July 29, 1941. J. S. RUBIN 2,250,605

TISSUE HOLDER

Filed April 1, 1940

FIG. 1.

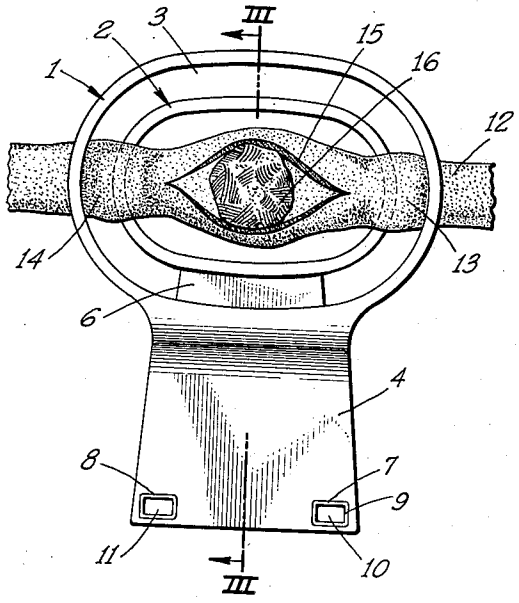


FIG. 2.

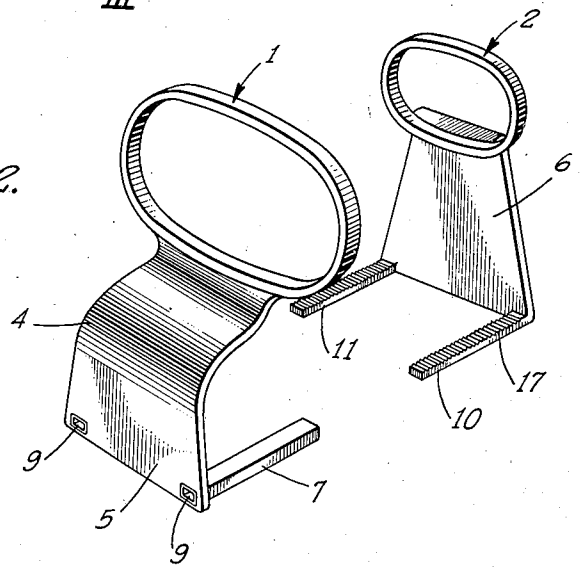
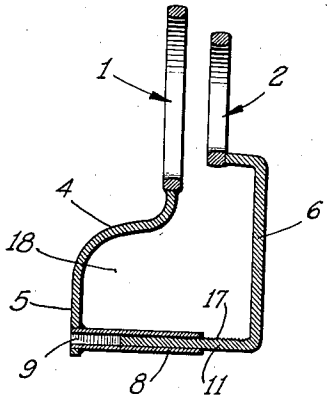


FIG. 3.



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TISSUE HOLDER

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3 Claims. (Cl. 128—346)

My invention relates to tissue holders and has particular reference to devices for grasping and holding body tissues during surgical operations.

In the performance of many surgical operations it is necessary to dissect certain tissues or organs which must be held in the operative field without possibility of such tissues or organs becoming obscured from ready access and also it is frequently necessary to localize portions of the tissue or bodies within the tissues or organs so as to prevent inadvertent dislocation of the bodies until their removal by performance of further steps in the operation can be accomplished.

One particular instance in which such segregation of the tissues and localizing of bodies therein is of great importance is in the performance of ureteral lithotomy. In the performance of this type of operation, the ureter, or at least that portion thereof in which the calculus is located, must be dissected and held in a suitable position to permit the subsequent opening of the ureter for the removal of the calculus therefrom. The ureter is, like most body tissues, difficult to handle and to fix in a given position by reason of the slippery nature of the organ. Further difficulty in the performance of such operations is that handling of the dissected ureter in attempts to tie the same with tapes or other known holding devices frequently dislodges the calculus from its then position, usually causing the calculus to move back toward the kidney and rendering the operation for removal thereof more complicated and more difficult.

