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H. BACHMANN

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TWEEZERS

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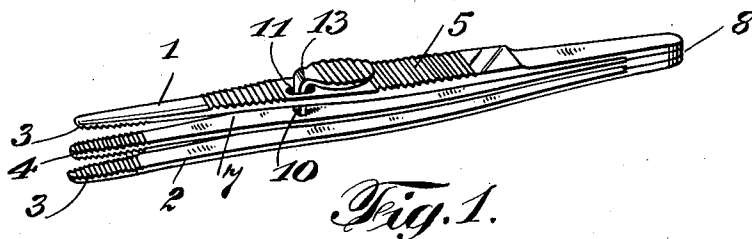


Fig. 1.

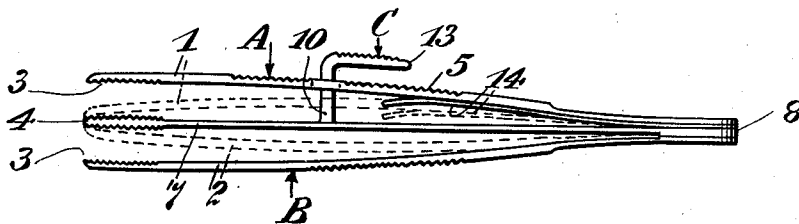


Fig. 2.

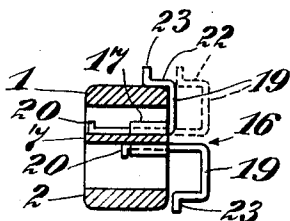


Fig. 3.

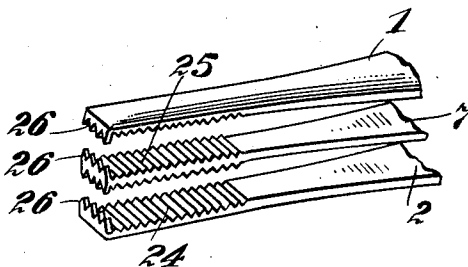


Fig. 4.

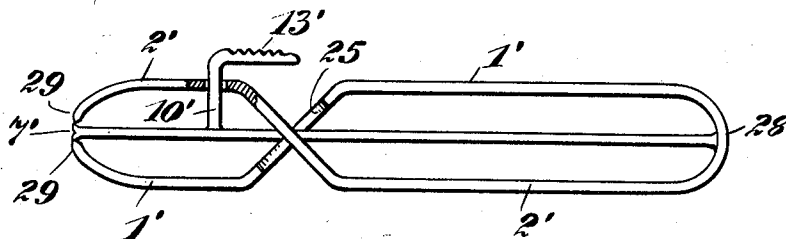


Fig. 5.

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TWEEZERS

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6 Claims. (Cl. 128—354)

The present invention relates to improvements in tweezers and more particularly to an improved construction for readily gripping either a single object or a plurality of objects.

5 The invention applies to tweezers generally, and is particularly applicable for use by doctors, surgeons, nurses and persons associated with them. Such persons, more than others, are frequently handicapped by having only a single pair
10 of hands with which to make incisions, close arteries, sew up wounds and to select articles and hold instruments at the same time. Various kinds of clamps and holding appliances are utilized by them to increase the operations and ma-
15 nipulations which can be performed simultaneously. Even these expedients, however, leave much to be desired. In surgical operations, for example, the surgeon generally requires the services of at least one nurse to assist him in holding
20 articles or in holding a vein, artery or tendon adjacent to where the surgeon is working. The advantages to the surgeon in being able to grasp, hold and release such adjacent portions instead of having to rely upon an assistant are num-
25 erous. This is particularly true where it is necessary to work within narrow confines and where speed is required. Also, in the event an emergency arises and a capable assistant is not available, the doctor is called upon to perform
30 his work alone as best he can.

The present invention aims to minimize or overcome the above and other similar difficulties by providing an improved tweezers construction adapted to be manipulated by one hand to grasp,
35 retain and release either a single or a plurality of objects independently. The device may be utilized in a small space and is inexpensive to manufacture and thoroughly practical.

40 An object of the present invention is to provide an improved tweezers capable of grasping either a single or a plurality of objects independently.

45 Another object of the invention is to provide a tweezers capable of releasing either a single or a plurality of objects independently.

Another object of the invention is to provide a tweezers of the above type which may be operated easily and quickly.

