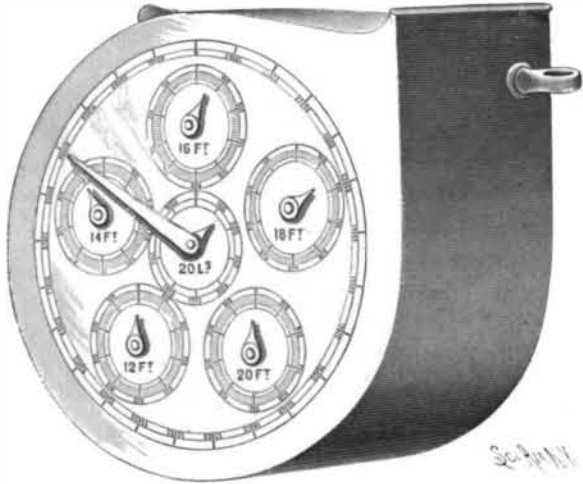


A NEW MEASURING AND REGISTERING DEVICE.

The accompanying illustration represents an improved device for measuring, registering, and adding a series of measurements and may be used for measuring lumber and for similar work. The device has been patented by Mr. George Krueger, of Johnstown, Pa. A cord or tape line attached to the knob, to be seen at the side of the instrument, is connected to control a wheel which connects with a number of graduated gear wheels, which in turn control a registering device. To operate the mechanism the cord or measuring line

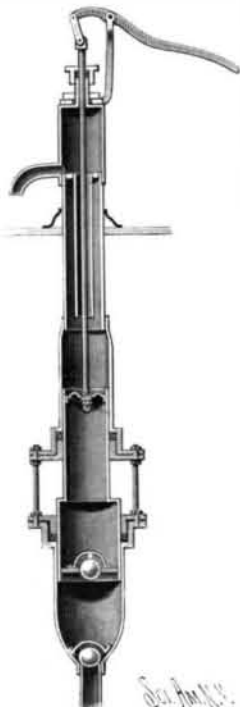


DEVICE FOR MEASURING LUMBER.

is drawn out over the surface to be measured. The length of line drawn out is recorded by the system of gear wheels on the several dials on the face of the instrument. These dials are graduated to indicate measurements from zero to 100 feet board measure (viz., one foot wide by one inch thick). Each dial can be made to record the sum of the measurements of boards of the same length, the unit of length being marked on each dial. Thus one dial may be used for 18 feet lengths, another for 16 feet lengths and so on. A knob is arranged on the top of the instrument to move along a scale graduated to indicate lengths of 18 feet, 16 feet, etc., and when the knob stands at, for instance, 18 feet, all measurements taken will be indicated on dial 18. The device will also record the total length in feet of all measurements this being registered on the outer and on the central dials. The central dial registers from zero to 1,000 feet and the great dial up to 25,000 feet. The inventor claims for his patent perfect accuracy, and a gain over similar devices in simplicity, durability and general convenience of manipulation.

AN EFFICIENT FORCE PUMP.

A simple and efficient pump, for forcing a continuous stream of water at great pressure, has been patented recently by Mr. William R. George, of Staunton, Illinois. The accompanying illustration represents a central longitudinal section of the improved pump and gives a clear idea of its construction. The outer casing is made in four parts. The upper part provides a sealed air chamber with an ordinary spout and handle. Below this is a compartment having a closed upper end and a central tube passing through it to form a passageway for water and for the plunger rod. The space at the top of this compartment around this tube forms an annular air chamber, and this serves as an air cushion, which assists in ejecting the water. Below this compartment are two separated pump barrel sections of different diameters. At the bottoms of these are two upwardly opening valves of the ordinary ball pattern. A tubular plunger of two diameters corresponding to the diameters of the two pump sections works, as may be seen in illustration, in the two lower pump barrels. The action of the pump is very simple and consequently is not likely to get out of order. It will be seen that as the plunger is raised a portion of the water above it will be forced out, and when the plunger is lowered the valve of the upper part of the plunger will be opened while the lower valve will be closed. The lower end of the pump plunger is twice the area of the upper part, and the volume of water therefore forced upward is sufficient to cause the water already in the pump barrel to be ejected, thus keeping up a constant flow of water. The air cushion, it will be seen, causes



GEORGE'S FORCE PUMP.

the water to be ejected with great force, and this makes this form of pump especially valuable in cases where a hose is to be used in connection with it.

