T. LIDBERG.

MICROSCOPE WARM STAGE.

APPLICATION FILED JUNE 24, 1914.

1,144,941. Patented June 29, 1915.

Fig. 1.

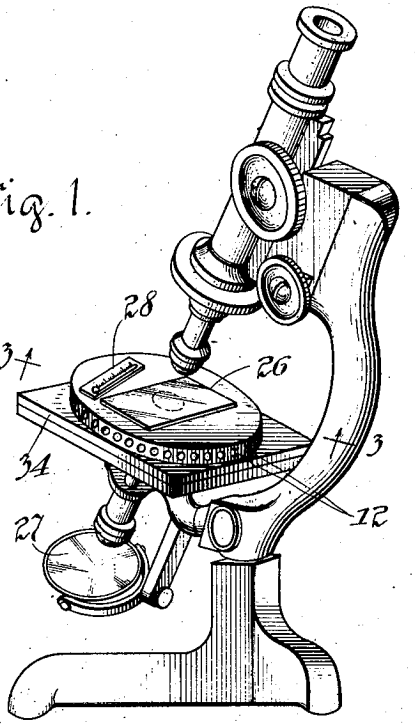


Fig. 2.

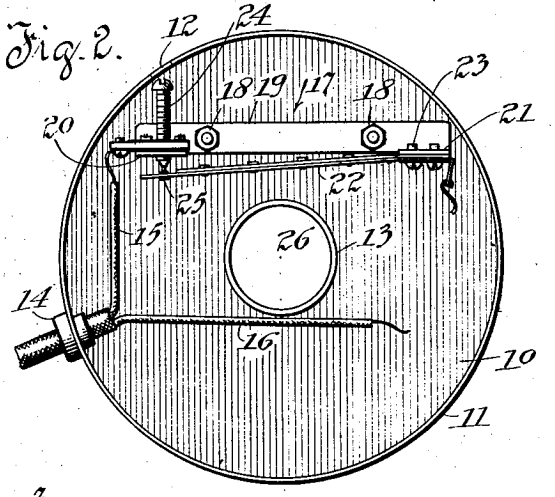
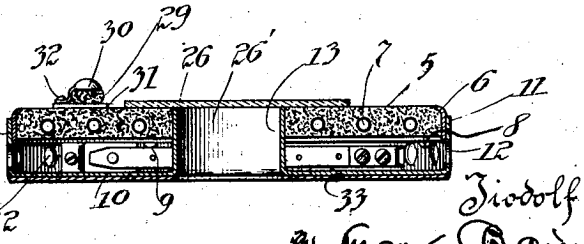


Fig. 3.



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UNITED STATES PATENT OFFICE.

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MICROSCOPE WARM STAGE.

1,144,941. Specification of Letters Patent. Patented June 29, 1915.

Application filed June 24, 1914. Serial No. 846,940.

To all whom it may concern:

Be it known that I, TIODOLF LIDBERG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Microscope Warm Stages, of which the following is a specification.

My invention relates to warm stages for microscopes.

One of the objects of my invention is to provide a preferably separable warm stage structure for microscopes whereby specimens to be examined under the microscope may be maintained at a predetermined, substantially constant temperature during such examination, or as long thereafter as may be desired.

Another object of my invention is to provide a structure of such character that relatively large changes of temperature in the surrounding air or varying drafts of air will not sensibly affect the temperature of the subject being operated upon because of the ready automatic response of the heating appliance to supply additional heat to compensate for the chilling effect that would otherwise be produced by such extraneous influences.

Another object of my invention is to generally improve structures of this character.

Other and further objects will become readily apparent to persons skilled in the art, from a consideration of the following description when taken in connection with the drawing, which is a part hereof, wherein—

Figure 1 is an elevation of an ordinary microscope showing my warm stage in position thereon. Fig. 2 is a plan view of the supporting housing with the warming plate removed. Fig. 3 is a transverse section taken on line 3—3 of Fig. 1.

In all the views the same reference characters are employed to indicate similar parts.

The warming plate 5 may be of insulating material, such as the material commonly known as "vulcabeston," and supposed to comprise asbestos fiber mixed with some vulcanizable material, or the like, provided with a central perforation and having its outer edges bound by metal rim 6. The heating wires 7, are preferably wound spirally, as shown in Fig. 3, and are embedded in the body portion of the plate 5. The wires terminate as at 8 and 9 in screws that take into the body portion of the plate.

