United States Patent [19]

Laufe et al.

[11] **3,789,849**

[45] **Feb. 5, 1974**

[54] **OBSTETRICAL FORCEPS**

[75] Inventors: **Leonard E. Laufe,** 1206 Iverness Ave., Pittsburgh; **Victor Jackman,** Westmoreland, both of Pa.

[73] Assignee: **by said Jackman said Laufe**

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[21] Appl. No.: **137,169**

[52] **U.S. Cl.** **128/323**

[51] **Int. Cl.** **A61b 17/44**

[58] **Field of Search** 128/323, 324

[56] **References Cited**

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Primary Examiner—Channing L. Pace

Attorney, Agent, or Firm—Parmelee, Utzler & Welsh

[57] **ABSTRACT**

Obstetrical forceps for assisting in the delivery of a baby. The forceps include a pair of elongated members pivotably connected with each other. Each member includes a fetus-engaging blade portion and a handle portion. At least one of the members has means movably connecting the blade portion thereof to its handle portion. Such blade and handle portions are connected in such a manner that the blade is shiftable a limited amount with respect to the handle. Biasing means are provided for holding the shiftable blade in an axially aligned position with respect to the handle. The biasing means are constructed and arranged to impart a predetermined holding force on the blade for holding the respective shiftable blade and handle together whereby when a force above and generally opposite in direction to the holding force is applied to the shiftable blade, as during the use of the forceps to assist delivery of a baby, the shiftable blade portion will shift its position relative to the handle.

