

May 26, 1953

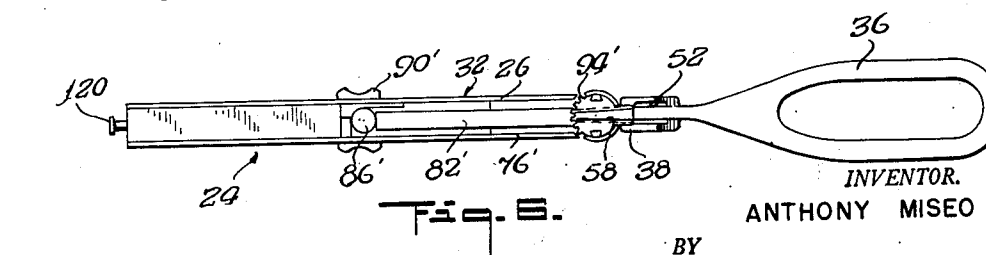
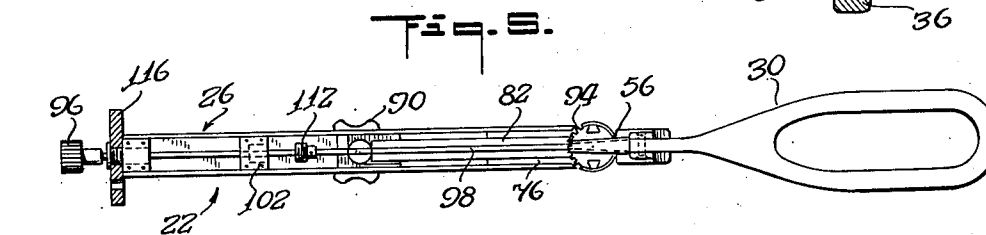
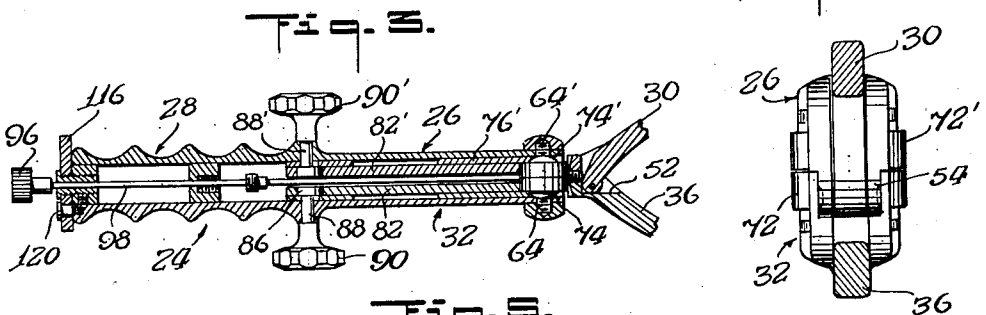
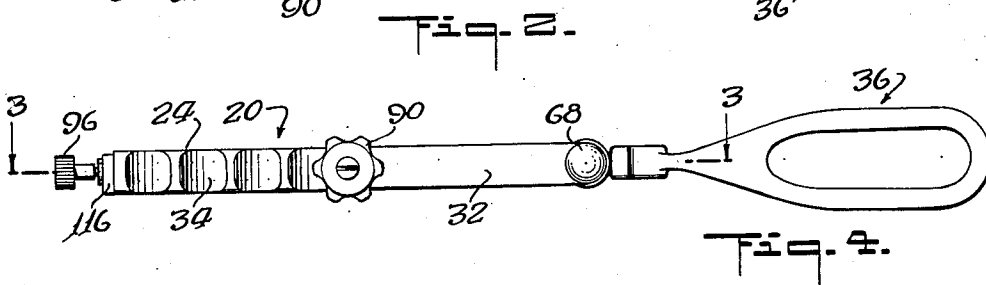
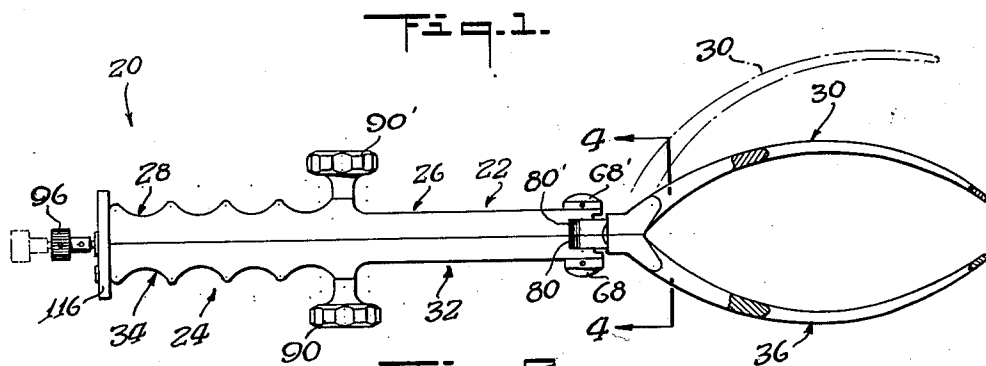
A. MISEO

