

[54] WASHING MACHINE PACKING BRACES

3,620,365 11/1971 Elwell 206/320

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3,809,232 5/1974 Kennington 206/320

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[22] Filed: Jan. 24, 1974

[21] Appl. No.: 436,112

[52] U.S. Cl. 206/320; 206/493; 206/523;
229/14 C

[51] Int. Cl.² B65D 81/04; B65D 85/30

[58] Field of Search 206/320, 520, 521, 523,
206/326, 446, 493; 229/14 C, 42, 6 R;
248/46

[57] ABSTRACT

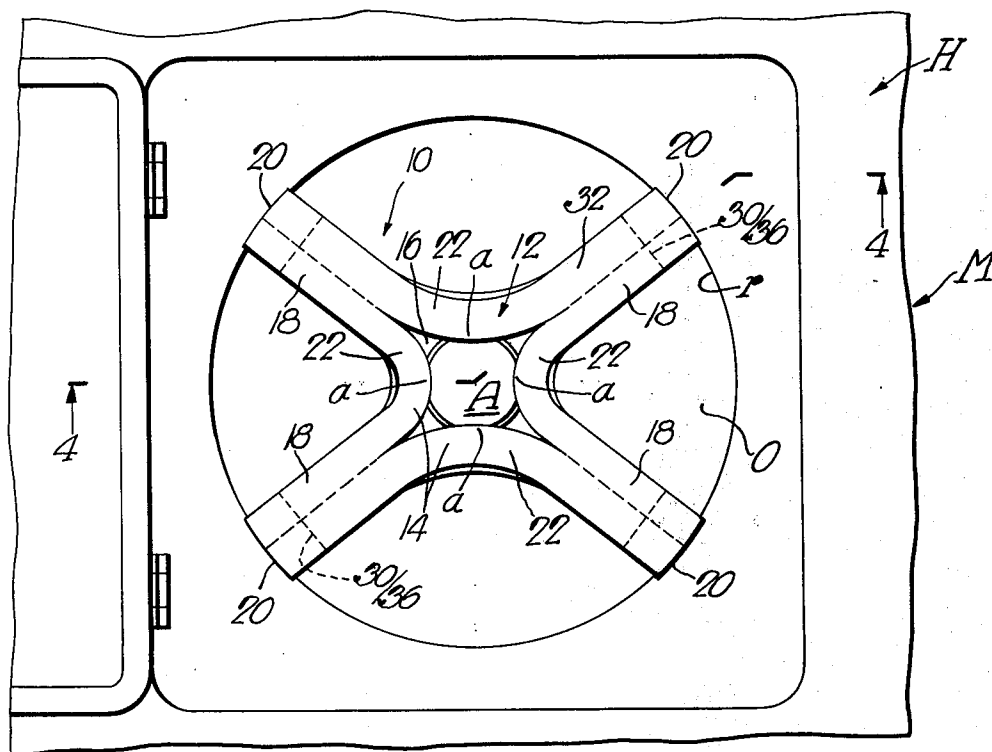
A single-piece packing brace having a hub formation with an aperture to be passed over the agitator in a washing machine, and a plurality of arms extending outwardly from the hub formation and to be wedged between the latter and the rim of the load opening in the machine.

