

[54] APPARATUS FOR TREATING
FILAMENTARY MATERIAL[76] Inventor: **Erhard Meinel**, Wallensteinstr 24,
8192 Geretsried, Germany[22] Filed: **Aug. 8, 1974**[21] Appl. No.: **495,792**[52] U.S. Cl. **118/264**, 15/104.93[51] Int. Cl. **B05c 11/00**, 118 264;270

[58] Field of Search 15/104.93

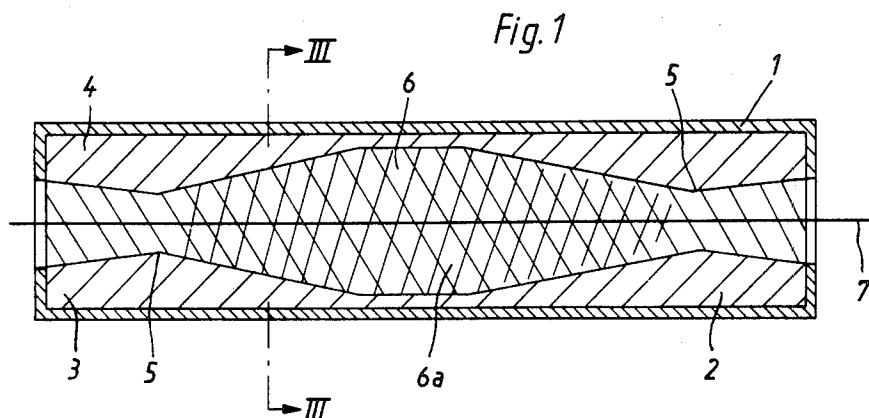
[56] **References Cited****UNITED STATES PATENTS**

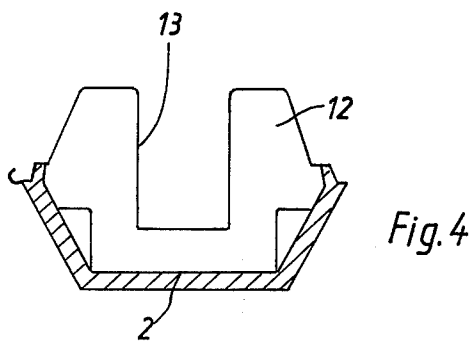
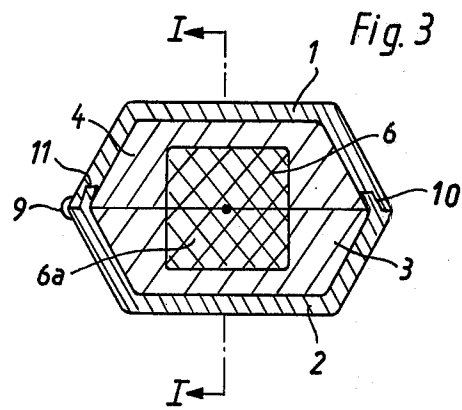
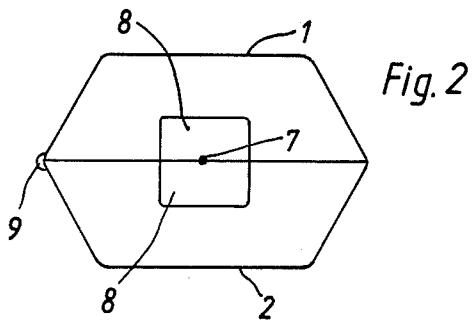
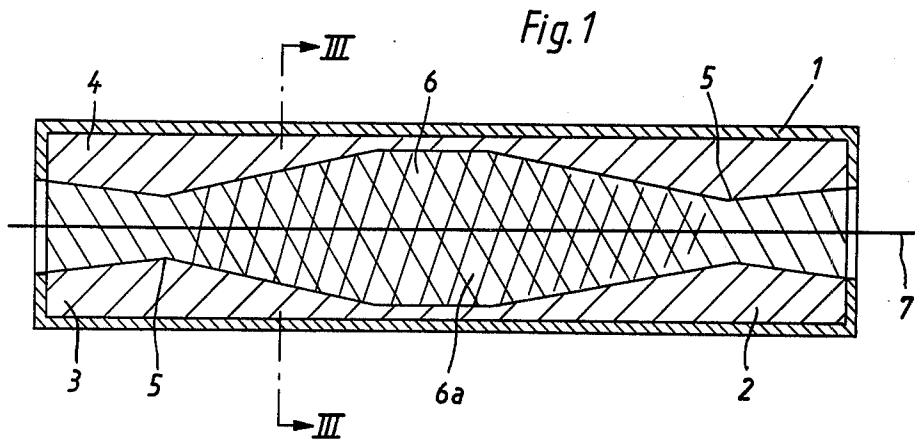
977,466	12/1910	Mortimer	118/264
1,102,965	7/1914	Smith	118/264
2,441,973	5/1948	Onzay	118/264

