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C. E. ZIEGLER.
UMBILICAL CORD CLAMP.
FILED OCT. 29, 1921.

1,440,574

FIG. 1.

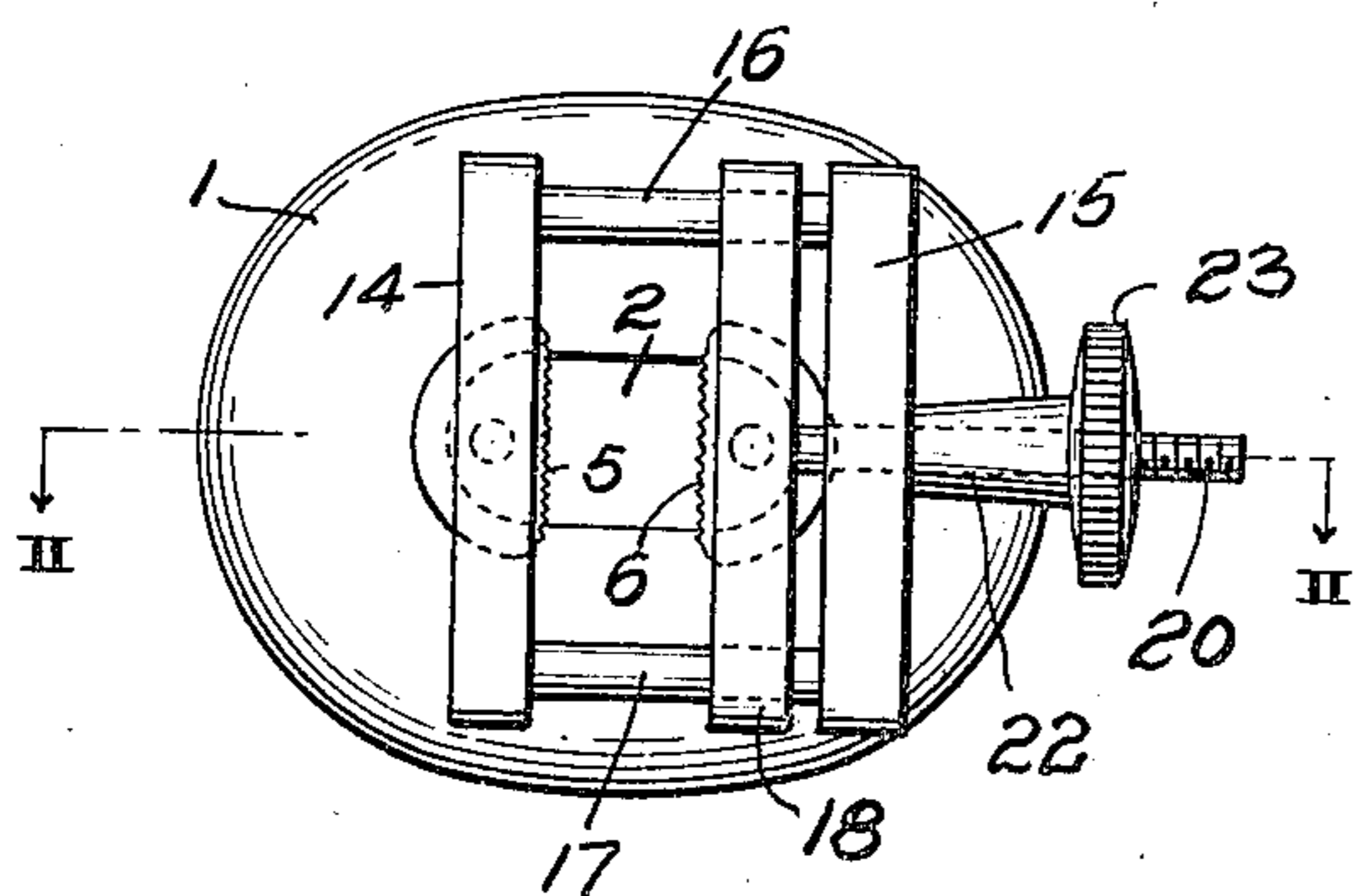


FIG. 4.

