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J. J. McCABE

1,861,640

WASHING MACHINE

Filed July 8, 1927

Fig. 1

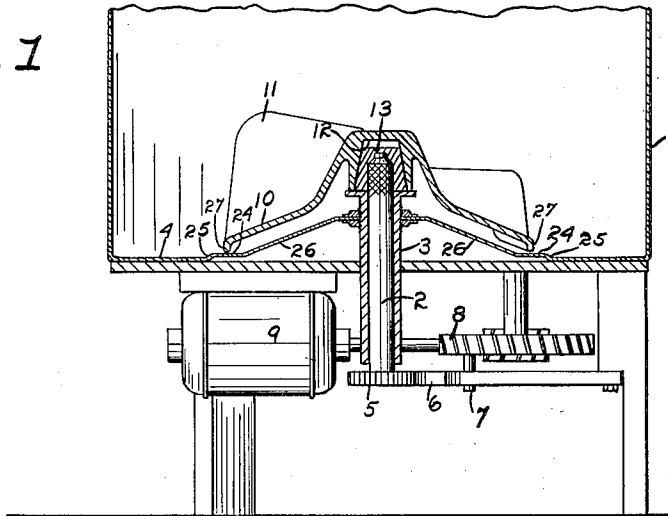


Fig. 2

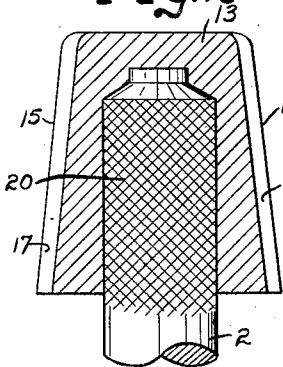


Fig. 3

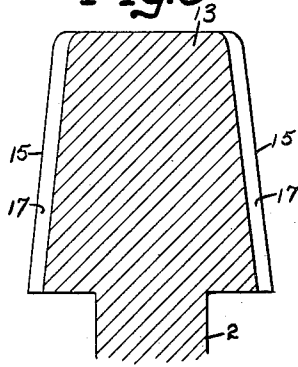


Fig. 4

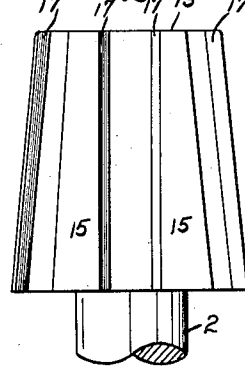


Fig. 5

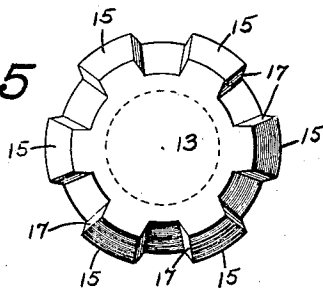
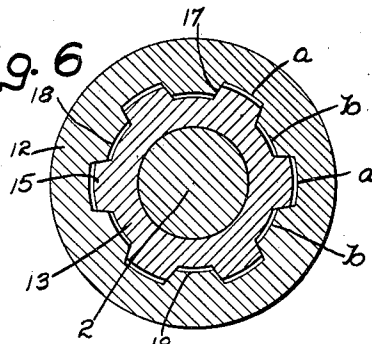


Fig. 6



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WASHING MACHINE

Application filed July 3, 1927. Serial No. 204,173.

This invention relates to clothes washing machines of the "gyrator" type and has for its objects the provision of an improved joint or connection between the dasher and the vertical shaft which supports the same whereby looseness and wear are prevented without impeding the ready removal and replacement of the dasher; the provision of a new, simplified and improved arrangement for preventing clothing from entering the space beneath the dasher; while further objects and advantages of the invention will become apparent as the description proceeds.

