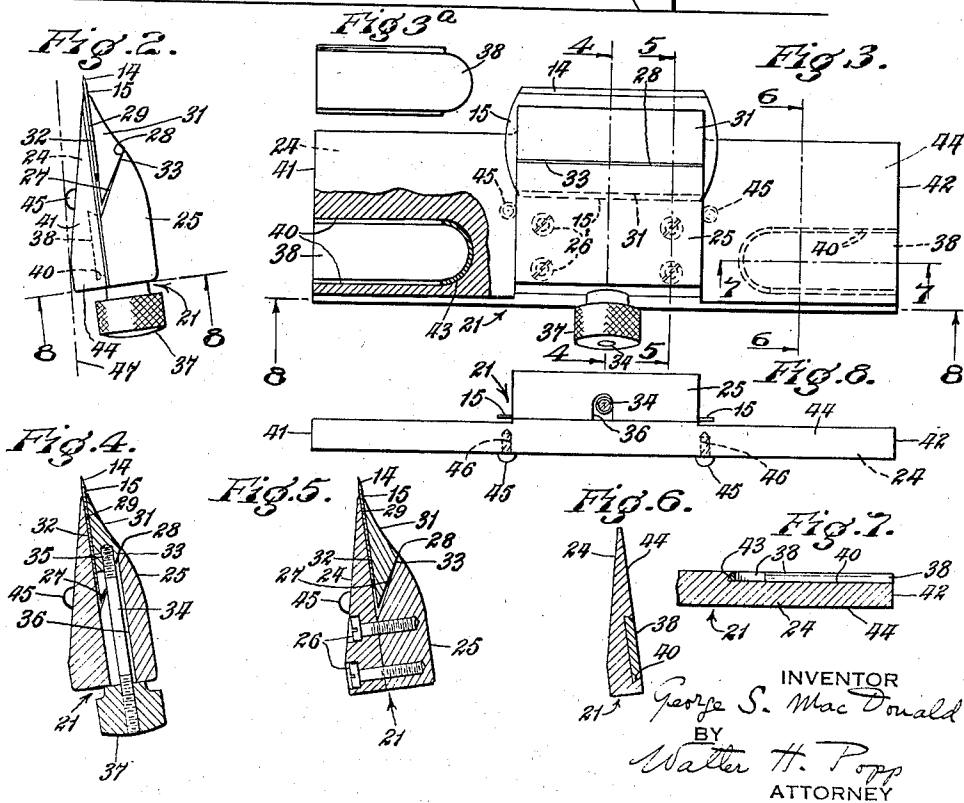
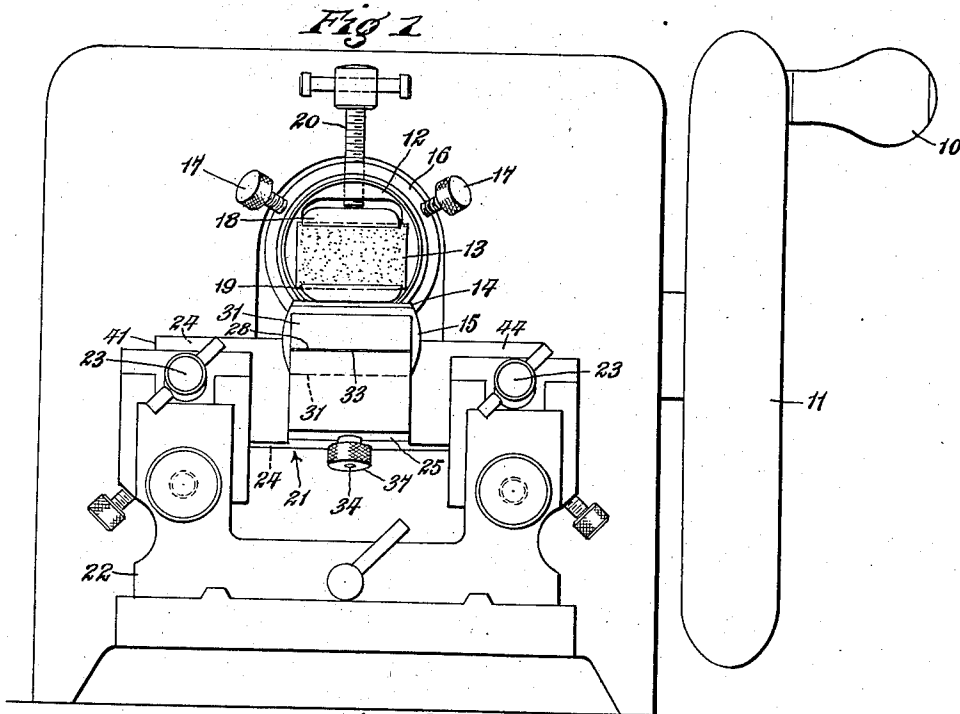


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MICROTOME BLADE HOLDER

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MICROTOME BLADE HOLDER

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4 Claims. (Cl. 88—40)

This invention relates to a microtome blade holder, and, more particularly, to a blade holder which can be used in present day microtomes and is able to employ a safety razor blade as the cutting means in place of the usual and difficult-to-resharpen ordinary microtome knife.