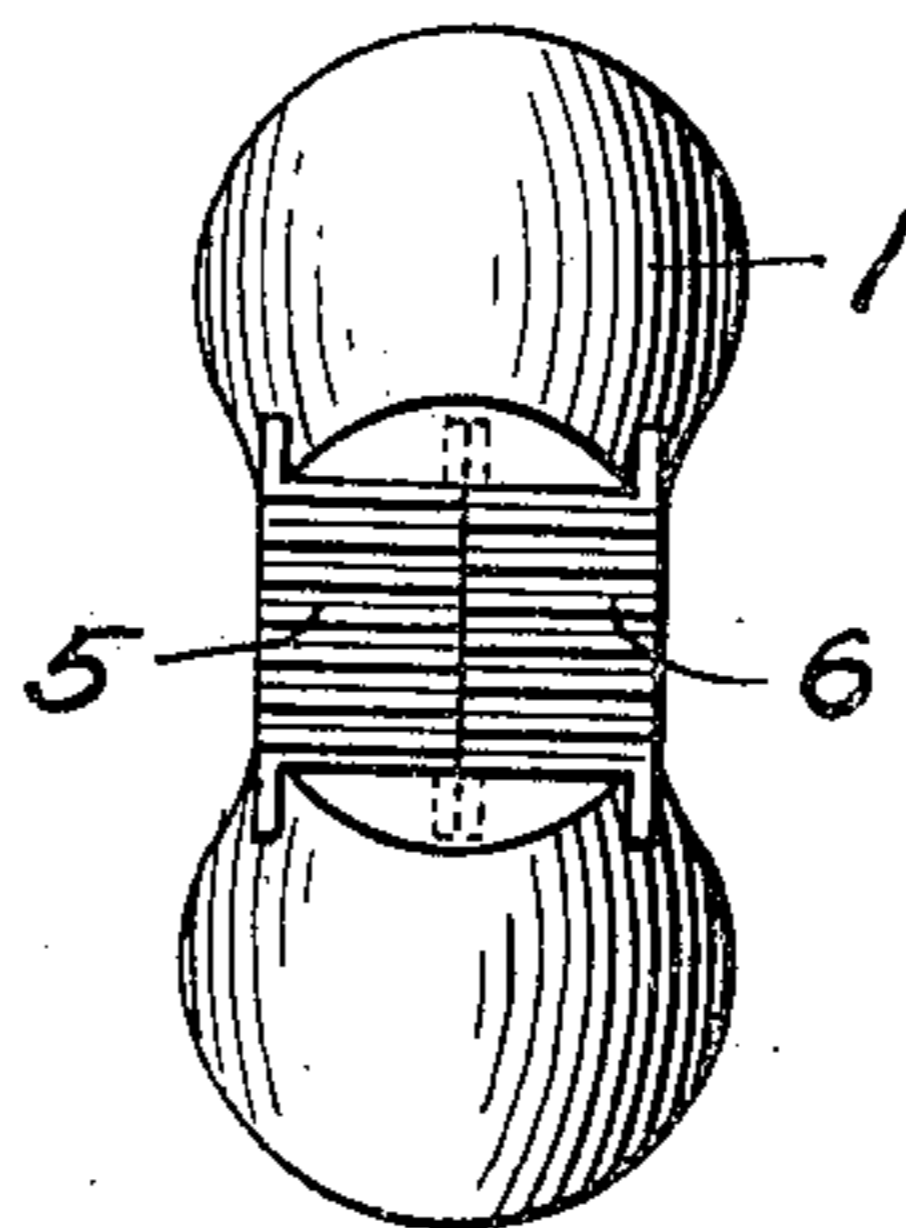


FIG. 2.

