

## A NEW VACUUM EXTRACTOR

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We have designed a new type of vacuum extractor which is made of metal, and has an exhaust hole. We believe that it has many advantages as compared with Malmstroem type and Toitsu type in following points.

- 1) It is made of whole metal, which can be easily sterilized.
- 2) The traction tube is fixed perpendicularly to the traction cup to avoid of the cup sliding off even by incorrect direction of traction.
- 3) Insertion into vagina and installation on the fetal head are easy.
- 4) It is more advantageous than others because traction and rotation of fetal head can be done simultaneously.
- 5) Protection plate is fixed by a semiscrew as compared with others in which protection plate is connected only by a chain. This assures constant and tight attachment of the cup to the fetal head.
- 6) In the presence of an hole, cup may attach to the fetal head even with the least negative pressure at the rest period. When labor pain starts again and extraction is to be done, the negative pressure may reach to the adjusted level spontaneously by gripping the traction handle. (When the handle is gripped, the exhaust hole can be closed automatically at the same time.)
- 7) Indication and condition for vacuum delivery have been also discussed.

### INTRODUCTION

Vacuum extraction delivery (V. D.) cannot entirely replace forceps delivery (F. D.) from the view point of its function<sup>(18, 24, 31)</sup>. However, it has been used not only in normal delivery but also in abnormal delivery because of its safety and technical simplicity<sup>(1, 12, 18, 19, 24, 28, 29)</sup>. Recently various types of vacuum extractor (V.E.) have been designed. They are the Con-jigou type<sup>(3, 11)</sup>, Malmstroem type<sup>(16, 17)</sup>, Finderle type<sup>(6, 7)</sup> and Gause type<sup>(9)</sup>. Among them, the Malmstroem type or its modified type and the Toitsu type are most widely used. Even the Toitsu type still has some practical problems, such as disinfection, insertion into vagina, application on the presenting part of the fetus, rotation of fetal head, negative pressure (aspiration) etc. In order to solve these problems the authors have designed a new type of vacuum extractor. The purpose of this report is to introduce this extractor

Malmström type

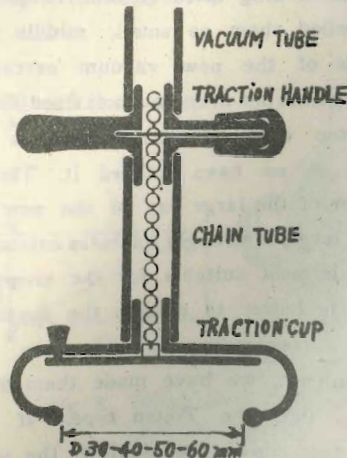


Fig. 1. Malmström type

and to express the authors' opinion on vacuum extraction with a review of the literature.

### APPARATUS AND PRINCIPLE

The structure of the apparatus is shown

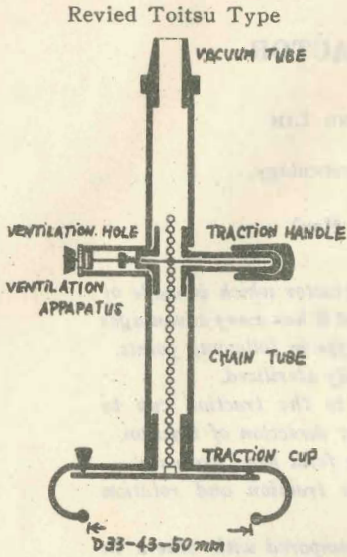


Fig. 2. Revised Toitsu Type

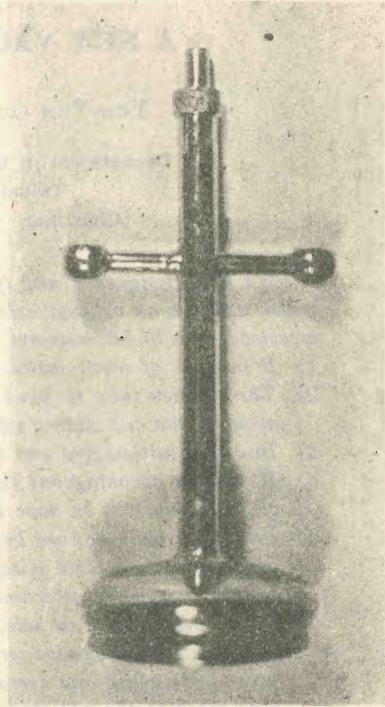


Fig. 3. Ou type

in Figs. 3, 4 and 5. The main part of the V. E. is made of metal. The special features of our V. E. are as follows:—