2,639,712

OBSTETRICAL FORCEPS

Filed Sept. 28, 1950

2 Sheets-Sheet 1



INVENTOR.
ANTHONY MISEO
BY
Edward J. Hamilton
ATTORNEY

May 26, 1953

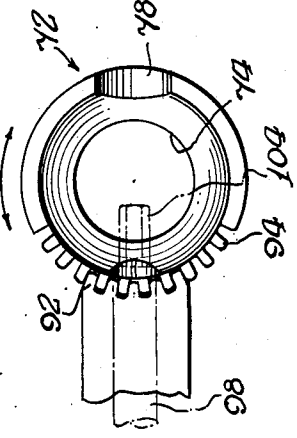
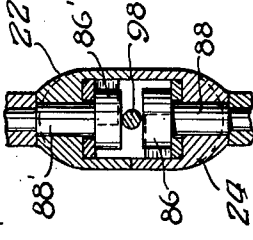
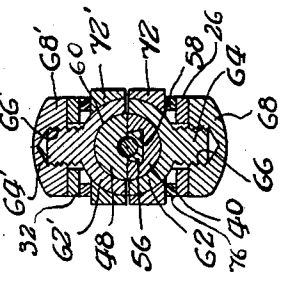
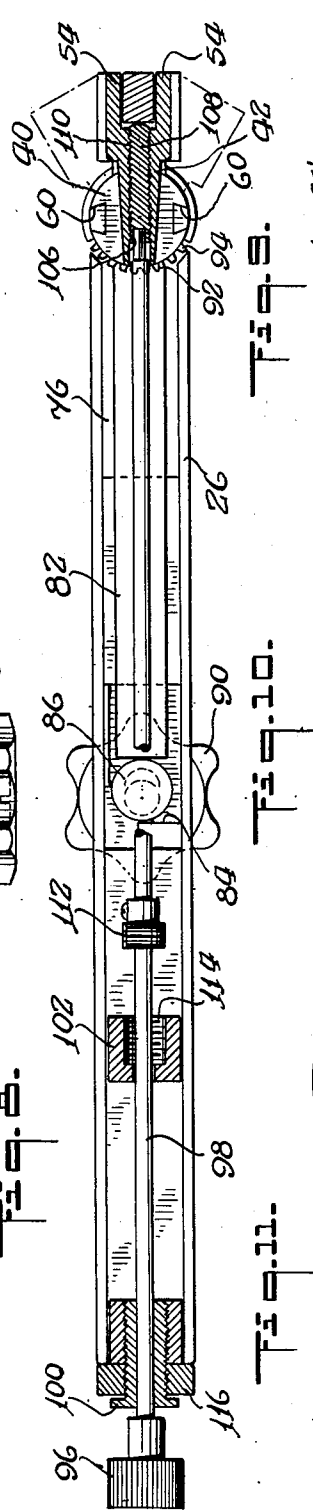
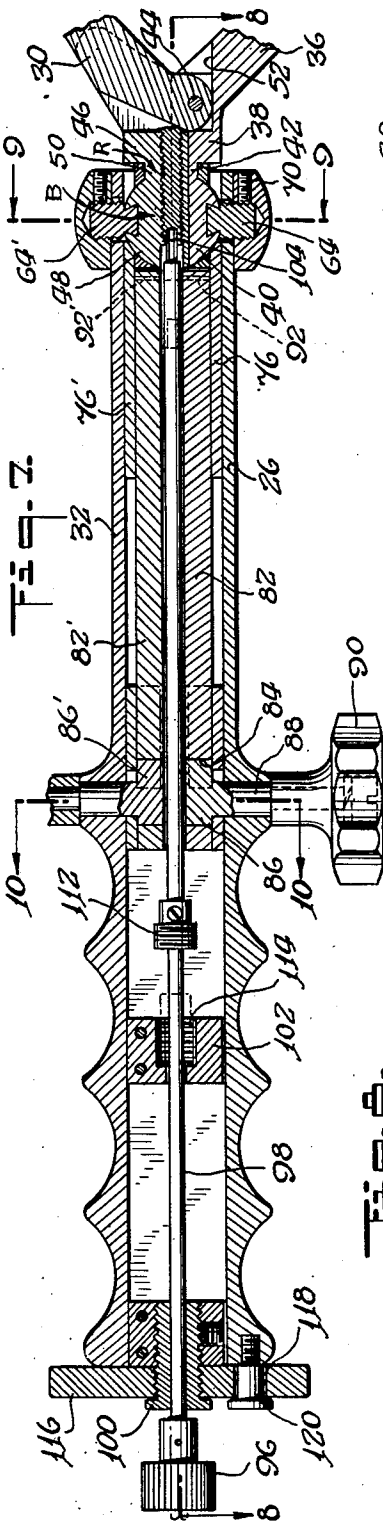
A. MISEO

