
KIELLAND'S FORCEPS

E. PARRY JONES



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KIELLAND'S FORCEPS

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FOREWORD

THE YOUNGER generation of obstetricians, in Great Britain at least, is making increasing use of Kielland's forceps, an instrument which for many years was viewed askance and was regarded as dangerous and unnecessary. This tendency has come about largely because a few of the more enterprising teachers, reading the Continental literature and visiting foreign clinics in the decade preceding the Second World War, decided to put the instrument to an unbiased test and, finding it valuable, demonstrated it and encouraged its use among their hospital residents. Knowledge of Kielland's forceps has thus been passed on verbally one to another and has rarely been acquired by reading, for hitherto their use has not been described in detail in the English language. Verbal transmission of messages and information always leads to distortion, and in this case has inevitably led to omission, misinterpretation and misunderstanding. So it comes about that many who are already protagonists of Kielland's forceps are not fully cognizant of all the principles underlying their use, and are unaware of details of technique which are necessary to ensure both safety and efficiency. In this respect I for one plead guilty and I take this opportunity to say how much I have learned from this monograph.

Dr. Parry Jones became interested in Kielland's forceps while a senior resident in the Liverpool Maternity Hospital and set out to study the literature, and in particular the writings of Kielland himself. The results of his researches are set forth in this monograph, which also includes the first published complete English translation of Kielland's original account of his forceps. This makes it clear that Kielland was well aware that his forceps are not a means for overcoming all forms and degrees of dystocia; he intended them for use in clearly defined circumstances. Dr. Parry Jones points out the misunderstandings which led to condemnation of the instrument by previous generations of obstetricians, and the particular advantages which, despite these condemnations, are bringing back the instrument into obstetric practice.

FOREWORD

Those who have had the privilege of watching Dr. Parry Jones carry out a smooth and effortless delivery with Kielland's forceps can have no doubts about their value in the hands of one who is well informed and skilful in their application. In the course of his experience he has become aware of certain practical points which make the difference between success and failure. These, as well as the full details of the various methods of application, are now handed on to those who at present tend to use the instrument only as a last resort and then rather haphazardly and without confidence.

All obstetricians are concerned to reduce not only the maternal but the foetal risks of childbirth. So far as the foetus is concerned the dangers presented by operative delivery are almost entirely eliminated by an accurate cephalic grip of the forceps, and by skilful rather than forceful traction on a foetal head lying in the most advantageous diameter of the pelvis. The proper use of Kielland's forceps ensures that all these points are covered.

Obstetricians are also concerned at the increasing use made of caesarean section as a means of circumventing nearly all the difficulties and complications of labour. A wider and more skilful use of Kielland's forceps would not do away with the need for caesarean section in cases of frank disproportion, but it might well reduce the number of sections for less clearly defined indications, and that without increased risk to either mother or child. As always, however, it is not enough to possess a good tool, it is more important to have a good workman handling it. The object of this book, as I see it, is to indicate the secrets of good workmanship so far as Kielland's forceps are concerned.

T. N. A. JEFFCOATE

PREFACE

I HAVE been encouraged to write this monograph as a result of a personal though limited experience of Kielland's forceps in hospital practice. I began employing this instrument under the guidance of my teachers and was soon aware not only of its value in selected cases but also of some of the technical difficulties associated with its use. This led me to the literature on the subject and to the fascinating accounts of the controversies which, in the past, centred on its use and misuse. One of the difficulties was to distinguish truth from prejudice, for amongst other things it became clear that statements had been made by those who had never read, or had ignored, Kielland's own account of his instrument and its method of application.

After many years, during which Kielland's forceps received little attention in this country, it would now appear that many of the younger generation of obstetricians give it a valued place in their practice. To them this book is presented in the hope that it will elucidate some of the finer points about the instrument itself, the indications for its use and the technique of its employment. Further, as far as I can ascertain an English translation of Kielland's original article has never previously been published, and this alone seemed worth while.

There is little in this monograph which can be claimed as new, rather it is an attempt to put together in orderly form ideas and conclusions drawn from a study of the literature and from my personal experience. During the time this volume has taken to write, I have discussed the forceps with colleagues, too many to name individually. All have contributed by suggestions and criticisms, and many ideas which I have come to regard as my own may well have come first from them. To all of them I extend my thanks not only for advice but also for encouragement.

Above all I must acknowledge the inspiration of my chief, Professor T. N. A. Jeffcoate, who has given without stint the benefit of his wide experience. Lacking his help, this self-imposed task might well have become a burden.

