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2,881,907

DRUM MOUNTING

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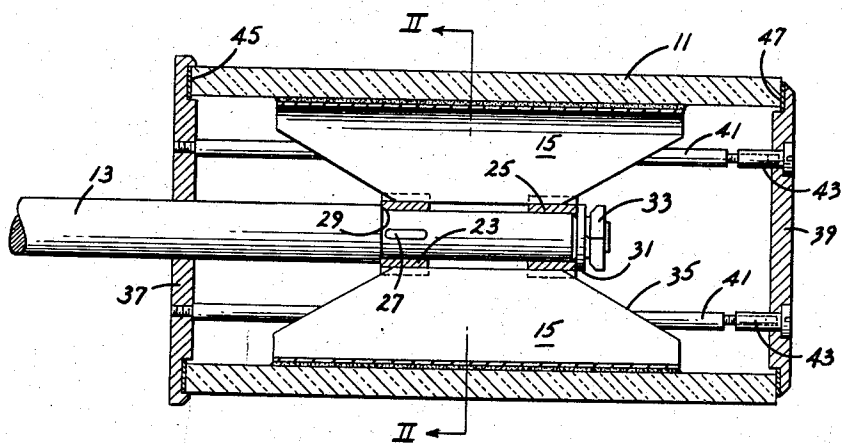


Fig. 1

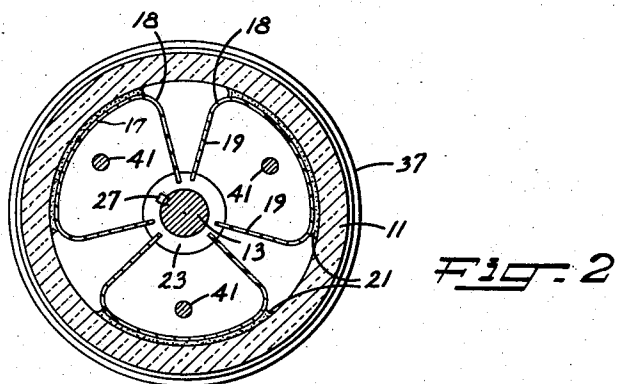


Fig. 2

Fig. 4

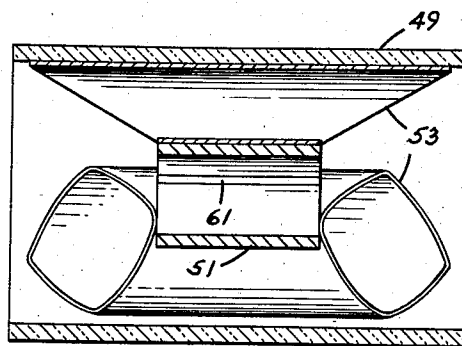
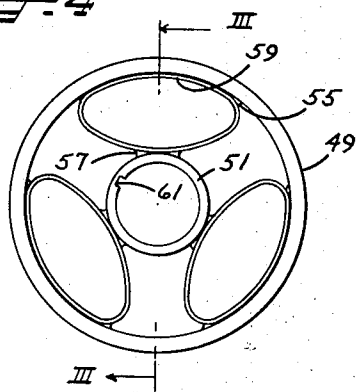


Fig. 3

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3 Claims. (Cl. 203—399)

This invention relates to a cantilever supported drum construction for use in textile treating equipment.

In the processing of certain artificial filaments and fibers, the filament handling drums are formed with a non-metallic material which will not be adversely affected by the various treating liquids to which the filaments or fibers are subjected. Annular porcelain shells or drums have been heretofore employed for such purposes. However, these have proved unsatisfactory from the standpoint of cost, ease of handling and assembly, ability to withstand expansion and contraction stresses, sturdiness, and waste yarn removal. It is therefore an object of this invention to provide a generally new or improved and more satisfactory treating drum construction.

Another object of this invention is the provision of a cantilever supported drum having a porcelain shell which is resiliently supported on a drive shaft extending within the drum.

Still another object of the invention is to provide a porcelain drum assembly, the interior of which may be effectively sealed against the entrance of fluids.