1. Cup. It is approximately the same in appearance as the Toitsu type, but in addition to the middle size (4.3 cm. in diameter) and large size (5.0 cm.) of the Toitsu type, we have made a king sized (5.3 cm.) cup. We have labelled them as small, middle and large size of the new vacuum extractor. Maeda<sup>(16)</sup> points out that the small sized Toitsu type is too weak to extract and is not practical, so we have omitted it. Though the caliber of the large cup of the new extractor is large, it strongly tolerates extraction and so it is most suitable for the crowning stage. It is better to change the depth of the cups corresponding to their sizes. But for convenience, we have made them 2 cm. uniformly, like the Toitsu type. If the depth of the cup is too shallow, the scalp easily contacts the bottom of the cup even by the weak negative pressure. In this instance, not only does the negative pressure fail to act on the contacted part but also the sucking force decreases by reaction, involvement of counteracting factors, therefore it is

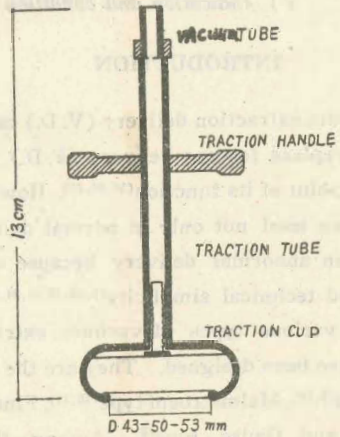


Fig. 4. Ou Type

easy to slide off. On the other hand, if the cup were too deep the negative pressure on the scalp would be considerably great, therefore the sucking force and tolerability to extraction would become stronger, but the separation between the skull and the scalp would become wider thus resulting easily in formation of hematoma. The rotation process

attached to the cup is omitted because it cannot facilitate rotation of the fetal head, and very often, contrarily cause the cup to slide off.

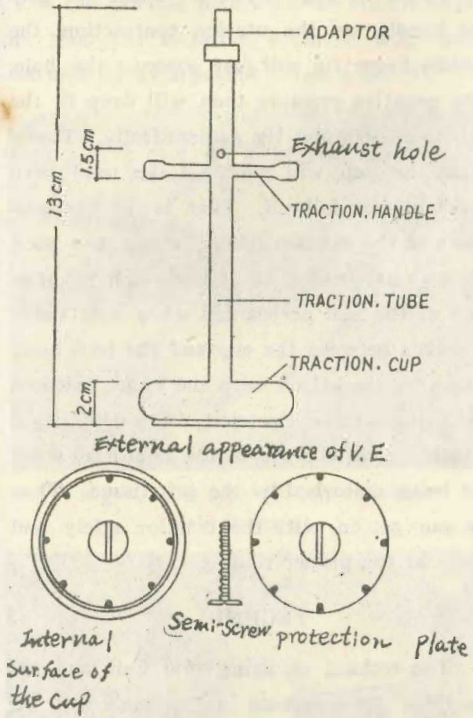


Fig. 5. Ou type

2. Protection plate. It resembles the Toitsu type in appearance, but the Toitsu type is connected with a chain and stopped by a pin. So if the stopping is not tight, it is easy to slide off. Our protection plate is fixed by a semiscrew, so it is not easy to slide off. Omitting of the protection plate was once taken into consideration but it cannot be done: when it is omitted, the tip of the extracted scalp will be sucked into the hole at the bottom of the cup and consequently block the exhaust hole resulting in decrease of negative pressure and then facilitating the sliding of the cup. The protection plate will assure increase of pressure acting on the presenting part of the fetus before the surrounding space of the protection plate is obstructed by the soft tissue. Consequently

the sucking force becomes strong and the cup is difficult to slide off.

3. Traction Tube. The aspiration tube, from the cup to the connecting joint of rubber, is called traction tube. The Toitsu type is made of soft silicon tube, but ours is made of hard metal.

