March 6, 1951 W. C. JONES 2,544,326

SURFACE FINISHING IRONING TOOL

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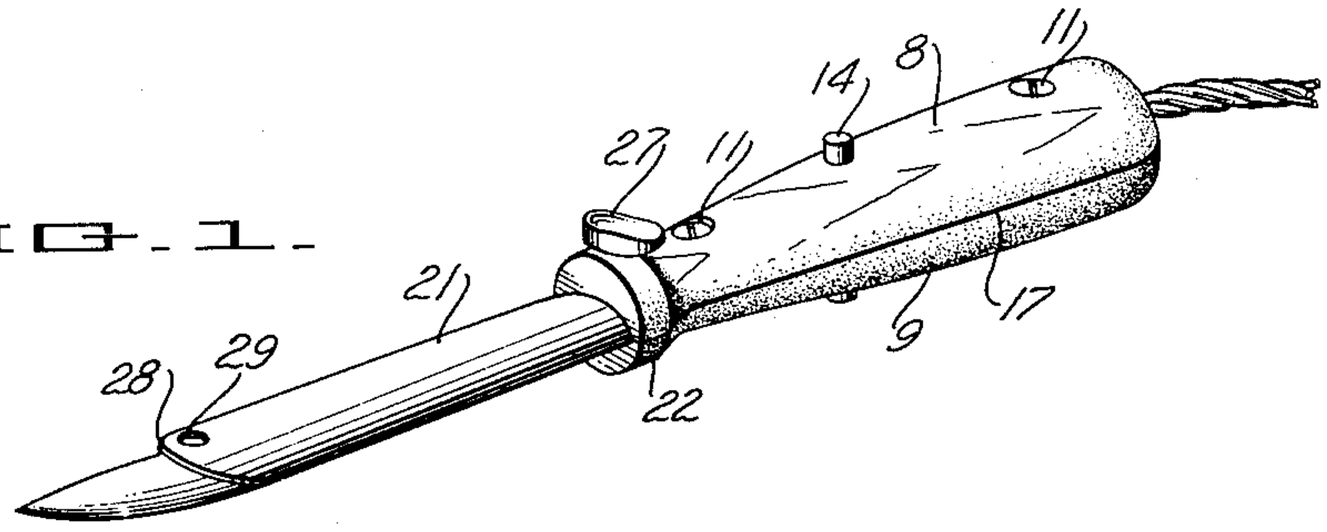

FIG. 1.

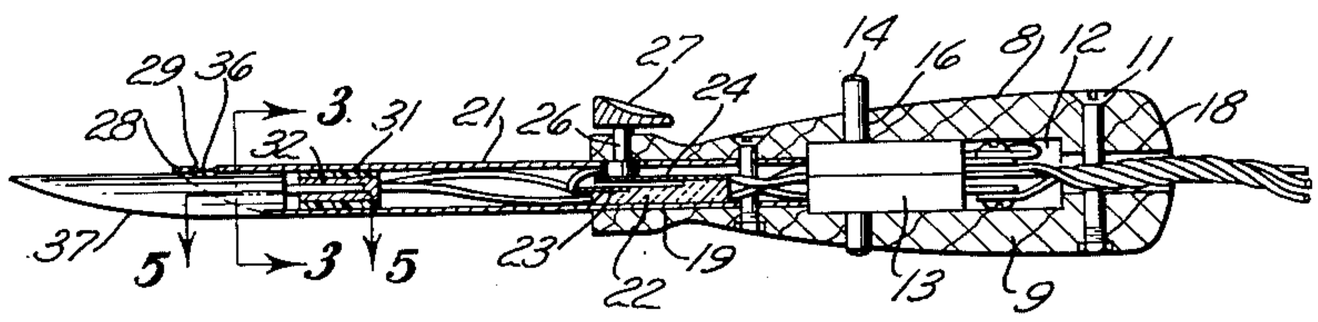

FIG. 2.

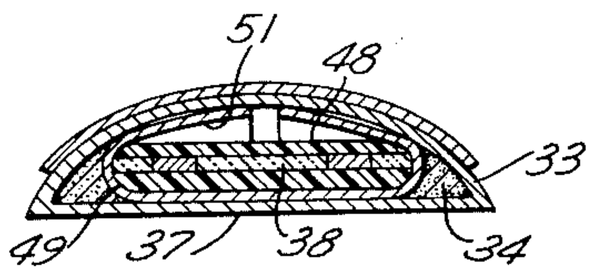

FIG. 3.