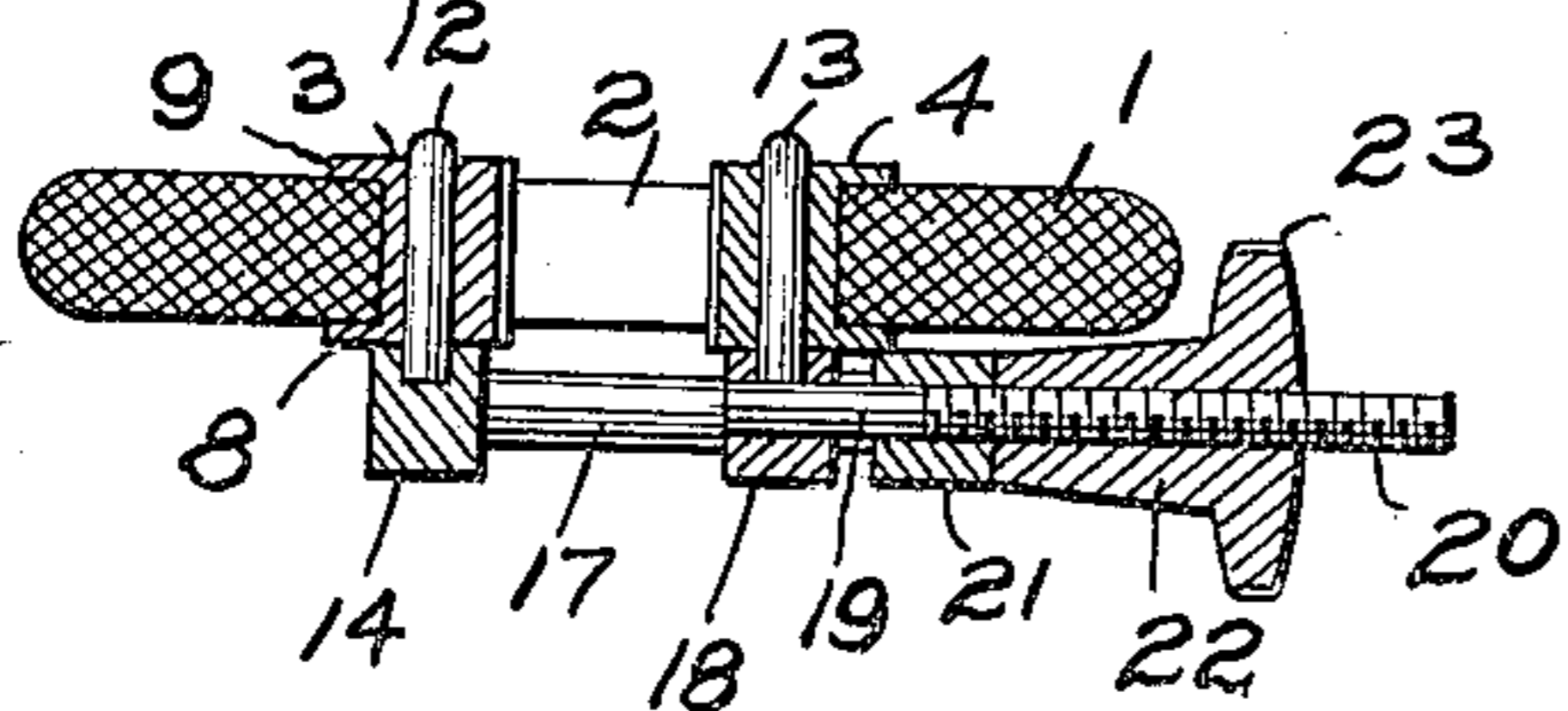


FIG. 5.

