

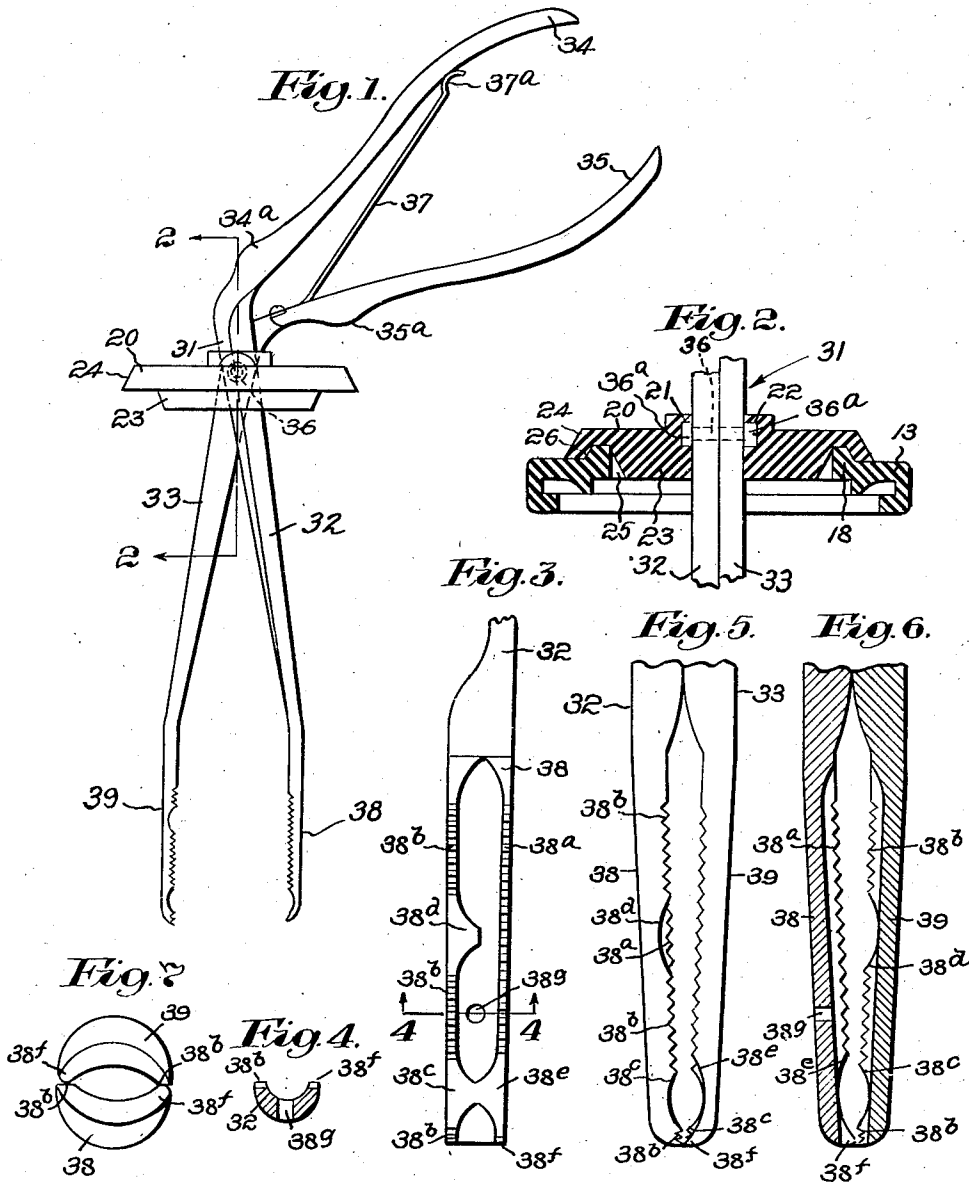
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FORCEPS

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FORCEPS

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9 Claims. (Cl. 128—321)

My present invention relates to an instrument of the forceps type for general hospital and surgical use and particularly adapted for picking up, seizing and transferring from one point to another any of a wide variety of different articles the sterile condition of which must be maintained.

In hospital practice, especially in the surgical operative field, it is essential to grasp and transfer numerous different sterile articles such as instruments, sponges, supplies and the like. These vary widely in shape, weight and bulk as from a milliner's needle to a heavy retractor or a sizable package of drygoods. The invention accordingly aims to provide a forceps of extensive or general utility, having an improved construction for the purpose and adapted and arranged for speed and convenience in use.

This application is a division of my copending application Serial No. 378,607, filed February 12, 1941, now Patent No. 2,316,731, dated April 13, 1943.