In the drawing accompanying and forming a part of this application I have shown an illustrative embodiment of my said invention wherein Fig. 1 is a vertical sectional view through a washing machine equipped with my improvements; Fig. 2 is an enlarged sectional view of the driving head shown in Fig. 1; Fig. 3 is a sectional view of a modified construction of driving head; Fig. 4 is a side elevation of either form of head; Fig. 5 is an end elevation of such driving head; and Fig. 6 is a sectional view of head and socket.

The type of machine to which this invention appertains comprises an upright casing 1, having journaled in its bottom a vertical shaft 2, connected at its lower end to a switch oscillating mechanism and at its upper end to a removable dasher. Said shaft is journaled in a hollow sleeve 3, tightly joined to the bottom 4 of the tub. The oscillating mechanism may take any desired form, that here shown comprising a pinion 5 secured to the shaft and meshing with a segmental gear or rack 6 which is oscillated by a pin 7 carried by the worm wheel 8 driven by the motor 9.

The dasher comprises a circular disk 10 provided with one or more vanes or blades 11 on its upper face and having a central socket 12 for the reception of the head 13 of the shaft. This head is fashioned both in size, in shape, and in profile to hold the dasher tightly at all times by gravity alone while permitting instant attachment and removal of said dasher.

To this end said head is formed with longi-

tudinal driving ribs 15 which are narrowest at the upper ends and flare circumferentially with increase of distance therefrom. The lateral edges 17 of these ribs are abrupt and face circumferentially more than radially. The socket is formed with complementary ribs 18 having lateral edge-faces which engage the edge faces of said first ribs so as to effect both the supporting and the driving functions. The length of the socket is made greater than the length of the head so that end engagement may not occur.

Preferably also the head and socket are made to taper longitudinally, this tapering being utilized to secure the tapered conformation of the driving ribs, the channels between said ribs being parallel sided; but when this profile is employed it is desirable that radial spacing occur at the points *a* and *b* as well as at the end of the socket in order to assure that the weight shall be supported by the same surfaces that effect the driving since upon any separation of these functions a certain degree of circumferential lost motion is likely to occur.

Preferably, too, the head is made larger than the shaft so as to increase the area of the wear-resisting surface and to obtain a better leverage for rotating the dasher, although the only reason for making the shaft smaller than the head is for cheapness. One of the easiest ways to produce this enlarged head is to cast around the roughened end 20 of the shaft 2, a mass of metal which shrinks on setting as shown in Figs. 1, and 2, but it is equally within my invention to make the head integral with the shaft as shown in Fig. 3 or in any other manner. Obviously the head can be carried by either member and the socket by the other, it being merely for convenience that the head is formed on the shaft.

It is permissible and within my invention to allow a certain amount of contact between the radially facing surfaces, but it is best to keep this so small that wear or deformation thereof will proceed at least as fast as at the driving surfaces. It is not necessary that the surfaces be spaced at both *a* and *b* as shown in Fig. 6 provided only that such proportions

be maintained as to retain contact at all times at the driving surfaces. This construction enables the employment of comparatively soft and inexpensive materials for the head and socket.

In order to prevent clothes from working beneath the edge of the dasher, despite considerable tolerance in dimensions and irregularities in shape, I have shown a very simple expedient in Fig. 1, wherein the bottom 4 of the tub or casing is formed with a circular elevated portion 24 which I call a step, terminated by a comparatively abrupt circular ledge 25 which in turn merges with the flat bottom of the tub or casing. This elevated portion can be either flat or conical. I have shown both, namely a central conical portion 26 or ledge and a flat portion or step surrounding the same inside the ledge 25, but it can be all flat or all conical. The disk 10 of the dasher is preferably flaring also and extends close to the face of the elevated portion 24 and terminates at a short distance radially inside the ledge 25. This distance is preferably of the same order of magnitude as the space between said disk and the portion 24. Preferably the margin of the disk terminates in a narrow circumferential depending lip 27 which facilitates machining and increases the manufacturing tolerance.

