Jan. 13, 1959

E. C. WEISKOPF ET AL

2,868,072

MOUNT FOR PARAFFIN-BLOCKED HISTOLOGIC TISSUE SPECIMEN

Filed March 29, 1955

Fig. 1.

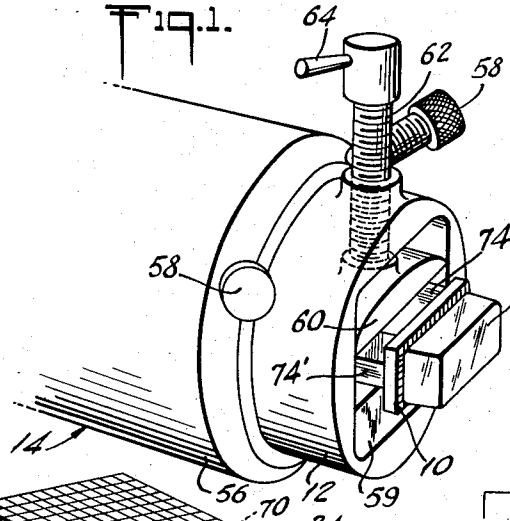


Fig. 2.

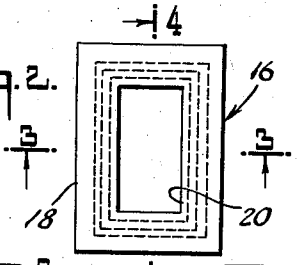


Fig. 3.

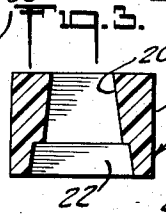
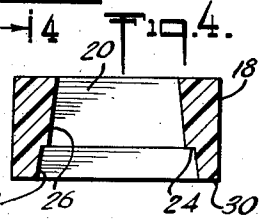


Fig. 4.



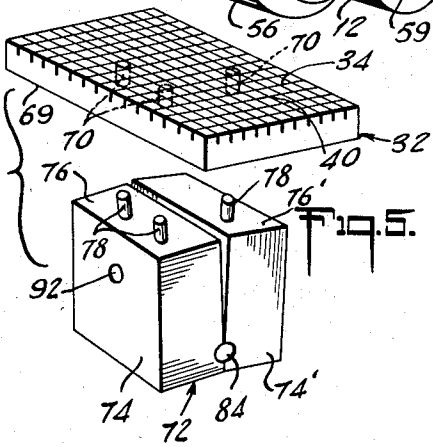


Fig. 5.

Fig. 6.

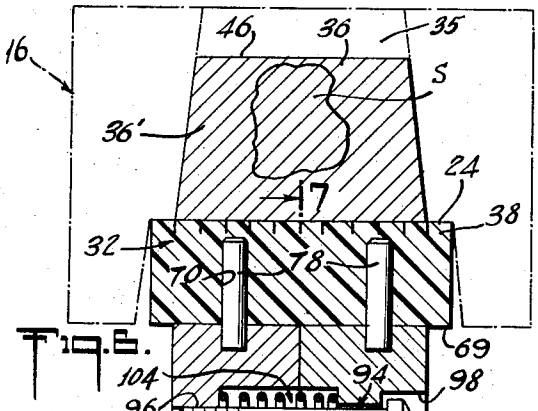


Fig. 8.

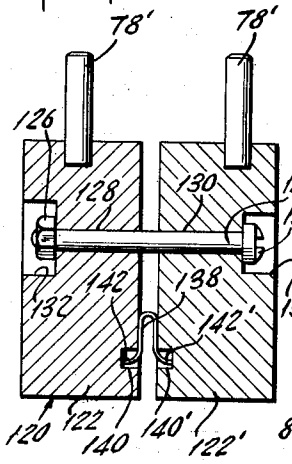


Fig. 7.