Primary Examiner—Mervin Stein*Assistant Examiner*—Steven A. Hawkins*Attorney, Agent, or Firm*—Steinberg & Blake[57] **ABSTRACT**

An apparatus for treating a filamentary material, such

as fishline, in such a way that the filamentary material is cleaned and treated as by having a treating fluid applied thereto. The apparatus includes an elongated tubular enclosure which has opposed open ends and which surrounds a given axis, this enclosure being longitudinally split and composed of a pair of units which have inner surfaces which engage each other when these units are in an operative position where the enclosure surrounds the above axis. Each of the units is formed at its inner surface with a longitudinal recess extending along the entire length of each unit and having a pair of longitudinally spaced constricted portions. The constricted portions of one recess are aligned with the constricted portions of the other recess when the units are in their operative position, so that in this way the enclosure has a hollow interior which is constricted at a pair of longitudinally spaced locations. An absorbent material is situated in each of the recesses, so that the absorbent materials in the two recesses engage each other when the units are in their operative position, and between the constricted portions of each recess the absorbent material therein is provided with a treating fluid.

12 Claims, 4 Drawing Figures



APPARATUS FOR TREATING FILAMENTARY MATERIAL

BACKGROUND OF THE INVENTION

The present invention relates to apparatus for treating filamentary material.

As is well known, in order that certain filamentary materials will have a long, useful operating life, it is necessary to resort to certain maintenance procedures. Thus different types of filamentary materials must be cleaned from time to time and they must be provided with certain treating fluids.

For example, in the case of fishline, it is important to periodically clean and oil the line in order to preserve it in a good operating condition.

However, at the present time operations in connection with cleaning and treating filamentary material of the above type are time-consuming and inconvenient to carry out.

SUMMARY OF THE INVENTION

It is accordingly a primary object of the present invention to provide an apparatus which will enable operations of the above type to be carried out in an extremely simple convenient manner to achieve an effective cleaning and treating of a filamentary material.

In particular, it is an object of the present invention to provide an apparatus of the above type which is suitable for cleaning and oiling fishline.

It is especially an object of the present invention to provide an apparatus of the above type which is inexpensive to manufacture.

Also it is an object of the present invention to provide an apparatus of the above type which is capable of both cleaning and applying a treating fluid to a filamentary material in one continuous operation.

According to the invention the apparatus for treating the filamentary material includes an elongated tubular enclosure means which as a pair of opposed open ends and which surrounds a given axis. This enclosure means is longitudinally split and includes a pair of units which respectively have inner surfaces engaging each other when the units are in an operative position where the enclosure means surrounds the above axis. Each unit is formed with a longitudinal recess extending along its entire length between its opposed ends, and each of these longitudinal recesses has between its ends a pair of longitudinally spaced constricted portions. The constricted portions of one recess are longitudinally aligned with the constricted portions of the other recess when the units are in their operative position, so that in this way the enclosure means has a hollow interior which is constricted at a pair of longitudinally spaced locations. These recesses of the above units are respectively filled with a pair of absorbent means which also engage each other when the units are in their operative position. In this way by providing a treating fluid in the pair of absorbent means between the above constricted locations, and by longitudinally moving, one with respect to the other, a filamentary material and the above enclosure, together with the absorbent means therein, it is possible first to clean the filamentary material at one of the above constricted locations and then to apply to the filamentary material a treating fluid from the absorbent medium between the pair of constricted locations.