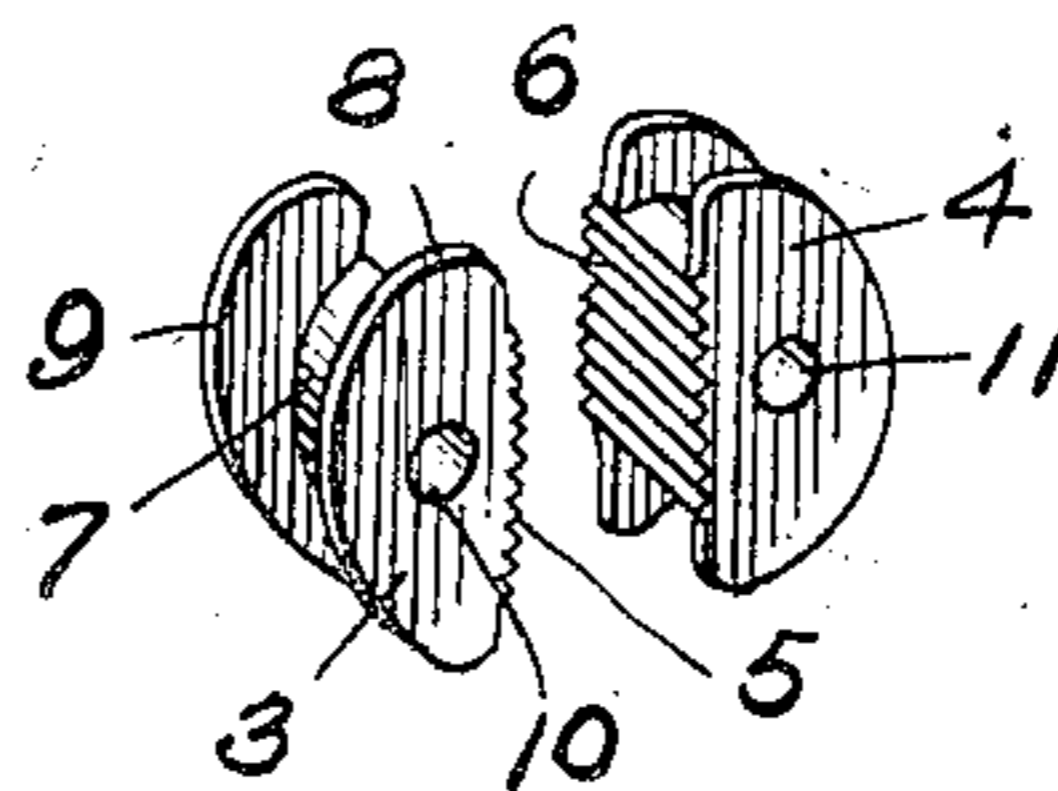


FIG. 3.