A further object is the provision of a porcelain drum assembly which is simple in construction and use, can be fabricated economically, and is capable of withstanding heavier loads than heretofore possible.

Further objects will be apparent from the specification and accompanying drawings in which:

Fig. 1 is a longitudinal vertical section of one form of the treating drum of the invention;

Fig. 2 is a transverse vertical section taken along the line II—II of Fig. 1;

Fig. 3 is a longitudinal vertical section of a second form of the invention taken on the line III—III of Fig. 4; and

Fig. 4 is a transverse vertical section through the second form of the drum assembly.

The invention comprises the provision of sheet metal supporting members between the drum shaft and the drum shell which are shaped to provide limited resilient movement of the drum shell relative to its shaft in response to varying loads and stresses. In one embodiment of the invention, the cross section of the supporting members, taken together, resemble a cloverleaf in which the periphery of each of the members is arched or curved to conform to the internal periphery of the drum shell to which the members are cemented. The sides of the supporting members extend inwardly toward the drum axis, generally along a radius of the shell, and are secured to annular collars keyed to the drum shaft. In the second form of the invention, the supporting members are elliptical in cross section and are cemented between the drum shell and a collar keyed to the shaft, with the conjugate or minor axis of the supporting members extending radially of the shell. As with the first embodiment, the portions of the elliptical supporting members which engage the shell are curved to conform to the internal periphery of the shell. Viewed from the side, the supporting members in both forms

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of the invention are undercut or having their ends lying in an inclined plane so that the portions of the supporting members adjacent the shell are substantially longer than those adjacent to the drum shaft.

With reference to Figs. 1 and 2 of the drawing, the drum assembly includes a relatively thin ceramic or porcelain shell 11 which is tubular in construction and is mounted on a central drive or idler shaft 13 by means of a plurality of resilient sheet metal supporting members or spokes 15. Preferably, three spokes are employed, each of which includes an arcuate or curved surface 17 connected by intermediate flexible arched sections 18 with a pair of sides 19 disposed in planes at approximately right angles to each other. The surfaces 17 of each of the spokes 15 is bonded at 21, preferably by a flexible cement, to the internal surface of the shell 11, while the sides 19 extend approximately radially inwardly toward the drive shaft 13 and are anchored within slots formed in the collars or hubs 23 and 25 carried adjacent to the free end of the shaft 13. As best seen in Fig. 2, the surfaces 17 of the spokes 15 together engage the shell 11 along approximately 270° of its internal circumference, thus providing a very rigid and strong support for the shell and enabling heavier loads to be carried without a corresponding increase in weight of the drum assembly itself.

The collar 23 is keyed at 27 to the drive shaft 13 and is prevented from moving axially along the shaft by its engagement with a shoulder 29, while the shell 11, with its supporting spokes 15 and collars 23 and 25, is fixed against axial movement off the free end of the shaft 13 by a lock washer 31 and nut 33. As seen in Fig. 1, the sides 19 are tapered or undercut at 35 and thus providing a greater contact between the spokes 15 and shell 11 than with the spokes and collars 23 and 25. From the structure thus far described, it is seen that the construction of the spokes 15 permits the shell to move radially relative to the axis of the shaft 13 in response to expansion and contraction stresses and differences in loading conditions and is adapted to resiliently return to its normal position when the stress or overload is removed. Further, the construction of the spokes 15 and their manner of connection to the shaft 13 permit the use of a shorter drive shaft than was heretofore possible, and eliminates the necessity for careful alignment as is required with the conventional construction which is driven through a gasket or spring arrangement.

When desirable, the ends of the shell 11 may be closed with end plates 37 and 39 which are clamped in place by tie rods 41 passing through the shell 11 and between the sides 19 of the hollow supporting members 15. As seen in Fig. 1, each of the rods 41 is threaded at both ends, with one end threadedly engaged with the plate 37, while its opposite end is threaded within the sleeve nuts 43 passing through the end plate 39. Gaskets 45 and 47 may be interposed between the edges of the shell 11 and the end plates 37 and 39, respectively, to seal the interior of the shell from liquid penetration.