BRIEF DESCRIPTION OF DRAWINGS

The invention is illustrated by way of example in the accompanying drawing which forms part of this application and in which:

FIG. 1 is a longitudinal sectional elevation of one possible embodiment of an apparatus according to the invention, the structure of the invention being shown schematically in FIG. 1 during treatment of a filamentary material, and the section of FIG. 1 being taken along line I—I of FIG. 3 in the direction of the arrows;

FIG. 2 is an end view of the structure of FIG. 1 as seen from the left of FIG. 1;

FIG. 3 is a transverse section of the structure taken along line III—III of FIG. 1 in the direction of the arrows; and

FIG. 4 is a fragmentary partly sectional elevation showing a possible variation of the structure of the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

The structure of the invention includes an elongated tubular enclosure means formed by the units 1 and 2 which are illustrated in the drawings. The elongated tubular enclosure means formed by these units 1 and 2 has a pair of opposed open ends, as illustrated in FIG. 1, and surrounds a given axis. FIG. 1 shows a fishline 7 extending along this axis. As is apparent from FIGS. 2 and 3, each of the units 1 and 2 is of a substantially trapezoidal cross-sectional configuration and in the operative position of units 1 and 2 shown in FIGS. 1-3, the bases of the trapezoids engage each other at a predetermined plane where the inner surfaces of the units 1 and 2 are located. Thus, the units 1 and 2 can be moved apart from each other to a non-operative position but are illustrated in FIGS. 1-3 in their operative position where the inner surfaces of the units 1 and 2 engage each other at a predetermined plane.

Each of the units 1 and 2 includes an outer shell and an inner body having a configuration conforming to the outer shell and seated therein. Thus, FIGS. 1 and 3 show the hollow interior of the shell of the upper unit 1 provided with the inner body 4, while the outer shell of the lower unit 2 of FIGS. 1 and 3 is illustrated as having the body 3 therein.

Each of these units 1 and 2 is formed at its inner surface, along the axis occupied by the filamentary material 7 in FIG. 1, with a longitudinal recess extending along the entire length of each unit. The outer shell of each unit is formed at its opposed end walls with a pair of notches 8, respectively, and the end notches 8 of one shell are aligned with the end notches 8 of the other shell, as illustrated in FIG. 2, so that in this way when the units 1 and 2 are in their operative position, the notches 8 form the openings at the opposed ends of the enclosure means formed by the units 1 and 2. The inner bodies 3 and 4, which are retained in the shells because of the outer surface configuration matching that of the shells, are formed with the longitudinally extending recesses which form continuations of the notches 8. Although many different materials may be used for the shells and inner bodies of the units 1 and 2, it is preferred to mold these shells and inner bodies from a plastic material, as by injection molding, for example, and according to a particularly preferred construction the outer shells as well as the inner bodies 3 and 4 therein will be made of polystyrene.

As is apparent from FIG. 1 in particular, the longitudinal recess formed in each of the units 1 and 2 has a pair of longitudinally spaced constricted portions 5, and the constricted portions of one recess are longitudinally aligned with the constricted portions of the other recess so that when the units 1 and 2 are in their operative position illustrated in FIG. 1 the hollow interior of the enclosure means 1, 2 will be constricted at a pair of longitudinally spaced locations where the constricted portions 5 are illustrated in FIG. 1. Furthermore, as is apparent from FIG. 1, each of the longitudinal recesses matches the notches 8 at its opposed ends and then has a gradually decreasing depth up to the pair of constricted recess portions 5. Between these constricted recess portions the recess in each inner body becomes gradually deeper so that the recess has its greatest depth between the pair of constricted portions 5 thereof. As is apparent from FIGS. 1-3, the lateral width of each recess gradually decreases from each notch 8 up to constricted recess portion 5 and then gradually increases to a region midway between constricted portions 5 so that the narrowing and widening of each recess respectively toward and away from each constricted portion 5 is provided both laterally and in a vertical or up-and-down direction, as viewed in FIGS. 1 and 3. The transverse cross sectional configuration of each recess is rectangular with the pair of recesses forming for the enclosure means 1, 2 an elongated hollow interior which in any transverse plane is of a square configuration, as is apparent from FIGS. 2 and 3.

