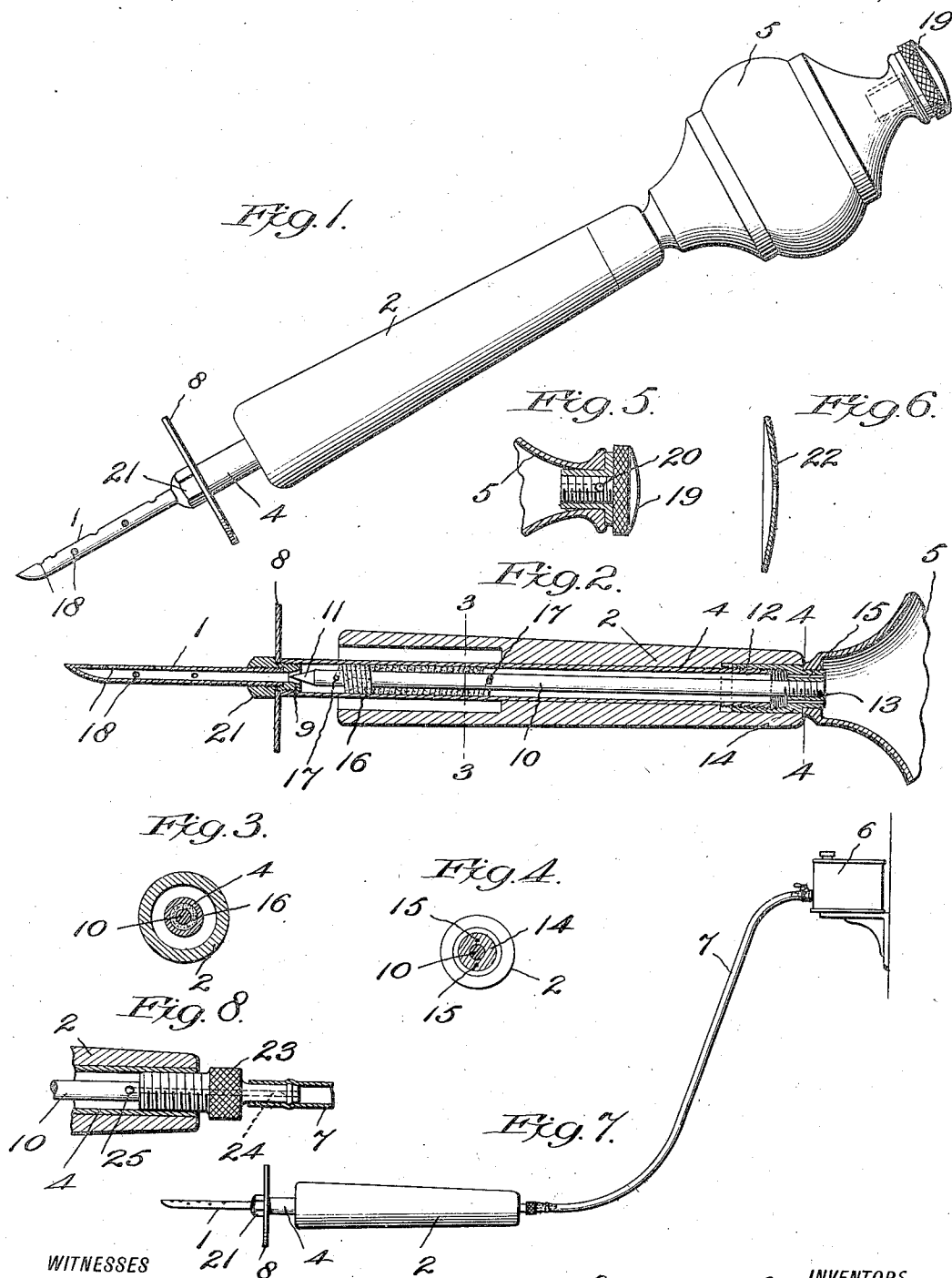


M. B. BAER & E. H. E. MALMQUIST.
PYROGRAPHIC DEVICE.

APPLICATION FILED MAR. 25, 1912.

1,053,265.

Patented Feb. 18, 1913.