22 Claims, 19 Drawing Figures

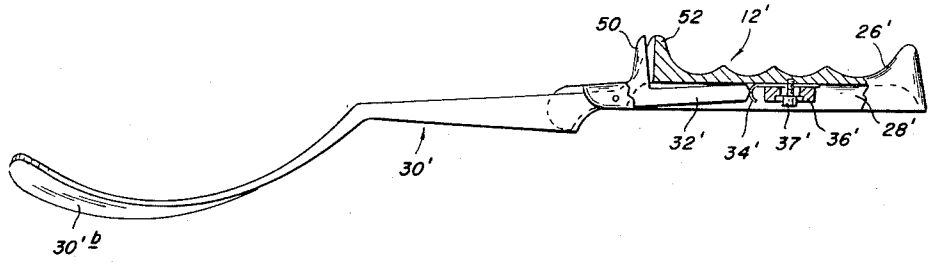

FIG. 1

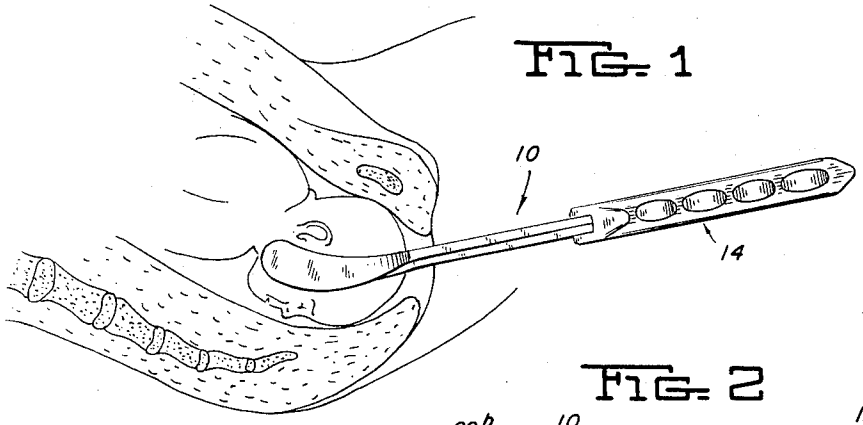

FIG. 2

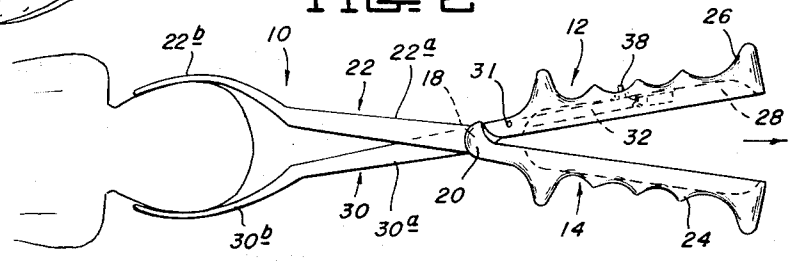

FIG. 3

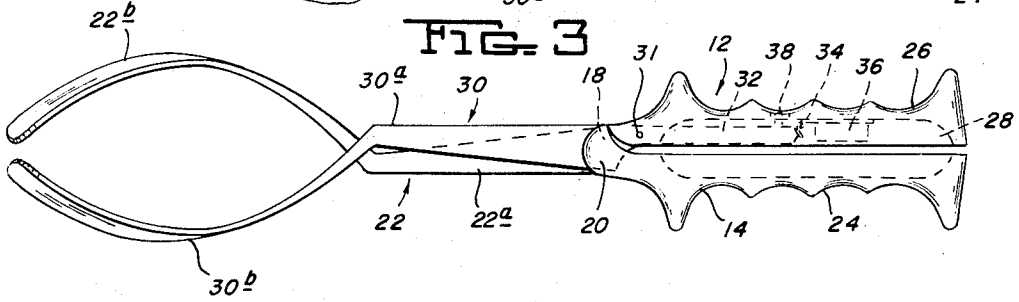

FIG. 4

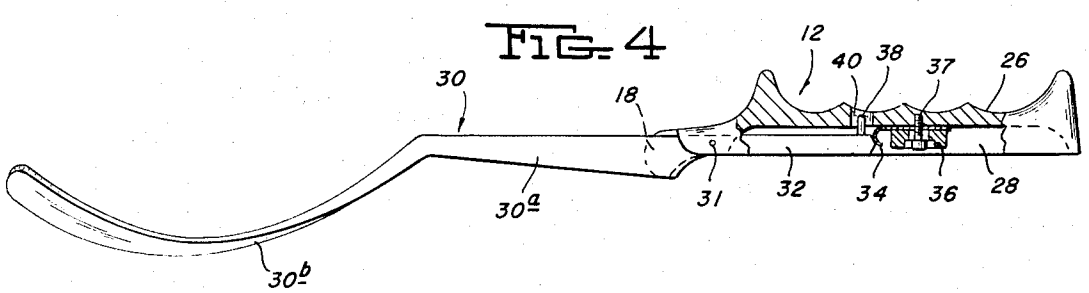

FIG. 5

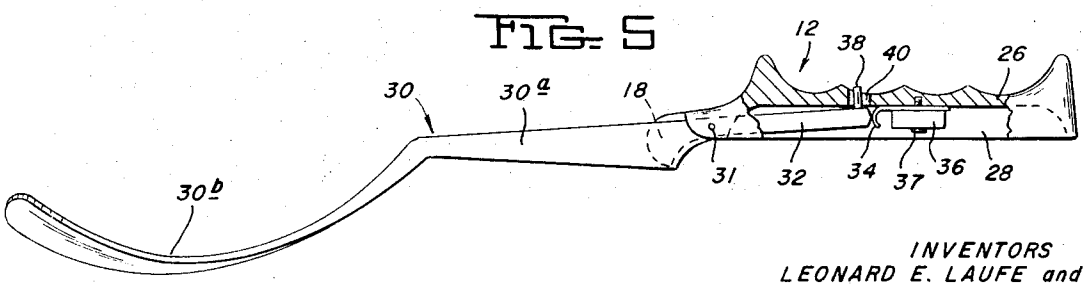

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FIG. 6

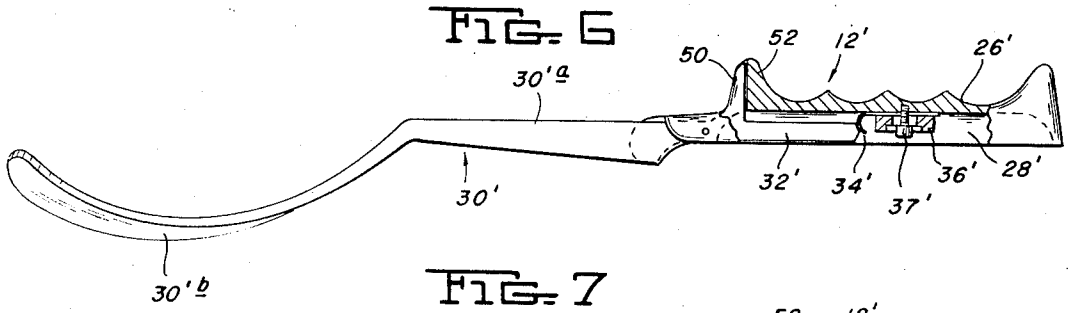

FIG. 7

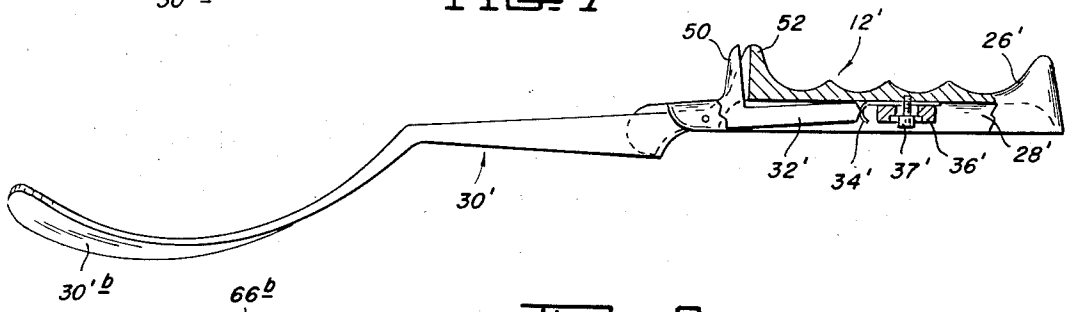

FIG. 8

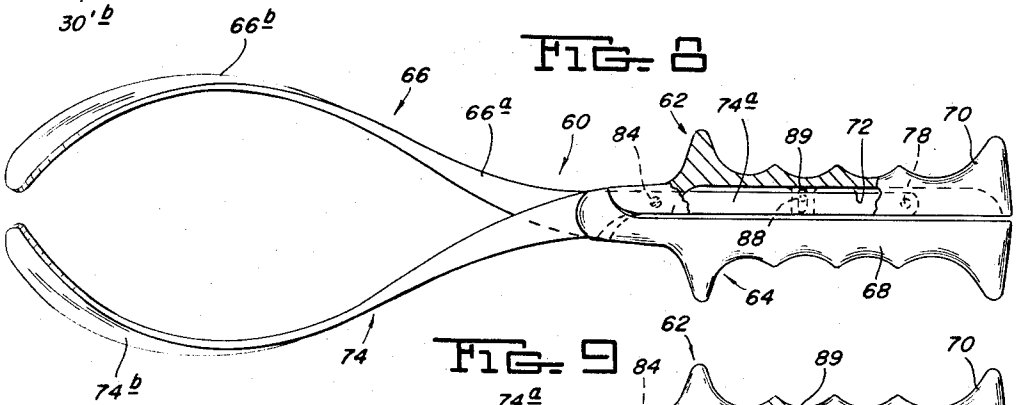

FIG. 9

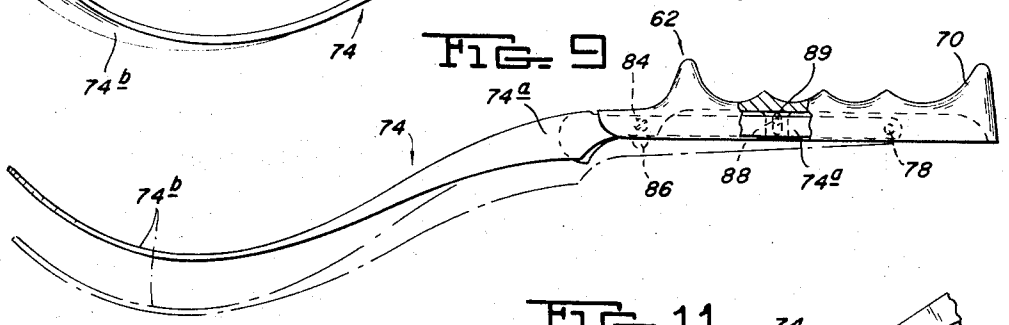

FIG. 11

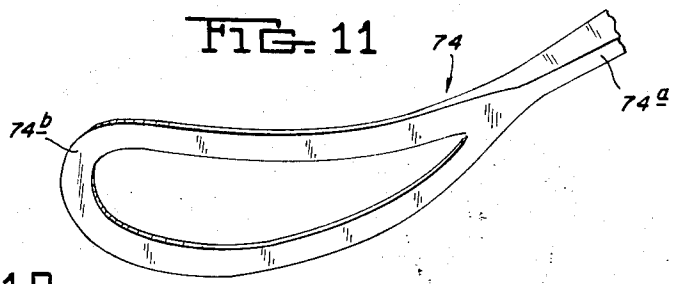

FIG. 10

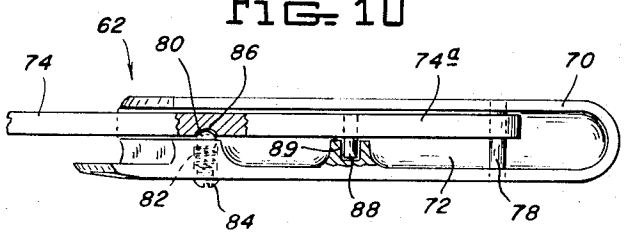

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FIG. 12