In the drawing illustrating by way of example one embodiment of the invention:

Fig. 1 shows the forceps in elevation, in association with a germicide container by which they are adapted to be received and supported when not in use, as in my parent application;

Fig. 2 is an enlarged vertical section at the lock portion of the forceps, substantially as on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged plan of the interior face of one of the forceps jaws;

Fig. 4 is a cross-section on the line 4—4 of Fig. 3; and

Figs. 5, 6 and 7 are further views of the forceps jaws, being respectively a side elevation, a longitudinal section and a front end view.

Referring to the drawing in more detail, the transfer instrument or forceps comprises in general a lock portion 31, a pair of legs or shanks 32, 33 below the lock and a pair of handle members 34, 35 above it. Instead of the usual straight handle portion with terminal finger rings, I have in the illustrated example provided the forceps with a pistol-grip handle element presented by the handle members 34, 35. These are disposed at an angle preferably at least 45° to the forceps legs 32, 33, so affording a stronger and more natural grip; see particularly Fig. 1. This angular relation of grip and legs has the further advantage that when the instrument is held by a user the forceps jaws are naturally projected in the axis of the user's forearm, in which position the load is easily handled, with minimum chance of

contaminating contact by misdirection of the forceps.

Desirably, lateral projections 34a, 35a are formed near the angle of each handle member. These give additional purchase for the thumb and forefinger respectively, to overcome any tendency of the loaded instrument to twist in the hand and also make it substantially impossible for the handle to slip back into the palm of a large hand. The handle members 34, 35 and hence also the shanks or legs 32, 33 normally stand somewhat open, as represented for example in Fig. 1, being yieldably urged toward such position by spring means. Such means is here illustrated as a unitary leaf spring 37 anchored at one end near the angle of one handle member, herein handle 35, and having a rounded portion 37a at its other end adapted to abut and have easy sliding contact on the inner face of the opposite handle member 34. The attached end of the spring may seat in a guide formation or recess at the inner face of the handle 35, holding it against turning relative to the latter. It is demonstrably or otherwise held in place, as by a screw. The spring desirably is constructed and proportioned to present the handle members substantially in the Fig. 1 position, when free of a user's hand, in which position the two handle members readily conform themselves to and are enclosable by the palm and fingers of the hand, similarly as in engaging the grip of a pistol, the thumb and forefinger coming naturally against the prominences 34a and 35a respectively. The forceps in the entirety, including said spring 37, preferably is formed of a chemical- and rust-resistant material such as one of the stainless steels.

The outer terminal portions or jaws 38, 39 of the forceps legs 32, 33 are specially constructed and arranged for maximum utility of the instrument, adapting it for picking up and grasping firmly any of the widely variant articles and materials as referred to in the introductory portion hereof.

Contributory to that end, the jaws are disposed at somewhat of an angle, inwardly toward each other, rather than as mere straight extensions in the longitudinal axis of their respective shank portions 32, 33. This allows the jaws to lie substantially parallel to each other in a slightly open position, say approximately one-half inch apart, and also enables them to remain more nearly in mutual parallelism throughout their opening and closing movements.

The jaws, each of which may be similar but op-

positely disposed, and each of which is shown as a solid one-piece member, are relatively narrow and have somewhat of a longitudinal taper, ending in a rather small externally rounded tip with a fairly sharp and almost blade-like inner edge, easily thrust beneath flat articles. In Figs. 3 and 4 one of the jaws is shown separately, in this case the jaw 38, at the end of the leg 32 integral with the handle member 34, this being the under jaw when the forceps is held with the user's thumb on top, on said handle 34, and the forceps legs extended horizontally. It will be understood however that the jaw portions proper may be substantially similar, although inverted relative to each other in the assembled instrument, so that what is said as to the jaw 38 of Figs. 3 and 4 is for the most part also pertinent to jaw 49, corresponding parts being indicated by similar reference characters; in this connection see also Figs. 5, 6 and 7. For purposes of description the portion of the forceps which is important to keep sterile, below the pivot or lock location, including at least the lower parts of the shanks or legs 32, 33 and their jaws, may be termed the infra-lock portion.

Referring now particularly to said Figs. 3 to 7, the jaws 38, 39 are concave at their inner faces, giving them an arcuate or crescentic form in cross section (Figs. 4 and 7). Their side edges taper toward the opposite jaw to relatively thin, sharp longitudinal crests. The two side-edge crests of each jaw are irregularly serrated, as at 38a, 38b, and are differently and non-oppositely recessed, upon arcs of different curvatures, as represented at 38c, 38d and 38e. In this instance one of the jaw side edges has two such recesses, 38c and 38d, the inner one 38d standing laterally opposite non-recessed serrated edge portions 38a, both of the same jaw and of the other jaw. The outer recess 38c is adjacent but spaced sufficiently from the tip of the jaw to provide for one or more serrations 38b between it and the terminal extremity of the jaw.