WITNESSES

Philip S. McLean
Teresa V. Lynch

Maurice B. Baer and
Ernest H. E. Malmquist
INVENTORS
BY
Brock Becken Smith
ATTORNEYS

UNITED STATES PATENT OFFICE.

MAURICE B. BAER AND ERNEST H. E. MALMQUIST, OF NEW YORK, N. Y., ASSIGNORS TO
FLEMISH ART COMPANY, A CORPORATION OF NEW YORK.

PYROGRAPHIC DEVICE.

1,053,265.

Specification of Letters Patent.

Patented Feb. 18, 1913.

Application filed March 25, 1912. Serial No. 686,175.

REISSUED

To all whom it may concern:

Be it known that we, MAURICE B. BAER and ERNEST H. E. MALMQUIST, citizens of the United States, and residents of the borough of Brooklyn, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Pyrographic Devices, of which the following is a specification.

The apparatus usually employed for pyrographic work consists at the present time of a stock or handle carrying a burning point, the point being supplied with a combustible gas, and the gas being ordinarily produced by forcing a current of air through or over a body of hydro-carbon oil, such as benzin. A hand-operated pump is used in most cases for supplying the current of air. This system necessitates the employment of tubing for conveying the air from the pump to the liquid container and other tubing for carrying the gas generated in the liquid container to the tool. The use of all this tubing is of course objectionable, and another objection to this system is that both hands are occupied in manipulating the apparatus—one hand being employed in handling the tool and the other hand in working the pump—so that no hand is left free to attend to the holding of the work. As an improvement over these conditions it has been proposed to do away with the need for the pump by feeding the fuel in liquid form direct to the tool and to produce the necessary gas by causing the heat generated by the tool to convert the liquid into a vapor. Many objections to this proposal were found to exist—for instance, the tube conveying the stream of liquid from the relatively fixed tank to the tool was much in the way, and on account of the necessarily long distance the liquid had to flow, some time was required in which to start the tool working, and once started, it would continue to burn some time after the flow had been cut off at the tank. But by far the most serious objection to this system was that the heating flame at the tool point could not be properly controlled or regulated. The only means by which it was attempted to control the heating flame, was by turning the liquid on and off at the tank, but on account of the tool point being so remote from the tank, a change in the flow of liquid at the tank would not affect the flow of gas (generated

from the liquid) at the point until considerably later, so that even if means were provided at the tank for regulating the flow of liquid, this would be of little or no practical value on account of the length of time intervening between the time of regulation of the flow of liquid, and the time when such regulation became apparent at the point. With such a method it would be necessary to regulate the liquid flow and then wait perhaps several minutes (dependent upon the length of tubing and hence the volume of the stream of liquid between the tank and the point) until a change was noticeable at the point—then if too much or too little liquid had been turned on, it would be necessary to guess at a second adjustment and wait for another period of time, and so on. It will be obvious that such a method of regulation would be impracticable.

Having thus set forth the present state of the art and some of the objections attendant upon the same, we would state that the object of our invention is in general to overcome and obviate these various objections.

Accordingly our invention resides in causing the heat from the burning point to convert liquid fuel into a gas or vapor for use in the burning point, and in combining with the burning point, means for controlling the flow of vapor to the point. Thus, according to our invention, the gas is generated as fast as it may be needed and the heat is controlled instantaneously by simply regulating the flow of gas to the burning point. Specifically the means for controlling the flow of vapor may be a valve placed relatively close to the burning point. In addition to this we provide for controlling the rate of vaporization and hence the flow of liquid, in accordance with the consumption or flow of gas to the burning point. This result is obtained preferably by placing a wick in the vaporizing tube—which tube is connected to or forms a part of the burning point so as to be heated thereby—which wick will check the flow of liquid and will by capillary action feed the liquid to the point of vaporization directly in accordance with the rate of vaporization.

Another feature of our invention consists in eliminating the objectionable tubing between the tank and the tool. We accomplish this by mounting the reservoir for the

fuel direct on the tool so as to be carried thereby.

Various other objects and features of our invention will appear as the specification proceeds.

In the accompanying drawings we have illustrated several preferred embodiments of our invention but we would have it understood that various changes and modifications may be made therein without departing from the spirit and scope of the invention.