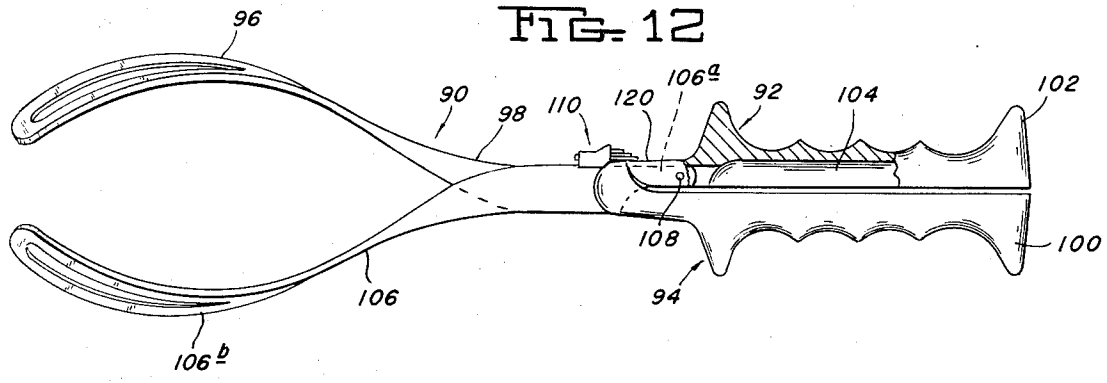

FIG. 13

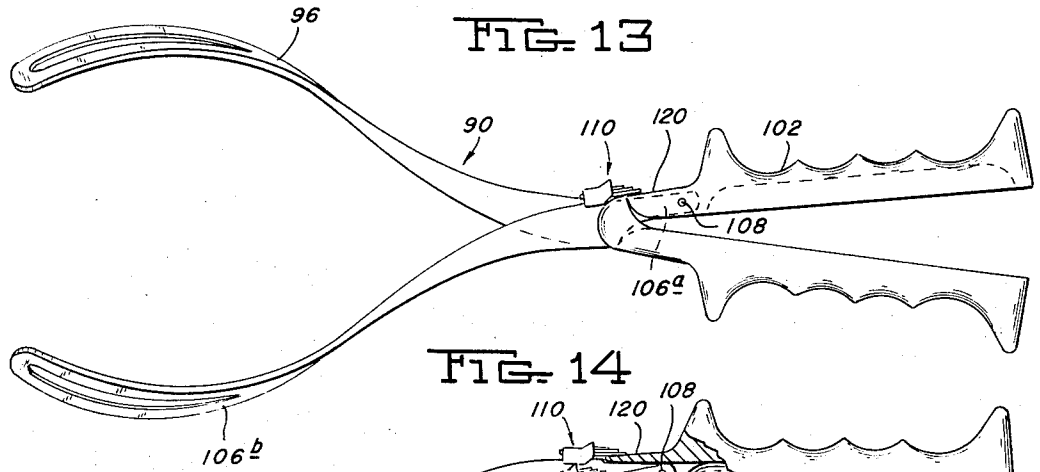

FIG. 14

FIG. 15

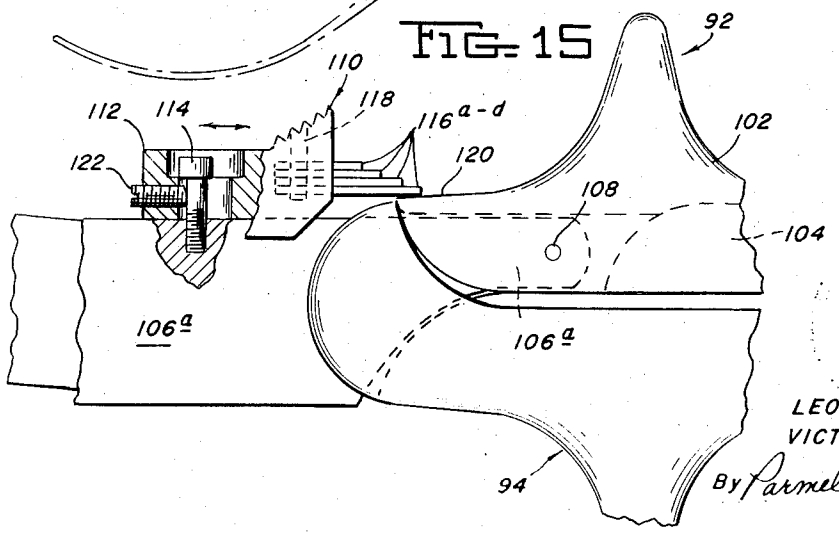

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FIG. 16

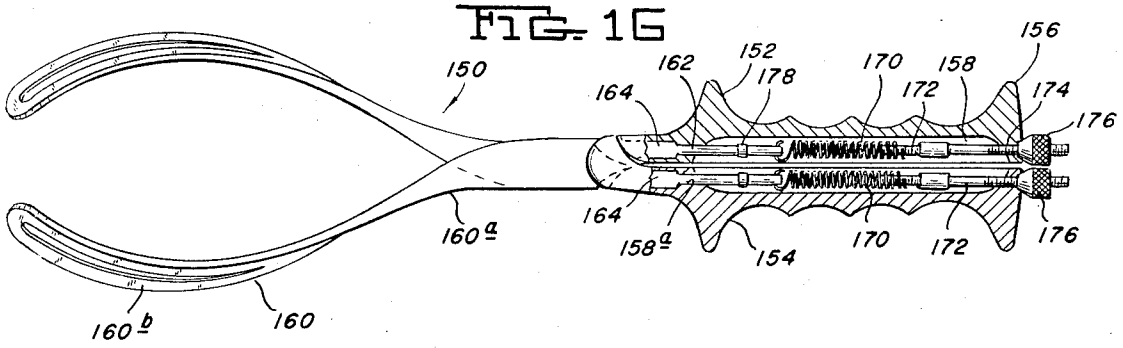


FIG. 17

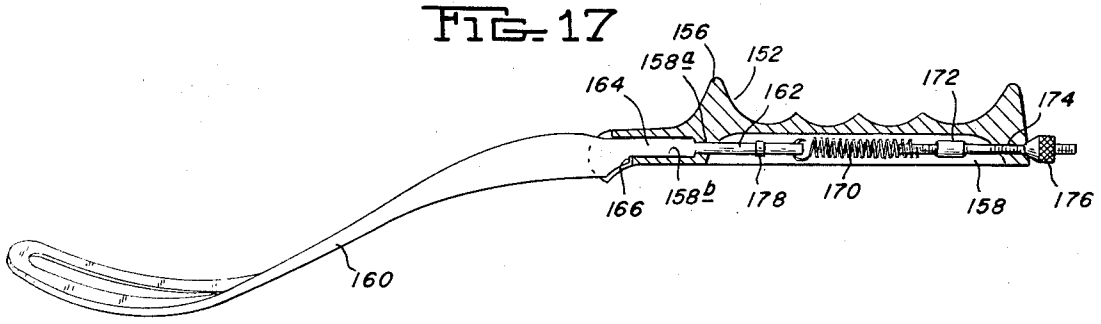


FIG. 18

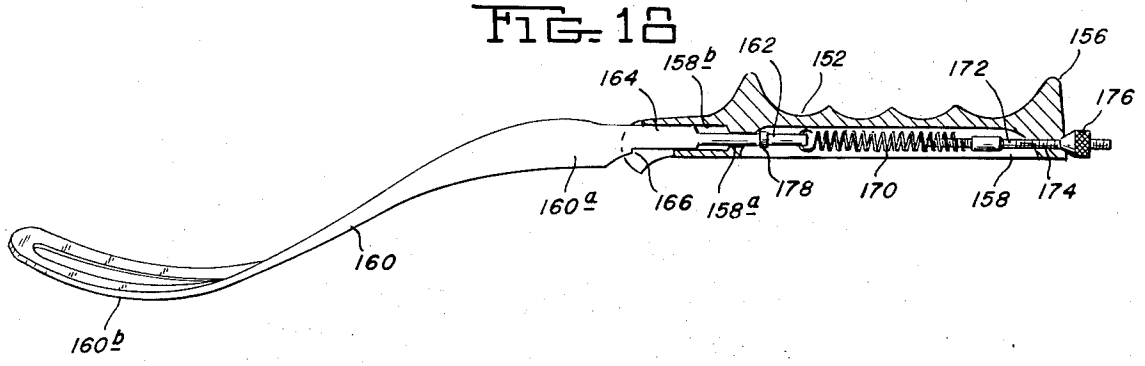
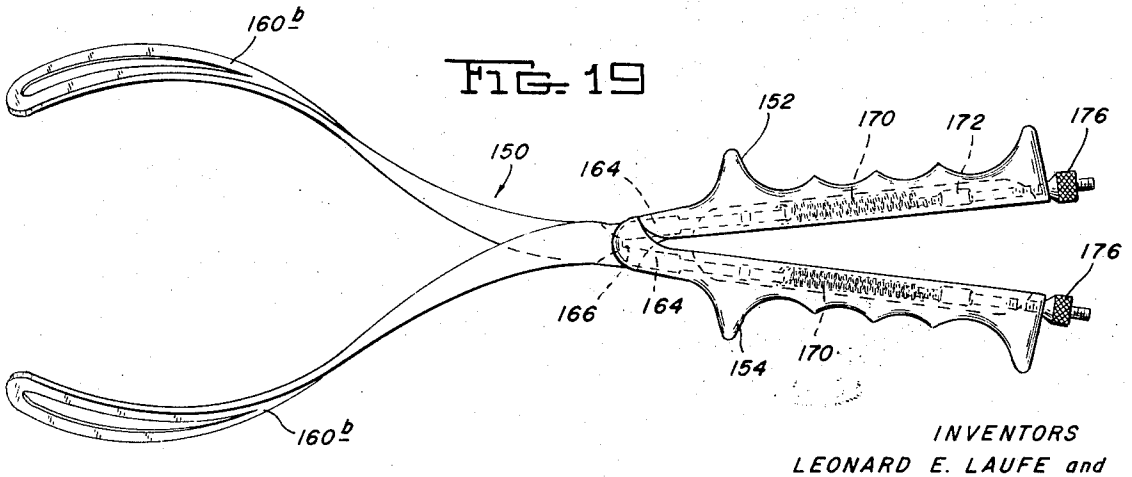


FIG. 19



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OBSTETRICAL FORCEPS

This invention relates to obstetrical forceps for use in assisting the delivery of a baby, and more particularly to improved obstetrical forceps that will prevent injury to the mother and baby due to excessive forces being applied to the baby when using the forceps.

It is common practice for obstetricians to use obstetrical forceps in assisting the delivery of a baby. Most of the obstetrical forceps used are the crossed or scissor type having crossed branches or shanks with pivot locks located at an intermediate point along the shanks. The crossed forceps act as a first class lever, and by virtue of the nature of the first class lever, any compressive force applied at the handles is transmitted to the fetus-engaging blades and thus to the fetal head itself. Many babies, delivered with the aid of forceps, have been clearly externally injured, and possibly internally injured, although it has not been actually determined whether, and to what extent, internal injury has been caused.