Liverpool 1952.

E. PARRY JONES

ACKNOWLEDGMENTS

I AM greatly indebted to Mr. D. J. Kidd not only for making my illustrations suitable for reproduction and for his drawings of Christian Kielland and Tarnier, but also for his invaluable advice in all matters appertaining to the illustrations.

I owe a special word of thanks to Mr. and Mrs. W. A. Lee of the Liverpool Medical Institution and Miss E. Whelan of the Cohen Library, University of Liverpool, through whose efforts the numerous references were made readily available to me.

I wish to record my gratitude to Mr. O. V. Jones for his assistance in reading the proofs; to Dr. W. A. Jauch of Konstanz for placing at my disposal his manuscript entitled *Die Kjelland-Zange—Ein Beitrag zur Reform der Zangen-Technik* (Kielland's Forceps—an essay on the reform of the technique of forceps delivery); to Mr. M. C. Rimmer of the Holborn Surgical Instrument Company for the photograph of the production stages of Kielland's forceps; to Messrs. Jetter and Scheerer for supplying me with the measurements of the "Original Kielland" forceps; to Mr. E. Ashworth-Underwood for allowing me to use many photographs in the Wellcome Historical Museum; to the following translators: my wife—the French literature; Mr. D. E. Bowman, Dr. W. Davis, Mrs. L. Collinson, Mr. W. H. Fox, Mr. M. B. Gaffney, Mr. K. Schmidt and Miss O. Lowenthal—the German literature; Dr. D. R. Justessen—the Norwegian literature; Dr. W. Benoliol—the Italian literature; Dr. E. T. Stok—the Dutch literature; Mr. H. B. Hall—the Spanish literature; and to the many authors and publishers who have allowed me to reproduce their illustrations—these are acknowledged in greater detail under the appropriate diagrams.

I have failed to trace the publishers of Kedarnath Das' book *Obstetric Forceps—its history and evolution*. I have, therefore, taken the liberty of reproducing some of the illustrations from this monograph but have acknowledged their source in every case.

Finally I wish to acknowledge my indebtedness to the publishers for their constant courtesy, patience and efficiency.

If I have inadvertently omitted to record acknowledgment where it is due, I ask to be informed so that I may correct the error at the first opportunity.

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CHAPTER 1

HISTORICAL

CHRISTIAN Casper Gabriel Kielland, son of a Norwegian vicar, was born in Zululand on November 10, 1871.

He studied medicine at the Universitas Regia Fredrickiana, Oslo, graduating in 1899. He married in 1900 and after holding resident appointments at the Gravadal Infirmary, Lofoten and Nordland, he set up his practice in Oslo in 1902, and remained there until his death in 1941. He left two sons and a daughter.

For 7½ years he was the private assistant of Professor Brandt, the obstetrician-in-chief at the University Clinic. After this he was the private assistant of Livemedicus * Egeburg, for 5 years. It was while holding these appointments that the design of the forceps which now bear his name took shape.

In 1910 he demonstrated these forceps at the Copenhagen Rigshospital, where he remained for 3 months. From 1911-1914 he occupied the post of Deputy Medical Officer at the Fødselsstiftel, Oslo. In 1915 he was appointed to the University Clinic and by 1922 had become one of its leading obstetricians.

Although he began his annual visits to various German clinics in 1910, it was not until 1915 that he was invited by Professor Döderlein to demonstrate his forceps at the University Clinic in Munich. This was the first occasion on which Kielland received the recognition for his forceps which he had previously failed to obtain in Kristiania (Oslo), Copenhagen and Berlin.

In 1916 Kielland published his paper describing his forceps and their method of application. This paper, translated into English, appears in Appendix A.

He visited America on two occasions, in 1931 and 1939. Early in the nineteen-thirties he also visited England, where he demonstrated his forceps on a model pelvis in Queen Charlotte's

* King's Physician.

Hospital. An eye-witness describes him as an impressive personality with a ready sense of humour.

Kielland did much for obstetrics, but perhaps his most important contribution was his emphasis on the need for determining the exact position of the foetal head before attempting to apply any pattern of forceps, and his insistence on an accurate cephalic grip by the blades. He designed his forceps primarily to ensure that this latter principle could be observed under all circumstances.

It is rare for any invention to be original in every respect; that which is claimed as new today, has often been described earlier. Thus, examination of the forceps existing before Kielland's time reveals that many, if not all, of the features which make his instrument different from the classical forceps had already been introduced. It is still uncertain whether the instrument now known as Kielland's forceps was the first model he designed or whether the final pattern was only reached by stages, but knowingly or unknowingly he combined the best features of several other forceps in one instrument.

