REMOVABLE DEVICE ENCLOSURE

The present invention is a device to enclose a medical port such as a gastric feeding tube with a Y port or valve) device to prevent the wearer of the device from tampering with it, or from the device from getting soiled, while enabling a nurse or caregiver to easily open the device and gain access to the port.

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STATEMENT REGARDING FEDERALLY FUNDED RESEARCH

No federal funds were used in the development of this invention

FIELD OF THE INVENTION

The present invention relates to keeping a medical port, such as a gastric feeding tube Y port or valve, from being tampered with by the wearer and to keep it from being soiled.

BACKGROUND OF THE INVENTION

Gastric feeding tube systems enable nutrients to be supplied directly into a patient's digestive system in cases where sustenance cannot be taken orally. A (KIMBERLY-CLARK) MIC-KEY port is attached to the abdominal wall, and a plastic feeding tube can be connected to the MIC-KEY. In some cases, the patient needs a near continuous flow, and hence the tube is left connected to the MIC-KEY and at its other end it is typically connected to a Y port assembly or valve. The port typically has three openings: one for the tube from the abdominal wall, one for administering of medicines,

and one for administering of sustenance (see for example, http://www.mic-key.com/index.asp?page=product). In young children in particularly, the port looks interesting so they want to play with it which can lead to the port being compromised. In addition, since the port is located around the mid section, in some cases, particularly when the patient wears a diaper, the port can become soiled.

Current procedure is to simply use an elastic member to hold the port cap closed and attempt to prevent a young patient from opening it. An example is the external feeding clamp of US Patent 6,375,231. This device can only be manipulated by a nurse or person with similar manual dexterity, but this is also one of its drawbacks: in the dark it can be clumsy to open. In addition, it adds further interesting features to the port to entice a curious person with the mental acuity to know not to play with it to do precisely the opposite: some patients tend to play with it and in some cases defeat it. Furthermore, the elastic member is soft and feels good to chew, and it has occurred where he inventor's child has chewed through the elastic and nearly choked on the chewed off port. Also, it does not protect the port from becoming soiled.

OBJECTS OF THE INVENTION

A principal object of this invention, therefore, is to provide a new device to encase and hence conceal and protect a medical port from tampering by the patient by hiding the port in a simple uninteresting container.

A further object of this invention is to provide interlocking (interlocking, snap fit or press fit) mechanism for holding the port encasing device together that, where a nurse

can easily open the port, but a patient without sufficient manual dexterity and mental acuity could not.

Another object is to provide a complete covering of the port so as to prevent it from being soiled.

Other and further objects will be explained hereinafter and more particularly delineated in the appended claims.

SUMMARY

In summary the invention uses a structure with two halves to enclose a gastric feeding tube and valve device (medical port) to prevent it from being tampered with by the wearer and to keep the medical port clean from being soiled. In one embodiment, two identical parts mate with each other using a press or snap fit to enclose the medical port. The device is referred to herein by the intended tradename "CoriSafe" in honor of the little girl (Cori) whose feeding tube port motivated one of the inventors to develop the original idea. Features on the sides of the parts enable the press or snap fit components to be disengaged and the device opened with a simple twisting action of thumb and forefinger. The structure has no color and no interesting features that make it look of interest to most patients, and hence in addition to requiring an adult caregiver's finger strength and dexterity, which most patients do not have, there is nothing inherent about the device to motivate the patient to try and open it.

Best mode and preferred designs and techniques will now be described.

DRAWINGS

The present invention can best be understood in conjunction with the accompanying drawing, in which:

Fig. 1A is an isometric view of the inside of one half of the device, which requires only two such parts for assembly;

Fig. 1B is an isometric view of the outside of one half of the device, which requires only two such parts for assembly;

Fig. 1C is an isometric close up view of the inside corner of the device showing the three features that elastically mate and grip the a post of the mating part to form a press-snap fit;

Fig. 2A is an isometric view of one half of the assembled device with the medical port structure inside;

Fig. 2B is an isometric view of the assembled device with the medical port structure inside;

Fig. 3A is an isometric view of an axis symmetric part where two such parts could mate together with a snap fit to form the enclosure device;

Fig. 3B is an isometric view of an axis symmetric assembly where two identical parts mate together with a snap fit to form the enclosure device;

Fig. 3C shows the enlarged detail of the snap-fit feature;

Fig. 3D shows the enlarged detail of the snap-fit features in the assembly.

In the drawings, preferred embodiments of the invention are illustrated by way of example, it being expressly understood that the description and drawings are only for the purpose of illustration and preferred designs, and are not intended as a definition of the limits of the invention.