Very little concern has been shown up to the present time with the degree of force applied to the fetus by using forceps to assist delivery and to the real physical damage caused by improper use of the forceps. Early investigations by one Kristeller in 1861 shows that an average traction force of around 35 pounds was applied to the forceps used in those days. Other later investigations showed average traction forces to be higher than 35 pounds. Recently investigations have considered the compressive forces acting on the fetus, but have not fully considered the damaging effect of compression forces on the fetus. It has been recently determined that peak traction forces of 50 pounds and higher and peak compression forces of 8 pounds and higher are applied to the forceps. It has also been determined that there is a correlation between the magnitude of the traction force on forceps and the magnitude of compressive force applied to the fetal head. Repeated test results showed that the total compressive force from a crossed forceps is about 25 percent of the total traction force, and that the total compressive force on divergent forceps is about 18 percent of the total traction force. It has also been found that the peak compressive force from a crossed forceps is about 10 percent of the peak traction force. Total compression and traction force are the average forces multiplied by the amount of time those forces are applied, while peak compression and traction forces are those which are momentary forces applied to the forceps. Studies are being currently conducted to determine the actual internal damage on the newborn babies due to the use of forceps. It is, however, strongly felt that internal damage does result to the baby from excessive compressive force and should be avoided.

One way of avoiding damage to the fetal head is to decrease the compressive force acting on the fetal head through the forceps. Divergent forceps of the type described in U.S. Pat. No. 3,550,595, issued to Leonard E. Laufe, co-inventor of the present invention, achieve a reduction in the total compressive force acting on the fetal head. As was noted earlier, the total compressive force applied with divergent forceps is around 18 percent of the total traction force as compared with 25 percent for crossed forceps. Nothing, however, has been done to control the compressive force applied to the fetal head by use of the crossed-type forceps. The

present invention provides an obstetrical forceps which, although it does not actually limit the compressive force applied through the forceps to the fetal head, signals or indicates to the user of the forceps that a known compressive force on the fetus has been exceeded. Thus, the user could reduce the traction and compressive forces on the forceps and thereby avoid injury to the fetus. More particularly, we provide obstetrical forceps which preferably comprise: a pair of elongated members, each of which has a fetal engaging blade portion at one end thereof and a handle portion at the opposite end, the members being pivotably connected with each other and freely movable with respect to each other when so connected; connection means in at least one of the members mounting the blade portion thereof in a limited shiftable relationship with the handle portion thereof; and biasing means for holding the shiftable blade in an axially aligned position with respect to the handle, with the biasing means being constructed and arranged to impart a predetermined holding force on the blade for holding the respective blade and handle together whereby when a force greater than and opposite in direction to the holding force is applied to the shiftable blade, as during use of the forceps to assist delivery of a baby, the blade will shift its position relative to the handle. Thus, when too great a traction and/or compressive force is applied to a fetal head and the shiftable blade changes its position, the obstetrician will readily observe the shift and ease up on the traction and compressive forces. In the preferred embodiment the biasing means is arranged such that either peak compressive force or peak traction force greater than the holding force will result in a shift in the blade. The present invention does, however, contemplate biasing means arrangements whereby a certain total compressive or traction force would have to be exceeded before the blade would shift. In one embodiment of the present invention, a blade shift indicator in the form of a finger is incorporated with the shiftable blade, and when the blade shifts, the finger would be readily observed by the obstetrician, signalling the shift to him. A typical holding force for a biasing means in the embodiment of the invention where the blade portion is pivotably mounted to the handle would be around 8 pounds whereby a peak compressive force of 8 pounds acting on the tip of the blade will cause the blade to shift. In another embodiment, the blade portion is axially movable with respect to the handle, and in this case a typical holding force for the biasing means would be around 50 pounds whereby a traction force of above 50 pounds applied to the forceps would result in the blade shifting axially with respect to the handle. The 50 pound peak traction force would produce a peak compressive force in a crossed-type forceps of about 5 pounds. Provision is also made in certain of the embodiments of this invention for selectively adjusting the biasing means to vary the holding force as desired.

Other details and advantages of the present invention will become apparent as the following descriptions of certain present preferred embodiments thereof proceed.

In the accompanying drawings, we have shown certain present preferred embodiments of this invention in which:

FIG. 1 is a sectional view through a maternal pelvis showing outlet obstetrical forceps embodying the present invention as being used to assist fetal delivery;

FIG. 2 is a plan view showing the forceps of FIG. 1 engaging the fetal head;

FIG. 3 is an enlarged plan view of the forceps of FIGS. 1 and 2 shown in a closed disposition;

FIG. 4 is a plan view, partly in section of one member of the forceps of FIG. 3, showing the details of construction of the shiftable blade and handle portions thereof, with the blade and handle being in an axially aligned relationship with respect to each other;

FIG. 5 is a view similar to that of FIG. 4 showing the blade shifted with respect to the handle;

FIGS. 6 and 7 are plan views, partly in section, of one member of an obstetrical outlet forceps embodying another form of the present invention, and showing, respectively, the shiftable blade axially aligned with the handle and shifted relatively to the handle;

FIG. 8 is a plan view, partly in section, of an obstetrical outlet forceps in the closed disposition showing yet another embodiment of the present invention;

FIG. 9 is a plan view of one member of the forceps of FIG. 8 showing, in solid line, the shiftable blade aligned with the handle and, in phantom outline, the blade shifted relative to the handle;

FIG. 10 is an enlarged side elevation view of the handle end of the member of FIG. 9 showing further details of construction;

FIG. 11 is a partial perspective showing the blade end of the member of FIG. 9;

FIG. 12 is a plan view, partly in section, of an obstetrical outlet forceps in the closed disposition showing still another embodiment of the present invention;

FIG. 13 is a plan view of the forceps of FIG. 12 shown in an open disposition;

FIG. 14 is a plan view, partly in section, of one member of the forceps of FIG. 12 showing, in solid line, the shiftable blade aligned with the handle and, in phantom outline, the blade shifted relative to the handle;

FIG. 15 is an enlarged plan view, partly in section, of a portion of the forceps of FIG. 12, and particularly the biasing means thereof, showing further details of construction;

FIG. 16 is a plan view, partly in section, of an obstetrical outlet forceps in the closed disposition showing yet another embodiment of the present invention;

FIGS. 17 and 18 are plan views, partly in section, of one member of the forceps of FIG. 16 showing, respectively the shiftable blade portion thereof aligned with the handle portion and shifted with respect to the handle portion; and

FIG. 19 is a plan view of the forceps of FIG. 16 shown in an open disposition.

Referring now to the drawings, and particularly to FIGS. 1–5, there is shown an outlet obstetrical forceps 10 embodying one form of the present invention and shown engaging a fetal head for assisting delivery. The forceps 10 include a pair of elongated branches or members 12 and 14 pivotably connected to each other at an intermediate position along the lengths of the members to form what is commonly known as a cross-type forceps. The pivotable connection between the members 12 and 14 comprises interlocking joints 18 and 20 of any well known construction to permit free pivotable movement between the members while allowing free separation of the members without the necessity of unbolting or unscrewing parts. Member 14 comprises a blade portion 22 rigidly fixed to a handle portion 24. Blade portion 22 comprises a straight shank 22*a* and a smoothly curved blade 22*b* fixed to the shank. The blade 22*b* is smoothly curved for engaging a fetal head in the manner shown. Handle portion 24 is provided with the usual contoured finger gripping surface for facilitating gripping by a hand.

