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(54) **ULTRASONIC SYSTEM FOR TREATMENT OF PROCTOLOGIC DISEASES AND ULTRASONIC INSTRUMENT FOR THESE PURPOSES AND ULTRASONIC PROCTOLOGIC SET**

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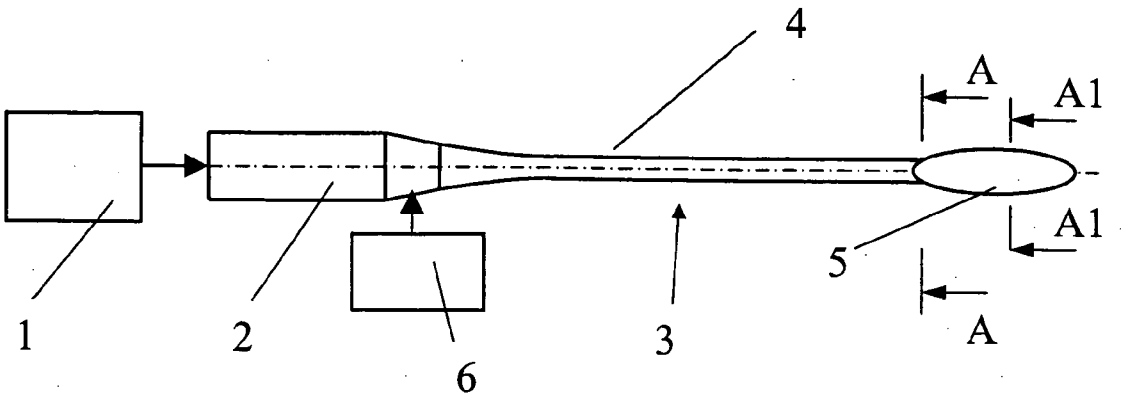
(57) **ABSTRACT**

An ultrasonic system is for treatment of proctologic diseases. The system includes an ultrasonic generator providing the working field in the frequency range of 15 to 100 kHz and amplitude 2 to 180 mcm, an acoustic unit coupled to the generator, and an ultrasonic instrument that connects rigidly with the acoustic unit. The ultrasonic instrument is a multi half-wave concentrator wave-guide, including a core with changeable cross-section and a working end. A length of the working end is to a length of the core as 1/20 to 3/10. The largest size of cross-section of the core in a place of connection with the working end is to the largest size of cross-section of the working end, as 1/15 to 8/1.



