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(71) Demandeur/Applicant:
MURPHY, RICHARD PETER, GB

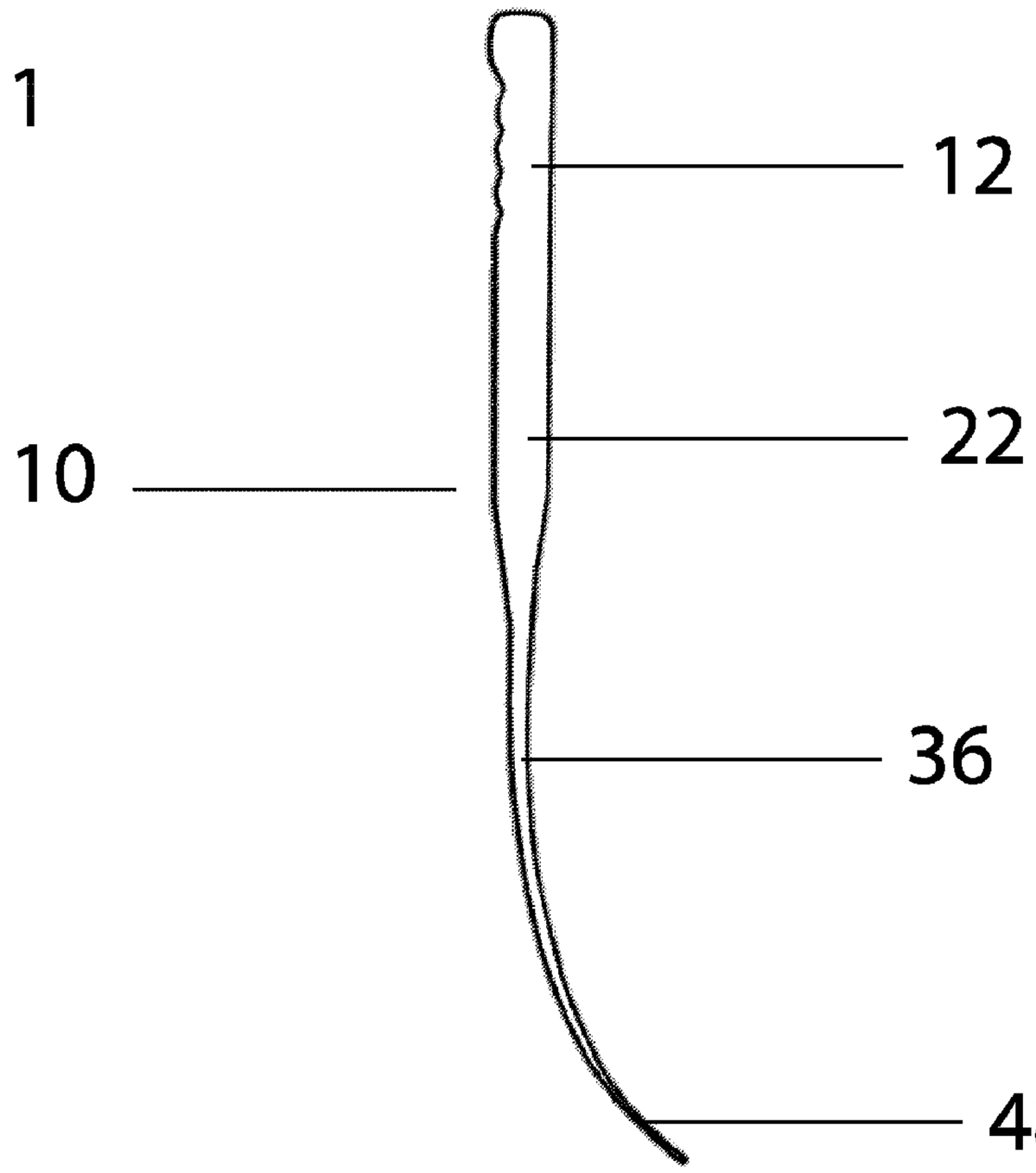
(72) Inventeur/Inventor:
MURPHY, RICHARD PETER, GB

(74) Agent: CONNEELY PROFESSIONAL CORPORATION

(54) Titre : OUTIL DE DEBOUCHAGE DE TOILETTES
(54) Title: TOILET UNBLOCKING TOOL

FIG. 1

1/6



(57) Abrégé/Abstract:
A tool for clearing blocked toilets comprises an elongate shaft comprising: a rigid handle portion extending along a longitudinal axis, a flexible curved portion extending from the distal end of the rigid handle portion, and a piercing tip portion at the distal end of the

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flexible curved portion. The flexible curved portion is flexible relative to the rigid handle portion, and curves away from the longitudinal axis from its proximal end to its distal end.

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(72) Inventor; and
(71) Applicant : **MURPHY, Richard Peter** [GB/GB]; 109 Vernon House, Friar Lane, Nottingham NG1 6DQ (GB).

(74) Agents: **SMALL, Gary James** et al.; Carpmaels & Ransford LLP, One Southampton Row, London WC1B 5HA (GB).

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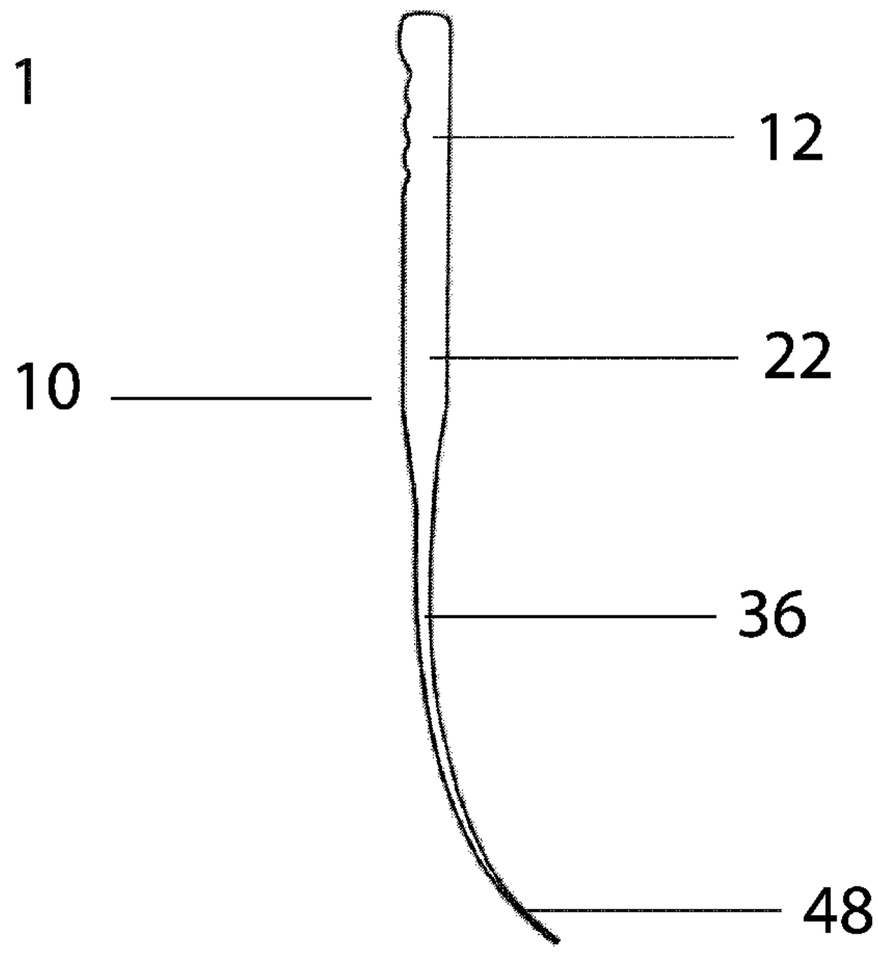
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(54) **Title**: TOILET UNBLOCKING TOOL

FIG. 1

1/6



(57) **Abstract**: A tool for clearing blocked toilets comprises an elongate shaft comprising: a rigid handle portion extending along a longitudinal axis, a flexible curved portion extending from the distal end of the rigid handle portion, and a piercing tip portion at the distal end of the flexible curved portion. The flexible curved portion is flexible relative to the rigid handle portion, and curves away from the longitudinal axis from its proximal end to its distal end.