Member 12 includes a handle portion 26 shaped to complement handle portion 24 and together to form a complete handle for gripping by an obstetrician. Handle portion 26 has a cup-shaped hollow section 28 formed on the inside portion thereof and extending longitudinally of the handle from adjacent the right end thereof, as viewed in the figures, through the left end thereof. Member 12 also includes a blade portion 30 having a shank 30*a* and a smoothly curved blade 30*b*, both shaped to complement the corresponding parts of member 14. Blade portion 30 is pivotably connected to handle portion 26 by means of a pivot pin 31 extending through shank 30*a* and the left end section of handle portion 26. Blade portion 30 also includes an extension piece 32 extending longitudinally from shank 30*b* into hollow section 28. Extension piece 32 is formed in an offset manner as shown in FIG. 4 such that it is spaced from the interior wall portion of hollow section 28 when the blade portion 30 and handle portion 26 are axially aligned. When the blade portion 30 is pivotably moved or shifted relative to the handle portions 26 the extension piece 32 will abut the interior surface of hollow section 28 thereby to limit the extent of movement between the blade portion and handle portion. The blade portion 30 is held in axial alignment with handle portion 26 by biasing means in the form of a curved spring clip 34 held to the interior surface of the hollow section 28 of handle portion 26 by a block 36 held on the surface of handle portion by a bolt 38. Spring clip 34 is suitably designed to provide the needed holding force for maintaining axial alignment between the blade portion 30 and handle portion 26. When a compressive force is applied to the blade portion 30 as when a fetus is engaged by the complete forceps 10 and being given a compressive and traction force, and the compressive force on the blade portion 30 exceeds the holding force of spring clip 34 the blade portion 30 will break away from the spring clip 34 and pivotably shift with respect to handle portion 26. The holding force of spring clip 34 is selected so that the compressive force applied to the fetus will not result in physical injury to the fetus and could be around 8 pounds. The holding force could, however, be varied between about 6 and 11 pounds. The most desireable force will ultimately be determined as data is obtained in the studies being conducted, to ascertain the internal injuries to babies caused by the high compressive forces acting on the fetal head. The holding force may be selectively varied by adjusting the position of spring clip 34 simply be repositioning block 36, and locking it in place by tightening bolt 38.

A signal or indicating means is provided for indicating to the user that the blade portion 30 has shifted with respect to the handle portion 26. The indicating means is in the form of a finger 38, fixed to and extending transversely from the free end portion of extension piece 32. The finger 38 fits into an opening 40 extending transversely through handle portion 26. The finger 38 is sized so that it is slightly below the outer surface of handle portion 26 when the blade portion 30 is axially aligned with the handle portion. Thus, when the blade portion 30 pivotably shifts in relation to handle

portion **26**, the finger **38** will extend out of opening **40** as shown in FIG. **5**. Finger **38** will be exposed to thereby indicate to the obstetrician that a shifting has occurred. If the shifting or misalignment between the blade portion **30** and handle portion **26** occurred with the forceps in use, the obstetrician will see the extended finger **38** and know to relieve the compressive and traction forces being applied to the forceps. It should, however, be noted that the indicating means is merely an aid to signalling a shift between the blade portion **30** and handle portion **26**, and not an absolute necessity since any shift will be felt and heard, and readily observed while the forceps are being used. Any misalignment prior to use of the forceps will more than likely be observed, with a routine established to check the forceps for alignment prior to use.

FIGS. **6** and **7** show another embodiment of the present invention. FIGS. **6** and **7** show one member of a forceps identical in all respects with the forceps of FIGS. **1–5** except for the signal or indicating means for indicating a shift between the blade portion and handle portion. In other words, the member **12'** of FIGS. **6** and **7** is identical to member **12** of FIGS. **1-5**, in that it has a blade **30'***a*, shank **30'***b*, extension piece **32'**, handle portion **26'**, hollow section **28'**, spring clip **34'**, block **36'**, and bolts **38'**. The indicating means of member **12'** is in the form of a finger **50** fixed to the left hand portion of extension piece **32'** and extending transversely to abut the left protrusion **52** of the handle portion **26'** in the manner shown. In FIG. **6** the blade portion **30'** is axially aligned with the handle portion **26'** and the finger **50** mates with the left protrusion **52** of the handle portion to form a continuous uninterrupted surface. In FIG. **7**, the blade portion **30'** is shown shifted with respect to the handle portion **26'** whereby the continuity between finger **50** and protrusion **52** will break to indicate the shift.

FIGS. **8–11** shows another embodiment of the present invention. FIG. **8** shows obstetrical outlet forceps **60** in the closed disposition. The forceps **60** include elongated members **62** and **64** pivotably connected to each other at an intermediate point thereof by interlocking joints of basically the same design as that shown in the earlier described embodiments. Member **64** has a blade portion **66** having a contoured fetal engaging blade **66a** fixed to a shank **66b** which in turn is rigidly fixed to a handle portion **68**. Member **62** includes a handle portion **70** having a hollow section **72** extending from within the right end portion thereof through the left end thereof. Member **62** also includes a blade portion **74** having a contoured fetal engaging blade **74***a* fixed to a shank **74***b* which in turn extends into hollow section **72** and is pivotably connected at its free end portion to handle portion **70** by a pivot pin **78** passing through the lateral walls of the hollow section. Thus, member **62** is pivotably movable or shiftable with respect to handle portion **70**.

Blade portion **74** is held in axial alignment with handle portion **70** by a biasing means in the form of a ball detent which, as clearly shown in FIG. **10**, includes a ball member **80** positioned in a cylindrical opening formed in an interior portion of the handle, with ball member **80** being biased out of the opening by a helical compression spring **82**, both ball and spring being held in position by an adjusting screw **84**. The ball member **80** fits into a detent **86** of shank **74***b*. The holding force on the ball member **80** and imparted to the blade portion **74** is sufficient to hold the member **62** and handle portion **70** in axial alignment until such time as a compressive force of such magnitude is applied to the blade **74***a*, as during the use of the forceps to assist delivery, to overcome the holding force, at which point the blade portion **74** will pivotably move or shift with respect to handle portion **70**. The holding force on the member **62** may be selectively varied within limits by tightening or loosening adjusting screw **84**. The degree of movement between blade portion **74** and handle portion **70** is limited by a pin **88** fixed in the wall of the handle portion and slidably received in a slot **89** formed on the surface of shank **74***b*, as shown in FIG. **9**.

