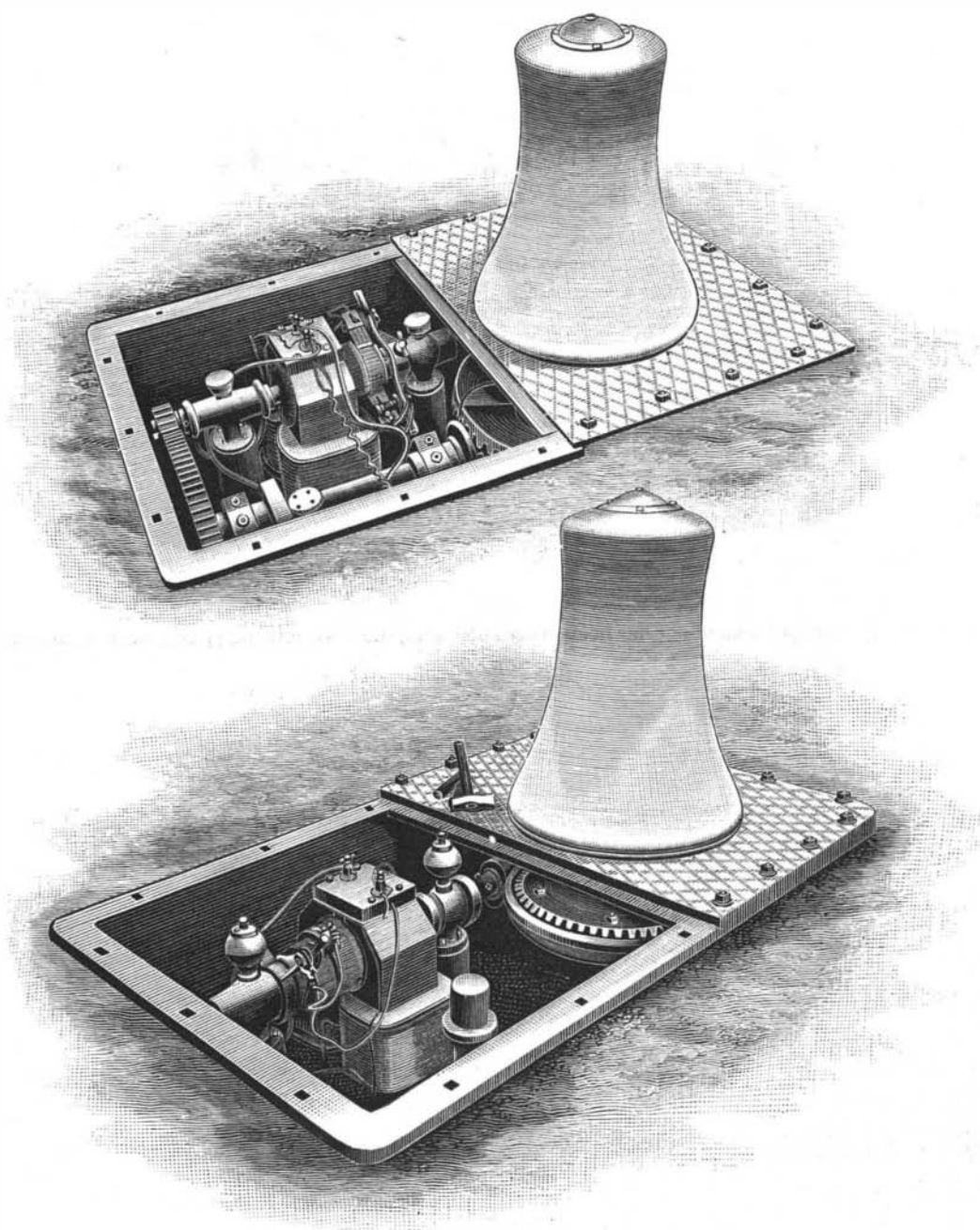
ELECTRIC CAPSTANS.