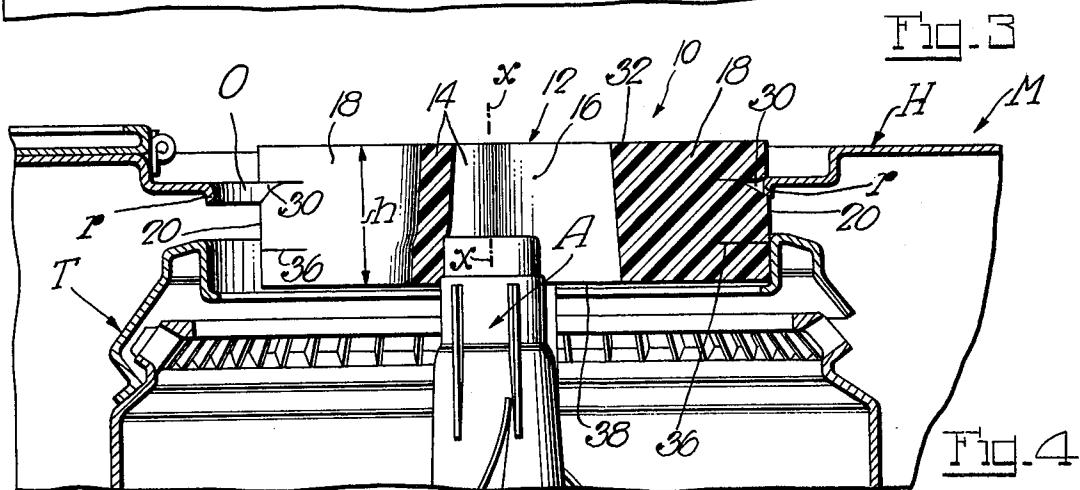
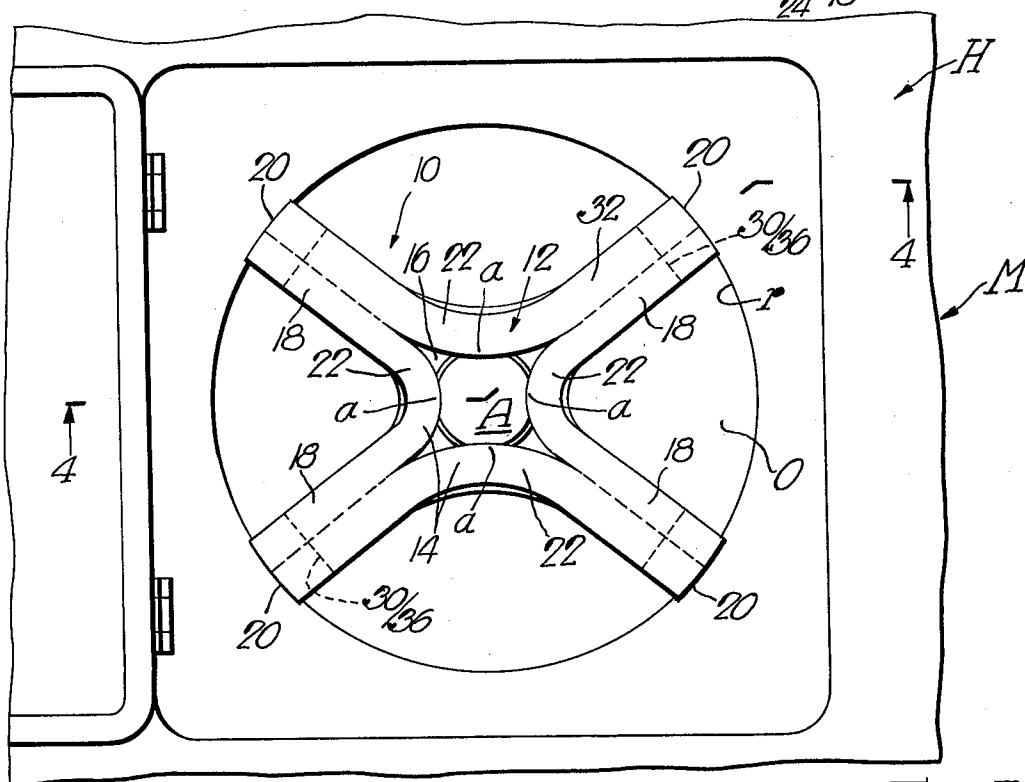
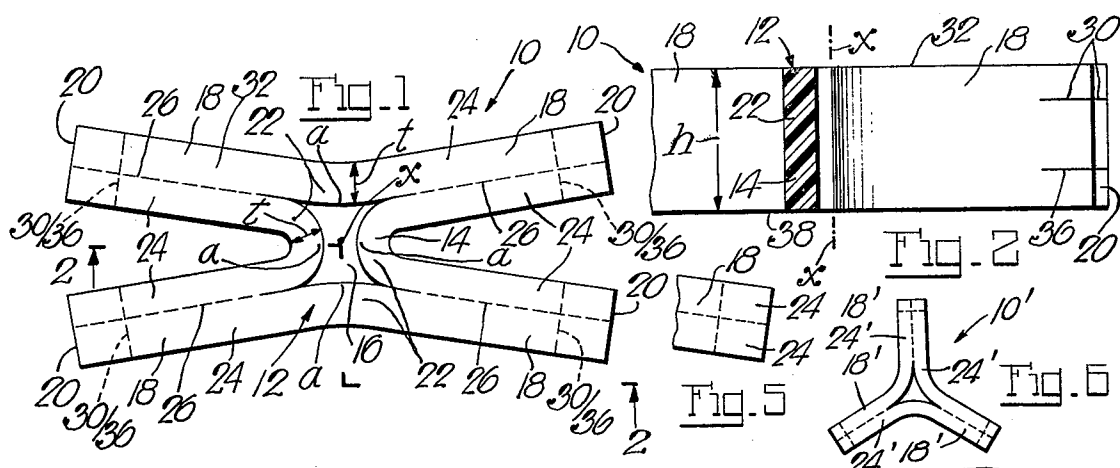
[56] References Cited

