from the front and rear upper corners of the cabinet.

Interposed between the door opening 10 of the cabinet and the opening 18 of the tub 1 is a flexible connector 19 of the character disclosed in the aforementioned copending application of W. C. Bruckman, M. A. Kreitchman and W. J. Olson, Serial No. 32,116. The connector 19 completely seals the tub 1 to the cabinet and when the door 11 is closed the outer extremities of the connector 19 engage the door. The connector 19 comprises two major sections, a tubular or cylindrical section 20 and an annular laterally extended section 21 which preferably includes at least one corrugation fold circumferential thereof between the section 20 and the rim 18 of the tub. The connector in this form being of flexible material, such as rubber, or rubber substitutes, substantially completely absorbs the vibratory forces transmitted thereto by said tub during washing and fluid extraction speeds without any apparent transmission therethrough to the cabinet.

In the embodiment shown in Figs. 1 to 5, the connector 19 is provided with a flexible fluid inlet or trap formed in the upper portion 22 of the tubular section 20. A part 23 of the tubular section is offset in a lateral direction with the upper or cover portion 24 thereof flared outwardly at an acute angle thereby forming a pocket 25. An orifice 26 is provided at the bottom of the pocket between the lip extremities of the portions 22 and 24. As shown in Figs. 4 and 5, the slot 26 extends for a substantial length and is terminated by partitions 27 and 28 which form the ends of the pocket.

A pipe 29 connected to a source of water or other cleaning fluid is mounted in the upper part of the cabinet 8 and includes a nozzle 30 for directing a stream of fluid into the pocket 25. This spaced relation is required by the Plumbing Code to avoid the possibility of the nozzle from becoming contaminated by suds, etc. and in case suction should occur within the water supply system to avoid withdrawal of cleaning fluid and suds from the tub.

The nozzle 30 is shaped to provide a flat jet of fluid which is projected against a deflector plate 31 which further spreads and directs the stream of fluid fan shaped through the orifice 26. While the deflector 31 may be mounted separately on the cabinet 8, as shown in Fig. 6, it is preferable to extend it for mounting on flange 32 of the main body of the cabinet by means of a bolt 33, where it may be utilized to support at least in part the pipe 29 as indicated by bracket 34.

During the introduction of fluid into the tub, the fluid projects from the nozzle 30 in a flat stream against the deflector 31 where it is deflected in a fan shape spray through the orifice 26 crosswise of the tub whereby fabrics contained in the basket 2 are thoroughly soaked or rinsed, as the case may be. Since the mounting of the nozzle 30, deflector 31 and the flexible orifice-defining lips of the member 19 is stationary, the spray is consistently distributed in the most desired manner, a fan-shaped spray, and the operation of the basket has no effect thereon except for tumbling the fabrics in the spray. In other words, the present embodiment insures against direct jet application of the fluid onto the fabrics.

In case fluid splashes against the orifice 26 or suds build up as in case of an overload of soap and create pressure within the tub, the passage of suds or fluid outwardly through the orifice is greatly impeded by the flexible character of the lip portions 22 and 24 which tend to collapse when subjected to pressure from within the tub thereby closing the orifice 26. The flexibleness of the lips 22 and 24 is also enhanced by the elongated shape of the orifice.

The fold 35 in the member 19 between the tubular section 20 and the laterally extending portion 21 thereof, operates as a trap for any fluid or suds that may possibly work backwardly through the orifice 26 or splashed out of pocket 25. The amount of fluid or suds that may work into the fold 35 is very slight and evaporates without accumulation sufficient to approach the nozzle 30. If desired, the fold may be provided with one or more apertures 36 for fluid caught in the fold to drain into the tub. This trapping of fluid in the fold may be further concentrated by forming partitions at least in the lower portion thereof as indicated at 37.

