THE WELSBACH GASOLINE BURNER.

The Welsbach mantle, which becomes highly incandescent to a hot flame, lends itself so admirably to the hydrocarbon burner that it is by no means astonishing how fast the old kerosene lamp, with its sickly yellow flame, has been supplanted by this more modern and more brilliant light. The interior of the farmhouse can now be illuminated as brightly as a town-house drawing-room.

The introduction of the Welsbach mantle was followed by the invention of numberless hydrocarbon burners, most of which were either unsafe or too complicated. The Welsbach Company, of Gloucester, N. J., itself finally introduced a lamp which certainly leaves nothing to be desired for efficiency and simplicity.

The Welsbach burner differs conspicuously from most similar patented devices for heating a mantle by hydrocarbon gases, in so far as the gasoline is not conducted through unsightly exterior vaporizing tubes passing over the lamp, and in so far as the hand-pump which plays so important a part in many burners is entirely dispensed with.

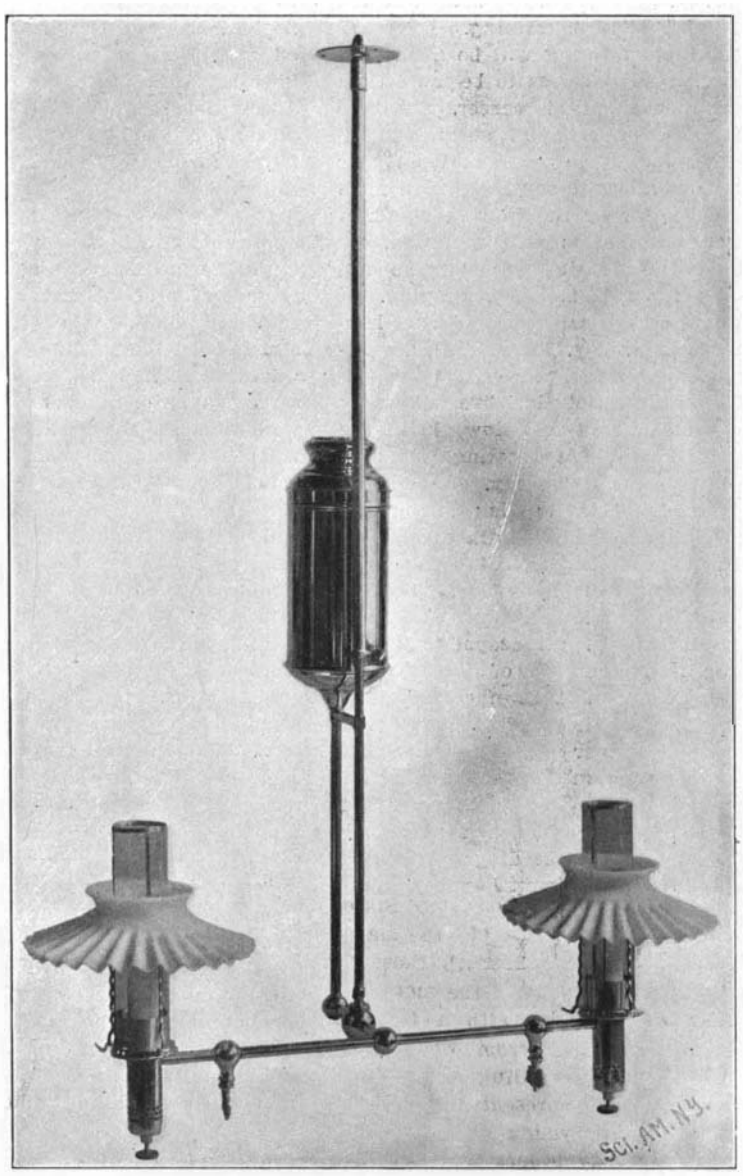
The gasoline is contained in a plain, neat, unobtrusive cylindrical reservoir, from which it is led by pipes to burners of such construction that it is consumed without in any way injuring the mantle.

The burner by which this result is obtained is composed essentially of three separable parts—an interior casting of peculiar form, an outer perforated jacket of sheet metal, and a needle-valve.