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TOILET UNBLOCKING TOOL

FIELD

The present invention relates to devices and methods for unblocking toilets, and more particularly to a tool comprising an elongate shaft and methods for using the same.

BACKGROUND OF THE INVENTION

Toilet pipes intended for moving fluids and solids are prone to blockages caused by lodged toilet paper and other foreign items which prevent normal outflow of fluids from the toilet bowl. Failure to remove a blockage can result in overflowing of the toilet bowl if repeated flushing is attempted, leading to spreading of unsanitary fluids.

The majority of such blockages occur in the mouth of the toilet bowl trap way passage, which is not easily accessed in its entirety by a conventional linear toilet brush. Consequently, a toilet brush often cannot effectively dislodge an obstruction and has a tendency to trap dirt.

Other solutions exist which seek to dislodge the blockage using a surge of the bulk fluid occupying the toilet bowl to impart a force on the obstruction. Examples of this include nozzle jet apparatus, such as US patent application US 2011/0284039, and the toilet plunger, such as that shown in US patent 6,779,202. Toilet plungers are the primary device most people use to unblock toilets. However toilet plungers are often large, cumbersome, unsightly and ineffective. Conventional plungers also suffer from an inability to access blockages caught in the trap way passage bend, and rely on the pressure imparted on the bulk fluid to dislodge the obstruction. The force imparted by a plunger, or a nozzle jet device, on the bulk of the waste water, can also lead to back splashing of unsanitary fluids from the toilet bowl which may come into contact with the user. Plungers are largely considered to be unpleasant to use and store. They are often not cleaned properly after use making toilet plungers unhygienic.

Other existing tools such as toilet augers and toilet snakes, as shown in US patent 5,230,116 for example, are also unsanitary due to the dirt trapping crevices present between interlocking components. Due to the irregular and unwieldy size and shape of these tools, they are considered difficult to control and require a substantial amount of physical effort to operate. Furthermore, these devices can also cause damage to the toilet enamel. Moreover, the inventor has found that it is sometimes desirable to scrape or rake obstructing debris from the mouth of toilet trap way

passage prior to tackling the blockage, and the flexible nature of these devices makes them completely unsuited to that purpose.

Alternative solutions have been sought which can directly access the mouth of the toilet bowl trap way passage to disrupt the blockage. Examples include US patent 6,094,765, US patent 7,194,773 and US patent application US 2012/0204334, which describe shaped tools with angled prongs or wide blades which can be used to agitate and loosen obstructing material, typically incorporating serrated or textured surfaces to facilitate cutting of the obstructing material. Serrations inevitably provide crevices in which dirt can collect and are therefore unhygienic. Such tools are typically constructed entirely of rigid materials which, whilst providing effective transfer of force from the user, are completely ineffective if the blockage is located deep within the trap way passage, or around a trap way passage bend.

Furthermore, tools which are designed to unblock a toilet by disrupting and churning the blockage often create a slurry consistency which can splash from the toilet, and therefore pose further hygiene concerns.

The plumbing industry requires a simple and easy to use tool which can efficiently and cleanly dislodge a blockage without damaging the toilet, and which can be easily cleaned and sanitised. The tool will then be suitable for unskilled and inexperienced users alike, to safely and effectively clear obstructions in blocked toilets.

It is, therefore, an object of the present invention to provide a tool for clearing blocked toilets, which is simple and cost effective to manufacture.

It is the further object of the present invention to provide a tool capable of being durable and suitably shaped to be used to rake waste from the mouth of the toilet bowl trap way passage.

It is the further object of the present invention to provide a tool capable of being flexible and capable of deforming to follow a toilet bowl trap way passage for easy clearing of all types of obstructions.

It is the further object of the present invention to provide a tool capable of redirecting the downward force around any bends in the toilet bowl trap way passage.

It is the further object of the present invention to provide a tool that is easy to clean, sanitise and make ready for re-use.

It is the further object of the present invention to provide a tool that is durable and will not cause damage to toilet bowls.

SUMMARY OF THE INVENTION

In a first aspect, there is provided a tool for clearing blocked toilets comprising: an elongate shaft comprising: a rigid handle portion extending along a longitudinal axis and having proximal and distal ends; a flexible curved portion extending from the distal end of the rigid handle portion, wherein the flexible curved portion has proximal and distal ends and is flexible relative to the rigid handle portion, and wherein the flexible curved portion curves away from the longitudinal axis from its proximal end to its distal end; and a piercing tip portion at the distal end of the flexible curved portion. Preferably the rigid handle portion is straight.

The particular combination of a rigid handle portion and relatively flexible curved portion has a number of benefits, in use. Firstly, the rigid handle portion allows a user to transfer an applied force into the toilet bowl trap way passage. The flexible curved portion allows the shaft to navigate the curved path of a toilet trap way passage easily, and to reach blockages that are deep within the passage or around a bend. The provision of a piercing tip portion allows the blockage to be pierced and dislodged without damage to the ceramic of the toilet bowl.

Preferably the flexible curved portion is resilient and is biased to a curved configuration, which not only allows superior control of the curved portion along the toilet trap way passage, but also allows a user to use the tool to scrape or rake obstructing debris from the mouth of toilet trap.

Preferably the distal end of the rigid handle portion tapers inwardly toward the longitudinal axis at a tapered section, the cross-sectional area of the distal end of the tapered section matching the cross-sectional area of the proximal end of the flexible curved portion where the two meet. This allows for a handle portion which has sufficient girth to be comfortable and practical to hold, and a flexible curved portion which is slender enough to flex around the curved path of a toilet trap way passage easily, and to pierce a blockage.

Preferably the rigid handle portion and flexible curved portion are integrally formed, which has advantages in terms of ease of manufacture and cleaning. Alternatively, the rigid handle portion and flexible curved portion may be connected together by a fixing means.

Preferably, the rigid handle portion comprises a grip portion having a plurality of ridges or indentations for providing an ergonomic grip for a user to hold. The grip portion may be provided on a side of the rigid handle portion opposite the direction in which the flexible curved portion curves away, which means that the grip portion would conform to a user's fingers when the user is using the tool to unblock a toilet. More preferably the handle can be completely smooth.

Preferably the flexible curved portion has a depth, measured in the plane of the curve, which tapers from its proximal end to its distal end. By "in the plane of the curve" it is meant the plane containing the longitudinal axis and the flexible curved portion, as shown in figure 1 for example. Tapering provides structural integrity at the proximal end of the flexible curved portion, and maximum flexibility at the distal end.

Preferably the cross-sectional area of the piercing tip portion matches the cross-sectional area of the distal end of the flexible curved portion where the two meet. Preferably the piercing tip portion is no wider than the width of the flexible curved portion and no deeper than the depth of the flexible curved portion. This means that the tool enables a blockage to be easily pierced, which is found to be the most effective way to clear the blockage whilst minimising damage to the toilet and maximising sanitary conditions.

Preferably the piercing tip portion is blunt. It may, for instance, comprise a substantially flat surface at the distal end. For the substantially flat surface to be oriented to facilitate scraping or raking when a user is holding the tool with the distal end of the shaft in the toilet, it most preferably occupies a plane oriented between 45° and 50° to the longitudinal axis. However, other angles are also found to be acceptable, including between 20° and 70° to the longitudinal axis, preferably between 25° and 60°, more preferably between 35° and 55°.

To aid the scraping or raking process, the substantially flat surface preferably comprises one or more ridges or protrusions, or surface texture. Moreover, the piercing tip portion may have a cross-sectional shape that is square, rectangular, circular or semi-circular, optionally with rounded corners. Preferred dimensions of the piercing tip portion are set out in the claims, wherein the dimensions relate to the largest (or sole) measurement in the given axis.

As with the other components of the shaft, the piercing tip and flexible curved portion are preferably integrally formed to facilitate ease of manufacture and cleaning. However, the piercing tip and flexible curved portion may be connected together by a fixing means.

Preferably at least the flexible curved section (more preferably the entire elongate shaft) is formed of surfaces that are substantially free of concavities, corners, joints or surface texture. This makes cleaning the tool with a cloth or disposable wipe particularly easy, and a preferred implementation of the invention is to provide a kit comprising the tool and a pack of such wipes.