50 Another object of the invention is to provide tweezers which may be operated with one hand.

Another object of the invention is to provide tweezers of the above type which are practical and inexpensive to manufacture.

55 Other and further objects of the invention will

be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the
5 invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawing, forming a part of the specification,
10 wherein

Fig. 1 is a perspective view of the tweezers in open position, illustrating a preferred embodiment of the invention;

Fig. 2 is a side elevational view of the construction shown in Fig. 1 with the addition of a spring
15 to bias one side of the tweezers;

Fig. 3 is an enlarged sectional view showing a form of locking means;

Fig. 4 is a perspective view showing a modified form of gripping portion; and

Fig. 5 is a side elevational view illustrating a further modification of the device.

Referring again to the drawing, there is shown a tweezers construction comprising spaced members or prongs 1 and 2, secured together at one
25 end 8 thereof. Gripping means 3 comprising edges or teeth are provided adjacent the ends of the prongs. Ridges 5 are also provided on the outer surfaces of the handle portions to facilitate
30 holding the tweezers. Positioned between the outer prongs 1 and 2 and joined with them at the closed end 8 is a third member 7 with gripping means 4 adjacent its end and a projection
35 10 located at a convenient point thereon. The projection 10 extends through a recess or aperture 11 in the outer member 1 and is operative to control the movement of the third member 7
40 with respect to the outer members. The tweezers may be held in the same manner as the ordinary type of tweezers and closing of the intermediate member with respect to the outer members is controlled by a finger resting against the en-
45 larged portion 13 of the projection 10. The projection 10 permits closing of one side of the tweezers and also permits release of a single side of the tweezers at a time which gives independent
50 operation of the two outer prongs with the inner prong. The construction, in effect, provides two pairs of tweezers in a single device which can be operated with a single hand somewhat similar to the manipulation of a single pair of tweezers.

Pressure applied against the lower member 2 and the finger rest 13 (B and C of Fig. 2) causes the free ends 3 and 4 of the lower and intermedi-
55

ate members 2 and 7 to come together so as to hold an object. These members are shown in closed relation by dotted lines in Fig. 2. Pressure applied against the upper member 1 at A causes this member to close with respect to the opposite side of the intermediate member 7 to hold another object. Removing the pressure from the upper member 1 allows the free end thereof to separate from the intermediate member. Removing the pressure from the lower member 2 and the finger rest 13 allows these members to separate. Pressure applied only to the upper and lower portions causes them to close in the ordinary manner.

The extension 10 may be dispensed with if desired, and independent operation of the sides of the tweezers obtained in another manner. A spring or other resilient means 14 may be positioned between the intermediate member 7 and one of the outer prongs to bias one side of the tweezers, that is to cause a greater resistance to closing one side than to closing the opposite side of the tweezers, which is not provided with a supplemental spring. Pressure applied to the outer prongs will cause the unbiased side to close prior to the side having the spring 14. As the pressure is released from the outer prongs, the biased side will open first since the force tending to open this side is greater than on the unbiased side. The sides of the tweezers may thus be operated with one hand to independently grasp and release objects, without the use of the extension 10 on the intermediate member.

In certain cases, it may be desired to use both a biasing spring and the extension 10 to effect opening and closing of the sides of the tweezers, and the tweezers in Fig. 2 are shown constructed in that way. When both are incorporated into a tweezers, either may be used alone to cause opening and closing of one side of the tweezers independently of the other side. If the spring is placed between the lower prong 2 and the intermediate member 7, the biasing effect of the spring combined with the extension 10 enables either side of the tweezers to be selectively closed or opened independently of the other side. Pressing together only the outer prongs closes the upper side first to hold an object since the spring biases the lower side. To close the lower side first, requires that pressure be applied to the extension 10 and to the lower prong 2. If both prong ends are closed, the upper may be released prior to the lower by removing the pressure from the upper prong, the lower side may be maintained closed by retaining pressure against the lower prong and the extension 10. To first release an object held by the lower side of the tweezers requires that the pressure applied to both the outer prongs be gradually released. The lower side will open first due to the spring 14.