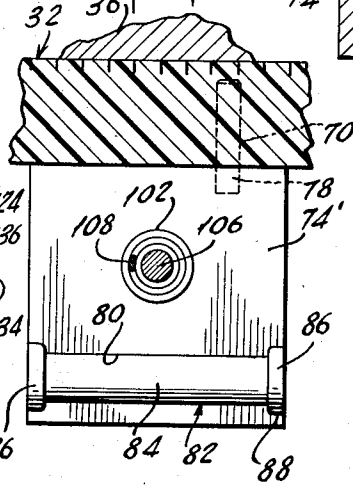
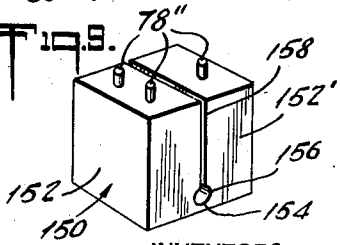


Fig. 9.



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MOUNT FOR PARAFFIN-BLOCKED HISTOLOGIC TISSUE SPECIMEN

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Application March 29, 1955, Serial No. 497,712

13 Claims. (Cl. 88—40)

This invention relates generally to a mounting device for a paraffin-blocked histologic tissue specimen and, more particularly, to a mounting device for a paraffin-blocked histologic tissue specimen adapted for mounting to the specimen holder of a microtome.

Pursuant to heretofore practiced histology technique, a mounted paraffin-blocked histologic tissue specimen is formed by pouring molten paraffin in a paper boat or container, placing the impregnated tissue specimen in the molten paraffin, and adding molten paraffin so as to cover such specimen. When the paraffin solidifies so as to form a paraffin-blocked histologic tissue specimen, the latter is mounted to a paraffin holding or mounting device, such as a plug or block formed of wood or molded fiber or a metal holder, and the paper container is removed. Where wood or molded fiber blocks are used, they remain permanently affixed to the paraffin-blocked specimen and have the attendant disadvantage of being relatively bulky and therefore utilize excessive space when filed. Where metal holders are utilized they are removed from the paraffin-blocked specimen for filing the latter due to the cost of such holders, adding technician's time and labor to the handling of such specimens. Furthermore, a mounted paraffin-blocked histologic tissue specimen must be oriented in the same position in the specimen holder of a microtome, especially when recutting a paraffin-blocked specimen that has been filed, and this orientation is a delicate and time consuming procedure utilizing blocks or holders of the character described above. It is accordingly the primary aim and object of this invention to provide an improved mounting device for a paraffin-blocked specimen which obviates the disadvantages of the heretofore used mounting devices and which provides for a relatively thin mounted paraffin-blocked specimen, whereby to minimize the space required for filing such specimens, said mounting device providing a ready means for mounting such specimens in properly oriented position in the specimen holder of a microtome.

Another object of the present invention is the provision of an improved mounting device for a paraffin-blocked specimen which is adapted to be firmly releasably clamped to a specimen holder for mounting such specimen in position and which is adapted to provide a small clamping force for releasably supporting such specimen on the release of the specimen holder clamping pressure.

Yet another object of the present invention is the provision of an improved mounting device for a paraffin-blocked specimen which is of simple design and construction, and which may be economically mass produced.

The above and other objects, features and advantages of the present invention will be more fully understood from the following description considered in connection with the accompanying illustrative drawings.

In the drawing which illustrates the best modes now contemplated by us for carrying out our invention;

Fig. 1 is a perspective view of a mounted paraffin-blocked histologic tissue specimen shown secured to a specimen holder of a microtome;

Fig. 2 is a top plan view of a paraffin-blocking mold formed according to the present invention;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is a perspective view of a mounting plate and one form of adaptor device for a paraffin-blocked histologic tissue specimen according to the present invention with the mounting plate and adaptor device shown in disassembled relation;

Fig. 6 is a vertical sectional view, on an enlarged scale, of a mounted paraffin block histologic tissue specimen shown in assembled relation with the adaptor device of Fig. 5;

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 6;

Fig. 8 is a vertical sectional view of a modified form of adaptor device; and

Fig. 9 is a perspective view of a further modified form of adaptor device.

