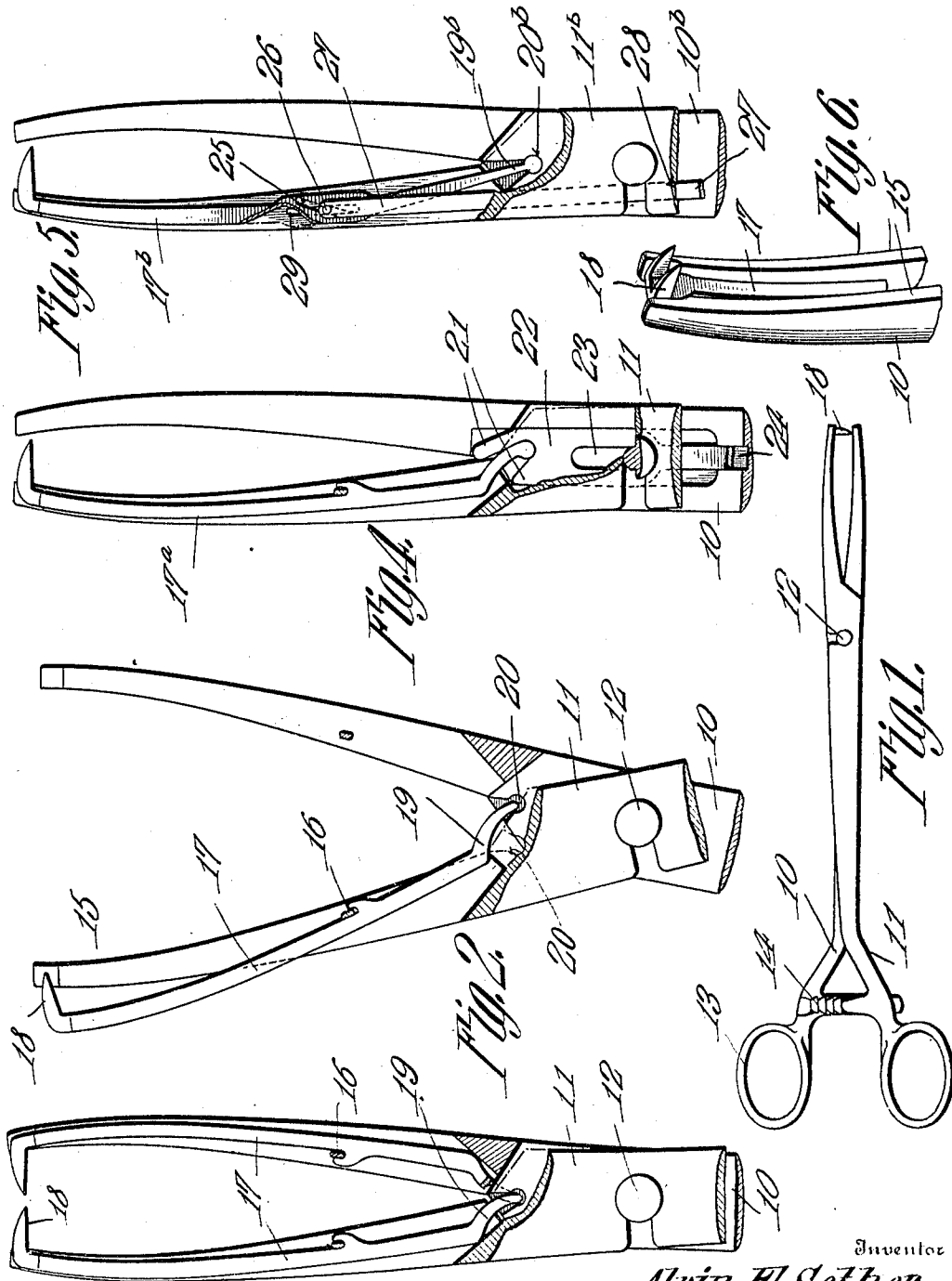


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SURGICAL FORCEPS.
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945,292.

Patented Jan. 4, 1910.



Witnesses

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UNITED STATES PATENT OFFICE.

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SURGICAL FORCEPS.

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To all whom it may concern:

Be it known that I, ALVIN F. SETHER, a citizen of the United States, residing at Glendale, in the county of Douglas and State of Oregon, have invented new and useful Surgical Forceps, of which the following is a specification.