A pair of absorbent means 6 and 6a are respectively situated in and fill the longitudinal recesses of the units 1 and 2, except for the notches 8, as shown in FIG. 1. Thus, the pair of absorbent means 6 and 6a will engage each other substantially at the same plane as the inner surfaces of the units 1 and 2, as illustrated in FIG. 3, when these units 1 and 2 are in their operative position shown in FIGS. 1-3. Preferably the pair of absorbent means 6 and 6a are formed by a suitable foam plastic capable of absorbing and containing a treating fluid such as oil. Also, when the units 1 and 2 are in their non-operative position where they do not engage each other, the foam plastic bodies 6 and 6a will bulge somewhat outwardly beyond the plane of the surfaces of the inner bodies 3 and 4 which engage each other in the operative position of the units 1 and 2 shown in FIG. 3, so that in this way when the units 1 and 2 are placed in their operative position the pair of absorbent means 6 and 6a will be compressed while engaging each other substantially in the same plane as the inner surfaces of the units 1 and 2. In this way the foam plastic components 6 and 6a will press against each other in the operative position of the units 1 and 2.

The units 1 and 2 are preferably connected to each other by a hinge means 9 so that the upper unit 1 of FIGS. 2 and 3 can be swung about its left edge, as viewed in FIGS. 2 and 3, upwardly away from the lower unit 2. The hinge means 9 can be formed by one or two hinge structures which may be molded directly with the shells of the units 1 and 2 so as to form an integral part of these shells. The upper unit 1 and the lower unit 2 can be effectively guided one with respect to the other to achieve a good closure by providing each of the opposed upper side edge regions of the shell of the lower unit 2 with upwardly extending snap strips 11 while the lower side edges of the shell of the upper unit 1 are provided with downwardly extending snap edge regions

10. As is apparent from FIG. 3 these closure-snap strips or edge portions 10 and 11 mate with each other on the one hand to provide an effective guiding of the units 1 and 2 to their closed operative position shown in FIG. 3 and on the other hand due to the springy nature of the plastic shells a snap closure can be achieved by way of the elongated cooperating portions 10 and 11 at each side of the enclosure means 1, 2.

Each of the absorbent means 6 and 6a is provided between the constricted portions 5 of each recess in the hollow interior of the latter with a treating medium or fluid for the line. Thus the pair of absorbent means 6 and 6a may be impregnated with a suitable treating medium situated between the constricted hollow interior locations of the enclosure means, 1, 2.

In order to use the apparatus described above the operator will first displace the units 1 and 2 to their non-operative position where they do not engage each other, by swinging the upper unit 1 at the hinge means 9 away from the lower unit 2, and now the fishline 7 or the like is placed on the upper surface of the absorbent means 6a substantially along the axis surrounded by the hollow enclosure means 1, 2 when the units 1 and 2 thereof are in their operative position. With the filamentary material 7 thus situated on the upper surface of the absorbent means 6a, the upper unit 1 is placed in its operative position with respect to the lower unit 2 engaging the latter as illustrated in FIG. 3, and thus the upper absorbent means 6 will now also engage the lower absorbent means 6a, so that the filamentary material 7 is situated between and frictionally engages the pair of absorbent means 6, 6a. Of course, the enclosure means 1, 2 will be maintained reliably in its closed position as a result of the snap-closure means 10, 11 described above. This snap-closure means presents a predetermined resistance to opening of the enclosure means. Thus, the pair of absorbent means 6 and 6a press against the line 7. If now the line 7 is drawn in either one of a pair of opposed longitudinal directions along its own axis with respect to the enclosure means, any particles which cling undesirably to the filamentary material 7, such as undesirable foreign bodies, particles of dirt, and the like, will be cleaned away from the filamentary material 7 at one or the other of the constricted hollow interior locations formed by the constricted portions 5. Thus, the filamentary material 7 will be cleaned as it approaches one or the other of the constricted hollow interior locations of the enclosure means 1, 2, and the frictional resistance to movement of any part of the filamentary material 7 with respect to the absorbent means 6, 6a increases as any part of the filamentary material 7 approaches the constricted location adjacent one or the other of the ends of the enclosure means. This frictional resistance to movement of the filamentary means 7 will increase only as each part of the filamentary means 7 approaches the narrowest part of the hollow interior of the enclosure means at one or the other of the constricted portions 5. Then the cleaned part of the line will be drawn along the intermediate portions of the absorbent means 6, 6a where they are impregnated with the treating fluid or lubricant, in the case of a fishline, so that in this way the exterior surface of the filamentary material becomes covered with the treating fluid. As a result when the filamentary material moves beyond the apparatus of the invention it will be in a cleaned and treated condition. The filamentary material then can be wound on to a

