inner circumferential face of the outer cylinder 913 facing the male member 911 is provided with a female thread 915. The female thread 915 is a right-hand thread.

[0005] The female connector 920 in FIGS. 12A and 12B has a hollow cylindrical tubular portion (female member) 921. An inner circumferential face 922 of the tubular portion 921 is a tapered surface (a so-called female tapered surface) whose inner diameter increases toward an end thereof. An outer circumferential face of the tubular portion 921 is provided with a spiral protrusion (male thread) 925.

[0006] The male connector 910 and the female connector 920 are connected by inserting the male member 911 into the tubular portion 921 and screwing the female thread 915 and the spiral protrusion 925 to each other. The outer circumferential face 912 of the male member 911 and the inner circumferential face 922 of the tubular portion 921 are tapered surfaces with the same diameter and taper angle, and thus they are in liquid-tight surface contact.

[0007] In enteral nutrition, the female connector 920 is used as a connector on the upstream side (container side) and the male connector ~~920~~910 is used as a connector on the downstream side (patient side) with respect to the flow direction of liquid matter.

[0008] In the male connector 910, the outer cylinder 913 surrounds the male member 911, and the inner circumferential face of the outer cylinder 913 is provided with the female thread 915. Accordingly, after enteral nutrition has been carried out, liquid matter (an enteral nutrient) tends to remain in a gap 916 between the male member 911 and the outer cylinder 913 (e.g., in the valley of the female thread 915).

[0009] When the male connector 910 is arranged at the upstream end of the catheter inserted into a patient, the male connector 910 is indwelled together with the catheter in the patient for a long period of time. If the male connector 910 continues to be indwelled in the patient with residual liquid matter, the male connector 910 may become unsanitary. Furthermore, solidified substances formed by liquid matter dried and solidified on the male connector 910 prevent the male connector 910 and the female connector 920 from being reconnected to each other. Accordingly, it is desirable to make the male connector 910 clean through cleaning.

[0010] Patent Document 1 describes a wiping tip for cleaning the male connector 910. The wiping tip includes a water-absorbing cylindrical portion. The cylindrical portion is inserted into the gap 916 between the male member 911 and the outer cylinder 913.

Liquid matter remaining in the gap is absorbed by the cylindrical portion and wiped off.

Citation List

Patent Document

[0011] Patent Document 1: JP 2017-099738A

Disclosure of Invention

Problem to be Solved by the Invention

[0012] Patent Document 1 describes that the cylindrical portion is constituted by a foam or a non-woven fabric made of urethane or polyvinyl alcohol, and can be produced through press molding, transfer molding, or the like. However, it is difficult to mold a foam or a non-woven fabric made of the above-mentioned materials into a cylindrical portion with desired strength. If the cylindrical portion is too soft, the cylindrical portion is likely to deform when it is inserted into the gap 916 between the male member 911 and the outer cylinder 913. Accordingly, the cylindrical portion cannot be inserted deep enough to reach the bottom plate 914, and it is difficult to wipe off liquid matter adhering to the vicinity of the bottom plate 914. On the other hand, if the cylindrical portion is too hard, the cylindrical portion cannot deform to match the male connector 910. Accordingly, for example, it is difficult to wipe off liquid matter adhering to the inside of the groove of the female thread 915 or a corner in the vicinity of the bottom plate 914. In this manner, conventional wiping tips are problematic in that it is not possible to completely wipe off liquid matter adhering to the male connector 910.

[0013] Embodiments of the present invention provide a wiping tip capable of cleanly cleaning a male connector provided with a female thread formed so as to surround a male member.

Means for Solving Problem

[0014] According to an aspect of the present invention, there is provided a wiping tip including: a hollow cylindrical member; and a cotton-like wiping member arranged on the cylindrical member. The cotton-like wiping member ~~constitutes~~includes a thin film portion covering an opening at an end of the cylindrical member, and an outer circumferential portion extending from the thin film portion and covering an outer circumferential face of the cylindrical member over a predetermined

length from the end, wherein the wiping tip for use to wipe clean a male connector including: a cylindrical male member; an outer cylinder surrounding the male member; and a female thread formed on an inner circumferential face of the outer cylinder facing the male member, wherein the thin film portion is penetrable by the male member, and the cylindrical member is insertable into a gap between the male member and the outer cylinder.