The reason is as follows:

(i) If it is soft, it often deviates from the perpendicular ABC direction of the cup, to AD direction as shown in Fig. 8. Let the angle between the attached surface and the direction of traction force be  $\theta$ , the intensity of the force be AD, and its component force be AB and AE, then  $AB=AD \cos\theta$  (effective traction force),  $AE=AD \sin\theta$ . Not only is AB less than the original traction force AD (=AC) but also AE acts on the cup as a lever to cause sliding of the cup. According to J. Brey and M. Faughanel's investigation<sup>(84)</sup>, when the traction direction is 45 degrees to the contact surface, the traction force decreases to 80% or 61% depending on whether the cup is large or middle. For these reasons, the hard traction tube which is fixed perpendicularly to the cup is superior to the soft one.

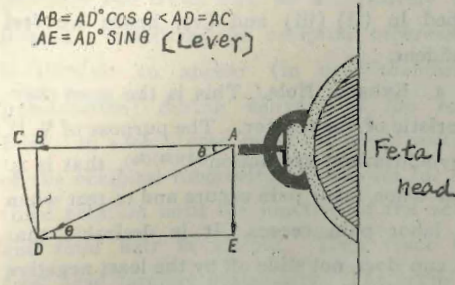


Fig. 8. Direction of traction of the fetal head

(ii) It may be assumed that the traction tube is soft, spontaneous rotation of the fetal head is easily conducted at traction, and conversely, spontaneous rotation of the fetal head may be disturbed when it is hard. In case of delivery which needs intervention and

assistance, the possibility of spontaneous rotation is questionable, but when the traction tube is hard we can help the spontaneous rotation actively by turning the handle from side to side. Therefore the rotation of the fetal head is more effective.

(iii) When the traction tube is soft we should hold the cup directly during insertion of the cup into the vagina or place the cup on the fetal head. Particularly when the fetal head is still high, the inserted hand is an obstacle, so insertion and installation is difficult. If it is hard, insertion and installation is easy.

(iv) When the traction tube is hard it may be hindered by the operation table during traction (particularly traction is made posteriorly and inferiorly). In order to obviate this hinderence, the length of the tube should be more important than its softness. Our tractor is short (13.0 cm.), so that it cannot be hindered by the table.

(v) Because the traction tube is metallic it is tolerable to fire, boiling, drugs and any type of disinfection. As shown above, there is no reason to believe that the traction tube should not be metallic, in fact after using a metallic one we can derive the benefits described in (ii) (iii) and (v), hence we feel confident.

4. Exhaust Hole. This is the most characteristic of our tractor. The purpose of V. D. is synchronized extraction<sup>(12)(25)(26)</sup>, that is to tract when labor pain occurs and to rest when the labor pain ceases. It is desirable that the cup does not slide off by the least negative pressure at rest (to avoid injury to the scalp). Switching off the electricity to lower the negative pressure is easy to cause sliding of the cup, while it is troublesome to raise or lower the scale of the vacuum gauge synchronizing with traction or rest, i.e. uterine contraction and interval. The Toitsu type has a disadvantage in that the exhaust button has to be pressed continuously during the

rest period. In order to eliminate the foregoing inconvenience, we have made an exhaust hole about 3 mm. in diameter at the traction tube 1.5 cm. below the center of the handle, as shown in Figs. 3 and 5. When we grip the handle, on the uterine contraction, the middle finger tip will just obstruct the hole. The negative pressure then will drop to the appointed -600 mm Hg automatically. Thereafter, the cup will suck up the fetal head and will not fall off. That is; in the presence of the exhaust hole, the cup may suck up the fetal head even at low negative pressure at the rest period and when soft tissue is placed between the cup and the fetal head, it can be warded off with the finger without switching off the electricity. Ensuring tight attachment of the cup to the fetal head without being disturbed by the soft tissue. Thus we can get on with the traction safely and ready at the proper timing.

#### TECHNIC

The technic of using this unit and indications for vacuum extraction will be described and discussed.

(A) At the interval of the labor pain, open the introitus vaginae with the left hand, and hold the traction tube with the right hand. Then insert the cup into the birth canal pressing the posterior wall of the vagina posteriorly, and finally place it on the presenting part of the fetus.

(B) Adjust the scale of vacuum gauge at -600 mm Hg and then switch on the electricity. Then, as mentioned above, the cup will be tightly attached on the presenting part at -100 mm Hg automatically.

(C) Check with the left hand whether or not the soft tissue is pinched between the cup and fetal head. If it is pinched, it can be got off simply with the finger tips. If it fails, switch off the electricity to get it off.

