

[54] **WAXING TOOL**

[76] Inventor: **Billy C. Hudson**, 948 Coronado Way, Livermore, Calif. 94550

[22] Filed: **May 15, 1973**

[21] Appl. No.: **360,564**

[52] U.S. Cl. **401/1**

[51] Int. Cl. **B67d 5/62**

[58] Field of Search **401/1-3; 228/53, 55**

3,332,108 7/1967 Bustamate 401/1 X
3,480,759 11/1969 Sachs et al. 222/55 X
3,662,927 5/1972 Cocks 401/1 X

Primary Examiner—Lawrence Charles
Attorney, Agent, or Firm—Flehr, Hohbach, Test, Albritton & Herbert

[57] **ABSTRACT**

Waxing tool having a body portion with a reservoir for holding wax and a handle pivotally connected to the body portion. A heating element is disposed within the reservoir for melting wax, and a needle valve controls the discharge of wax through a nozzle at the bottom of the reservoir. The needle valve extends through the top of the reservoir and is connected to a control lever which can be operated by a hand gripping the handle.

10 Claims, 3 Drawing Figures

[56] **References Cited**
UNITED STATES PATENTS

1,328,769 1/1920 Spencer 401/1
1,767,079 6/1930 Kenyon 401/1
1,815,589 7/1931 Saachy 401/1 X
2,865,037 12/1958 King 401/1

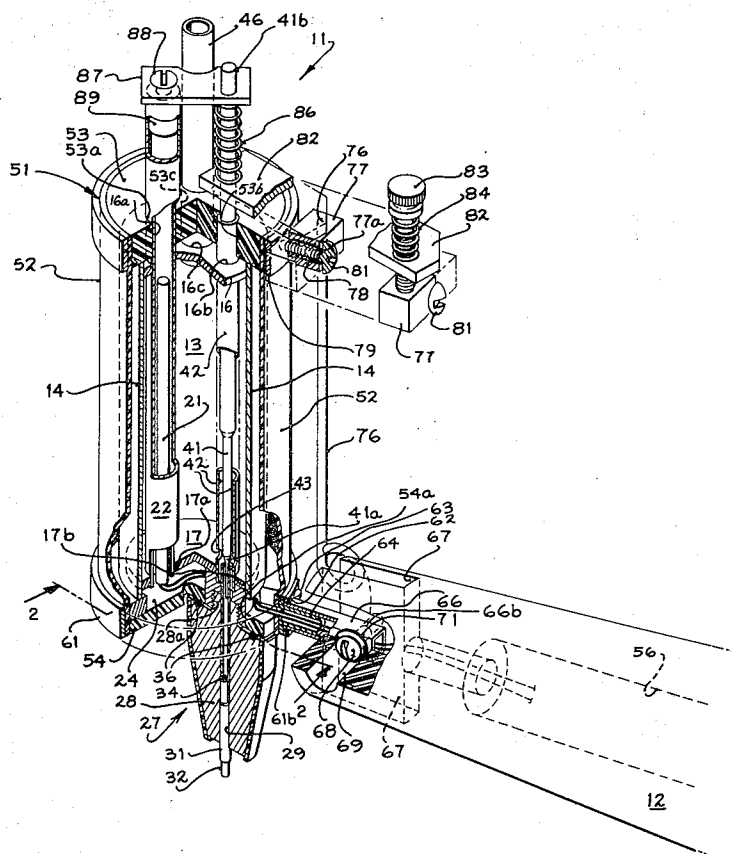
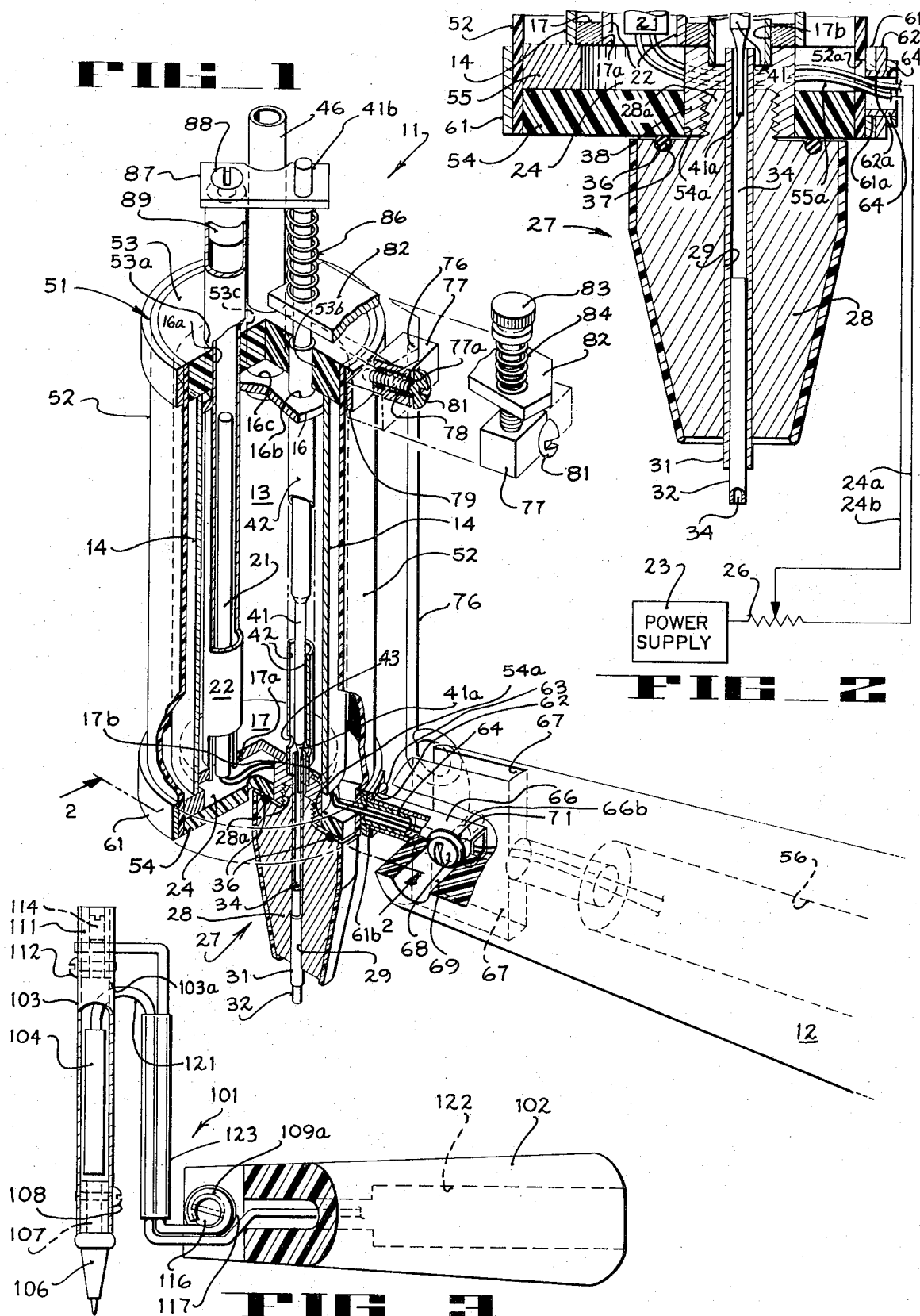


