March 8, 1927. 1,620,351

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MICROSCOPIC SLIDE STAINING AND DRYING APPARATUS

Filed Oct. 30, 1925 2 Sheets-Sheet 1

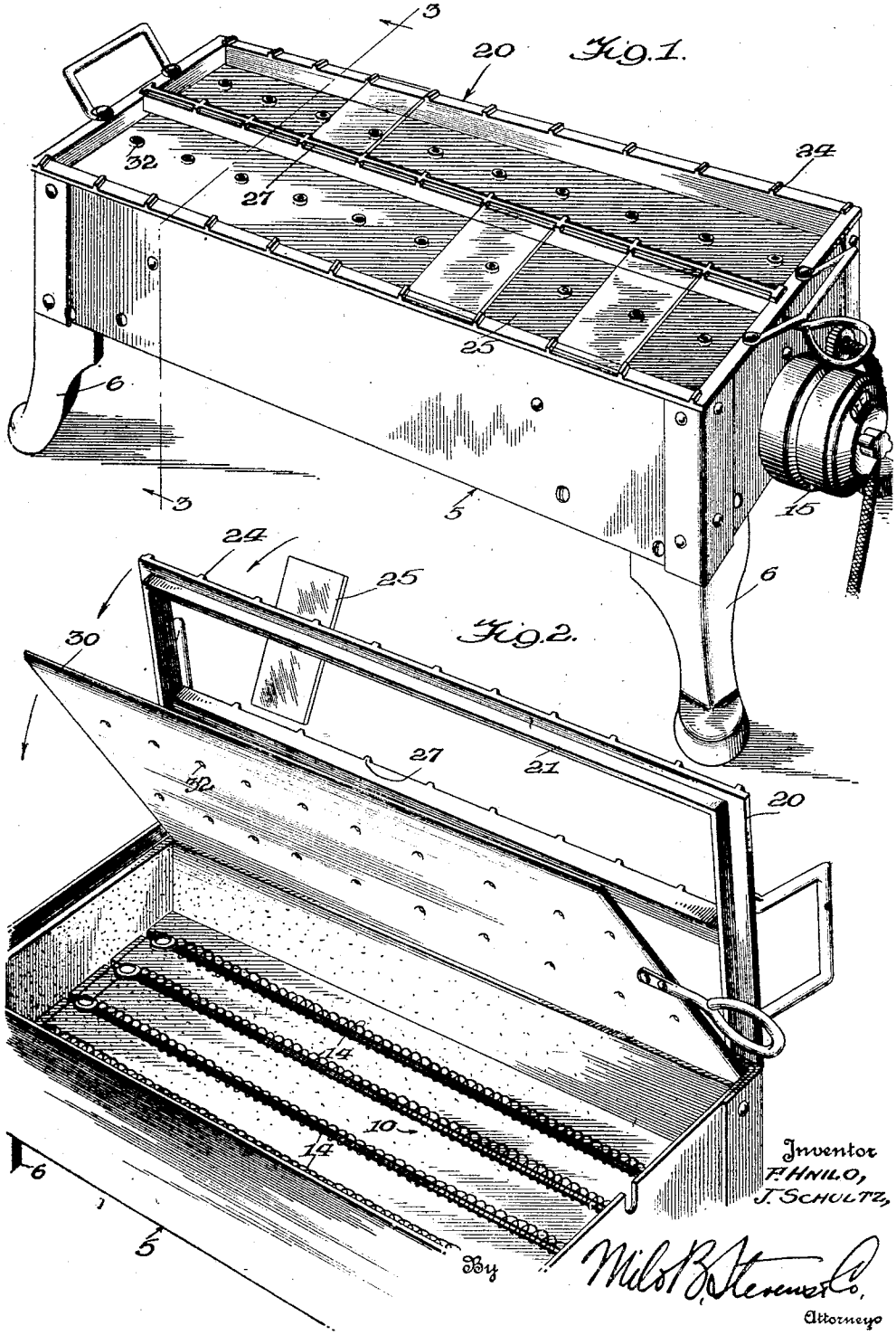


Fig. 1.

Fig. 2.

