Dec. 31, 1940. S. A. PETROFF 2,226,778

MICROSCOPIC SLIDE HOLDER

Filed June 1, 1939

Fig. 1

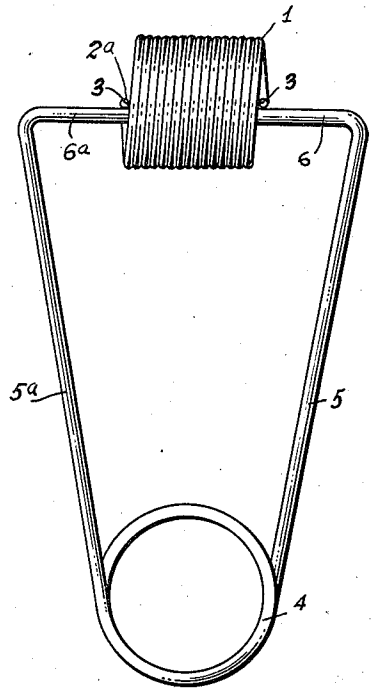


Fig. 2

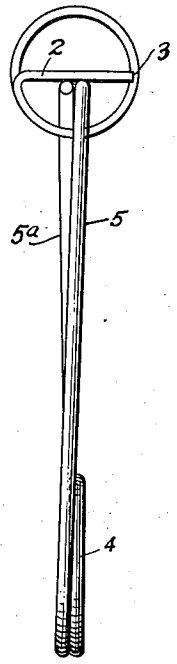
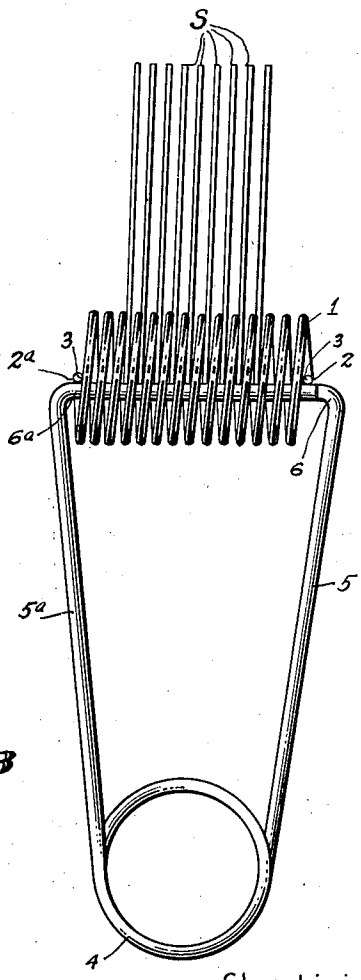


Fig. 3



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MICROSCOPIC SLIDE HOLDER

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4 Claims. (Cl. 294—87)

This invention is a device for collectively holding a plurality of microscopic slides in parallel juxtaposed relation and free from contact with one another whereby they may be handled as a unit for the staining, decolorization, counterstaining and washing of all of the slides at the same time. The device is particularly useful when employed in conjunction with slides for histological and bacteriological examinations, for it permits of a number of such slides to be subjected to the same treatment. In addition it obviates the necessity of time consuming individual manipulation of the slides and assures uniform results.

The device of this invention utilizes a coiled or helical spring as a holding element, between the several convolutions of which the slides are adapted to be individually introduced with the spring under such tension as to cause them to be gripped by the spring. To facilitate the opening of the coils for the introduction of the slides, the holding spring is provided with a handle of resilient character which, when manually manipulated, distends the holding spring in such manner as to separate its coils for convenient insertion of the slides. The handle, however, is so constituted that, when the handle is released from the pressure of the hand of the operator, it cooperates with the inherent resiliency of the holding spring to grip the slides tightly, so that they cannot become inadvertently displaced.

An important feature of the present invention resides in the fact that the handle portion of the device cooperates with the holder spring in substantially the axis of the latter, whereby, when the handle is gripped and compressed, the coils of the holder spring will be uniformly separated and, when the handle is released, the compressing effect thereof upon the holder spring will be in substantially the axis of the latter and will not tend to warp or bend such holder spring out of line, as would be the case if the connection between the handle and the holder spring were other than substantially axial.

Another important feature of the invention resides in the fact that the handle extends through the holder spring and serves as a stop against which the slides seat to be uniformly engaged by the coils of the holder spring. With this arrangement the device may be more efficiently and satisfactorily manipulated than would be the case if the holder spring were permitted to warp out of line between its points of attachment with the handle.

Features of the invention, other than those adverted to, will be apparent from the hereinafter detailed description and claims when read in conjunction with the accompanying drawing.

The accompanying drawing illustrates one practical embodiment of the invention, but the construction therein shown is to be understood as illustrative, only, and not as defining the limits of the invention.

Figure 1 is a side elevation of a device embodying the present invention.

Figure 2 is an end view of such device.

Figure 3 shows the construction of Figure 1 with a series of slides supported thereby.