FIG. 1



1

WAXING TOOL

BACKGROUND OF THE INVENTION

This invention pertains to a waxing tool useful in the construction of wax patterns such as are used in making dental inlays and crowns and in casting jewelry and other art objects.

Heretofore, wax patterns have been constructed by heating spatulas and repeatedly depositing small quantities of wax on the patterns with the heated spatulas. This process is slow and time consuming. Recently, tools have been developed for applying molten wax directly to the patterns from reservoirs within the tools. For the most part, the tools heretofore provided tend to leak, and because of the high temperatures required for melting the wax, the tools are frequently uncomfortably hot to hold.

SUMMARY AND OBJECTS OF THE INVENTION

The invention pertains to a waxing tool having a body portion with a reservoir for holding wax, an electrically energized heated element in the reservoir, and a discharge nozzle at the bottom of the reservoir. A needle valve which extends through the top of the reservoir controls the flow of wax through the nozzle. A handle is pivotally mounted to the body portion, and a control lever is connected to the needle valve at the top of the reservoir and disposed for being operated by the hand of an operator gripping the handle. An inlet tube communicates with the reservoir for receiving wax and for connection to a source of vacuum or pressure, as desired.

It is in general an object of the invention to provide a new and improved waxing tool for use in the construction of wax patterns and the like.

Another object of the invention is to provide a waxing tool of the above character which includes a heated reservoir and a needle valve for controlling the discharge of molten wax from the reservoir.

Another object of the invention is to provide a waxing tool of the above character having a handle pivotally connected to the portion of the tool containing the reservoir.

Another object of the invention is to provide a tool of the above character which can be connected to a source of pressure or vacuum, as desired.

Additional objects and features of the invention will be apparent from the following description in which the preferred embodiments are set forth in detail in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view, partially cut away, of one embodiment of a waxing tool incorporating the invention.