2,639,712

OBSTETRICAL FORCEPS

Filed Sept. 28, 1950

2 Sheets-Sheet 2



INVENTOR.
ANTHONY MISEO
BY
Edward J. Pimentel
ATTORNEY

UNITED STATES PATENT OFFICE

2,639,712

OBSTETRICAL FORCEPS

Anthony Miseo, New York, N. Y.

Application September 28, 1950, Serial No. 187,315

12 Claims. (Cl. 128—323)

1

This invention relates to obstetrical forceps.

In a conventional obstetrical forceps the handles are rigidly connected to the blades and for this reason such forceps are difficult to use in instrument delivery. For instance, an infant should rotate as it descends the birth canal, but a conventional forceps after it has been turned part way to accomplish such rotation must be withdrawn, and turned 180° and reinserted before it can be used for traction of the child over the balance of the birth canal. Reinsertion of the forceps obviously is a delicate and time-consuming operation and risks the danger of infection and injury to the baby's head.

It has been proposed to overcome the foregoing difficulty by providing an obstetrical forceps having a universal joint between the blades and handles. This forceps would permit the blades to rotate during traction and thus to turn with the head of the child as it passed through the birth canal. Nevertheless, such forceps have not proved to be satisfactory because they could not positively rotate the child during delivery.

It is a principal object of the present invention to provide an obstetrical forceps which has neither of the mentioned defects, that is to say which is so constructed that the blades can swivel relative to the handle during traction and yet can be firmly locked in any position whereby the child can be turned in the canal as and when the doctor desires.

More specifically, it is an object of my invention to provide an obstetrical forceps of the character described wherein the blades can swivel with respect to the handles and can be locked rigidly simply and quickly by handle-mounted controls.

It is another object of my invention to provide an obstetrical forceps constituting two members, each of which includes a handle and a blade, wherein one of the members is so constructed that its introduction into the birth canal subsequent to that of the other member is simplified.

It is another object of my invention to provide an obstetrical forceps of the character described wherein the spacing between the blades can be quickly and easily varied by manipulation of a control on the handles so as to accommodate infants' heads of various sizes.

It is another object of my invention to provide an obstetrical forceps of the character described which is positive and efficient in operation and can be readily disassembled for cleaning and sterilization.

2

It is another object of my invention to provide an obstetrical forceps of the character described whose parts are not unduly complex and which can be manufactured at a reasonable price.

