

MAXIM'S NEW GAS MACHINE.

[Continued from first page.]

escape through the jet, L. This produces a partial vacuum at L, and draws air in at C. The air and steam pass with great rapidity through the tube, G. The action of the air and steam produces another partial vacuum at N, which draws gasoline in through the pipe, B. The adjustment of the opening is such that one pound of steam draws in air sufficient for two pounds of gasoline. The heat of the steam is taken up by the refrigeration caused by the evaporation of the gasoline, so that at E the compound is carbureted air and cold water. The tube, F, presents the curious phenomenon of being hot at *a* and cold at *b*. In one short piece of tube we have a hot retort and a cold condenser. The supply of gasoline is regulated by the valve, D. The dash pot, H, prevents a too rapid action of the valve, I. Gas of any desired density may be made, and when once adjusted the gas does not vary. The burner used with this machine is made to produce the very best results attainable, and then the gas is regulated to a density and pressure to suit the burner. The nuisance of an adjustable burner is thus obviated.

The holder closes off the supply when full, and lets on a supply when nearly empty. Gasoline has been much improved within a few years. It is now so very cheap that the equivalent of one thousand feet of coal gas of standard quality may be equalled for sixty cents. Where no steam is at hand these machines are run with a small oil burner. They are being made by the Pennsylvania Globe Gas Light Co., 131 Arch St., Philadelphia, Pa., of from 100 to 10,000 burner power. This machine was patented June 8, 1880.

PREVENTION OF BOILER EXPLOSIONS.

This vexed problem has occupied the minds of engineers and inventors since the introduction of steam as a motive power, and there are several theories of boiler explosions, each having its adherents. Of course there are conditions under which a boiler explosion is involved in no mystery; as, for example, when the water is dangerously low, when the safety valve is of insufficient capacity, or when it is unduly loaded; but there are other cases where an explosion cannot be rationally explained in the light of the well known theories.

Mr. Daniel T. Lawson, of Wellsville, Ohio, has recently patented, in this and several other countries, a device for preventing boiler explosions, which appears practical, and according to the testimony of scientific men the claims of the inventor are well founded.

The inventor, in explaining his invention, says that when water is superheated it becomes as explosive as gunpowder, exploding by bursting into steam from a reduction of pressure. When the engineer opens the throttle valve the cylinder is instantly filled with steam, creating a vacuum to that extent in the boiler. The superheated water then immediately rises to fill the vacuum, and is met by the valve, instantly cutting off the escape into the cylinder; this causes a concussion on every square inch in the boiler much greater than the regular pressure of the steam. There is abundant reason to believe that it is

this concussive action which causes the numerous and mysterious boiler explosions, and which cause is wholly independent of the amount of water in the boiler; in fact, the greater the amount of water in the boiler the more terrific the explosion.

This invention, which is based upon this theory, consists in reducing the concussive strain produced by the impulsive and intermittent escape of steam to the cylinders to an approximately uniform pressure, by rendering the evolution or passage of steam from the water to the steam space approximately constant and independent of the intermittent discharges from the steam space to the cylinder. The means for accomplishing this consist in a boiler constructed with a partition, A, intervening between the water space and the space from which the steam is taken to supply the cylinder, and feeding the steam as it is generated through valves or

moved from the water immediately under it, consequently the water rises through the valve. A number of small openings for the liberation of steam from the superheated water will remedy this difficulty.

MISCELLANEOUS INVENTIONS.

Mr. Niels C. Larsen, of Sacramento, Cal., has patented a purse or satchel fastening which can be securely locked and present a smooth and unbroken surface without projections.

A combined dental speculum and shield has been patented by Mr. Alfred W. Edwards, of New York city. The object of this invention is to facilitate the performance of dental operations, such as the filling of teeth. It consists in a combined dental speculum, gag, and shield formed of a flaring or bonnet-shaped shell of metal, having a longitudinal slot in its lower side to receive the teeth, and an arched wire attached to its lower part, upon the opposite sides of the slot, to rest upon the teeth and support the forward part of the shell.