It is the primary object of the present invention to improve generally the construction of vulsellum and other surgical forceps and the improvements are directed chiefly to the provision of means for automatically clearing the tips of jaws of forceps of this class so that no tissue is injured when the forceps are being placed for grasping tissue and when being removed.

In the extirpation of tissues or tumor masses, it frequently happens that the teeth at the tip of forceps jaws cling to the tissues or in the process of removing the forceps the tissues are torn by the projecting teeth, especially when working where space is limited. Also the tissues may cling to the jaws of the forceps and must be removed either by the fingers or the use of another instrument.

In order to overcome the objectionable features above noted, an instrument is provided in which the gripping element co-operates with clearing means upon manipulation of the instrument to release the tissues held thereby or for the purpose of removing any particles of membrane or cyst which may adhere to the said gripping element. It will be understood that an instrument so constructed will not only have its gripping element automatically clear of particles of membrane and cyst where the instrument is employed in removing or extracting a tumor or similar growth, but that where the instrument is employed in holding a membrane-inclosed part, the tearing of the membrane upon manipulation of the instrument to release the part will be obviated.

In the accompanying drawings, Figure 1 is a view in side elevation of a pair of vulsellum forceps embodying my invention, Fig. 2 is a similar view in detail, partly in section and partly in elevation of the jaw end of the forceps illustrated in Fig. 1. Fig. 3 is a view similar to Fig. 2 but showing a slightly modified form of the invention, the forceps being open. Fig. 4 is a view similar to Fig. 2 showing also a slight modification. Fig. 5 is a view similar to Fig. 4

showing a still further modification, and Fig. 6 is a detail perspective view of one end of one of the gripping members of the instrument.

In the form of the invention shown in Figs. 1, 2 and 6 of the drawings, the forceps are comprised of a pair of crossed pivoted members one indicated by the numeral 10 and the other by the numeral 11. The pivot for the members is indicated by the numeral 12 and the members are provided at corresponding ends with finger holds 13 and with a locking rack device 14 which needs no specific description inasmuch as it forms no part of the present invention. The members 10 and 11 of the forceps to the other side of their pivot 12 are each bifurcated to form spaced portions 15 and mounted to rock between the spaced portions of one of the members 10 or 11, here illustrated as the member 11, upon a fixed fulcrum 16 which connects the spaced portions 15 of the said member, is one gripping element of the forceps, in the nature of a finger 17 which at its outer end is provided with teeth or the like, 18, which are to bite into the tissue or membrane. The finger 17 at its inner end is off-set as indicated by the numeral 19 and seats in each end in a notch 20 formed in the edge of the member 10 adjacent its pivot.

From an inspection of Fig. 2 of the drawings, it will be observed that when the forceps are opened or in other words when the bifurcated end portions of the members 10 and 11 are spread apart or separated, the tissue gripping end 18 of the gripping element 17 will project beyond that face of the member 11 which is presented in the direction of the working end of the member 10, it being understood that the tumor or other growth or the part to be treated is held against the said end of the member 10 by the engagement of the gripping end of the finger 17 with the growth or part. It will further be apparent that upon opening the forceps to release the growth or the part to be operated upon, the tendency which is exerted by the spurs 18 to remain engaged in the growth or part or to injure the membrane by tearing it away from the part which it surrounds, will be arrested by the shear-like movement of the gripping end of the finger 17 between the spaced portions of the member 11, the growth or part being operated upon being drawn against the grip-

ping end of the member 11 by this tendency of the spurs to remain embedded in the growth and being held thereagainst until the spurs disengage from the growth or part.

5 This movement of the member 17, it will be understood, is accomplished by reason of the engagement of its inner end with the notch 20 and the mutual separation of the members 10 and 11 by swinging upon their
10 pivot.

Where the forceps are employed in the extirpation of a growth, any particles of membrane of cyst adhering to the outer end of the gripping finger 17 will be automatically
15 removed, upon opening the forceps to release the tissues by reason of the receding of the spurs to position rearwardly of the gripping faces or sides of the members 10 and 11.

It is desirable, under some conditions, to
20 provide a gripping finger such as above described upon each one of the members 10 and 11 and such an arrangement of parts is shown in Fig. 3 of the drawings, it being understood that when the forceps illustrated
25 in this figure are opened or are manipulated to release the growth or part to be operated upon, the gripping ends of the fingers will recede in opposite directions and each behind the working or gripping face or side
30 of its respective member 10 or 11.

