Feb. 28, 1967 R. W. BRACKETT 3,306,139

TWEEZER CONSTRUCTION

Filed Sept. 13, 1965

Fig. 1.

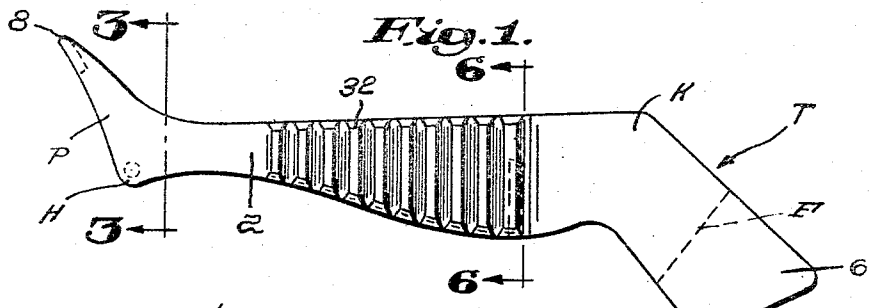


Fig. 2.

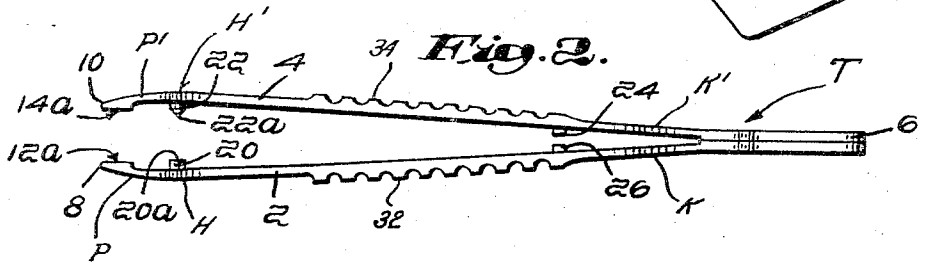


Fig. 3.

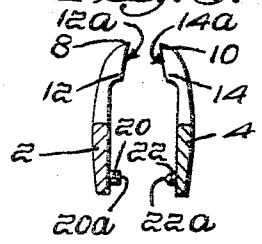


Fig. 4.

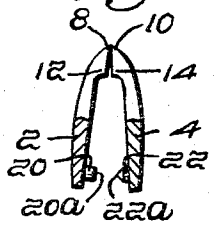


Fig. 5.

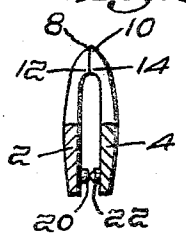
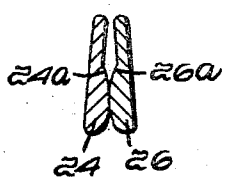


Fig. 6.

Fig. 7.



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TWEEZER CONSTRUCTION

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6 Claims. (Cl. 81—43)

This invention relates to an improved tool construction and, more particularly, to a small pincer type of tool of the class commonly referred to as "tweezers."

In the usual type of tweezer construction, it is customary to provide a pair of resilient nipper portions which can be compressed against one another along a substantially straight line. These nipper portions may range in width all the way from 1/16 of an inch up to 1/4 of an inch. To give the user an unobstructed view, especially when removing hair on or about the face while using a mirror, attempts have been made to construct the nipper portions in an offset shape and to provide a stop. This does not entirely prevent the ends of the jaw portions from opening or spreading apart or otherwise twisting out of a correct gripping position when excessive pressure is exerted by the user.

It is found that tweezers of the various types described are also open to some objection especially when used to grip and remove small objects such as hair, splinters, metal particles, and the like. For example, with nipper portions of the usual type which have relatively wide jaws and close along a straight line, it is difficult to provide for satisfactory engagement with an embedded object. This is particularly the case when the embedded object may be underneath a fingernail or in some other inaccessible area.

An object of the present invention is to improve tweezer construction and to devise an arrangement of nipper portions which provide for specially formed jaws designed so that at their extremities they can meet and be compressed together along a very small area of nipping.

Another object of the invention is to combine with a pair of tweezer nipper portions a plurality of stop elements and cam portions which cooperate with one another to provide for exerting compressive forces in a progressively applied manner.

Still another object of the invention is to devise an arrangement of parts in a pair of tweezer legs whereby a combined rolling and twisting force can be exerted to localize pressure at the tweezer tips in a novel manner.

The general nature of the invention and other objects and novel features will be more fully understood from the following detailed description. In the accompanying drawings,

FIGURE 1 is a side elevational view of the tweezer construction of the invention in an open position;

FIGURE 2 is another elevational view of the tweezer viewed along the side edges thereof;

FIGURE 3 is a detail cross sectional view taken on the line 3—3 of FIGURE 1;

FIGURE 4 is another cross sectional view similar to FIGURE 3 but illustrating the tweezer in a partly closed position;

FIGURE 5 is a view similar to FIGURES 3 and 4 but illustrating the tweezer in a fully closed position;

FIGURE 6 is a cross section taken on the line 6—6 of FIGURE 1; and

FIGURE 7 is another cross sectional view showing the structure of FIGURE 6 in a fully closed position.

The principal parts of the tweezer construction of the invention include a pair of resilient nipper elements joined together by a connecting portion in a position such that the nipper elements are caused to flex along a substantially transverse line of flexing. The nipper elements are

normally disposed in diverging relationship to one another to present a pair of spaced apart gripping jaws. Each nipper element consists of a thin flat strip of spring steel or other suitable material having a contour generally resembling the human knee, lower leg and foot. This shape is not only intended to be decorative, but is also useful from the standpoint of progressively applying forces which can be localized in the jaws in a novel manner as hereinafter described.