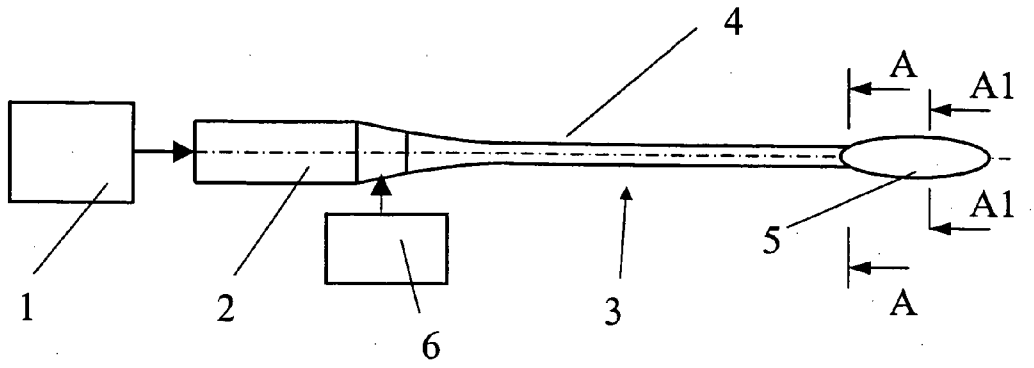


FIG 1

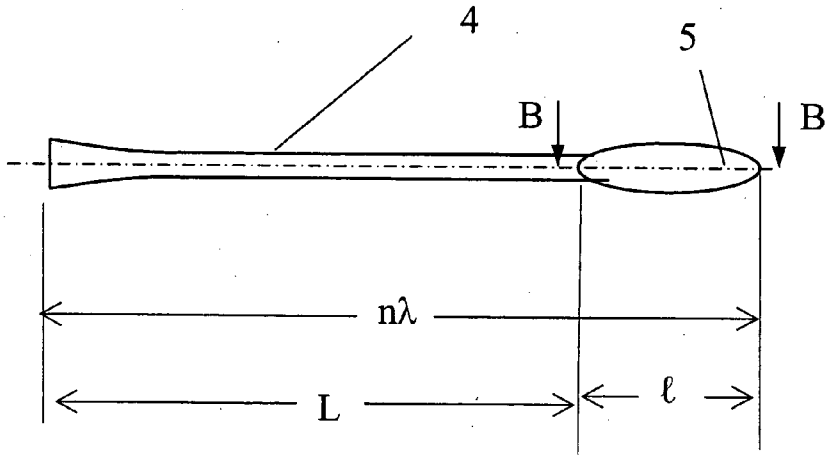


FIG 2

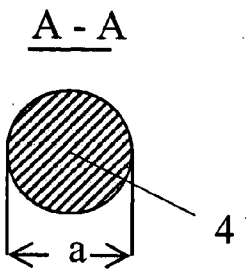


FIG 3A

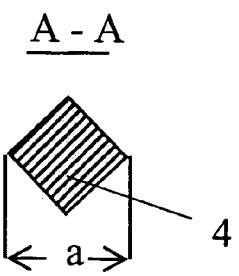


FIG 3B

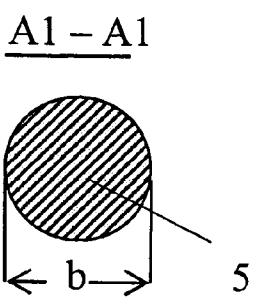


FIG 3C

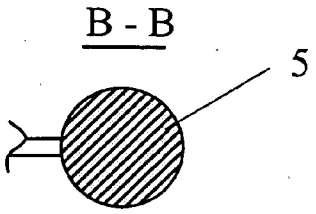


FIG 4A

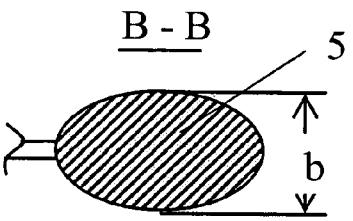


FIG 4B

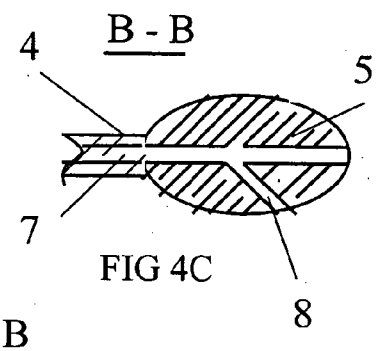


FIG 4C

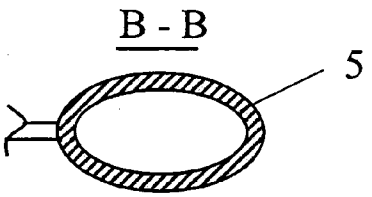


FIG 4D

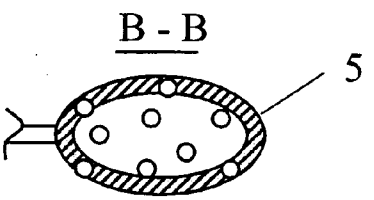


FIG 4E

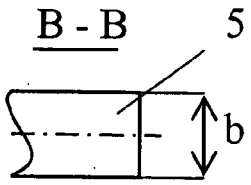


FIG 5A

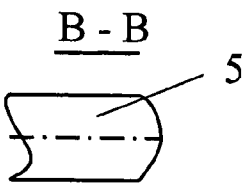


FIG 5B

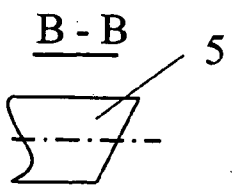


FIG 5C

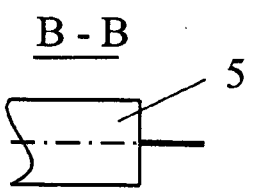


FIG 5D

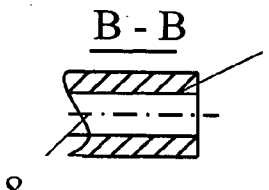


FIG 5E

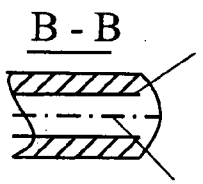


FIG 5F

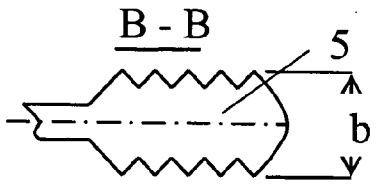


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FIG 5G

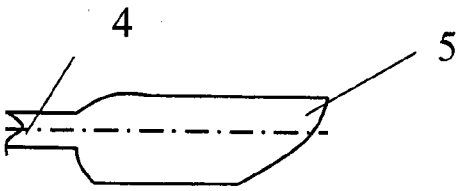

FIG 6A

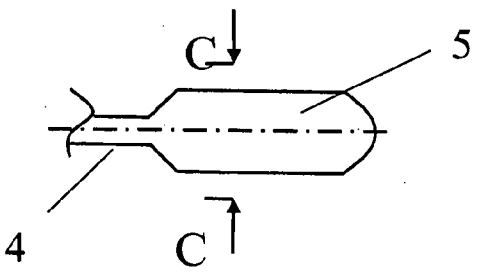

FIG 6B

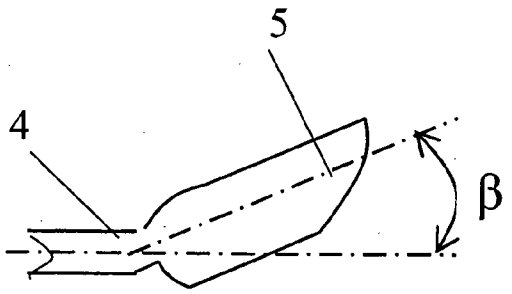

FIG 6C

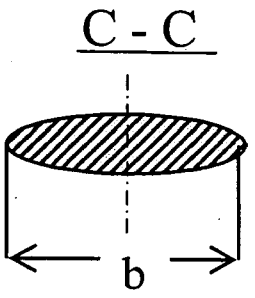

FIG 7A

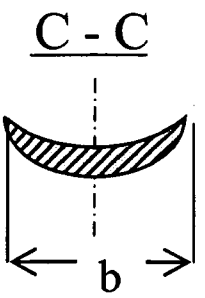

FIG 7B

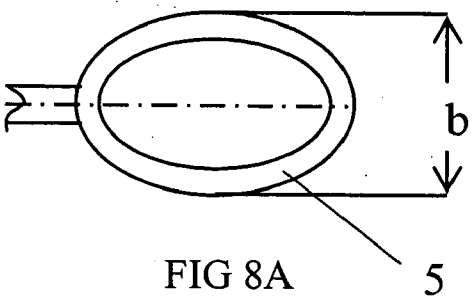

FIG 8A

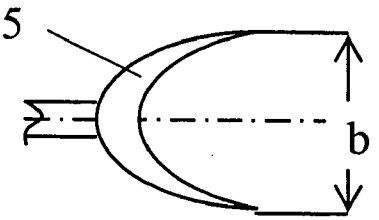

FIG 8B

ULTRASONIC SYSTEM FOR TREATMENT OF PROCTOLOGIC DISEASES AND ULTRASONIC INSTRUMENT FOR THESE PURPOSES AND ULTRASONIC PROCTOLOGIC SET

RELATED APPLICATION

[0001] This application is a continuation-in-part application of U.S. patent application Ser. No. 10/169,522, filed on Jul. 02, 2002.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates generally to medical devices and is concerned with ultrasonic means to act to biological tissue. More particularly, the present invention relates to ultrasonic system for treatment of proctologic diseases.