PREFERRED EMBODIMENT(S) OF THE INVENTION

Figs. 1A and 1B shows isometric views of one half 10 of the device, which requires only two such parts for assembly. The inner chamber region 20 is where the medical port to be encased would reside. Openings 12a and 12b are where the medical port tubes would be placed. Posts 11a and 11b are tapered for easy release from the mold and extend beyond the plane of the part to mate with press or snap fit features 15b and 15a respectively of an identical part. Depressions 14a and 14b would be opposite ledges 13b and 13a respectively of an identical part. Gussets 17a and 17b strengthen ledges 13a and 13b respectively and also enable the caregiver's fingers to feel where the fingers should be placed (not on the gussets) to open the device in the dark, or simply to rapidly open it by feel without the need for direct line of sight.

Fig. 1C shows the detail inside corner of the device which is the female mating feature 15a for a male post such as 11b. The functional requirements of the corner are that it grip the post with a repeatable force, and hence it cannot merely be a hole into which the post is pressed. The features 16b and 16c act as rigid anvils and the curved structure 16a deflects as the post is forced into the space, and the resulting deflection produces a force that pushes the post against the anvils 16b and 16c. When two such posts are pressed into two such features on opposite corners of the device, they uniquely define the position of one part with respect to another while providing room inside the device to enclose the medical port; hence the device is small and efficient and less obtrusive and less interesting to the wearer. The three features that elastically mate and grip the a post of the mating part to form a press-snap fit;

These press or snap fit features, the male posts 11a and 11b as well as the female features 15a and 15b, are very small yet strong and robust because of their substantially round shapes anchored to the body 9 of the part 10. Note that the posts 11 are anchored to the body 9 below the top surface of the plane 15a, so they will have some lateral compliance to accommodate tolerances in the molded part. In Fig. 1A the region between the post 11a and the sides of the body 9 is marked as 18a. Generous fillets between features at the corners make the part resistant to breakage.

Fig. 2A is an isometric view of one part 10 with the medical port structure 31 inside; the medial port structure 31 includes, for example, a port 33 that can be opened and medicine injected by the caregiver, and tube 30, which leads into the patient's abdomen, as well as for example a second tube 32 through which sustenance can be injected. Of course the medical port shown here is just an example and many other types and configurations could be placed inside the part 10. If the medical port had only one tube 30 leading from it, a version of the part 10 could be formed with only one entrance region 12a, and 12b could be excluded to better isolate the medical port.

Fig. 2B is an isometric view of the assembled device 50 with the medical port structure inside. All the wearer would see is a simple plastic box. The writing is molded into the part, and would be very faint to the typical wearer and hence not interesting, or there could be no writing on the outside and only writing on the inside. Similarly, the opening features 14b, 13a, and 14a, 13b on one side (and a corresponding set on the other side but not shown in this view) are not interesting and require manual dexterity to open; however, to an adult caregiver once shown how to use thumb and forefinger twist open, the device 50 is simple to open.

The device is shown made from two parts, so a single cavity mold can make all the parts needed: simply two identical parts are used to make up the completed device. It would be possible to mold a single part with a living hinge between the two halves of the device and press or snap fit features along the free edge opposite the hinge. This would accomplish the same function and is also considered to be in the scope of this invention where a simple device protects the medical port from tampering or being soiled.

The design shown here is also rectilinear, yet as shown in Figs. 3A and 3B, an axis symmetric device 70 that was egg-shaped could also be created where each of the two halves of the egg 60 are connected by snap fit features 64 which project from ledges 63. Three ledges are shown in this embodiment, but more or less could be used such as two ledges. The inventors have found that two ledges are easier to open, three ledges makes a very strongly held together system.

The two halves are pulled apart by the caregiver and slide apart along the lengths of the tubes 30 and 32. Snap fit "teeth" 64 have convex curvature above plane of ledges 63 and concave below as shown in Fig. 3C with the result that they self-mate as shown in detail in Fig. 3D. Since these teeth are outside the principle diameter of the body 65, they can be formed from the molds used to injection plastic mold the part 60, without having to use any side pulls as there are no effective reentrant cavities in the mold. A blade-type feature could also extend down from the underside of the ledge 63 to form an attachment clip, also without requiring a side-pull in the mold. This clip could clip onto a diaper, for example to help prevent tugging on the tube 32.

The snap fit teeth do not project inward of the outer rim of the egg-shaped body 60, and hence the parts can be made from a simple mold without the need for side pulls.