The illustrations, for which we are indebted to *Engineering*, represent two electric capstans constructed by Messrs. Humpidge & Snoxell, Limited, Dudbridge, Stroud, Gloucestershire, and differing in the type of gearing adopted. Both are in daily requisition, moving coal trucks, etc., empty and loaded, to and from various parts of the yards, and each is capable of hauling two loaded 10-ton wagons round the ordinary curves and gradients at a speed of about 2½ miles an hour. The working parts are contained in a water-tight iron casing below the ground level, access to the motors being readily obtained by means of a small cover provided for that purpose. The motors were made by Messrs. Crompton & Co., of Chelmsford. They are compound wound and take, in regular work, a current of 45 amperes at 110 volts pressure; but will pass a good deal more current at starting for a short time without injury. The leads are brought to the capstans in a 2-inch wrought iron pipe laid underground; and the starting switch is arranged so that the current is applied gradually, so as to start the motor without undue shock. In the one case the motor drives the hauling head by means of ordinary machine cut spur gearing, with a compressed rawhide pinion on the motor spindle. In the other capstan this arrangement was modified, and the motor is geared direct into the capstan head spindle by means of a worm and wheel. The greatest care was taken to make this latter arrangement as effective as possible; the worm was made of hard tool steel, double threaded, and provided with a proper collared thrust bearing. The worm wheel was made of phosphor bronze, accurately shaped to the worm, and the whole arrangement worked in an oil bath. The efficiency, although high, was found to be slightly lower than in the case of the capstan with the spur gearing.

The first capstan has been in daily use since May 25, 1891, and is probably the first electric capstan ever started in regular work. It has advantages over a capstan worked by water pressure, principally on the score of economy of working. The current taken is directly in proportion to the work which is being done, whereas with an hydraulic capstan the full amount of water is passed, whether any work is being done or not.



IMPROVED ELECTRIC CAPSTANS.

The Municipal Art Society.

The exhibition of the sketches in the competition invited by the Municipal Art Society, for the decoration of the court room of Oyer and Terminer in the new Criminal Courts building of New York, has recently been held in the Vanderbilt gallery of the Fine Arts Society. Forty-seven sets of designs were submitted, which showed the decorators of the American school of art to good advantage. Mr. E. E. Simmons' design carried off the first prize of $500, and he will eventually complete the work in the court room, when the finances of the society admit of paying the $4,500 additional. The society is in a flourishing condition and numbers between 700 and 800 members. Mr. Wm. A. Coffin, first vice-president of the society, recently assisted a committee of citizens in Cincinnati to form a Municipal Art Society in that city, so that the good work begun in New York is already stimulating other cities to have similar societies of their own.

It is a curious and instructive fact that some of the grandest works of art ever made were produced under the direction of a committee of citizens which acted as a jury to judge of the merits of the works submitted to competition. Probably the most interesting competition on record was that for the bronze doors of the Baptistery in Florence, won by Lorenzo Ghiberti, and the dome of the cathedral of Florence, won by Filippo Brunelleschi. Both of these works are of pre-eminent importance, and the story of the competition will live forever in the delightful pages of that prince of biographers Giorgio Vasari.

IN some places boys are employed to test eggs by candle light. They earn $3 a week, and in about three months they go to the hospital suffering with sore eyes.

An Important Rubber Concession.

The authorities of Madagascar have just granted to the Hon. John L. Waller, ex-U. S. consul for Madagascar, a concession, measuring in area 15 miles square, in the district of Fort Dauphin, on the southeast coast, and which is conceded to be one of the richest rubber districts on the island. The country also abounds in ebony, mahogany, rosewood, and teak. The discovery of rubber in Madagascar is of recent date, as we noted in our issue of October 28, 1893. The *Madagascar News* states that Mr. Waller will stop the destruction of the rubber trees and vines by the natives, as far as his own concession is concerned, and will preserve them by having the milk extracted in a scientific manner. The trade will be specially benefited by the quantity of rubber which will be obtained from the new source.

Selling for Cash and Buying on Credit.