Other objects of my invention will in part be obvious and in part will be pointed out hereinafter.

My invention accordingly consists in the features of construction, combinations of elements and arrangements of parts which will be exemplified in the device hereinafter described and of which the scope of application will be indicated in the appended claims.

In the accompanying drawings in which is shown one of the various possible embodiments of my invention,

Fig. 1 is a top view of a pair of forceps constructed in accordance with the invention;

Fig. 2 is a side view thereof;

Fig. 3 is a sectional view taken substantially along the line 3—3 of Fig. 2, and showing details of the manipulative controls for selectively locking or unlocking swiveling movement of the blades and for varying the spacing therebetween;

Fig. 4 is an enlarged sectional view taken substantially along the line 4—4 of Fig. 1, the same being illustrative of the outward aspect of the swivel joint;

Fig. 5 is a view of the inner side of one of the halves of the forceps as it appears when disengaged from the other half;

Fig. 6 is a similar view of the other half of the forceps;

Fig. 7 is a view similar to Fig. 3, but on a larger scale and with the swivel joint in section;

Figs. 8, 9 and 10 are sectional views taken substantially along the line 8—8, 9—9 and 10—10, respectively of Fig. 7; and

Fig. 11 is a view of the swivel socket and locking means therefor.

Referring now in detail to the drawings, the reference numeral 20 denotes an obstetrical forceps embodying my invention. Said forceps constitutes two detachably engageable halves, to wit: a first half 22 (see Figs. 1 and 5) and a second half 24 (see Figs. 1 and 6).

The first half includes a shank 26 having a handle 28 which is scalloped to facilitate grasping. The side of the shank facing the second half is of U-shaped section to receive blade-controlling elements hereinafter described in detail. The first half also includes a blade 30 of conventional contour which is attached to the shank in a unique fashion embodying the present invention.

The second half also comprises a shank 32 in-

3

cluding a handle 34. Said shank has associated therewith a blade 36. The side of the shank 32 facing the first half likewise is of U-shaped section to receive blade-controlling elements. By thus recessing both shanks and by complementally shaping their juxtaposed surfaces (inclusive of the blade-controlling elements) the two shanks can be readily abutted over their full lengths.

The blade 36 has a tang 38 to which a hemispherical coupling member 40 rigidly is secured by a semi-cylindrical stub rod 42. The axis of symmetry of said rod is coincident with a major diameter of the hemisphere and the truncated faces of the rod and hemisphere are coplanar.

The other blade 30 is pivotally carried by a pin 44 mounted on a tang 46 to which a hemispherical coupling member 48 rigidly is secured as by a semi-cylindrical stub rod 50. The rod 50 and coupling member 48 are of the same shapes and dimensions as the rod 42 and coupling member 40 and have the same relative disposition. Thus, when the rods 42, 46 and coupling members 40, 48 have their truncated faces placed against one another, there is formed a ball B which is connected by a cylindrical rod R to the tangs of the two blades.

It will be observed that the blade 36 is formed with a cavity 52 to accommodate the pivot end of the blade 30 and the pedestals 54 between which the pivot end of the blade turns and to which the ends of the pin 44 are secured.

For a purpose which later will be apparent, the truncated faces of one of the coupling members and its associated rod, e. g. the member 48 and rod 50, are shaped to include as an integral part one-half of a detachable engaging means, for example, a key 56 of dove-tail cross-section, said key extending in a direction axially of the associated blade and converging away therefrom. The truncated faces of the other coupling member 40 and rod 42 are shaped to snugly receive said key, being formed for this purpose with a groove 58 of dove-tail cross section which negatively conforms to the contours of the key. The wide end of the groove 58 is unblocked, whereby to permit the key readily to be inserted therein. It will be apparent that when the key is thus positioned the two coupling elements are firmly connected to form the ball B.

Each coupling element is provided with a semi-circular dove-tail groove 60, the ends of the two grooves being aligned in the ball B to provide a continuous annular groove which circumscribes the ball along a great circle, this preferably being the circle in the plane perpendicular to the longitudinal axis of the rod R.