Sometimes, a user desires to clamp objects between one or both the tweezers prongs for a substantial period of time, leaving the user free for other operations. In Fig. 3 there is shown an enlarged sectional view of a locking device adapted to perform this function. The upper side of the tweezers is shown held in closed relation by the locking device and the lower side is shown in open relation. One leg of a substantially U-shaped member 19 is adapted to slide longitudinally within a guide 17 secured to the intermediate member 7. The remaining free leg of the U-shaped member extends over one of the outer prongs to hold it closed with respect to the intermediate member and extends beyond the

side thereof when the tweezers prong is in open relation. A projection 23 on the free leg of the U-shaped member facilitates engagement and movement by the user and a projection 20 on the free end of the leg in the guide 17 prevents disengagement from the guide or cover 17. The lugs for each side of the tweezers are alike and operate in the same way.

While the free ends of the prongs and intermediate member have been shown provided with an ordinary type of corrugation or ridge, it will be understood that other constructions may be substituted therefor, depending upon the particular field of use of the tweezers. The construction illustrated in Fig. 4, for example, has transverse corrugations 24 on the outer prongs, similar corrugations 25 on the intermediate member and teeth 26 at the ends of the prongs and intermediate member. This latter construction is adapted for certain types of surgical work and for other purposes.

In Fig. 5, the present invention is shown applied to a different type of tweezers, wherein the prongs are normally maintained in closed relation and must be opened in order to grasp an object. A pair of resilient outer prongs 1' and 2' are secured together at one end 28 thereof and provided with adjacent, inwardly facing recesses 25 at some convenient point along the length thereof. At a point adjacent the recesses 25, the outer prongs reverse sides, that is each crosses to the opposite side of the tweezers and from thence extends outwardly and inwardly to the free ends 29. The adjacent recesses 25 are each located in that portion of the outer member which crosses to an opposite side of the tweezers and they cooperate to provide, in effect, a single aperture. Extending outwardly between the outer prongs from the secured end 28 and through the aperture formed by the cooperating recesses 25, is an intermediate member 7' provided with a projection 10' and a finger portion 13'. The intermediate member preferably terminates adjacent to the free ends of the outer prongs, which are formed so as to be normally maintained resiliently in contact with the intermediate member. Pressure against the outer prongs opens both sides of the tweezers and releases objects held between each of its free ends. Pressure applied to the projection 10' and the lower prong 2', which crosses to the upper side of the tweezers, opens the upper side of the tweezers and releases an object held thereby.

The operation of each type of tweezers will be clear from the above description. It will be seen that the present invention provides an improved, inexpensive and thoroughly practical tweezers construction with which a user may independently grasp or release either a single or a plurality of objects. The device may be easily and quickly operated with one hand, may be locked and released with the same hand, and requires a minimum of effort and skill on the part of the user. As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:
1. A tweezers comprising outer members of substantially equal length, a member intermediate said outer members with the free end thereof terminating at the ends of said outer members.

said members being attached together at one end thereof, and means secured to said intermediate member and extending laterally thereof beyond the plane of the outer surface of one of said outer members adapted to move said intermediate member independently of one of said outer members.

2. A tweezers device comprising a plurality of outer prongs, one of said prongs having a recess therein, and a prong interjacent said outer prongs with a projection thereon extending through said recess adapted to close and open said interjacent prong with respect to one of said outer prongs.

3. A tweezers having a pair of outer members, one of said outer members having a recess therein and a third member positioned between said outer members with a projection thereon extending laterally from the third member through the recess in said outer member with a finger portion bent substantially parallel to said recessed outer member and adapted to facilitate opening and closing of said third member with one of said outer members.

4. A tweezers comprising a pair of outer members, a member normally spaced intermediate said outer members with a projection thereon adapted to facilitate closing of said intermediate member with respect to one of said outer members, said other outer member being provided with a recess adapted to accommodate the projection on said intermediate member to facilitate closing thereof

with respect to said intermediate member, and means on said intermediate member for selectively retaining one of said outer members in closed relation with respect to said intermediate member.

5. In a tweezers device a pair of outer members adapted to be normally retained in closed position, and a member intermediate said outer members with a projection thereon extending laterally thereof beyond the plane of one of said outer members and adapted to be pressed to move said intermediate member away from one of said outer members.

6. A tweezers comprising a pair of outer members retained together adjacent one end thereof and normally spaced at the working ends thereof, a member intermediate said outer members maintained in position by the retained ends of said outer members and a separate member located between said intermediate member and one of said outer members and maintained in position adjacent the retained ends of said outer and intermediate members adapted to press outwardly against said outer member to increase the tendency of said outer member to remain open to a greater extent than the other outer member so as to facilitate closing of said other outer member with said intermediate member prior to the closing of said outer member on which the separate member is effective with the intermediate member.

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