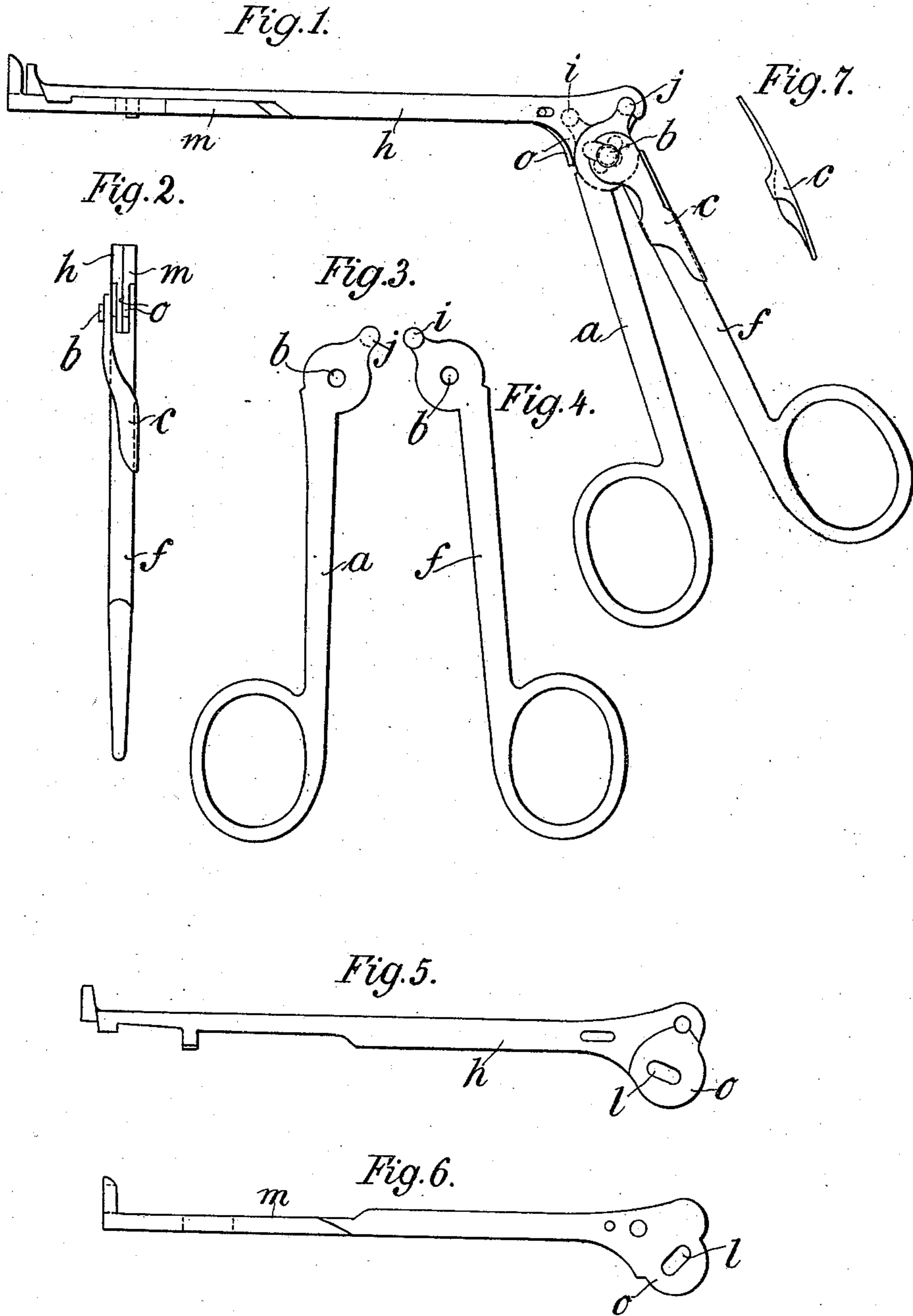


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 SURGICAL FORCEPS.  
 APPLICATION FILED SEPT. 8, 1909.

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2 SHEETS—SHEET 1.