The modified drum assembly shown in Figs. 3 and 4 is generally similar to that described above, and includes a relatively thin ceramic or porcelain shell 49, a collar or hub 51 disposed centrally within the shell and extending coaxially thereof, and a plurality of equally spaced resilient sheet metal supporting member or spokes 53 bonded, as for example by a flexible or plastic cement, at 55 and 57 to the inner peripheral surface of the shell 49 and the hub 51, respectively. As best seen in Fig. 4, the spokes 53 are positioned with their conjugate or minor axes extending approximately radially of the shell 49 so that the arched or curved portion 59 of each of the spokes contacts the inner peripheral surface of the shell approximately along a 90° arc. As with the previous-

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ly described embodiment, the ends of the spokes are tapered or undercut to provide a reduced contact area in engagement with the hub 51. From the structure thus far described, it is seen that any expansion or contraction stresses induced in the drum assembly are readily absorbed by the bonding cement and for the most part by the resilient construction of the spokes 53.

The central collar or hub 51 is preferably an elongated one-piece tube having a keyway 61 formed in its inner periphery to facilitate a driving connection between the drum shell and a conventional drive shaft. The drum assembly shown in Figs. 3 and 4 is fixed against axial movement relative to the drive shaft by the same means as shown in Fig. 1, namely a lock washer and nut, and if desired, end plates may be provided in the same manner as described above and shown in Figs. 1 and 2.

With this second described construction, the drum assembly is capable also of carrying heavier loads without a corresponding increase in weight of the drum assembly, and permits the use of a shorter cantilever drive shaft than was heretofore possible with known constructions.

In both of the embodiments described, a bonding cement suitable for transmitting any expansion or contraction stresses without causing a rupture of the joint is employed. The modifications described above both permit the use of an extruded centerless ground porcelain drum shell which was not heretofore utilized, since, in known forms of drum assemblies the spokes are formed as an integral part of the shell itself. Further, the end plates of the present construction are readily assembled without any critical alignment, as is presently required with known constructions, in view of their dissociation with the drive shaft. The expansion and contraction stresses and any changes in loadings to which the drum assembly may be subjected are not entirely compensated for by the bonding cement itself, but are absorbed and transferred by the resilient character of the spokes themselves, which may be formed from any suitable flexible sheet material.

It is seen that the objects of the invention are well fulfilled by the structure described. The description is intended to be illustrative only and it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined in the appended claims.

We claim:

1. A thread advancing drum for use with textile treating machinery comprising an elongated ceramic tubular drum element, a plurality of resilient members attached to the interior of said drum element, said members hav-

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ing surfaces conforming with the interior of said drum element and having tapered portions extending inwardly toward the axis of said drum element, and a hub secured to the tapered portions of said resilient members coaxially of said drum element whereby said thread advancing drum may be secured to the end of a drive shaft with one end of said drum element extending beyond the end of the shaft.

2. A thread advancing drum for use with textile treating machinery comprising a ceramic tubular drum element, a plurality of resilient spoke elements attached to said drum element interiorly thereof, said spoke elements having a hub member secured thereto substantially coaxial of said drum element whereby said thread advancing drum may be mounted upon a drive shaft, and circular disks closing the ends of said tubular drum element to prevent foreign matter from entering the interior of said element, one of said circular disks having an opening therein aligned with said hub member whereby a drive shaft may extend into said drum for driving engagement with said hub member.

3. A thread advancing drum for use with textile treating machinery comprising an elongated hollow cylinder formed of ceramic material, resilient spoke members for mounting said cylinder on an axially aligned hub, said spoke members each having an arcuate outer portion conforming with the curvature of the inner surface of said cylinder and extending lengthwise of said cylinder for a substantial portion of its length, each spoke member having other portions integral with their arcuate portions and extending inwardly substantially radially of said cylinder, said last-mentioned portions being tapered inwardly in the direction axial of said drum, a hub secured to said spoke members axially of said drum, and means securing the arcuate outer portions of said spoke members to said drum.

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