UNITED STATES PATENTS

2,961,141 11/1960 Lukes 229/14 C

14 Claims, 6 Drawing Figures





WASHING MACHINE PACKING BRACES

This invention relates to packing braces for washing machines in general, and to packing braces for the agitator and tub of washing machines in particular.

The invention is concerned with washing machines of the widely used type in which the agitator and tub assembly in the housing has sufficient pivotal freedom to give way to an unbalanced load in the spinning tub and thereby avoid excessive operational vibration of the machine. However, while pivotal freedom of the agitator and tub assembly is thus highly desirable in operation of the machine, it is detrimental when the machine is being carried and shipped in that the assembly may then strike against the housing and thus become damaged. To avoid damage to the agitator and tub assembly from this cause, there have become known various braces for temporarily locking the assembly against damaging pivotal give in the machine. Among these braces is a more recent one which provides a plurality of diverging arms of some resilient compressibility, of which the inner ends are joined by a resilient cord and the outer ends have ledges at the top. In applying this prior brace to a washing machine, the arms are forced axially into the open top of the housing and radially wedged between the agitator and tub, with the outward ledges on the arms coming to rest on top of the housing so that the outer ends of the arms also bear against the rim of the top opening in the housing. This particular brace is generally satisfactory and also has advantages over other known braces, but the cord-joined arms also entail some drawbacks. Thus, while the arms of this brace are of very low cost, this costwise advantage is more than offset by the relatively high cost of joining the inner ends of the arms by an elastic cord. Further, the cord-joined arms lend to the brace characteristics which require not only some knowledge but also some dexterity in order correctly to apply the brace to a washing machine. In this connection, the brace, when not in use, is in knocked-down condition in which adjacent arms are placed side-by-side for least space requirement and ease of handling of the brace in shipment and storage, and opposed inner ends of the arms are drawn into butting engagement with each other by the elastic cord. However, while the knocked-down condition of the brace is advantageous for shipment and storage of the latter, it also leaves the brace without any similarity in its appearance when in applied condition and also without any ready indication how to apply the brace correctly. It is, therefore, for a packer to know, from experience or given instructions, that the knocked-down brace must first be set-up in a particular way for its correct application to a washing machine, involving separating the abutting inner arm ends and spreading the arms apart into a cross brace pattern for their forced passage into a washing machine and radial wedge between the top of the agitator and the tub and also the rim of the top opening in the housing.

It is among the objects of the present invention to provide a packing brace which has all the advantages, but none of the drawbacks, of the aforementioned prior brace.

It is a further object of the present invention to provide a packing brace which is neither knocked-down in non-use nor requires set-up for use in a washing machine, yet takes up no more space in shipment and storage than the prior brace in knocked-down condition

and, moreover, is in non-use and in use of a characteristic and quite similar appearance which clearly and unmistakably suggests even to the most inexperienced packer the only feasible and correct mode of applying the brace to a washing machine.

Another object of the present invention is to provide a packing brace which is a single integral piece wholly made of a suitable material, preferably inexpensive plastic foam, which has some resilient flexibility and compressibility, with this piece having the pattern of a central hub or collar formation with an aperture, and a plurality of more than two, and preferably four, arms which extend outwardly from the hub formation. Thus, making the brace as a featured single integral piece of the same material largely contributes to its aforementioned low cost, while its also featured pattern clearly and unmistakably indicates its only correct application to a washing machine, to wit, axially forcing the brace into the top opening in the housing, with the central hub formation passing over the top of the agitator and the arms being lowered to a depth at which their outer ends wedge against the rim of the top opening in the housing and also extend part-way into the tub therebeneath.