[0004] 2. Description of the Prior Art

[0005] Ultrasound is widely applied in the modern medicine to diagnose various diseases, in therapy and surgical practice. We use ultrasound to sterilize liquids, surgical tools, prepare medicinal substances. Ultrasonic therapy is useful for treatment and preventive maintenance of treatment of a person. Various thermal and physical and chemical factors causing anti-inflammatory, anesthetizing and stimulating reactions in processable tissues are a base of therapeutic action of a ultrasonic field.

[0006] The ultrasonic surgery is based on mechanical action to biological tissues by means of mid-frequency and low-frequency ultrasonic vibrations.

[0007] Now there are a lot of ultrasonic devices providing various methods of action to biological tissues and are intended for different purposes.

[0008] Ultrasonic method and apparatus for cosmetic and dermatological applications are taught in the U.S. Pat. No. 5,618,275, issued Apr. 08, 1997, to Robert Bock. Low frequency ultrasonic pressure waves are applied to the skin of sufficiently high intensity to cause cavitation in the skin which facilitates penetration of a therapeutic agent such as medicine or a cosmetic such as moisturizer. The therapeutic agent may be applied to the skin to the application of the pressure waves. The therapeutic agent may also be applied to the skin subsequent to the application of the pressure waves.

[0009] Apparatus and methods for ultrasonically enhanced fluid delivery are taught in the U.S. Pat. No. 5,735,811, issued Apr. 07, 1998, to Axel Bricken. The apparatus for the ultrasonically enhanced localized delivery of therapeutic fluids, for example fibrinolytic and anti-thrombogenic agents, within the vasculature and other body lumens has been proposed.