A bottom cup shaped housing 10 is provided with a laterally deflected peripheral wall 11 perforated at intervals, as at 12. It is also provided with a central perforation and surrounding laterally deflected wall 13, which enters the central perforation within the plate or disk 5, and the latter circumferential flange 11 telescopically engages the metal rim 6 that surrounds the outer periphery of the disk 5. The disk 5 is held in association with the housing 10 by the frictional engagement of the rim 6 with the flange 11, or by any other suitable means that may be provided for the purpose.

Passing through one of the perforations 12, in the flange 11 is an insulating button 14, through which current conducting wires 15 and 16 pass into the interior of the housing 10. The wires are connected to the terminals 8 and 9, respectively, of the disk 5, but intermediate the terminal 8 and the wire 15, is an automatic heat responsive thermostat 17 secured to the bottom of the housing 10, as by nuts 18 and screws that pass through the bottom wall of the housing. A plate 19 forms the base of the thermostat and at each end a piece 20 and 21, respectively, is turned up for attachment of parts of the thermostat. The thermostatic bar 22 is insulatedly connected to the upturned part 21, by screws 23, and an adjustable contact screw 24, adapted for association with the contact 25 carried by the thermostatic bar, is insulatedly secured in the upturned portion 20. The screw is accessible for adjustment through a perforation 12, made in the wall 11 of the housing 10. When the contact 25, of the thermostatic bar 22, is in connection with the end of the adjustable contact screw 24 the circuit through the thermostatic heating conductor is closed, and when the heat from the conductor 7 embedded in the disk 5 has reached a predetermined degree its effect upon the thermostatic bar 22, will be to curve it in a direction to carry the contact 25 away from the contact screw 24 and thereby to open the circuit. The circuit will remain open until the disk 5 cools to some extent when the bar will be restored to its normal circuit closing position, as common with thermostatic bars of this character. It is the heat that radiates from the disk which directly controls the action of the thermo-

static bar 22 rather than the current that passes through the bar for the purpose of heating the resisting conductor, although they conjointly coöperate upon the bar.

The glass plate, or slide 26, upon which the subject to be examined is mounted is placed over the perforation in the center of the device so that the light reflected by the mirror 27 may pass through the perforation and illuminate the object upon the slide 26. Considerable surface of the plate 26 rests upon the flat surface of the disk 5, and in that way heat is communicated to the object plate, and the aperture 26′ within the device contains air that has been heated, as the result of the effect of the electric current upon the electrostatic conductor.

A thermometer 28 is mounted upon the upper surface of the disk 5 within easy view of the observer. This thermometer will indicate substantially the same temperature as that to which the plate 26 has been heated. In order that it may be affected as little by extraneous influences as may be, I place a cork covering 29 over the bulb of the thermometer and hold it in place by a cap 30, secured to the base 31 of the thermometer, by means of the pin or screw 32.

On the bottom of the housing 10 is a soft rubber disk 33 secured thereto as by cement or otherwise, the object of which is to prevent the warm stage from slipping off of the microscope stage 34 when the latter is inclined to a greater or less extent. The friction engendered by the surface of the rubber tends to hold the warm stage in its position on the fixed stage of the microscope.

While I have herein shown a single embodiment of my invention for the purpose of clear disclosure, it is evident that considerable changes may be made in the specific form and arrangement of parts within the scope of the appended claims.

Having described my invention, what I claim is:—

1. A warm stage for a microscope comprising a centrally perforated plate; an electric conductor encompassing said perforation to heat the plate; a metal housing support centrally perforated, having a laterally projecting, perforated, peripheral wall; a circuit varying thermostat bar within said housing, in circuit with said heating conductor, and means to adjust said thermostat, accessible through one of said peripheral perforations.

2. In a structure of the character described the combination of a support comprising a central tube, a base part radiating from the lower end of the tube, the outer edge portion of the base part being upturned to form a peripheral wall; and an electric heating disk adapted to fit within the peripheral wall and having a central opening therethrough to receive said tube.

3. In a structure of the character described the combination of a support comprising a central tube, a base part radiating from the lower end of the tube, the outer edge portion of the base part being upturned to form a peripheral wall; and an electric heating disk positioned with its outer edge within said peripheral wall and its lower face spaced away from the base part to provide an air chamber therebetween, said disk having a central perforation to receive the said tube.

4. In a structure of the character described the combination of a support comprising a central tube, a base part radiating from the lower end of the tube, the outer edge portion of the base part being upturned to form a peripheral wall; an electric heating disk positioned with its outer edge within said peripheral wall and its lower face spaced away from the base part to provide an air chamber therebetween, said disk having a central perforation to receive the said tube and a current varying thermo-responsive element positioned within said air chamber.

In testimony whereof I hereunto set my hand in the presence of two subscribing witnesses.

TIODOLF LIDBERG.

In the presence of—
STANLEY W. COOK,
MARY F. ALLEN.