(12) UK Patent Application (19) GB (11) 2 039 243 A

(21) Application No 7900154
(22) Date of filing 3 Jan 1979
(43) Application published 6 Aug 1980
(51) INT CL³ A61B 17/28
(52) Domestic classification B4W 5C2 5F 5M
(56) Documents cited None
(58) Field of search B4W
(71) Applicants Vsesojuzny Nauchno-Issledovatelsky I Ispytatelny Institut Meditsinskoi Tekhniki, ulitsa Kasatkina 3, Moscow, Union of Soviet Socialist Republics
(72) Inventors Nikolai Nikolaevich Kapitanov
Natalya Petrovna Petrova
Vladimir Vasilievich Ippolitov
(74) Agents Marks & Clerk

(54) **Forceps for anastomosis**

(57) One jaw 4 has a groove 9, and the other jaw 5 fits closely within this groove. A blood vessel placed within the groove is therefore pinched when the forceps are closed. Each jaw has a removable piece 8, 10 which, when removed exposes a part of the pinched vessel. This exposed region is sufficient to allow access by a suturing apparatus.

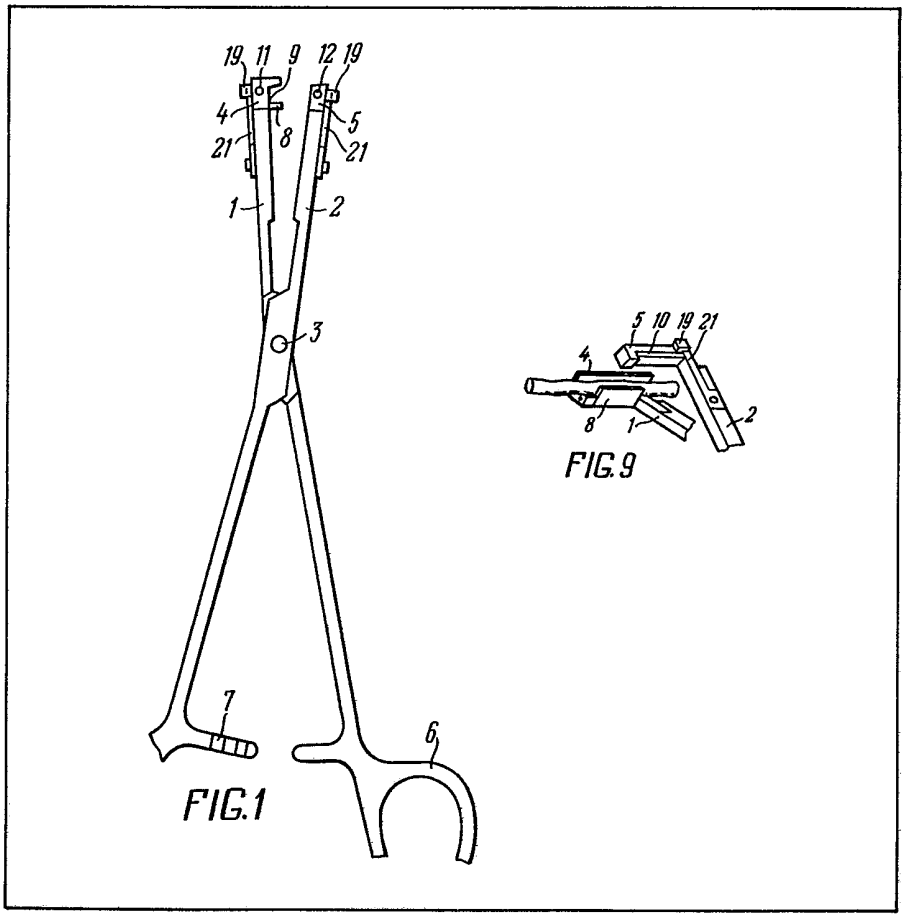


FIG.1

FIG.9

GB 2 039 243 A

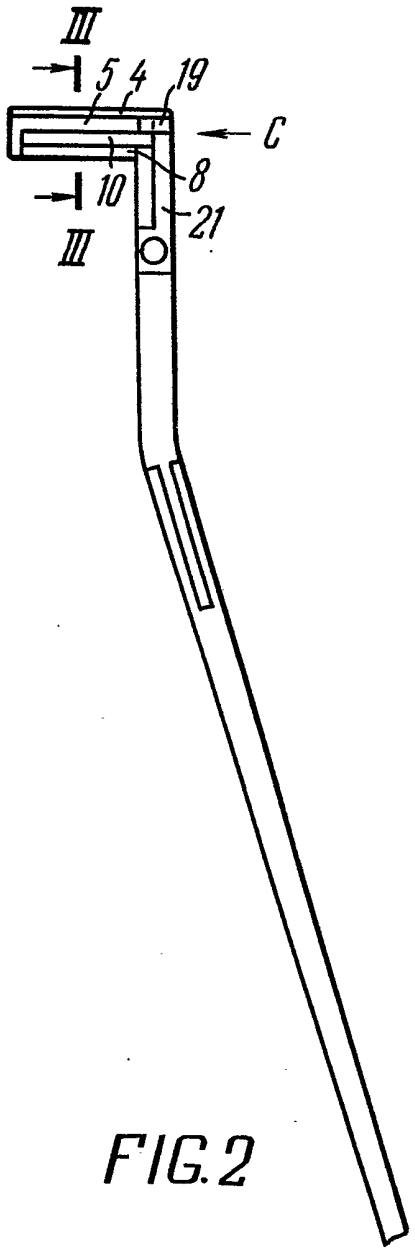


FIG.2

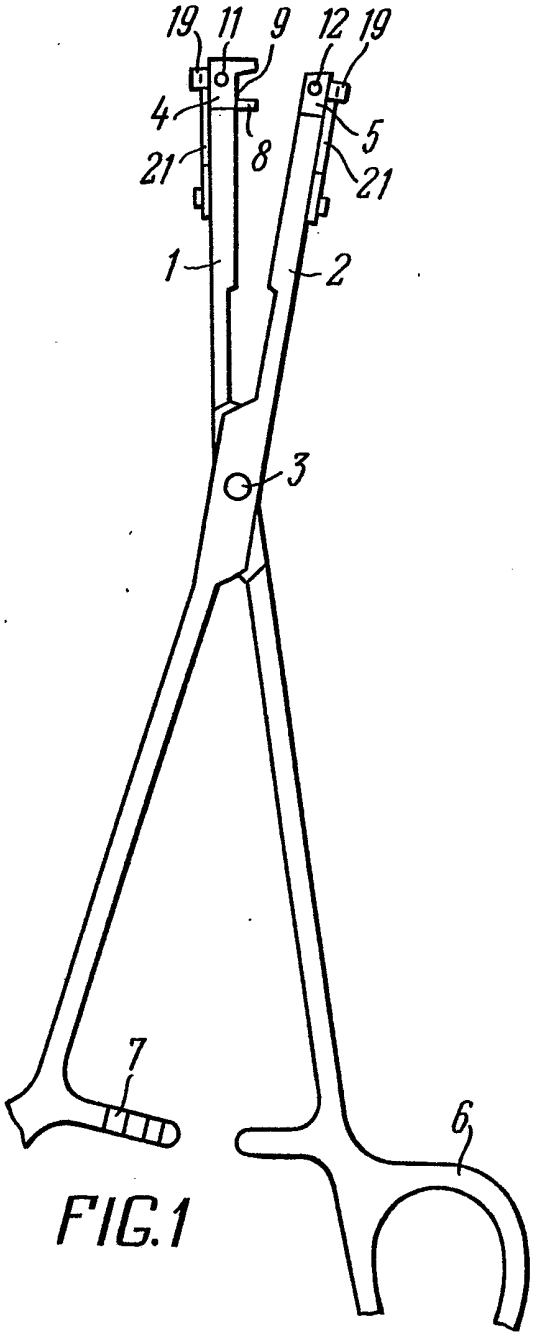


FIG.1



FIG.3

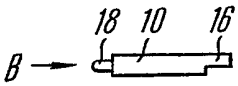


FIG.5



FIG.7

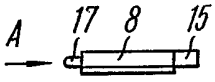


FIG.4



FIG.6

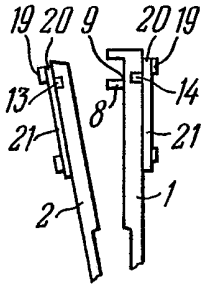


FIG.8

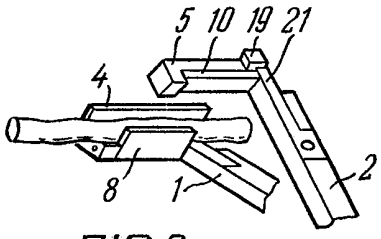


FIG.9

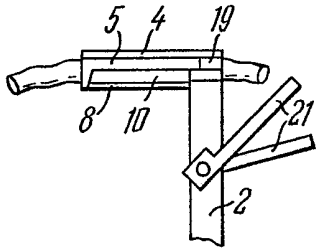


FIG.10

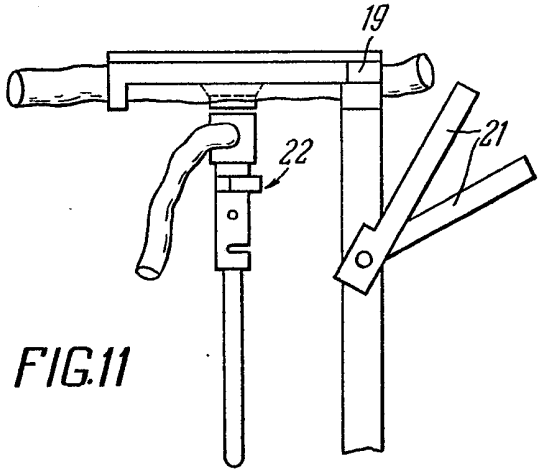


FIG.11

SPECIFICATION