The points of similarity between Kielland's and previous patterns of forceps can be examined by considering the instrument as a whole, its major components, and its methods of application.

The forceps as a whole

Kielland's forceps are essentially straight and therefore follow the early instruments of Chamberlen and Smellie. The majority of the many forceps designed by their successors have a pelvic curve, and only a few, as for example those used by Haighton (1790), Zeigler (1850), Murphy (1860), Hewitt (1861), Lazarewitsch (1866), McFerran (1884) and Boryakovsky (1889), have been "straight" in type (Figs. 1-7). Kielland recognized that the straight forceps facilitated intravaginal "wandering" of the blades and that they permitted traction in the axis of the pelvis. This latter statement requires elaboration.

In the early days of assisted delivery, forceps were usually only employed when the head was low in the pelvis, and for this purpose a straight instrument was adequate. They proved less

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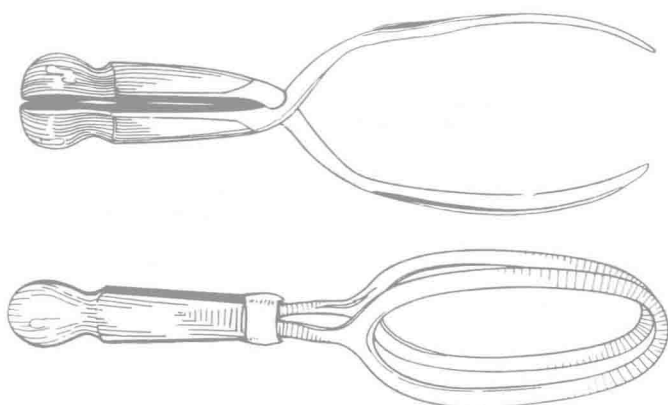


FIG. 1.—Haighton's forceps (1790).

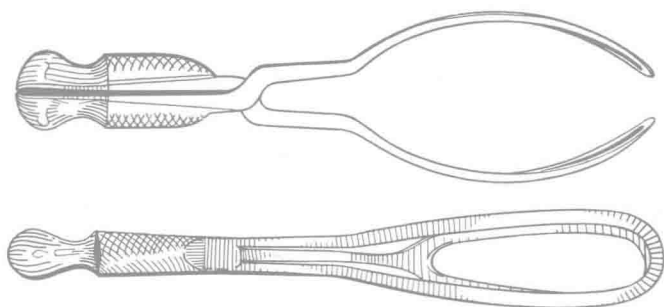


FIG. 2.—Forceps of the type known as Ziegler's, introduced in 1850.
(In the Wellcome Historical Medical Museum.)

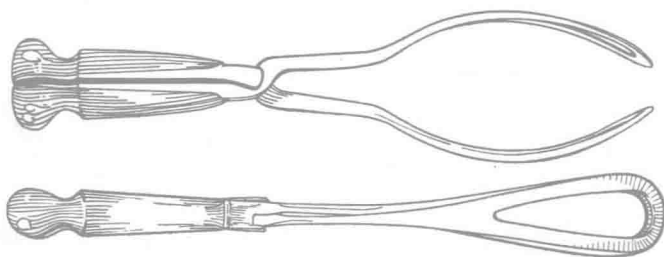


FIG. 3.—Murphy's long forceps (? 1860).

KIELLAND'S FORCEPS

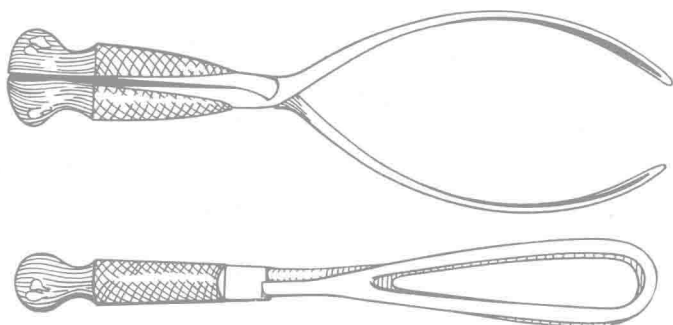


FIG. 4.—Forceps of the type known as Graily Hewitt's ordinary forceps, introduced in 1861. (*In the Wellcome Historical Medical Museum.*)