A further object of the present invention is to provide a packing brace in the form of the aforementioned single piece which lends itself to efficient mass production at particularly low cost, by fabricating the brace wholly from flat strips of preferred plastic foam, and by coordinating and permanently joining the separate strips in an exceedingly simple and rapid fashion for their finish-formation into a brace of the aforementioned pattern of a central hub formation and therefrom extending outward arms. Thus, flat strips may be obtained by simply cutting them from readily available foam strip supply stock of adequate thickness, say one inch, for example, and of a width which is considerably greater than its thickness and determines the height of the brace, with the strips being advantageously left with square ends, and a number of such strips equal to the desired number of arms of a brace are finish-formed into the brace, simply by flexing intermediate lengths of the strips as needed to bring opposite endlengths of each strip into side-by-side abutment with similar endlengths of one other strip at chosen angles between adjacent butted strip lengths, and then permanently joining the butted strip lengths preferably and advantageously by virtually instantaneous heat-fusion, with the strip lengths thus joined constituting the arms of the brace and the free strip lengths intermediate these arms constituting the apertured hub formation of the brace.

A preferred brace of this type which is highly effective in use and lends itself to particularly efficient and low-cost mass production, features four arms and, hence, requires four flat strips which are preferably identical. For finish-forming the strips into the brace, two of the strips are simply folded on themselves and interposed or sandwiched between the two remaining, outer strips, with the outer ends of the interposed strips kept flush with the ends of the outer strips which will keep the inner folded ends of these interposed strips spaced from each other, and the outer strips being kept flat for joining the butted strip lengths by heat-fusion to from two opposed pairs of adjacent arms and thereby conclude the formation of the brace. Once the brace is thus formed, the adjacent arms of each pair will open up to some extent into a rather deep V-formation

owing to the resilient urgency of the folded strips to unfold over their free extent between the adjacent arms, which leaves the brace in a natural state that is quite advantageous. Thus, the brace in its natural state has the aforementioned characteristic appearance which clearly and unmistakably indicates the only correct mode of applying it to a washing machine; yet the same takes up but inappreciably more shipment and storage space than the aforementioned prior brace in its knocked-down condition. The present brace may even be held in a flat state of minimum space requirement with little resistance from the opposite arm pairs, as where a multitude of these braces are, for their shipment and storage, packed sufficiently snugly to that end and no matter for how long, yet the braces will, when once unpacked, immediately spring back to their advantageous natural state.

Braces thus formed have also some unique structural and functional characteristics. Thus, in coordinating and permanently joining the strips, the free strip intermediate the arms are of single chosen strip thickness at which they are fairly flexible, while the arms are twice the strip thickness and, hence, are much less flexible but all the more longitudinally compressible without collapsing. This is quite advantageous in applying a brace to a washing machine, in that the more flexible hub formation will respond more readily to a packer's manipulation of the brace in passing the hub formation over the top of the agitator and also forcing the arms between the agitator and housing with dispatch and minimum effort, while the greater longitudinal compressibility of the arms affords an entirely secure lock of the agitator and tub assembly to the housing of most washing machines with existing dimensional variations. Further, the hub-forming strip lengths between the arms extend like curved straps which combine to lend to the hub formation a unique outline, but even more important, they leave the hub formation widely flexible and with an aperture which is readily distortable into even grip with most any agitator top. Moreover, the wide flexibility of the hub formation readily permits spreading of the arms, even after their forced passage into a washing machine, into relative angular positions in which they are most evenly wedged in the machine.

It is another object of the present invention to provide a packing brace of this type which has also exceedingly simple, yet highly effective, safeguards against forcing the brace into a washing machine to an excessive depth i.e., below the housing top, at which the brace would fail to protect the agitator and tub assembly against possible damage. To this end, the outer ends of at least one pair of opposite arms, and preferably of all arms, are near the top face of the brace simply provided with transverse slits. The outer arm ends may thus be slit with simple knife blades, even with razor-like edges which easily penetrate the preferred foam material and retain their sharpness for the longest time. The slits thus formed need not even be noticeable on the brace, but whether noticeable or not, they are highly effective in operation. Thus, in forcing the brace into a washing machine and thereby wedging the arms between the agitator and housing top, the brace will reach an intended correct depth in the machine at which the slits in the arms ends are adjacent the rim of the top opening in the housing. It is then, and totally without involvement of the packer, that the compressed arms force the slits in their outer ends with a

snap action into sudden interlock with the rim of the top opening in the housing, with this snap action being clearly felt by the packer and thereby unmistakably indicating to him that the brace is now correctly applied and requires no further forcing.