This design uses snap fits. A press fit design could have the egg shaped body have a ledge all the way around it, and it would have Lego-like posts projecting up which would mate with female features. To enable the parts to be identical, one half of the ledge would have male posts while the other half would contain mating female features. Hence one part rotated and facing a copy of itself would mate with its copy and enclose a medical port.

Although the invention is described with reference to enclosing a gastric feeding tube port system, it can also be used to enclose and protect any medical tube/port systems such as drainage tubes, IV ports etc. It can also be used in veterinary applications, or other applications where it is desired to enclose a connection or port to protect it from tampering or abuse or the elements.

Further modifications of the invention will also occur to persons skilled in the art, and all such are deemed to fall within the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A caregiver openable device to substantially visually and physically enclose a medical port comprising:
    a. Two halves that surround the medical port when closed
    b. A press or snap fit connection between the two halves
    c. At least one entrance aperture to the device
2. The device of claim 1 wherein the device is comprised of two identical parts that mate with each other.
3. The parts of claim 1 that are substantially rectilinear in shape.
4. The parts of claim 1 that are substantially rotationally (axis) symmetric in shape.
5. The device of claim 1 wherein the device is comprised of a single part with two halves joined along one edge by a hinge and openably connected by a press or snap fit along one or more edges.
6. The device of claim 5 where the hinge is a flexible (living) hinge.
7. A caregiver openable device to substantially visually and physically enclose a medical port comprising:
    a. Two substantially identical parts, with no re-entrant features that would require use of a mold with side-pulls, that surround the medical port when fitted together;
    b. A snap fit connection between the two halves;
    c. At least one entrance port to the device
8.

ABSTRACT

An enclosure device with two halves to enclose a sensitive device such as a medical port which might be a gastric feeding tube with a Y port, to prevent it from being tampered with, by for example the wearer, and to keep the enclosed device from being soiled. In one embodiment, two identical parts mate with each other using a press fit to enclose the medical port. Features on the sides of the parts enable the press fits to be disengaged and the device opened with a simple twisting action of thumb and forefinger. The structure has a plain uninteresting color and no interesting features that make it look of interest to most patients, and hence in addition to requiring an adult caregiver's finger strength and dexterity, which most patients do not have, there is noting inherent about the device to motivate the patient to try and open it.