In the drawings: Figure 1 is a side elevation of the preferred embodiment of the invention, showing the same in approximately the position of usage. Fig. 2 is a longitudinal section view of the same with the reservoir broken away. Fig. 3 is a transverse sectional view of the device, taken on line 3—3 of Fig. 2. Fig. 4 is another cross-sectional view taken on line 4—4 of Fig. 2. Fig. 5 is a broken sectional view of the filling cap, to illustrate the vent therein. Fig. 6 is a sectional view of a slightly modified form of the guard flange. Fig. 7 is a view on a slightly smaller scale of a slightly modified form of the invention, and Fig. 8 is a broken detail view of the form of the invention shown in Fig. 7, this view being on a somewhat larger scale than Fig. 7.

Like reference characters refer to corresponding parts throughout the different views.

The burning point 1 is of any desired shape and size and is usually made hollow for the passage of the fuel thereto. The point is suitably mounted in some kind of a holder, such as the stock or handle 2, and the fuel is supplied to the point by a suitable conduit such as supply tube 4, to which the point is connected. While the burning point and supply tube are, for purposes of manufacture, preferably made in separate parts, as a matter of fact the two might be made in a single piece. The fuel in liquid form is furnished to the supply tube in any suitable fashion. The preferred method, however, is to provide a reservoir 5 of suitable capacity which is attached to the upper end of the tool and forms a part of the same. This reservoir is made of such size and is so shaped and located upon the tool that it will not interfere with the free usage of the tool. In the drawings the reservoir is shown as having the shape of a spinning top and as being mounted at the extreme upper end of the handle so that the under conical portion of the top-shaped reservoir may readily rest upon the back of the hand of the user when the tool is being held in the same way as an ordinary pen or pencil. The shape and location of the reservoir may, however, vary to suit different requirements. Another way of conducting the liquid fuel

to the supply tube is illustrated in Fig. 7, in which case the liquid is contained in a separate tank or reservoir 6 mounted at a convenient height upon a wall or other support and connected by flexible tubing 7 with the upper end of the supply tube. As the supply tube forms in effect a continuation of the burning point and as in the normal position of the tool, the burning point is below the supply tube, the supply tube naturally receives a good deal of the heat rising from the burning point. The heat which the supply tube thus receives from the burning point is sufficient to vaporize the liquid within the supply tube, and at any rate that part of the liquid in the lower portion of the supply tube. The supply tube is thus also a "vaporizing tube" since the liquid fed thereto is vaporized therein and passed in the form of a vapor from the tube to the burning point.

In order to protect the fingers of the user from the heat of the point, we preferably provide a guard in the form of an annular flange 8 which is suitably mounted at the lower end of the tool, as by being secured direct upon the supply tube, as shown.

For the purpose of securing a direct and substantially instantaneous control of the heating flame at the burning point, we place a valve in the supply tube, which valve is so located as to control the flow of vapor from the supply tube into the burning point. As the most of the vapor generated in the vaporizing or supply tube is generated in the lower end of the tube, the valve for controlling the flow of vapor is therefore preferably located in the lower end of the tube. A preferred construction is, as illustrated in Fig. 2, to provide a valve seat 9 in the lower end of the tube and to have a rod 10 extend down through the tube, which rod is provided with a valve 11 on its lower end for engagement with the valve seat. The valve may be manipulated in any suitable way. According to the preferred construction, in which the fuel reservoir is carried direct by the tool, the valve is adjusted by turning the reservoir with respect to the handle of the tool. For this purpose the reservoir is adjustably engaged upon the end of the supply tube as by having a screw-threaded connection therewith, as shown at 12, and the valve rod is secured to the reservoir, as indicated at 13, so that the adjustment of the reservoir upon the supply tube will serve to open or close the valve more or less as the case may be. The preferred method of securing the valve rod to the reservoir is by securing a plug or bushing 14 in the lower end of the reservoir and then fastening the valve rod direct to this plug. This plug is also, as illustrated in Fig. 2, preferably the part which makes the screw-threaded or other adjustable connection with

the end of the supply tube. The flow of liquid from the reservoir down into the supply tube is preferably by way of one or more relatively small openings 15 arranged at the side of the valve rod so that the liquid will flow down over the surface of the rod.