Referring to the drawing, 1 indicates a holder spring of helical form embodying a plurality of convolutions, the number of which will depend upon the maximum number of plates which it is desired to manipulate at any given time. This holder spring is preferably made of some metal which will not corrode or be attacked by the baths or chemicals usually employed in histological or by bacteriological examinations and such material should also be such as not to contaminate such baths through chemical reaction. The opposite ends of the holder spring 1 are bent out of the path of the helix to extend across the terminal convolutions of the spring, as shown at 2 and 2*a*, and these diametrically disposed ends 2 and 2*a* may be sweated, soldered or welded to the contiguous convolutions as at 3.

The handle for manipulating the holder spring 1 is formed from a length of spring wire bent into V-shaped form and provided intermediate its bottom with a turn or coil 4 from which extend divergent arms 5 and 5*a*. The end portions 6 and 6*a* of these arms are bent toward one another to lie closely adjacent side by side. They are arranged to extend through the holder spring 1 in opposite directions with the terminal of the end 6*a* attached to the spring end 2 and with the terminal of the end 6 attached to the spring end 2*a* in any suitable manner as by sweating, soldering or welding. The handle is so tensioned that its arms 5 and 5*a* normally tend to diverge and the holder spring 1 is so constituted that it normally tends to contract. Such being the case, all parts of the structure tend to close the holder spring 1 and force its several convolutions into close contact with one another. However, if the arms 5 and 5*a* are gripped in the hand of the operator and forced toward one another, the spring portions 2 and 2*a* will be forced apart to separate the successive convolutions of the holder spring 1, in order to permit a plurality of slides S to be inserted between them as shown best in

Figure 3. As these slides are introduced, they will come to a seat upon the end portions **6** and **6a**, and when the grip on the handle is released the holder spring will be permitted to contract and its inherent resiliency, together with the inherent resiliency of the handle, will force the successive convolutions of the spring into tight gripping relation with the interposed slides. The strength of the several respective resilient elements of the structure will be such as to hold the slides firmly in position without, however, exerting so much pressure as might tend to break these slides, which are of glass.

The slides, supported by the device, as shown in Figure 3, may now collectively be passed as a unit through the usual staining, decolorization, counter-staining and washing operations common to examinations of the character described and during such operations they will be maintained in fixed parallel relation, free from contact with one another and projecting from the holder spring to such extent as not to interfere with the satisfactory treatment of the slides during the operations stated. When it is desired to release the slides, the operator grips the arms **5** and **5a** and forces them together and the pressure thus applied expands the spring holder **1** and simultaneously releases all of the slides.

I wish to call particular attention to the fact that the end portions of the arms **5** and **5a** extend through the center of the holder spring **1** and are attached to the terminals thereof in substantially the axis of the holder spring, so that the pressure applied by the handle in gripping the slides is exerted in substantially the axis of the holder spring, while the action of the handle in expanding the holder spring is also substantially in the axis of the latter. By this arrangement the various convolutions of the holder spring are uniformly acted upon by the handle and do not tend to be warped or forced out of coaxial relation. Furthermore the side by side relation of the ends **6** and **6a** provides a convenient seat for the slides when introduced between the convolutions of the holder spring, so as to insure uniform projection of the slides and uniform gripping of all of them.

The device of this invention is extremely simple in construction, but thoroughly efficient in operation. It greatly minimizes the work of the technician and insures uniform treatment of all of the slides which are simultaneously subjected to the same treatment.

The foregoing detailed description sets forth the invention in its preferred practical form, but the invention is to be understood as fully commensurate with the appended claims.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. A microscopic slide holder comprising a helical holder spring having a plurality of convolutions tensioned to normally maintain the consecutive convolutions in contact, in combination with a spring handle of a single length of wire bent to form two opposing arms respectively extending through the holder spring from the opposite ends thereof with the free ends of said arms attached to the terminal convolutions of the holder spring in substantially the axis of the holder spring and said spring handle being biased to assist in forcing the consecutive convolutions of the helical holder spring into contact with one another.

2. A microscopic slide holder comprising a helical holder spring having a plurality of convolutions tensioned to normally maintain the consecutive convolutions in contact, in combination with a spring handle having two opposing arms respectively extending through the holder spring from the opposite ends thereof with the free ends of said arms attached to the terminal convolutions of the holder spring, said spring handle being tensioned to axially compress the holder spring.

3. A microscopic slide holder comprising a helical holder spring having a plurality of convolutions tensioned to normally maintain the consecutive convolutions in contact, and with the opposite ends of the holder spring formed to extend diametrically across the ends of said spring and anchored to the adjacent convolutions thereof, in combination with a spring handle having two opposing arms which respectively extend through the holder spring from the opposite ends thereof and are attached at their ends to the diametrically extending end portions of said spring, said handle being tensioned to axially compress the holder spring.

4. A microscopic slide holder comprising a helical holder spring having a plurality of convolutions, in combination with a handle embodying a length of resilient wire bent intermediate its ends to form a spring coil with divergent arms, the ends of which are bent toward one another and are respectively passed in opposite directions through the holder spring and attached to the distant ends of the holder spring adjacent the axis of the latter, said handle being biased to normally compress the holder spring.

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