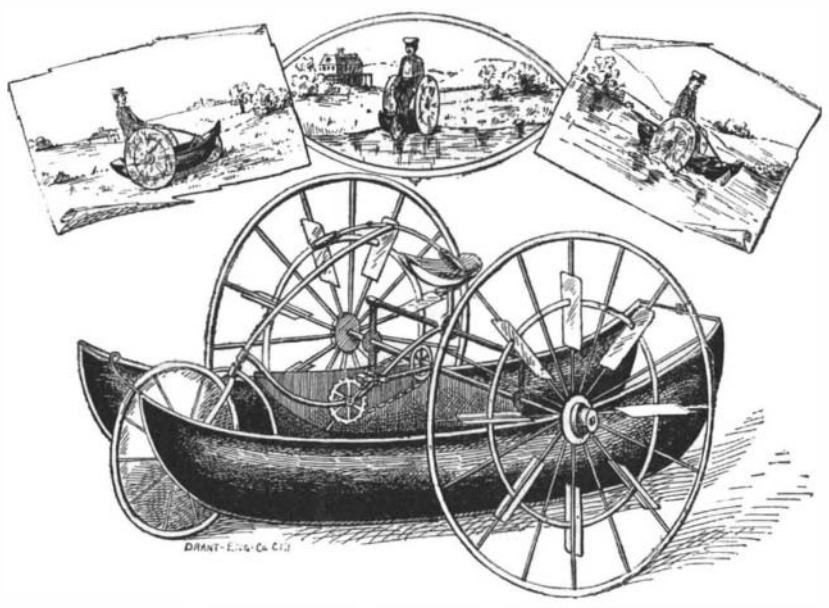
COMBINED CYCLING AND BOATING MACHINE.

Land and water have been traveled over by vehicles or devices wherein each was adapted to its special sphere. Seldom have land and water been laid under contribution by a single mechanical device. It remained for the genius of a citizen of Chicago to devise a machine for both use and pleasure, which should enable his fellows to traverse with great speed either land or water, proceeding readily from one on to the other. This Mr. Thore J. Olsen has done by means of a combined tricycle and boat, or boats, so connected that they operate together most perfectly on either element, although it takes but a moment to separate the boat from the tricyle.

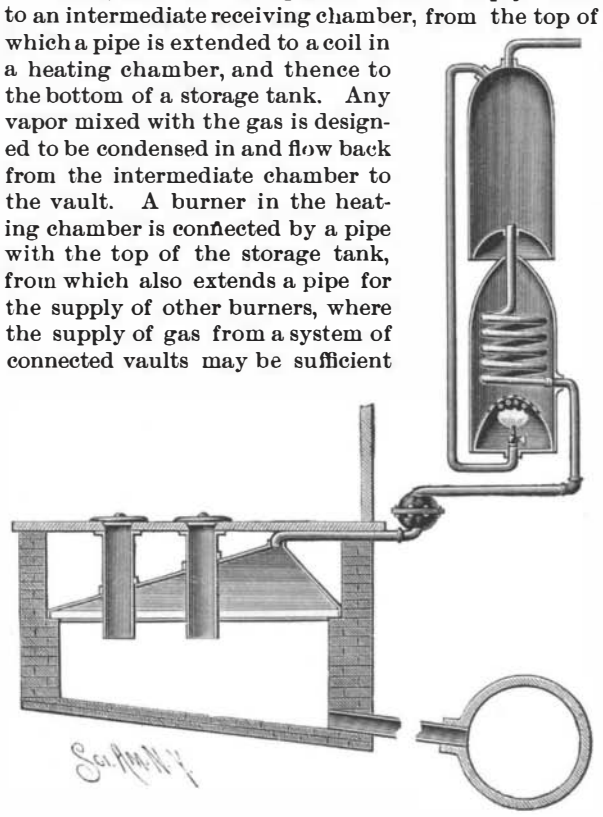
In the accompanying sketch the machine is shown ready for use. It consists of twin boats rigidly connected and a tricycle connected to said boats so ingeniously arranged that the machine is propelled and steered by the same mechanism. This machine has the most perfect stability in either element, is light, sightly, and attractive, producing the liveliest interest when exhibited on account of its originality. In this device the traveler may carry his necessary baggage, tools, and hunting and fishing tackle, yet the whole device without load weighs but from 50 to 75 pounds, and while it is arranged to carry but one person on land, its buoyancy is such that it will carry two and sustain three or more persons on the water. Thus the traveler, the pleasure seeker and the military man will not be hindered from reaching each his destination on account of floods, washed-away bridges or no bridges or pontoons. This device has been patented and its capacity and popularity demonstrated during a part of the past season. Further particulars with reference to this improvement may be obtained of Mr. T. J. Olsen, 427 W. Madison Street, Chicago.