Under some conditions, it is desirable that means be provided for adjusting the gripping member 17 so that its spurs or teeth 18 will lie more or less closely to the outer end
35 of the member 10 when the forceps are closed, and one means for accomplishing this adjustment is shown in Fig. 4 of the drawings. In this figure of the drawings, the inner end of the gripping member, here
40 indicated by the numeral 17^a does not engage with the notch corresponding to the notch 20 but between fingers 21 formed at one end of a bar 22, the fingers projecting laterally angularly from the outer end of the
45 bar and forming between them a fulcrum for the gripping element 17^a. The bar 22 is formed with a slot 23 through which passes the pivot 12 and works in a groove 24 formed in the inner face of the member 10 longitudinally thereof, the bar being in this manner
50 adapted to be slid longitudinally of the said member 10 so as to vary the position of the fulcrum of the gripping element 17^a, it being understood that by drawing or sliding the bar in the direction of the finger hold 13, the inner end of the element 17^a will be swung outwardly and the outer end inwardly or in other words in the direction of
55 the corresponding end of the member 10. The advantage of such an adjustment as is above described, lies in the fact that where the member to be gripped is of small dimension or where membrane is to be held by the forceps, the proper adjustment of the gripping
60 element 17^a with respect to the corre-

sponding end of the member 10 may be readily accomplished and the element afterward restored to normal adjustment. On the other hand, where a growth such as a tumor
70 is to be gripped by the forceps, the bar 22 is adjusted in the direction of the gripping ends of the members 10 and 11 thereby shifting the gripping element 17^a away from the gripping end of the member 10 to as great a degree as is possible with the forceps in
75 closed or gripping position.

Another means for accomplishing the adjustment of the gripping element 17 is illustrated in Fig. 5 of the drawings, and in this figure, the gripping element indicated here
80 by the numeral 17^b has its inner end 19^b engaged in a notch 20^b formed in the member 10^b if the forceps and the said gripping member is formed with a diagonally extending slot 25 in which works a pivot or fulcrum pin 26 carried at the outer end of a
85 sliding bar 27 mounted, as in the case of the bar 24, in a groove 28 formed in the inner face of the member 11^b, the said pivot pin 26 working also in longitudinal slots 29
90 formed in the spaced portions of the said member 10^b. By sliding the bar 27 lengthwise of the member 11^b in the direction of the finger hold 13, the pin 26 will be shifted diagonally outwardly or in other words in a
95 direction to adjust the spur or gripping end of the gripping element 17^b away from the corresponding end of the member 10^b, the slots 25 being extended at such an angle and in such a direction as to accomplish this result. On the other hand, when the bar is shifted outwardly or in the direction of the gripping end of the forceps, the gripping
100 end of the element 17^b will be adjusted toward the corresponding end of the member 10^b.

From the foregoing description of my invention, it will be seen that I have provided a pair of surgical forceps in which the gripping elements or jaws are automatically
110 cleaned or cleared of membrane or of the part being operated upon so that where the forceps are employed in the extirpation of a growth, particles of the growth will be automatically cleaned from the gripping elements of the forceps when the same are
115 opened to release the growth upon its removal from the wound or incision and that where the forceps are employed in holding a member while being operated upon, clearing of the tissues enveloping the member will be obviated.

It is to be understood, in connection with the foregoing description and the illustrations of the invention, that means other than
125 that here shown may be employed in effecting the result described, and that means other than that illustrated in Figs. 4 and 5 of the drawings may be employed for the purpose of securing the adjustment of the
130

gripping element of the forceps or that this adjustment may be entirely dispensed with and further that one or two of the gripping elements may be employed, each of the members 10 and 11 of the forceps being formed with a fulcrum 16 to permit employment of one or two of the gripping elements in a single instrument. Furthermore, it will be observed that inasmuch as the gripping elements of such forceps now in use, have their gripping ends formed in a number of ways such as by one or several spurs or by merely roughening the said portions of the gripping element are not to be limited to the employment of spurs for this purpose.

What is claimed is:—

1. In an instrument of the class described, relatively movable members, and a receding jaw upon one of the members cooperating with the said member to clear the jaw of matter adhering thereto.

2. In an instrument of the class described, relatively movable bifurcated members, and a gripping element carried by one of the members and cooperating with the other one of the members when the members are in gripping relation, the said gripping element being mounted between the furcations of the member with which it is associated and being arranged to recede upon separation of the members whereby to clear the member by which it is carried of matter adhering thereto.