The two coupling elements are similarly mounted in their associated shanks 26, 32 and, accordingly, the mounting structure for only one of said elements 40 will be described in detail. The components of the mounting for the other element are denoted by the same reference numerals primed.

The coupling member 40 has a semi-circular key 62 slidably received in its dove-tail groove 60, said key being of dove-tail shape to correspond to the configuration of the groove. The two keys are in register and define a ring when the two halves of the detachable engaging are in mesh. Integral with the key 62 is one end of a pivot post 64 whose shank is threaded for engagement in a tapped bore 66 of a cap 68 where it is held fixed by a set screw 70. The coupling element 40 is seated in a hemispherical socket 72 and the other coupling element 48 is seated in a hemi-

4

spherical socket 72'. The two sockets face one another and define a spherical cage for the ball B.

The socket 72 is fashioned with a plane surface on the side thereof remote from the socket 72', said surface being provided with an opening 74, to pass a protruding portion of the coupling element 40 and the post 64. Said plane surface of the socket rests on a clamp plate 76 which is slidable on the inner surface of the base of the U-shaped shank 26. The upper edge of said clamp plate is slotted to pass the pivot post 64, the base of the slot being chamfered to match the curvature of the ball B.

The base of the U-shaped shank 26 is formed with an opening which passes the pivot post 64, the cap 68 being on the outer side of said shank. Thus the pivot post extends through the socket 72, the clamp plate 76 and the shank 26 to be fixedly received in the cap 68 whereby to permit rotation of the coupling element about the axis of the pivot posts, such action being accompanied by a corresponding rotation of the other coupling element 48, the caps 68, 68', and the sockets 72, 72'. The sockets will rotate about the posts with the ball inasmuch as the sockets are provided with grooves 78, 78' in which the rods 42, 50 are snugly received.

Rotation of the divers elements mentioned about the registered axes of the pivot pins 64, 64' is limited only by abutment of the tangs of the blades against the edges of notches 80, 80' in the sides of the U-shaped shanks (see Fig. 1). The dot-and-dash lines in Fig. 8 are indicative of the extent to which the ball and blades can be swung to either side from a straight-ahead position.

Means is included to lock the socket and, therefore, the blades in any angular position of rotation about the pivot pins. Said means includes a bar 82 which is fixed to and movable with the plate 76 in the U-shaped shank 26. Said bar is fashioned with an opening 84 adjacent the end thereof remote from the ball, there being received in this opening a cam 86 mounted on a shaft 88. Said shaft is journaled in the handle 24 and is manipulated by a knob 90. The end of the bar adjacent the ball is formed with an arcuately arranged set of teeth 92 which are designed to selectively mesh with a mating set of teeth 94 (see Fig. 11) on the periphery of the socket 72.

It will be appreciated that when the knobs 90, 90' are rotated to disengage the teeth 92, 92' from the teeth 94, 94' and to disengage the chamfered edges of the plates 76 from the coupling element 40, the ball B will be free to turn about the axes of the pivot pins.

Moreover, said ball will be free to rotate within and relative to the ring defined by the two semi-circular keys 62, 62'. Such second freedom of rotation is about an axis perpendicular to the axis of rotation of the pins and through the axis of the ring, being unchecked by limit stops.

This latter rotation can be prevented at will by manipulating the handle 90 to force the bar 82 and plate 76 toward the ball. At such time, the chamfered edges of the plates 76, 76' are frictionally wedged between the base walls of the shanks 26, 32 and the portions of the ball B protruding through the opening 74, 74' whereby to lock the ball. Simultaneously the teeth 92 on the bars 82, 82' mesh with the teeth 94, 94' positively to inhibit rotation of the sockets 72, 72' and ball B about the registered axes of the posts

64, 64', thus relieving some of the locking stresses on the chamfered edges of the plates 76, 76'. Inasmuch as the locking action for the ball is controlled from the blade handles irrespective of the positions of the blades, the blades can be locked or freed for swiveling movement at any time during delivery with the blades anywhere in the birth canal.