OLSEN'S CYCLING AND BOATING MACHINE.

AN APPARATUS TO CONSUME SEWER GAS.

An improved means of conducting away the gas from privy vaults, with the design of also making it available for illuminating purposes, is shown in the accompanying illustration, and forms the subject of a patent issued to Mr. Jacob Eckhardt, of No. 3913 Vest Avenue, St. Louis, Mo. The top of the vault is covered with a tight-fitting, somewhat triangular-shaped hood, through which the receiving tubes of the vault descend, by means of close joints, so that the volatile gas will not escape from the hood into the tubes. A discharge pipe leads from the bottom of the vault to the sewer, and from the apex of the hood a pipe leads to an intermediate receiving chamber, from the top of which a pipe is extended to a coil in a heating chamber, and thence to the bottom of a storage tank. Any vapor mixed with the gas is designed to be condensed in and flow back from the intermediate chamber to the vault. A burner in the heating chamber is connected by a pipe with the top of the storage tank, from which also extends a pipe for the supply of other burners, where the supply of gas from a system of connected vaults may be sufficient to utilize it for illuminating purposes. The coil-heating burner may be supplied with gas from other sources, if desired, and, the chamber being closed, an upward current is produced in the coil, while the gas is superheated so that it will not afterward deposit moisture. The apparatus is designed to be of especial value in getting rid of and rendering innoxious the very dangerous sewer gas, even where such gas cannot be turned to use.



ECKHARDT'S APPARATUS TO CONSUME SEWER GAS.

MOULDS for casting iron can only be made in sand. Iron or other metallic moulds chill the iron and it does not fill well. The great heat at which iron melts will burn any other material, or will stick so as to break the mould.

Alloys of Iron or Steel and Nickel.

A process of manufacturing nickel steel has been recently patented by Mr. E. F. Wood, of the Homestead Steel Works. The invention concerns, chiefly, the method of introducing the nickel into the presence of the melted iron or steel and securing its admixture therewith, and it consists in effecting the reduction of oxide of nickel in the presence of the fused iron or steel, either before or after the decarburization of the pig metal, by mixing the oxide of nickel with carbon and exhibiting the mixture to the metal fused or in the process of fusion, so that the nickel ore may be reduced. The nickel oxide used may be any of the natural ores, or what is known as "artificial" nickel ore, which is preferable on account of the leanness of the natural ores, and generally analyzes about as follows: Iron, 23·870; nickel, 48·230; phosphorus, 0·007; silica, 1·900; sulphur, 0·264; copper, trace; oxygen and earthy matter, 25·729 per cent.

The process of manufacture of this nickel steel differs only from the ordinary open hearth or Bessemer process in the manner of introducing the nickel, which is thus accomplished. The nickel addition is prepared by grinding or otherwise pulverizing the nickel oxide and then mixing it with powdered charcoal or coke in the proportions of about one part, by weight, of carbon with three parts, by weight, of pulverized nickel ore. If a lean natural ore is used, a smaller percentage of carbonaceous matter will be required, and if the proportion of nickel in the material used is greater or less than before mentioned, the amount of carbonaceous matter should be correspondingly increased or diminished, the object of the carbon being to effect the reduction of the oxide of nickel, the exact proportions of carbon added being easily determined in practice. The nickel and carbon being intimately mixed, are formed into a plastic mass, with a sufficient quantity of some binding material, such as tar or silicate of soda, and this plastic material is formed into small masses, preferably bricks, which are compressed into a solid condition. The purpose of this pressure is to compact the materials, so that they can the more readily be kept immersed in the melted metal. It is preferable to previously dry the ore, so as to render the bricks more compact and to prevent the presence of water. The amount of oxide of nickel contained in these bricks can be readily determined by a previous analysis of the ore (natural or artificial) of which they are composed, and on the quantity of such bricks used with a given charge of metal will depend, of course, the percentage of nickel contained in the resulting product, which may vary in any desired degree, according to the character of the nickel iron or nickel steel to be manufactured, it being understood that an allowance should be made for the loss of about 10 per cent. of metallic nickel, which passes into the slag and is lost.