Most preferably the material from which the tool is made is medium-density polyethylene (MDPE), which the inventor has found provides the required properties of rigidity, flexibility and strength. Alternative materials from which the tool can be made include: silicone; rubber; polymers; resins; plastic; for instance one of polyvinyl chloride (PVC), polyvinylidene chloride (PVDC), polyethylene terephthalate (PET), polyethylene terephthalate glycol-modified (PETG), low-density polyethylene (LDPE), high-density polyethylene (HDPE), polypropylene (PP), polystyrene (PS), high impact polystyrene (HIPS), acrylonitrile butadiene styrene (ABS), polyethylene/acrylonitrile butadiene styrene (PE/ABS), polycarbonate (PC), polycarbonate/acrylonitrile butadiene styrene (PC/ABS), polyurethanes (PU), thermoplastic and polyamides (nylons). The material from which the tool is made may further comprise an antibacterial additive.

To provide a tool of a most convenient size, it is preferred for length of the elongated shaft to be between 700mm and 760mm; and for the lengths of the rigid handle portion and flexible curved section to both be between 350mm and 380mm.

However, other elongated shaft lengths are also found to be acceptable, including between 300mm and 1500mm, preferably between 500mm and 1200mm, more preferably between 600mm and 1000mm, yet more preferably between 700mm and 800mm; most preferably between 720mm and 750mm. Other rigid handle portion lengths are also found to be acceptable, including between 700mm and 50mm, preferably between 600mm and 100mm, more preferably between 500mm and 200mm, yet more preferably between 300mm and 400mm; most preferably between 350mm and 380mm. Other flexible curved section lengths are also found to be acceptable, including between 700mm and 50mm, preferably between 600mm and 100mm, more preferably between 500mm and 200mm, yet more preferably between 300mm and 400mm; most preferably between 350mm and 380mm.

The ratio of lengths of rigid handle portion and flexible curved section to elongate shaft is also found to be important, and preferably both are 50% of the length of the elongate shaft. However, other ratios of each are found to be acceptable, including between 25% and 75% the length of the elongate shaft; preferably between 35% and 65%, more preferably between 40% and 60%, yet more preferably between 45% and 55%.

The rigid handle portion may take any cross-sectional shape, including square, rectangular, circular, and oval. Preferred dimensions of the handle portion are set out in the claims, wherein the dimensions relate to the largest (or sole) measurement in the given axis.

The ratio of lengths of depths of the flexible curved section and rigid handle portion, measured in the plane of the curve, is also found to be important, and preferably the depth of the flexible curved section, measured in the plane of the curve, is between 20% and 25% of the depth of the rigid handle portion measured in the plane of the curve. However, other ratios of each are found to be acceptable, including between 10% and 40%, more preferably between 15% and 30%; most preferably between 20% and 25%.

In a second aspect, there is provided a method of using a tool according to any one of claims 1 to 38 for clearing a blockage in a toilet trap way passage, comprising: inserting the flexible curved portion of said tool into the toilet trap way; penetrating the blockage with the piercing tip to produce a hole in the blockage; and removing the tool to facilitate outflow of water from the bowl through the hole, wherein the outflow of water displaces the blockage. A user may, optionally, performing twisting, chopping or churning actions to break up the blockage.

Preferably, the toilet trap way passage has a curved path, and the method further comprises the step of inserting the flexible curved portion of the tool into the passage such that the curve of the flexible curved portion substantially conforms to at least a portion of the curved path of the trap way passage

As explained above, this method of unblocking a toilet is found to be the most effective, and can be easily managed by providing a tool with the aforementioned features.

Preferably the method further comprises advancing the flexible curved portion such that the flexible curved portion flexes as it is advanced along the curved path of the toilet trap way passage. This allows blockages located deep within the passage or around a bend to be accessed.

Preferably the method comprises determining that the water level in the toilet bowl is at a normal level and flushing the toilet prior to penetrating through the toilet blockage, thereby suspending a volume of water in the toilet bowl. This step facilities outflow of water from the bowl through the hole, wherein the outflow of water displaces the blockage.

Preferably the method further comprises determining that the water level in the toilet bowl is at a normal level and flushing the toilet after penetrating through the toilet blockage. Again, this step

facilities outflow of water from the bowl through the hole, wherein the outflow of water displaces the blockage.

In a third aspect there is provided a method of using a tool according to any one of claims 1 to 38 for clearing a blockage in a toilet trap way passage having a pan surface and following a curved path, comprising: inserting the flexible curved portion of said tool into the toilet trap way passage such that the distal end of the flexible curved portion is oriented orthogonally to the plane of the pan surface of the trap way passage; performing a raking action to rake excess debris away from the mouth of the toilet bowl trap way passage.

As explained above, it can be desirable to remove part of a blockage in this way to loosen it prior to or after it is pierced.

In summary, it is the object of the present invention to provide a toilet unblocking tool, with an elongate shaft comprising a rigid handle portion, a flexible curved portion and a piercing tip portion. The flexible curved portion is tapered and flexible enough to deform and follow the bends in the toilet bowl trap way passage. The rigid handle portion, provides effective leverage and transfer of force to the flexible curved portion and piercing tip portion.

In use, the user can first grasp the tool by the rigid handle portion with the piercing tip portion facing down and use the tool to rake waste away from the mouth of the toilet bowl trap way passage if required. The user then rotates the tool so that the piercing tip portion is facing upwards and inserts the flexible curved portion and piercing tip portion into the toilet bowl trap way passage to make contact with the obstruction.

The user pushes the rigid handle portion down towards the toilet so that a part of the flexible curved portion of the tool makes contact with the beginning of the toilet bowl trap way passage. When the user pushes down further towards the toilet the force is redirected around the toilet bowl trap way passage bend, so that the piercing tip portion can be easily pushed through any part of the obstruction.

When the user pulls the piercing tip portion back out of the obstruction the user can simply flush the toilet to clear the obstruction. If the water level is normal (i.e. at equilibrium level), the flushing of the toilet can be performed either before or after penetration of the obstruction. However if the water level is high because of the obstruction, the water will simply rush through the hole made by the inventive tool, clearing the obstruction without the need to flush the toilet.

As will be appreciated by one skilled in the art, minor modifications may be made to the subject-matter described herein without departing from the scope of the claimed invention.

The advantages of the present invention will become more fully apparent from the following detailed description, claims, and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention, reference may be had to the accompanying drawings in which:

FIG. 1 is a side view of a first embodiment of a tool according to the present invention.

FIG. 2 is a front view of the tool of figure 1.

FIG. 3 is a cross section side view of a conventional toilet showing the tool of figure 1 in position to rake waste from the mouth of the toilet trap way passage.

FIG. 4 is a cross section side view of a conventional toilet showing the tool of figure 1 in contact with the obstruction.

FIG. 5 is a cross section side view of a conventional toilet showing the tool of figure 1 in use, bending.

FIG. 6 is a cross section side view of a conventional toilet showing the tool of figure 1 in use, deforming to follow the curve of the toilet bowl trap way passage.

DETAILED DESCRIPTION

The invention will now be described in detail with reference to Figs. 1-5, in which all numerals refer to like portions of the inventive tool. FIGS. 1-2 illustrate an embodiment of a toilet tool 10 of this invention.

FIG. 1 is a side view of a toilet tool 10 of this invention. The tool 10 has an elongate shaft 22 comprising a rigid handle portion 12, a flexible curved portion 36 and a piercing tip portion 48. The rigid handle portion 12 has a secure ergonomic grip, comprising a plurality of ridges or indentations, preferably provided on a side of the rigid handle portion 12 opposite the direction in

which the flexible curved portion 36 curves away. The flexible curved portion 36 extends from the distal end of the rigid handle portion 12, and tapers from the rigid handle portion 12 to the piercing tip portion 48. The rigid handle portion 12 is preferably straight and stiff to provide effective leverage on the flexible curved portion 36 and piercing tip 48, as well as to transfer sufficient force to the piercing tip portion 48 to dislodge an obstruction, or to rake away debris. The flexible curved portion 36 is resilient and biased to a curved configuration to provide superior control of insertion into the bend of the toilet trap way passage and to facilitate effective raking of debris from the blockage.