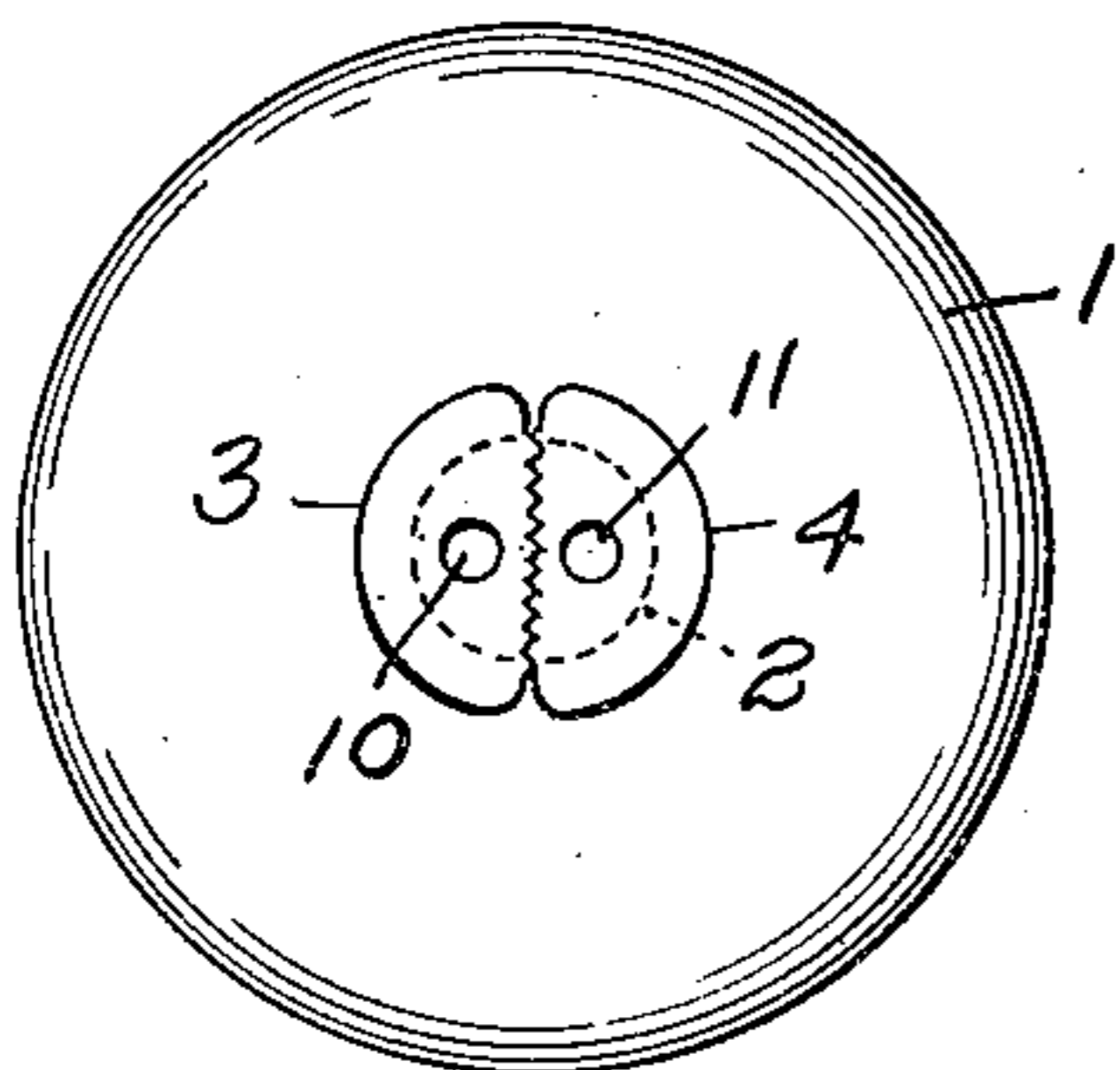
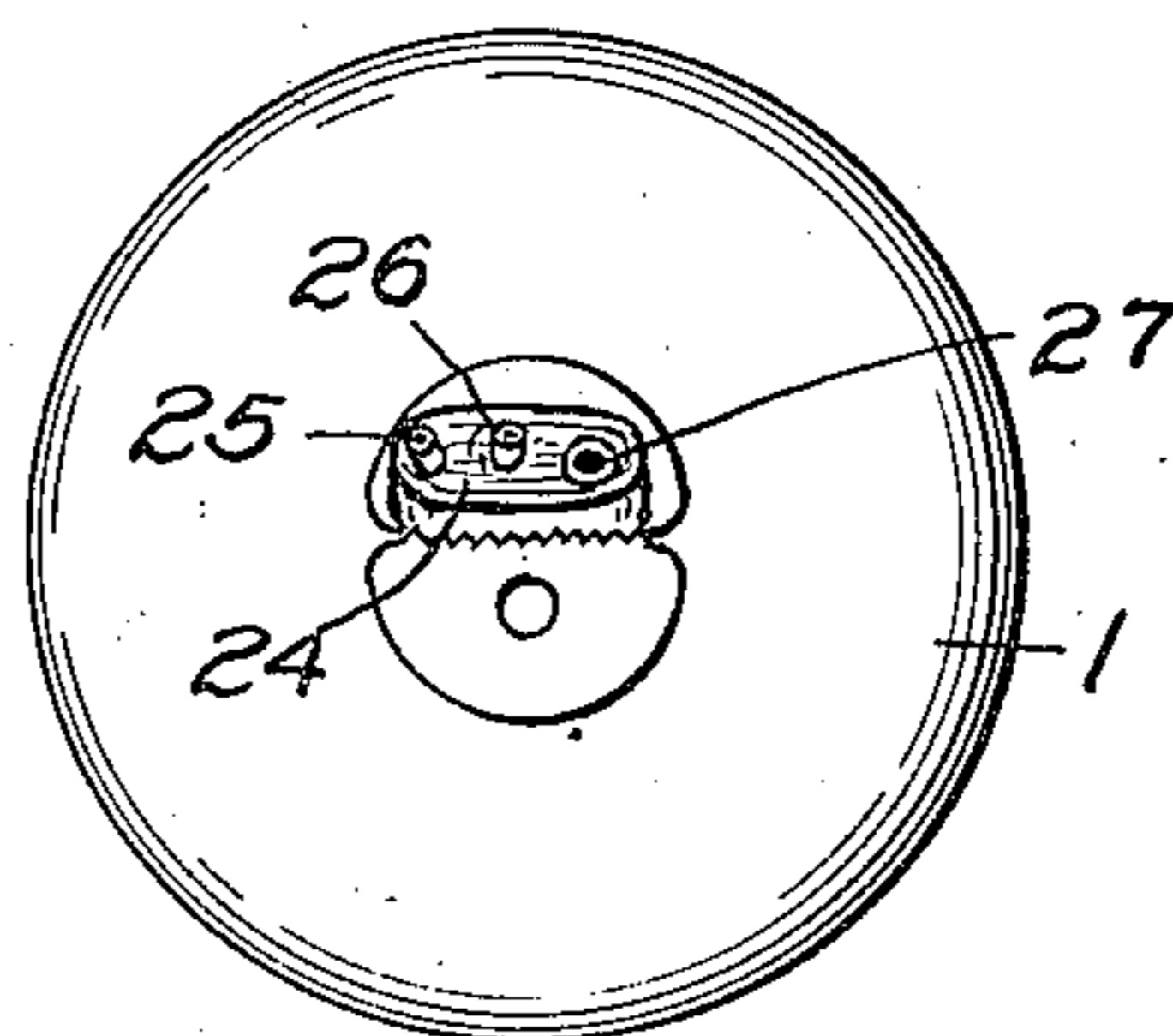