An improved coupling for the shafts of a wagon, which can be readily fastened to or unfastened from the axle, has been patented by Mr. William W. French, of Stockbridge, Mass. The invention consists in the combination with the axle clip and knuckle joint of a sliding bearer and spring catch to facilitate the opening and closing of the coupling.

Mr. Joseph Kintz, of West Meriden, Conn., has patented an improved process for bronzing iron surfaces, which consists in cleaning and buffing the iron surfaces, then electro-

plating with copper, then dipping in acid solution, then again buffing, then boiling in a salt of tin solution, and then finishing by subjecting the article to heat until the copper and spelter coatings are fused into bronze.

A simple device for extending the steps of passenger cars, for the convenience of passengers getting in and out of the car, and for protecting at the same time the treads of the permanent steps from sparks, cinders, snow, etc., during the passage of the car from one station to another, has been patented by Mr. Benjamin F. Shelabarger, of Hannibal, Mo.

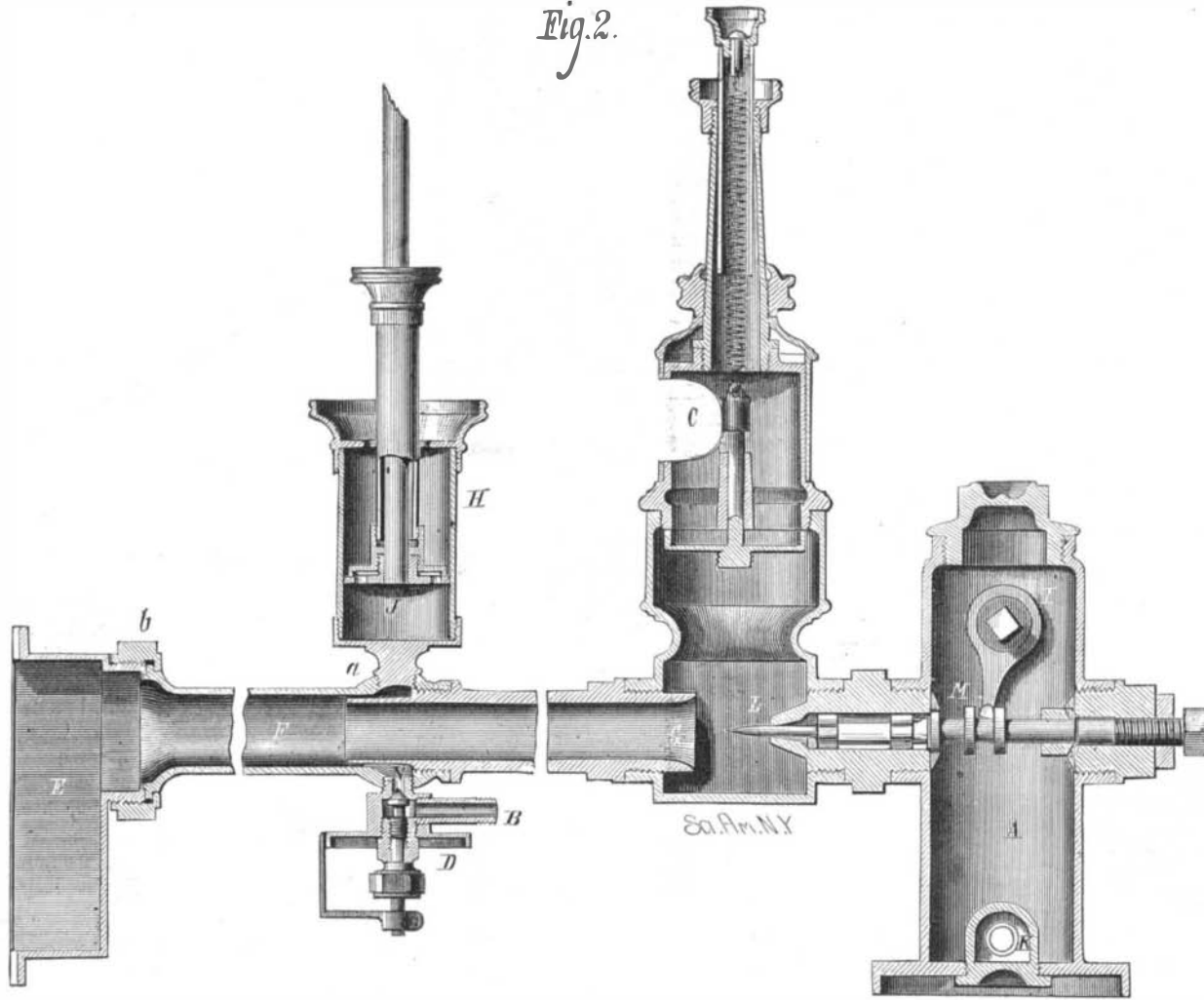
Mr. Luther C. Baldwin, of Manchester, N. H., has patented a new and improved automatic heat regulator, simple in construction and so arranged as to operate, under the smallest changes of temperature, upon the valves of the source of heat.

