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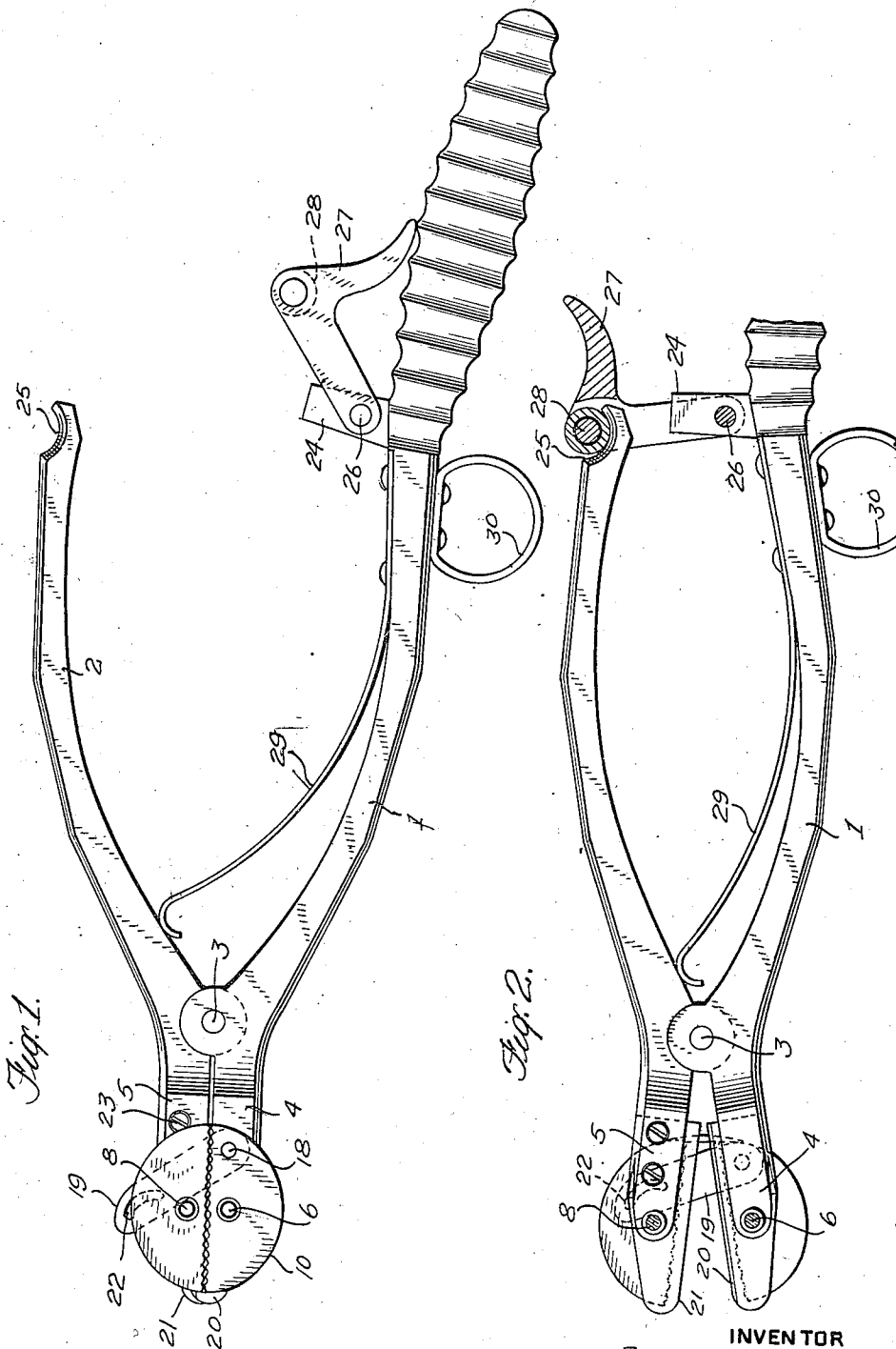
J. P. COCO

2,052,870

CLAMPING DEVICE

Filed Feb. 18, 1936

2 Sheets-Sheet 1



INVENTOR
JOSEPH P. COCO

BY *Attorney*
Attorney

Sept. 1, 1936.