In order to prevent a too rapid feeding of the fuel to the burning point and at the same time to prevent the vapor being generated from flowing back up into the reservoir, we provide a check of some sort, which is in the preferred instance, a wick 16, which wick is located in the vaporizing or supply tube and preferably near the lower end of the same. In a preferred form the wick is made by winding a cord of soft wool about the lower portion of the valve rod. The wick is preferably secured in place upon the valve rod by having its ends passed through openings 17 in the rod. This wick serves to check the gravity flow of the liquid and by capillary action conveys the liquid on down to the point where it is vaporized. The wick may thus be said to extend down into the zone of vaporization. The wick by its absorbent qualities serves to control the flow of liquid in direct proportion to the rate of vaporization. This is explained by reason of the fact that as the liquid is vaporized the wick becomes drier and hence capable of absorbing more liquid. The wick will therefore feed the liquid down by capillary action in direct proportion to the rate of vaporization, and as the rate of vaporization is in turn controlled by the flow of vapor to the burning point, it will be evident that as the flow of vapor is regulated, the supply of liquid for vaporization will be controlled in like proportion.

The burning point is preferably made with a plurality of flame openings 18 therein so that a sufficient heat will be imparted to the supply tube. This burning point may be made of different materials, but so far we have found German silver to be the material best suited to this purpose, since it is best able to withstand the heat and usage to which the point is subjected.

The reservoir is provided with a cap 19 or other device to permit filling of the same and this cap preferably has one or more vent openings 20 therein, which, when the cap is partially unscrewed, allow free flow of the liquid.

Where, as in the present case, the burning point and the supply tube are separate parts instead of one single piece, the two parts are preferably united by means of a bushing 21 to one end of which the supply tube is secured and to the other end of which the burning point is secured. This bushing preferably carries the valve seat 9 which is located at the lower end of the supply tube, and it may also serve the additional purpose of securing the guard flange 8 in place.

These features are clearly illustrated in Fig. 2. A somewhat more effective guard is obtained by making the flange in more or less concave shape, as shown at 22, Fig. 6.

The form of the invention illustrated in Fig. 7 is substantially the same as already described, except for the feature that the tank 6 is not carried by the tool but is supported independently thereof. The valve in this case is substantially like that already described, only the valve rod 10 in this case is carried by a bushing 23 adjustably engaged in the end of the supply tube, and the liquid is conveyed into the supply tube through this bushing by means of a passage 24, ending in an outlet 25. The bushing 23 and valve rod 10 may be made integral if desired. In this, as well as in the first form of the invention, the liquid is fed into the supply tube through a bushing or so-called "supply member" secured in the upper end of the supply tube and the heat at the burning point is in this case also regulated by the relative adjustment of the valve and valve seat.

It will be noticed from Fig. 2 that the wick terminates short of the end of the valve rod. This is to provide a vaporizing space or chamber in the lower end of the supply tube, between the inner end of the bushing and the end of the wick.

What is claimed, is:

1. In a pyrographic tool, a handle, a supply tube extending down through the handle, a liquid fuel reservoir adjustably engaged on the upper end of the supply tube, a valve rod carried by said reservoir extending down through the supply tube and provided with a valve on its lower end, the fuel reservoir having openings therein to permit flow of the liquid down into the supply tube, a bushing secured in the lower end of the supply tube provided with a valve seat on its inner end to be engaged by the valve on the end of the valve rod, a burning point secured to the outer end of the valve rod, and a wick surrounding the lower end of the valve rod terminating short of the end of the rod to provide a vaporizing chamber in the supply tube between the end of the bushing and the end of the wick.

2. In a pyrographic tool, a handle, a burning point at the lower end of the handle, a fuel reservoir adjustably mounted at the upper end of the handle, a supply tube extending from the reservoir to the burning point and arranged to be heated by the burning point so as to vaporize the liquid therein, a valve seat in the lower end of the supply tube, a rod carried by the reservoir and adjustable therewith, carrying a valve on its lower end for coöperation with the valve seat aforesaid, and a wick engaged upon the lower portion of the valve rod.