A person skilled in the art would appreciate that the terms “rigid” and “stiff” imply values of material properties, such as Young’s modulus, which are sufficient to prevent distortion of the portion of the tool, as described, under typical loads exerted by a user when unblocking a toilet. Furthermore, the term “flexible” relates similarly to such properties, wherein the properties take values such that the tool will conform to the shape of the toilet bowl under typical loads, whilst deforming elastically but not plastically. The material must also be of sufficient strength, particularly under compression. It will be appreciated that where these terms are used in this specification they are not referring to absolute values but are relative to other parts of the device. For instance, the rigid handle portion 12 is relatively rigid compared with the flexible curved portion 36, and the flexible curved portion 36 is relatively flexible compared with the rigid handle portion 12. The exact measure of flexibility or rigidity is not critical to performance of the invention. Suffice it to say that a skilled person is capable of moulding a tool from a material which would yield the relative rigidity and flexibility properties, and select materials and dimensions for the tool that would create a device that could pierce or scrape a blockage, and bend around a corner with reasonable force.

The rigid handle portion 12 is of suitable length (described further below) to provide the user with sufficient reach to the bottom of the toilet bowl, including particularly deep toilet bowl configurations, without having to submerge a hand in unsanitary fluids.

The distal end of the rigid handle portion 12 tapers inwardly toward the longitudinal axis at a tapered section, the cross-sectional area of the distal end of the tapered section matching the cross-sectional area of the proximal end of the flexible curved portion 36 where the two meet. This allows for a handle portion 12 which has sufficient girth to be comfortable and practical to hold, and a flexible curved portion 36 which is slender enough to flex around the curved path of a toilet trap way passage easily, and to pierce a blockage. The tapering of the flexible curved portion 36, from the rigid handle portion 12 to the piercing tip portion 48, is preferably gradual and continuous, such that flexibility of the tool increases continuously towards the piercing tip 48

allowing the tool to conform to the shape of the toilet bowl trap way passage and to direct the applied downward force to an obstruction in this region. The tapering and shape is provided to ensure a suitable balance between strength and flexibility. The progressive tapering toward the piercing tip is also provided to avoid fatigue breakage due to stress concentration associated with abrupt interfaces. The continuous tapering towards the piercing tip portion 48 may include the flexible curved portion 36 alone, or include portions of the rigid handle portion 12.

In the preferred embodiment of the invention the tool 10 is made from but not limited to, any plastic material from of a wide range of synthetic or semi-synthetic organic solids and is preferably moulded in one piece. Examples of suitable materials include silicone, rubber, plastic (such as PVC, PET, MDPE and PETG), nylon, a composite or any other similar types or materials or blends of materials. Additives can be added to such materials to inhibit bacteria build up, such that after bleaching or chlorination a protective barrier is formed to provide antibacterial properties. Preferably the elongate shaft 22 is integrally formed such that the rigid handle portion 12 and flexible curved portion 36 are provided together as a one-piece device. Alternatively, the rigid handle portion 12 and flexible curved portion 36 can be formed separately and connected together by a fixing means. Preferably the piercing tip portion 48 is also integrally formed with the flexible curved portion 36.

It is preferable that the tool 10 is made from a sanitisable material that is easy to wipe clean. It is preferable that the tool 10 is smooth in overall design and finish with no crevices, corners, holes or surface textures for dirt to collect in. This is ideally achieved by forming the tool 10 from one continuous piece of material. Advantageously, the tool 10 can also be provided as part of a kit of parts comprising the tool and a packet of cleaning wipes. The tool 10 is preferably made by injection moulding, but can also be milled from a block of material, or made by 3D printing.

In the preferred embodiment the tool 10 has a length of 736mm, which has been found to provide optimal reach into the toilet bowl trap way passage without having to submerge a hand in unsanitary fluids. Furthermore, the rigid handle portion 12 has a length of 368mm to provide sufficient length with which to grip the tool, and to provide optimal leverage and transfer of force to the flexible curved portion 36. Furthermore, the flexible curved portion 36 has a length of 368mm, which has been found to provide optimal flexibility for advancement around the bend in the toilet trap way passage, and the optimal of combination of flexibility and resilience for raking waste away from the blockage. In the preferred embodiment the rigid handle portion 12 and flexible curved portion 36 each account for 50% of the length of the tool 10, which has been found to provide an optimal balance between leverage and flexibility to conform to the curvature of the toilet bowl trap way passage. The tool is configured to be at least of a length such that when the

tip is in contact with the base of a standard toilet bowl, at least a portion of the handle extends beyond the rim of the toilet. This ensures that the user's hand does come into contact with unsanitary fluids. A person skilled in the art will appreciate that the necessary dimensions and proportions may vary according to typical toilet dimensions and proportions. In the preferred embodiment, the tapering of the depth of the flexible curved portion varies from 10mm at the proximal end, 7mm half way along its length, and 5mm at the blunt piercing portion. In the preferred embodiment, the tapering of the width of the flexible curved portion varies from 19mm at the proximal end, 17mm half way along its length, and 15mm at the blunt piercing tip portion. It should be noted that the depth is measured in the plane of the flexible curved portion. Specifically, this is the plane containing both the flexible curved portion and the longitudinal axis of the tool, as shown in figure 1 for example. The width is measured orthogonal to this, in a plane for which the longitudinal axis of the tool, at the position in question, is perpendicular to the plane. The piercing tip portion preferably comprises a substantially flat surface. In the preferred embodiment the piercing tip portion 48 points in a direction around 48° to the longitudinal axis defined by the rigid handle portion 12. This angle is measured such that the angle between the rigid handle portion and piercing tip portion direction is obtuse. Examples of suitable combinations of ranges dimensions of the various components, including the width and depth of the rigid handle portion, flexible curved portion and piercing tip portion, are summarised in the tables below.

Elongate shaft length (mm)	**Rigid handle portion length (mm)**	**Flexible curved portion length (mm)**
300-720	150-360	150-360
720-750	350-380	350-380
800-1000	375-500	375-500
1000-1500	500-750	500-750

Rigid handle portion depth (mm)	**Rigid handle portion width (mm)**	**Flexible curved portion depth (mm)**	**Flexible curved portion width (mm)**	**Piercing tip portion depth (mm)**	**Piercing tip portion width (mm)**
5-30	5-18	1-30	1-18	1-5	1-15
30-35	18-35	3-35	2-35	3-10	2-25
35-55	22-55	3-55	4-55	3-20	4-30
55-75	50-70	3-75	4-70	3-30	4-30

It is preferred that the piercing tip portion 48 is shaped in such a way that it can easily pierce through a typical toilet blockage, but blunt in shape and finish so that the tool 10 is completely safe to use and does not pose any risk to the user or any other person. A sharp piercing tip would be unnecessary for the purpose of piercing through soft debris including tissue paper and faecal matter. Cross-sectional shapes of the piercing tip portion 48 include, but are not limited to, square, rectangular, circular or semi-circular, and may include rounded corners where appropriate. It should also be noted that the cross-sections referred to throughout, including cross-sectional area and cross-sectional shape, refer to a transverse cross-section in a plane which intersects the longitudinal axis of the tool at a right-angle.

FIG. 3 illustrates the present invention in position ready to be used to rake waste away from the mouth of the toilet bowl trap way passage 18 in a toilet 20. In the preferred method of use the user grasps the tool 10 by the rigid handle portion 12 and inserts the flexible curved portion 36 and piercing tip 48 into the toilet bowl 14 to rake waste away from the mouth of the toilet bowl trap way passage 18. The flexibility of the flexible portion 36 relative to the rigid handle portion facilitates effective raking of debris in conformity with the contours of the base of the toilet bowl trap way passage. The piercing tip portion 48 is preferably blunt so as to prevent damage to the toilet.

FIG. 4 illustrates the present invention in position ready to be used to clear an obstruction in a toilet 20. In the preferred method of use the user grasps the tool 10 by the rigid handle portion 12 and inserts the flexible curved portion 36 and piercing tip 48 into the toilet bowl trap way passage 18 to make contact with the obstruction.

FIG. 5 illustrates the present invention under mild force. The user applies mild force and pushes the rigid handle portion 12 further down towards the toilet bowl 14 so a part of the flexible curved portion 36 of the tool 10 makes contact with the beginning of the trap way passage 18.