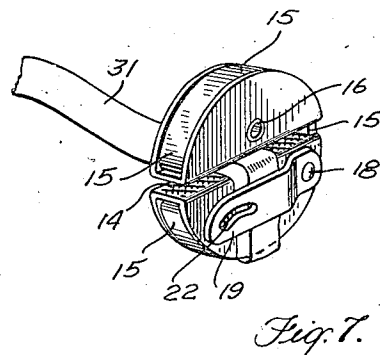
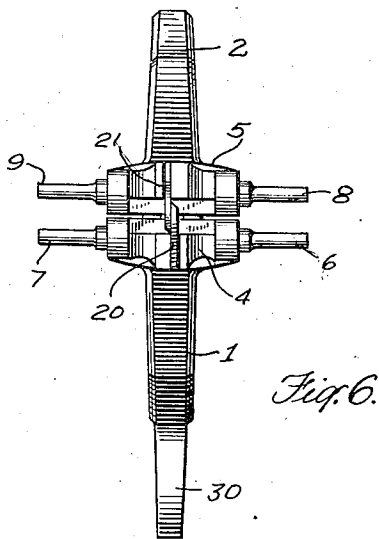
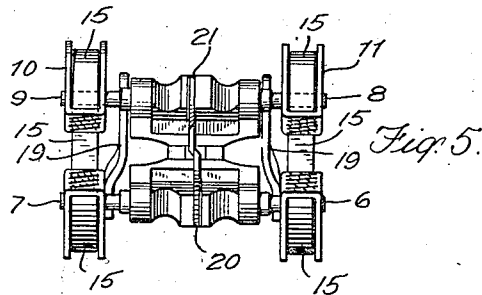
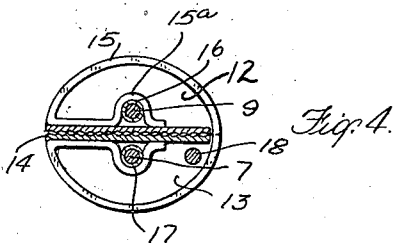
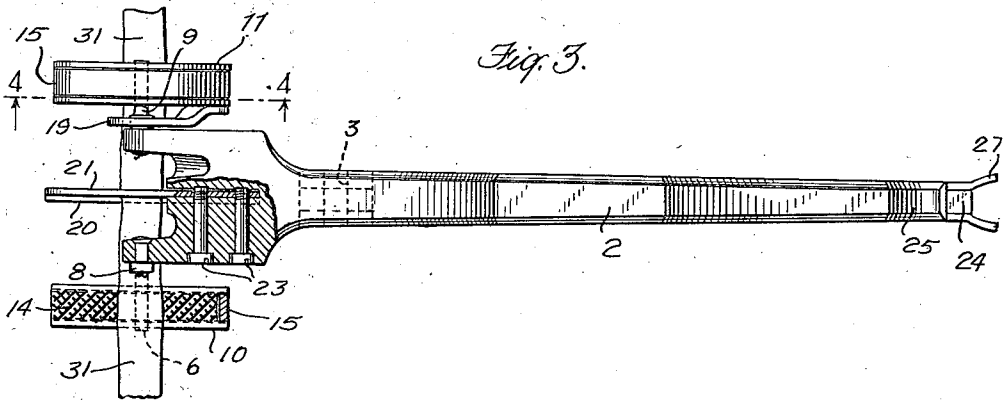
J. P. COCO

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CLAMPING DEVICE

Filed Feb. 18, 1936

2 Sheets-Sheet 2



INVENTOR
JOSEPH P. COCO
BY *his* ATTORNEY
Alfred

UNITED STATES PATENT OFFICE

2,052,870

CLAMPING DEVICE

Joseph P. Coco, Readsboro, Vt., assignor of one-half to Sara Coco, Ozone Park, Long Island, N. Y.

Application February 18, 1936, Serial No. 64,469

7 Claims. (Cl. 128—346)

My invention relates to clamping devices and is more especially concerned with clamping instruments adapted for use by surgeons and physicians.

5 The clamping instrument embodying the present invention is more particularly designed for obstetrical work to be used in securely and safely tying or clamping the umbilical cord.

10 Frequently difficulties arise in the operation of tying or clamping the umbilical cord, especially when, as it sometimes happens, the cord is wrapped around the child's neck. Also, there is often the danger, that during the drying and consequent shrinking of the cord, the cord is not sufficiently compressed requiring further manipulations which may lead to fatal hemorrhages, infection and umbilical hernia.