Considering the structure described in greater detail, I provide two nipper elements 2 and 4 which are resiliently joined together by a connecting section 6 so that they are caused to flex along a transverse line of flexing F. The nipper elements 2 and 4 in a normally open position diverge outwardly in an angularly disposed manner to define spaced apart knee-shaped portions K and K' and tapered foot portions P and P'. Each of the foot portions P and P' are further formed with heel sections as H and H' and toe sections as 8 and 10. The toe sections 8 and 10 taper down to relatively small tips of narrow width designed to be inserted under fingernails and other inaccessible areas with a minimum of difficulty.

I further provide along inner surfaces of the nipper elements 2 and 4 a series of pairs of contact surfaces with each pair of surfaces being offset with respect to one another and being differentially spaced apart. With the differential spacing noted the contact surfaces when compressed toward one another are caused to meet in successive stages which makes possible the development of desirable torsion or twisting effects.

By means of the torsion or twisting forces there may be exerted an extremely effective gripping action which is localized in the outermost contact surfaces 12*a* and 14*a* of gripping jaws 12 and 14. It is pointed out that the surfaces 12*a* and 14*a* occur in slightly angled relationship to one another as best shown in FIGURES 3 and 4 so as to provide for the surfaces meeting along a relatively sharp but narrow line of engagement.

Another one of the pairs of contact surfaces referred to above is comprised by surfaces 20*a* and 22*a* located on stops 20 and 22 in turn mounted on the inner surfaces of the heel portions H and H' as best shown in FIGURES 2 to 5 inclusive. The surfaces may be of different shapes including two flat surfaces or two concaved surfaces or possibly one rounded surface and one pointed surface.

Still another pair of contact surfaces referred to above is comprised by cam surfaces 24*a* and 26*a* of cam parts 24 and 26 located on the inner sides of the knee portions K and K'.

The surfaces 12*a* and 14*a* of gripper jaws 12 and 14 are arranged in such a manner that when the nipper elements are compressed together these surfaces meet first. Thereafter, with increasing compressive forces exerted on the nipper elements 2 and 4, the surfaces 20*a* and 22*a* on stops 20 and 22 come into contact. At this time the cam surfaces 24*a* and 26*a* are still in spaced relation to one another.

Further application of compressive forces then move the cam surfaces to begin to come together and by increasing compressive forces slightly more the cam surfaces engage with a rolling or twisting action which operates to twist the nipper elements slightly alone one side. Since the stops 20 are already engaged the twisting effect is caused to become localized in the gripper body surfaces 12*a* and 14*a* and particularly at the very extreme ends of these surfaces.

It will be observed that the relatively narrow toe portions of the gripper jaws are sufficiently narrow so that they can be inserted into extremely inaccessible areas and at the same time by the twisting forces described, can be clamped together very tightly as gradually increasing com-

pressive forces are exerted on the nipper elements. Thus a maximum efficiency for locating and gripping small objects in various embedded positions may be realized in a highly convenient manner since the angled gripping surfaces meet along a relatively sharp and narrow line of engagement. It is also pointed out that the angularly disposed position of the nipper elements at points where they extend outwardly from the connecting portion **6**, together with the offset arrangement of contact surfaces **20***a* and **22***a*, results in compressive forces which are exerted on the rib portions **32** and **34** producing a very strong gripping action with a minimum of pressure being required.

It will be understood that changes and modifications may be resorted to and in particular there may be employed a single larger stop in place of the two smaller stops **20** and **22** and similarly the cams **24** and **26** may be replaced by a single cam surface at one side of the tweezer.

From the above description of the invention it will be apparent that the difficulties heretofore realized with conventional types of tweezers may be largely avoided and a very effective gripping action may be realized by the combination of parts described and changes and modifications are contemplated within the scope of the appended claims.

I claim:

1. An improved tweezer construction comprising a pair of resiliently connected nipper elements including spaced apart engaging jaws, the ends of the engaging jaws being laterally offset with respect to the general longitudinal axis of the connected nipper elements stop means located along inner surfaces of the nipper elements for selectively guiding the engaging jaws into a nipping position, and cam means for producing twisting forces as the offset ends of the gripping jaws move into a fully closed position.

2. A structure according to claim **1** in which the stop means includes a plurality of abutting surfaces which come into contact with one another before the cam means engage.

3. A structure according to claim **1** in which the jaws present an inner gripping surface which extends angularly with respect to one another.

4. Tweezer construction comprising a pair of resilient nipper elements and a connecting body portion for joining the nipper elements together along a transverse line of flexing, said nipper elements diverging outwardly from said transverse line of flexing in an angularly disposed manner to define spaced apart knee shaped portions and tapered foot portions, each of said foot portions including a heel section and a toe section, stop means formed on inner surfaces of the heel section, gripper jaws formed on inner surfaces of the toe sections, and said knee shaped portions being formed at inner sides thereof with a pair of cooperating cam parts which are arranged to come into rolling contact with one another when the knee portions are flexed together thereby to exert torsional forces which are localized at the toe section and which increase the gripping action of the jaws.

5. A structure as defined in claim **4** in which the said stop means in the heel section are spaced apart a lesser distance than the spacing of the cam parts to provide for engagement of the stops before the cam parts meet and the nipper elements are flexed together.

6. A structure according to claim **5** in which the stop means occur in offset relation to the gripper body and the cam parts.

References Cited by the Examiner

UNITED STATES PATENTS

573,036	12/1896	Piaget	81—43
1,198,958	9/1916	Risley	81—43
1,286,673	12/1918	Linke	294—99
1,889,475	11/1932	Henkel	81—43

FOREIGN PATENTS

55,970	4/1891	Germany.

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