Opposite this outer recess 38c of the plurally recessed jaw edge the other edge has the somewhat longer recess 38e extending substantially fully to the very terminal tip of the jaw, there forming a sharp terminal corner or single tooth 38f. The latter, in cooperation with the plural-toothed terminus of the oppositely arranged jaw, see Figs. 5 to 7, is adapted to pickup and hold firmly relatively minute articles and objects such as the smaller surgical needles, sutures, etc. In picking up such small articles the non-opposite single points or teeth 38f of the respective jaws serve in effect to lift and feed them into a position where they are grasped or clamped by the other teeth 38b; in this connection see particularly Figs. 5 to 7.

The irregular and non-matching structure for the opposed jaws such as here illustrated and described by way of example, together with their length, special tip formation, and ability to open from a tip-contacting position at an inclination toward each other, through a position of parallelism, to open positions up to angles of 90° and more (the spring 37 being able to move away from handle 34 in the wider open conditions) affords for the forceps an extremely wide range of usefulness, importantly extending its capacity for general utility pick-up and transfer purposes.

As seen in Figs. 3, 4 and 6, the jaw 38, the one in the lower position when the forceps is held extended, may be formed with a drainage aperture 38g, through which germicide which might other-

wise be held in the concavity of the jaws may readily escape.

Referring to Figs. 1 and 2, the forceps as here illustrated has provided at its lock portion 31, in lateral line with the pivot axis thereof, an exterior seating formation, either protuberant or reentrant, such as laterally projecting hubs, bosses or the like 36a, 36a, Fig. 2. These may be variously formed. As here illustrated by way of example, they comprise extensions of the pivot element, screw, pin or the like 36 of the forceps lock portion. These formations or projections 36a, 36a are adapted for cooperation with a laterally projecting guard and supporting element 20 whereby the instrument may be held upright at the mouth of a jar or other container for a germicide solution, such jar having a receiving rim 13 at its upper end; as more fully described in my copending application previously mentioned. This guard and supporting element 20 also affords means whereby the forceps jaws are held above and out of contact with a flat surface, such as a table top, should the instrument be laid flatwise on the latter, said element further serving as a hand guard and barrier for the grip portion of the instrument. As here shown the protective and supporting element 20 associated with the forceps lock comprises a molded or otherwise formed plate or disc of a rubber or rubber-like or other resilient composition at least at its central portion. It is centrally apertured to receive the lock portion 31 of the forceps, with the forceps legs or shanks 32, 33 substantially up to the lock projecting below or beyond the element 20, at the side of the element 20 opposite the grip portion, the latter extending oppositely above or beyond said element 20. At opposite sides of the central aperture of this laterally projecting guard and supporting element 20 are sockets 21, 22, Fig. 2, adapted to snap firmly into position over the described lateral projections 36a, 36a on the forceps jaws and which in the illustrated form are constructed as lateral extensions of the pivot element 36.

Thus the disc or plate element 20 normally is securely positioned on the forceps, with its aperture closed by the lock portion of the latter and by the resilient opening-defining wall means of said element 20, affording in effect a variable aperture conforming to the inserted portion of the forceps and laterally yieldable further to open or to reclose the aperture snugly about the forceps. If desired, this guard and supporting element 20 may be removed for cleaning or replacement by distending it sufficiently to release the forceps pivot extensions from their receiving sockets 21, 22, permitting withdrawal of the forceps legs. When not required, the element 20 accordingly may be omitted.

In the general use of the transfer forceps in operating rooms and the like, this instrument is kept in an upright jar containing germicide, and as to which container the element 20 of the forceps serves as a cover, in addition to its functions as a support and guard for the instrument, as for example in the parent application referred to. As in said application, such jar or container may have a receiving rim 13, Fig. 2, previously mentioned, such rim desirably having an upright flange or lip 18 with an inclined outer wall. In such case the guard and supporting element 20 of the forceps may have a depending plug portion 23 preferably with a downwardly tapered peripheral wall, for positioning within the receiving aperture of the jar or container rim

13, together with a surrounding downwardly projecting peripheral flange 24 spaced from the plug portion to provide an annular channel such as 25 for snug sealing reception of the jar rim flange 18, the inner wall 26 of said peripheral flange 24 of the forceps guard and supporting element 20 then being beveled or outwardly inclined to conform to such flange 18. Thus the laterally projecting forceps element 20 is adapted for easy and assured firm seating on the container, requiring no special attention in placing it in forceps-supporting position, and in which said element serves as a closure for the jar or container and effectively prevents undue evaporation of the germicidal content.