Referring to the drawing in detail, there is shown a mounted paraffin-blocked histologic tissue specimen **10** which is formed by the method and apparatus to be described in detail hereinafter, said mounted paraffin-blocked specimen being adapted to be releasably clamped to the specimen block holder **12** of the microtome **14** for slicing specimen sections of accurately predetermined thickness for histological examination.

The mounted paraffin-blocked histologic tissue specimen **10** is formed by utilizing the paraffin-blocking mold **16** which may be formed of any suitable material, such as neoprene, polyethylene, Bakelite, or the like. The paraffin-blocking mold **16** comprises a receptacle part **18** which is of quadrilateral configuration and which has an opening **20** of quadrilateral cross section extending therethrough, said opening having an enlarged part **22** at the bottom thereof defining the peripherally extending shoulder **24** which is adapted for a purpose which will be evident from the description which follows. The opening **20** and the enlarged bottom part **22** thereof have side walls **26** and **28**, respectively, which diverge outwardly towards the bottom face **30** of the part **18** in order to facilitate the removal of the mounted paraffin-blocked histologic tissue specimen **36** from the receptacle part **18** of the mold **16**. It will be understood that the receptacle part **18** and the opening **20** extending therethrough may be of any desired size and shape and the specific embodiment illustrated and described is given by way of example only. The paraffin-blocking mold **16** further includes the mounting device **32** which is best shown in Fig. 5, said mounting device being adapted to form a removable bottom wall of the receptacle part **18**. The mounting device or block **32** is of a size and shape as to removably fit in the enlarged part **22** of opening **26**, as shown in Fig. 6, and said mounting device, which may be formed of any suitable material such as Bakelite or any other suitable plastic, has an outer planar scored face **34** which is adapted to form the bottom wall of the cavity **35** when the mounting block is in assembled relation with the receptacle part **18** of the mold. Thus the side walls **26** of the receptacle part **18** and the scored face **34** of the mounting block **32** collectively define the mold cavity **35** when said block and said receptacle part are in assembled relation as illustrated in Fig. 6. The plastic mounting block or plate **32** is of rigid relatively thin construction for a purpose which will be evident from the description which follows and said block is adapted to mount the paraffin-blocked histologic tissue specimen **36**, the latter being constituted by a solidified block of praffin having a tissue specimen S embedded therein. The mounting block **32** is of quadrilateral configuration cor-

responding to the configuration of the side walls 28 of the enlarged part 22 and said block is adapted to fit in said enlarged part with the peripherally extending marginal edge portion 38 interengaging with the peripheral shoulder 24. Accordingly the peripheral shoulder 24 of the part 18 constitutes abutment means for the mounting block the latter being assembled to the part 18 by being positioned in the enlarged opening 22 with the peripherally extending marginal edge portion 38 abutting the peripheral shoulder 24.

The scored or interrupted surface area or face 34 is adapted for the adhesion thereto of the paraffin-blocked histologic specimen 36, it being noted that the score lines 40 extend longitudinally and laterally of the mounting block with said score lines being spaced uniformly and relatively close to each other in the illustrated embodiment. The score lines 40 define a corresponding series of depressions and the latter provide for the adhesion of the paraffin-blocked specimen 36 to the plate 32, it being understood that molten paraffin will flow into such depressions to provide a firm securement between such paraffin-blocked specimen and the mounting plate 32.

