pressure of the rivet punch amounts to 32 tons. To effect this, the motor takes 25 ampères at 110 volts, or about 3½ electrical horse-power, for a period of two or three seconds at each rivet. The motor is a multipolar machine, having eight poles on each side of the armature and two carbon brushes placed at 45 degrees apart. The switch is arranged so that the lever in the furthest position cuts off the current after the piston has developed sufficient momentum. In this position also a brake can be applied to the fly-wheel to suit the requirements of the work. In bringing the lever back to the intermediate position a spring carries it clear of the starting contact and places it in the position ready for reversing. On reversing the motor the piston is carried back ready for the next rivet. The rivet punch is raised in the present machine by a hand crank, but it is intended to perform this by the action of the motor on reversing. In France and Germany these riveters have been used successfully and economically, and patents have also been granted in England.

DURING the last twenty years there has been a great increase in the consumption of coal. In Europe, the amount burned during the decade ending with 1890 was 62,000,000 tons greater than during the one previous. It is estimated that the annual output of coal for the entire world closely approaches 500,000,000 tons, the chief consumers of which are: America 141,000,000 tons, Great Britain and Ireland 128,000,000 tons, Germany 90,000,000 tons, and France 280,000,000 tons. Of course the supply cannot last for ever, and there have been many attempts to calculate just when coal will be a rare commodity. Each year the amount used increases, and thus constant increase seems to be taking place in an ever-growing ratio. A Royal Commission have estimated that in Great Britain about 146,773,000,000 tons are available at depths not exceeding 4,000 feet; and we note that another statistician declares that this supply will require less than 300 years to exhaust it.

THE French marine department recommends tar smoke painting as a preservative of iron work. The best way of taking care of tubular boilers when out of use is to fill them completely with water to which an alkaline reaction has been imparted by the addition of a small quantity of lime or soda. The external parts of the boiler, where accessible, should be painted with either red lead or coal tar; while those parts which a brush cannot reach may be preserved by burning coal tar under them. The smoke of the burning tar condenses in the cold tubes, and there forms a protecting layer which prevents corrosion.

ALEXANDER SIEMENS has constructed a new kind of electrical furnace for the equable heating of iron rods. It consists of a large, hollow core of carbon, which is rendered incandescent by the passage of an electric current. If an iron rod is passed slowly through this it becomes red hot at once, the heat being regulated by the speed with which it is pulled through. This furnace proves valuable also for tempering springs, and, with some modifications, may be used for heating rivets.

IN connection with the damage to the bridge at Upper Woodstock, N.B., Albert Brewer, its builder, finds fault with its plans and specifications, and says that the piers were not adapted to that form of bridge at all. The piers should have a peaked cutwater, and the water should have a decline of a foot and a half in depth, instead of the abrupt cutwater provided by the plans. It is stated that when the ice breaks and the logs come down, they are carried from the Woodstock side with great force, not against the face of the cutwater of the pier, but against the side, which, according to specifications, is only about 14 or 15 feet wide. Against this great pressure it is hardly possible for the stone or iron not to give way. It appears strange that the specifications of a bridge should provide a cutwater for a pier in a place where it is unexposed, and yet allow no protection for a spot which has to bear the full force of running ice and a strong current.

FROM some experiments that have been recently made in Germany, it seems that by continued exposure to the air, coal suffers a material loss. It is said that ordinary bituminous coal depreciates nearly one-third in weight, and nearly one-half in gas-making function after long exposure to the weather. This depreciation is supposed to arise from a slow process of oxidation which probably takes place, thus causing the practical burning of a portion of the coal, and a lessening of its heating capacity.

OSMIUM is the most infusible metal known. Even in the intense heat of the electric arc, hardly a trace of fusion can be discerned. In alloy with iridium it is a very good material for the tips of gold pens.

IN France a vessel is being made of aluminium. Her hull will weigh 2,500 kilos, whereas, if built of the ordinary material, it would weigh 4,500 kilos.

A NEW kind of wire for telephone use, having an aluminium-bronze core with a copper-bronze envelope, is being experimented with in Germany. It is said to have a low resistance and great tensile strength.

BOG ORES AND THE ANCIENT FORGES OF RADNOR.

THERE is not only a mine of metallic wealth, but a mine of literary and historical wealth, in the district of St. Maurice, where the ancient forges of Radnor are situated, and from which the celebrated bog ores of the province of Quebec have been taken from the time of Louis XIV., with various interruptions, down to the present day. At least 225 years ago, in the early days of the French regime, specimens of the bog ores of this region were examined and favorably reported on by Sieur la Pontardiere to the Government of France. Count Frontenac, in a letter dated Nov., 1672, described the situation, and mentioned that there were six piles of ore then lying at Cap de la Madelaine, which would suffice for two castings a day for four months, and the only question was where to place the forges which were to be brought out. The Jesuit Fathers already had a mill there, and he proposed to operate the forges by water power. It was not till 1737 that a blast furnace was erected by Cugnet & Cie, known as "La Compagnie des Forges," whom the French King, Louis XV., empowered to establish iron works, advancing them 100,000 livres without rent or taxes. This furnace was afterwards taken over by the Crown, skilled workmen being brought out from France and Sweden, and the historic furnace was operated from time to time down to 1883. In 1747 Prof. Kalm, of the Swedish Academy of Sciences, visited the works, and in the course of his account of them said: "Whilst my company was resting, I went on horseback to view the iron work. The country which I passed through was pretty high, sandy and generally pretty flat. I saw neither stones nor mountains here. The iron work, which is the only one in