(D) When it is certain that nothing is pinched between the cup and the fetal head,

switch on and wait until the labor pain starts

(E) When the labor pain starts, place the index finger on the upper part of the handle and the middle finger on the lower part of the handle (also with the third finger if necessary) with the second joint of the fingers. Close the exhaust hole with the middle finger tip, then the negative pressure will reach -600 mm Hg as adjusted (Figs. 6 and 7).

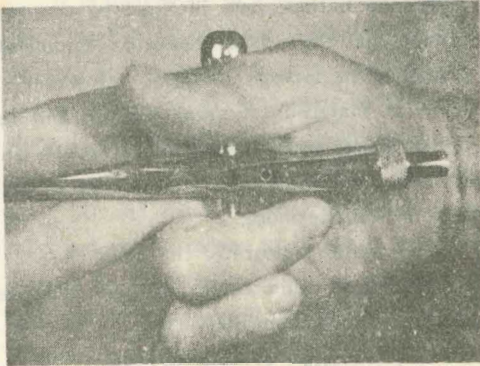


Fig. 6. Ou type (When exhaust hole is open)

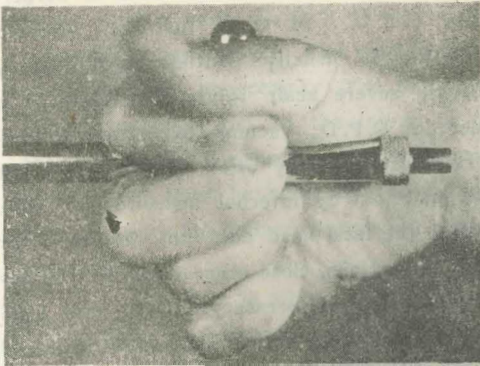


Fig. 7. Ou type (When exhaust hole is Closed)

(F) At this time, place the left index finger on the fetal head at the margin of the cup to guide the direction of the traction and help the traction, with an assistant conducting Kristeller expression gently and then start the traction at the same time. The direction of traction must be in accordance with the pelvic axis. The direction of traction must be changed a little vertically or horizontally from time to time, the fetal head will descend gradually along the low resistant place.

Cultivate a knack of how to feel the direction of the low resistance and how to tract along the pelvic axis<sup>(12)</sup>. The traction force must be within the limit of the negative pressure adjusted and the direction of traction force also must be kept perpendicular to the sucked surface. If the resistance of the perineum disturbs the traction, make an episiotomy immediately<sup>(4,10,12,22,29)</sup>. The cup is apt to slide off if too strong a force is added. As mentioned above, changing the direction of traction vertically or horizontally very often is the cause of the cup sliding off. This can be avoided by decreasing the traction force whenever the direction of traction is changed. If the cup slides off at labor pain, repeat sucking and traction immediately. If it is well fixed at the labor pain and at the interval of labor pain, open the exhaust hole at the interval, then the cup will be fixed on the fetal head at the pressure of -100 mm Hg. In this case the traction can be repeated at the next labor pain without worrying about the soft tissue being pinched. When the fetal head appears on the perineum through crowning and third rotation, open the exhaust hole, and then the negative pressure decreases rapidly to -100 mm, at this time the cup may be removed even without switching off. Shoulder and trunk may be successively delivered. Sometimes the occipital tuberosity is difficult to appear (in occipitoanterior presentation) during delivery of the fetal head. In such a case, make the upper portion of the occipital tuberosity a fulcrum for the third rotation until the junction of the scalp and fetal hair is visible. Then tract the fetal head forcibly posteriorly. The occipital tuberosity is easy to appear and the fetal head can be delivered without difficulty.

#### DISCUSSION AND REVIEW OF THE LITERATURE

Indications and condition for vacuum extraction as compared with those of forceps

will be discussed with a review of the literature.

1. Indications: Vacuum extraction is indicated in the following conditions:—

- (i) Prolonged second stage of labor
  - (a) Inertia
  - (b) Mild C. P. D.
- (ii) Diseases indicated for shortening the second stage of labor
  - (a) Chronic or acute disease of the mother
  - (b) Signs of fetal distress
- (iii) To shorten the second stage of spontaneous delivery. Vacuum extraction may be used without indications of (i) (ii) but just only to shorten the time for labor, to lessen the pain and compression on the fetal head.