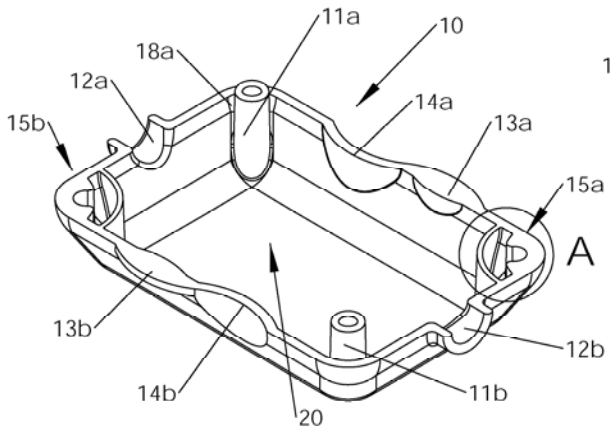

Fig. 1A

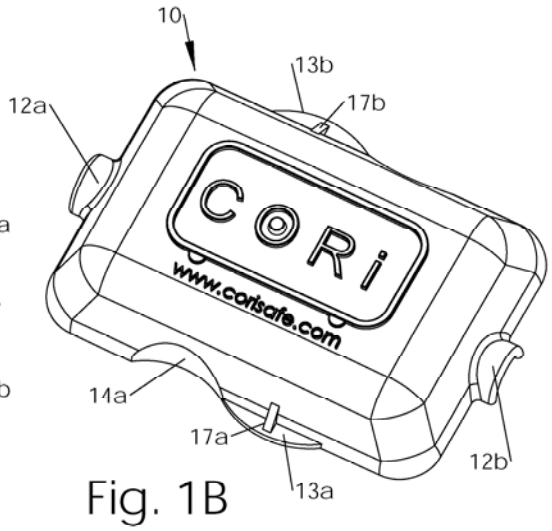

Fig. 1B

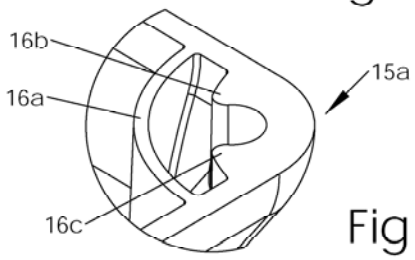

Fig. 1C

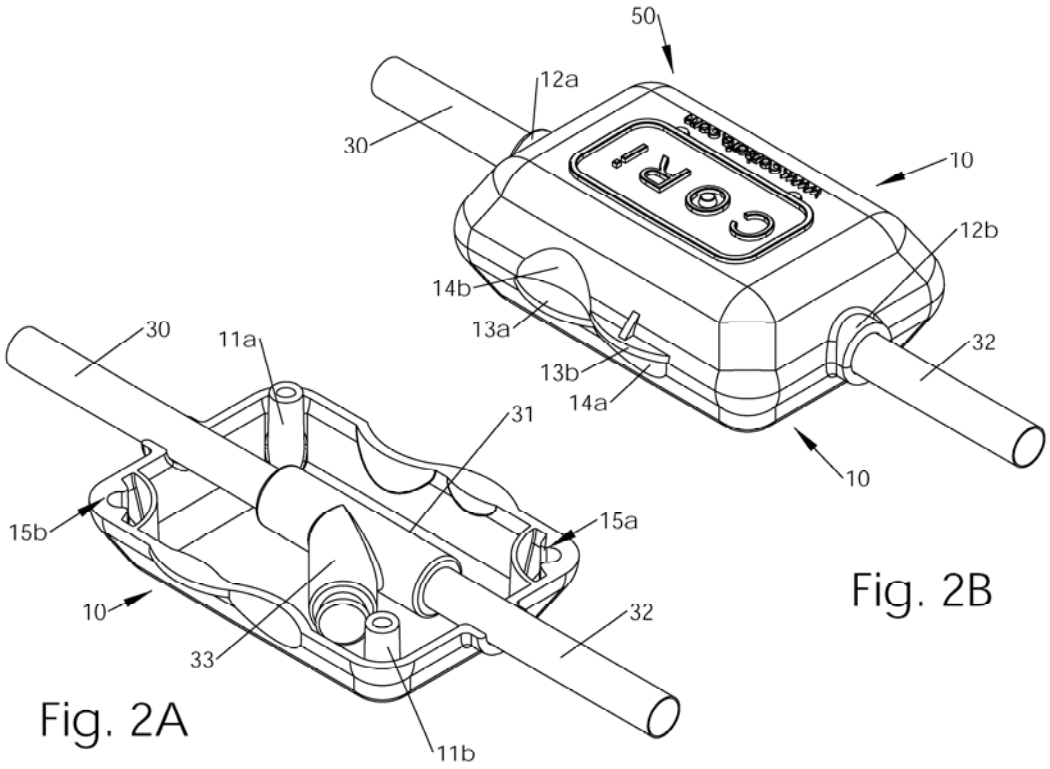
50
12a
30
10
12b
14b
13a
32
13b
14a
10

Fig. 2B

30
11a
31
15b
15a
10
32
33
11b

Fig. 2A

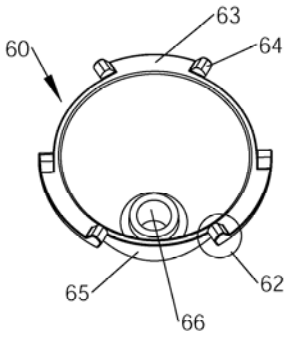

Fig. 3A

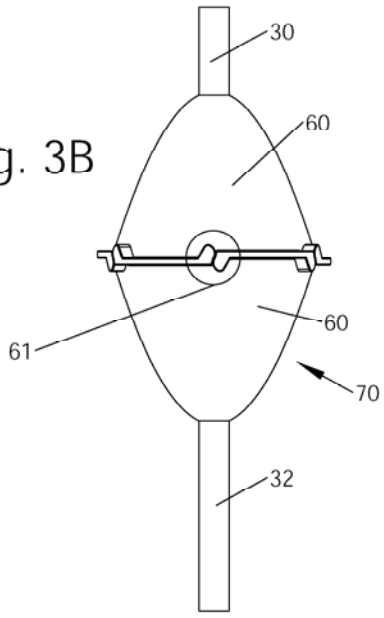

Fig. 3B

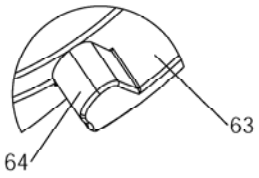

Fig. 3C

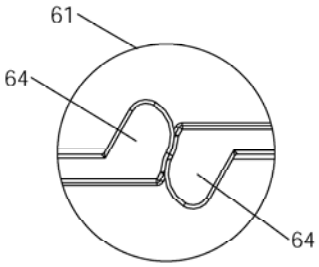

Fig. 3D