In order to move the blade 30 toward and away from the blade 36 about the pivot pin 44 another knob 96 is provided on the handle. Said knob is on the projecting end of a long spindle 98 which is journaled in a bushing 100 carried by and disposed at the remote end of the handle half 22. Said spindle likewise is journaled in a bearing 102 secured to said half intermediate the ends thereof. The proximate tip 104 of the rod is fashioned in a non-circular shape, as for example a hexagonal shape, for reception in a socket 106 of matching configuration. This socket is formed in one end of a screw 108 which turns in a tapped bore 110 provided in the coupling element 48 on which the male half or key 56 of the detachable engaging means is located. The other end of the screw 108 projects from the key so as to engage the tang of the blade 30. It will be apparent that when the screw is turned in one direction it will force the blade 30 toward the blade 36, and if the spindle is turned in the opposite direction it will permit the blade 30 to move away from the blade 36, such latter movement being exemplified by the dot-and-dash position of the blade 30 in Fig. 1.

If the tip of the spindle 98 were permanently disposed in the socket of the screw 108, the ball could not swivel. Accordingly, to permit disengagement of the spindle the same is mounted for axially shiftable movement in the handle half wherein it is supported. The full line position of the spindle shown in Fig. 7 is that wherein its tip operably engages the screw 108, and the dot-and-dash line position of the spindle in the same figure shows its disengaged location. In order to maintain the spindle in its disengaged position, the same has fixedly secured thereto a male-threaded collar 112 which is designed to engage a tapped well 114 coaxially disposed in the journal 102 at such time as the spindle is disengaged. It will be noted that the adjustable blade 30 only can be moved toward the fixed blade 36 when both blades are in their straight-ahead position, this being independent of the angular position of the ball with respect to the keys 62.

Means is included to prevent relative axial movement of the two halves, i. e. relative movement parallel to the spindle 98. As is shown herein, said means constitutes a latch 116 screwed on an externally threaded projecting end of the bushing 100. Said latch is of elongated shape as viewed from the end of the handle and is provided with a notch 118 in one of its longitudinal edges for receiving a headed pin 120 carried by the half 24. When the pin lies within the notch the two handle halves are locked against relative axial movement.

To use the instrument, it being assumed that the two halves 22, 24 are separated from one another, the knobs 90 are turned to loosen the coupling elements 40, 49 which, however, are retained against translation by the semi-circular keys 62, 62'. Said elements are rotated to dispose their truncated faces on the open sides of the U-shaped shanks with the plane of the keys 62, 62' perpendicular to the longitudinal axes of said shanks. Thereupon the knobs are turned to

prevent rotation of the coupling elements which now are so positioned that the detachable engaging means of the two halves can be engaged. The blades thus are rigidly connected to the shanks.

The half 24 having the fixed blade 36 is introduced into the birth canal. Thereafter the half 22 with the pivoted blade 30 is inserted. During such insertion, the blade 30 is free to move between two extremes determined by the position of the screw 108 whereby to facilitate entry of said blade. After both halves are in the canal, the detachable engaging means are coupled with the blades on opposite sides of the infant's head. The latch 116 is turned to locking position. The knob 96 is rotated to disengage the collar 112 from the well 114 and the tip 104 of the spindle inserted in the socket 106. The knob 96 thereafter is turned further to embrace the infant's head with a sufficient degree of firmness.

The practitioner now is ready to assist in delivery of the infant by pulling upon the handle of the forceps and turning the same as may be required positively to rotate the infant. When the delivery has reached a point at which normally the forceps would have to be withdrawn, turned and reinserted, the knobs 90 are turned to free the ball B and sockets 72, 72'. The handle now can be swiveled with respect to the blades. If it is desired to exert traction only, the handle simply is pulled with a freely swiveling connection maintained between the handle and blades. If simultaneously with the traction, it is desired to exert a rotative effort, the knobs are turned to retighten the connection between the handle and the ball in a new angular position of the latter and this can be accomplished regardless of the relative position between the blades and handle.

It thus will be seen that I have provided an instrument which achieves all the objects of my invention and is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein described, or shown in the accompanying drawings, is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. An obstetrical forceps comprising two halves, each half including an elongated handle and a blade, means to secure each handle to a different one of said blades, said securing means including means to captively attach the blade to the handle for swiveling movement relative thereto about a pair of perpendicular axes of which one includes the longitudinal axis of the handle, means to render said swiveling movement ineffective at will in any relative position of the blade and handle, and manually manipulative means on the handle remote from the blades to operate said last-named means.