[0010] Transdermal delivery of encapsulated drugs is taught in the U.S. Pat. No. 5,814,599, issued Sep. 29, 1998, to Samir Mitragotri. Applications of low-frequency ultrasound enhances transdermal transport of high-molecular weight proteins, for example insulin or gamma interferon. This method includes a simultaneous application of ultrasound and protein on the skin surface in order to deliver therapeutic doses of proteins across the skin.

[0011] Method and apparatus for selective cell destruction are taught in the U.S. Pat. No 4,315,514, issued Feb. 16, 1982, to William Drewes. The use of ultrasound for destroying selected cells in a host without damage to non-selected cells is disclosed. In order to select a suitable resonant frequency for use in destroying the abnormal cells, the various resonant frequencies and corresponding damping coefficients of the abnormal cells must be determined. To do so, a biopsy of the abnormal cells is preferably taken.

[0012] Apparatus for transport of fluids across, into or from biological tissues are taught in the U.S. Pat. No. 6,096,000, issued Aug. 01, 2000, to Katsuro Tachibana. An apparatus for creating holes in a biological tissue is disclosed. The apparatus includes a housing which at least partially defines a fluid chamber. The fluid chamber including a tissue contact surface which is configured to be positioned adjacent the biological tissue. An ultrasound delivery device is positioned adjacent the fluid chamber and is configured to cavitate a fluid within the fluid chamber. A plurality of apertures extend from the fluid chamber through the tissue contact surface. The apertures are sized to permit passage of the cavitated fluid through the apertures.

[0013] None of the before-mentioned patents or prior arts is intended and may be used for purposes of the present invention specifically treatment of proctologic diseases.

[0014] Inventors proposed systems that realize the ultrasonic technologies of the contact and hydrodynamic action to biological tissues for treatment of proctologic diseases.

[0015] The system for ultrasonic action on blood vessel or cavernous body is diclosed in the RU. U.S. Pat. No. 2,214,193, issued Oct. 10, 2003, to Savrasov. The ultrasonic instrument has a concentrator waveguide with a pointed end, by which a puncture of the wall of the vessel or cavernous body is accomplished, and a working part, which is introduced through this puncture inside the vessel or cavernous body thus realizing the method of ultrasonic action. Provided action on the inner cavity of the vessel or cavernous body reduces loss of blood, reduces traumatism of tissues, eliminates necessity of use of devices cutting out the vessel from the blood flow.

[0016] This system is used in vascular surgery of an internal cavity of a vessel and hemorrhoids and is not intended for the treatment of such proctologic diseases, as acute and chronic rectal fissures, proctopolypuses and condylomas, perianal fistulas, postoperative wounds, chronic prostatitises, and also action by energy of ultrasonic vibrations on a mucous coat of a rectum at the general diseases etc.

[0017] Treatment of diseases of a rectum is an actual proctologic problem. It is due to a prevalence of rectum diseases of inflammatory genesis, and also known methods and means of medicamentous therapy are insufficiently effective and often do not meet doctor's requirements because of a various sort of complications, relapses of disease, and also long terms of treatment of patients.

[0018] The method and device for action with a ultrasonic field to biological tissue, comprising a ultrasonic generator for transformation of the electric energy to ultrasonic energy, a acoustic unit for transformation of electric vibrations in mechanical, their amplification and further transfer, and a ultrasonic instrument that is a concentrator wave guide in the

form of a core with working end are disclosed in U.S. application Ser. No. 10/169,522 to the same inventors. The notification of grant of Patent of method of ultrasonic action to biological tissues was received under this application.

SUMMARY OF THE INVENTION

[0019] The present invention is the further improvement of the device taught in the patent U.S. application Ser. No. 10/169,522 to the same inventors, dicloses a particular case of the general device applicable in proctology and is intended for treatment of patients with proctologic diseases.

[0020] The invention provides such ultrasonic system for treatment proctologic diseases, ultrasonic instrument for these purposes and ultrasonic proctologic set that allow to realize all necessary complex of ultrasonic actions to reduce terms of treatment in 1,5-2 times at simultaneous reduction of number of relapses, and also to enhance convenience in service.

[0021] The ultrasonic system for treatment of proctologic diseases is provided, the system comprising:

[0022] an ultrasonic generator providing the working field in the frequency range of 15 to 100 kHz and amplitude 2 to 180 mcm; an acoustic unit coupled to the generator, and an ultrasonic instrument that connects rigidly with the acoustic unit, wherein the ultrasonic instrument is a multi half-wave concentrator wave-guide, including a core with changeable cross-section and a working end, and a length of the working end is to a length of the core as 1/20 to 3/10; and the largest size of cross-section of the core in a place of connection with the working end is to the largest size of cross-section of the working end, as 1/15 to 8/1.