FIGS. **12–15** illustrate still another embodiment of the present invention. The forceps **90** shown in the figures are similarly constructed to the forceps **60** of FIGS. **6–11**. Thus, forceps **90** include a pair of elongated members **92** and **94** pivotably interconnected at an intermediate point thereof, with member **94** having a blade **96** fixed to a shank **98** which in turn is fixed to a handle portion **100**. Member **92** includes a handle portion **102** with a hollow section **104**, and a blade portion **106** having a blade **106a** fixed to a shank **106b** which extends into the left side portion of hollow section **104** and is pivotably connected by pivot pin **108** to handle portion **102**. Blade portion **106** is held in axial alignment with handle portion **102** by a biasing means in the form of a spring clip **110**, clearly shown in FIG. **15**, including a main housing **112** maintained in position on shank **106***b* by an adjusting screw **114**. Four leaf springs **116***a –d* of progressively longer lengths are fixed in housing **112** by a pin **118**. The springs **116***a –d* extend outwardly of the housing such that the longest and lowermost spring **116** *d* engages the free or left end of tab **120** at the left end of handle portion **102**. The springs **116***a –d*, thus, impart a holding force holding blade portion **106** axially aligned therewith. The holding force may be selectively adjusted within limits by positioning housing **112** along shank **106***b* as desired. A set screw **122** is provided in the left end of housing **112** to engage adjusting screw **114** and limit the positioning of housing **112** on shank **106***b*. As in the earlier described embodiments, when a compressive force is imparted to blade **106***a*, greater than the holding force of springs **116***a–d*, as when using the forceps **90** to assist delivery of a baby, the blade portion **106** will break away from handle portion **102**, as shown in phantom outling in FIG. **14**.

FIGS. **16–19** show yet another embodiment of the present invention. The forceps **150** shown in the figures include a pair of similarly constructed complementary shaped elongated members **152** and **154** pivotably interconnected at an intermediate point thereof, by a well known pivot lock connection. In this embodiment, both elongated members **152** and **154** have blade portions shiftable with respect to their respective handle portions although it would be possible to have only one of the members provided with a shiftable blade portion. Since both members **152** and **154** are similarly constructed, only the details of member **152** will be described with it being understood that the description pertains also to member **154**. Member **152** includes a handle portion **156** with a hollow section **158** extending from adjacent the right end of the handle, as viewed in the left end thereof. Member **152** also includes a blade portion **160** having a contoured fetal engaging blade **160***a* integrally fixed to a shank **160***b*. Shank **160***b* has

a rod shaped right end section **162** which is slidably received in a bore **158***a* forming part of the left hand portion of hollow section **158.** Shank **160***b* also includes a generally rectangular cross-section shaped intermediate section **164** which is slidably received in a similarly shaped pasageway **158***b* forming the remainder of the left hand portion of hollow section **158.** The rectangular shapes of intermediate section **164** and passageway **158***b*, thus, prevent rotation of the blade portion **160** relative to handle **156** when the blade portion and handle are joined to each other. A shoulder **166** is formed on the left portion of intermediate section **164,** which shoulder is shaped to abut the left end of the wall of handle **156** as clearly shown in FIGS. **16** and **17.** Shoulder **166** thus serves as a stop member for the reciprocal movement of blade portion **160** into the hollow section **158** of handle portion **166.** The blade portion **160** is held in axial alignment with blade portion **156** by means of a helical coil compression spring **170** fixed at one end thereof to the free end portion of rod section **162** of shank **160***b*. The other end of spring **170** is fixed to an elongated threaded adjusting screw **172** received in a passageway **174** extending through the right end of handle **156** to communicate with hollow section **158.** The adjusting screw **172** has a knurled, interiorly threaded head **176** received on the outer end thereof. The screw **172** is arranged with respect to spring **170** in such a manner that turning of head **176** will increase or decrease the compression force of the spring depending on which direction the head **176** is turned. By varying the compression force of spring **170,** the holding force for keeping the blade portion **160** axially aligned with handle portion **156** is varied. A typical holding force for the blade portion **160** would be about 50 pounds which, as noted earlier, would be equivalent to a peak compression force of around 5 pounds applied to the forceps. Thus, when a traction force greater than 50 pounds is applied to the forceps, the blade portion **160** will shift to the left with respect to handle portion **156,** as is illustrated in FIG. **18.** It should be understood, however, that the holding force for blade portion **160** could be set at any desired magnitude as between 40 and 80 pounds. As in the case of the compression forces of the earlier described embodiments, the most desireable traction holding force of the forceps of FIGS. **16–19,** will ultimately be determined as data is obtained in the studies being conducted to ascertain the internal injuries to babies caused by improper use of forceps.

To prevent the blade portion **160** from shifting too far to the left, the spring **170** should have an outer diameter greater than the diameter of bore **158***a*.

Various modifications could be made for forceps embodying the present invention, as those skilled in the art would readily recognize. For example, biasing arrangements could be provided with a time delay mechanism so that a total compressive or traction force (i.e., a force acting for a predetermined time period) would have to be exceeded before the shiftable blade would shift. Those skilled in the art would also recognize that divergent forceps could be adapted to incorporate the essence of this invention. It is considered, however, that divergent forceps would not require shiftable blades since the compressive force applied to a fetal head is much less than the compressive force applied with crossed-type forceps.

While we have shown and described certain present preferred embodiments of this invention, it is to be distinctly understood that the invention is not limited thereto, but may be otherwise variously embodied within the scope of the following claims.

We claim:

1. Obstetrical forceps comprising: a pair of elongated members, each of which has a fetus-engaging blade portion at one end thereof and a handle portion at the opposite end thereof, said members being pivotably connected with each other intermediate their ends and freely movable with respect to each other when so connected; connection means in at least one of said members mounting the blade portion thereof in a limited shiftable relationship with the handle portion thereof; biasing means for holding the shiftable blade portion in an axially aligned position with respect to the handle portion connected thereto, with said biasing means including means for imparting a predetermined holding force on the blade portion for holding the respective blade and handle portion in axial alignment until a force greater than and generally opposite in direction to said holding force is applied to the shiftable blade portion, as during use of the forceps to assist delivery of a baby, the shiftable blade portion will shift its position relative to the handle portion connected thereto.