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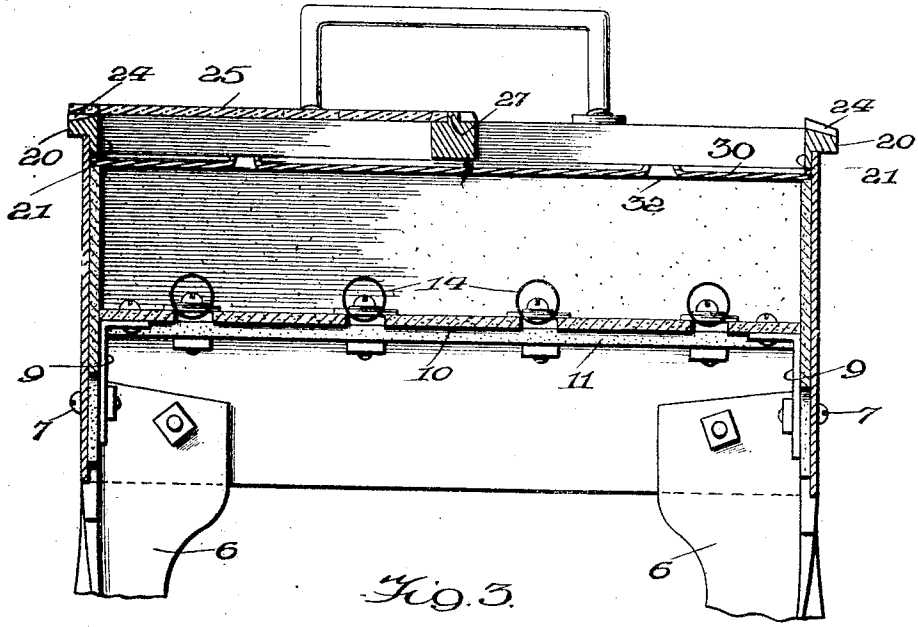


Fig. 3.

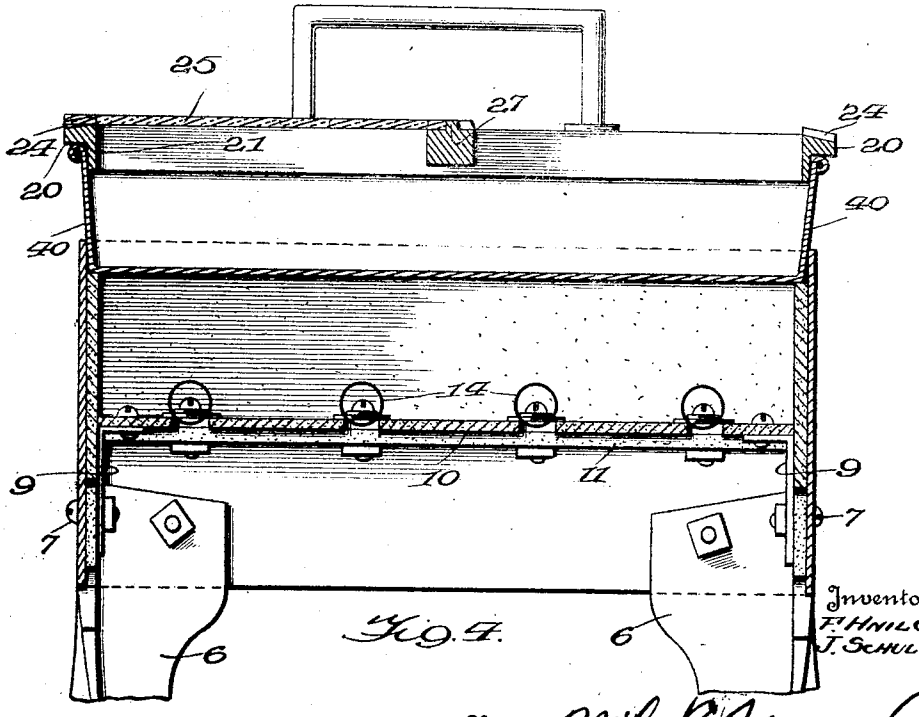


Fig. 4.

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UNITED STATES PATENT OFFICE.

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MICROSCOPIC-SLIDE STAINING AND DRYING APPARATUS.

Application filed October 30, 1925. Serial No. 65,901.

This invention relates to a microscopic slide staining and drying apparatus and has for an important object the provision of means whereby a number of slides bearing pathological or physiological specimens may be simultaneously heated when staining the slides or when drying the same for use under a microscope.

A further and equally important object of the invention is to provide an apparatus of the character specified which is of highly simplified construction and which is provided with novel means for directing the heated air into contact with the central specimen bearing portions of the slides and thereby allowing the edge portions of the slides to remain comparatively cool so that the latter may be easily and safely gripped by the fingers of the operator.

Also, an aim of the invention is to provide novel means whereby the staining solution which is applied to the several slides is prevented from dropping onto the heating elements and detracting from the utility and appearance of the machine.

A further object is to provide an apparatus of the character described which is efficient, durable in use, and comparatively cheap to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a perspective of the improved slide staining and drying apparatus;

Fig. 2 is a fragmentary perspective illustrating the rack or supporting frame for the slides in elevated or inoperative position so as to expose the heating means and the heating chamber;

Fig. 3 is a vertical transverse sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is a detail transverse sectional view illustrating the employment of a pan in connection with the invention.