FIG. 2 is an enlarged centerline sectional view of the lower portion of the embodiment shown in FIG. 1.

FIG. 3 is a sectional view of another embodiment of a waxing tool incorporating the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As illustrated in FIGS. 1-2, the waxing tool includes a body portion 11 and a handle 12. A reservoir 13 for holding hot wax is provided within the body portion. This reservoir is defined by a generally cylindrical side

2

wall 14, a top wall 16 and a bottom wall 17. These walls are fabricated of a thermally conductive material such as brass, and they are joined together by suitable means such as silver soldering to form a liquid tight container, with the top and bottom walls being inset from the ends of the side wall.

An electrical heating element 21 is provided for melting wax in the reservoir. The heating element is mounted in a cylindrical tube 22 which extends through the reservoir and passes through openings 16a and 17a in the top and bottom walls of the reservoir. This tube is fabricated of a thermally conductive material such as brass, and it is silvered soldered to the top and bottom walls to provide liquid tight joints. The heating element is of the resistive type, and it is connected to a power supply 23 by wires 24a and 24b. The power supply includes a rheostat 26 for controlling the temperature of the heating element.

A nozzle assembly 27 is provided at the bottom of the reservoir. This assembly includes a generally frustoconical body 28 having a threaded boss 28a and its upper end. An axial bore 29 extends through the body, and tubular members 31 and 32 are mounted in the bore. The outer diameter of member 31 is substantially equal to the diameter of bore 29, and this member extends beyond the upper and lower ends of the body. The outer diameter of tubular member 32 is substantially equal to the inner diameter of member 31, and member 32 extends from the lower end of member 31 to provide a working tip. An axially extending flow passageway 34 extends through tubular members 31 and 32 and communicates with the inside of reservoir 13. An O-ring groove 36 is formed in the upper surface of body 28 at the base of boss 28a, and an O-ring 37 is disposed in the groove and surrounds flow passageway 34. Boss 28a is threadedly received in a nozzle coupling 38 which is affixed to lower reservoir wall 17 by suitable means such as silver soldering. The coupling is disposed coaxially of an opening 17b in the reservoir wall, and the upper end of tubular member 31 extends through the coupling into the opening. In the preferred embodiment, body 28, tubular members 31 and 32, and coupling 38 are all fabricated of a thermally conductive material such as brass.

Means is provided for controlling the communication between reservoir 13 and low passageway 34. This means includes a needle valve 41 comprising a tapered lower portion 41a which extends into nozzle passageway 34 and a tubular upper portion 41b which extends above the top of the reservoir. The needle valve is slidably mounted in a tubular guide 42 which extends through an opening 16b in the top wall of the reservoir and opening 17b in the bottom wall. The guide is fabricated of a material such as brass, and it is silvered soldered to the top and the bottom walls to provide liquid tight seals. Orifices 43 are formed in the guide toward the bottom of the reservoir to provide communication between the reservoir and the passageway in the nozzle. In its fully closed position, the needle valve seats against the upper portion of tubular member 31 of the nozzle assembly.

An inlet tube 46 extends through an opening 16c in the top wall of the reservoir and communicates with the inside of the reservoir. This tube is fabricated of a material such as brass, and it is attached to the top wall by suitable means such as silver soldering.

The reservoir is enclosed within a housing 51 comprising a generally cylindrical side wall 52, a top wall 53, and a bottom wall 54. Top wall 53 is mounted within the upper portion of side wall 52, and it abuts against the upper end of reservoir side wall 14. Bottom wall 54 is mounted within the lower portion of side wall 52 and is spaced from the lower end of reservoir wall 14. An annular space 55, having a cut-away portion 55a, is disposed between the lower end of reservoir wall 14 and bottom wall 54 and abuts against the same. The housing walls are fabricated of thermally insulative materials such as phenolic and teflon. Heater tube 22, valve guide tube 42, and inlet tube 46 pass through openings 53a, 53b, and 53c, respectively, in top wall 53. Nozzle coupling 38 passes through an opening 54a in bottom wall 54, and O-ring 37 abuts against the lower surface of wall 54 to provide a liquid tight seal when the nozzle is tightened in the coupling.

Handle 12 is adapted to be held by the hand of an operator using the tool. The handle is rounded and axially elongated to provide a comfortable grip. It is preferably fabricated of a thermally insulated material such as plastic, and it includes an axially extending bore 56 through which heater wires 24 pass.