The principal object of the invention is to provide a blade holder of this character which will grip the razor blade very firmly with a minimum of manual effort and irrespective of the thickness or shape of the razor blade. Another object of the invention is to provide a microtome blade holder whose main body member may be constructed of soft and easily machined material but is provided with a suitable wear block to withstand the heavy twisting pressures of the clamping screws which are to be found in most present day microtomes. A still further object of the invention is to provide suitable spacing feet on the blade holder so that when said holder is not being used in the microtome, but is lying upon a supporting surface, the cutting edge of the razor blade is elevated above the supporting surface and is thereby prevented from injury. Numerous other objects of the invention and practical solutions thereof are described in the following specification and illustrated in the attached drawing wherein:

Fig. 1 is a diminutive front elevation of one type of microtome showing the improved blade holder in working position therein.

Fig. 2 is an end elevation of the blade holder with a typical form of razor blade clamped therein.

Fig. 3 is a front elevation thereof with certain parts broken away.

Fig. 3a is a front elevation of one of the wear plates prior to its being assembled in the knife holder.

Figs. 4, 5 and 6 are vertical transverse sections through the blade holder taken on the correspondingly numbered lines of Fig. 3.

Fig. 7 is a fragmentary longitudinal section through one end of the blade holder taken on line 7—7, Fig. 3.

Fig. 8 is a horizontal longitudinal section of the blade holder taken on line 8—8 of Figs. 2 and 3. Similar characters of reference indicate like parts throughout the several figures of the drawing.

In Fig. 1 is shown a typical form of what is known as a rotary microtome. In this form of microtome manual power is applied to the handle 10 of the wheel 11 and this power, through the instrumentality of well known mechanism, is used to reciprocate vertically the work holder 12 and,

at each stroke of said work holder, to feed the same forwardly whatever distance may be desired, so that the paraffin block or other work piece 13 being operated upon by the microtome, successively moves outwardly and then downwardly against the cutting edge 14 of the razor blade 15 and thereby cuts off successive laminations from said work piece 13.

The work holder 12 is oriented in the usual and well known manner relatively to the main reciprocating head 16 of the microtome by means of a number of oblique orienting screws 17 or otherwise. The paraffin block or other work piece 13 is suitably clamped between the jaws 18 and 19 of the work holder 12 by means of the clamping screw 20.

The present invention relates solely to the means for cutting the work piece 13 and consists primarily of a main body member 21 which is suitably held in the carriage 22 of the microtome by means of clamping screws 23 or otherwise. As illustrated in the drawing this main body member 21 is clamped at its opposite ends in the microtome, but it is to be understood that the present invention is not confined to any such specific mounting arrangement because for certain work with sliding microtomes it has been found desirable to secure one end only of the main body member 21 to the microtome. Said main body 21 comprises a base plate 24 and an overhanging portion 25 which is secured to said base plate 24 by means of counter sunk machine screws 26 or otherwise. Said overhanging portion 25 is provided with an upwardly and forwardly inclined wedging surface 27 which terminates at its outer end in a thrust nose 28. The latter is somewhat rounded so as to prevent excessive local stresses at its extreme outer end. The portion of the base plate 24 which faces and is opposite said thrust nose 28 may be conveniently denominated a clamping face 29 and it is against this clamping face that the rear face of the razor blade 15 is adapted to bear. Adapted to bear against the front face of said razor blade 15 is a clamping head 31 which is substantially triangular in cross-section, its base 32 constituting a clamping face which bears against the front face of the razor blade while its apex 33 is adapted to make contact with the thrust nose 28 of the overhanging portion 27 of the main body member 21.

Secured centrally to said clamping head 31, as best shown in Fig. 4, is a pull rod 34. The connection between said pull rod 34 and the clamping head 31 may be effected in any desired manner as, for instance, by threading the upper end of