Forceps for anastomosis

The present invention relates to forceps which can be used to isolate a part of a blood vessel during anastomosis.

The forceps of the invention may be used to isolate small vessels more accurately than has up to now been possible.

Thus, the present invention consists in forceps suitable for use in anastomosis and having one jaw having a groove that can accommodate a blood vessel, and another jaw that can fit within the groove to pinch the vessel when the forceps are closed; each jaw having a removable part such that when these parts are removed a pinched vessel can be partly exposed to allow anastomosis to be carried out. The removable part of the jaw having a groove preferably defines one wall of that groove, and preferably also defines part of the base of that groove.

The removable parts are preferably positioned within the jaws by male and female cooperating means, which preferably comprise pins or protrusions on the removable parts and holes or slots in the jaws. The removable parts are preferably secured in position by movable plates pivotally attached to the limbs of the forceps.

We prefer that the jaws of the forceps are at an angle, preferably perpendicular, to the length of the limbs on which they are mounted such that the jaws remain parallel to one another as the forceps are closed.

The forceps are preferably provided with locking means to hold them in the closed position. Also, the forceps may have the usual rings by means of which the forceps can be held in the hand.

The second mentioned jaw is preferably a close fit within the groove, which may be a box-shaped groove, of the first mentioned jaw. In any case, a blood vessel may be held between the two jaws without the vessel slipping or bending. The removable parts of the jaws allow a fixed vessel to be isolated more accurately.

In the end-to-side anastomosis of vessels using known suturing and prosthesis apparatus the forceps of the invention may be used to separate a vessel into two regions. This allows the relevant part of the suturing apparatus (known as a tetrahedral part) to be inserted into the isolated part of the vessel. As a result the sides of the isolated vessel can be sutured to the end of the inserted vessel, thus avoiding any narrowing of the isolated vessel. Conversely, if the tetrahedral part of the suturing apparatus is inserted into the isolated vessel without the aid of the forceps of the invention, this tetrahedral part may abut against the inner wall of the isolated vessel; as a result, the inserted vessel is not sutured at its end to the incized edge of the isolated vessel, but instead the inserted vessel may extend at least to the middle of the isolated vessel. The forceps of the invention can, therefore, be used to suture vessels by end-to-side ligation by a method involving lesser parts of the vessel and without reducing the diameter of the vessel.