The patient may have above indication, singly, or in combination with two of them such as (i) and (ii), or (ii) and (iii). Actually (i) and (ii) are the same as indications for forceps delivery but (iii) is not. It is a specific indication for vacuum extraction. Because forceps can more or less cause injury to the mother and fetus, it should not be used without indications. However, maternal and fetal injuries caused by vacuum extraction are less common and minor, when conditions are complete. It may be safely used in normal delivery. If indication (iii) is well justified we may consider that vacuum extraction is equivalent to Kristeller's method as a minor assistance to delivery instead of operation. If so, it can be done without specific indication.

2. Condition. Though extraction causes minor injury to the mother and fetus, unexpected accidents may develop if one does not use it in suitable condition. In other words, the condition which cause the minimal injury should be desirable. The conditions for vacuum extraction as well as those for forceps are as follows:

- (i) Complete dilation of the cervix

It has been reported that vacuum extraction may be applied when the cervix dilates to 6 cm. or more. However, the fetal head is usually in a high station at this time and application of the extractor is difficult. Cervical laceration may result particularly when the cervix is not soft enough. As injury to the mother and fetus is more often seen in the second stage of labor than in the first stage, the authors are inclined to the conclusion that the cervix should be completely dilated as in forceps delivery. However, if there is maternal or fetal distress and the cervix is soft enough, vacuum extraction may be used even when the cervix dilates only 6 cm. or a little more.

- (ii) After rupture of the membrane

Of course this condition must be prerequisite for vacuum delivery.

- (iii) Absence of mild C. P. D.

Because of limited traction power, vacuum extraction often fails in the cases of borderline C. P. D.. In these instance repeated traction is usually fruitless and possibly causes severe scalp injury. If there is a definite C. P. D., vacuum extraction is contraindicated. Very often C. P. D. could not be made out by internal measurement only. When the fetal head does not descend after 3-5 extractions, close observation of the delivery course if necessary. If the fetal head remains high, the patient should be considered one with C. P. D. who is not a candidate for extraction, and forceps delivery may be tried. If the fetal head comes down, vacuum extraction may be tried once again. X-ray pelvimetry and cesarean section, of course, should be taken into consideration.

- (iv) Absence of definite caput succedaneum or bony overlapping.

Marked caput succedaneum or bony overlapping is an indirect evidence of the existence of C. P. D.. In this instance, it is difficult to attach the cup which often slides off. Nevertheless, because the mother and fetus

will not be injured after 2-3 failures the authors are inclined to try again. In the authors' opinion, when the size of the cup is changed, the order should be: large, median, small. If the cup slides several times, it is better to give up and change to forceps as soon as possible.

(v) The fetal head is in the correct station for forceps delivery.

It is dangerous to apply forceps when the fetal head is not engaged or fixed in the pelvic cavity. If the head is engaged and fixed, it means that C.P.D. does not exist or if it does, it is just borderline. Condition (v) can be possible only on the basis of condition (iii). If the head is fixed already but not engaged yet, it means that there is C.P.D. caused by a too large head. In such a case the cup often slides off and the fetal head is subject to injury. Failure of extraction is to be expected. If the head is engaged but not fixed yet, it means that the C.P.D. is caused by too small a head. In such a case vacuum extraction is unnecessary. One must be aware of the fact that unnecessary trial extraction simply increases risk of the injury to the the birth canal. For these reasons, the station of the head must be accurately determined not only in forceps delivery but also in vacuum extraction.

(vi) The fetus is alive

Because forceps may cause injury both mother and fetus more or less, the use of forceps for expelling the dead fetus is contra-indicated as it causes injury to the mother. As vacuum extraction causes less maternal injury, it may be tried, when the conditions are adequate, even on the dead fetus, before resorting to craniotomy, a cruel and difficult technic. It means that extraction may be carried out whether the fetus is alive or not. It is not too late to perform craniotomy after failure of extraction.

The conditions from (i) to (v) are quite similar for both forceps and vacuum extraction

but (vi) is required only for forceps, and absolutely not for vacuum extraction.