Means is provided for pivotally mounting the handle to the lower portion of body 11 to permit the angle between the axis of nozzle 27 and the axis of the handle to be adjusted as desired. This means includes an annular support ring 61 which is mounted on the lower portion of insulative housing wall 52. An arcuate support bracket 62 is attached to one side of the ring by screws 63. A tubular support coupling 64 is mounted in an opening 61a in ring 61 and extends outwardly through an opening 62a in the support bracket. A support arm 66 extends from support bracket 62 and is rigidly affixed thereto by suitable means such as silver soldering. This arm is disposed coaxially of coupling 64 and is rigidly affixed thereto by suitable means such as silver soldering.

Support arm 66 extends into a cutaway region 67 at one end of the handle, and the handle is pivotally mounted on the support arm by means of a screw 68. The head of the screw is recessed in the opening 69 on one side of the cutaway region, and it passes freely through an opening 66b in the support arm. The screw is threadedly received in the handle of the side of the cutaway region, and an O-ring 71 is disposed between the head of the screw and the support arm. As the screw is tightened, the O-ring is frictionally engaged by the head of the screw and the support arm to hold the handle at a desired angle.

Heater wires 24a and 24b are dressed around nozzle coupling 38, and they pass out of the body portion of the tool to bore 56 in handle 12 through the cut-away portion of spacer 55, an opening 52a in side wall 52, and the openings in coupling 64 and support arm 66.

Means is provided for moving the needle valve between its advanced and retracted positions. This means includes a control lever 76 which extends down the side of the body portion of the tool and can be operated by the hand of an operator gripping the handle. The upper end of the control lever is rigidly affixed to a pivot arm 77 which is pivotally mounted on a bushing 78. A support ring 79 is mounted on the upper portion of housing 51, and the bushing is affixed to the support ring by a screw 81. The bushing passes through an opening 77a in the pivot arm, and the head of screw 81, being larger

than the opening, retains the arm on the bushing. A control arm 82 is rigidly affixed to valve member 41 and extends radially there from. A thumbscrew 83 is threadedly mounted in the control arm, and the lower end of this screw is engaged by the pivot arm when the control lever is actuated. A compression spring 84 is provided between the head of screw 83 and control arm 82 to hold the screw at a desired setting.

A compression spring 86 is constrained between control arm 82 and a bracket 87 and urges the needle valve toward its closed position. The bracket is affixed to the upper portion of heater tube 22 by means of a screw 88 and a threaded plug 89. The bushing is disposed in the upper portion of the tube and affixed thereto by suitable means such as silver soldering.

Operation and use of the waxing tool can be described briefly. Initially, let it be assumed that wax has been introduced into the reservoir through inlet tube 46 and that heating element 21 has been energized to melt the wax. Handle 22 can either be held like a pencil, or it can be laid across the palm of the hand like a hammer, as the operator prefers. In order to deposit wax with the tool, the operator swings control lever 76 to raise pivot arm 77. As the arm is raised, it engages the lower end of thumbscrew 83, moving needle valve 41 off its seat in tubular member 31. With the needle valve open, wax flows into passageway 34 and out the tip of the nozzle. The opening of the needle valve, and hence the amount of wax that is discharged, for a given movement of the control lever is determined by the setting of thumbscrew 83. As the screw is tightened down, it is engaged sooner by pivot arm 77, and more wax is discharged. When the operator releases the control lever, the needle valve is returned to its closed position by spring 86.

The tip of the nozzle can also be used as a hot spatula for melting or carving. Inlet tube 46 can be connected to a vacuum source, in which case the tool can be used for removing wax melted by the heated tip. Similarly, the inlet tube can be connected to a source of pressure, and the combination of the hot tip and bursts of air can be used to produce a textured effect.

FIG. 3 illustrates another embodiment of the invention which is particularly suitable for use as a wax spatula. This embodiment includes a body portion 101 and a handle 102. The body portion comprises a generally cylindrical housing 103 in which an electrically energized heating element 104 is disposed. A tip 106 fabricated of a thermally conducted material such as brass is provided at the lower end of housing 103. The tip is threadedly mounted in a threaded bushing 107 which is secured in the lower portion of the housing by a screw 108.

Handle 102 is generally similar in construction to handle 12. Means is provided for pivotally mounting the handle to the body portion to permit the angle between the axis of the handle and the axis of the body portion to be adjusted as desired. This means includes a support arm 109, one end of which is rigidly affixed to the upper portion of housing 103. The end of the arm passes diagonally through an internally threaded plug 111 which is mounted in the upper portion of the housing. The bushing is secured to the housing by a screw 112, and the arm is held in place in the bushing by a set screw 114. The support arm extends toward the lower end of the body portion where it is formed in a loop 109a. The screw 116 passes through loop 109 and

5

is threadedly mounted in the handle. An O-ring 117 is disposed between the loop and the handle to provide means for holding the handle at a desired angle when the screw is tightened. Heater wires 121 pass through an opening 103a in the housing and through an axially extending opening 122 in the handle. The wires are dressed adjacent to support arm 109 by suitable means such as shrink tubing 123.