The invention is further illustrated by reference to the accompanying drawings, in which:

Figure 1 shows in side view a pair of forceps according to the invention and suitable for isolating a part of a blood vessel during anastomosis;

Figure 2 shows a front view of the pair of forceps shown in Figure 1;

Figure 3 is a cross-section taken along line III-III of Figure 2;

Figure 4 shows a removable part of one of the jaws of the pair of forceps;

Figure 5 shows a removable part of the other jaw;

Figure 6 is a view in direction A of Figure 4;

Figure 7 is a view in direction B of Figure 5;

Figure 8 is a view in direction C of Figure 2;

Figure 9 shows part of the forceps of the invention in an open position and having a blood vessel positioned in one of the jaws;

Figure 10 shows part of the forceps of the invention in a closed position with a blood vessel between the jaws; and

Figure 11 is a large scale view of the forceps of the invention with a blood vessel between the jaws, and showing part of a saturing apparatus inserted within the blood vessel.

The forceps have limbs 1 and 2 and are hinged by a pin 3. The ends of limbs 1 and 2 bear jaws 4 and 5 which are arranged at an angle to the limbs and are intended to hold a blood vessel. Rings 6 are provided at the other end of limbs 1 and 2 and a locking means 7 is provided to hold the forceps in the closed position. A removable part 8 is provided on jaw 4. This removable part, which extends along only part of the length of the jaw, defines, in conjunction with the rest of the jaw, a groove 9 open towards the other jaw 5. Jaw 5 has a removable part 10, also extending along only part of the length of the jaw. Jaw 5 together with its removable part 10 forms a ridge having the same width as the groove 9 in jaw 4. Therefore, as the forceps are closed the ridge slides within the groove.

In the arrangement illustrated the removable parts have pins and protrusions which mate with holes and slots respectively in the jaws and limbs of the forceps. It is, of course, possible for the removable parts to be provided with holes or slots and for the jaws and limbs of the forceps to be provided with pins or protrusions. In the accompanying drawings, jaws 4 and 5 have holes 11 and 12, and limbs 1 and 2 have slots 13 and 14. Removable parts 8 and 10 have at one end pins 17 and 8 and at another end protrusions 15 and 16 which mate with the holes and slots respectively. The removable parts 8 and 10 are held in place by movable plates 21 which are pivoted to limbs 1 and 2. These movable plates lock into slots 20 in protrusions 19.

The forceps are opened by separating rings 6. A vessel, preferably one of small diameter, is placed in groove 9 of jaw 4 as shown in Figure 9. The jaws are then closed so that jaw 5 together with removable part 10 holds the vessel tightly within groove 9, thus displacing blood from the part of the vessel within the jaws. Locking means 7 will automatically hold the forceps closed. Tilting plates 21 are then rotated away from slots 20 to allow removable parts 8 and

10 to be removed. This exposes part of the vessel along its longitudinal axis. The other part of the vessel remains fixed between jaws 4 and 5. The exposed part of the vessel may then be incized longitudinally and a tetrahedral part of a suturing apparatus 22 maybe inserted into the incized exposed vessel. The vessel may then be sutured.

CLAIMS

1. Forceps suitable for use in anastomosis and having one jaw having a groove that can accommodate a blood vessel, and another jaw that can fit within the groove to pinch the vessel when the forceps are closed; each jaw having a removable part such that when these parts are removed a pinched vessel can be partly exposed to allow anastomosis to be carried out.

2. Forceps according to claim 1, in which the removable part of the jaw having a groove defines one wall of that groove.

3. Forceps according to claim 2, in which the removable part of the jaw having a groove defines one wall and a part of the base of that groove.

4. Forceps according to any one of the preceding claims, in which the removable parts are positioned within the jaws by male and female cooperating means.

5. Forceps according to claim 4, in which the removable parts are secured to the jaws by movable plates pivotally attached to limbs of the forceps.

6. Forceps according to any one of the preceding claims, having locking means to hold the forceps in the closed position.

7. Forceps according to any one of the preceding claims, in which the jaws are substantially perpendicular to the length of the limbs on which they are mounted such that the jaws remain parallel to one another as the forceps are closed.

8. Forceps according to claim 1, substantially as herein described with reference to the accompanying drawings.

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1980.
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.