In the foregoing, indications and conditions for vacuum extraction have been discussed as compared with forceps. Though vacuum extraction is safe, change of indications and addition of conditions should be considered in view of its limited effect in extraction. First, the indication (iii)—to shorten the second stage of spontaneous deliver—may become the source of careless extravagant use of vacuum extraction. It might be changed to (iii) for severe pain and suffering of the mother in the second stage, even in normal progress. Pain may originate from physical and emotional aspects. The former includes stretching or compression of the birth canal by the fetal head (compression of fetal head and vice versa) and the latter includes anxiety of the pregnant woman. In such a case, the application of vacuum extraction to relieve pain and to shorten duration of compression of fetal head is justified. As far as conditions are concerned, vacuum extraction can replace almost all the low forceps and a part of mid forceps but cannot replace high forceps, the conditions for mid and low forceps might be valid for vacuum extraction. According to its capability the authors will add another requirement besides the above mentioned one.

(vii) The fetal head must be below the wide pelvis in multi-gravidas; and below the narrow pelvis in primigravidas.

When all conditions including (vii) and indication for extraction are present, then we may carry out vacuum extraction. In other words, if the delivery urgently needs obstetrical assistance, the methods other than extraction such as forceps are more effective when condition (vii) is lacking.

#### **Sliding off of the cup and its Management**

The most unpleasant failure in vacuum extraction is sliding-off of the cup. Here the the causes of sliding off and its management

are summarized as follows:

(A) The resistance of the birth canal exceeds the tolerability of vacuum extraction.

(a) The Fetal head is too high, that is, when the fetal head remains at the pelvic inlet or at wide pelvis (primigravida). According to the station of the fetal head there is a classification of high F. D., mid F. D. and outlet F. D.. Perhaps the vacuum extraction may also be classified under high, mid and outlet V. E.. In practice, the effect of vacuum extraction is poor when the fetal head is still at the inlet and wide pelvis (primigravida) except in the case where the pelvis is too large or the fetal head too small. In such a case sliding-off of the cup is frequent, therefore the risk of injury to the scalp may be increased. For this reason, if emergency should occur in the mother and fetus it would be better to change to F. D. immediately. Otherwise, one may have to wait for condition (vii) to carry out V. D.. At this time the fetal head may be delivered easily by one to five extractions. That is, V. D. can almost entirely replace the F. D. and a part of mid F. D., and cannot entirely replace high F. D. and a larger part of mid F. D..

(b) At C. P. D.

As pointed out by various investigators, V. D. is hardly applied to C. P. D.<sup>(2, 7, 18, 28, 34, 27)</sup>. In this case, it is better to abandon V. D. and change to F. D. or Cesarean section immediately.

(c) When the soft part of the birth canal become rigid.

In this case, try Kristeller's expression and episiotomy<sup>(4, 10, 12, 22, 20)</sup> to decrease the resistance of the birth canal.

(B) In case of insufficiency of sucking.

(a) When the scalp is thin and subcutaneous tissue is scanty.

(b) When caput succedaneum and bony overlapping are pronounced. In case of (a) and (b), V. D. is useless, further observation or changing to F. D. is necessary.

(C) Direction of traction is not perpendicular to the cup and fetal head. In this regard, ours is superior to the Toitsu type because the traction tube is fixed perpendicularly to the cup.

(D) Traction force exceeds tolerability of tractor.

(C) and (D) are merely technical problems, and be overcome by skill.

(E) When the cup is too small.

As shown by sucking force  $F=R^2P$  (P is the intensity of negative pressure). We usually use the cup as large as possible.

(F) If the cup slides off over and over with the same one.

In this case, the cup lying over the same shaped caput succedaneum means decrease of capacity—decrease of sucking force—decrease of traction force. In this case, replace the cup according to the order of large, middle and small.

### CONCLUSION

In this paper we have introduced a new type of vacuum extractor which is designed by us. Discussions with a review of the literature concerning vacuum extraction have also been made.

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### REFERENCES

- (1) ANDO K.: *Obst. & Gynec.* 28: 364, 1961.
- (2) BRUNNIQUEL, G. & ISRAEL, A.: *Gynec. et Obstet.*, 7: 222, 1958.
- (3) CONJIJOU, Y.: *Prospectus*, 1947.
- (4) DOERFFER, P.: *Med. Klinik.*, 27: 1234, 1959.
- (5) EVELBAUER, K.: *Geburt. u. Franenh.*, 16: 223, 2956.