Moreover, the employment of known surgical clamps and clamping devices for the purpose of grasping and holding many body tissues, such as the ureter, is unsatisfactory due to the fact that the forces required to securely engage such clamps with the tissues or organs requires the squeezing or compressing of the tissues so that injury to the tissues results therefrom.

It is therefore an object of my invention to provide a tissue holder which will securely engage and retain satisfactory tractile grip upon tissues without exerting crushing or injurious compressive forces upon the tissues or organs.

Another object of my invention is to provide a tissue holder of the character set forth in which the tissue or organ is grasped between two similarly shaped ring-like members, the periphery of one being sufficiently large to extend about and completely encircle the other so as to grasp the tissue by a tortuous deflection of the tissue but without squeezing or crushing the tissues therebetween.

Another object of my invention is to provide a tissue holder of the character set forth in which the cooperating ring-like members may be readily drawn toward each other to grasp the tissues therebetween or moved apart to release the tissues by the manipulation thereof with but one hand of the operator.

Another object of my invention is to provide a tissue holder of the character set forth in which the ring-like members are self-retaining in any adjusted position.

Other objects and advantages of my invention will be apparent from a study of the following specifications, read in connection with the accompanying drawing, wherein

Fig. 1 is a plan view of my tissue holder illustrating the relative position of the parts when grasping an ureter and localizing a calculus therein which is to be removed from the ureter;

Fig. 2 is a perspective view of the clamp shown in Fig. 1 and illustrating the position of the parts when completely separated from each other; and

Fig. 3 is a vertical sectional view taken along line III—III of Fig. 1 and illustrating the parts in their assembled positions.

Referring to the drawing, I have illustrated my holder as comprising an outer ring-like member 1 and an inner ring-like member 2, the contour of each of these members being of any suitable shape though I prefer that they be constructed of elliptical or oval shape for the purpose of providing long and short axes for the ring-like members to more readily adapt my tissue holder to various types of tissues and body organs. From an inspection of Fig. 1, it will be observed that the outer ring-like member 1 is considerably larger in its dimensions than the inner member 2 so that when the members are assembled together with the inner member nested within the outer, there is a space band 3 of considerable width between these two members.

The outer member is mounted upon or formed integrally with a support 4 which preferably extends forwardly and downwardly so as to dispose the outermost end 5 of the support in parallel relation to the plane of the ring 1 but in forwardly offset relation thereto. The inner ring 2 is similarly mounted upon or secured to a suitable support 6 which is likewise preferably disposed in a plane parallel to but rearwardly offset from the plane of the ring 2. Formed integrally with or secured to the support 4 are a pair of tube-like arms 7 and 8 extending from the rear face of the support 4 and in a direction transverse to the plane of the ring 1. The tubu-

lar arms 7 and 8 preferably engage the support 4 at its lowermost end, that is, as far as it is conveniently practicable away from the center or longitudinal axis of the ring 1. The arms 7 and 8 are each provided with a longitudinal bore 9 extending therethrough, preferably of rectangular cross section, into which may be received the forwardly projecting rectangular cross sectioned arms 10 and 11 formed upon or attached to the rear bracket or support 6, the arms 10 and 11 extending from the lowermost portion of the bracket 6 and spaced from each other sufficiently to permit the arms 10 and 11 to be readily slidable into the tubular arms 7 and 8, respectively.

By referring particularly to Fig. 3, it will be observed that the tissue holder may be readily assembled merely by projecting the arms 10 and 11 into the arms 7 and 8 and then pressing the supports 4 and 6 toward each other, sliding the arms 10 and 11 within the arms 7 and 8 until the rings have been drawn toward each other a sufficient distance to grasp the tissue or organ to be held. For example, in grasping an ureter the rear ring 2 is placed beneath the ureter and the upper ring is placed above the ureter when the two rings are in their maximum separated positions but with the arms 10 and 11 assembled in the tubes 7 and 8.