It is a further object of the present invention to provide a brace of this type which, in further contrast to the aforementioned prior brace, neither requires, nor has, a designated top face which must be uppermost for the only correct application of the brace to a washing machine and, instead, may correctly be applied with either one of its opposite faces being uppermost, and the brace further has safeguards against forcing it into a washing machine to an excessive depth irregardless of which one of its opposite faces is uppermost. The present brace with its featured characteristics, including square arm ends, naturally adapts itself to correct application to a washing machine with either of its opposite faces uppermost, and the safeguards against excessive depthwise application of the brace in a washing machine are obtained by simply providing the aforementioned transverse slits in the outer arm ends near each of the opposed faces of the brace.

Further objects and advantages will appear to those skilled in the art from the following, considered in conjunction with the accompanying drawings.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

FIG. 1 is a top view of a packing brace;

FIG. 2 is a section through the packing brace taken substantially on the line 2—2 of FIG. 1;

FIG. 3 is a top view of the packing brace as applied to a washing machine;

FIG. 4 is a section through the applied packing brace taken substantially on the line 4—4 of FIG. 3;

FIG. 5 is a fragmentary view of a modified packing brace; and

FIG. 6 is a top view, at a reduced scale, of a further modified packing brace.

Referring to the drawings, and more particularly to FIGS. 1 and 2 thereof, the reference numeral 10 designates a packing brace which is in the form of a single piece of a suitable resilient material having the configuration of a hub or collar 12 with a center axis *x* and a circumferential wall 14 defining a center aperture 16, and a plurality of angularly spaced arms 18 extending outwardly from the hub wall 14.

In applying the brace 10 to a washing machine M (FIGS. 3 and 4), the brace is inserted through the load opening O in the top of the housing H, with the hub 12 of the brace being passed over the top of the agitator A in the machine, and the arms 18 being with their outer ends 20 wedged against the rim *r* of the load opening O in the housing, thereby locking the pivotally yielding agitator to the housing of the machine against possibly damaging pivotal give in carrying and shipping the machine. Customarily, the agitator A and the tub T of the machine are as a unit mounted for operational pivotal give to reduce vibration of the machine in operation during a spinning cycle of the tub with an unbalanced wash load therein, wherefore the applied brace, by its lock of the agitator to the housing of the machine, locks the entire unit, including the tub T, to the housing. However, for passing the hub 12 of the brace 10 over the top of the agitator and also wedging the arms 18 with their outer ends 20 against the rim of the load

opening in most washing machines, the brace is of a height h at which the same will usually extend also part-way into the tub T (FIG. 4) and thus enhance the secure lock of the agitator-and-tub unit to the housing of the machine.

The brace 10 of FIGS. 1 and 2 has an exemplary number of four arms 18, and the circumferential wall 14 of the hub 12 is in this instance formed by wall sections 22 of a number equal to the number of arms, with the wall sections 22 extending in curved strap-like fashion between, and merging tangentially with, the arms 18, and being with their apices a nearest the center axis x . The wall sections 22 thus combine to define an aperture 16 of a cross-sectional area which is advantageously considerably in excess of that of the top of the exemplary agitator A, and which in any event is sufficiently large for passage of the hub over the top of most any agitator, while the characteristic multi-curved outline of the hub is further advantageous in that it leaves the latter quite flexible for ready give into secure grip with the top of an agitator on forced passage of the hub thereover. The present brace 10 is further characteristic in that the curved wall sections 22 are of a thickness t which is reduced from that of the arms 18, thereby further enhancing the flexibility of the hub 12 for its ready forced passage over an agitator top, while the greater thickness of the arms 18 leaves them less flexible but more longitudinally compressible for their secure wedge to the rim of the load opening in most washing machines of existing dimensional variations. For preferred smooth and complete continuity of the curved wall sections 22 with the arms 18 at their merger, the two curved wall sections merging with each arm have a combined thickness equal to that of the arm, and preferably are each of one-half the thickness of the arm. The wide flexibility of the hub 12, stemming from the curvature and reduced thickness of its wall sections 22, is further advantageous in that the arms 18 may, in the course of their forced passage into the load opening in most any washing machine, be easily spread further or closer apart for their secure wedge application to the rim of the load opening with about the same reasonable effort despite existing dimensional variations in the load openings of these machines. Thus, with the arms 18 of the brace in its natural state (FIG. 1) being arranged in exemplary opposite pairs of which the arms of each pair are spaced apart fairly closely, it may well be that the brace is applied to the washing machine with the exemplary load opening O in FIG. 3, by spreading the arms of each pair further apart as shown. Conversely, if the load opening of the machine would be somewhat larger, the brace might well be applied with the least effort by spreading the arms of each pair less apart than in FIG. 3. The present brace thus has also the feature of ready adaptability to washing machines with load openings of existing dimensional variations at about the same firm wedge application.