[0023] The working end of the concentrator wave-guide is a body of revolution, and the largest size of cross-section of the core in a place of connection with the body of revolution is to the largest size of cross-section of the last one, as 1/2 to 1/30 or the working end of the concentrator wave-guide is a body of revolution, and the largest size of cross-section of the core in a place of connection with the body of revolution is to the largest size of cross-section of the last one, as 8/1 to 1/1 or the working end of the concentrator wave-guide is a two-dimensional, thin-walled element, wherein the largest size of cross-section of the core in a place of connection with the element is to the largest size of cross-section of the last one, as 1/5 to 1/1 or the working end of the concentrator wave-guide is a two-dimensional, thin-walled element, wherein the largest size of cross-section of the core in a place of connection with the element is to the largest size of cross-section of the last one, as 1/15 to 1/1.

[0024] An ultrasonic instrument is provided, wherein the ultrasonic instrument is a multi half-wave concentrator wave-guide, including a core with changeable cross-section and a working end, wherein the working end of the concentrator wave-guide is a body of revolution, and the largest size of cross-section of the core in a place of connection with the body of revolution is to the largest size of cross-section of the last one, as 1/2 to 1/30 or 8/1 to 1/1.

[0025] An ultrasonic instrument, wherein the ultrasonic instrument is a multi half-wave concentrator wave-guide is provided, including a core with changeable cross-section and a working end, wherein the working end of the concentrator wave-guide is a two-dimensional, thin-walled element, and the largest size of cross-section of the core in a place of connection with the element is to the largest size of cross-section of the last one, as 1/5 to 1/1 or 1/15 to 1/1.

[0026] Optimal embodiment of this invention, realized in the practice, is a ultrasonic set for treatment of proctologic diseases comprising a ultrasonic generator, an acoustic unit, units for feeding and evacuation of liquid phase and replaceable ultrasonic instruments, each of the instruments is a multihalf-wave concentrator wave-guide including a core with a working end wherein the working end is in form of olive, sphere, cylinder, cylinder with a bevelled butt end, cylinder with a convex butt end, cylinder with spikes, cylinder with needle, scalpel, loop with cutting edge, fork with cutting edge.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] Several features of the present invention are further described in connection with the accompanying drawings, in which There is illustrated in **FIG. 1 a** general view of the ultrasonic system for treatment of proctologic diseases;

[0028] There is illustrated in **FIG. 2 a** general view of the ultrasonic instrument for these purposes;

[0029] There are illustrated in **FIGS. 3A-3C** some of variants of cross-section of the core in a place of connection with the working end; and

[0030] There are illustrated in **FIGS. 4A-4E** and **FIGS. 5A-5G** preferable variants of the working end of the ultrasonic instrument in the form of bodies of revolution and their cross-sections;

[0031] There are illustrated in **FIGS. 6A-6C**, **FIGS. 7A-7B** and **FIGS. 8A-8B** preferable variants of the working end of the ultrasonic instrument in the form of two-dimensional, thin-walled elements and their cross-sections.

DETAILED DESCRIPTION OF THE INVENTION

[0032] The ultrasonic system for treatment of proctologic diseases, showing in **FIG. 1**, comprises

[0033] an ultrasonic generator **1** providing the working field in the frequency range of 15 to 100 kHz and amplitude 2 to 180 mcm, an acoustic unit **2** coupled to the generator, and an ultrasonic instrument **3** that connects rigidly with the acoustic unit, wherein the ultrasonic instrument is a multi half-wave concentrator wave-guide, including a core **4** with changeable cross-section and a working end **5**. The system can be provided with the feed unit of liquid phase into the working end **5**.

[0034] The numerous experimental researches realized by the applicant have shown, that the best effect of ultrasonic action for treatment of proctologic diseases is reached when a length **1** of the working end **5** is to a length L of the core **4** as 1/20 to 3/10; and the largest size of cross-section—a of the core **4** in a place of connection with the working end **5** is to the largest size of cross-section—b of the working end **5**, as 1/15 to 8/1.

[0035] Performance of the ultrasonic instrument **3** with other proportion of the sizes does not allow to realize effective ultrasonic action to biological tissues, and also, do not provide compatibility of ergonomic and technological parameters of this action.

[0036] Also it is important, that the length of the core of the concentrator wave-guide is one, two, three or more half-wave of the ultrasonic vibrations to provide delivery of necessary energy of ultrasonic vibrations in a zone of action.

