

The Steam Engine.

The *Commercial Bulletin* justly concludes that it seems like a reproach upon the mechanical skill and ingenuity of the nineteenth century that nine-tenths of the caloric force applied to even the most economical steam engine is wasted. That is to say, every ton of coal is one-third wasted in the process of generating steam, and when the steam is once formed, only one-seventh of it is actually converted into work by the engine. The remaining six-sevenths is lost either in the exhaust or through radiation from the cylinders or in similar ways; so that only one-seventh of two-thirds, or about one-tenth of the whole heating power of the fuel, becomes actually embodied in the working power of the engine.

An actual test made with the pumping engine of the Lynn (Mass.) water works showed that of 4,264,125 units of heat generated by the furnace, only 2,793,660 (or 66 per cent) were converted into steam, and only 430,625 (or a trifle less than 10 per cent) contributed to the working force of the engine. A unit of heat is the amount required to raise the temperature of a pound of water one degree, and is one forty-second part of a horse power. It follows, therefore, from the above figures that of 100,000 horse power generated in the furnace of the Lynn pumping engine, 35,000 were wasted between the furnace and the boiler and 55,000 in the engine.

But even those results were only obtained on one of the most economical of engines. A common high pressure engine of the best type usually utilizes but 6 per cent of the energy generated by the fuel. In locomotive engines only 2½ per cent of the caloric power is used.

Invention is said to be the result of two things: first of the sagacity which has discerned a want; and secondly of a resolute effort to supply that want. The first of these requisites is evidently at hand in the case of the steam engine, and if "necessity is the mother of invention," the second ought not to be wanting in this age of marvelous mechanical and scientific achievements.

Economy in Hops.

The extraordinary prices which hops have fetched this season must have set many brewers thinking as to how some economy might be effected. Any process, says the *Brewers' Guardian*, by which three pounds of hops can be made to go as far as four pounds would be of enormous value. Many suggestions have been made, but we hear of none of them being practically applied. There seems to be two ways in which some economy in hops might be effected: one is to grind or tear the hops before maceration, so that their essence may be more easily and completely extracted; the other is to prevent the loss of the essential oil by extracting the hops in closed vessels. Long boiling undoubtedly dissipates much of the fragrant aroma of the hop, as the neighborhood of any brewery so frequently testifies. If the hops were submitted, prior to boiling, to a current of steam at high pressure, a large percentage of the volatile oil might be condensed and collected; this oil could be added to the wort at the termination of the boiling, and the steamed hops could be boiled with the wort as usual; our brewery engineers ought to have no difficulty in devising and constructing the necessary plant for this operation, and its cost would soon be saved in a season like the present.

IMPROVED SAWING MACHINE.

Our engraving represents an improved sawing machine recently patented by Mr. H. K. Olson, of Coalville, Utah Ter., and designed for felling trees and sawing logs into lengths. The machine can be driven by hand or power, and is capable of working either horizontally or vertically. It has an automatic screw feed for moving the saw forward when making a horizontal cut, and this feed is readily detached when it is desired to saw vertically, so as to allow the saw to feed by its own gravity. The entire apparatus is mounted on a light portable frame, so that it may be easily transported from tree to tree or log to log, as occasion may require. The crank shaft and the driving shaft are mounted in sliding boxes, movable up and down by the windlass at the top of the inclined posts. The crank is wide to admit of the lateral movement of the connecting rod, and it is adjustable as to the length of its stroke; the design of this arrangement being to adapt the machine to different kinds of work. The saw guide moves through a sleeve that is adjustable along the slotted bar by means of the screw in the slot of the bar. The screw receives its motion from the driving shaft of the machine by a belt. As the crank of the drive wheel is turned the saw is reciprocated, and at the same time moved forward to its work. When it is desired to saw vertically, the feeding screw is disconnected from the saw guide, and the slotted bar is placed in a vertical position, as shown in dotted lines in the engraving. The joint between the saw guide and the connecting rod is swiveled to admit of turning the saw at any desired angle. This machine works rapidly and easily, and may be operated by one or more men, or by horse or steam power.