It is another feature of the present brace that the same clearly indicates, by its appearance even in its exemplary natural state in FIG. 1, how to apply the same in the only correct way to a washing machine. Thus, the appearance of the hub 12 and diverging arms 18 can hardly leave any doubt in the mind of even in inexperienced packer that the only possible application of the hub is over the top of the agitator and the only possible application of the arms is their interposition between

the hub and the rim of the load opening of a washing machine if the brace is to function at all.

While the brace 10 of FIGS. 1 and 2 has an exemplary number of 4 arms, it is, of course, within the ambit of the invention to provide the same with a different number of arms, but preferably more than two arms. Thus, FIG. 6 shows a modified brace 10' which may in all respects be like the brace 10, except that the modified brace has three arms 18' which, moreover are equiangularly spaced in the natural state of the brace as shown.

The present brace in either of its configurations of FIGS. 1 and 6 may be formed from any suitable elastic material, as by blanking in a single piece from sheet stock. A preferred material is elastic plastic foam, such as polyethylene foam, for example, which is readily available and of low cost and also has a resiliency which is well suited for the brace. In using plastic foam as the brace material, the brace may also be molded in a single piece. However, rather than blanking or molding the brace, the same is far more advantageously formed from separate flat strips of plastic foam which are easily coordinated and permanently joined into a single-piece brace. Thus, the exemplary brace 10 of FIG. 1, having four arms 18, is formed from the same number of separate foam strips 24 which are initially flat and conveniently of the same length, with these strips being simply cut from strip supply stock and left with square ends. The strips are finish-formed into the brace 10, simply by flexing intermediate lengths of the strips as needed to bring each one of two opposite endlengths of each strip into side-by-side abutment with a similar endlength of another strip along the dotted lines 26 (FIG. 1) at chosen angles between adjacent butted strip lengths, and then permanently joining the butted strip lengths preferably and advantageously by heat fusion, as by momentarily wiping their interfaces with a hot plate and then pressing these interfaces together to form the permanent joints which are also indicated by the dotted lines 26.

The modified brace 10' with three arms 18' is made up of three separate strips 24' which may also be finish-formed into the brace in the manner just described.

It will be noted in FIG. 1 that two of the four strips 24 of which the brace 10 is made up are less thick than the two remaining strips. While this is feasible, it is preferred to make all four strips 24 of the same thickness as indicated in FIG. 5, whereby, among other advantages, all four strips may be cut from supply strip stock of the same thickness.

While the four strips 24, which make up the brace 10, may be finish-formed as described above, they may also be finish-formed into the brace 10 in a somewhat modified manner, by folding two of these strips on themselves and interposing or sandwiching them between the two remaining or outer strips, and leaving the outer strips flat for joining them with the interposed strips. The brace, once finish-formed in this fashion, will of its own accord assume a natural state like or similar to that shown in FIG. 1, owing to the urgency of the folded strips to unfold to some extent despite their joinder with the other two strips.

The four-arm brace 10 of FIG. 1 is preferred over a brace with any other number of arms, not only because the same lends itself particularly well to efficient and low-cost mass production and the four arms combine to lock the agitator-and-tub unit of a washing machine

to the housing thereof with particular safety, but this brace in its natural state takes up little space in shipment and storage.

It is also a characteristic of the brace 10 that the outer ends 20 of the arms 18 are left square. These square arm ends are used to good advantage in providing the brace with exceedingly simple stop provisions to avoid overforcing the brace into a washing machine to a depth below the load opening in the housing at which the brace would be totally ineffective. These stop provisions are in the form of simple transverse slits 30 in the outer ends 20 of at least two opposite arms 18, and preferably in the outer ends of all arms, with these slits 30 being near the designated top face 32 of the brace. Thus, in applying the brace to a washing machine and thereby also forcing the arms 18 into wedged extension between the agitator and load opening in the machine, the arms 18 are forced more often than not to a depth at which the slits 30 reach the rim *r* of the load opening and are then forced into interlock with the rim *r* by the resiliently compressed arms (FIG. 4). The interlock thus occurring between the slits in the outer arm ends and the rim of the load opening is quite sudden and of some snap urgency which is readily felt by the packer and unmistakably indicates to him that the brace is now in place and requires no further forcing.