[0037] One of embodiments of a system for treatment of proctologic diseases is a variant when the working end **5** of the concentrator wave-guide **3** is a body of revolution, and the largest size of cross-section of the core—a in a place of connection with the body of revolution is to the largest size of cross-section—b of the last one, as 1/2 to 1/30.

[0038] Thus, longitudinal section B-B of the working end of the ultrasonic instrument **3** can represent a circle, as shown in **FIG. 4A** or an oval, as shown in **FIG. 4B**.

[0039] Other embodiment of a system for treatment of proctologic diseases is a variant when the working end **5** of the concentrator wave-guide **3** is a body of revolution, and the largest size of cross-section of the core—a in a place of connection with the body of revolution is to the largest size of cross-section—b of the last one, as 8/1 to 1/1.

[0040] Thus, longitudinal section of the working end of the ultrasonic instrument **3** can represent a square, as shown in **FIG. 5E**.

[0041] One more embodiment of a system for treatment of proctologic diseases is a variant when the working end **5** of the concentrator wave-guide **3** is a two-dimensional, thin-walled element, as shown in **FIGS. 6A-6C** wherein the largest size of cross-section of the core **4**—a in a place of connection with the element is to the largest size of cross-section—b of the last one, as 1/5 to 1/1.

[0042] Thus, the two-dimensional, thin-walled element can be plane, as shown in **FIGS. 6A-6B**, or curved in a vertical plane, as shown in **FIG. 6C**.

[0043] The following embodiment of a system for treatment of proctologic diseases is a variant when the working end **5** of the concentrator wave-guide **3** is a two-dimensional, thin-walled element, as shown in **FIGS. 8A-8B**, wherein the largest size of cross-section of the core **4**—a in a place of connection with the element is to the largest size of cross-section—b of the last one, as 1/15 to 1/1.

[0044] Thus, the two-dimensional, thin-walled element can be plane with an aperture, as shown in **FIG. 8A** or plane with a pit, as shown in **FIG. 8B**.

[0045] The ultrasonic instrument **3** in proposed system can revolve or make longitudinal movement (drives on the drawings are not shown).

[0046] The working end **5** of the ultrasonic instrument **3** can set to an angle β30 to 45 degrees to an axis of the last one, as it is shown on **FIG. 6C**.

[0047] The proposed system can be provided of feed unit of liquid phase **6** in a chamber of the working end through the ducts for pass of a liquid phase **7** in a core **4** of ultrasonic instrument **3**, and further in ducts **8** as it is shown on **FIG. 4C**.

[0048] Thus, it is preferable to provide the feed unit of liquid phase **6** in the form of a injector. (in drawings it is not shown) Inventors propose also the ultrasonic instrument that is a multi half-wave concentrator wave-guide, including a core **4** with changeable cross-section and a working end **5**, and a length of the working end is to a length of the core as 1/20 to 3/10; wherein the working end of the concentrator wave-guide is a body of revolution, and the largest size of cross-section of the core **4**—a **(FIGS. 3A, 3B)** in a place of connection with the body of revolution is to the largest size of cross-section **(FIG. 3C)** of the last one, as 1/2 to 1/30.

[0049] The working end **5** can be solid **(FIGS. 4A and 4B)**, with ducts for movement of liquid phase **(FIG. 4C)**, hollow **(FIG. 4D)** and perforated **(FIG. 4E)**. The working end **5** can have the form of a sphere **(FIG. 4A)** or olive **(FIG. 4B)**.

[0050] One more embodiment of the ultrasonic instrument is the following the ultrasonic instrument that is a multi half-wave concentrator wave-guide, including a core **4** with changeable cross-section and a working end **5**, and a length of the working end is to a length of the core as 1/20 to 3/10; wherein the working end of the concentrator wave-guide is a body of revolution, and the largest size of cross-section of the core **4**—a **(FIGS. 3A, 3B)** in a place of connection with the body of revolution is to the largest size of cross-section **(FIG. 3C)** of the last one, as 8/1 to 1/1.

[0051] The working end **5** can be solid **(FIGS. 5A and 5B**, 5C), with ducts for movement of liquid phase **(FIGS. 5E, 5F)**, hollow and perforated.

[0052] The working end **5** can have the form of a cylinder **(FIGS. 5A, 5E)**, cylinder with needle **(FIG. 5D)**, cylinder with a bevelled butt end **(FIG. 5C)**, cylinder with a convex butt end **(FIG. 5C)** or cylinder with spikes on lateral surface of the cylinder **(FIG. 5G)**.