Then by merely pressing the supports 4 and 6 toward each other, the two rings will approach each other, grasping the ureter indicated at 12 between them in such fashion as to bend the ureter upwardly as at 13 from behind the front ring 1 and over the rear ring 2 while at the same time the ureter will be bent upwardly as indicated at 14 by the offset sides of the rings 1 and 2.

It will be noted that this method of grasping the ureter does not crush any of the tissues but retains an entirely satisfactory secure grip upon the ureter merely by the distorting of the ureter as it passes over and under the rings 1 and 2, respectively.

The ureter or other tissue so grasped may be readily picked up and held in the operative field by one hand of the operator grasping the supports 4 and 6, the rings 1 and 2 being held in their gripping relation by reason of the leverage afforded by the distance between the central axes of the rings 1 and 2 and the arms 7, 8, 10 and 11, any tendency to separate the rings being opposed by the twisting of the arms 10 and 11 in their respective sockets 7 and 8. Thus the tissue or organ will be retained entirely by the frictional resistance of the arms 10 and 11 and the arms 7 and 8.

While the tissue is so gripped, other subsequent portions of the operation may be performed upon the tissues such as the nicking of the ureter, as indicated at 15, to open the same and permit the ready removal of the calculus or other body 16 therefrom and to permit the re-closing and suturing of the organ.

By making the rear holding member 2 and the front holding member 1 both as rings or annuli, the precise point of operation upon the tissue or organ may be left entirely free of any clamping or gripping surfaces and permit the manipulation thereof in the performance of subsequent portions of the operation. For example, in the illustration shown the calculus, while held against possible escape in either direction along the ureter by the action of my tissue holder, is not in its grasp by any clamp, tie or other holding device and hence the particular point of the operation is entirely free for the performance thereof.

In order to insure against inadvertent slipping of the supports 4 and 6 while holding a tissue, I prefer to roughen at least one of the surfaces of the arms 10 and 11 as indicated at 17 which may be accomplished by producing a "satin finish" thereto.

When the operation is complete, a clamp may be readily removed by the manipulation of the fingers of one hand as by extending one finger into the space 18 between the front and rear supports 4 and 6 to straighten these supports into substantially parallel relation to each other, whereupon the frictional grip is released and the two members may be readily separated.

While I have shown and described the preferred embodiment of my invention, I do not desire to be limited to any of the details of construction shown and described herein, except as defined in the appended claims.

I claim:

1. A tissue holder comprising an annular front tissue engaging member, an annular rear tissue engaging member having the same shape as the internal periphery of the front member but of lesser length, means individual to each of said members for supporting the same, a pair of arms on one of said supports extending in a direction transverse to the plane of the member supported thereby, and arm receiving means on the other of said supports for receiving said arms to thereby intercouple the supports, said arms and said arm receiving means being disposed at points on the respective supports spaced laterally from the central axes of said tissue engaging members, whereby the leverage effect between the arms and the arm receiving means will frictionally hold said members in any adjusted position.

2. A tissue holder comprising an annular front tissue engaging member, an annular rear tissue engaging member having the same shape as the internal periphery of the front member but of lesser length, means individual to each of said members for supporting the same, a pair of arms on one of said supports extending in a direction transverse to the plane of the member supported thereby, and tubular means on the other of said supports extending in a direction transverse to the plane of the member on said support for slidably receiving the arms.

3. A tissue holder comprising an annular front tissue engaging member, an annular rear tissue engaging member having the same shape as the internal periphery of the front member but of lesser length, means individual to each of said members for supporting the same, a pair of arms on one of said supports extending in a direction transverse to the plane of the member supported thereby, tubular means on the other of said supports extending in a direction transverse to the plane of the member on said support for slidably receiving the arms, and means on said arms for frictionally engaging the interior of said tubular means.

JOSEPH SALEM RUBIN.