

It is only necessary to allow the bubbles to separate from the pipe in about the same perpendicular line as that corresponding to the axis of the funnel; they will invariably come in contact with the flame, and this, of course, is all that is necessary. If the bubbles contain hydrogen, the flame frequently fills the funnel for a moment, and presents a very pretty appearance. The experiment is very easily performed, and success is certain.

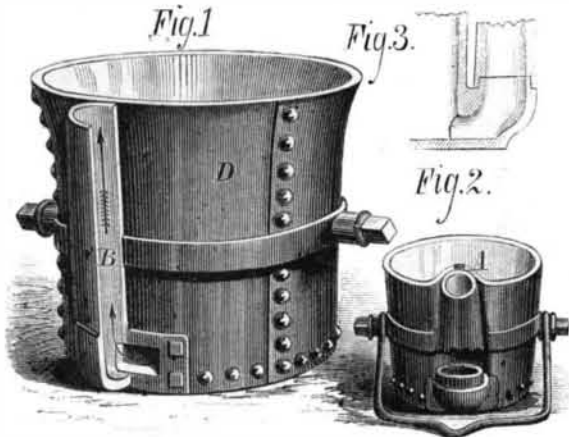
FAWCETT'S IMPROVED LADLE.

In making car wheels, manufacturers generally use great care and skill in selecting a variety of the best brands of pig iron, with a view of combining their different qualities, for the purpose of producing a uniform wheel of the required strength and necessary depth of chill. The disorders to which cupolas are liable, and the different degrees of fusibility of the several grades of iron, have a tendency to change the results and cause considerable variations in the life, strength, and mileage of car wheels. Before casting, a large ladle is filled with molten metal from the furnace. This is done without reflecting that there has been a circulation going on in the molten metal similar to that which prevails in all hot liquids. Each grade of iron tends to assume its own particular level in the molten mass, according to its density, all impurities and iron of a light and loose texture rising to the surface, while the dense and close-grained qualities sink to the bottom by their own superior gravity.

Wheels cast with iron taken from the top of a large ladle or receiver are not of the same quality of metal, strength, or depth of chill as those cast with iron from the bottom. This explains why some wheels, cast on the same day, from the supposed same mixture and ladle, have such an irregular and uncertain life.

William Fawcett, of Omaha, Nebraska, has patented in the United States, England and Canada, an improved ladle, which is designed for the purpose of giving a uniform mixture all through the heat, and prevent spotting, putting the best iron where it properly belongs, namely, the tread of the wheel. It is simple in construction, and inexpensive, and can be easily attached to any ladle, old or new.

In the annexed engraving, Fig. 1, D represents the ladle, and B the vertical conduit on the side which opens into the bottom of the ladle, so that, as the latter is tilted, the purer and close-grained metal at the bottom passes up the conduit