said pull rod 34 into said clamping head 31 and locking it in place by a suitable lock pin 35 which is driven into a suitable hole drilled perpendicularly into the base 32 of the clamping head 31 and into the upper end of said pull rod 34. The central part or shank of said pull rod 34 is received within a U-shaped clearance opening 36, this clearance opening being economically formed by suitably milling the overhanging portion 25 of the main body member 21 prior to its being assembled to the base plate 24 of said main body member. The lower end of the pull rod 34 is threaded to receive a clamping nut 37 which, when rotated in a clockwise direction, as viewed from the bottom of Fig. 4, bears upwardly against the lower flat face of the main body member 21 and pulls the clamping head 31 downwardly. This action causes the razor blade 15 to be firmly clamped between the clamping face 29 of the base plate 24 and the clamping face 32 of the clamping head 31. It will be noticed that as the clamping nut 37 draws the clamping head downwardly, the clamping face 32 of the clamping head remains at all times substantially parallel to the clamping face 29 of the base plate 24, thereby permitting razor blades of varying thicknesses to be securely clamped in the blade holder. It should also be noticed that the only part of the overhanging portion 27 of the main body member 21 which is in contact with the clamping head 31 is the nose 28 so that said clamping head 31 is enabled to slightly rock to compensate for any irregularities in thickness of the razor blade 15. This enables a large area of the razor blade to be clamped and permits said razor blade to be firmly clamped between the two clamping surfaces 29 and 32 under all circumstances.

In the ordinary type of microtome the clamping screws 23 exert a very vicious twisting force upon the main body of the blade holder. Heretofore this has resulted in the blade holder becoming very rough and unsightly after a relatively short period of use. In the present invention such a condition is prevented by providing a pair of hardened steel wear blocks 38 whose function is to take the brunt of the twisting thrust caused by the clamping screws 23. These wear blocks permit the main body member 21 of the blade holder to be constructed of soft and relatively easily formed material with the twisting thrust of said clamping screws taken care of by said wear blocks which are constructed of a hard material and are of such shape as to be easily machined. These wear blocks 38 are arranged in the main body member 21 of the blade holder as follows: Formed in the front vertical face of the base plate 24 of said main body member is a reverse flared socket 40 which is formed by passing a flared end mill longitudinally inwardly from the outer edges 41 and 42 of the base plate 24. As a consequence of this machining operation, the socket 40 has two straight parallel reverse-flared side walls while its inner end also has a reverse flare and is of semi-circular shape. To make a wear block 38 of the same shape as this socket 40 would be prohibitively expensive and in the present invention each of said wear blocks 38 is constructed with its longitudinal side edges bevelled so as to snugly fit between the side walls of said socket 40 while its inner end is not bevelled but is machined so as to have a semi-circular end which is square cut as best shown in Fig. 3a. This construction results in a cavity between the inner portion of each socket 40 and the inner end of its com-

panion wear block 38. To fill up this cavity, a suitable amount of liquid solder or other plastic material 43 is placed in the socket 40 and then the companion wear block 38 driven into place. This permits the base plate 24 to be electroplated by the plating 44 with the wear blocks 38 in position, without enabling any of the plating solution or the washing solution to work its way into any interstices between the wear blocks 38 and the sockets 40. It is obvious, that, instead of using a plastic material 43, a material such as ordinary solder may be used inasmuch as the same is plastic when heated. It is also obvious that this plastic may be eliminated entirely if the base plate 24 and the wear plates 38 are plated individually and said wear plates then driven into place.

When the microtome knife holder is not in use it is desirable to provide means to prevent the razor blade 15 from coming into contact with the table or other surface upon which it is being supported when not being used in the microtome. This result is effected in the present invention by providing two spacing feet 45 which are preferably of the round headed shape shown, with their shanks of the self-threading type so that when they are driven into suitably located holes 46 they are rigidly and permanently retained therein. The construction line shown in Fig. 2 represents the table or other supporting surface 47 upon which the blade holder is supported when not being used in the microtome and illustrates how the razor blade 15 is prevented from coming into contact with said supporting surface 47.

It is to be understood that the present invention is not to be restricted to the scope of the present disclosure, but includes all variations which come within the essence of the invention and the scope of the appended claims. For instance, the blade holder may be used not only to hold ordinary safety razor blades, but to hold any flat replaceable cutting blade such as, for instance, the relatively thick, steel blades of isosceles trapezoidal shape used for cutting wall board. Furthermore, the invention is not to be confined to use in rotary microtomes but includes the use in other types of microtomes such as those of the sliding type, parallel link type, "table" type, etc. Furthermore, the shape of the main body member 21 is not to be restricted to the form shown in the drawing but includes a main body member having a base plate 24 provided with a clamping face 29 but otherwise of any shape whatsoever and connected at either one or both of its ends to a microtome in any manner whatsoever.