3. In a pyrographic tool, a handle, a

burning point at the lower end of the handle, a fuel reservoir mounted at the upper end of the handle, a supply tube extending from the reservoir to the burning point, having screw thread connection with the reservoir so that the reservoir may be adjusted longitudinally thereon and arranged to be heated by the burning point so as to vaporize the liquid therein, a guard flange secured upon the supply tube, a valve seat in the lower end of the supply tube, a rod carried by the reservoir and adjustable therewith, carrying a valve on its lower end for cooperation with the valve seat aforesaid, and a wick engaged upon the lower portion of the valve rod.

4. In a pyrographic tool, a handle, a supply tube extending down through the handle, a plug adjustably engaged on the upper end of the supply tube, a liquid fuel reservoir carried by said plug, a rod carried by the plug, extending down through the supply tube and carrying a valve on its lower end, the plug having fuel openings therein arranged at the sides of rod aforesaid, a bushing secured in the lower end of the supply tube, provided with a valve seat at its inner end to be engaged by the valve on the rod, a burning point secured in the outer end of the bushing, and a wick surrounding the lower end of the valve rod, terminating short of the end of the rod to provide a vaporizing chamber in the supply tube between the end of the bushing and the end of the wick.

5. In a pyrographic tool, a handle, a supply tube extending down through the handle, a plug adjustably engaged on the upper end of the supply tube, a liquid fuel reservoir carried by said plug, a rod carried by the plug, extending down through the supply tube and carrying a valve on its lower end, the plug having fuel openings therein arranged at the sides of rod aforesaid, a bushing secured in the lower end of the supply tube, provided with a valve seat at its inner end to be engaged by the valve on the rod, a burning point secured in the outer end of the bushing, a wick surrounding the lower end of the valve rod, consisting of a cord of woolen material wrapped spirally about the rod and terminating short of the end of the rod to provide a vaporizing chamber in the supply tube between the end of the bushing and the end of the wick, and a guard flange clamped by the bushing against the end of the supply tube.

6. In a pyrographic tool, a handle, a supply tube extending down through the handle, a liquid fuel reservoir adjustably engaged on the upper end of the supply tube, a valve rod carried by said reservoir extend-

ing down through the supply tube and provided with a valve on its lower end, the fuel reservoir having openings therein to permit flow of the liquid down into the supply tube, a valve seat in the lower end of the supply tube to be engaged by the valve on the valve rod, a burning point carried by the lower end of the supply tube, and a wick surrounding the lower end of the valve rod, terminating short of the end of such rod to provide a vaporizing chamber in the supply tube between the valve seat and the end of the wick.

7. In a pyrographic tool, a handle, a supply tube extending down through the handle, a supply member connected with the upper end of the supply tube and provided with an opening or openings to permit flow of the liquid down into the supply tube, a valve rod carried by the supply member, extending down through the supply tube and provided with a valve on its lower end, a burning point carried by the lower end of the supply tube, a valve seat in the lower end of the supply tube to be engaged by the valve on the end of the valve rod, the said valve and valve seat being relatively adjustable to control the flow of vapor, and a wick surrounding the lower end of the valve rod, terminating short of the end of the rod to provide a vaporizing chamber in the supply tube between the valve seat and the end of the wick.

8. A pyrographic tool comprising a handle, a supply tube extending down through the handle, a bushing engaged in the lower end of the supply tube, a burning point secured in the outer end of the bushing, a valve seat formed on the inner end of the bushing, a bushing secured to the upper end of the supply tube and provided with an opening or openings to permit flow of the liquid down into the supply tube, a valve rod supported by said bushing, extending down through the supply tube and provided with a valve on its lower end to engage with the valve seat, the said valve and valve seat being relatively adjustable for controlling the flow of vapor, and a wick surrounding the lower end of the valve rod, terminating short of the end of the rod to provide a vaporizing chamber between the valve seat and the end of the wick.

Signed in the borough of Brooklyn, in the county of Kings, city and State of New York this 22nd day of March A. D. 1912.

MAURICE B. BAER.
ERNEST H. E. MALMQUIST.

Witnesses:

JOHN F. BURKE,
NORA BURKE.