Referring to Fig. 6 an alternative form of suds trap is shown, utilizing the fold 35 as a pocket 38 for the fluid inlet portion in the connector. As indicated, the bottom of the fold is open and the side walls thereof extend downwardly to form lips 39 and 40 in definition of an elongated orifice 41. Spaced apart partitions as indicated at 42 are disposed at the ends of the orifice 41 crosswise of the fold to complete the pocket. The nozzle 30 and the pipe associated therewith is mounted on a bracket 43 which in turn is secured to the flange 32. A deflector 44 is disposed in front of the nozzle 30 and in overlying relation with respect to the pocket 38 so as to direct and further spread the stream of fluid ejected from nozzle 30. The deflector 44 is secured such as by welding at 45 to the casing of the washing machine. The deflector, of course, may comprise if desired a continuation of the bracket 43 similarly as shown in Fig. 2.

The operation is similar to that described in connection with Figs. 1 to 5 in that the fluid is ejected as a flat shaped stream against deflector 44 where it is further spread in a fan shaped manner for passage through the orifice 41. In case of suds pressure the flexible lips 39 and 40 collapse thereby impeding movement of fluid and suds outwardly through the orifice 41.

While the principles of the invention are described in connection with specific apparatus, it is to be clearly understood that this description

is made only by way of example and not as a limitation to the scope of the invention.

I claim:

1. In a washing machine having a casing with a door opening, a tub in said casing having an opening therein and a flexible member connecting the openings of said casing and tub the flexible member having a fold in a wall thereof; said member having a fluid inlet opening including an orifice in the form of a slot in part of said fold which is adapted to close in response to exertion of pressure from within said tub and means spaced from said member for directing a stream of fluid into said inlet opening from a point outside said tub.

2. A washing machine according to claim 1, wherein the slot forming the orifice of said fluid inlet opening is located in the bottom of said fold.

3. A washing machine according to claim 1, wherein said member is provided with spaced apart partitions crosswise of said fold to form a pocket with the orifice slot in the bottom of said pocket.

4. A washing machine according to claim 1, wherein the means for directing a stream of fluid into said inlet opening includes a nozzle having an orifice greater in one cross-sectional dimension than in the dimension crosswise thereof so as to provide a fan shaped stream of fluid.

5. A washing machine according to claim 4, wherein the means for directing a stream of fluid into said inlet opening further includes a deflector plate disposed intermediate said nozzle and the orifice contained in said flexible member.

6. In a washing machine, a casing with a door opening, a tub in said casing, a fabric container in said tub, means to rotate said container, means to resiliently support said tub in said casing with the openings of the tub and container in substantial alignment with said door opening and a flexible member having at least one fold connecting the openings of said casing and tub, said member having a fluid inlet opening in the bottom portion of said fold in the form of a slot and adapted to close in response to exertion of pressure from within said tub, and means for directing a stream of fluid into said inlet opening from a point outside said tub.

7. A washing machine according to claim 6, wherein said flexible member includes a tubular section extending from said door opening to adjacent the opening of said tub and a second section extending laterally from said tubular section to the rim of said tub, and means forming a pocket which includes at least a part of one of said sections, said pocket having an opening in the bottom portion thereof constituting the said fluid inlet opening.

8. A washing machine according to claim 7, wherein said pocket is formed in said tubular section, said tubular section having a part thereof recessed toward said laterally extended section, said pocket comprising a part of the wall of said tubular section overlying said recessed portion and a wall portion flared upwardly and outwardly in overlying relation to said recessed portion.

9. A washing machine according to claim 7, wherein said laterally extended portion includes an annular portion having its inner edge connected to said tubular section with spaced apart partitions extending crosswise between said tubular section and said annular portion to form said pocket.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
24,476	Mayall	June 21, 1859
242,871	Bradish	June 14, 1881
343,938	Williams	June 15, 1886
1,233,417	Stephan	July 17, 1917
1,596,520	Eskholme et al.	Aug. 17, 1926
2,264,307	Haberstump	Dec. 2, 1941
2,296,257	Breckenridge	Sept. 22, 1942
2,347,988	Burke	May 2, 1944
2,352,642	Langdon	July 4, 1944
2,498,179	Oliver	Feb. 21, 1950