I claim:

1. A microtome blade holder for use with a blade having a normally flexible body tapering into a knife-like cutting edge, said holder having a supporting portion with a clamping surface adapted to engage a side surface of the blade throughout substantially the major portion of the area of said side surface with substantially only the cutting edge of the blade exposed and having a portion disposed on the opposite side of said blade having an outwardly extending surface terminating in a thrust-like nose adjacent its free edge, a wedge-like clamp head having a substantially triangular cross-section with the base of said triangle having a clamping surface shaped to engage the major portion of the opposite side surface of the blade and the apex of said triangle adapted to make contact with the

thrust nose of the portion having the outwardly extending surface, said extending surface, inwardly of said thrust nose, being spaced from the adjacent surface of the clamp head whereby said clamp head is enabled to slightly rock on said nose to compensate for any irregularities in thickness of the blade, and means for imparting a substantially straight line movement to said head for urging the apex of the triangular like shape thereof into engagement with the thrust nose and the clamp surface on the base thereof into binding and clamping relation with the blade with the said head being so dimensioned that when in binding relation with said blade a portion of said blade adjacent its cutting edge is exposed.

2. A microtome blade holder for use with a blade having a normally flexible body tapering into a knife-like cutting edge, said holder having a supporting portion with a clamping surface adapted to engage a side surface of the blade throughout substantially the major portion of the area of said side surface with substantially only the cutting edge of the blade exposed and having an outer surface tapering to a relatively thin edge adjacent the cutting edge of the blade and a portion disposed on the opposite side of said blade having an outwardly tapering surface terminating in a thrust-like nose adjacent its free edge, a wedge-like clamp head having a substantially triangular cross-section with the base of said triangle having a clamping surface shaped to engage the major portion of the opposite side surface of the blade and the apex of said triangle adapted to make contact with the thrust nose of the portion having the outwardly tapering surface, said tapering surface, inwardly of said thrust nose, being spaced from the adjacent surface of the clamp head whereby said clamp head is enabled to slightly rock on said nose to compensate for any irregularities in thickness of the blade, and means for imparting a substantially straight line movement to said head for urging the apex of the triangular like shape thereof into engagement with the thrust nose and the clamp surface on the base thereof into binding and clamping relation with the blade with the said head being so shaped and dimensioned that when in binding relation with said blade a portion of said blade adjacent its cutting edge is exposed and an outer surface portion of said head tapers to a relatively thin edge adjacent said cutting edge.

3. A microtome comprising means for supporting an object from which specimens are to be cut, a carriage having clamp means, a blade holder secured to said carriage by said clamp means and having a normally flexible blade with a knife-like cutting edge therein, said blade holder having a supporting portion with a clamping surface engaging a side surface of the blade throughout substantially the major portion of the area of said side surface with substantially only the cutting edge of the blade exposed and having a portion disposed on the opposite side of said blade having an outwardly extending surface terminating in a

thrust-like nose adjacent its free edge, a wedge-like clamp head having a substantially triangular cross-section with the base of said triangle having a clamping surface engaging the major portion of the opposite side surface of the blade and the apex of said triangle contacting the thrust-like nose of the portion having the outwardly extending surface, said extending surface inwardly of said thrust nose being spaced from the adjacent surface of the clamp head whereby said clamp head is enabled to slightly rock on said nose to compensate for any irregularities in thickness of the blade and means for imparting a substantially straight line movement to said head substantially in the direction of the plane of a side surface of the blade for urging the apex of the triangular-like shape thereof into engagement with the thrust nose and the clamping surface of the base thereof into binding and clamping relation with the blade with the said head being so dimensioned that when in binding relation with said blade a portion of said blade adjacent said cutting edge is exposed.

4. A microtome comprising means for supporting an object from which specimens are to be cut, a carriage having clamp means, a blade holder secured to said carriage by said clamp means and having a normally flexible blade with a knife-like cutting edge therein and having hardened bearing plates for receiving the clamping pressure of said clamp means, said blade holder having a supporting portion with a clamping surface engaging a side surface of the blade throughout substantially the major portion of the area of said side surface with substantially only the cutting edge of the blade exposed and having an outer surface tapering to a relatively thin edge adjacent the cutting edge of the blade and a portion disposed on the opposite side of said blade having an outwardly tapering surface terminating in a thrust-like nose adjacent its free edge, a wedge-like clamp head having a substantially triangular cross-section with the base of said triangle having a clamping surface engaging the major portion of the opposite side surface of the blade and the apex of said triangle contacting the thrust nose of the portion having the outwardly tapering surface, said tapering surface inwardly of said thrust nose being spaced from the adjacent surface of the clamp head whereby said clamp head is enabled to slightly rock on said nose to compensate for any irregularities in thickness of the blade and means for imparting a substantially straight line movement to said head substantially in the direction of the plane of a side surface of the blade for urging the apex of the triangular-like shape thereof into engagement with the thrust nose and the clamping surface of the base thereof into binding and clamping relation with the blade with the said head being so shaped and dimensioned that when in binding relation with said blade a portion of said blade adjacent said cutting edge is exposed and an outer surface portion of said head tapers to a relatively thin edge adjacent said cutting edge.

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