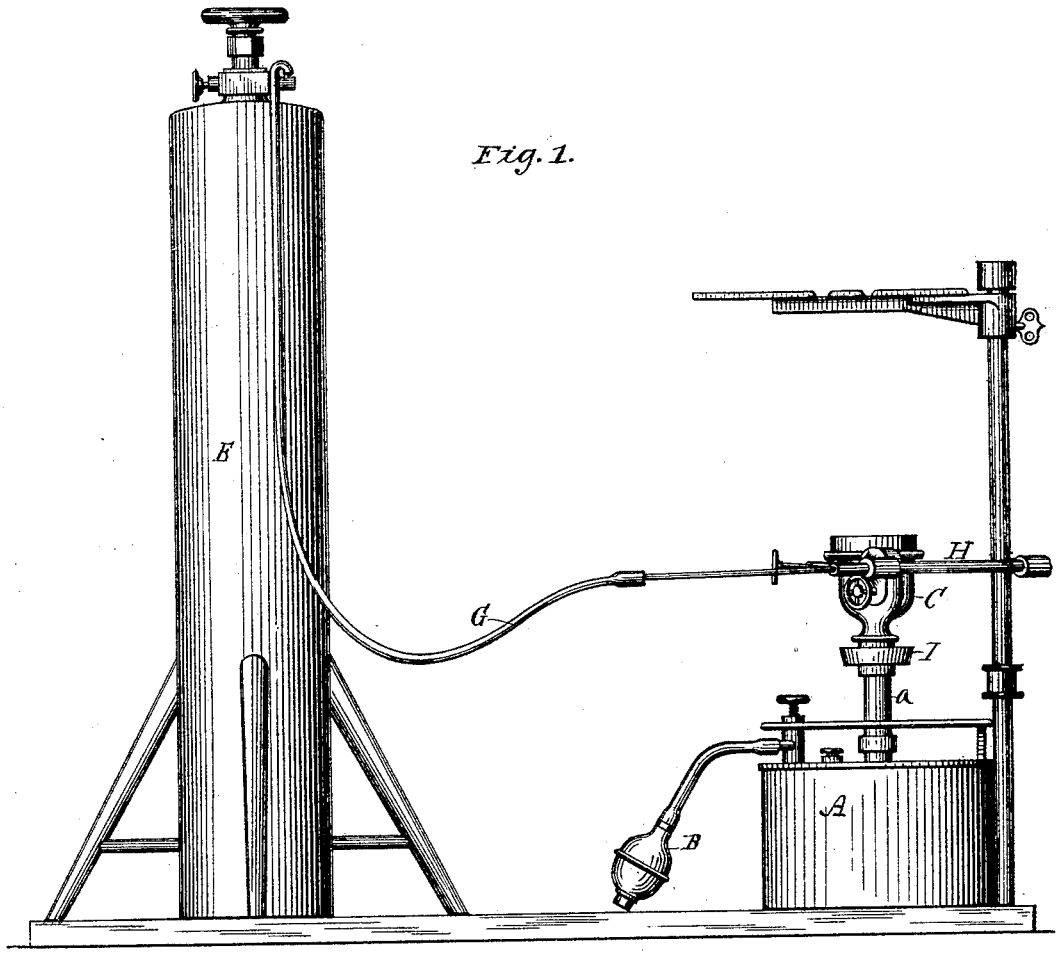
(No Model.) 2 Sheets—Sheet 1.

# F. A. TWITCHELL.

## DENTAL STOVE AND BLOW PIPE.

No. 459,057. Patented Sept. 8, 1891.