The ordinary speed to run a pump is one hundred feet of piston per minute.

NEW LAMP EXTINGUISHER.

The extinguisher shown in our engraving is applicable to all forms of lamps, and is capable of putting out the flame instantly, without the slightest danger of exploding the lamp. It is well known that to extinguish a lamp by blowing down the chimney is a dangerous operation, especially where the lighter grades of oil are used. It is troublesome to remove the chimney whenever it is desired to put out the lamp, and blowing from beneath does not usually accomplish the object.

The ingenious invention shown in the engraving obviates all these difficulties, and adds but a mere trifle to the cost of the lamp. Two extinguishing plates, hinged under the cap

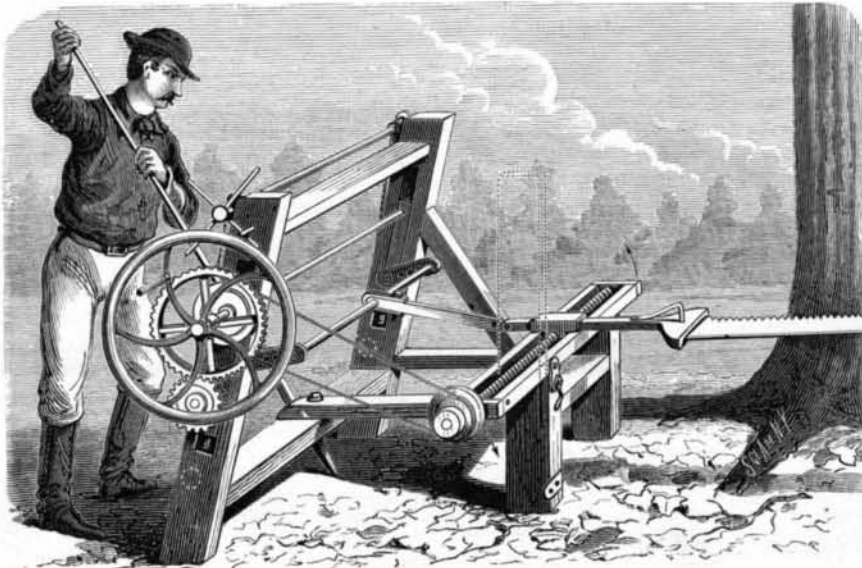
**GREENHALGH'S LAMP EXTINGUISHER.**

and near the wick tube, are provided with arms, which project outward and through oblique slots in a plate connected with a wire that extends downward along the side of the lamp and its standard, and is provided with a knob or handle, by which it may be readily pulled down, so as to effect the closing of the extinguishers over the end of the wick tube. A spring surrounding the wire returns the parts to their normal condition.

This useful invention has been patented by Mr. John B. Greenhalgh, of Blackstone, Mass.

The London Fish Exhibition.

The largest and most complete fish show ever held will be opened by Queen Victoria at the South Kensington Gardens, London, during May, which in importance and extent, it is expected, will eclipse the great German Exhibition of 1879. All branches connected with fish or fishing in their practical, commercial, scientific, and historic ways will be represented. One class of exhibits will include sea fishing gear

**OLSON'S SAWING MACHINE.**

of all kinds. Fresh water fishing will be represented by rods, reels, artificial flies, etc. Another class will show all kinds of articles used and worn by fishermen, even to the clothing. Fish in all forms, canned and uncanned, as prepared for commerce will occupy a large space, and will constitute one of the most important features of the show.

From former shows of this kind held in Europe great benefit has been reaped by this country. Above all, a vast increase of export trade for American fish products has sprung up from these exhibitions. To Australia alone are now sent ten times as many of these products as in 1870—last year's shipments amounting to two million dollars.

The fishing interests of the United States greatly exceed

those of any other country, and it is expected that the exhibits shown by us will surpass all others in the completeness and variety of articles shown. For the collective exhibit at Berlin the United States obtained the first prize and the greatest fame; and the collection made up for London is more perfect, especially in angler's material, than the one sent to Berlin.