It will be understood that my invention is not limited to the exemplary embodiment herein illustrated or described, and I set forth its scope in my following claims:

I claim:

1. A transfer forceps comprising a pair of elongated main handle and jaw members each having an intermediate lock portion, a pivot member extending through both said members at their lock portions and having its opposite ends projected laterally beyond them, and a laterally projecting flange-like guard and supporting element surrounding said main members at the lock pivot, said element being centrally apertured to receive said main members and having seating formations for the projecting ends of the lock pivot member thereby to secure said element to the main members, at least the portion of said element which immediately surrounds and defines its central aperture being adequately flexible to accommodate the opening and closing movements of the forceps main members while remaining in substantially enclosing engagement with them.

2. In a transfer forceps, a pair of pivotally associated elongated handle and jaw members, an exterior seating formation laterally disposed at the pivot axis of said members, and a centrally apertured flange-like element adapted for mounting on the forceps in laterally projecting relation at the pivot region and in general parallelism with the pivot axis, said element having means at the periphery of its aperture for interengagement with said seating formation thereby to secure said element upon the forceps.

3. In a transfer forceps, a pair of pivotally associated elongated handle and jaw members, an exterior seating formation at the pivot axis of said members, and a centrally apertured flange-like element having means at the periphery of its aperture for interengagement with said seating formation thereby to secure said element upon the forceps, at least the central apertured portion of the flange-like element being resilient and the aperture wall snugly surrounding the forceps lock portion with capacity for yielding to accommodate opening and closing movement of the forceps handle and jaw members.

4. In a transfer forceps, a pair of pivotally associated elongated handle and jaw members, an exterior seating formation at the pivot axis of said members, and a centrally apertured flange-like element having means at the periphery of its aperture for interengagement with said seating

formation thereby to secure said element upon the forceps, the seating formation at the forceps lock portion and the means on the flange-like element interengageable therewith being readily releasably associated and whereby said element is demountable.

5. A sterile transfer forceps particularly adapted to pick up and hold firmly articles of various shapes and sizes including articles of relatively minute cross-section such as surgical needles, such forceps comprising a pair of pivotally associated main elements each having a handle at one end and an elongated jaw at the other end, each jaw at its grasping end being recessed at its inner face and transversely rounded at its outer face to provide a crescentic cross-sectional shape at said end, the outer terminal portion of each jaw having at one inner longitudinal side edge a single tooth-like formation and at the other inner side edge a plurality of teeth, for transversely grasping by said jaws such needle-dimensioned articles and others.

6. A sterile transfer forceps of general utility for picking-up and transferring articles of various shapes and sizes, particularly in surgical, medical, blood-banking and such practice, such forceps comprising a pair of pivotally associated main elements each having a handle at one end and an elongated substantially straight jaw at the other end, each jaw being a solid one-piece member having at its inner face a plurality of laterally spaced longitudinally extensive series of grasping serrations, one such series adjacent each longitudinal side of each jaw, the jaws being longitudinally troughed between adjacent serration series and terminating at their outer ends in convex and inwardly rounded tips, said jaws being manipulable as between positions of tip contact or substantially so for grasping small articles such as surgical needles and positions of wide-angle opening for grasping larger articles and objects such as sponges, surgical dressings, packages and the like for sterile transfer thereof.

7. A sterile transfer forceps according to claim 6 wherein the longitudinal series of grasping serrations of each jaw are disposed along the longitudinal side edge portions of the inner face and are spaced laterally by an intervening longitudinal depressed portion, the serrations of at least one series of each jaw being interrupted by one or more recesses of substantial longitudinal extent, with a recess of one serration series standing transversely opposite a non-recessed portion of the other serration series of the same jaw.

8. A sterile transfer forceps in accordance with claim 6 wherein the jaw of the forceps which is in the lower position when the forceps is held extended is formed with a drainage aperture through which germicidal and other fluid which might otherwise be held in the jaws may readily escape.

9. A sterile transfer forceps in accordance with claim 6 wherein the handles of both main elements are disposed in general parallelism at an angle of at least about 45° to the jaws, to present a pistol-grip handle for enclosure by the palm and fingers of a user's hand with the forceps projected in the axis of the forearm.

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