*Fig. 1.*

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

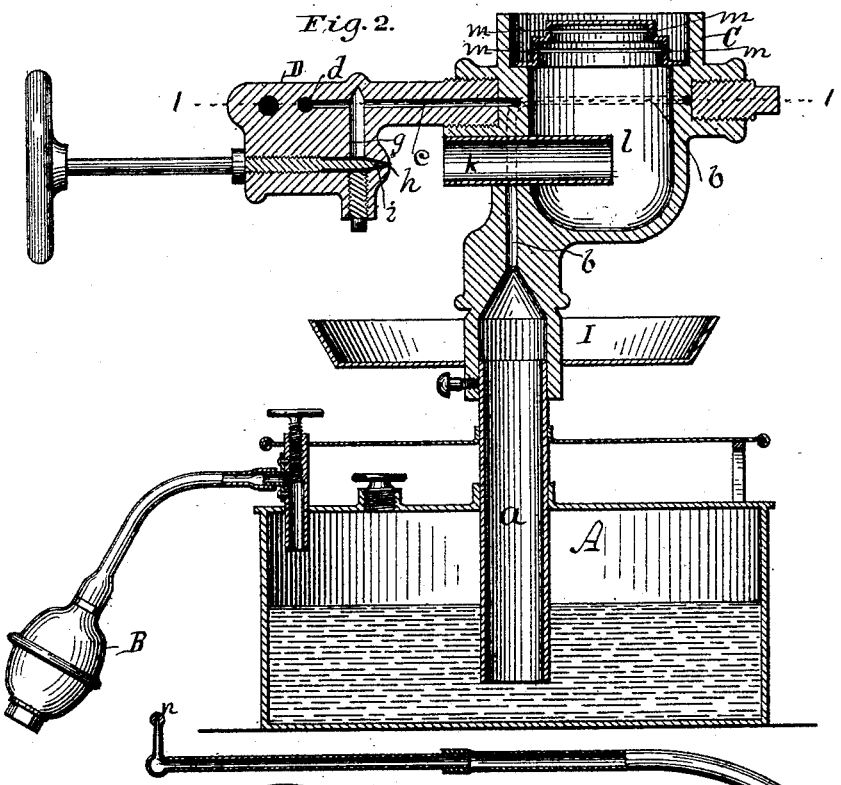
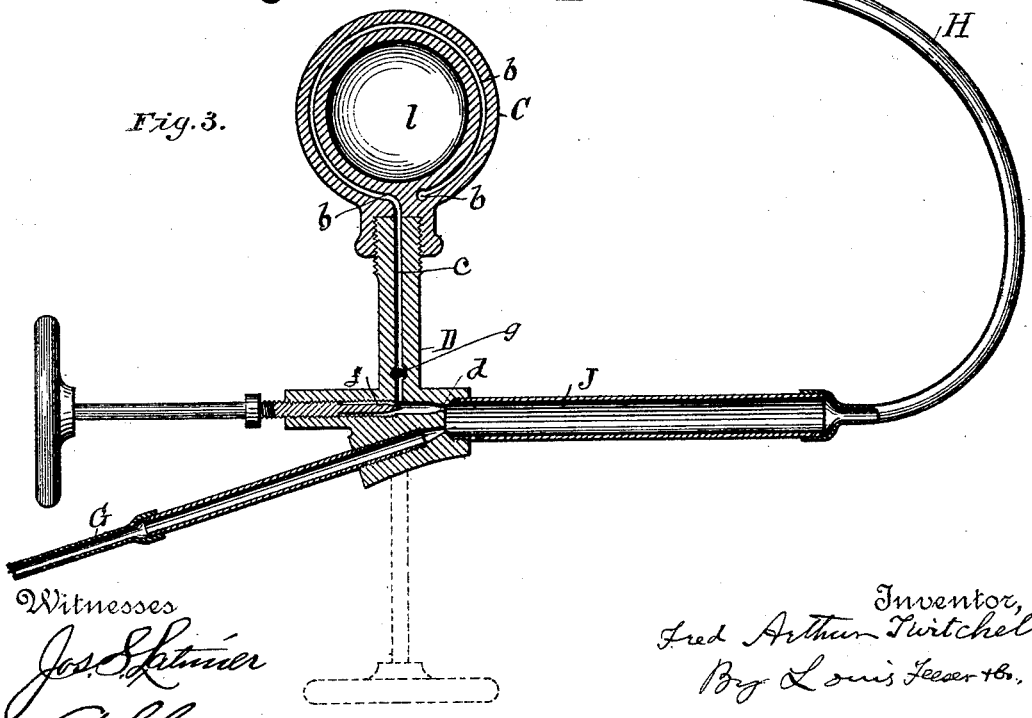



Fig. 3.

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# UNITED STATES PATENT OFFICE.

FREDERICK ARTHUR TWITCHELL, OF ALBERT LEA, MINNESOTA.

## DENTAL STOVE AND BLOW-PIPE.

SPECIFICATION forming part of Letters Patent No. 459,057, dated September 8, 1891.

Application filed April 26, 1888. Renewed March 13, 1891. Serial No. 384,957. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK ARTHUR TWITCHELL, a citizen of the United States, residing at Albert Lea, in the county of Freeborn and State of Minnesota, have invented a new and Improved Dental Stove and Blow-Pipe; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification.

Compound blow-pipes have heretofore been of little use to dentists on account of their expense and the inconvenience attending their use, since the oxygen and hydrogen gases employed had to be stored separately in large heavy tanks expensive to charge and to transport. Hence their use has been mostly confined to a few large laboratories and other places where such a blow-pipe was required regardless of expense. These objections to the old oxyhydrogen blow-pipe have recently been partially overcome in the Knapp blow-pipe by substituting for the pure hydrogen gas the ordinary illuminating coal-gas used in large cities, thereby dispensing with the heavy and inconvenient tank for containing the hydrogen; but in neither of the blow-pipes above referred to is the construction such that gasoline-vapor could be used therein, because the vapor, being let into cold tubes or pipes leading to the flame-jet, would become instantly condensed and be reconverted into liquid form.

To overcome these inconveniences and difficulties and enable me to employ gasoline-vapor as a substitute for hydrogen, I have made the present invention, which consists of a single attachment to a gasoline-stove such as is used by dentists at the present time, or an equivalent gasoline-burning heater, the said attachment being kept heated by the stove-burner, so that the gasoline-vapor passing through the same to the jet cannot become condensed. As a further advantage in the blow-pipe, I employ, instead of oxygen gas, the nitrous-oxide gas now in common use among dentists for anesthetic purposes, so that no additional apparatus is required for the blow-pipe, except the simple attachment to the gasoline-stove burner, as hereinafter specified, and any dentist may at a trifling expense provide himself with a compound blow-pipe. By this invention a small gasoline-burner is made to generate one of the gases required for the blow-pipe and to perform the additional office of heating the casting or attachment in which the gases are mixed, so that the gasoline-vapor cannot be condensed before the mixture is burned.