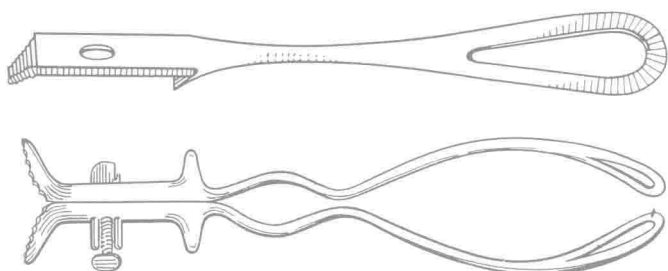


FIG. 5.—The obstetrical forceps of Lazarewitsch of Kharkoff (1866). From Mathieu's Catalogue of 1890. (*Drawn from a photograph supplied by Wellcome Historical Medical Museum.*)

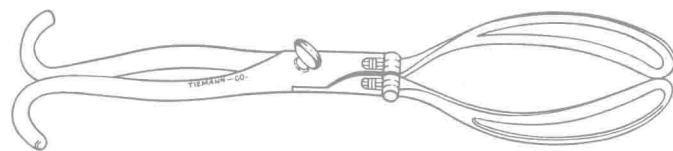


FIG. 6.—McFerran's forceps (1884). From the *American armentarium chirurgicum* of George Teimann, New York (1889). (*Drawn from a photograph supplied by Wellcome Historical Medical Museum.*)

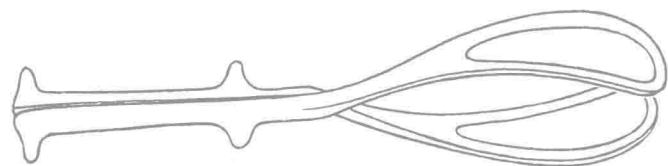


FIG. 7.—Boryakovsky's forceps (1889). (*From Das, Obstetric Forceps, The Art Press, Calcutta.*)

satisfactory when the foetal head was arrested at higher levels in the pelvis, a fact which led Pugh, Levret and Smellie to add a pelvic curve (Figs. 8-10). This, however, did not eliminate all the difficulties associated with high or mid-forceps operations and, in an effort to overcome these, various modifications were introduced. Two of them are important in this context, namely: (1) axis-traction forceps; and (2) forceps designed to lie in the antero-posterior diameter of the pelvis.

Axis-traction forceps

The object of the various axis-traction instruments is to ensure that the line of pull coincides with the pelvic axis. Any diagram illustrating the principle of axial traction has the axis of pull represented by a straight line passing from the foetal head to the traction handle (Fig. 11). In other words, a curved instrument is made to function as though it was straight. Why is this so? The only reason which appears to have been put forward is that the axis-traction apparatus reduces the amount of force needed because none is expended against the pelvic wall.

It seems probable, however, that the pelvic curve was introduced because of the obstacle presented by the perineum. The straight forceps of Smellie were abandoned because it was found that when the head was high they could not be applied correctly unless the handles were pressed against the perineum. The higher the head is in the pelvis the greater is the pressure of the forceps on the perineum and the greater the danger to its integrity—a point of particular importance when anaesthesia was unknown and the standard of surgical technique was low. It was the need to spare the patient pain during delivery and the disadvantages of poor healing of the perineum which were primarily responsible for the development of the classical pelvic curve. It is interesting to speculate whether Smellie and Tarnier would have developed their forceps if the modern advantages of anaesthesia and aseptic surgery had been available.

Now that episiotomy has become a well recognized obstetric operation without risk to the mother, the pelvic curve of the classical forceps is no longer essential.

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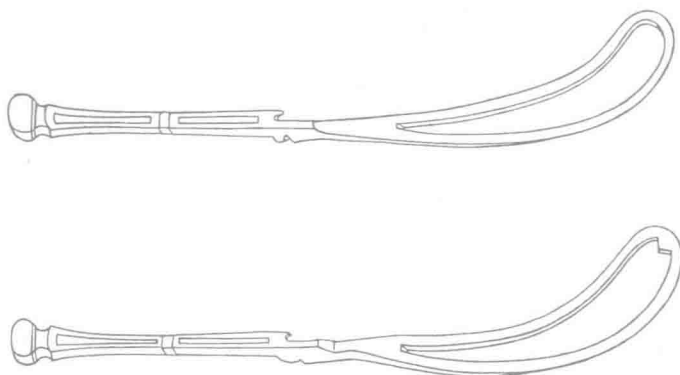


FIG. 8.—Pugh's curved forceps (1754). (*From Pugh's, A Treatise of Midwifery* (1754).