3. In an instrument of the class described, relatively movable gripping members, and a receding gripping element carried by one of the members and cooperating with the said member to clear the same of matter adhering thereto.

4. In an instrument of the class described, relatively movable gripping members and a receding jaw carried by one of the members and operated by the relative movement of the members and cooperating with the said member to clear the same of matter adhering thereto.

5. In an instrument of the class described, relatively movable gripping members, and a receding jaw carried by one of the members and operable by the movement of the other member and cooperating with the said member to clear the same of matter adhering thereto.

6. In an instrument of the class described, relatively movable members, and a receding jaw carried by one of the members and arranged to have a shear-like movement with respect thereto to clear the member by which it is carried of matter adhering thereto.

7. In an instrument of the class described, relatively movable members, and a receding jaw carried by one of the members and arranged to oscillate beside a portion of the said member by which it is carried

whereby to clear the said member of matter adhering thereto.

8. In an instrument of the class described, relatively movable members, and a gripping element carried by one member and arranged for movement beside a portion thereof whereby to clear the said member of matter adhering thereto.

9. In an instrument of the class described, relatively movable members, and a receding jaw carried by one of the members and arranged to clear the member by which it is carried of matter adhering thereto.

10. In an instrument of the class described, relatively movable members one of which is formed with spaced portions, and a gripping element carried by the said member and working between the said spaced portions and terminating short of the extremities thereof.

11. In an instrument of the class described, relatively movable members, and a gripping element carried by one of the members and cooperating with the other one of the members when the members are in gripping relation, the said element being arranged to recede upon separation of the members whereby to clear the member by which it is carried of matter adhering thereto.

12. In an instrument of the class described, relatively movable members, and a fulcrumed gripping element carried by one member and arranged to be swung upon its fulcrum to recede from the working face of the member upon separation of the two members whereby to clear the said face of the member by which it is carried of matter adhering thereto.

13. In an instrument of the class described, relatively movable members, and a gripping element carried by one of the members and having a working portion projecting beyond the working face of the said member by which it is carried when the members are in gripping relation, the said working portion of the element being arranged to recede from said face of the member when the members are in separated position whereby to clear the said face of the member by which it is carried of matter adhering thereto.

14. In an instrument of the class described, relatively movable members, and a gripping element fulcrumed upon one of the members and having its working end projecting in position for cooperation with the other member when the members are in gripping position, the opposite end of the said element having engagement with the other one of the members whereby the first mentioned end of the gripping element will be caused to recede upon separation of the said members and thereby clear the member by which it is carried of matter adhering thereto.

15. In an instrument of the class described,

relatively movable bifurcated members, and a gripping element carried by each of the members and mounted to rock between the furcations thereof, said gripping elements
 5 coöperating one with the other when the members are in gripping relation, the said elements being arranged to recede upon separation of the members whereby to clear their respective gripping elements by which
 10 they are carried.

16. In an instrument of the class described, relatively movable bifurcated members, a gripping element carried by each member and mounted to rock between the furcations
 15 thereof, and having operative engagement with the other member whereby to be caused to recede upon separation of the members and thereby to clear the members of matter adhering thereto.

20 17. In an instrument of the class described, relatively movable members, and a gripping element carried by one of the members and having a variable fulcrum.

18. In an instrument of the class described,
 25 relatively movable members, and a gripping element carried by one of the members and actuated through relative movement of the members, the said element having a variable fulcrum.

30 19. In an instrument of the class described,

relatively movable members, and a receding gripping element adjustably carried by one member.

20. In an instrument of the class described, relatively movable members, and a receding
 35 gripping jaw adjustably fulcrumed upon one member.

21. In an instrument of the class described, relatively movable members, and a receding gripping element adjustably fulcrumed upon
 40 one member and operable through the relative movement of both members.

22. In an instrument of the class described, relatively movable members, and a receding gripping jaw having a variable fulcrum
 45 upon one member and engaged with the other member.

23. In an instrument of the class described, relatively movable members, a fulcrumed gripping element carried by one member and
 50 engaged pivotally with the other member, and means whereby the fulcrum of the element may be adjusted.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature
 55 in the presence of two witnesses.

ALVIN F. SETHER.

Witnesses:

LUELLA M. SETHER,
 MARTHA G. McMANUS.