The amount of this loss varies, however, somewhat with the different processes of iron or steel manufacture.

The application of the process to the open hearth furnace is thus described: The open hearth furnace being suitably heated, a proper proportion of nickel-addition bricks is placed on the hearth, mixed with the charge of pig metal, which is so placed as to prevent the bricks rising to the surface of the metal as it melts, after which the open hearth process is carried on in the usual way, the decarburization of the pig metal and its subsequent recarburization, together with the addition of spiegeleisen or ferro-manganese, being conducted in the usual manner. The effect of introducing the nickel addition in the manner described is that the oxide of nickel is reduced in the presence of the melting or melted pig metal, and the metallic nickel thus produced becomes intimately mixed with the iron, while the earthy and foreign matter of the nickel ore is melted and unites with the slag. The process applies also to the use of the nickel addition in the basic process of decarburizing pig metal without any other change than the addition of the nickel bricks, and it is found preferable in the basic process to add the bricks after the addition of the limestone and before charging the pig iron, so as to bring the nickel bricks into more intimate contact with the melting iron or steel.

When used in connection with the Bessemer process it is preferable to introduce the nickel additions into the iron ladle as the molten pig metal is being charged into the converter, if the iron were hot enough at that stage of the process · but as this is usually not the case, it is better to introduce the nickel brick into the Bessemer converter befor the molten metal is charged, no other change in the conduct of the Bessemer process being required · or the nickel bricks may be added to the Bessemer metal in the steel ladle at the end of the process, the steel being blown hot enough to cause the complete fusion of the bricks, in which case the nickel ore will be at once converted into metallic nickel and mingled with the liquid steel.

Water Power Electricity.

The description by the *Electrical World* of the most powerful plant in this country for the transmission of electric power is interesting. The plant is now in course of construction for the San Antonio Electric Light and Power Company in the San Antonio canyon, in Southern California. There is a minimum flow of 1,300′ of water per minute, affording a head of about 400′. The water is brought to the power station through 1,900′ of 30″ and 600′ of 24″ double riveted sheet iron pipe, which involves a loss of head by friction of 12′, leaving 390′ effective head or running pressure. The power station is provided with four double nozzled Pelton wheels 34″ in diameter coupled direct to the armature shafts of as many Westinghouse alternating current generators of 200 horse power each.

The current generated will be carried on two No. 7 bare copper wires down the canyon to a point where they diverge, one running to Pomona, 15 miles, and the other to San Bernardino, 28 miles, covering by the return circuit in the latter case a distance of 56 miles. By means of transformers, the potentials will be raised at the generating station to 10,000 volts, and the current carried at this pressure to sub-stations just outside the cities named, where, by means of step-down transformers, it will be reduced to about 1,000 volts and then distributed for both light and power purposes.

A NOVEL DESIGN FOR A BADGE.

The badge design shown in the illustration, having an interior representation of a globe surrounded by a series of women's heads, has been patented by Mr. W. B. Munger, of 21 North Fifteenth Street, Harrisburg, Pa. The ornamentation forms a rebus, enigmatically expressing "World's Fair," while an eagle surmounts the body of the badge.

MUNGER'S "WORLD'S FAIR" BADGE.

Luminosity of Vacuum Tubes.

In the course of a discussion before the British Association on a paper by Prof. Schuster on "Primary and Secondary Cells," Mr. Crookes stated that if a long vacuum tube containing oxygen exhausted to a point giving the greatest luminosity is held somewhere near a plate connected with one of the terminals of a high tension coil it becomes very luminous. If the tube has been lighted and put in a cool, dark place, and thereafter held near a coil, it remains dark, and no amount of placing it near the coil will make it luminous. If the tube is rubbed, it suddenly flashes into luminosity, and remains so; but if laid down in a dark room for an hour, it becomes non-sensitive again. It seemed to him that the gas inside the tube requires to be put in a state of disassociation. Prof. H. Von Helmholtz, who was one of the lions of the meeting, said he believed that in these vacuum tubes, if there is a little stratum of gas adhering to the surface there are always molecules, which can be separated into positive and negative. There is really a measurable stratum of air adhering to the interior of the glass tubes. If a rarefied vacuum is made, the greater part of that air goes away; but there are always traces of gas left, even in the vacuum of a glass tube which is completely melted.