Electricity in Sugar Manufacture.

Electricity and bacteriology are the two youngest sciences. They are destined to promote human health and wealth to a far greater extent than has been dreamed by those not familiar with the rapid progress which has been made recently in those sciences. Bacteria, microbes and bacilli are the causes of chemical changes upon which our existence depends; they cause health and they also cause disease and death. The influence of electricity upon the vital forces of plants and of animals is not well understood. Its effect upon chemical changes and transformations is only partly comprehended. An electrical current destroys, disintegrates and decomposes. It also builds up, develops and perfects chemical combinations. A green leaf separated from a plant decomposes carbonic acid. Sugar forms in the stem of the cane from material furnished by roots and leaves. An electrical current passed through a solution breaks up strong combinations and forms new combinations. How far these results are due to the same cause we cannot tell. The development of electrical science has been so rapid that electricians have not had time to become old. Its progress is so rapid that an expert electrician would find it difficult to keep informed in regard to its new applications to industrial art in all lines, for it applies directly or indirectly to nearly all lines of human effort. The progress of electrical science is a matter of days or of hours. The electric lamp is the original star of destiny. It lights up the way to startling discoveries which will affect all industrial arts. The electric current produces power, light, heat and chemical effects, all of which are required in sugar manufacture. A wire which passes easily through a keyhole can carry hundreds of horse power to almost any distance. A carbonized fiber of cane produces an illumination. The electric furnace gives heat which is more intense than coal. The strongest chemical compounds are separated and new compounds are formed by electrical action. It seems not at all impossible that electricity may play an important part in future sugar manufacture.

It has been recently discovered that caustic soda is cheaply produced by passing an electric current through a solution of salt. Chloride of sodium—that is, common salt—is a strong combination, but as sodium has also a strong affinity for the oxygen contained in water, and as chlorine has also a strong affinity for the hydrogen of water, the oxide of soda is easily formed by passing an electric current through a solution of salt, forming muriatic acid and caustic soda instead of salt and water.

As the fiber of cane is a valuable paper-making material, and as caustic soda is largely used in cleansing the fiber, it seems that this application of the electric current may be useful to the sugar industry, to the salt industry and to the paper industry; for as salt is one of the cheapest commodities, and as the fiber of cane is practically almost a waste product, and as sugarhouses have dynamos for generating current, the caustic soda which is required in reducing cane fiber to paper pulp may be produced upon the plantation.

Another application of the electric current in sugar manufacture may be found in clarifying cane juice or sirup. It has been found that a current of electricity at high pressure or voltage inverts sugar, but that at a pressure or voltage which is sufficient to decompose water, the electric current does not invert sugar. Water in the juice is decomposed, oxygen and hydrogen being set free to act upon the impurities in the juice. It is said that fifteen European beet sugar factories will adopt electric clarification next season.—La. Planter.

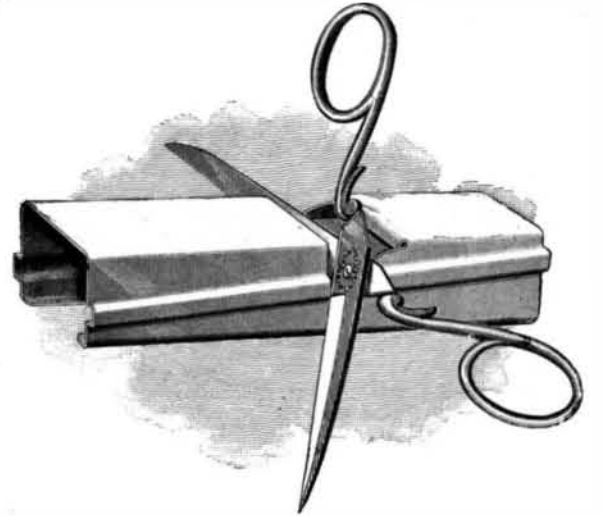
The Bearing Power of Various Soils.