In practice, the mounted paraffin-blocked histologic tissue specimen 10 is prepared by pouring molten paraffin in the cavity 35 and immersing or placing the impregnated tissue specimen S in the molten paraffin in said cavity. More paraffin is poured into the cavity 35 until the specimen S is covered and thereafter the paraffin is allowed to solidify to form the paraffin-blocked tissue specimen 36', the latter being adhered to the scored face 34 of the mounting block 32 and the tapered side walls 26 of the opening 20. As noted above, the scored face 34 constitutes a removable bottom wall of the mold and after the paraffin containing the specimen S has solidified, sufficient pressure is applied on the top surface 46 of the paraffin-blocked tissue specimen 36' to release the latter and the mounting device 32 from the mold. It will be apparent that the tapered side walls 26 of the mold facilitate the release of the paraffin-blocked histologic tissue specimen therefrom, the mounted paraffin-blocked specimen 10 which has now been released from the receptacle part 18 of the mold 16 being adapted to be clamped to the specimen block holder 12 in the manner to be described hereinafter. From the above it will be apparent that the aforedescribed method for forming a mounted paraffin-blocked histologic tissue specimen provides for the mounting of such blocked specimens in the same operation with the formation thereof.

The specimen block holder 12 of microtome 14 is conventional in all respects and is releasably secured in adjusted position to the part 56 of the microtome by means of the pair of clamping screws 58. The specimen block holder 12 comprises a stationary block 59 and a block 60 which is movable towards and away from the stationary block by means of the screw member 62 which mounts the movable block 60. The screw member 62 is adapted to be rotated by the lever 64 for clamping and unclamping the adaptor members to be described hereinafter between the relatively movable companion blocks 58 and 59.

The side 69 of the mounting block or plate 32 is provided with a series of spaced recesses or apertures 70 and in order to mount the plate to the holder 12, there is provided an adaptor device 72 which comprises a companion pair of resiliently interconnected adaptor members 74 and 74'. Projecting from the faces 76 and 76' of members 74 and 74', respectively, are pin members 78 which are adapted for releasable engagement in the apertures 70 of the mounting plate 32. The apertures and pin members 70 and 78, respectively, are spaced nonequidistant in the assembled relation of the mounting plate 32 and the device 72 in order to provide for one-way assembly between said mounting plate and said device. The members 74 and 74' are interconnected for pivotal movement towards and away from each other and to this end each of said members is grooved as indicated at 80, said grooves collectively defining the pivot pin mounting aperture 82 which is adapted for the reception of the pivot pin 84. The pivot pin 84 is headed at its opposite ends as indicated at 86 and the aperture 82 is correspondingly enlarged at its opposite ends as indicated at 88 for the reception of said heads 86. The headed pivot pin 84 is adapted to be positioned in its complementary aperture 82 on the assembly of the blocks 74 and 74' to each other in the manner to be described hereinafter. It is to be noted that the members 74 and 74' define a slot 90 therebetween adjacent the pivot pin aperture 82, said slot being adapted to provide the requisite amount of clearance for the pivotal movement of said members away from each other. The adaptor members 74 and 74' are provided with registering apertures 92 and 94, respectively, which extend therethrough, said aperture 92 being internally threaded as indicated at 96 and said aperture 94 being countersunk as indicated at 98. The apertures 92 and 94 are further provided with registering enlarged portions 100 and 102, said enlarged portions collectively defining the internal chamber 104. The members 74 and 74' are resiliently interconnected by means of the bolt 106 which is threaded through the compression spring 108, the threaded part 110 of said bolt being threadedly engaged in the threaded aperture 96 with the head 112 of said bolt disposed in the countersunk portion 98 of aperture 94. The spring 108 surrounds a portion of the bolt 106 and is seated in the chamber 104 to resiliently urge the members 74 and 74' pivotally away from each other. In the assembly of the adaptor device 72 the spring 108 is positioned in the chamber 104 and the bolt 106 is extended through said spring and threadedly interengaged in the threaded aperture 96. The adaptor device 72 and the mounting plate 32 are releasably assembled to each other by inserting the pin members 78 in their associated apertures 70 and this mounting plate and adaptor assembly is adapted to be clamped to the specimen holder 12 of the microtome for clamping the mounted paraffin-blocked specimen 10 in properly oriented position. In practice, the adaptor device and mounted paraffin-blocked specimen assembly is releasably clamped between the blocks 59 and 60 of the specimen block holder 12 by manipulating the lever 64 in a clamping direction, it being apparent that this mounting arrangement provides for the securement of the paraffin-blocked specimen 10 to holder 12 in properly oriented relation. On manipulating the lever 64 to release the specimen holder clamping pressure, the members 74 and 74' will be urged apart by the spring 108 against blocks 59 and 60, this arrangement providing a loose clamping force for releasably supporting the mounted paraffin-blocked specimen in the microtome holder. If desired, the adaptor device 72 may be left in loosely clamped relation in the holder 12 in which case the selected mounted paraffin-blocked specimen may be readily secured thereto in the manner described above and firmly clamped in position in the microtome holder. It will be understood that on the firm clamping of the device 72 between the blocks 59 and 60 of the holder 12, the pin members 78 will exert a lateral force against the walls of the apertures 70 to firmly clamp the mounted paraffin-blocked specimen 10 in position. On the release of the specimen holder clamping pressure, the spring 108 will provide for the exertion of a small clamping force between the apertures and pin members 70 and 78, respectively, for loosely supporting the mounted paraffin-blocked specimen in the specimen holder.