2. The obstetrical forceps as set forth in claim **1,** wherein said biasing means includes means for selectively varying said holding force.

3. The obstetrical forceps as set forth in claim **1** including indicating means for indicating to the user of the forceps when the shiftable blade portion has shifted due to said holding force being exceeded on the shiftable blade portion.

4. The obstetrical forceps as set forth in claim **1** wherein said connection means pivotally mounts the shiftable blade portion to the handle portion connected thereto.

5. The obstetrical forceps as set forth in claim **1** wherein said connection means mounts the shiftable blade portion to the handle portion connected thereto in such a manner that the blade portion is shiftable axially with respect to the handle portion.

6. Obstetrical forceps comprising:

a pair of elongated members, each of which has a fetus-engaging blade portion at one end thereof and a handle portion at the opposite end thereof, said members having interlocking pivot portions disposed between their respective blade and handle portions for pivotably connecting the members to each other whereby the members are freely movable with respect to each other when they are so connected;

connection means in at least one of said members mounting the blade portion thereof in a limited shiftable relationship with the handle thereof;

biasing means for holding the shiftable blade portion in an axially aligned position with respect to the handle portion connected thereto, with said biasing means including means for imparting a predetermined holding force on the blade portion for holding the respective blade and handle portions in axial alignment whereby when a force exceeding and generally opposite in direction to said holding force is applied to the shiftable blade portion, as during use of the forceps to assist delivery of a baby, the shiftable blade portion will shift is posi-

tion relative to the handle portion connected thereto.

7. The obstetrical forceps as set forth in claim 6 whereby said connection means pivotably mounts the shiftable blade portion to the handle portion connected thereto.

8. The obstetrical forceps as set forth in claim 6 wherein said connection means mounts the shiftable blade portion to the handle portion connected thereto in such a manner that the blade portion is shiftable axially with respect to the handle portion.

9. The obstetrical forceps as set forth in claim 6 including indicating means for indicating to the user of the forceps when the shiftable blade portion has shifted due to said holding force being exceeded on the shiftable blade portion.

10. The obstetrical forceps as set forth in claim 7 wherein said connection means pivotably mounts the shiftable blade portion to the handle portion at the forward end portion of the handle portion; the handle portion having a hollow section intermediate its ends; the shiftable blade portion having an extension piece extending longitudinally with respect to said blade portion from the pivot connection into said hollow section; said biasing means being a spring clip member disposed within said hollow section to engage the end portion of the extension piece.

11. The obstetrical forceps as set forth in claim 10 including indicating means in the form of finger member fixed to the extension piece and extending transversely towards the handle portion whereby said finger member will move with the shiftable blade portion to indicate such movement to the user of the forceps.

12. The obstetrical forceps as set forth in claim 7 wherein said biasing means is a spring member mounted on the shiftable blade portion and engaging the handle portion.

13. The obstetrical forceps as set forth in claim 10 wherein said spring clip member is selectively adjustable in its relative position with respect to the extension piece whereby the holding force on the shiftable blade portion is selectively variable.

14. The obstetrical forceps as set forth in claim 7 wherein the handle portion connected thereto the shiftable blade portion has a hollow section extending from the forward end thereof to an intermediate position of the handle portion; said connection means pivotably mounts the shiftable blade portion to the handle portion at a point within the hollow section; said biasing means is a spring urged ball-detent mounted in the handle portion and engaging an area of the shiftable blade portion within the hollow section.

15. The obstetrical forceps as set forth in claim 11 wherein the handle portion connected thereto the shiftable blade portion has a opening transversely therethrough to communicate with said hollow section, said opening being adjacent the free end of said extension piece; said finger member being fixed to the free end portion of said extension piece and extending into said opening, with said finger member being below the surface of the outer surface of the handle portion when the shiftable blade portion and handle portion are axially aligned and extending outwardly of said surface when the shiftable blade portion shifts.

16. The obstetrical forceps as set forth in claim 6 wherein the handle portion connected to the shiftable blade portion has a hollow section extending from one end thereof to adjacent the other end; said connection means is a portion of said hollow section shaped to receiprocally, slidably receive the free end of the shiftable blade portion; said biasing means is a spring fixed at one end to the shiftable blade portion and at the other end to the handle portion, whereby when a traction force greater than and generally opposite in direction to the holding force of the spring is applied to the shiftable blade portion, as during use of the forceps to assist delivery of a baby, the shiftable blade will axially shift its position relative to the handle portion.

17. The obstetrical forceps as set forth in claim 16 wherein both blade portions are arranged to axially shift with respect to their handle portions.

18. The obstetrical forceps as set forth in claim 16 wherein said shiftable blade portion includes stop means for limiting the reciprocal movement of the blade portion into and out of the hollow section of the blade portion.

19. A blade member forming one half of an obstetrical forcep with a mating blade member comprising: an elongated fetus-engaging blade portion at one end thereof and an elongated handle portion at the opposite end thereof; an interlock member for pivotable connection of the blade member with another mating blade member intermediate their ends; connection means mounting the blade portion; biasing means for holding the blade portion in an axially aligned position with respect to the handle portion, with the biasing means including means for imparting a predetermined holding force on the blade portion for holding the respective blade and handle portion in axial alignment whereby when a force greater than and generally opposite in direction to said holding force is applied to the blade portion, as when the blade member is being used in a forceps to assist delivery of a baby, the blade portion will shift its position relative to the handle portion away from the mating blade member.

20. The blade member as set forth in claim 19 wherein said biasing means includes means for selectively varying the holding force.

21. The blade member as set forth in claim 19 wherein said connection means pivotably mounts the blade portion to the handle portion.

22. The blade member as set forth in claim 19 wherein said connection means mounts the blade portion to the handle portion in such a manner that the blade portion is shiftable axially with respect to the handle portion.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,789,849 Dated February 5, 1974

Inventor(s) Leonard E. Laufe, et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 8, last line, "is" should read --its--.

Column 9, line 44, "thereto" should read --to--.

Column 9, line 54, "thereto" should read --to--.

Column 9, line 55, "a" should read --an--.

Column 10, line 11, "receiprocally" should read --reciprocally--

Signed and sealed this 19th day of November 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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