15 The principal object of the present invention is to provide a clamping device, whereby the umbilical cord is instantly, safely and securely clamped at two separate places (double clamping action) and whereby a constant clamping pressure on the shrinking cord is maintained so that there is no danger of the cord slipping and no necessity of the cord having to be retied. My clamping instrument, therefore, is provided with two separate spring-actuated clamps which are so set and controlled that upon being released, they will act instantly and simultaneously to 30 firmly clamp the umbilical cord and maintain a constant pressure on the same. Each clamp is, moreover, provided with an accessory member, whereby, after the cord has been clamped, angulation of the cord may be effected and maintained so as to make it absolutely impossible for the cord to slip off regardless of the size of the cord, thus positively preventing hemorrhage.

35 Intermediate the two clamps, there may be provided on the same instrument a cutter comprising two cooperating blades so disposed that at the moment when the umbilical cord is gripped and secured by the clamps, the cutting blades operate to sever the umbilical cord. In this manner, the instrument will in a single operation 40 clamp and also cut the cord, without any danger to either the mother or the child, for because of the simultaneous operation of the two clamps, any hemorrhage is effectively guarded against. The operations of clamping and cutting, being simultaneous, being in fact a single operation, there is no need of reclamping, re-cutting and re-tying the cord.

45 The instrument is so constructed that it is simple of being handled, and the arrangement

of the parts is such that upon the instrument being assembled, the clamping and cutting actions are automatically performed under the action of the springs controlling the two clamps. The latter are separate elements of the clamping instrument and can be easily attached thereto to be set into operative position. The cutting blades being made removable, the instrument can be used either with or without them at the will of the operator.

10 The instrument is preferably made of stainless steel so as to permit it to be readily sterilized prior to being used.

15 For a fuller understanding of my invention, I refer to the annexed drawings, in which I have shown a preferred embodiment of the new instrument and in which

20 Fig. 1 is a side-view of the instrument in closed position; Fig. 2 is a similar view as Fig. 1 showing the instrument with the jaws of the clamps open, a portion of one handle being broken away; Fig. 3 is a top plan view of the instrument partly in section and one of the jaws of one of the clamps being removed, the larger handle being shown broken away; Fig. 4 is a section along line 4—4 in Fig. 3 showing one of the clamps; Fig. 5 is a view of the instrument as seen from the left in Fig. 2; Fig. 6 shows the instrument when closed as seen from the front, without the clamps; Fig. 7 shows one of the clamps with its accessory clamping member.

25 As seen from Figs. 1 and 2, the instrument has the appearance of a pair of tongs provided with two handles of unequal length, the longer handle being shown at 1 and the shorter handle being shown at 2. These handles are pivotally connected at 3, their forward portions, shown respectively at 4 and 5, being of rather great width (Figs. 3 and 5). Each of these forward portions has fixed therein near its front end on opposite sides a pin, respectively shown in Fig. 6 at 6, 7, 8 and 9. These pins project laterally outward and are designed to receive and hold in place the clamping elements, of which there are two as shown in Figs. 3 and 5, being there indicated at 10 and 11. Each clamp consists of two jaws 12 and 13 (Fig. 4) each jaw having a corrugated or roughened clamping face as shown at 14 in Figs. 3, 4 and 7.

30 Each clamp has the shape of an ellipsis and comprises two jaws pressed firmly against each other by a strong spring 15, the configuration of which is shown in Fig. 4 and which has arched end portions 15a and 15b, bearing each against 55

a hollow stud 16 and 17 respectively secured in each jaw. These hollow studs are of an inner diameter so that the studs will snugly receive the pins (6, 7, 8 or 9) provided on the broad forward ends 4 and 5 of the handles 1 and 2. The spring 15 is of such a strength that the jaws of the clamps can be moved apart only by the operation of the instrument, the jaws being normally urged into closest engagement with each other by the spring 15.

To one of the jaws of each clamp is pivoted at 18 an accessory clamping member 19 for the purpose hereinafter described. This clamping member has at its forward end a small slot 22 to be engaged by the nail of the thumb or some flat tool.