FIG. 6 illustrates the present invention under moderate force and at maximum reach. When the user pushes down further towards the toilet bowl 14 the force is redirected around the trap way passage 18 bend, so that the piercing tip 48 can be easily pushed through any part of the obstruction. When the user pulls the piercing tip 48 back out of the toilet 20 the user can simply flush the toilet 20 to clear the obstruction. However if the water line is high because of the obstruction, resulting from flushing the toilet prior to unblocking it, the water will simply rush through the hole made by the inventive tool 10, clearing the obstruction without the need to flush the toilet 20.

It is to be understood that the present invention is not limited to the details of the specific embodiments described above, and is defined by reference to the accompanying claims.

CLAIMS

1. A tool for clearing blocked toilets comprising:

an elongate shaft comprising:

a rigid handle portion extending along a longitudinal axis and having proximal and distal ends;

a flexible curved portion extending from the distal end of the rigid handle portion, wherein the flexible curved portion has proximal and distal ends and is flexible relative to the rigid handle portion, and wherein the flexible curved portion curves away from the longitudinal axis from its proximal end to its distal end; and

a piercing tip portion at the distal end of the flexible curved portion.

2. The tool of claim 1, wherein the flexible curved portion is resilient and is biased to a curved configuration.

3. The tool of claim 1 or claim 2, wherein the distal end of the rigid handle portion tapers inwardly toward the longitudinal axis at a tapered section, the cross-sectional area of the distal end of the tapered section matching the cross-sectional area of the proximal end of the flexible curved portion where the two meet.

4. The tool of any one of claims 1 to 3, wherein the rigid handle portion and flexible curved portion are integrally formed.

5. The tool of any one of claims 1 to 3, wherein the rigid handle portion and flexible curved portion are connect together by a fixing means.

6. The tool of any preceding claim, wherein the rigid handle portion is straight.

7. The tool of any preceding claim, wherein the rigid handle portion is either smooth, or comprises a grip portion having a plurality of ridges or indentations.

8. The tool of claim 7, wherein the grip portion is provided on a side of the rigid handle portion opposite the direction in which the flexible curved portion curves away.

9. The tool of any preceding claim, wherein the flexible curved portion has a depth, measured in the plane of the curve, which tapers from the proximal end to the

distal end of the flexible curved portion, and optionally a width, measured in a plane orthogonal to the plane of the curve, which tapers from the proximal end to the distal end of the flexible curved portion.

10. The tool of any preceding claim, wherein the cross-sectional area of the piercing tip portion matches the cross-sectional area of the distal end of the flexible curved portion where the two meet.

11. The tool of any preceding claim, wherein the piercing tip portion is no wider than the width of the flexible curved portion and no deeper than the depth of the flexible curved portion.

12. The tool of any preceding claim, wherein the piercing tip portion is blunt.

13. The tool of any preceding claim, wherein the piercing tip portion comprises a substantially flat surface at the distal end.

14. The tool of claim 13, wherein the substantially flat surface occupies a plane oriented at between 20° and 70° to the longitudinal axis, preferably between 25° and 60°, more preferably between 35° and 55°, most preferably between 45° and 50°.

15. The tool of claim 13 or 14, wherein the substantially flat surface comprises one or more ridges or protrusions, or surface texture.

16. The tool of any preceding claim, wherein the piercing tip and flexible curved portion are integrally formed.

17. The tool of any one of claims 1 to 16, wherein the piercing tip and flexible curved portion are connected together by a fixing means.

18. The tool of any preceding claim, wherein the piercing tip portion has a cross-sectional shape that is square, rectangular, circular or semi-circular, optionally with rounded corners.

19. The tool of any preceding claim, wherein the flexible curved section is formed of surfaces that are substantially free of concavities, corners, joints or surface texture.

20. The tool of any preceding claim, wherein the elongate shaft, and optionally the entire tool, is formed of surfaces that are substantially free of concavities, corners, joints or surface texture.

21. The tool of any preceding claim, wherein the material from which the tool is made is silicone or rubber.

22. The tool of any preceding claim, wherein the material from which the tool is made is plastic.

23. The tool of claim 22, wherein the plastic is MDPE.

24. The tool of any of claims 21 to 23, wherein the material from which the tool is made comprises an antibacterial additive.

25. The tool of any preceding claim, wherein the length of the elongate shaft is between 300mm and 1500mm, preferably between 500mm and 1200mm, more preferably between 600mm and 1000mm, yet more preferably between 700mm and 800mm; most preferably between 720mm and 750mm.

26. The tool of any preceding claim, wherein the length of the rigid handle portion is between 50mm and 700mm, preferably between 100mm and 600mm, more preferably between 200mm and 500mm, yet more preferably between 300mm and 400mm; most preferably between 350mm and 380mm.

27. The tool of any preceding claim, wherein the length of the flexible curved portion is between 50mm and 700mm, preferably between 100mm and 600mm, more preferably between 200mm and 500mm, yet more preferably between 300mm and 400mm; most preferably between 350mm and 380mm.

28. The tool of any preceding claim, wherein the length of the rigid handle portion is between 25% and 75% the length of the elongate shaft; preferably between 35%

and 65%, more preferably between 40% and 60%, yet more preferably between 45% and 55%; most preferably 50%.

29. The tool of any preceding claim, wherein the length of the flexible curved portion is between 25% and 75% the length of the elongate shaft; preferably between 35% and 65%, more preferably between 40% and 60%, yet more preferably between 45% and 55%; most preferably 50%.

30. The tool of any preceding claim, wherein the depth of the rigid handle portion, measured in the plane of the curve, is between 5mm and 75mm; preferably between 15mm and 50mm; more preferably between 25mm and 40mm; most preferably between 30mm and 35mm.

31. The tool of any preceding claim, wherein the width of the rigid handle portion, measured in a plane orthogonal to the plane of the curve, is between 5mm and 50mm; preferably between 10mm and 30mm; more preferably between 15mm and 25mm; most preferably between 18mm and 22mm.

32. The tool of any preceding claim, wherein the rigid handle has a circular cross section and a diameter between 5mm and 75mm; preferably between 15mm and 50mm; more preferably between 25mm and 40mm; most preferably between 30mm and 35mm.

33. The tool of any preceding claim, wherein the depth of the flexible curved portion, measured in the plane of the curve, is between 1mm and 25mm; preferably between 3mm and 15mm; more preferably between 5mm and 10mm; most preferably 7mm.

34. The tool of any preceding claim, wherein the width of the flexible curved portion, measured in a plane orthogonal to the plane of the curve, is between 5mm and 35mm; preferably between 10mm and 25mm; more preferably between 15mm and 19mm; most preferably 17mm.

35. The tool of any preceding claim, wherein the depth of the flexible curved portion, measured in the plane of the curve, is between 5% and 50% of the depth of the rigid handle portion measured in the plane of the curve; preferably between 10%

and 40%, more preferably between 15% and 30%; most preferably between 20% and 25%.

36. The tool of any preceding claim, wherein the depth of the piercing tip portion, measured in the plane of the curve, is between 1mm and 20mm; preferably between 2mm and 15mm; more preferably between 3mm and 10mm; yet more preferably between 4mm and 6mm; most preferably 5mm.

37. The tool of any preceding claim, wherein the width of the piercing tip portion, measured in a plane orthogonal to the plane of the curve, is between 5mm and 30mm; preferably between 10mm and 20mm; more preferably between 13mm and 17mm; most preferably 15mm.

38. A tool substantially as described herein with reference to and as shown in the accompanying drawings.

39. A kit comprising the tool of any preceding claim and a packet of cleaning wipes.

40. A method of using a tool according to any one of claims 1 to 38 for clearing a blockage in a toilet trap way passage, comprising:

inserting the flexible curved portion of said tool into the toilet trap way passage;

penetrating the blockage with the piercing tip to produce a hole in the blockage; and

removing the tool to facilitate outflow of water from the bowl through the hole, wherein the outflow of water displaces the blockage.

41. The method of claim 40, further comprising:

advancing the flexible curved portion such that the flexible curved portion flexes as it is advanced along the curved path of the toilet trap way passage.

42. The method of claim 40 or 41, further comprising:

determining that the water level in the toilet bowl is at a normal level and flushing the toilet prior to penetrating through the toilet blockage, thereby suspending a volume of water in the toilet bowl.