- (6) FINDERLE, V.: *Gynecologia*, 133: 225, 1952.
- (7) FINDERLE, V.: *Am. J. Obst. & Gynec.*, 69: 1148, 1955.
- (8) FULST, W.: *Zbl. Gynak.*, 82: 321, 1960.
- (9) GAUSE, R.: *Zbl. Gynak.*, 84: 133, 1961.
- (10) HATA, S. *et al.*: *Sanfujinka no Sekai*, 14: 311, 1962.
- (11) HASEGAWA, T. *et al.*: *Nippon Sanfujinka Zassi*, 13: 876, 1961.
- (12) HAYASHI, S. *et al.*: *Sanfujinka no Sekai*, 15: 731, 1963.
- (13) FUKUOKA, T. *et al.*: *Nippon Sanfujinka Zassi*, 13: 876, 1961.
- (14) KAWASAKI, I. *et al.*: *Sanfujinka on Jissai*, 10: 1076, 1961.
- (15) MAEDA, K.: *Sanfujinka no Jissai*, 11: 171, 1962.
- (16) MALMSTROEM, T.: *Acta Obs. et Gynec. Scand.*, 33: suppl. 4, 1954.
- (17) MALMSTROEM, T.: *Acta Obst. et Gynec. Scand.*, 36: suppl. 3, 1957.
- (18) MORIMOTO, D.: *Nippon Sanfujinka Zassi*, 13: 770, 1961.
- (19) MORIMITSU, T.: *Sanfujinka no Jissai*, 11: 362, 1962.
- (20) MITANI, S.: *Obst. & Gynec.* 33:
- (21) MITANI, S.: *Obst. & Gynec.* 31: 32, 1964.
- (22) MITANI, Y.: *Sanfujinka no Jis ai*, 33: 18, 1966.
- (23) NAGAE, S.: *Obst. & Gynec.*, 29: 372, 1962.
- (24) NAGAUCHI, K. *et al.*: *Sanfujinka no Sekai*, 13: 1278, 1961.
- (25) NAKAO, T.: *Sanfujinka no Jissai*, 11: 527, 1962.
- (26) OGUNI, Y.: *Nippon Sanfujinka Zassi*, 13: 880, 1961.
- (27) OKUJAMA, T. *et al.*: *Obst. & Gynec. Theraphy*, 17: 126, 1968.
- (28) PIGNAUD, H.: *Bull. Fed. Soc. Gyn. et Obst.*, 9: 62, 1957.
- (29) SAITO, K. *et al.*: *Clin. Obst. & Gynec.* 18: 442, 1964.
- (30) SHIOYAMA, K.: *Obst. & Gynec.*, 28: 529, 1961.
- (31) TRICOMI, V., AMOROSI, L., GOTTSCHALK, W.: *Am. J. Obst. & Gynec.*, 61: 681, 1961.
- (32) MISUNO, J.: *Obst. & Gynec.* 32: 623, 1965.
- (33) HURUBATA, T. *et al.*: *Sanfujinka no Sekai*, 13: 69, 1961.
- (34) BRBY, J. & FANGHAENEL, M.: *Geburt-sch. u. Frauenhk.* 20: 1357, 1960.
- (35) MEINRENKEN, H. & SCHIEFERSTEIN, W.: *Geburtsch. u. Frauenhk.*, 17: 1086, 1957.
- (36) ITAO, S.: *Clin. Obst. & Gynec.*, 17: 927, 1966.
- (37) KASAMORI, S.: *Operative Obstetrics*, 1: 317, Kanahara Comp. Tokyo, 1936.

## 新 吸 引 透 娩 器

歐 雲 炎 林 其 祥

臺 北 醫 學 院 婦 產 科

著者等新設計一種全金屬性並具有漏氣孔之吸引透娩器。本器比起 Malmström 型及東一型有如下之優點。

- 1) 全部以金屬造成，故易於消毒。
- 2) 因 Traction Tube 垂直固定於 Traction Cup 故即使牽引方向稍有偏頗 Cup 亦不易脫落。
- 3) 插入陰腔及固定於兒頭均甚容易。
- 4) 可同時施行牽引及兒頭之回轉故甚為方便。
- 5) 保護板以平螺絲釘固定，故比起以鎖條連結者不易脫落而能。恒固定與兒頭。

6) 因有漏氣孔故陣痛間歇時 Cup 能以最少之陰壓固定於兒頭。等陣痛發作時只需握着 Traction Handle，漏氣孔即自動關閉。陰壓自然降底到所需之處。

7) 使用吸引器之適應症及使用時之必要條件亦一並加以論述。

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