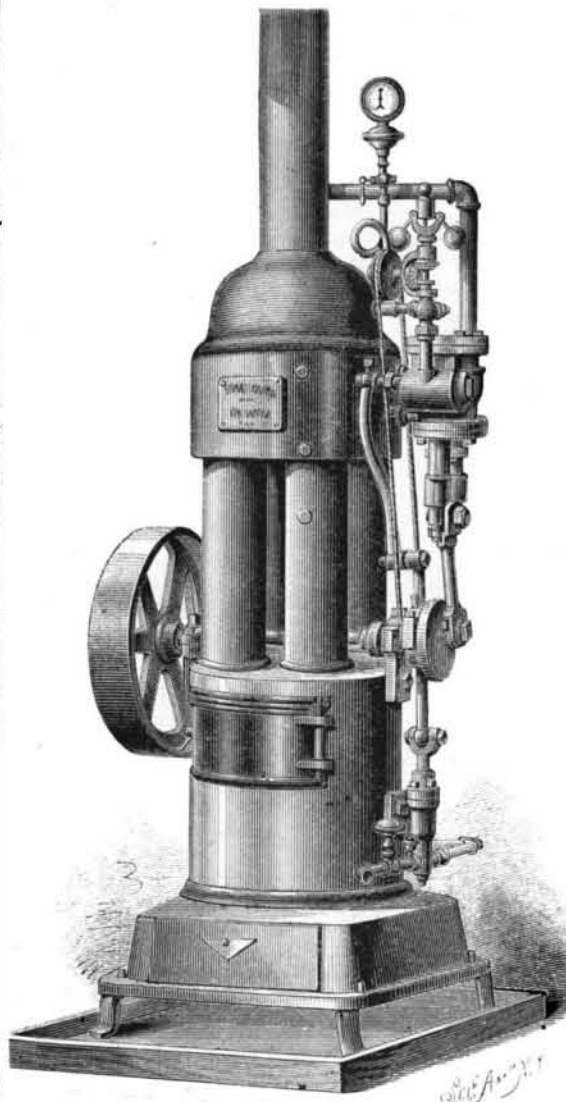


and discharges into a smaller ladle, shown in Fig. 2. This is similarly constructed for the purpose of first delivering into the mould the hot metal in its best fused and most dense state, leaving in the ladle the cold, unamalgamated iron, with the scoria floating on the top; thereby producing with the same material a greatly superior wheel, of greater purity, and of more uniform density on the tread than can be produced by the ordinary manner of pouring metal from the top of a ladle, as such a loose system as this always gives chance results. Fig. 3 is a detailed section of Fig. 2. A lip at the top of the inner wall, A, insures the discharge from the outlet in the direction of the arrows, without spilling over the lighter metal floating on the top within the ladle. The labor of skimming is thus entirely obviated. For further particulars address the inventor as above.

THE NEW BAXTER PORTABLE ENGINE.

In the annexed illustration we represent the new Baxter portable engine, a one horse power machine, designed especially to meet the large and increasing demand for small motors for light work. It was to engines of this description that we had reference in our recent article calling the attention of farmers to what good service such apparatus could be put in numerous operations about the farm. It could easily drive small barn machinery, such as grain cleaners or feed cutters, run a small circular saw for firewood, or pump water, and perform a large variety of other work at much saving of time and labor.

The chief novel features of the present machine, which is the invention of Mr. William Baxter, already well known as the inventor of the Baxter engine and steam canal boat, lie mainly in the construction of the boiler and the manner in which the engine is attached thereto. The base is 2 feet square and the total of the machine is 4 feet. The cylinder parts are about 15 inches in diameter at bottom and top, which are connected by four upright sections, all being cast in one piece of the best car wheel iron. This form is claimed to impart all the strength of a sectional boiler, with no large flat surfaces, nor any great volume of water or steam in any one



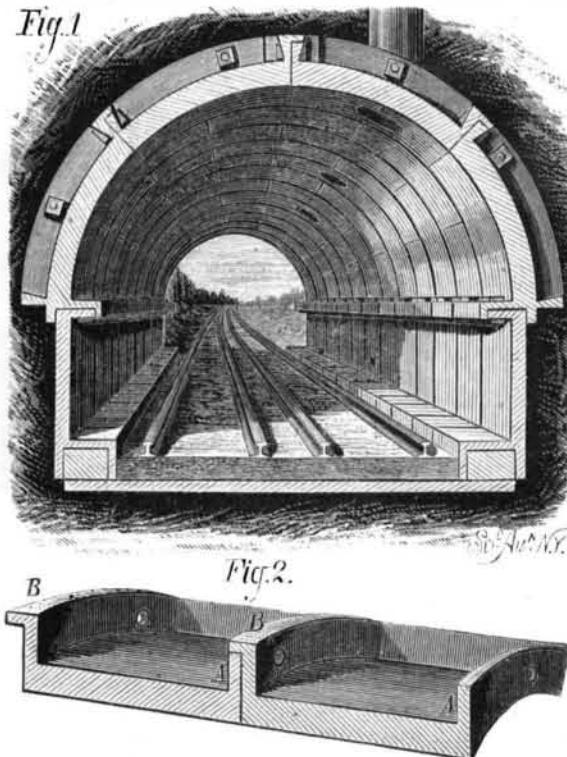
THE BAXTER PORTABLE ENGINE.

part. The tubes through which the heat passes are of the best lap welded boiler tubing, and act as braces to the lower and upper heads, as in any ordinary fluesheets. There is a water space all around the furnace, as in ordinary upright boilers. Steam and water gauges, gauge cocks, safety valve, blow-off and check valves, and a rocking grate to dump the fire should occasion require, are all provided. Every boiler is, we are informed, tested to a hydrostatic pressure of 200 pounds to the square inch. The engine has a 3 x 3 inch steam cylinder, which is rated at from 1½ to 2 horse power, all made in simple and substantial manner, with a plunger and pump attached to feed the boiler regularly while the engine is in motion. The manufacturer claims that the engine can be run on about 10 cents' worth of coal or woodper day. The entire weight is 650 pounds.

For further information address the manufacturer, Mr. Joseph C. Todd, 10 Barclay street, New York city.

METALLIC ARCHES FOR TUNNELS.