[0053] One more embodiment is the ultrasonic instrument that is a multi half-wave concentrator wave-guide, including a core **4** with changeable cross-section and a working end, and a length of the working end S is to a length of the core as 1/20 to 3/10; wherein the working end of the concentrator wave-guide is a two-dimensional, thin-walled element, and the largest size of cross-section of the core **4**—a **(FIGS. 3A, 3B)** in a place of connection with the element is to the largest size of cross-section **(FIG. 3C)** of the last one, as 1/5 to 1/1.

[0054] The working end **5** can have the form of a scalpel **(FIGS. 6A, 6C)**, spade **(FIGS. 6B, 7A**, 7B).

[0055] One more embodiment is the ultrasonic instrument that is a multi half-wave concentrator wave-guide, including a core **4** with changeable cross-section and a working end, and a length of the working end **5** is to a length of the core as 1/20 to 3/10; wherein the working end of the concentrator wave-guide is a two-dimensional, thin-walled element, and the largest size of cross-section of the core **4**—a **(FIGS. 3A, 3B)** in a place of connection with the element is to the largest size of cross-section **(FIG. 3C)** of the last one, as 1/15 to 1/1.

[0056] The working end **5** can have the form of a fork with cutting edge **(FIG. 8B)**, loop with internal cutting edge **(FIG. 8A)**.

[0057] The optimal embodiment of the system for treatment of proctologic diseases is a ultrasonic set for treatment of proctologic diseases comprising a ultrasonic generator **1**, an acoustic unit **2**, units for feeding and evacuation of liquid phase **6** and replaceable ultrasonic instruments **3**, each of the instruments is a multihalf-wave concentrator wave-guide including a core **4** with a working end **5** wherein the working end is in form of olive, sphere, cylinder, cylinder with a

bevelled butt end, cylinder with a convex butt end, cylinder with spikes, cylinder with needle, scalpel, loop with cutting edge, fork with cutting edge to allow to realize all complex of required actions in proctology.

What is claimed is:

1. A ultrasonic system for treatment of proctologic diseases, the system comprising:

an ultrasonic generator providing the working field in the frequency range of 15 to 100 kHz and

amplitude 2 to 180 mcm;

an acoustic unit coupled to the generator, and

an ultrasonic instrument that connects rigidly with the acoustic unit, wherein

the ultrasonic instrument is a multi half-wave concentrator wave-guide, including a core with changeable cross-section and a working end,

and a length of the working end is to a length of the core as 1/20 to 3/10;

and the largest size of cross-section of the core in a place of connection with the working end is to the largest size of cross-section of the working end, as 1/15 to 8/1.

2. The system according to claim 1 wherein the length of the core of the concentrator wave-guide is one, two, three or more half-wave of the ultrasonic vibrations.

3. The system according to claim 1 wherein the working end of the concentrator wave-guide is a body of revolution, and the largest size of cross-section of the core in a place of connection with the body of revolution is to the largest size of cross-section of the last one, as 1/2 to 1/30.

4. The system according to claim 3 wherein the longitudinal section of the working end of the concentrator wave-guide is a circle or a oval.

5. The system according to claim 1 wherein the working end of the concentrator wave-guide is a body of revolution, and the largest size of cross-section of the core in a place of connection with the body of revolution is to the largest size of cross-section of the last one, as 8/1 to 1/1.

6. The system according to claim 5 wherein the longitudinal section of the working end of the concentrator wave-guide is a square.

7. The system according to claim 1 wherein the working end of the concentrator wave-guide is a two-dimensional, thin-walled element, wherein the largest size of cross-section of the core in a place of connection with the element is to the largest size of cross-section of the last one, as 1/5 to 1/1.

8. The system according to claim 7 wherein the two-dimensional, thin-walled element is plane.

9. The system according to claim 7 wherein the two-dimensional, thin-walled element is curved in vertical plane.

10. The system according to claim 1 wherein the working end of the concentrator wave-guide is a two-dimensional, thin-walled element, wherein the largest size of cross-section of the core in a place of connection with the element is to the largest size of cross-section of the last one, as 1/15 to 1/1.

11. The system according to claim 10 wherein the two-dimensional, thin-walled element is plane with an aperture.

12. The system according to claim 10 wherein the two-dimensional, thin-walled element is plane with a pit.

13. The system according to claim 1 wherein the ultrasonic instrument can revolve.

14. The system according to claim 1 wherein the ultrasonic instrument can make longitudinal movement.

15. The system according to claim 1 wherein the working end of the concentrator wave-guide is set to an angle 30 to 45 degrees to an axis of the concentrator wave-guide.

16. The system according to claim 1 wherein the system is provided with a feed unit of liquid phase into the ducts of the working end and the core of the concentrator wave-guide has a duct for movement of liquid phase.