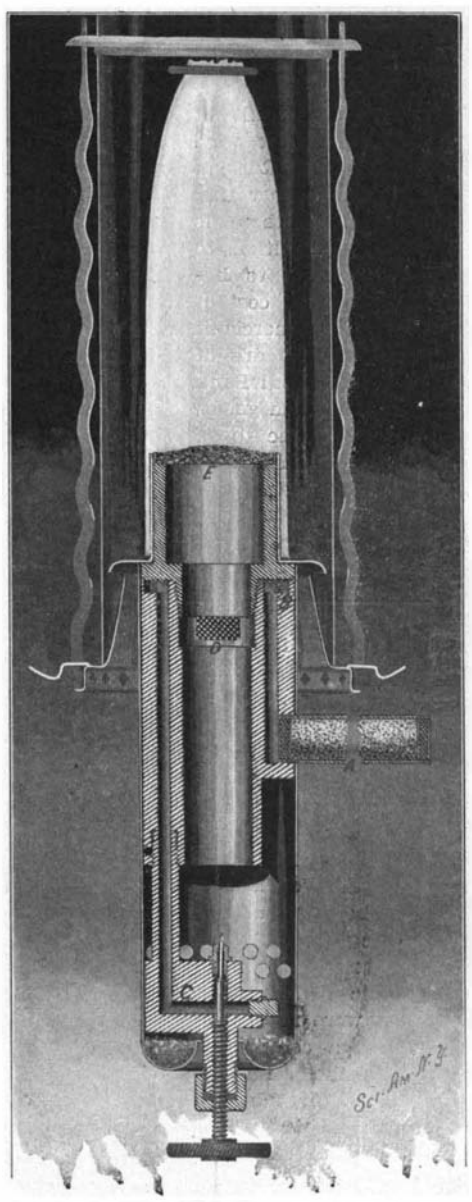
The interior casting is so fashioned that it is provided with an opening for the gasoline inlet tube, *A*, leading from the reservoir previously mentioned; an upwardly extending channel for the gasoline, leading to a vaporizing-chamber, *B*, of circular form; sub-burners, *D*, which serve to vaporize the gasoline in the chamber, *B*; a downwardly extending channel with a branch, *C*, extending to the bottom of the burner, and having a feed opening which is controlled by the needle-valve previously mentioned; and finally a brass gauze burner, *E*, which constitutes the burner proper and by which the mantle is heated to incandescence. Over this casting fits the thin, nickeled jacket, formed with an opening at the middle to permit the entrance of the sand-filled gasoline pipe, *A*, and perforated near the bottom to permit the air to mingle with the vaporized gasoline. The bottom of this outer jacket constitutes a receptacle for alcohol-soaked asbestos which, when ignited, serves as a preliminary heater to start the burner.

Upon leaving the stop-cock on the fixture arm, the gasoline passes into the tube, *A*, packed in sand held in position by gauze caps. The gasoline after having been thus filtered rises in the channel provided for it in the casting and reaches the vaporizing-chamber, *B*. The gasoline, after having been vaporized by heat supplied from the sub-burner, *D*, passes down the opposite side of the casting through the channel previously mentioned, and finally reaches the branch pipe, *C*, in a gaseous form. The vaporized gasoline escaping through the minute opening controlled by the needle-valve is mingled with air entering by way of the perforations of the outer jacket. The mixture thus formed travels upwardly through a central tube in the casting, reaches the burner, *E*, and is there ignited, producing a hot, colorless or pale blue flame which serves to heat the mantle to incandescence. The alcohol-soaked asbestos in the bottom of the outer sheet-metal jacket serves to heat the generator before the lamp is ignited, the gasoline at the time of heating not being turned on at the stop cock. After the generator has been sufficiently heated by the alcohol to be able to vaporize the gasoline, the stop cock is open and the gasoline allowed to flow into the burner, there to be immediately vaporized so that it can be ignited by a match held over the burner. After ignition, the device continues to operate spontaneously, gasoline entering by way of the pipe, *A*, becoming vaporized at *B*, mixed after leaving the pipe, *C*, and ignited at *E*.

As we have previously remarked, the burner is so constructed as to vaporize all gasoline that flows into it perfectly, irrespective of drafts or extremely low temperature. This vapor is mixed and properly controlled with extreme nicety by means of the needle-valve. The simplicity of the construction which characterizes these burners reduces the possibility of the lamp's getting out of order, and also permits the various parts to be readily cleaned. Used in conjunction with Welsbach gasoline mantles, these burners give a light equal to that of 100 candles at a cost of less than one-fifth cent per hour. In other words, for one cent a night, one can have practically all the benefits of city gas in its most approved and brilliant form of incandescent lighting with trouble less than that associated with the handling of an ordinary kerosene lamp. The lamps give no odor, are free from dirt, are smokeless, and do not discolor ceilings.



THE WELSBACH BURNER AS ADAPTED FOR THE USE OF GASOLINE.



Section showing details of Welsbach Gasoline Burner.