Effects of the Invention

[0015] The cylindrical member makes it possible to deeply insert the cotton-like wiping member into a gap between a male member and an outer cylinder. The cotton-like wiping member is interposed between a cylindrical member and a male connector. Thus, according to embodiments of the present invention, it is possible to cleanly clean a male connector provided with a female thread formed so as to surround a male member.

Brief Description of Drawings

[0016] [FIG. 1] FIG. 1A is a perspective view of a wiping tip according to Embodiment 1 of the present invention. FIG. 1B is a cross-sectional view of the wiping tip according to Embodiment 1 of the present invention.

[FIG. 2] FIG. 2 is a cross-sectional view showing a step of cleaning the male connector using the wiping tip according to Embodiment 1 of the present invention.

[FIG. 3] FIG. 3 is a cross-sectional view showing a next step of cleaning the male connector using the wiping tip according to Embodiment 1 of the present invention.

[FIG. 4] FIG. 4 is a cross-sectional view showing a next step of cleaning the male connector using the wiping tip according to Embodiment 1 of the present invention.

[FIG. 5] FIG. 5 is a cross-sectional view showing a next step of cleaning the male connector using the wiping tip according to Embodiment 1 of the present invention.

[FIG. 6] FIG. 6A is a perspective view of another wiping tip according to Embodiment 1 of the present invention. FIG. 6B is a cross-sectional view of the wiping tip in FIG. 6A.

[FIG. 7] FIG. 7A is an enlarged perspective view of part of a wiping tip according to Embodiment 2 of the present invention. FIG. 7B is an enlarged

two ends of the cylindrical member ~~11~~10. The outer circumferential face and the inner circumferential face of the cylindrical member 10 both have a circular cross-sectional shape. The inner diameter and the outer diameter of the cylindrical member 10 are each constant along the longitudinal direction of the cylindrical member 10. The cylindrical member 10 is strong enough so as to not allow the cylindrical member to substantially deform when it is pinched by user's fingers or when a bending force or a torsional force is applied thereto. There is no limitation on the material of the cylindrical member 10, but examples thereof include resin materials such as polyethylene, polypropylene, polycarbonate, styrene ethylene, polyethylene terephthalate, polybutylene terephthalate, a butylene styrene block copolymer, polyacetal, polyamide, and hard polyvinyl chloride, and, of these materials, it is preferable to use polyolefin-based resins such as polyethylene and polypropylene. It is preferable that the cylindrical member 10 is integrally produced as a single component through injection molding of the above-described resin materials.

[0033] The cotton-like wiping member 20 is a cotton-like material in which fibers are entwined. There is no limitation on the material of the cotton-like wiping member 20, but examples thereof include water-absorbing materials such as cotton and rayon, and it is particularly preferable to use absorbent cotton. The cotton-like wiping member 20 constitutes a thin film portion 21 in the shape of a thin film covering an opening at an end of the cylindrical member 10, and an outer circumferential portion 23 extending from the thin film portion 21. The outer circumferential portion 23 covers the outer circumferential face of the cylindrical member 10, over a predetermined length from the end of the cylindrical member 10. The cotton-like wiping member 20 is arranged at an end of the cylindrical member 10 such that the thin film portion 21 and the outer circumferential portion 23 are continuously formed.

[0034] There is no limitation on the method for attaching the cotton-like wiping member 20 to the cylindrical member 10, and, for example, it is possible to use substantially the same method as a method for producing a cotton swab. That is to say, a cotton-like material with a predetermined size is pressed against the end of the cylindrical member 10 so as to close the opening of the cylindrical member 10, and the cylindrical member 10 is rotated so that the cotton-like material is wound around the outer circumferential face of the cylindrical member 10. It is also possible to firmly fix

from the bottom plate 914). The cotton-like filling member 25 may be in contact with the thin film portion 21.

[0067] The wiping tip 3 of Embodiment 3 can be used to clean the male connector 90 as in the case of the wiping tip 1 of Embodiment 1.

[0068] In Embodiment 3, when the male member 911 of the male connector 90 penetrates the thin film portion 21 and enters the hole 11, the cotton-like filling member 25 comes into contact with the end of the male member 911. When the wiping tip 3 is rotated and moved forward to the male connector 90, the male member 911 gradually compresses or moves the cotton-like filling member 25 while rotating with respect to the cotton-like filling member 25. Even in the case in which liquid matter adhering to the end of the male member 911 is not completely wiped off by the thin film portion 21 when the male member 911 pierces the thin film portion 21, the liquid matter can be wiped off later by the cotton-like filling member 25.