17. The system according to claim 16 wherein the feed unit of liquid phase is a injector.

18. An ultrasonic instrument, wherein

the ultrasonic instrument is a multi half-wave concentrator wave-guide, including a core with changeable cross-section and a working end,

and a length of the working end is to a length of the core as 1/20 to 3/10;

wherein the working end of the concentrator wave-guide is a body of revolution,

and the largest size of cross-section of the core in a place of connection with the body of revolution is to the largest size of cross-section of the last one, as 1/2 to 1/30.

19. The ultrasonic instrument according claim 18 wherein the working end of the concentrator wave-guide is solid.

20. The ultrasonic instrument according claim 19 wherein the core of the concentrator wave-guide has a duct for movement of liquid phase.

21. The ultrasonic instrument according claim 18 wherein the working end of the concentrator wave-guide is hollow.

22. The ultrasonic instrument according claim 21 wherein the working end of the concentrator wave-guide is perforated.

23. The ultrasonic instrument according claim 18 wherein the working end of the concentrator wave-guide is in form of a sphere.

24. The ultrasonic instrument according claim 18 wherein the working end of the concentrator wave-guide is in form of a olive.

25. An ultrasonic instrument, wherein

the ultrasonic instrument is a multi half-wave concentrator wave-guide, including a core with changeable cross-section and a working end,

and a length of the working end is to a length of the core as 1/20 to 3/10;

wherein the working end of the concentrator wave-guide is a body of revolution,

and the largest size of cross-section of the core in a place of connection with the body of revolution is to the largest size of cross-section of the last one, as 8/1 to 1/1.

26. The ultrasonic instrument according claim 25 wherein the working end of the concentrator wave-guide is solid.

27. The ultrasonic instrument according claim 26 wherein the core of the concentrator wave-guide has a duct for movement of liquid phase.

28. The ultrasonic instrument according claim 25 wherein the working end of the concentrator wave-guide is hollow.

29. The ultrasonic instrument according claim 28 wherein the working end of the concentrator wave-guide is perforated.

30. The ultrasonic instrument according claim 25 wherein the working end of the concentrator wave-guide is in form of a cylinder.

31. The ultrasonic instrument according claim 30 wherein the working end of the concentrator wave-guide is in form of a cylinder with a needle.

32. The ultrasonic instrument according claim 30 wherein the working end of the concentrator wave-guide is in form of a cylinder with a bevelled butt end.

33. The ultrasonic instrument according claim 30 wherein the working end of the concentrator wave-guide is in form of a cylinder with a convex butt end.

34. The ultrasonic instrument according claim 30 wherein the working end of the concentrator wave-guide is in form of a cylinder with spikes on lateral surface of the cylinder.

35. An ultrasonic instrument, wherein

the ultrasonic instrument is a multi half-wave concentrator wave-guide, including a core with changeable cross-section and a working end,

and a length of the working end is to a length of the core as 1/20 to 3/10;

wherein the working end of the concentrator wave-guide is a two-dimensional, thin-walled element,

and the largest size of cross-section of the core in a place of connection with the element is to the largest size of cross-section of the last one, as 1/5 to 1/1.

36. The ultrasonic instrument according claim 35 wherein the working end of the concentrator wave-guide is in form of a scalpel.

37. The ultrasonic instrument according claim 35 wherein the working end of the concentrator wave-guide is in form of a spade.

38. An ultrasonic instrument, wherein

the ultrasonic instrument is a multi half-wave concentrator wave-guide, including a core with changeable cross-section and a working end,

and a length of the working end is to a length of the core as 1/20 to 3/10;

wherein the working end of the concentrator wave-guide is a two-dimensional, thin-walled element,

and the largest size of cross-section of the core in a place of connection with the element is to the largest size of cross-section of the last one, as 1/15 to 1/1.

39. The ultrasonic instrument according claim 38 wherein the working end of the concentrator wave-guide is in form of a fork with cutting edge.

40. The ultrasonic instrument according claim 38 wherein the working end of the concentrator wave-guide is in form of a loop with internal cutting edge.

41. A ultrasonic set for treatment of proctologic diseases comprising a ultrasonic generator, an acoustic unit, units for feeding and evacuation of liquid phase and replaceable ultrasonic instruments, each of the instruments is a multi-half-wave concentrator wave-guide including a core with a working end wherein the working end is in form of olive, sphere, cylinder, cylinder with a bevelled butt end, cylinder with a convex butt end, cylinder with spikes, cylinder with needle, scalpel, loop with cutting edge, fork with cutting edge.

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