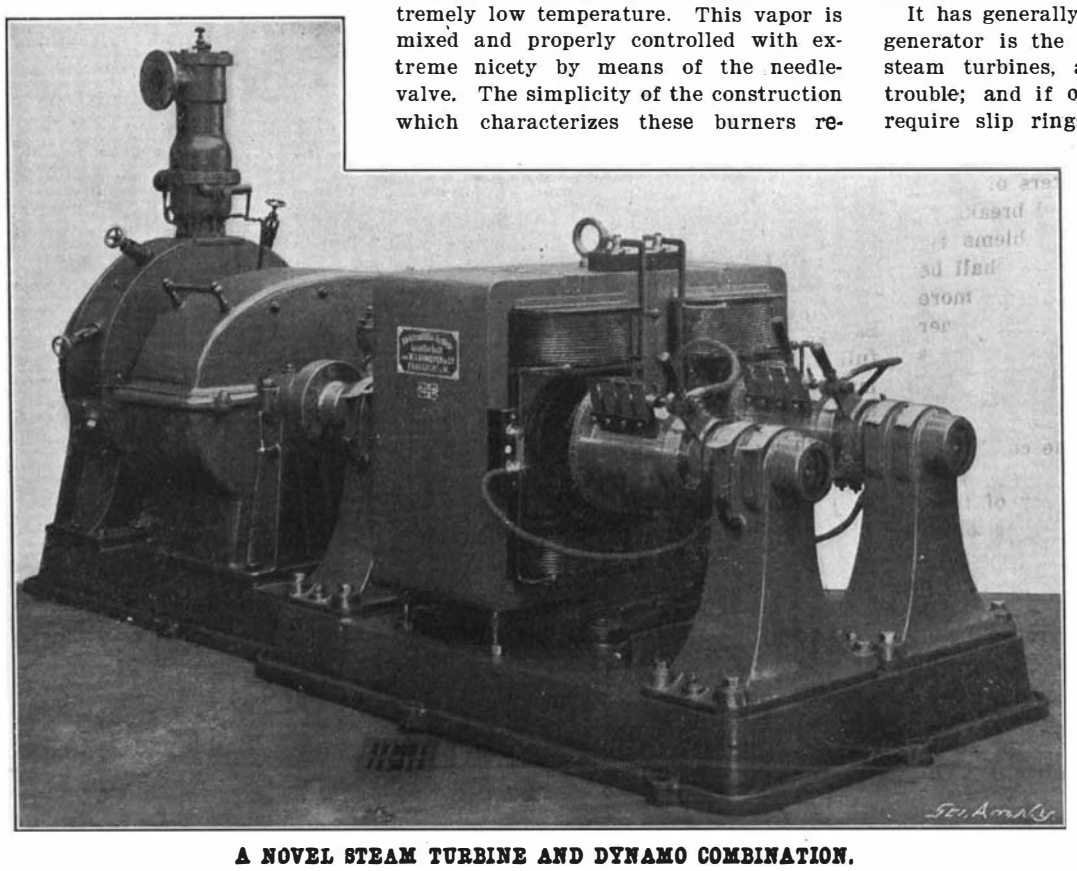
A consular report from Frankfort, Germany, gives the particulars of the plans of a new stone arch bridge now being built over the Petrusse River, at Luxemburg, Germany. The span of the arch will be 275.6 feet, and the roadway will be 144 feet above the river. According to the plans there will be two arches 19.7 feet apart, the total width being 52½ feet. The stone used is being furnished from quarries in the immediate vicinity. The materials required are as follows: Masonry, 776,925 cubic feet; wood for scaffolding, 28,252 cubic feet; metals (iron, zinc and cables), 45 tons. The bridge will cost $270,000, and is being built by the government of the Grand Duchy of Luxemburg at its own expense. Preliminary work was commenced in December, 1899, and it is intended to open the viaduct for traffic in the spring of 1903.

NOVEL STEAM TURBINE AND DYNAMO COMBINATION.

The steam turbine is coming more and more into general service for power work both in this country and abroad, but one of the special fields which open to it great opportunities is that of generation of electrical currents for both light and power purposes. The dynamo, being easily designed for high speeds, is particularly well adapted for operation by steam turbines, which are necessarily high-speed machines.

The higher the speed of an electric generator, the less the cost of construction both for materials and labor, and bipolar dynamos may do the work which at lower speeds requires four-pole or multipolar types.

It has generally been conceded that the alternating generator is the best type of dynamo for use with steam turbines, as it has no commutator to give trouble; and if of the inductor type, does not even require slip rings for taking off the current, both armature and field windings being stationary. Direct-current machines have been used, however, to a considerable extent, and it is with interest that we note the peculiar construction of the German outfit in the accompanying illustration. It consists of a steam turbine of 100 horse power mounted on the same base and operating a double direct-current generator, having two armatures, two fields and two sets of bearings, and in reality practically amounting to two machines. The two fields of the dynamo, however, are wound on one frame, and one pair of leads deliver a continuous current of 110 volts potential. This combination was built and installed by the Electricitäts Actien Gesellschaft, vorm. W. Lahmeyer & Co., of Frankfurt a. M., Germany, to whom we are indebted for the accompanying illustration.



A NOVEL STEAM TURBINE AND DYNAMO COMBINATION.