Prof. Baird has loaned and sent over from the Smithsonian Institution a very large and important collection of fresh, stuffed, and preserved fish, and many plaster casts of odd and curious occupants of the sea. The spacious structure in which the exhibition is to be held is located in the beautiful gardens of South Kensington.

A visitor, in passing through the main entrance, will find himself opposite a spacious lobby, the walls of which are marked at the sides "Great Britain," and so apprising him that the space is to be devoted to articles connected with the British fisheries. To the left, just immediately on entering, are spacious dining rooms with large kitchens in the rear, while to the right and left, running from the central walk which goes due north, stretch east and west on each side respectively, the halls for life boats, of which there will be a grand display, a prize of \$3,000 being offered for the best and safest; and the machinery in motion, such as for fish curing and tackle making. Beyond these ranges, and immediately on entering upon the foreign and colonial branches, a site is being prepared for the Prince of Wales' pavilion.

Passing the royal pavilion, will be found arranged, running east and west, exhibits from Newfoundland and the Netherlands, the former, no doubt, being mostly representative of cod fishing on the world-famed banks. The sections for America, Canada, Newfoundland, Norway, Sweden, the Netherlands, and Belgium apply for an average of 10,000 square feet each; China, Japan, India, and New South Wales requiring together about 30,000 square feet.

The United States exhibit will be found to the left, alongside of that for Canada, while running north and south, parallel and alongside, will be the collections of Sweden and Norway; Spain and New South Wales occupy, together with China, corridors in the right wing; the Chinese exhibits will be arranged in the form of a pagoda. Great Britain, again, runs right round the outside of the exhibition, through the conservatory on the north down to where the aquarium will be situated. Close to the aquarium will be found the exhibits of Belgium and Russia, which will also be well represented. A fish market at the right entrance will be an interesting feature, and the fish dinners in the dining rooms will, no doubt, be indulged in by many; simply with a view to learn how many different ways a fish may be cooked after it has been hooked.

The Berlin exhibition was visited by 483,000 people, while this one in London, a city of 5,000,000 inhabitants, will unquestionably be visited by several millions.

The American commission who go out in charge of the United States exhibit are Prof. G. Brown Goode, Deputy U. S. Fish Commissioner; Mr. R. E. Earl, in charge of fish culture; Capt. J. W. Collins, in charge of nets, boats, and marine fisheries; Mr. Joseph Palmer, taxidermist; Mr. Reuben Wood, in care of the angling exhibit; a secretary, and perhaps others.

The Cost of Stopping a Train.

This is a problem which may possibly be cleared up one of these days, but just now the outlook in that direction is not promising. The best plan would seem to be, to get a large number of experienced railroad men to guess at it and then average the guesses. This would be an approximation near enough, perhaps, for all practical purposes.

Any one who will figure the cost of stopping a passenger train down to the fraction of a cent, and then prove his figuring to be correct, will beat the weather prophets all to pieces. A very little reflection, however, ought to satisfy any rational mind that it is quite impossible to disentangle and separate all the elements of cost, that enter into the stopping of any particular train from the various elements of cost involved in the general operations of a road.

There is manifestly no dividing line by means of which the former can be eliminated with any degree of precision. The basis upon which to work in order to arrive at an approximate result is more unreliable than that upon which the mileage cost of transporting freight is estimated, and apparently of much less importance. It is a problem, as it seems to us, that is more speculative than practical.

The making of stops by railroad trains is a necessity, no matter what the cost may be. The cost of the regular stops of passenger trains is probably about as little as it can be with due regard for the interests of the traffic, and if such cost could be ascertained with absolute certainty for each and every train, it would amount to little more than a curious piece of information.—*National Car Builder*.

Messrs. Emerson, Smith & Co., Beaver Falls, Pa., have received notice that, with a 68-inch No. 7 gauge circular saw purchased from them, Messrs. Terry & Casey, of New Orleans, lately sawed 600 feet of 6 x 8, 8 feet long, 200 feet 1½ x 14 inches, and 260 feet of inch boards, all yellow pine, in three minutes, making 1,060 feet in all.