This invention relates to apparatus for the treatment of filaments, yarns, threads, and the like, and relates more particularly to an improved orifice device adapted to be used as an entrance or exit for yarns or the like to fluid treatment chambers, such as stretch tube assemblies.

In the prior art there has been used as an outlet orifice a cock or plug valve with a transverse slot cut in it to permit wide opening for lacing and allow the thread to continue through the orifice when it is partially closed. These cocks or plug valves also had stops on them, so that when they were new they all theoretically had the same size openings. However, this ideal result could never be achieved due to difficulties imposed in machining an elliptical groove in a tapered surface on the side of the cock and also the location of a stop accurate enough to permit the opening always to occur at the same point. These cocks were rapidly because of the impracticality of making them of materials which are sufficiently resistant to the rubbing action of the yarn, especially in the presence of treating fluids such as steam, having erasive and/or corrosive action upon the cocks. This wear changed the orifice area and thereby caused an increase in the escape of treating fluid from the chamber and rendered it difficult to maintain constant, treating conditions in the chamber.

The disadvantage of the prior art is overcome in the present invention which provides two relatively rotatable orificed discs which can be made practically of a hard wear-resistant material such as sapphire, ruby, or other gem stones, or Alnimag, lava, glass, porcelain, etc.

The main object of the present invention is to provide a complementary mating means between two orificed discs for maintaining constant registry between a predetermined area of each orifice at all times.

Another object of the present invention is to avoid the practical difficulties inherent in the machining of a cock or other flow-regulating device to be used as an orifice for the passage of filamentary material.

Other objects and advantages will become apparent from a study of the description of the following drawings.

In the drawings,

Figure 1 is a side view of the present invention in section.

Figure 2 is a top view of the lower of the two discs employed.

Figure 3 is a sectional view of Figure 2 taken along the section lines A-A of Figure 2,

Figure 4 is a bottom view of the upper of the two discs employed, and

Figure 5 is a sectional view of Figure 4 taken along section lines B-B of Figure 4.

As shown in Figures 1 to 5 and more particularly in Figure 1, reference character 2 indicates a supporting member suitably mounted and surrounding the lower end of the treating chamber or tube 1. The supporting member 2 is bored out just below the treating tube 1 to accommodate two relatively rotatable elements which may take the form of discs. As specifically shown herein, reference character 3 indicates a stationary disc pressed therein and a rotatable disc 4 rotatably mounted therein. Means are provided for rotating disc 4. Thus, pins 5 project from the rotatable flanged body 6 into suitable bores in disc 4. The flanged body 6 has a longitudinal bore therethrough to accommodate the thread, strand, yarn or other filamentary material as it passes through the device.

The handle 7 attached to the body of the flange facilitates operation outside the treating chamber. The flanged body 6 is held in place on the supporting member 2 by a threaded coupling 8 screwed to the outside of the supporting member 2 and locked in place by a lock nut 9.

There are complementary mating means between the two discs for holding part of the orifice in registry at all times as shown in Figures 2 and 5. Rotatable disc 4 has a tongue 13 concentric with the circumference of the rotatable orifice. This tongue fits into a similar concentric groove in the stationary disc 3.

The large eccentric, semi-circular portion 15 of the orifice in the rotatable disc 4 is opposed to a portion 14 and is connected therewith by a passage between two opposite lateral walls. The large eccentric, semi-circular portion 12 of the orifice in the stationary disc 3 is opposed to a concentric semi-circular portion 11 and is connected therewith by a passage between two opposite lateral walls. It can be seen that by rotating rotatable disc 4 in such a direction that the large orifices 12 and 15 on discs 3 and 4 respectively are 180° apart, it will form a circular orifice made of orifices 11 and 14. By rotating the rotatable disc another 180° it will bring the orifices 12 and 15 into an overlapping position forming a much larger orifice. The larger orifice allows for lacing and the smaller maintains constant treating conditions in the chamber, such as proper steam temperature.

When the large orifices 12 and 15 are in an opposed position so that the small circular orifice is
formed, there is a spaced portion between them, due to the passage between the two walls connecting each with its respective smaller orifice. The spaced portion prevents any leakage of the treating fluids except through the circular orifices.

The longitudinal bore in the flange body is of such a diameter that it is larger than the small circular orifice formed and smaller than the area of the large orifices when they overlap. This prevents any clogging or jamming of the filamentary material during the treating or lacing operation.

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.

I claim:

1. Yarn guiding apparatus comprising supporting means, two relatively rotatable adjacent orificed discs having a common axis mounted on the supporting means, the orifice in each disc having a central area communicating with an eccentric area, means for rotating one of the discs relative to the other, complementary mating means between the opposed faces of the two discs for holding the central area of each orifice in registry in all relative positions of the two discs.

2. Apparatus in accordance with claim 1 in which the mating means comprises an annular tongue on one disc and an annular groove on the other disc.

3. Yarn guiding apparatus comprising a supporting member, an orificed disc fixedly secured to the member, an orificed disc mounted rotatably adjacent the first-mentioned disc, each of the discs having an orifice comprising a central small area and an eccentric large area, the central areas of the orifices being substantially the same in area and shape and being disposed in registry, complementary mating means on the opposed faces of the two discs for holding the central area of each orifice in registry in all relative positions of the two discs, a rotatable member having a portion extending outside the supporting member adjacent the rotatable disc, and means for connecting the rotatable member to the rotatable disc to transmit movement to the disc.

4. Apparatus in accordance with claim 3 comprising a coupling member secured to the supporting member for holding the rotatable disc against the first-mentioned disc, said coupling member having an opening through which the rotatable member extends.

5. Apparatus in accordance with claim 4 in which the mating means comprises an annular tongue on one disc and an annular groove on the other disc.

HUGH MILLER.

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