In the drawings, the numeral 5 designates a rectangular body of the desired length, width and height and the numerals 6 designate a number of legs which are employed for supporting the body and which as illustrated in Figs. 1 and 3 are secured to the side and end walls thereof by bolts or other fastening devices 7.

Particular attention is directed to the fact that a suitable number of L-shaped brackets 9 are secured to the side walls of the body and have connection with the outermost longitudinally extending slats or strips 10, which as shown in Fig. 4 are arranged in spaced parallel relation to define a slotted bottom wall. The outermost strips 10 are in turn connected by bolts or other suitable fastening devices with transverse strips 11 at the ends of the body and these transverse strips are in turn employed to support the inner longitudinal strips 10, this feature providing an extremely simple and durable construction. It is understood, however, that the slotted bottom wall is of a heat insulating and fire-proof material and the sides and ends of the body may be lined with a similar material thereby defining a main heating chamber within the body.

At this point it might be stated that heating coils 14 extend longitudinally of the body immediately above the slots in the bottom wall thereof and have connection with a control switch or rheostat 15 by means of which the heat may be regulated. For convenience the switch may have four adjustments,—"low", "medium", "high" and "off" and the purpose of these various adjustments will be referred to in the description of operation. It is believed to be obvious, however, that as the air flows upwardly through the slotted bottom wall it is heated by contact with the electric coils.

A rack or frame 20 is provided on the under side thereof with a flange 21 which is snugly received in the upper portion of the body and, therefore, provides a convenient attaching means for the frame. It will be seen with reference to Figs. 1 and 4 that the frame is provided with side and central members having aligned transverse ribs 24 between which the slides 25 may be placed. The outer ends of the slides terminate adjacent the outer edges of the frame and it will be observed that the top of the frame is beveled so that the fingers of the operator may be conveniently engaged with the upper and lower sides of the slides. This is an important feature of the invention. By reason of this arrangement the operator is enabled to securely grip a slide which may bear an important specimen. The central member of the frame 20 is provided with an upstanding stop rib 27 which limits the inward movement of the slides.

In carrying out the invention, a plate 30 may be positioned upon the upper edges of the lining for the heating chamber and this plate may, as clearly shown in Fig. 3, be provided with a plurality of heat passages 32. These heat passages direct the heat upwardly into contact with the central specimen bearing portions of the slides and allow the edge and end portions of the slides to remain comparatively cool. It will be seen with reference to Fig. 3 that the walls of the heat passages 32 are extended upwardly as are the edge portions of the plate so as to form in effect a shallow container to collect any drops of the liquid stain which may happen to drop from the slides. This prevents such drops from falling onto the heating coils or other place.

If desired a shallow pan 40 may be applied to the upper portion of the body as shown in Fig. 4 and in this case the pan is especially adapted for the reception of a cold stain by means of which the slides may be stained in the usual and well known manner. In this case, however, the plate 30 is dispensed with.

In the operation of the improved slide staining and drying apparatus the slides to be heated are placed upon the frame 20 as shown in Fig. 1 and the switch is turned to its "high" position so as to supply the greatest amount of heat to the slides. The staining operation now takes place and when it is desired to finally dry the slides it is merely necessary to adjust the switch to its "medium" or "low" position. It is believed to be obvious with reference to the foregoing description that the air constantly circulates through the apparatus when the switch is turned to one of its operative positions and that the slides will be brought to the desired temperature during the staining or drying of the pathological or physiological specimens. It might be added that the plate 30 is employed when staining the slides under heat and when the slides are being dried the plate 30 may if desired be removed.

From the foregoing it will be seen that the invention forming the subject matter of this application is capable of a wide variety of mechanical expressions and it is, therefore, to be understood that the form of invention herewith shown and described is to be taken merely as a preferred example of the same and that such minor changes in arrangement and construction of parts may be made as will remain within the spirit of the invention and the scope of what is claimed.

Having thus described the invention, what is claimed is:

1. A microscopic slide staining and drying apparatus comprising a body having a heating chamber, a support associated with the body and having a plurality of ribs adapted to be engaged by the edges and ends of microscopic slides to support the same in operative relation to the heating chamber.

2. A microscopic slide staining and drying apparatus comprising a body having a heating chamber, a support associated with the body and having a plurality of ribs adapted to be engaged by the edges and ends of microscopic slides to support the same in operative relation to the heating chamber, the portions of said support adjacent the outer ends of the slides being beveled to provide finger receiving means whereby the fingers of the operator may be conveniently engaged with the slides.

3. A microscopic slide staining and drying apparatus comprising a body having a heating chamber, a support associated with the body and having a plurality of ribs adapted to be engaged by the edges and ends of miscroscopic slides to support the same in operative relation to the heating chamber, the portions of said support adjacent the outer ends of the slides being beveled to provide finger receiving means whereby the fingers of the operator may be conveniently engaged with the slides, and a partition between the heating chamber and said support and having heat passages.