FIG. 6.



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CHARLES E. ZIEGLER, OF PITTSBURGH, PENNSYLVANIA.

UMBILICAL-CORD CLAMP.

Application filed October 29, 1921. Serial No. 511,503.

To all whom it may concern:

Be it known that I, CHARLES E. ZIEGLER, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Umbilical-Cord Clamps, of which the following is a specification.

This invention relates to umbilical cord clamps intended for application to such cord at the time of birth of an infant and has for an object the provision of a clamp which is simple, durable, compact, cheap to manufacture, strong, easy to apply and remove, which is dependable in its operation and which can be readily cleaned after removal.

The primary object of ligating or clamping the cord is, as is well known, to prevent hemorrhage. Experience has proved that no matter at what point the cord is ligated separation always occurs at the skin junction caused by the death of the stump of the cord and its removal by granulation tissue. It has also been found that mummification of the stump minimizes the chances of infection and hastens separation, while on the other hand moist gangrene, infection and delayed separation go hand in hand. Asepsis and elimination of moisture are therefore desirable, if not imperative, in the treatment of the stump.

Special objects of the invention are to provide a device which completely squeezes out the moisture from the tissues of the stump, one in which there is no lessening of compression as the tissues of the cord give away, one in which a cutting of the amniotic covering will occur, facilitating the escape of the jelly of Wharton and other moisture therefrom, one which keeps the stump elevated and away from the abdomen and one which is of such light weight and small size as to be readily incorporated into the cord dressings without discomfort to the infant.

In the accompanying drawings which illustrate the preferred embodiment of the invention, Fig. 1 is an elevation of the clamp with a retractor frame applied thereto for holding the elastic disk in distended position; Fig. 2 a sectional view taken on the line II—II, Fig. 1; Fig. 3 an elevation of the clamp with the retractor frame removed in which the parts are shown in normal posi-

tion; Fig. 4 an elevation showing the method of exposing the clamping surfaces by flexing the elastic disk; Fig. 5 a perspective view of the clamping members removed from the disk; and Fig. 6 an elevation showing the clamp applied to the cord.