One of the anomalies of railway management is that pertaining to its financial conduct. The ordinary stock and bond transactions and the dividends and interest pertaining thereto are not here referred to, but the income and outlays attaching to the conduct of the business of the road. In ordinary commercial pursuits, and especially houses of large means, the rule is to buy for cash and sell for credit, but in railroad operation this is entirely reversed; they sell for cash and buy on credit. The charges for the transportation of passengers are collected in advance and for freight are collected on delivery, but the payments for purchases are in a majority of cases deferred as long as possible. This practically amounts to a discount of earnings and yet it is, as already stated, an almost universal practice. The fact is that railroads, as at present conducted, are run upon borrowed capital. Some of it is borrowed on its bonds; some from those of whom it purchases supplies: and some from its patrons in various ways which need not here be mentioned. Its owners (if a property so covered up with debt as to consume in its carrying charges all its earnings may be said to have owners others than its creditors) rarely, if ever, supply the capital needed to conduct the business—another particular in which railway operation differs from ordinary commercial affairs. Possibly when the stockholders of a road shall supply the money needed to operate upon a business basis this may not be the case, but until then it may be expected that railroads will go on selling for cash and buying on credit—doing business on other people's money—to their loss.—*Railway Review.*

Golden Sands of the Pacific Coast.

BY CLARENCE M. BUEL, E.M., ST. PAUL, MINN.

These auriferous deposits, denominated "black sands," occur at intervals from Takutat Bay, some 250 miles north of Sitka, in Alaska, to Santa Cruz Bay, California, and have been worked for many years with primitive appliances—sluice box and pan—the gold being fine flake or flour, less than twenty-five per cent being saved. These deposits, already mined, milled and on the dump, ready to work, contain a sufficient quantity of gold to more than pay the national debt, *could it be saved;* but the prospector, finding two hundred colors in his pan, little thinks that the color visible to the naked eye is but the 1,000,000th part of a grain, finds it so alluring that he at once rigs up a rough sluice box, and often sends a sample to an assayer who gives him returns from $5 to $40 per ton, wonders that he seldom makes more than $4 per day, though other methods have been pursued in attempting to separate the gold from the sands too numerous to relate.

Accompanying the gold is found platinum and nearly all the platinoid metals. Chlorination has been tried without success, and the cyanide process (McArthur-Forrest patent) proved a failure, the reason chiefly being that the magnetic iron, of which these deposits are largely composed, converts the cyanide of potassium into a ferrocyanide, and the zinc used in precipitation is rendered inert by reason of its speedy oxidation in the humid saline atmosphere to which it must needs be subjected. On the Oregon coast, at the mouth of the Coquille, the camp of a thousand miners a few years since is now reduced to a single miner. There are old beaches miles back from the present beaches, with beds several feet in thickness, rich in gold, inexhaustible in extent, unworked now and awaiting some method by which the precious metal may be extracted. This state of affairs exists at Gold Beach, Port Orford, Yaquina Bay, Peterson's Point, and over one hundred other localities. Yet each year sees its quota of Chinese working in their crude manner and paying a royalty of $1 per foot for the privilege.

The magnetic iron forms nearly $\frac{40}{100}$, and is a mixture of the protoxide and sesquioxide of iron, having 72 parts metallic iron to 28 of oxygen. It is quite hard and scratches glass; strongly magnetic, it is the same as the loadstone, excepting that the latter possesses polarity. It is found in nature disseminated through granite, gneiss, mica, slate, syenite, hornblende slate, chlorite slate, and limestone, and is suitable for making the finest quality of steel. Zircon is also found, though too small to be noticed except mineralogically. —*Science.*

How "Cream-colored" Milk is Made.

A writer in the *Economic Review* reveals some of the secrets of the milk trade, as discovered by himself in an attempt to run a London dairy upon honest principles. His first discovery was that all London milk had to be "dyed" to suit the London fancy. This is effected by mixing about one teaspoonful of liquid annatto, a vegetable dye of a harmless nature, with every eight quarts of milk. In vain he explained to his London customers that the proper color of most milk is white. "They insisted that my white milk was 'chalk and water,' and other people's 'cream-colored' milk was creamy, beautiful, rich, and fresh. My milk was skimmed, etc. I gave way in this thing alone. I gave them their heart's desire—the cream-colored milk."

Artificial Whalebone.

Mr. Munck, according to the *Genie Civil*, has invented a process for making artificial whalebone. He treats leather by sulphide of sodium, then soaks it for 24 or 36 hours in a weak solution of sulphate of potassium, and afterward stretches it on a frame. The skin is then dried slowly, and exposed to a temperature of 50° to 60° C. The influence of light, combined with the action of the sulphate of potassium, renders the gelatine insoluble in water. The skin is then submitted to pressure, and its properties are thus very nearly those of real whalebone as regards hardness and elasticity.