[0069] Not only portions in the vicinity of the two ends of the hole 11 of the cylindrical member 10 but also a portion over substantially the entire length of the hole 11 may be filled with the cotton-like filling member 25.

[0070] The cotton-like filling member 25 may be impregnated with the cleaning solution described in Embodiment 1.

[0071] Embodiment 3 is the same as Embodiment 1, except for the above-described aspects. The description of Embodiment 1 applies also to Embodiment 3. Embodiment 3 may be applied to the wiping tip 2 of Embodiment 2.

[0072] Embodiment 4

FIG. 9 is a cross-sectional view of a wiping tip 4 according to Embodiment 4 of the present invention. In Embodiments 1 to 3, the entirety of the stick-shaped rod corresponding to a core of the wiping tips 1 to 3 is constituted by the hollow cylindrical member 10. On the other hand, in the wiping tip 4 of Embodiment 4, only part (the ends) of the stick-shaped rod is constituted by the hollow cylindrical member. That is to say, holes 16 extend from the two end faces of an elongated stick-shaped rod 15 extending straight, along the longitudinal direction of the rod 15. The holes 16 are non-through-holes that are not formed extending through the rod 15. In a similar way to that of Embodiment 1, the cotton-like wiping members 20 are arranged so as to cover the openings of the holes 16. In Embodiment ~~5~~4, portions 10' of the rod 15 in

CLAIMS

~~[1]~~1. A wiping tip comprising:

a hollow cylindrical member; and a cotton-like wiping member arranged on the cylindrical member,

wherein the cotton-like wiping member ~~constitutes~~comprises a thin film portion covering an opening at an end of the cylindrical member, and an outer circumferential portion extending from the thin film portion and covering an outer circumferential face of the cylindrical member over a predetermined length from the end,

wherein the wiping tip is for use to wipe clean a male connector including: a cylindrical male member; an outer cylinder surrounding the male member; and a female thread formed on an inner circumferential face of the outer cylinder facing the male member,

wherein the thin film portion is penetrable by the male member, and the cylindrical member is insertable into a gap between the male member and the outer cylinder.

~~[2]~~2. The wiping tip according to claim 1, wherein the cotton-like wiping member is arranged at both ends of the cylindrical member.

~~[3]~~3. The wiping tip according to claim 1, wherein the cotton-like wiping member is arranged at only one end of the cylindrical member.

~~[4]~~4. The wiping tip according to any one of claims 1 to 3, wherein the cotton-like wiping member is impregnated with a cleaning solution.

~~[5]~~5. The wiping tip according to any one of claims 1 to 4, wherein a slit is formed through the thin film portion.

~~[6]~~6. The wiping tip according to any one of claims 1 to 5, wherein a cotton-like filling member is placed in the cylindrical member.

~~[7]~~7. The wiping tip according to any one of claims 1 and 3 to 6, comprising a stick-shaped rod,

wherein a hole is provided over a predetermined length extending along a longitudinal direction of the rod, from an end face of the rod, and

the portion of the rod in which the hole is provided is the cylindrical member.

~~[8]~~8. The wiping tip according to any one of claims 1 and 3 to 7, wherein one end thereof comprises the cylindrical member provided with the cotton-like wiping member, and another end thereof comprises a handle.

~~[9] The wiping tip according to any one of claims 1 to 8, for use to wipe clean a male connector including: a cylindrical male member; an outer cylinder surrounding the male member; and a female thread formed on an inner circumferential face of the outer cylinder facing the male member.~~

~~[10] The wiping tip according to claim 9, wherein the thin film portion is penetrable by the male member, and the cylindrical member is insertable into a gap between the male member and the outer cylinder.~~

~~[11]~~9. The wiping tip according to ~~claim 9 or 10~~according to any one of claims 1 to 8, wherein the thin film portion is configured to be penetrated by the male member and folded into the cylindrical member.

~~[12]~~10. The wiping tip according to any one of claims ~~9 to 11~~1 to 9, wherein an outer diameter of the outer circumferential portion is larger than an inner diameter of the female thread.

~~[13]~~11. The wiping tip according to any one of claims ~~9 to 12~~1 to 10, wherein an outer diameter of the cylindrical member is equal to or smaller than an inner diameter of the female thread.

~~[14]~~12. The wiping tip according to any one of claims ~~9 to 13~~1 to 11, wherein an inner

diameter of the cylindrical member is equal to or larger than a maximum outer diameter of an outer circumferential face of the male member.