

of iron and steel, and make them more elastic. The more frequent breaking of rails and railway machinery in winter is caused by the frozen condition of the ground, depriving it of its yielding qualities, and the existence of flaws in the metal into which water penetrates, and expands in freezing.

PETROLEUM AS A FUEL.—At the Laclede Rolling Mills, St. Louis, there is a simple looking machine which appears to have overcome all the objections to the use of petroleum as a fuel. It consists of a couple of upright cylinders, one inside the other, in which the crude petroleum is vaporized by contact with tubes charged with super-heated steam. The hydro-carbon gas thus created is mingled with other super-heated steam as it passes from the receptacle to a jet where it is burned. The heat is regulated by turning a stop cock in the pipe. The advantages over coal are said to be, the heat is more intense, is invariable, being free from sulphur and carbon, and makes purer iron; it saves the handling of coal and ashes, and cleaning of grates, works less injury to the furnace, creates no smoke, the fire can be brought to a white heat in one-third the time required by coal, and there is a saving in fuel of from 25 to 50 per cent.

CONSUMPTION OF SMOKE.—An invention for securing the consumption of smoke, in use by Messrs. Mitchell & Co., Craig street, Montreal, is very simple and yet seems to have effectually solved the problem of smoke consumption. It consists of a tube, through which is led a steam pipe of small diameter, both carried into the furnaces. The tube is fixed immediately above the door of the furnace, and when the fire is fed, steam is turned on by two branches, into which the pipe is divided. The rush of the steam through the pipe and the draught carry in air, which mixes with the steam before it plays on the fire. In a very short time the black smoke disappears, being consumed inside the furnace.

HYDROSTATIC WEIGHING.—A new hydrostatic weighing machine may be seen in use at the Millwall docks. The principle of the apparatus consists in filling an open top cylinder with water and suspending it from a crane. A piston is fitted with the rod passing downward through the cylinder, and terminating in an eye for the attachment of the goods to be weighed. The dial gauge on the exterior shows the pressure and consequently the weight. The merits of this invention are extreme simplicity and portability. A machine to weigh ten tons weighs itself only 84 lbs. Machines to weigh up to a ton can be made to go into the pocket, oil can be used instead of water and is preferable in the winter months. The danger of leaking is obviated by the moulder or cup leather packing, which from its peculiar form, becomes tighter with every increase of pressure.

TO PRESERVE WATER FROM PUTRIDITY.—Bits of iron will prevent water from becoming putrid. Sheet iron or iron trimmings are the best. The offensive smell of water in vases of flowers can be prevented by putting a few small nails in the bottom of the vases.

A NEW USE FOR SHEEP.—A New Zealand farmer having more sheep than he could keep, killed a number, and threw their carcasses into a stream. A short time after he discovered that they had been converted by the action of the running water into an inodorous waxy substance which would easily burn, and a quantity of it was sold to the colonial soap makers. More recently in England a number of eels have undergone the same change, and the masses of *adepocire* are described by Mr. Frank Buckland as of a dirty white color

very light, and to the touch like a stearine candle.

GIANT POWDER.—As an explosive, this new powder is destined to supplant, nitro glycerine and ordinary powder. It possesses the powerful qualities of the former besides being perfectly safe to handle and transport. Its power is 40 times greater than ordinary blasting powder. Boulders of large size can be broken by exploding the powder on their surface. One factory in Germany already produces over a million pounds monthly.

PYROGRAPHY is a new art invented in England, of printing by fire through a series of metallic cylinders, which burn into the wood any design required and which is indestructible. It is of great beauty and the cost very little, and is likely to supersede in a great measure much of the hand work now done.

DISINFECTING WATER.—Metallic iron is said to be the simplest means of keeping water fresh. The Thames water taken to sea in iron tanks becomes sweet and remains so during a long voyage. A leech and some iron filings were put in a vessel with a very small quantity of water, and at the end of six months the water was quite fresh, and the leech alive and healthy.

RAILROAD SIGNAL.—A gentleman connected with one of the Western roads has invented a valuable railroad signal light. In the centre of the roof of the rear car, over the rear axle, is placed a square lantern with alternate panes of white and red glass. This is connected by a shaft with one of the axles in such a way that 8 revolutions of the axle makes one of the lanterns. When the car stops the lantern ceases to revolve. On each side of this lantern are two others, connected with the axle in such a way that when the train is moving forward a solid red light is displayed, and if backing, a green light. By observing these lights an engineer coming up in the rear can tell whether the train before is moving backwards or forwards, or standing still.

STEEL MANUFACTURE.—A rival to the Bessemer process is adopted at the works at Givors, France. Gas is used both as a heating agent, and for improving the quality of the iron by purification. Iron of a secondary quality can be used to obtain steel for certain special purposes. By combined action of air and gas, acting alternately by means of oxidation and reduction in keeping the waste at minimum, decarbonizing and recarbonizing the nature of the product can be regulated at will and with certainty. The operation takes from an hour to an hour and a half, and the process can be arrested at a moment, giving the desired quality of steel.

NEW MATERIAL FOR SHIP BUILDING.—Colonel W. C. Czerchrey, Oxford street, London, has perfected a discovery named Zopissu, out of which he makes paper boards for ships, forts, houses, &c. One of these, an inch in thickness, was fired at by a Whitworth rifle, and a similar shot directed against a solid oak block 10 inches thick. The ball went clean through the oak, but the paper it only penetrated three-fourths of an inch. They are non-absorbent and incombustible. A large jet of gas was applied to the surface of one of them. Combustion only took place at the part to which the flame was applied. The material was discovered many years ago in Egypt, by Colonel Czerchrey, and it appears that when applied to paper, it forms a material and absolute non-conductor to heat, cold and electricity.

NEW MODE OF MAKING BREAD.—Put the wheat in a vessel, covered with water, and stir until the lighter grains and extraneous parti-