2. An obstetrical forceps comprising two halves, each half including a handle and a blade, means captively to secure each handle to a different one of said blades against translation, said securing means including means to attach the blade to the handle for swiveling movement relative thereto, means to render said swiveling movement ineffective at will in any relative position of the blade and handle, and manually manipulative means on the handle remote from the blades to operate said last-named means.

3. An obstetrical forceps comprising a pair of blades, an elongated handle, means to connect said blade to said handle for swiveling movement relative thereto about a pair of perpendicular axes of which one includes the longitudinal axis of the handle, means to render said swiveling movement ineffective at will in any relative position of the blades and handle, and manually manipulative means on the handle remote from the blades to operate said last-named means.

4. An obstetrical forceps comprising two detachably interengageable halves, each half including a handle and a blade, each blade including a coupling element having a semi-circular open-ended groove with a constricted mouth, the grooves on the two elements being adapted to be disposed with their ends in registry to define a circle, each handle having rotatably secured thereon a semi-circular key slidable in one of said grooves, the axes of rotation of the keys having aligned, and means mounted on the handles to secure the coupling elements and keys against rotation at will.

5. An obstetrical forceps as set forth in claim 4 wherein means is provided selectively to detachably engage the handles.

6. An obstetrical forceps as set forth in claim 5 wherein means is provided selectively to detachably engage the coupling elements.

7. An obstetrical forceps comprising two halves, each half including an elongated handle and a blade, each blade including a semi-spherical coupling element having a semi-circular open-ended groove with a constricted mouth, the grooves on the two elements being adapted to be disposed with their ends in registry to define a circle, each handle having rotatably secured thereon a semi-circular key slidable in one of said grooves, the axes of rotation of said keys being aligned, and means controllable from said handles selectively to frictionally bind the keys in the grooves whereby to secure the coupling elements against rotation at will.

8. An obstetrical forceps as set forth in claim 7 wherein the coupling elements include detachably engageable parts to secure said elements to one another for joint rotation as a ball.

9. An obstetrical forceps as set forth in claim 8 wherein the handles include means selectively to prevent relative axial movement thereof.

10. An obstetrical forceps as set forth in claim 7 wherein one element has a straight key on its flat surface and the other element a matching

groove to detachably secure said elements to one another for joint rotation as a ball.

11. An obstetrical forceps as set forth in claim 10 wherein one of the blades is mounted for movement toward and away from the other blade, wherein a screw is threaded through the straight key and is operable to vary the position of the movable blade, and wherein the screw is detachably engageable by an axially slidable and rotatable spindle manipulatable from a point on a handle remote from the blades.

12. An obstetrical forceps comprising two detachably engageable halves, each half including a handle and a blade, each blade including a semi-spherical coupling element having a semi-circular open-ended groove with a constricted mouth, the grooves in the two elements being adapted to be disposed with their ends in registry to define a circle, each handle having a socket in which the associated coupling element is seated, said socket having an opening through which a portion of the element protrudes, said sockets defining a cage in which the elements are jointly rotatable as a ball, said sockets having a joint opening through which members extend connecting the elements to the blades, said ball being rotatable about an axis extending through the second named opening, each socket having a set of teeth lying on a circle in a plane at right angles to said axis, each handle having a semi-circular key slidable in one of said grooves, a post connected to each key, said posts being rotatable in alignment on said handles, a plate slidable in each handle into frictional engagement with the protruding position of the associated element, and means mounted on each handle to control the position of the plate, said means including teeth for meshing with the teeth on the socket when the plate frictionally engages the element.

ANTHONY MISEO.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
249,073	Miller	Nov. 1, 1881
1,994,585	Mann	Mar. 19, 1935
2,219,424	La Breck	Oct. 29, 1940
2,293,984	Kirschbaum	Aug. 25, 1942

FOREIGN PATENTS

Number	Country	Date
30,858	Austria	Nov. 25, 1907
41,175	Switzerland	June 19, 1907