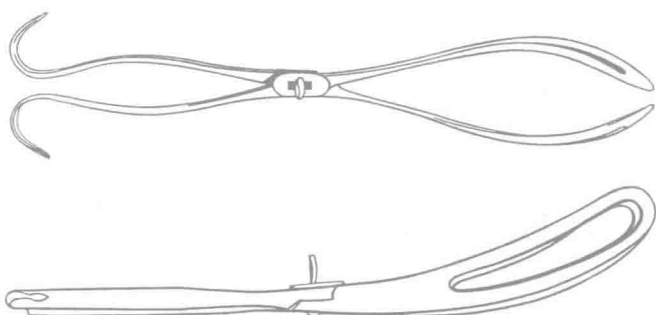


FIG. 9.—Levret's forceps (1747).

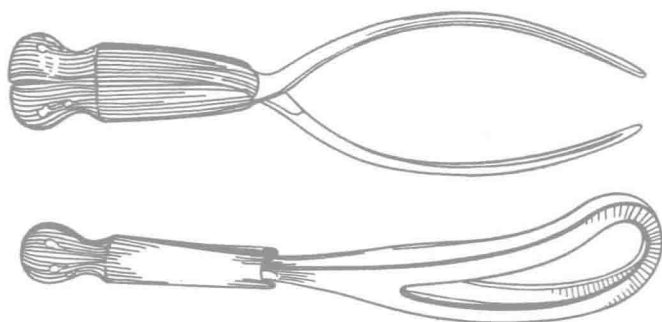


FIG. 10.—Smellie's long-curved forceps.

HISTORICAL

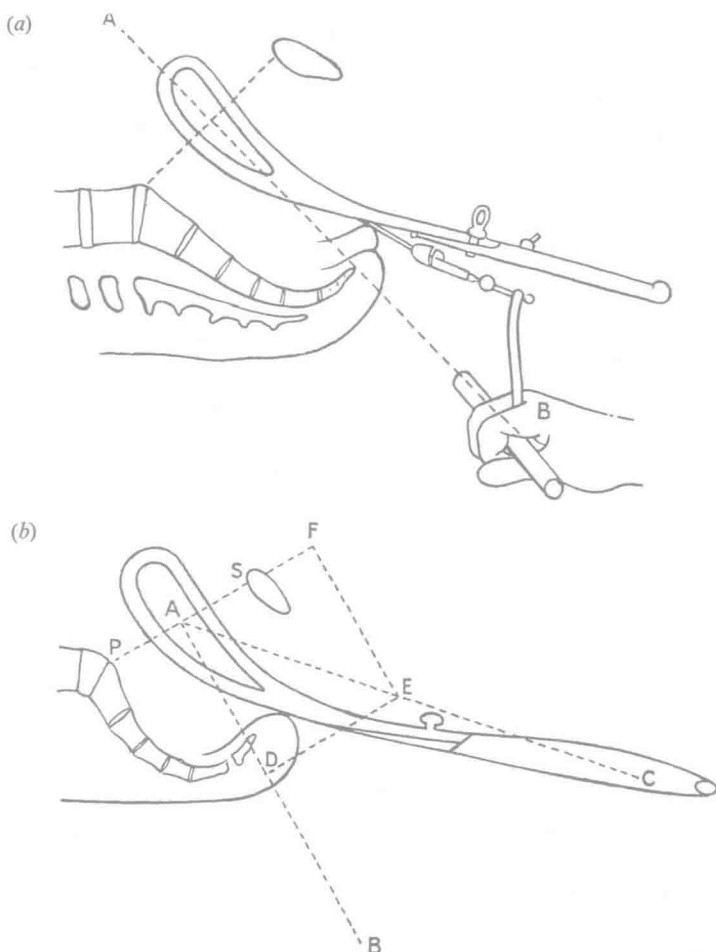


FIG. 11.—(a) Correct direction of traction AB (Tarnier's forceps).
 (b) Tarnier's diagram of the directions of traction. AC = direction of pull with classical forceps. AB = direction of pull with classical forceps with axis-traction apparatus.
 From Eastman, N. J. Williams Obstetrics, 10th ed. (1950). By courtesy of Appleton-Century-Crofts, Inc.)