With reference to Fig. 8, there is shown a modified form of adaptor device 120 which comprises a companion pair of members 122 and 122' which are releasably interconnected to each other by means of the bolt and nut 124 and 126, respectively. The members 122 and 122' are provided with registering apertures 128 and 130, respectively, which are adapted for the reception of the bolt 124 therethrough, said apertures being countersunk, as indicated at

132 and 134, respectively, for the reception of the nut 126 and bolt head 136, respectively. The members 122 and 122' are laterally movable away from each other out of interengagement and disposed between said members is a spring 138 for biasing said members away from each other. The members 122 and 122' are provided with aligned recesses 140 and 140' and the spring 138 has end portions 142 and 142' which are seated in said recesses 140 and 140', respectively. Projecting from the members 122 and 122' are pin members 78' which correspond in all respects to the pin members 78 previously described. Thus the spring member 138 urges the members 122 and 122' laterally apart for the purposes aforenoted in connection with the description of the device 72. Accordingly, the device 120 is adapted for association with a mounted paraffin-blocked specimen 10 in the manner previously described in detail.

With reference to Fig. 9, there is shown an adaptor device 150 which comprises members 152 and 152' which are integrally joined to each other as indicated at 154, said integral portion providing for the resilient biasing of said members away from each other. The portion 154, which constitutes the resilient biasing means of device 150, extends for the full width of members 152 and 152', said integral portion being defined by the circular opening 156, which extends for the full width of said device, and which is disposed at the inner end of the slot 158 defined between said members. The device 150 may be readily fabricated from a one-piece blank by slotting the latter as indicated at 158 and by drilling said blank as indicated at 156 to define the relatively narrow longitudinally extending integral formation 154. Projecting from the members 152 and 152' are pin members 78'' which correspond in all respects to the pin members 78 and 78' previously described. From the above, it will be apparent that as long as the adaptor device 72, 120 or 150 is consistently positioned in the holder 12, the aforedescribed arrangement provides for the orientation and reorientation of the paraffin-blocked tissue specimen in the same position in the specimen holder of the microtome and, accordingly, when recutting a paraffin block that has been filed, it is unnecessary for the technician to manually orient such paraffin-blocked specimen in accordance with the heretofore used technique.