The embodiment illustrated in the drawings comprises a substantially circular disk 1 of elastic and flexible material, such as rubber, provided with a central aperture 2 in which is disposed a pair of segmental gripping blocks or jaw members 3 and 4 having serrated jaws or clamping faces 5 and 6, respectively. Each of the blocks is substantially semi-circular in cross section and is provided with a body portion 7 and lateral peripheral flanges 8 and 9.

The serrations of the jaws are preferably so formed that the ridges of one fill the grooves of the opposite jaw to effect an unbroken contact between the faces throughout their entire extent, and when members 3 and 4 abut as shown in Fig. 3 the body portions and peripheral flanges cooperate to form an annular channel into which the disk 1 fits to force said faces into intimate contact.

Each body portion has an aperture formed therein as indicated at 10 and 11 with which the respective pins 12 and 13 slidably and removably engage. Said pins project from a retractor frame adapted to distend the disk so as to separate the jaws 5 and 6 to enable the clamp to be applied to and removed from the cord in a manner to be presently described.

While various forms of retractors may be used, the preferred form is shown herein and consists of two members 14 and 15 connected at their opposite ends by the guide rods 16 and 17 upon which slides the movable bar 18. The pin 12 is fixed to and projects from the member 14 and the pin 13 is likewise attached to the bar 18, as clearly shown in Fig. 2. A rod 19 having a threaded extremity 20 is fixed to the bar 18 midway of its length and extends through an aperture 21 in the member 15 against which a nut 22 provided with the knurled head 23 upon the threaded end 20 abuts.

The parts are so designed that when bar 18 abuts the member 14 the pins 12 and 13 will be spaced apart the exact distance between the apertures 10 and 11, when the

clamping members are in the position shown in Fig. 3, so as to facilitate application of the retractor frame to the clamp proper.

The operation of the device is as follows:

5 Normally the parts occupy the position shown in Fig. 3 in which position the retractor frame may be readily applied to the clamp by unscrewing the nut 22 until the bar 18 abuts member 14 when the pins 12
10 and 13 are spaced exactly the distance between the apertures 10 and 11. After the pins have been inserted into the apertures, the nut 22 is screwed upon the rod 20, thus moving the parts to the position shown in
15 Figs. 1 and 2. The clamp may then be placed over the cord 24 the arteries of which are indicated at 25 and 26 and its vein at 27, with the cord passing through the opening 2. Unscrewing of the nut 22 permits the
20 elastic disk 1 to force the faces 5 and 6 together clamping the cord securely between them, in the manner illustrated in Fig. 6.

In actual use an aseptic pad of absorbent cotton about half an inch thick, and provided with a hole in its center through which the cord is drawn, is placed adjacent the infant's body and packed snugly about the stump. The clamp is then applied in the manner above described at a point close to
25 the skin junction and the cord cut just beyond the retractor frame. After removal of the retractor the stump and clamp are covered with a similar pad of aseptic absorbent cotton and a sterile gauze binder
30 pinned in place over all.

It has been found that crushing of the cord materially shortens the time of separation of the stump, and the device described ensures a constant pressure between the
40 faces of the clamping jaws irrespective of the breaking down of the tissues of the cord. With such treatment the stump reduces to a very thin parchment-like remnant within a few days at which time it can be
45 readily twisted off by rotating the clamp.

The disk is preferably made of the best quality of rubber and the clamping members constructed of Monel metal which is a non-corrosive nickel alloy unaffected by
50 antiseptics, blood and tissue substances. But it is evident that other substances having similar qualities could be used without departing from the spirit of the invention.

One of the important features of the invention is the fact that a constant pressure is exerted between the clamping faces 5 and 6 which abut substantially throughout their full extent effecting a cutting through of the amniotic covering of the cord, thus
60 facilitating the escape of the jelly of Wharton and other moisture. Another particularly important feature is the ease with which the clamp may be cleaned after use. By simply flexing the disk 1 to the position
65 shown in Fig. 4 the jaw members 3 and 4

roll upon each other until the sides thereof abut, thus leaving the faces 5 and 6 exposed as shown, in which position they may be easily scrubbed or otherwise cleaned. Upon release of the disk 1 the clamp assumes its
70 normal form, returning the parts to the positions illustrated in Fig. 3.