WITNESSES  
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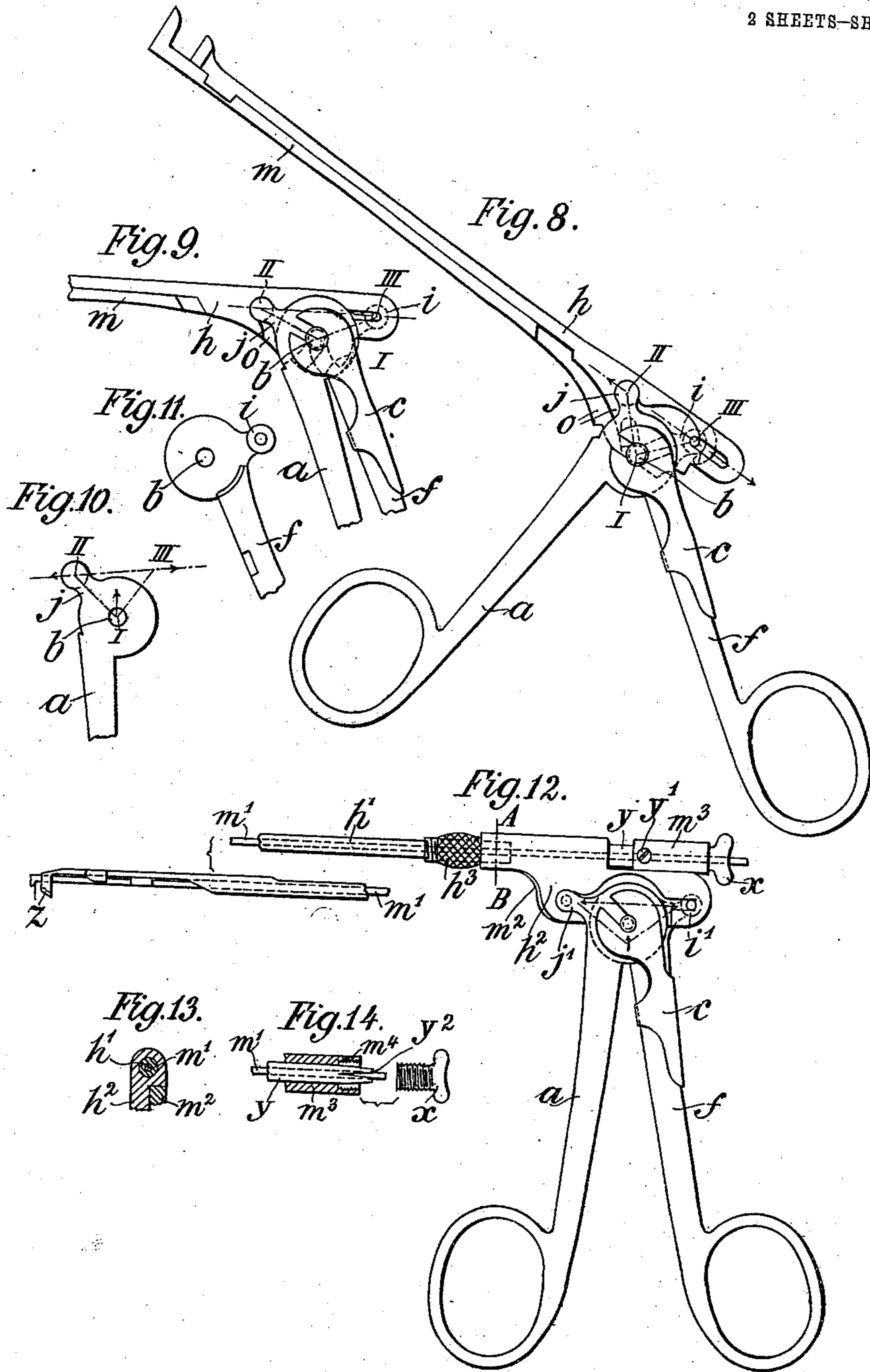
INVENTOR  
 Paul Frisch  
 BY Wm Wallace White

ATLX

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ATTY.

# UNITED STATES PATENT OFFICE.

PAUL FRISCH, OF BERLIN, GERMANY.

## SURGICAL FORCEPS.

984,756.

Specification of Letters Patent. Patented Feb. 21, 1911.

Application filed September 8, 1909. Serial No. 516,717.

To all whom it may concern:

Be it known that I, PAUL FRISCH, a subject of the German Emperor, residing at No. 9 Carlstrasse, Berlin, Germany, have invented new and useful Improvements in Surgical Forceps, of which the following is a specification.

The present invention relates to surgical forceps of the kind in which the cutting edges acting in the manner of jaws, pliers or punches are provided at the ends of branches of the instrument which are guided one upon the other in a sliding manner. In instruments of this kind, the defect is found that, owing to the rigid connection of one of the guiding arms or branches with the handle portion, when in use the instrument readily effects a rocking movement or oscillation of both arms around the point at which the connection of the arm displaced along the guide arm is located.

Now in accordance with the present invention, the defect referred to above is obviated by providing the instrument not only with a sliding arm but also pivoting the handle member to the other arm.

An embodiment of the invention is illustrated by way of example in the accompanying drawing, in which:—

Figure 1 is a side elevation of the forceps; Fig. 2 is a rear elevation of the same; Figs. 3 and 4 illustrate the two handle portions; Figs. 5 and 6 show the two guide arms; Fig. 7 is a detail view of the clip holding the handle portions on the guide arms; Fig. 8 illustrates a modified form of forceps; Fig. 9 is a partial section of this forceps when the handle portions have been brought together; Figs. 10 and 11 illustrate the handle portions of this type of forceps; Fig. 12 represents a similar construction of the forceps, pliers or punch to that shown in Fig. 8 in which one of the sliding arms is constituted as a rod or wire and is guided inside the other arm which constitutes a sleeve; Fig. 13 represents a section on the line A—B in Fig. 12; and Fig. 14 shows the means for fixing the arm presenting the form of a rod or wire on the rear cheek displaced by one of the handle members.