The mounted paraffin-blocked tissue specimen 10 is relatively thin whereby to minimize the space required for filing such specimens and it will be understood that once a paraffin-blocked specimen is mounted the mounting block 32 is not removed therefrom. The thickness of the mounting block or plate 32 is substantially less than the lengths of the surface axes of the outer face 34 thereof in order to minimize the bulk of a mounted specimen, this arrangement enabling the mounting plate with the specimen 36 secured thereto to be filed in a shallow drawer or tray of a filing cabinet. Certain features shown and described herein are claimed in the application of Edwin C. Weiskopf for Method and Apparatus for Forming a Mounted Paraffin-Blocked Histologic Tissue Specimen, Serial No. 497,546, filed concurrently herewith, and assigned to the assignee of the present invention.

While we have shown and described the preferred embodiments of our invention, it will be understood that various changes may be made in the idea or principles of the invention within the scope of the appended claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. A device for mounting a paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer face with an interrupted surface area for the adhesion thereto of a paraffin-blocked histologic specimen, adaptor means for mounting said plate to the specimen holder, said adaptor means being of such conformation as to always orient the tissue specimen in the same position relative to said specimen holder, and means providing for the releasable interengagement of said adaptor means and said plate.

2. A device for mounting a paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer face for the adhesion thereto of a paraffin-blocked histologic specimen, and adaptor means for mounting said plate to the specimen holder, said adaptor means and said mounting plate having releasably interengageable parts which in their engaged relation provide for the mounting of said plate to said adaptor means, said interengageable parts having provision to always orient the mounting plate in the same position relative to said adaptor means.

3. A device for mounting a paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer planar face with an interrupted surface area for the adhesion thereto of a paraffin-blocked histologic specimen, and adaptor means for mounting said plate to the specimen holder, said adaptor means comprising a companion pair of resiliently interconnected members adapted to be clamped together by said specimen holder, said members and said mounting plate having releasably interengageable parts which in their engaged relation provide for the mounting of said plate to said adaptor means and for clamping said plate to said adaptor means in response to the clamping of said members.

4. A device for mounting a paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer face for the adhesion thereto of a paraffin-blocked histologic specimen, and adaptor means for mounting said plate to the specimen holder, said adaptor means comprising a companion pair of resiliently interconnected members, one of the latter and said mounting plate having pin means and the other of said members and said mounting plate having formations complementary to said pin means, said pin means and said formations being adapted for releasable interengagement for the mounting of said plate to said members, the latter being adapted to be pressure urged towards each other by the specimen holder for clamping said mounting plate in position, said members being adapted to be clamped between the jaws of the specimen holder for urging said members toward each other and for applying a clamping force between said releasable parts whereby to clamp said mounting plate in position.

5. A device for mounting a paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer face for the adhesion thereto of a paraffin-blocked histologic specimen, and adaptor means for mounting said plate to the specimen holder, said adaptor means comprising a companion pair of members resiliently urged away from each other, said members and said mounting plate having releasably interengageable parts which in their engaged relation provide for the releasable mounting of said plate to said members, the latter in engaged relation with said plate being adapted to be clamped between the jaws of the specimen holder for urging said members toward each other and for applying a clamping force between said releasable parts whereby to clamp said mounting plate in position.

6. A device for mounting a paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer face for the adhesion thereto of a paraffin-blocked histologic specimen, and adaptor means for mounting said plate to the specimen holder, said adaptor means com-

prising a companion pair of members pivotally movable towards and away from each other, and means for resiliently biasing said members away from each other, said members and said mounting plate having releasably interengageable parts which in their engaged relation provide for the mounting of said plate to said members.

7. A device for mounting paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer face for the adhesion thereto of a paraffin-blocked histologic specimen, and adaptor means for mounting said plate to the specimen holder, said adaptor means comprising a companion pair of members resiliently urged away from each other, said members and said mounting plate having releasably interengageable parts which in their engaged relation provide for the releasable mounting of said plate to said members, the latter in engaged relation with said plate being adapted to be clamped between the jaws of the specimen holder for urging said members toward each other and for applying a clamping force between said releasable parts whereby to clamp said mounting plate in position, said members being pivotally movable towards and away from each other and having spring means disposed therebetween for urging said members away from each other.