Because of the small size, light weight and form of the clamp it can be readily incorporated into the cord dressings without
75 discomfort to the infant and will hold the stump elevated and away from the abdomen where perspiration otherwise adds to its moisture, and when used as above described the absorbent packings will absorb all moisture from the parts. It is also obvious that
80 where it is desired to clamp the cord merely until danger of hemorrhage has passed, which is the practice of some physicians, the clamp may be easily removed whenever
85 desired by inserting the pins of the retractor and turning the nut in the manner previously described.

I claim:

1. An umbilical cord clamp comprising 90 a pair of cooperating jaws, and elastic means encircling the same for constantly urging them toward each other and in contact with a cord.

2. An umbilical cord clamp comprising 95 a pair of jaw members substantially semi-circular in cross section provided with cooperating jaws, and resilient means encircling the said members for urging the jaws toward each other and in contact with a
100 cord.

3. An umbilical cord clamp comprising a pair of segmental jaw members having cooperating jaw faces and provided with spaced peripheral flanges, and a resilient
105 band surrounding the said members and disposed between said flanges for urging the jaw faces toward each other and in contact with a cord.

4. An umbilical cord clamp comprising 110 jaw members having cooperating faces and provided with peripheral positioning means, and a resilient band encircling the members and engaging the said means to position the same, the resilient band urging
115 the said faces toward each other and in contact with a cord.

5. An umbilical cord clamp comprising a pair of segmental jaw members having cooperating jaw faces and provided with
120 spaced peripheral flanges, and a resilient band surrounding the said members and disposed between said flanges for urging the jaw faces toward each other, each of the jaw members having an aperture in the
125 body thereof for the reception of mechanism for distending the said band.

6. An umbilical cord clamp comprising a pair of segmental jaw members having serrated faces contacting throughout their
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length and provided with spaced peripheral flanges, and a resilient band encircling the said members and positioned between the flanges for urging the faces toward each other.

7. An umbilical cord clamp comprising a resilient disk having a central aperture, gripping members provided with cooperative jaw faces disposed within the said aperture, said disk urging said jaw faces toward each other.

8. An umbilical cord clamp comprising an elastic disk having an aperture, a pair of gripping members provided with cooperative jaw faces, and means for retaining a portion of the periphery of the gripping members opposite said faces in contact with the disk whereby flexing of the disk will cause the faces to be separated whereby the same may be readily exposed for cleaning.

9. An umbilical cord clamp comprising an elastic disk having a central aperture, gripping members disposed within the aperture provided with contacting jaw faces, and engaging means on the body portions thereof, and means for cooperating with the engaging means to separate the said faces by stretching the disk.

10. An umbilical cord clamp comprising an elastic disk having an aperture, gripping blocks provided with cooperating clamping surfaces, and means for retaining the blocks within the aperture, said blocks be-

ing adapted to roll around each other upon flexing of the disk to curved form whereby the clamping surfaces will be exposed for cleaning.

11. An umbilical cord clamp comprising an elastic disk having a central opening, gripping blocks normally held in contact by the disk disposed therein and provided with cooperating clamping surfaces and with apertures formed in their body portions, a frame, projections on the frame removably fitting the said apertures, and means for moving the said projections to separate the clamping surfaces.

12. An umbilical cord clamp comprising a pair of cooperating jaws, and a single resilient means for maintaining the jaws in assembled relation and for urging the same towards each other and in contact with a cord.

13. An umbilical cord clamp comprising a pair of cooperating jaws and resilient means for clamping said jaws upon an umbilical cord, said jaws being mounted for variable movements with relation to each other whereby the jaws under the action of the clamping means move to exert uniform pressure upon the cord throughout the extent of the jaws.

In testimony whereof, I sign my name.

CHARLES E. ZIEGLER.

Witness:

EDWIN O. JOHNS.