43. The method of any one of claims 40 to 42, further comprising:

determining that the water level in the toilet bowl is at a normal level and flushing the toilet after penetrating through the toilet blockage.

44. The method of any one of claims 40 to 43, further comprising:

inserting the tool into the toilet bowl trap way passage and performing twisting, chopping or churning actions to break up the blockage.

45. The method of any one of claims 40 to 44, wherein the toilet trap way passage has a curved path, and further comprising the step of:

inserting the flexible curved portion of the tool into the toilet trap way passage such that the curve of the flexible curved portion substantially conforms to at least a portion of the curved path of the trap way passage.

46. A method of using a tool according to any one of claims 1 to 38 for clearing a blockage in a toilet trap way passage having a pan surface and following a curved path, comprising:

inserting the flexible curved portion of said tool into the toilet trap way passage such that the distal end of the flexible curved portion is oriented orthogonally to the plane of the pan surface of the trap way passage;

performing a raking action to rake excess debris away from the mouth of the toilet bowl trap way passage.

47. A method substantially as described herein with reference to the accompanying drawings.

48. A tool for clearing blocked toilets comprising:

a rigid elongated shaft extending from a rigid handle end to a flexible curved section and blunt piercing tip.

49. A method of use for using a tool for clearing a blocked toilet comprising:

providing a rigid elongated shaft extending from a rigid handle end to a flexible curved section and blunt piercing tip;

wherein when the said tool for clearing a blocked toilet is inserted into the toilet trap way passage the said tool will clear any blockage.