The ledge 25 serves to deflect the water currents in such a way as to divert articles of clothing away from the narrow space below the edge of the disk. It is for this reason that the edge of the disk should lie everywhere inside the ledge 25. Also the formation of a slight depression outside of the dasher enables sand, grit, and accidental foreign articles such as pins and buttons to collect where they cannot become wedged under the dasher or injure the articles being washed.

It will be understood that I do not limit myself to the details herein shown nor in any other wise except as specifically set forth in my following claims which I desire may be construed each independently of limitations contained in other claims.

Having thus described my invention what I claim is:

1. In mechanism the combination with a vertical shaft and means for moving the same about its axis, of a driving element detachably mounted on the upper end thereof, said shaft and element having a head and socket connection, the walls of which are formed with plural interfitting ribs and channels which flare circumferentially with increase of the distance therealong said ribs and channels having circumferentially facing driving surfaces which also support the weight of said element.

2. In a washing machine of the gyrator type the combination with a vertical shaft and means for oscillating the same about its axis, of a dasher detachably mounted on the upper

end thereof, said shaft having at its upper end a head formed with a plurality of angularly spaced longitudinal ribs each of which tapers circumferentially from its bottom to its top and said dasher having a socket with internal ribs which engage the edges of said first ribs in advance of any radial engagement.

3. The combination with a vertical shaft and mechanism for moving said shaft about its axis, of a member removably carried by the upper end of said shaft in driven and supported relation, said shaft and member having a male and female connection, the walls of which are formed with plural interfitting longitudinal ribs and channels which flare circumferentially with increase of distance downward from the top of the shaft, said ribs having lateral driving faces which engage the corresponding faces of the channels in combined supporting and driving relation.

4. The combination with a vertical shaft and mechanism for moving said shaft about its axis, of a member removably carried by the upper end of said shaft in driven and supported relation, said shaft having a tapered enlarged head thereon and said member having a tapered socket adapted to receive said head, the sides of said head and socket being formed with abrupt-sided, circumferentially tapering, interfitting ribs, and the length and diameter of said head and socket being such that first engagement occurs between the margins of said ribs.

5. A detachable connection for a driving member and a driven member comprising ribs formed on one of said members and complementary channels formed on the other of said members, characterized in that a development of said members exhibits a longitudinal tapering of at least a part of said ribs and channels.

6. A detachable connection for a driving member and a driven member comprising a frusto conical head on one member, the side of said head being formed with longitudinally disposed ribs and channels, the other member having a socket adapted to receive said head, the side of said socket being formed with ribs and channels complementary to those carried by the head, characterized in that a development of said members exhibits a longitudinal tapering of at least a part of said ribs and channels.

7. A driving shaft having an enlarged tapered end portion, integral splines formed on said tapered end portion, the laterally facing side walls of adjacent splines being obliquely disposed relatively to the radius at each point so that the projections of their planes intersect in a line positioned between said splines and the axis of said shaft, and a driven member having an internally splined socket complementary to the corresponding portion of said

driving shafts and adapted to receive the latter.

8. A detachable connection for a driving member and a driven member comprising a head carried by one member and having a diameter which is greater than the diameter of the member which carries it, the other member having a socket for said head, and the engaging faces of said head and socket being formed with ribs and channels adapted to interfit in driving relation, some at least of said ribs and channels being narrowest at one end and flaring circumferentially with increase of distance therefrom and having abrupt circumferentially-facing driving shoulders.

9. A detachable connection for a driving member and a driven member, one of said members having a head which is larger than the member by which it is carried, and the sides of said head being formed with alternating ribs and channels which traverse the complete length of said head, and the other member having a socket formed with ribs and channels complementary to those of the head, said head and socket having complementary tapered portions, and said socket having a closed end which is spaced from the end of the head at the time that said head has been inserted into said socket as far as it will go.

In testimony whereof I hereunto affix my signature.

JOHN J. McCABE.