The two handle members *a f* comprise short lever arms *i j* behind the pivot *b* common to them both; these arms preferably connected by disk shaped pivots to the rear ends of the guide arms *m h*. Owing to this jointing of the two arms to the handle mem-

bers *a f*, during the use of the instrument the hand is able to remain in approximately the same position without thereby producing any appreciable alteration in the position of the guide arms *m h* or a rocking or oscillating movement of these parts. The reason for this is that each handle member is able to effect the same angular movement relatively to the other on the pivot common to both parts, while the direction of the guide arms remains unaltered.

In order to render the guide arms of the forceps or their joint portions more stable, the arms *m h* are provided with flanges *o* bearing one against the other between the joint plates of the handle portions; curvilinear slots *l* (Figs. 5 and 6) are provided in these flanges for the pivot *b* of the handle portions.

*c* is a spring clip holding all the parts together.

In the construction illustrated in Figs. 8 to 10 the handle portions *a f* do not engage the pivot *b* with their short lever arms *j i* crosswise as in the construction described above, but the lever arms are fitted in opposite directions on the plates or cheeks of the handles, the lever arm *y* of the handle portion *a* extending forward and the lever arm *i* of the handle portion *f* rearward. In this manner a kind of toggle joint is formed and, as illustrated in Figs. 8 and 10 in broken lines, the central pivot I (at *b*) during the relative movements of the handle members *a f* slides in the direction of the path II—III as shown by the arrow so that the points II—III separate in the sense of extending the toggle joint and assume the position shown in Fig. 9. The operation of this form of forceps is more advantageous than that of the first construction, as during the relative displacements of the handle members the short lever arms assume a more extended angular position than in the other position of the handle members and thereby develop an increased force in the pull or push direction of the arms or sliding parts.

In both forms of the instrument described above the parts *m h* which slide one upon the other can be made relatively thin for their length and the part *m*, which is subjected to extension strains, can be of smaller cross section or be formed of wire or a flexible strip of metal or the like. This traction member would in this case be guided on the other stronger part *h* and it is obvious that

in this construction it is also possible to curve the two sliding parts in any desired manner.

5 The tools or operative parts situated at the front ends of the sliding parts can be of any suitable arrangement or construction and may either act as forceps or exert a punching or shearing action.

10 In order that it may be possible to maintain the invariable position of the guide arms of the two jaws with greater exactitude during operation, one or other of these arms may be provided with a rigid extension piece at the rear (not shown) and this piece  
15 may comprise a handle or bend of appropriate form to facilitate grasping it.

The construction illustrated in Figs. 12 to 14 differs from the forms of instruments described above only owing to the modified  
20 construction of the sliding arms and the method of fixing them to the cheeks  $m^2$   $h^2$  which are in engagement with the handle portions. One of the sliding arms is formed as a sleeve  $h'$  which at one end, which is  
25 screw threaded, is screwed into the cheek  $h^2$  intended to be actuated by the arm  $j'$  of the handle member  $a$  and is fixed thereon by means of a lock nut  $h^3$ . The other arm  $m'$ , which is constituted by a wire, is carried  
30 through the sleeve  $h'$  and fixed in a sleeve  $m^3$  mounted on the cheek  $m^2$  which is actuated by the arm  $i'$  of the handle member  $f$ . With this object a clipping sleeve  $y$  is provided inside the sleeve  $m^3$  in which it is re-  
35 tained by a fixing nut  $y'$ . The rear end of the clipping sleeve is provided with a wedge shaped slit  $y^2$  on each side. A recess  $m^4$  in-

ternally screw threaded is provided in the rear end of the sleeve  $m^3$  and in this recess a nut  $x$ , which is preferably perforated  
40 conically, can be screwed for the purpose of compressing the slit end of the clipping sleeve  $y$  and thereby retaining the wire  $m'$  in the sleeve  $m^3$  so that it is displaced by the  
45 movement of the handle members or of the cheeks  $m^2$ .

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be per-  
50 formed, I declare that what I claim and wish to secure by Letters Patent is:—

In surgical forceps of the type described, the combination of a pair of handle mem-  
55 bers which are detachably linked to each other by means of a common pivot pin, each member being provided with a short crank or lever arm, said cranks or arms being so  
60 positioned angularly with respect to the handle members that when the latter are drawn together the cranks are spread apart like toggle-links, and a pair of slide-like  
65 guided branches provided with cutting or grasping jaws at their front ends, said branches being connected pivotally at their rear ends to the said crank or lever arms, whereby the latter act as a toggle joint.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PAUL FRISCH.

Witnesses:

HENRY HASPER,  
WOLDEMAR HAUPT.