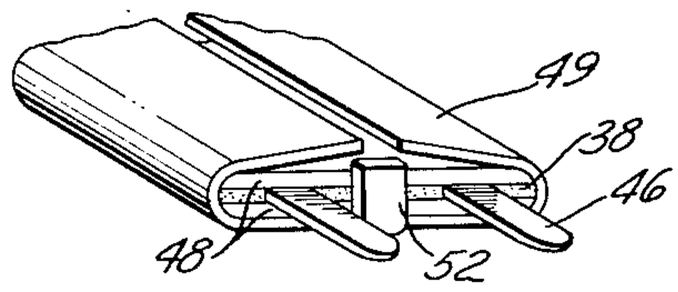

FIG. 4.

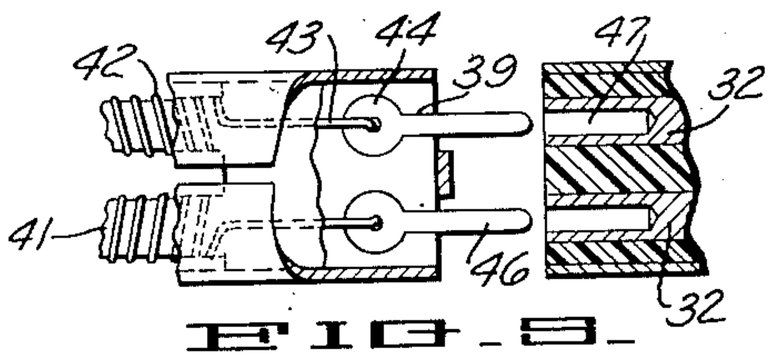

FIG. 5.

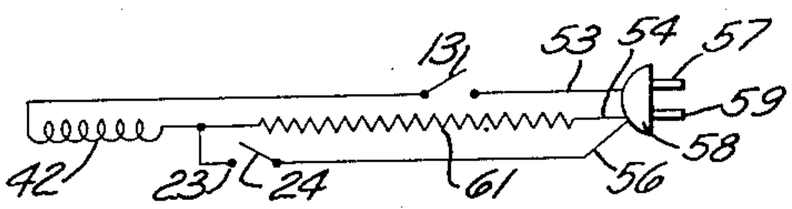

FIG. 6.

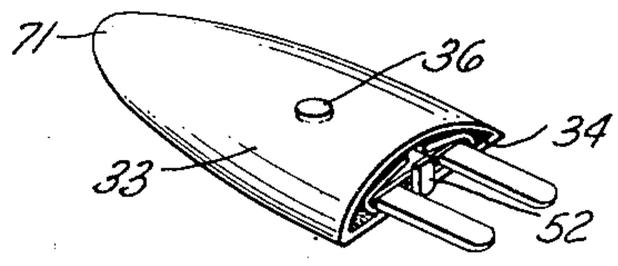

FIG. 8.

FIG. 8.

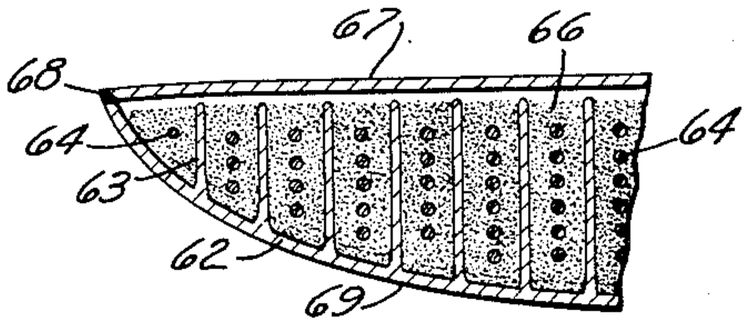

FIG. 7.

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SURFACE FINISHING IRONING TOOL

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2 Claims. (Cl. 219—21)

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This invention relates to electrically-heated tools for working thermally ductile materials and, more particularly, relates to improvements over the structure shown in my previous Patent No. 1,787,866, issued January 6, 1931.

An object of the invention is to provide a tool of the character described having a plane ironing surface so arranged with respect to an associated electric heating element that the heat conductance path from the heating element to the ironing surface is reduced as much as possible so as to bring the latter surface to proper operating temperature in a minimum of time.

Another object of the invention is to provide an electrically-heated tool of the type referred to in which the flat ironing surface is constantly maintained at a pre-heating temperature considerably above normal room temperature but still below that sufficient to prevent scarring of fusible surface materials with which the tool may accidently contact, and in which provision is made to elevate the ironing surface to material-fusion temperature at the selection of the operator.