In the accompanying drawings, Figure 1 is a side view of the apparatus complete comprising the nitrous-oxide containing cylinder or reservoir, the gasoline-stove, and the blow-pipe attachment; Fig. 2, a central vertical section of a part of the gasoline-stove and through its burner and the blow-pipe attachment; Fig. 3, a horizontal section through the burner and blow-pipe attachment in a plane indicated by the line 1 1, Fig. 2.

Like letters designate corresponding parts in all of the figures.

In the drawings, A represents the body or reservoir of the gasoline-stove; B, a rubber air-pump for producing pneumatic pressure over the gasoline in the body or reservoir A, and thereby forcing gasoline up to the burner; C, the burner; D, the blow-pipe attachment to the burner, in the form of a casting, of the proper construction; E, the cylinder or reservoir containing the nitrous-oxide gas; G, a flexible pipe conducting the nitrous-oxide gas from the cylinder E to the blow-pipe casting, and H a flexible pipe for conducting the commingled gasoline-vapor and nitrous-oxide gas to the blow-pipe jet.

From the body or reservoir A of the gasoline-stove a tube *a* extends upward to the burner C and supports the same, the two being suitably made in one casting, as shown. A duct *b* is formed in this casting, leading from the upper end of the tube *a* proper all or nearly all the way around the burner, as shown in Fig. 3. The blow-pipe attachment D, being, also, suitably a casting, is screwed or otherwise attached to the burner where the duct *b* terminates therein, and a continuation *e* of the said duct leads through the blow-pipe attachment to a discharge-orifice *d*. This orifice is regulated by a needle-point valve *f* or its equivalent, whereby the amount of gasoline-vapor discharged into the blow-pipe commingling-tube J is regulated or the flow entirely cut off. A branch duct *g* also leads

from the extension-duct *c* down to another orifice *h*, the discharge through which is regulated or cut off by another needle-point valve *i* or its equivalent. The discharge from the orifice *h* is directed centrally to the outer open end of a short tube *k*, which opens into the chamber *l* of the burner C, through which tube gasoline-vapor is thrown to support the flame of the burner, the vapor issuing through jet-apertures *m m* in the top of the burner. As seen in Fig. 3, the nitrous-oxide gas from the reservoir after passing through the pipe G enters the blow-pipe attachment near where the gasoline-duct *c* terminates and is discharged into the pipe H near the gasoline-discharge orifice *d*, so that the gas and vapor are commingled as they enter the pipe H, and they are discharged together at the nozzle *n* of the pipe, where, on being lighted, they burn together in the air, under the pressure with which they are discharged, with intense heat.

A cup I around the tube or pipe *a* and a little below the burner C is employed for containing a little of the gasoline to heat the burner at the start and commence the vaporization of the gasoline. For this purpose a little gasoline is let out of the orifice *h* by turning back the valve *i*, which is then immediately closed again. The gasoline drops into the cup I and is lighted. The heat from the combustion quickly heats the burner and the blow-pipe attachment thereon sufficiently to vaporize the gasoline in the ducts *b c* thereof. Then the valve *i* is again turned back, when gasoline-vapor begins to issue in a jet and passes through the tube *k* into the body of the burner and issues therefrom in jet-flames through the burner-apertures *m m*. The flames of the burner then continue to keep the burner and the blow-pipe attachment heated sufficiently to keep up the vaporization of the gasoline in the ducts thereof, and thus the subsequent operation of the burner and of the blow-pipe is automatic and continuous as long as their use is required, and the gasoline-vapor cannot then become condensed as it passes to the tube H, and it is not condensed after a commingling with the nitrous-oxide gas, which is also heated by the attachment.

I claim as my invention—

1. The combination of a vaporizing-burner having a vapor-receiving chamber in the middle of the same and a vaporizing-duct around the chamber, a vapor-inlet tube or passage opening from the outside into the said chamber, a blow-pipe attachment secured to the burner, provided with a duct communicating with the burner-duct, and two branch ducts, one leading to the blow-pipe commingling-chamber and the other terminating with a jet-opening directed to the inlet tube or passage of the burner, a gas-supply pipe connected with the said blow-pipe attachment, and a commingling-chamber into which one of the vapor-ducts and the gas-supply pipe discharge and which leads to the blow-pipe jet-nozzle, substantially as herein specified.

2. The combination of a vaporizing-burner, a blow-pipe attachment receiving the heated vapor from the burner, a nitrous-oxide-gas-supply pipe secured to the blow-pipe attachment, and a commingling-chamber leading to the blow-pipe jet-nozzle and adapted to receive the nitrous-oxide gas from the supply-pipe and the vapor from the burner in a heated state to be commingled with the gas, substantially as and for the purpose herein specified.

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

FRED. ARTHUR TWITCHELL.

Witnesses:
D. R. P. HIBBS,
C. E. RICHARDSON.