We illustrate herewith an improvement in the construction of arches to be used for tunnels, buildings, sewers, and all other purposes. In building the tunnel it is preferable that the side walls should be made entirely of iron and put together in sections, being provided, as seen in Fig. 1, with a



shoulder and downward projecting flanges, which straddle the top of the foundation wall, and a flange on top to which the bottom section of the arch is bolted. The arch consists

of any desired number of cast iron sections, Fig. 2, having upward projecting flanges, A, through which bolts pass for securing the sections together. Other flanges, B, parallel with the body of the section, lap over the other sections for the double purpose of supporting the sections in position and closing the joints, where they come together, to prevent leakage.

In erecting the arch it is necessary to erect only a single center at the beginning, upon which the first line of sections is secured, and then all the other sections require only to be hoisted into position, and the flanges, B, overlapping those already up, will hold the sections in place, without any further fastenings in any form. In order to make secure a bolted coupling is passed over the top of the flanges wherever three or four come together. As the space on top of each section is intended to be filled in with cement or brick work, the flanges are constructed with a bevel, which projects inward over this filling, so that any uneven pressure only tends to pack it solidly under this projection.

An opening can be made at any point through the sections, communicating with the outer air, through which the smoke and gas from the locomotives can escape.

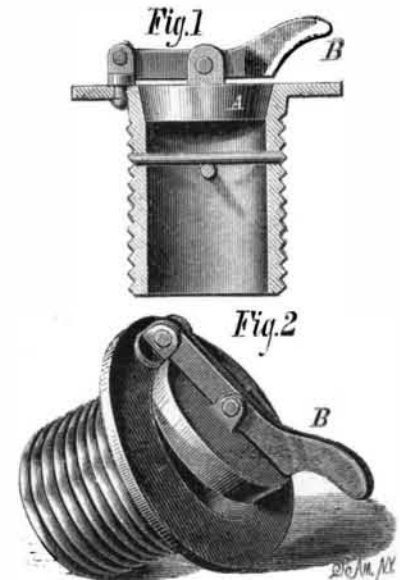
The Board of Managers of the Maryland Institute in 1875 resolved that the design was a valuable improvement. It was patented July 1, 1873, by Josiah Groves, of Ellicott City, Md.

For further information address John F. Corcoran, attorney, 63 N. Eutaw street, Baltimore, Md.

CARNES' IMPROVED BASIN STOPPER.

We illustrate herewith a new mode of attaching stoppers to washbasins, which dispenses with the chain ordinarily used for that purpose. It will be seen that the stopper, A, is suspended by lugs and a pin to a lever, B, one end of which is hinged to the strainer pipe and the other is provided with a handle. A space for clearance is left between the lever and stopper, so that the latter may oscillate slightly on the pin of the former. This enables it to be inserted vertically on its seat in the strainer independently of the circular motion of the pin on the hinge.

The device is exceedingly simple, and constitutes a neat and handy attachment. Patented through the Scientific



American Patent Agency November 27, 1877. For further information address the inventor, Mr. H. W. Carnes, box 143, Brookline, Mass.

New Inventions.

In an improved Trace Holder devised by Mr. William K. Hardenbrook, of Albia, Iowa, there is a combination of a double hook or holder with the frame that connects the back strap, crupper strap and straps that support the breeching. The traces are securely held in whatever position the horse may be.

An improved Button Fastening, invented by Mr. Charles M. Underwood, of New York city, consists of two plates placed together, one having an aperture and slot, the other a central aperture. The edges of the second plate are folded over those of the first. A loop of metal is slipped through the eye of the button and its ends brought together from a neck having a head which is passed through the slot in the plates, and secured by drawing the latter apart.

Messrs. George H. Thompson and George P. Muldoon, of Omaha, Neb., have devised a Wooden Spring for vehicles which is so constructed that it may be adjusted to sustain a greater or less load, and which will quickly recover its shape when pressure upon it is removed.

Mr. Alonzo T. Decker, of New York city, has patented a new Rear Sight for Firearms. It consists of a plate made elastic fastened at one end and provided with a sight at the other, combined with a slide and bed having stepped side flanges. It is arranged to give a lower elevation and consequently a more accurate aim for short distances than the rear sights now in use.

A Fastening for Pocket Books, invented by Daniel M. Read, of New York city, consists of a base plate with a longitudinal slot for the catch and a lateral slot beneath for the handle of the latch. The catch is inserted, and the prongs of the latch, which is pivoted on an inner plate, engage with it and hold it fast. It is a compact and serviceable fastening.