An improved cigar lighting stand has been patented by Mr. Joseph Kintz, of West Meriden, Conn. This improvement relates to lamp stands for cigar lighting, and has for its object the production of a stand of ornamental character which may be packed closely for transportation and readily put together for use.

A simple, safe, and efficient device in which light oils may be used as fuel for heating sad irons for domestic use, or for the use of tailors, dress-makers, etc., has been patented by Mr. Harvey L. Wells, of Evansville, Ind. It consists essentially of an iron box divided longitudinally into two chambers, the lower being the combustion chamber and the upper the heating chamber.

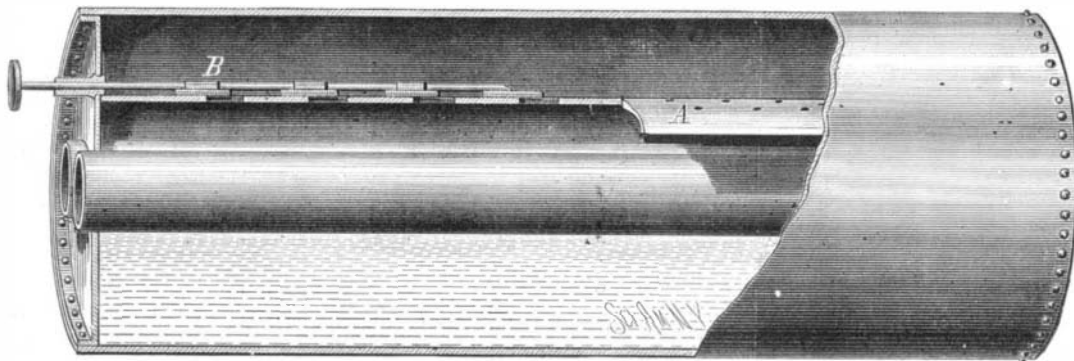
An improvement in electric light has been patented by Mr. Charles J. Van Depoele, of Detroit, Mich. The object of

this invention is to automatically regulate the feed of the carbon in electric lights according to the changes of resistance in the current caused by the consumption of the carbon points, so as to prevent flickering and variations in intensity of the light.

**MAXIM'S GAS MACHINE—SECTION OF INJECTOR.**

orifices, B, in the partition, of a smaller size than the port or opening through which the steam passes into the cylinder. By this means the normal steam pressure or steam supply, when thus intermittently or alternately reduced, is restored gradually by reducing the flow from the water space to the steam space, so that the transformation of water into steam is made approximately uniform in spite of the intermittent escape of steam through the cylinders, and the boiler is thus relieved of the constant wear and strain of the concussion.

In supplying steam from the water compartment to the steam compartment, the inventor intends using a number of small perforations, not amounting in the aggregate to more than about one twentieth the size of the cylinder port, in connection with a number of small valves to be under control of the engineer, so that the amount of steam required can be readily regulated, yet carefully avoiding the possibility of all, when opened to their utmost capacity, forming as large an opening as the valve through which the cylinder is supplied. A number of small valves and perforations in

**LAWSON'S IMPROVED STEAM BOILER.**

the partition sheet between the water and steam compartments, will remedy that hitherto very general annoyance of water rising to and through the valves, which is occasioned by pressure of steam upon the surface of the water, and when one large valve is opened, the pressure is partly re-