At 20 and 21 are shown cooperating cutter blades which are received in suitable recesses provided in the broad forward ends or heads 4 and 5 of the handles 1 and 2 respectively. These blades are fastened by screws 23 which as shown in Fig. 3 pass through the sides of the head and engage suitably tapped holes in the rear ends of the cutter blades. The latter are arranged about midway between the clamps 10 and 11 and are so disposed that as the jaws of the two clamps come into engagement with each other, they are brought into cutting engagement with each other.

The larger handle 1 of the instrument is provided with a short stem 24 (Figs. 1 and 2) inwardly projecting toward the shorter handle 2, which at its free end has a shallow rounded recess 25. On the said stem 24 there is pivoted at 26 an angular trigger-like finger-piece 27 which carries a roller shown in Fig. 2 at 28. When the handles 1 and 2 are moved against each other and the finger-piece 27 is rocked about its pivot toward the left in Fig. 1, the roller 28 will drop into the shallow recess 25 at the free end of the handle 2 for holding the handles in the position shown in Fig. 2. At 29 is shown a leaf spring secured to the longer handle 1 and bearing with its curved free end against the shorter handle 2 thereby urging the same into the position shown in Fig. 1. At 30 in Figs. 1 and 2 is shown a ring rigidly secured to the longer handle 1 on the outside thereof just in advance of the stem 24 to which the finger-piece 27 is pivoted. The part shown at 31 in Figs. 3 and 7 shall represent a portion of the umbilical cord to be cut.

When the clamping device is to be used, the parts are first assembled as follows:

In case the cutter blades are to operate, they are first placed in the recesses provided therefor in the broad forward ends (heads) of the handles, and the screws (23 in Fig. 3) are inserted and screwed down to hold the cutter blades firmly in place. Then, while the two handles, 1 and 2, occupy the positions shown in Fig. 1, the two clamps are placed with their hollow studs 16 and 17 on the pins 6 and 8 and 7 and 9, laterally projecting from the two sides of the heads 4 and 5. In the position of the handles 1 and 2 as shown in Fig. 1, the clamps will be closed with their roughened or corrugated clamping faces in engagement with each other, as shown in Fig. 1. Then the handle 2 is moved towards the handle 1 until the roller 28 on the trigger-like finger-piece 27 can be slipped by a corresponding rocking movement of said finger-piece into the shallow recess 25 at the free end of the shorter handle 2 (Fig. 2). While the latter has been moved against the longer handle 1, the pins on the forward ends (heads) of the two handles have separated the opposing jaws of the two clamps against

the pressures of the springs 15 controlling the position of the jaws, whereby the springs are placed under a strong tension. Together with the separation of the clamp-jaws also the cutter-blades 20, 21, have been separated, all as clearly shown in Fig. 2 of the drawings.

Now, the operator grasps the rear extension of the longer handle 1 and passes his fore-finger through the ring 30, while he places his thumb on the trigger-like finger-piece 27.

Let us suppose that the instrument is to be used for the clamping and simultaneous cutting of an umbilical cord, the obstetrician with the instrument in his hand as just described places the cord between the opened jaws of the two clamps as shown in Fig. 3 of the drawings. If he then exerts a rearward pressure on the trigger-like finger-piece 27, he thereby causes the roller 28 to slip out of the shallow recess at the free end of the shorter handle releasing the latter with the result that the previously opened jaws of the two clamps snap together firmly grasping at two separate places the umbilical cord 31 between their roughened or corrugated clamping faces while at the same time, the two cutter blades 20 and 21 cut the cord between the two clamps.

Because of the strength of the springs 15 controlling the jaws of the clamps, the jaws not only firmly and securely grip the cord between them, but also maintain a constant pressure on the cord so that even as the latter dries and shrinks, there will be no danger of its slipping out from between the jaws of the clamp. However, as an additional safeguard, there is pivoted to the lower jaw of each clamp an accessory clamping member which is shown in Fig. 7 at 19 and which is in the shape of a flat part having its forward edge rounded off. Near its free end, the member 19 is provided with a curved slot 22, adapted to be engaged by the thumb nail or a suitable small tool. After the umbilical cord has been cut by the cutting blades 20 and 21, the stumps are bent over by a corresponding movement of the accessory clamping member 19, as the same is swung about its pivot 18 from its normal slanting position shown in Figs. 1 and 2 to the horizontal position shown in Fig. 7. In order to operate the accessory clamping member, the clamps must, of course, first be removed from the heads of the handles. The forward edges of the accessory clamping members 19 are rounded off so that as these members are moved over the stumps bending them into the position shown in Fig. 7 will not tear the tissue. The clamping portion of the members 19, moreover, is slightly offset so as to provide some space between that portion and the main clamp to which the clamping member is attached.