With the outer ends 20 of the arms 18 left square, these outer arm ends are preferably and advantageously provided with second slits 36 near the other face 38 of the brace 10. Thus, in applying the brace to a washing machine with its face 38 uppermost, the slits 36 in the outer arm ends will be forced into interlock with the rim of the load opening when the forced brace reaches the proper depth in the machine. Regardless of which of the faces 32 or 38 is uppermost in applying the brace, one of the slits in each arm end will first pass and spring into momentary interlock with the rim of the load opening in the machine, but such interlock occurs long before the brace is in place and is so transitory that, if then felt by the packer, he knows that the brace must be forced much deeper into the machine in order to function properly.

What is claimed is:

1. A packing brace for locking a pivotally yielding agitator and tub unit to the load opening in a washing machine, comprising a single piece of resilient material in the form of a collar with a center axis and an endless wall extending about said axis and defining a center aperture, and more than two angularly spaced arms extending outwardly from said collar wall and being integral therewith, said collar and arms being, for brace application, forced over the top of the agitator and into wedged interposition between the collar and load opening, respectively, with the cross-sectional area of said center aperture being larger than that of the agitator top and the thickness of said collar wall being less than the thickness of said arms so that said arms are longitudinally compressible and less flexible than said collar wall.

2. A packing brace as in claim 1, in which said single piece lies in a plane normal to said axis and is of uniform height in the direction of said axis, and said collar wall and arms are of rectangular cross-sections of which the longer sides define said uniform height and the shorter sides define said thickness of said collar wall and arms, respectively.

3. A packing brace as in claim 2, in which the thickness of each arm is twice that of said collar wall.

4. A packing brace as in claim 2, in which said piece has opposite faces parallel to said plane, and said arms are at least three in number, and have square outer ends with narrow slits therein near one of said faces, with said slits having opposite surfaces parallel to each other and to said one face, and being adapted for snap-interlock with said load opening in applying the brace with said one face uppermost.

5. A packing brace as in claim 4, in which the height of said piece between said slits and the other of said faces is sufficient for extension of the applied brace into the tub.

6. A packing brace as in claim 4, in which said slits constitute first slits, and said outer arm ends are provided with second slits identical with said first slits and extending near and parallel to the other of said faces for their snap interlock with said load opening in applying the brace with said other face uppermost.

7. A packing brace as in claim 2, in which said collar wall is formed of curved wall sections of a number equal to the number of arms, with each curved section having an apex, and each section extending snap-like between, and merging tangentially with, the inner ends of two adjacent arms and being with its apex nearest said center axis, and two curved wall sections leading from each arm having a combined thickness equal to the thickness of the arm.

8. A packing brace as in claim 7, in which said piece is formed wholly of flat strips of resilient material having opposite sides of said uniform height and being equal in number to the number of arms, with each strip having opposite endlengths and an intermediate length, of which each of the opposite endlengths of each strip is permanently joined side-by-side with one endlength of one other strip for the formation of the arms by said joined strip lengths, and said intermediate strip lengths being at said angular spacing of the arms flexed into curved extension between the arms and constitute said sections of the hub wall.

9. A packing brace as in claim 8, in which said strips are identical dimensionwise.

10. A packing brace as in claim 9, in which said strips have square ends which are flush in the joined strip lengths to leave the arms with outer square ends.

11. A packing brace as in claim 10, in which said piece has opposite faces parallel to said plane, and said outer arm ends are provided near and at the same spacing from one of said faces with narrow slits having opposite surfaces parallel to each other and to said one face and adapted for snap-interlock with said load opening in applying the brace with said one face uppermost.

12. A packing brace as in claim 11, in which said slits constitute first slits, and said outer arm ends are provided with second slits identical with said first slits and extending parallel to the other of said faces at a distance therefrom equal to the distance between said first slits and said one face, with said second slits being adapted for snap-interlock with said load opening in applying the brace with said other face uppermost.

13. A packing brace as in claim 8, in which said strips are of plastic foam, and said strip endlengths are permanently joined by fusion at their interfaces.

14. A packing brace as in claim 8, in which said arms are four in number which are arranged in two pairs on opposite sides, respectively, of said axis, with the arms of each of said pairs being, in non-use of the brace spaced at an acute angle.

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