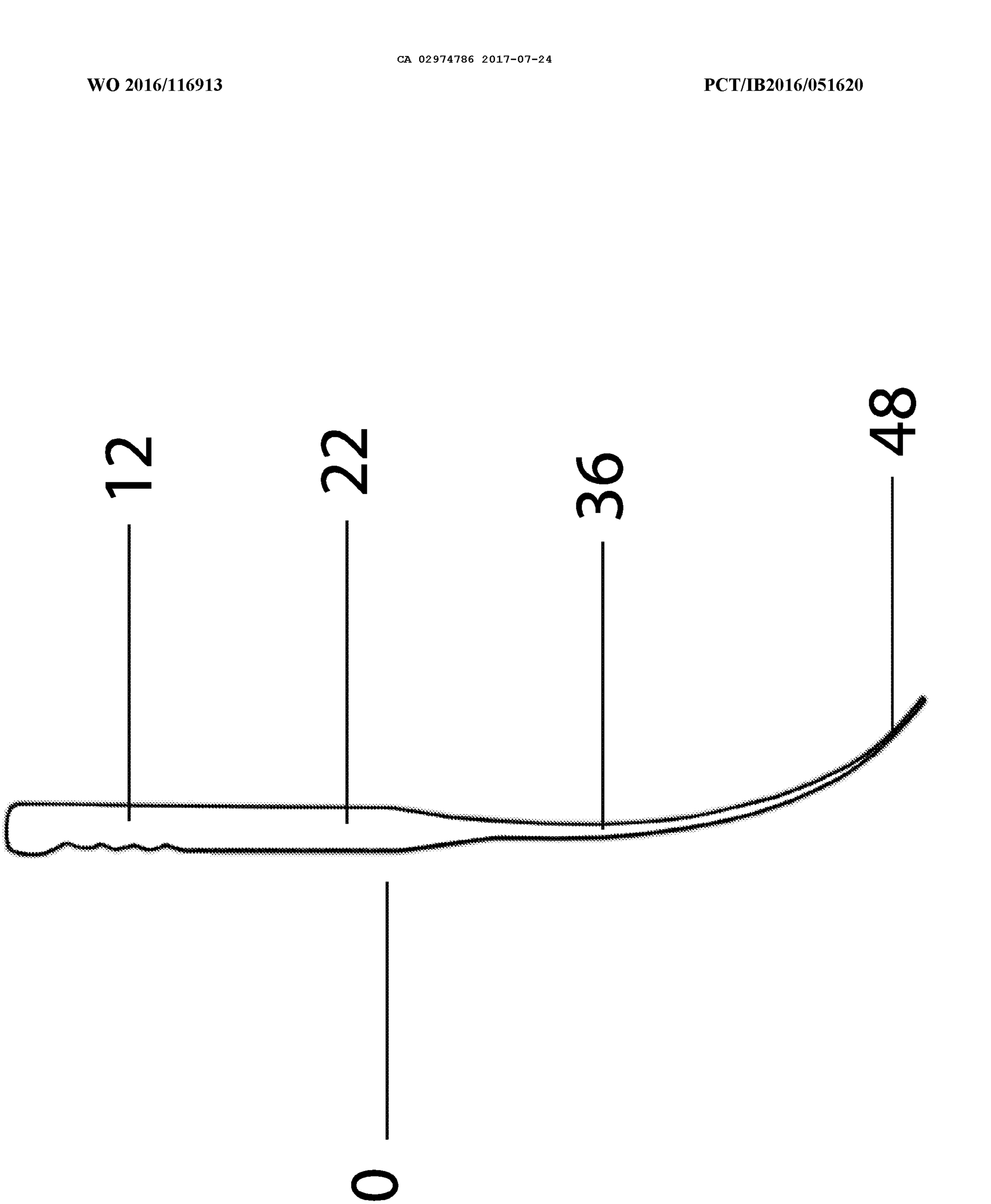


FIG. 1

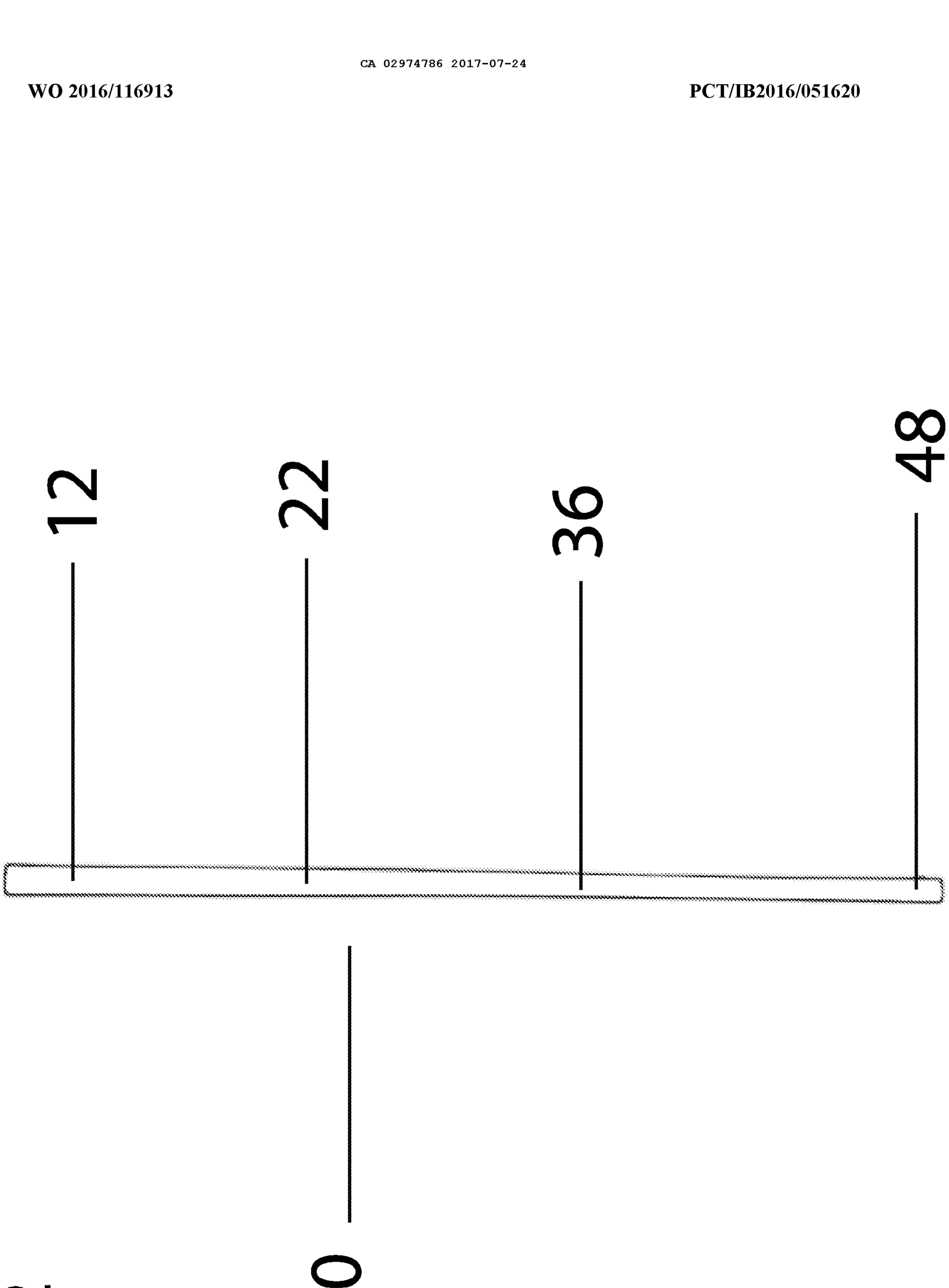


FIG. 2

FIG. 3

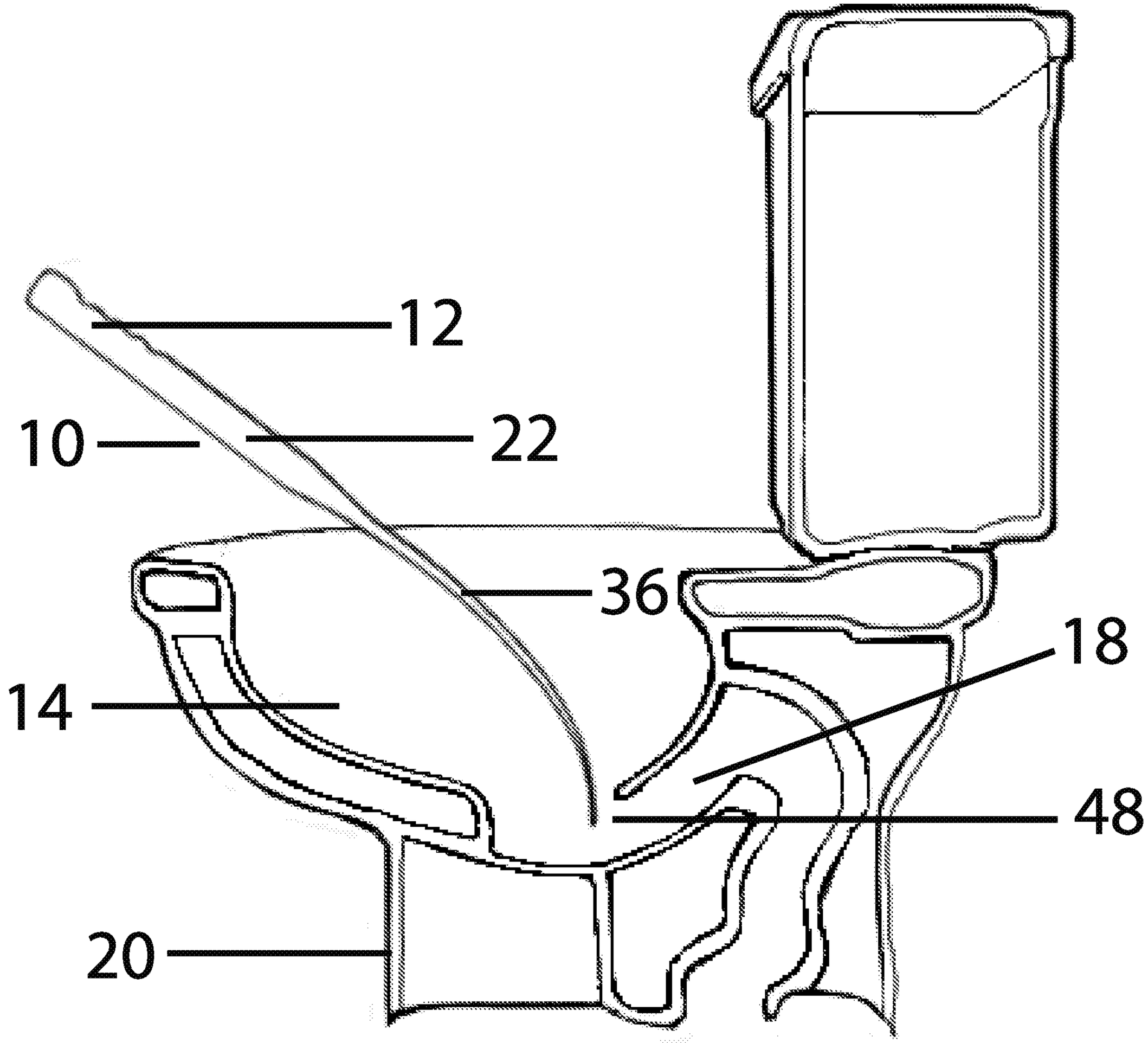