Needless to say, if it is desired to use only the clamps without the blades 20 and 21, the mere unscrewing of the screws 23 shown in Fig. 3 will release the blades permitting them to be removed from their positions. In that case, the portion of the umbilical cords lying between the two clamps may be cut with a knife or a pair of scissors.

While I have shown and described a practical embodiment of my invention, it is, of course, understood that my invention is not in any way limited thereto, since various modifications may be made without a departure from the gist of the invention.

I claim:

1. In a clamping device of the type described, the combination of a pair of clamping members, each comprising two opposed jaws provided with clamping faces and a spring operatively associat-

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ed with said jaws so as to normally close said jaws maintaining them in clamping position, means for simultaneously opening the jaws of both said clamping members against the action of their spring, means for locking the clamping members in open position, and a means for releasing said locking means permitting the jaws of said clamping members to close upon each other under the action of said spring.

2. In a clamping device of the type described, in combination a pair of clamping members, each comprising two opposed jaws provided with clamping faces and a spring operatively associated with said jaws so as to normally close said jaws maintaining them in clamping position, means for simultaneously opening the jaws of both said clamping members against the action of their spring, said means having parts for the ready attachment thereto of the jaws of said clamping members, a means for locking the clamping members in open position, and a means for releasing said locking means permitting the jaws of said clamping members to close upon each other under the action of said spring.

3. In a clamping device of the type described, in combination a pair of handles pivotally connected to each other forming a pair of tongs having opposed broadened portions, a pin laterally projecting at either side from each of said broadened portions, two clamping members each comprising two jaws and a spring operatively associated therewith so as to normally close said jaws maintaining a constant action thereon, the jaws of said clamping members being adapted to be detachably fitted onto said pins whereby upon said handles being moved towards each other, the jaws of said clamping members are opened simultaneously against the action of their springs, a means for locking the handles together, and a means for releasing said locking means causing said clamping members to be closed automatically by their springs.

4. In a clamping device of the type described, in combination two handles pivotally connected to each other forming a pair of tongs having opposed broadened portions, means tending to move said portions against each other, a pin laterally projecting from each of said broadened portions at either side thereof, two clamping members each comprising two jaws and a spring operatively associated therewith so as to normally close said jaws maintaining a constant action

thereon, the jaws of said clamping members being adapted to be detachably fitted onto said pins whereby upon said handles being moved towards each other the jaws of said clamping members are opened simultaneously against the action of their springs, a means for locking the handles together, and a means for releasing said locking means causing said clamping members to be closed automatically by their springs.

5. In a clamping device of the type described, in combination two handles pivotally connected to each other forming a pair of tongs having opposed broadened portions, a pin laterally projecting from each of said broadened portions on either side thereof, two clamping members each comprising two jaws and a spring operatively associated therewith so as to normally close said jaws maintaining a constant action thereon, the jaws of said clamping members being adapted to be detachably fitted onto said pins whereby upon said handles being moved towards each other the jaws of said clamping members are opened simultaneously against the action of their springs, two opposing blades detachably mounted in said broadened portions in the space between said clamping members, a means for locking the handles together, and a means for releasing said locking means causing said clamping members to be closed automatically by their springs, said blades being thereby simultaneously operated.

6. In a clamping device of the type described, in combination a clamping member comprising two opposed jaws provided with clamping faces and a spring operatively associated with said jaws so as to normally close said jaws maintaining a constant action thereon, and an accessory clamping element pivoted to one of said jaws and adapted when moved relative to the outside face of said jaw to grip the part clamped between said jaws.

7. In a clamping device of the type described, in combination a clamping member comprising two opposed jaws provided with clamping faces and a spring operatively associated with said jaws so as to normally close said jaws maintaining a constant action thereon, and an accessory clamping element pivoted to one of said jaws having an offset portion spaced from said jaw and a rounded forward edge on said portion, said clamping element being adapted when moved relative to the outside face of said jaw to grip the part clamped between said jaws.

JOSEPH P. COCO.