A further object of the invention is to provide, in a tool of the class described, a readily removable headpiece of generally pointed form containing a heating element and contact members through which current may be conducted from the main body of the tool to the heating element, the heating element being so arranged that the flat ironing surface of the headpiece, even to the extreme tip thereof, will be rapidly and substantially uniformly heated.

Still another object of the invention is to provide, in conjunction with a detachable headpiece for a tool of the type referred to, simple and effective means for locking the headpiece to the main body portion of the tool so that relative separation of the headpiece and main body portion may not accidently occur during normal usage of the tool.

Yet another object of the invention is to provide in a device of the character described, separate control switches for regulating current flow to the heating element which may be operated singularly or plurally to produce a variable thermal output in the heating element; the switches being capable of actuation by a single hand of the operator which is also employed in manipulating the tool.

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It is another object of the invention to provide a heated headpiece for a tool of the above-described character in which provision is made to trap and convey to the flat ironing surface of the headpiece the maximum amount of heat emitted by the heating element contained therein.

It is a further object of the invention to provide in a shell-type headpiece, for a tool of the class referred to, which is provided with an electric heating element therewithin, means for resiliently wedging the heating element into the headpiece so as to effect continuous firm contact of the heating element with the wall portion of the shell subjacent to the flat ironing surface to insure that heat is transmitted to the latter surface over the shortest possible transmission route.

It is still another object of the invention to provide, in a tool of the character described, a headpiece including a single-circuit heating element controllable by means disposed for the most part exteriorly of the tool to variably heat the headpiece and serving to reduce to a minimum the bulkiness of the tool which would be greatly increased if the entire control mechanism was contained within the body of the tool.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by said drawings and description may be adopted within the scope of the invention as set forth in the claims.

Referring to the drawing:

Figure 1 is a perspective view of the improved ironing tool of my invention.

Figure 2 is a vertical sectional view taken in a plane extending longitudinally of the structure of Figure 1.

Figure 3 is an enlarged vertical sectional view taken in the plane indicated by the line 3—3 of Figure 2.

Figure 4 is an enlarged perspective view of the terminal end portion of the electric heating unit.

Figure 5 is a horizontal sectional view taken in the plane indicated by the line 5—5 of Figure

2, the terminals being shown in relatively disengaged positions.

Figure 6 is a circuit diagram showing the relationship and the connections between the various electrical components of the apparatus.

Figure 7 is an enlarged vertical sectional view of a portion of the headpiece showing a modified form of my invention.

Figure 8 is a perspective view of one form of headpiece.

Figure 9 is a perspective view of a modified form of headpiece.

In carrying out my invention, I provide a cylindrical grip or handle, preferably constructed of wood or molded of any of the synthetic resins, which comprises a pair of juxtaposed sections 8 and 9 secured together by transaxially extending screws 11 or in any other suitable manner. Substantially centrally of the handle, I provide a chamber 12, composed of registered recessed portions of each handle section, in which is contained a current control switch 13 preferably of the single-pole single-throw snap type having a control rod or elongated push button 14 slidably extended through suitable transaxial apertures 16 provided therefor in the handle sections. The switch 13, it will be seen, may be selectively turned on or off by movements of the operator's hand grasping the handle. Also provided in the handle and extending along the parting plane 17 thereof, are bores 18 and 19 the former of which is circular in cross-sectional form and the latter of which is shaped as the chordal segment of a circle, one side being flat and inserted by a curved opposite side whose center of curvature lies beyond the flat surface and exteriorly of the area enclosed by the flat and curved surfaces. The exact contour just described is illustrated in Figure 3 of the drawing.

Disposed in the bore 19, and extending beyond the end of the handle, is a tubular metallic shank 21 complementary in cross-sectional form with the bore 19 and secured in the latter by means of one of the screws 11 which passes vertically through the shank. Within that portion of the shank resting in the bore 19, I provide a control switch having a base block 22 of synthetic resin or the like on which is mounted a fixed contact 23 and an overlying flexible contact arm 24 normally held out of engagement with the contact 23 but engageable therewith when flexion pressure is applied to the arm. Means for applying such pressure is provided in an axially slidable push rod 26 mounted in the handle overlying the contact arm 24 and provided with an externally exposed push button 27 capable of being depressed by the thumb or a finger of the operator's hand grasping the tool handle. The outer end of the shank 21 is cut off diagonally to form an overhanging lip 28 having an aperture 29 and within the end of the shank is provided a block 31 of electrical insulating material having therein a pair of separate contact sockets 32 clearly shown in Figure 5.