Antero-posterior forceps

Although Tarnier's axis-traction apparatus was the most discussed for many years, other forceps, invented both before and after his, deserve greater appreciation than has so far been paid

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to them. In particular this is true of instruments designed for application in the antero-posterior diameter of the pelvis. Like other forceps of their day, many of these instruments were used for compression of the foetal head as well as traction. Uytterhoven (1805) was the first to invent such an instrument. Although Poulet (1881) said that it was never used, the forceps must nevertheless be regarded as the forerunner of all subsequent antero-posterior forceps. Prior to this, the foetal head when high could only be gripped and compressed in the transverse or oblique diameter of the pelvis, an application which very often resulted in an increase in that diameter of the head occupying the true conjugate. Thus difficulties were artificially increased. On the other hand, the antero-posterior forceps, when applied to the head lying transversely in the pelvis, compressed the biparietal diameter sufficiently to make delivery easier—the consequent enlargement of the sub-occipito bregmatic diameter being less important because of the relatively greater length of the transverse diameter of the pelvis.



FIG. 12.—Uytterhoven's forceps (1805). (From *Das, Obstetric Forceps, The Art Press, Calcutta.*)

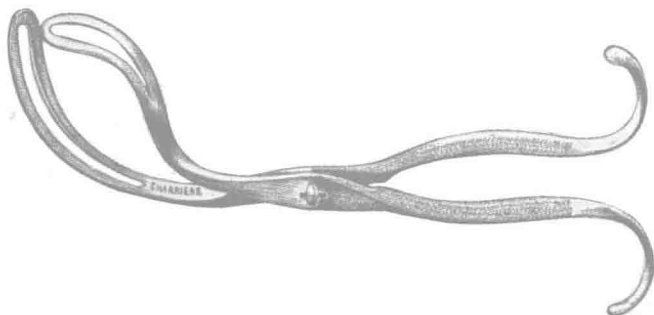


FIG. 13.—The obstetrical forceps of Baumers of Lyon (1849). (From *Gaujot and Spillman's Arsenal de la chirurgie, Paris (1872)*. (Drawn from a photograph supplied by Wellcome Historical Medical Museum.)

HISTORICAL

After Uytterhoven's forceps came those of Baumers (1849), Reid (1878), Poulet (1881), Fry (1889), Sloan (1889), Cameron (1893) and Fraenkel (1919). Those of Uytterhoven, Baumers, Sloan and Fraenkel are simple modifications of the classical forceps (Figs. 12–15), the only difference being that the blades

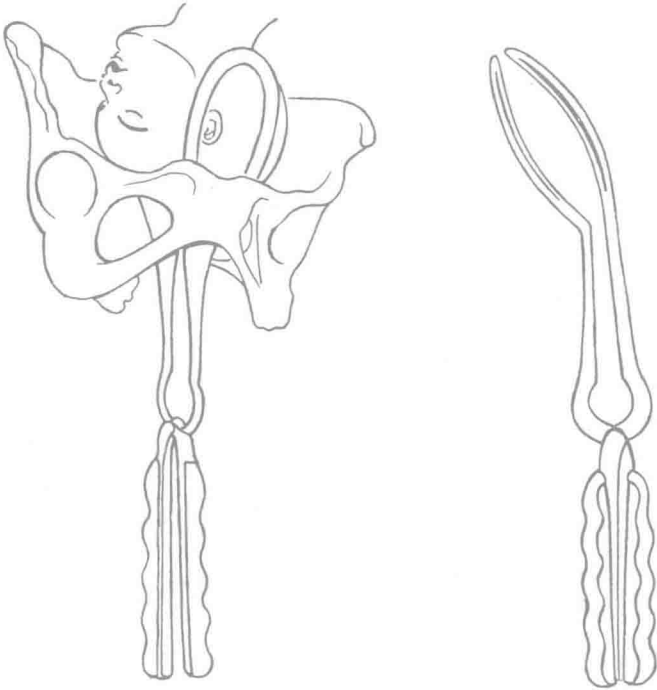


FIG. 14.—Sloan's forceps (1889). (*From Brit. med. J.* (1889), 1, 229.
By courtesy of the Editor.)

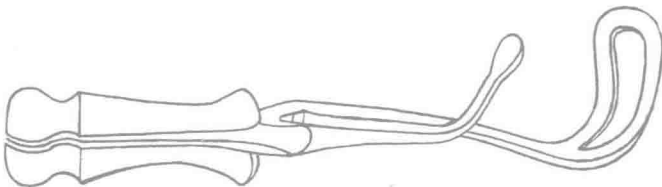


FIG. 15.—Fraenkel's forceps (1919). (*From Mschr. Geburtsh. Gynäk.*
(1919), 50, 80. By courtesy of S. Karger, Basel.)