8. A device for mounting a paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer face for the adhesion thereto of a paraffin-blocked histologic specimen, and adaptor means for mounting said plate to the specimen holder, said adaptor means comprising a companion pair of members resiliently urged away from each other, said members and said mounting plate having releasably interengageable parts which in their engaged relation provide for the releasable mounting of said plate to said members, the latter in engaged relation with said plate being adapted to be clamped between the jaws of the specimen holder for urging said members toward each other and for applying a clamping force between said releasable parts whereby to clamp said mounting plate in position, said members being laterally movable away from each other out of interengagement and having spring means disposed therebetween for urging said members in said last mentioned direction.

9. A device for mounting a paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer face for the adhesion thereto of a paraffin-blocked histologic specimen, and adaptor means for mounting said plate to the specimen holder, said adaptor means comprising a companion pair of members having integrally joined portions, said members being movable towards and away from each other and being resiliently biased in said last mentioned direction by said integrally joined portions, said members and said mounting plate having releasably interengageable parts which in their engaged relation provide for the mounting of said plate to said members, and said members being adapted to be clamped between the jaws of the specimen holder for urging said members toward each other and for applying a clamping force between said parts.

10. A device for mounting a paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer face for the adhesion thereto of a paraffin-blocked histologic specimen, and adaptor means for mounting said plate to the specimen holder, said adaptor means comprising a companion pair of members resiliently urged away from each other, said members and said mounting plate having releasably interengageable parts which in their engaged relation provide for the releasable mounting of said plate to said members, the latter in engaged relation with said plate being adapted to be clamped between the jaws of the specimen holder for urging said members toward each other and for applying a clamping force between said releasable parts whereby to clamp said mounting plate in position, said members having integrally joined portions and being movable towards and away from each other, said integrally joined portions constituting means for resiliently biasing said members in said last mentioned direction.

11. A device for mounting a paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer face for the adhesion thereto of a paraffin-blocked histologic specimen, and adaptor means for mounting said plate to the specimen holder, said adaptor means comprising a companion pair of members having integrally joined portions, at one side thereof, said members being movable towards and away from each other and being resiliently biased in said last mentioned direction by said integrally joined portions, said members at the opposite side thereof and said mounting plate having releasably interengageable parts which in their engaged relation provide for the mounting of said plate to said members, and said members being adapted to be clamped between the jaws of the specimen holder for urging said members toward each other and for applying a clamping force between said parts.

12. A device for mounting a paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer face for the adhesion thereto of a paraffin-blocked histologic specimen, and adaptor means for mounting said plate to the specimen holder, said adaptor and said mounting plate having companion releasable interengageable parts for removably securing said plate to said adaptor, said parts of said plate being related to the companion parts respectively of said adaptor in non-symmetrical relation whereby said plate and adaptor are attachable to each other by said interengageable parts in only one predetermined relative position, and said adaptor being of multi-lateral conformation for securement to said specimen holder in only one predetermined relative position.

13. A device for mounting a paraffin-blocked histologic tissue specimen to the specimen holder of a microtome for cutting tissue sections for microscopic examination of the tissue, comprising a mounting plate having an outer face for the adhesion thereto of a paraffin-blocked histologic specimen, and adaptor means for mounting said plate to the specimen holder, said adaptor and said mounting plate having companion releasable interengageable parts for removably securing said plate to said adaptor, said parts of said plate being releated to the companion parts respectively of said adaptor in non-symmetrical relation whereby said plate and adaptor are attachable to each other by said interengageable parts in only one predetermined relative position, and said adaptor being of multilateral conformation for securement to said specimen holder in only one predetermined relative position said interengageable parts comprising recesses in said mounting plate and pin projections on said adaptor receivable respectively in said recesses only in said predetermined relative position of said plate and adaptor.

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