suitable spool, for example, and can be preserved for a long time in good condition as a result of the treatment with the apparatus of the invention.

After the above operation with respect to a given length of filamentary material 7 has been completed, the units 1 and 2 can be moved apart from each other to their non-operative position, so that any foreign bodies, dirt, or the like, engaging the surface of the absorbent means 6 and 6a can be cleaned away from the latter and the pair of absorbent means 6 and 6a can then be impregnated with an additional supply of treating fluid. In this way repeated use of the apparatus of the invention is assured.

According to the embodiment of the invention which is illustrated in FIG. 4, one of the shells of the units 1 and 2, the shell of the lower unit 2 in the example of FIG. 4, is provided in its interior next to its end walls with a pair of guides 12 in the form of relatively thin plates having a pair of fingers projecting upwardly beyond the shell of the lower unit 2 so as to be received in the shell of the upper unit 1 when the latter is displaced to its operative position, the bodies 3 and 4 and the absorbent means 6 and 6a being made slightly shorter to be spaced a slight distance from the end walls of the shells in order to enable the guide means 12 to be accommodated. Thus, the pair of guide fingers of each guide means 12 define between themselves a space 13 into which the filamentary material 7 is placed so that in this way a guide is provided for properly situating the filamentary material 7 substantially along the axis surrounded by the enclosure means when the units 1 and 2 thereof are in their operative position. In this way the filamentary material can be quickly and surely situated accurately along the center of the device along the above axis.

As was indicated above, the pair of absorbent means 6 and 6a preferably take the form of a foam plastic, and it is preferred to use a relatively soft resilient foam plastic made of a material which can receive and hold oil. A particularly good result with fishline has been obtained by impregnating the pair of absorbent means 6 and 6a with a silicon oil having a viscosity of 350 CT. This silicon oil can be retained by the foam plastic and as a result of the above-described structure of the apparatus of the invention the silicon oil is continuously pressed toward the central region of the enclosure means between the constricted locations thereof.

Thus, the apparatus of the invention has the advantage of enabling the filamentary material to be cleaned simply by being pulled longitudinally along the pair of absorbent means which taper toward the constricted interior portions of the enclosure means so as to clean away any foreign particles which otherwise would remain clinging to the filamentary material. In this simple way the filamentary material becomes cleaned. Upon travelling through the next region of the pair of absorbent means situated at the enlarged portion of the hollow interior of the enclosure means where the pair of absorbent means are impregnated with the lubricant, the filamentary material is treated by having the impregnated fluid applied to its exterior surface so that in this way the filamentary material can be stored for a long time in a cleaned and treated condition without suffering any damage.

Because of its above-described construction the apparatus of the invention is exceedingly simple and inexpensive to manufacture. It will furthermore be noted

that the units 1 and 2 are constructed as mirror images of each other so that in this way also the manufacture of the individual components is considerably simplified.

The cost of the structure of the invention is further rendered particularly favorable by making both the shells and the inner bodies of the units of polystyrene which can be injection molded, for example, while the pair of absorbent means are made of a simple soft resilient foam which can be glued to the inner bodies at the recesses thereof. It is also possible to glue the inner bodies to the shells although the inner bodies will be retained in the shells as a result of the configuration of the shells in the bodies, as described above. Although a pair of guide means 12 as described above and shown in FIG. 4 are not essential, the introduction of the filamentary material into the structure of the invention is simplified and can be rapidly performed in a highly accurate manner by the use of the pair of guide means 12.