I provide a headpiece or ironing tip, examples of which may be seen in Figures 8 and 9, for detachable connection with the tool shank. These headpieces may be made in various forms for use in accomplishing various finishing jobs, such as the rounded and spade points shown, but each comprises an outer sheet metal shell 33 having therein an open-ended recess 34 and provided in its upper arched surface with an upwardly pressed protuberance 36 complementary

with and adapted for engagement in the aperture 29 of the lip 28. The lower outer face 37 of the shell comprising the ironing surface is flat over its entire extent but has its distal portion adjacent the tip, as shown in Figure 2, curved upwardly so as to facilitate accommodation of the tool to work on flat or slightly concave surfaces.

In the recess 34 of the headpiece is disposed an electrically energized heater preferably comprising a center strip 38 of mica, pressed asbestos board or the like, having at one end a pair of separate keyhole-shaped notches 39 and further provided with integral tongues 41 or the like upon which is wound a unit length of chrome-nickel alloy wire 42 whose terminal end portions 43 are engaged in the apertured head elements 44 of terminal lugs 46 registered with and adapted to enter the recesses 47 of the sockets 32 so as to establish electrical contact with the latter. The lugs 46 and the center strip 38 have corresponding vertical thickness. The head elements 44 and the immediately adjacent shank portions of the terminal lugs 46 are shaped correspondingly with the keyhole shaped notches 39 and fit snugly therein, as shown in Figure 5, so as to lock the terminal lugs in the center strip 38. Overlying the upper and lower surfaces of the center strip and its attached terminal lugs, I provide sheets 48 of mica or the like heat-resistant and electrical insulating material and encircling the assembly is a metal sheath 49 whose opposite wing portions 51 are left projecting angularly from the uppermost sheet 48 as will be seen in Figure 3. When the assembled heater is pressed longitudinally into the lengthwise tapering recess 34 of a headpiece, the wings 51 will engage the inner sloping surface of the arched upper member of the shell thereby flexing the ears downwardly and forcibly pressing the heater against the lower flat wall of the shell above the ironing surface 37. As a means for locking the heater in the headpiece shell so as to forestall possible dislodgement of the former due to abnormal tensile strains which may be exerted on the lugs in the process of detaching the headpiece, I provide an ear 52, shown in Figure 4, preferably formed integrally with the sheath 49 and bent upwardly between the lugs 46 to overlie the end surfaces of the stacked insulating strip and sheets 38 and 48 respectively. After the heater has been properly positioned the shell recess 34 may be filled with porcelain cement or the like heat-resistant substance.

Attachment of the headpiece to the main body portion of the tool may be effected by bringing the former into proper alignment with the latter, as regards the relative cross-sectional forms thereof, and pushing the headpiece toward the end of the tool which will cause the lugs 46 to enter the recesses 47. As the lugs approach their fully inserted positions, the protuberance 36 approaches and passes under the outer extremity of the lip 28 which will thereby cause a slight downward flexing of the lugs. Thus, when the protuberance 36 comes into registry with the aperture 29 the former will snap into the latter and thereafter securely lock the headpiece to the tool body until forcibly and deliberately released. Since, during normal operation of the tool, pressure of the headpiece will be exerted downwardly against the work surface, the resultant upward pressure against the flat ironing surface 37 will further tend to retain the protuberance 36 in engagement with the locking aperture 29.

Associated with the tool I provide a current supply cord preferably composed of three conductors **53**, **54** and **56**, the former of which may be attached to one terminal lug **57** of a plug connector **58** and the latter two of which may be attached to the other terminal lug **59** of the plug connector. The conductor leads to one terminal of the switch **13** and from the other terminal of the latter switch to connect with a terminal end of the heater winding **42**. The conductor **56** is connected to one terminal **24** of the push button control switch, the other terminal **23** of which is connected with the remaining terminal end of the heater coil **42**. The conductor **54** either comprises or has built thereinto a current limiting resistor **61** the terminal end of which is connected to the switch contact **23** or the conductor permanently connected therewith. Operation of the tool is effected by attaching the plug connector **58** to a suitable current outlet and closing the switch **13**. This causes current to flow through the heater coil **42** at a reduced rate due to the presence of the resistor **61** in the conductor **54**. When the push button **27** is also depressed to close the contacts **23** and **24**, the resistor **61** will be shunted and full current flow will occur in the heater coil. The circuit design is such that under full current load, with both switches closed, the heater coil will generate sufficient heat to create a temperature in the ironing surface **37** of the headpiece which will cause desirable softening or complete melting of the fusible finishing materials which will be described presently and with which the present tool is adapted for use. Opening of the switch contacts **23** and **24**, by the removal of finger pressure from the push button **27**, will reduce current flow to the heater coil so that the ironing surface may cool to a temperature somewhat below the fusion temperature of the aforesaid finishing materials. The tool is therefore always kept in a preheated condition at a reduced temperature and may be more rapidly brought to full operating temperature, when such condition is required, than would be the case if all current flow to the heater coil were shut off.