Mr. E. L. Corthell, of the Western Association of Architects, gives in a recently published text book the following data as to the bearing power of foundations. In clay soils the resistance is from 2 to 8 or 9 tons per square foot, with allowance for friction. In sand the data vary much in different kinds. Sand mixed with loam will not bear more than 5 tons per square foot. Nine and one-third tons per square foot were placed on fine gravel and sand at Urk Viaduct; masonry piers on cylinders 4.8 inches diameter; friction neglected. In India, on coarse sand, not over 9 tons are used. In experiments 20 tons have been placed on sand without settlement. Referring to friction, the author says: Side friction varies from 200 pounds to 600 pounds per square foot. Blackfriars Bridge, on clay, is put at 5 tons per square foot, settled; new London Bridge, 5 tons per foot on piles = 80 tons per pile, settled badly. Other weights are given of American buildings. Thus, Washington Monument is 9 tons per square foot, inside edge; clay and sand, 3 tons per square foot, outside edge. These data vary greatly, arising from the ad-

mixture of loam or gravel with the sand; the latter appears to give the highest results.—Architecture and Building.

THE "DIAMOND" SHEARS AND SCISSORS SHARPENER.

The simple and useful little device for sharpening scissors which we illustrate has been put upon the market by the Diamond Cutlery Company, whose offices are at No. 64 Broadway, New York City. The



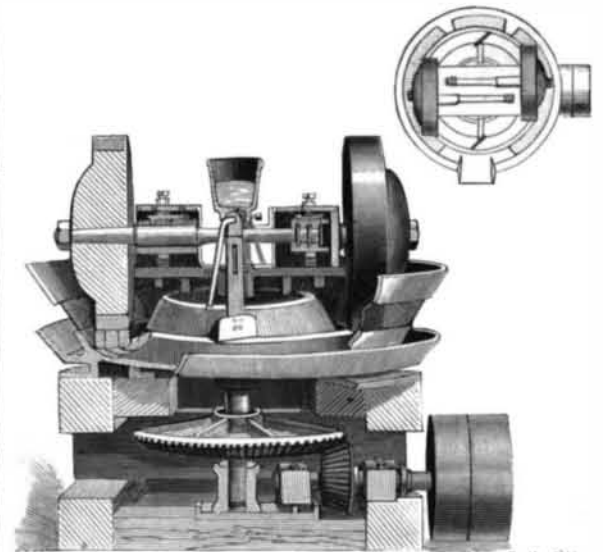
IMPROVED SCISSORS SHARPENER.

device consists of a nickel-plated metallic case provided with inside grooved runways for holding a special diamond-cut file. The top of the case is cut by a groove which holds the scissor in position and guides it when it is passed over the file.

The inside grooved runways holding the file are arranged at such an angle as to file the edge of the scissor at a proper bevel, and they permit the file to be adjusted when one portion becomes worn.

AN IMPROVED ORE CRUSHER.

The illustration accompanying this notice refers to an improved form of ore crusher, which it is claimed can be operated with less power than is required to run the ordinary forms of such machines. The crusher has been patented by Mr. August H. Schierholz, of 1421 California Street, San Francisco, California. The patent provides for a circular pan for holding the ore, supplied with a feed spout. The sides of the pan are inclined, and these are provided with openings covered with wire screens which allow the crushed ore to pass out into a discharge spout. At the bottom of this pan a circular die is arranged on which the crushing rollers travel. These rollers, two in number, extend on opposite sides of a central driving shaft and are connected with this shaft by a simple and powerful system of gear wheels, as may be seen by reference to the illustration. Power is applied to the horizontal shaft to be seen in the lower part of the illustration, and this shaft transmits its motion to the vertical drive shaft carrying the rollers, so that the crushing rollers are made to revolve both on their own axes and about the vertical shaft. It will be seen that they will move regularly about the circular die, thus crushing the ore. The frame of the rollers is provided with a common form of scrapers which move over the face of the circular die, thus keeping it free from clogging materials. At the upper end of the central vertical driving shaft



SCHIERHOLZ ORE CRUSHER.

a reservoir is arranged, and connected with this is a water pipe supported at the upper end of the driving shaft. The nozzle of this pipe revolves with the shaft and is carried around and delivers a steady stream of water on the screens over the openings in the side of the pan. This serves to wash the materials through the screens into the circular discharge spout, and keeps the screens free from clogging matter.