4. A microscopic slide staining and drying apparatus comprising a body having a heating chamber, a support associated with the body and having a plurality of ribs adapted to be engaged by the edges and ends of microscopic slides to support the same in operative relation to the heating chamber, the portions of said support adjacent the outer ends of the slides being beveled to provide finger receiving means whereby the fingers of the operator may be conveniently engaged with the slides, and a partition between the heating chamber and said support and having heat passages located centrally with respect to the slides whereby to supply heat to the central portions of the slides.

5. A slide staining and drying apparatus comprising a body having a heating chamber, a slide supporting member at the top of the heating chamber, and a partition between the heating chamber and the slide supporting member and having heat passages adapted to direct the heat toward the center of the slides.

6. A slide staining and drying apparatus comprising a body having a heating chamber, a slide supporting member at the top of the heating chamber, and a partition between the heating chamber and the slide supporting member and having heat passages adapted to direct the heat toward the center of the slides, the walls of said passages being directed upwardly to define a guiding means for the heated air and to

define a shallow receptacle for the reception of drops which fall from the slides.

7. A slide staining and drying apparatus comprising a body having a heating chamber, a slide supporting member at the top of the heating chamber, and a partition between the heating chamber and the slide supporting member and having heat passages adapted to direct the heat toward the center of the slides, the walls of said passages being directed upwardly to define a guiding means for the heated air and to define a shallow receptacle for the reception of drops which fall from the slides, the edge portions of said partition being extended upwardly to cooperate with the walls of said heat passages in defining said shallow receptacle.

8. A slide staining and drying apparatus comprising a body having a heating chamber, a slide supporting member at the top of the heating chamber, a partition between the heating chamber and the slide supporting member and having heat passages adapted to direct the heat toward the center of the slides, the walls of said passages being directed upwardly to define a guiding means for the heated air and to define a shallow receptacle for the reception of drops which fall from the slides, the edge portions of said partition being extended upwardly to cooperate with the walls of said heat passages in defining said shallow receptacle, and a lining received in said heating chamber and terminating below the upper edge of the heating chamber to define a support for said partition.

9. A slide staining and drying apparatus comprising a body having a heating chamber, a slide supporting member at the top of the heating chamber, a partition between the heating chamber and the slide supporting member and having heat passages adapted to direct the heat toward the center of the slides, the walls of said passages being directed upwardly to define a guiding means for the heated air and to define a shallow receptacle for the reception of drops which fall from the slides, the edge portions of said partition being extended upwardly to cooperate with the walls of said heat passages in defining said shallow receptacle, and a lining received in said heating chamber and terminating below the upper edge of the heating chamber to define a support for said partition, said partition being held in place by said support.

10. A slide staining and drying apparatus comprising a body having a slotted bottom and a lining, said lining terminating below the upper edge of said body to define a ledge, a partition mounted on said ledge and having a plurality of spaced heat passages, the walls of which are extended upwardly, the edge portions of said partition being extended upwardly to cooperate with the upwardly directed walls of said heat passages in defining a shallow receiver for drops which fall from objects above.

11. A slide staining and drying apparatus comprising a body having a slotted bottom and a lining, said lining terminating below the upper edge of said body to define a ledge, a partition mounted on said ledge and having a plurality of spaced heat passages, the walls of which are extended upwardly, the edge portions of said partition being extended upwardly to cooperate with the upwardly directed walls of said heat passages in defining a shallow receiver for drops which fall from objects above, and a slide supporting frame mounted on said body and adapted to engage the edge portion of said partition to hold the same firmly in place.

12. A slide staining and drying apparatus comprising a support, a heating means associated with said support, a frame mounted on said support and having sides and a central connecting member, said sides and said central connecting member being provided with ribs, said ribs constituting a means to support slides in more or less regularly spaced relation on the frame.

13. A slide staining and drying apparatus comprising a support, a heating means associated with said support, a frame mounted on said support and having sides and a central connecting member, said sides and said central connecting member being provided with ribs, said ribs constituting a means to support slides in more or less regularly spaced relation on the frame, the top of said frame being beveled to define finger receiving means between the frame and the slides mounted thereon.

14. A slide staining and drying apparatus comprising a support, a heating means associated with said support, a frame mounted on said support and having sides and a central connecting member, said sides and said central connecting member being provided with ribs, said ribs constituting a means to support slides in more or less regularly spaced relation on the frame, the top of said frame being beveled to define finger receiving means between the frame and the slides mounted thereon, and a partition between said heating means and said frame and having means to direct the heat to the central portion of said slides whereby the stain thereon which covers the pathological or physiological specimen is dried.

In testimony whereof we affix our signatures.

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