Furthermore, as has been indicated above, the releasable connection between the upper unit 1 and the lower unit 2 is preferably achieved by providing along one of the longitudinal side edges of the units a hinge connection 9 integrally molded with the shells or welded thereto, for example. Furthermore, an effective closure of the units 1 and 2 to achieve a reliable pressure of the foam plastic against the filamentary material drawn therebetween is assured by providing the lower shell with the upwardly extending snap strips and the upper shell with the downwardly extending snap edges so that these snap strips and snap edges will snap into engagement with each other for retaining the units 1 and 2 in their closed operative position until the operator manually opens the enclosure means in opposition to the springly force of the closure strips or edge regions.

What is claimed is:

1. In an apparatus for treating filamentary material, elongated tubular enclosure means having opposed open ends and surrounding a given axis, said enclosure means being longitudinally split and including a pair of units which have inner surfaces engaging each other when said units are in an operative position where said enclosure means surrounds said axis, said units being movable one with respect to the other to a non-operative position where said inner surfaces are spaced from each other, and each of said units being formed at said inner surface thereof along said axis with a longitudinal recess extending along the entire length of each unit between the opposed ends thereof and having between the latter opposed ends a pair of constricted portions which are longitudinally spaced with respect to each other, the pair of constricted recess portions of one unit being longitudinally aligned with the pair of constricted recess portions of the other unit when said units are in their operative position so that said recesses define for said enclosure means a hollow interior which is constricted at a pair of longitudinally spaced locations, and a pair of compressible absorbent means respectively situated in and filling said recesses at least between and in the region of said constricted recess portions, so that said pair of absorbent means engage each other when said units are in their operative position, whereby a supply of treating fluid can be provided in said pair of absorbent means between said constricted hollow interior locations and an elongated filamentary material can be situated substantially along

said axis between and engaging said pair of absorbent means, so that longitudinal movement of said filamentary means of said enclosure means, one with respect to the other substantially along said axis, will result in first cleaning the filamentary material at one of said constricted hollow interior locations and then applying said treating fluid to the filamentary material between said constriction locations.

2. The combination of claim 1 and wherein each of said units includes an outer shell and an inner body seated in and conforming to the configuration of said shell, each shell having a pair of opposed end walls respectively formed with notches respectively situated at the opposed ends of each longitudinal recess and the inner body of each unit being formed with the remainder of each longitudinal recess extending between said notches, and the notches of one shell being aligned with the notches of the other shell when said units are in their operative position to define the opposed open ends of said enclosure means.

3. The combination of claim 2 and wherein said recess in each body gradually tapers and narrows from said notches of each shell toward said pair of constricted recess portions of each unit and the recess of each body then becoming gradually larger from said constricted recess portions on each body toward a part of each body situated between the constricted recess portions.

4. The combination of claim 3 and wherein each of said absorbent means is in the form of a foam plastic.

5. The combination of claim 4 and wherein said units and said pair of absorbent means are mirror images of each other and said inner surfaces of said units engaging each other when said units are in their operative position at a predetermined plane, said pair of absorbent means also engaging each other substantially at the latter plane when said units are in their operative position.

6. The combination of claim 5 and wherein said pair of compressible absorbent means bulge outwardly beyond said inner surfaces of said units when the latter are spaced from each other in their non-operative position, so that the pair of absorbent means become compressed while engaging each other substantially at said plane when said units are in their operative position.

7. The combination of claim 3 and wherein said shells and said bodies therein are made of polystyrene.

8. The combination of claim 5 and wherein said pair of absorbent means are made of a soft foam plastic and are glued to said bodies in said recesses thereof, respectively.

9. The combination of claim 1 and wherein said units are hinged to each other for swinging movement one with respect to the other between said operative and non-operative positions.

10. The combination of claim 9 and wherein said units respectively have longitudinal edges engaging each other when said units are in their operative position with said edges forming a snap closure means for releasably holding said units together in their operative position.

11. The combination of claim 3 and wherein one of said shells carries next to the end walls thereof a pair of guides, respectively, each having a pair of fingers extending beyond said inner surface of the unit which includes said one shell for being received in the other of said units and for forming a guide fork defining between said fingers a space for receiving the filamentary material.

12. The combination of claim 1 and wherein a silicon oil having a viscosity of 350 CT is carried by the pair of absorbent means between said constricted locations to form the treating fluid.

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