In Figure 7 I have shown a modified form of headpiece designed to concentrate as much as possible of the heat generated by the coil at the flat ironing surface. Here I have shown the lower portion **62** of the shell as a separate flat plate on which is formed a plurality of relatively spaced transverse ribs **63** about which is wound the coils **64** of the heater, the latter being embedded in poreclain cement **66** or the like for electrical insulation from the metal headpiece. The crowned upper plate **67** may be secured to the lower plate along its margin by brazing **68** or the like. Heat from the coils will be radiated into the ribs **63** which will conduct it to the bottom plate **62** and thence to the flat ironing surface **69**.

The widest field of use for the tool of my invention lies in the finishing of furniture or the like wherein suitably colored, heat fusible substances such as rosin, certain of the synthetic resins and the like are used as fillers for cracks, surface nicks and other imperfections which would mar the appearance of the finished product. Most of the substances useful for this work have melting points of about three or four hundred degrees which means that the ironing surface of the tool must be brought to or above the larger temperature to work properly. Obviously, to maintain the tool at such an elevated temperature during times when the tool is not in

actual use for finishing, requires excessive wastage of current and creates the danger of the heated tool accidently coming in contact with and scorching a finished piece of work or the like or effecting severe contact burns on the person of the user should the latter accidently brush against or grasp the heated tool. By providing for immediate reduction in current flow to the heater coil, when the tool is momentarily set aside between the numerous applications of filler material which are necessary in the average finishing or refinishing job, the dangers of burning or scarring of the person of the operator or of highly finished surfaces on which the tool may be placed are reduced to an absolute minimum since with the resistor **61** in circuit with the heater coil, the temperature of the ironing surface may not exceed about one hundred degrees which renders the tool incapable of causing the aforesaid damage. However, since the tool is maintained at the lower temperature as long as the switch **13** is turned on and current is being supplied to the conductors **53**, **54** and **56**, as soon as the contacts **23** and **24** are closed by pressure on the push button **27**, the heater coil temperature will, in a matter of seconds, rise to the higher operating temperature. During the course of actual application and smoothing of the fusible finishing material the heat at the ironing surface will be under the full control of the operator who, by manipulating the push button **27**, may keep the headpiece at approximately the correct temperature to properly work the particular finishing material being used.

The illustrations of Figures 8 and 9 show two of the more common shapes of headpieces employed in the general run of furniture finishing. The unit of Figure 8 with its comparatively sharp rounded point **71** is designed for general work but particularly the recessed surfaces of flutes, rosettes and the like while the comparatively flat chisel point **72** of the unit of Figure 9 is adapted for general flat work and finishing operations in entrant corners. Regardless of which one of several headpieces may be in use it is possible, as was explained in detail above, to very rapidly interchange the headpieces on the main body portion of the tool as the needs for particularly shaped headpieces arise.

I claim:

1. A surface finishing tool having a headpiece comprising a metallic shell having a wall member provided with a flat ironing surface and having a recess therein of which said wall member forms a part, said recess being of longitudinal tapering form, an electric heater including a metallic sheath provided with extended flexible portions and inserted in said recess whereby said extended flexible portions will engage a tapered side of the recess so as to forcibly press the heater against said wall member, and a portion of said shell deformed to overlie a portion of said heater so as to preclude dislodgement of the latter from said recess.

2. In a surface finishing tool, a headpiece comprising a metallic shell having a wall member provided with a flat ironing surface and having a recess therein of which said wall member forms a part, said recess being of longitudinal tapering form, an electric heater comprising a center sheet of insulating material carrying coils of resistance wire and provided in an end portion with a pair of keyhole-shaped notches, correspondingly-shaped terminal lugs connected with said coils and disposed in said keyhole-shaped notches

whereby said terminal lugs are locked to said center sheet, cover sheets of insulating material overlying said center sheet and terminal lugs, a metallic sheath encircling said cover and center sheets and provided with extended flexible portions, said heater being inserted in said shell recess whereby said extended flexible portions will engage a tapered side of the recess so as to forcibly press the heater against said wall member, and a portion of said shell deformed to overlie a portion of said heater so as to preclude dislodgement of the latter from said recess.

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