In use, handle 102 can be gripped either as a pencil or as a hammer, as desired. When the heating element is energized, tip 106 can be utilized for melting and carving the wax.

The invention has a number of important features and advantages. It can be used as a wax applicator, a spatula, a texturing tool, and a tool for removing wax. The needle valve assembly is readily disassembled and cleaned. Since the valve mechanism is controlled from the top of the reservoir, there are no problems of sealing and leakage around the control mechanism. The handle is thermally insulated from the heating element and hot wax reservoir, and the tool can be held and operated with one hand. The handle can be set at a convenient angle, and the fingers of the operator can be close to the tip, giving him good control over the tool.

It is apparent from the foregoing that a new and improved waxing tool has been provided. While only the presently preferred embodiments have been described herein, as will be apparent to those familiar with the art, certain changes and modifications can be made without departing from the scope of the invention as defined by the following claims. I claim:

1. In a waxing tool, a body portion including means defining a reservoir for holding wax, electrically energized heating means disposed within the reservoir for melting the wax, a nozzle mounted at the bottom of the reservoir having an axially extending passageway communicating with the reservoir, a needle valve member disposed coaxially of the passageway and movable between advanced and retracted positions for controlling the flow of wax through the nozzle, said valve member extending outside the reservoir at the top thereof, an elongated handle pivotally attached to the body portion for movement in a plane extending radially of the axis of the nozzle whereby the angle between the axis of the nozzle and the axis of the handle can be varied, a control lever pivotally mounted on the body portion for movement about a radially extending pivot in a plane generally normal to the plane of handle movement, one end of the lever extending toward the junction of the handle and the body portion, whereby the lever can be operated by the hand of an operator gripping the handle, and means connecting the control lever to the valve member externally of the reservoir whereby the position of the valve member is controlled by the lever.

2. A waxing tool as in claim 1 wherein the nozzle is threadedly attached to the means defining the reservoir.

3. A waxing tool as in claim 2 further including an O ring surrounding the passageway in the nozzle and providing a seal between the nozzle and the means defining the reservoir.

6

4. A waxing tool as in claim 1 wherein the needle valve member extends into the passageway in the nozzle and the upper portion of the nozzle serves as a seat for the valve member.

5. A waxing tool as in claim 1 wherein the body portion further includes a housing of thermally insulative material surrounding the reservoir.

6. A waxing tool as in claim 1 wherein the means connecting the control lever to the valve member includes a pivotally mounted arm to which the lever is affixed, a control arm affixed to the valve member, and an adjustable thumbscrew threadedly mounted in the control arm, the tip of said thumbscrew being engaged by the pivotally mounted arm when the control lever is operated.

7. A waxing tool as in claim 1 further including inlet means communicating with the reservoir at the top thereof.

8. A waxing tool as in claim 1 further including variable power supply means connected to the heating means for controlling the temperature of the same.

9. In a waxing tool, a body portion including means defining a reservoir for holding wax, electrically energized heating means disposed within the reservoir for melting the wax, a nozzle mounted at the bottom of the reservoir having an axially extending passageway communicating with the reservoir, valve means for controlling the flow of wax through the passageway, an elongated handle pivotally attached to the body portion for movement in a plane extending radially of the axis of the nozzle whereby the angle between the handle and nozzle can be varied, and a control lever for the valve means pivotally mounted on the body portion for movement about a radially extending pivot in a plane generally normal to the plane of handle movement, one end of the lever extending toward the junction of the handle and the body portion, whereby the control lever can be operated by the hand of an operator grasping the handle.

10. In a waxing tool, an axially extending reservoir for holding wax, an electrically energized heating element disposed within the reservoir for melting the wax, a generally cylindrical housing of thermally insulative material surrounding the reservoir, a nozzle extending from the housing at the bottom of the reservoir and having an axially extending passageway communicating with the reservoir, an axially extending needle valve member for controlling the flow of wax through the nozzle, a control lever pivotally mounted on a radially extending pivot toward the top of the housing for movement in a tangential plane, means connecting the control lever to the valve member whereby the position of the valve member is determined by the control lever, and an elongated handle pivotally mounted toward the bottom of the housing for movement in a radial plane, the lower end of the control lever extending toward the junction of the handle and the housing whereby the control lever can be operated by the hand of a person grasping the handle.

* * * * *