FIG. 4

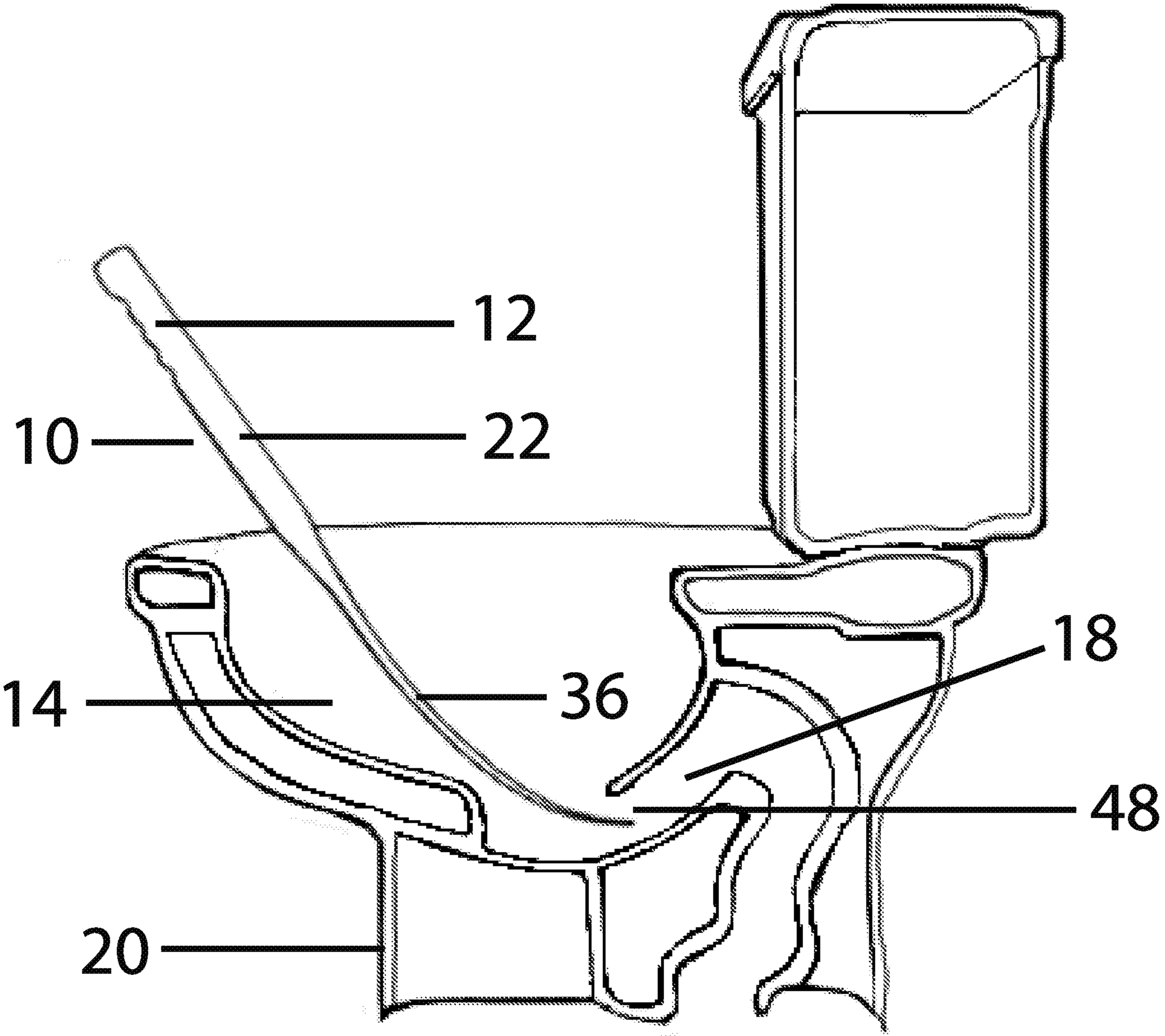


FIG. 5

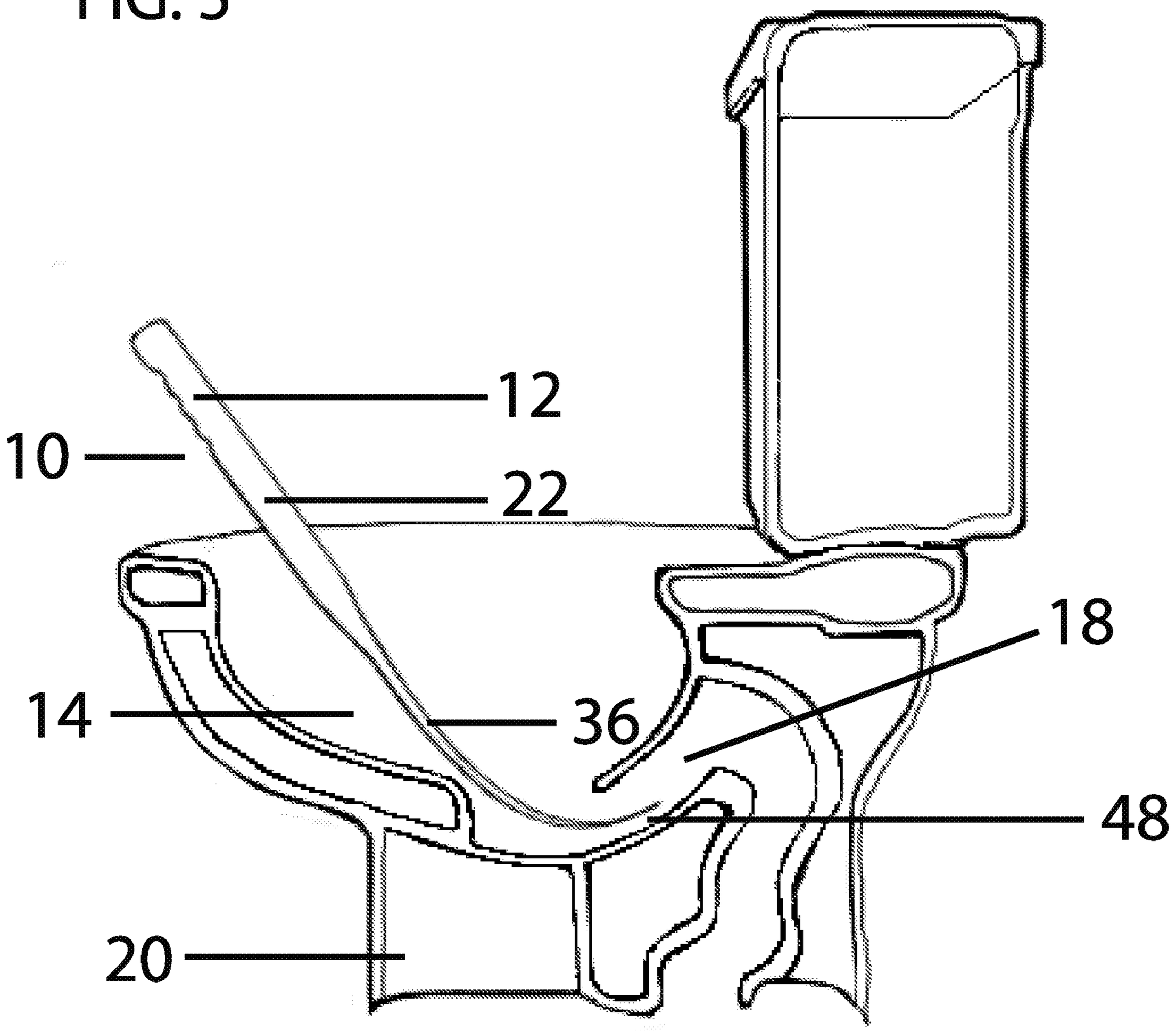


FIG. 6

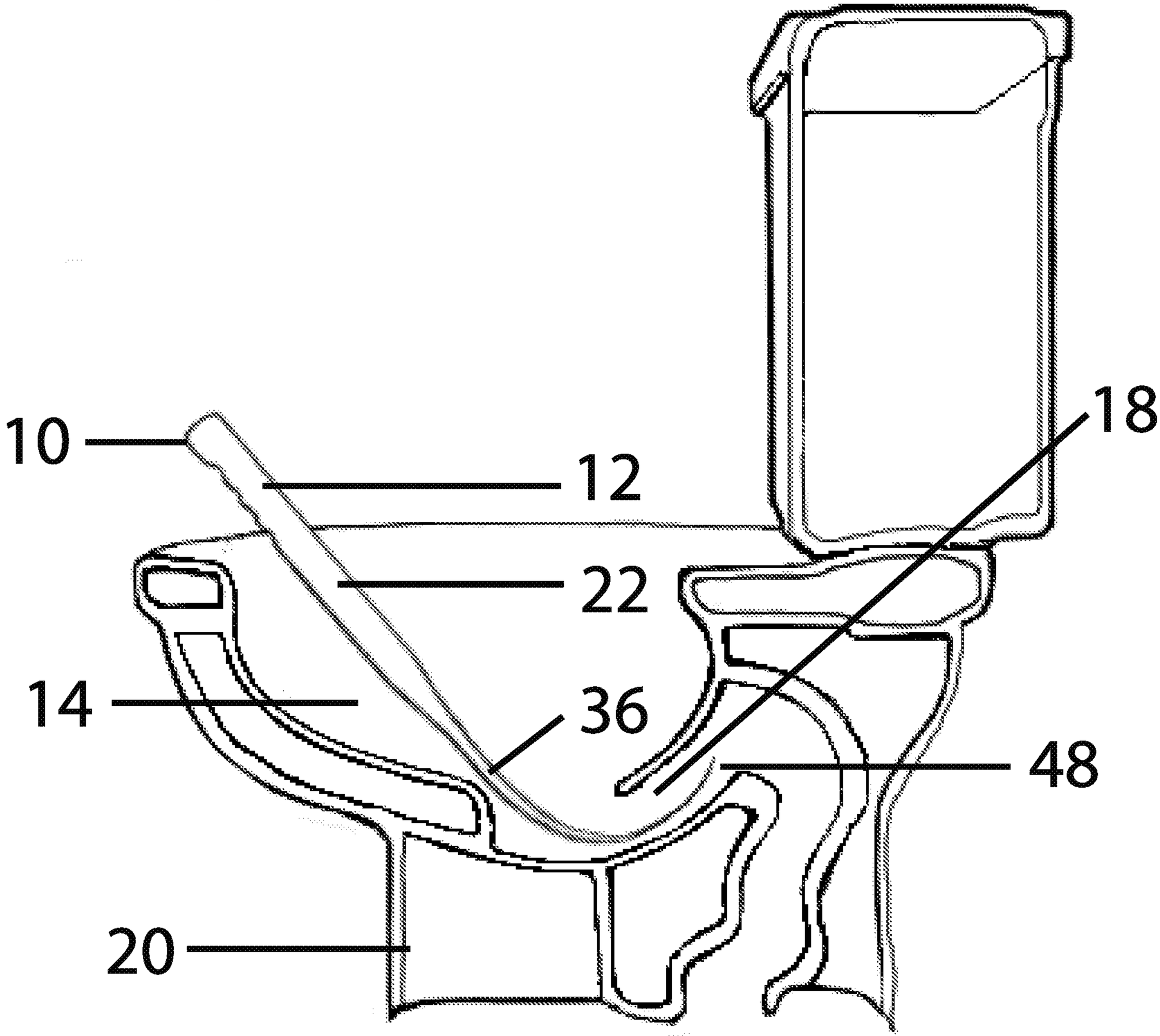


FIG. 1

