

ADJUSTABLE WHEELBARROW.

The wheelbarrow which is shown in the accompanying illustration is so constructed that it may be readily adjusted to fit or hold articles of varying sizes. The handles are adapted to be moved toward or from each other, but when released they will be automatically thrown outward, or separated, under tension of a pair of spring straps.

The engraving shows the wheelbarrow handles, A, partly drawn together. The handles are preferably made of wood faced with iron strips, E. At their forward ends the handles are pivoted between two yoke-pieces, D. These yoke-pieces are connected together by bolts which pass through sleeves, the latter serving to properly space the yoke-pieces apart, and prevent binding on the handles. Pivot bolts pass through the yoke pieces and the handles, and at their lower ends are provided with eyes which form bearings for the axle of the wheel, B. The spring-yielding straps, C, extend forward from the handles and are joined together at their forward ends. Stop pins, F, are located on the handles at suitable places to prevent a barrel or other article from rolling or sliding against the wheel. These pins extend in both directions, as shown, for the wheelbarrow is designed to be turned either side up, since by turning it in the reverse position to that illustrated, the handles will be brought closer the ground, making the loading of heavy boxes or barrels much easier. The wheelbarrow can be made at a comparatively small cost, and when not in use it may be folded closely together, and therefore will require but little space for storage as it can be stood up in a corner. A patent for this invention has recently been granted to Messrs. W. A. House and W. F. Hosken, of Covington, Ky.

**ADJUSTABLE WHEELBARROW.**

the liquid takes place, but the gas itself passes out of the perforations, when sufficient pressure has been attained, and chokes out the fire. The extinguisher may be located in the room which is to be protected at a point near the ceiling, where it will be comparatively inaccessible. Now, if a fire breaks out, the heat generated will cause the alarm to be automatically rung and the liquid sprayed out or a gas formed, which will extinguish the fire.

Baldwin's Failure.

Mr. Evelyn B. Baldwin has explained his failure to reach the Pole as follows:

"Tromso, Norway, Thursday.—The public has been deceived by false reports regarding the expedition. Nearly every member has been faithful, and my comrades ought to and must have due credit for their work in establishing large depots at Camp Ziegler during March, April and May. Sometimes they had to traverse the same route ten times. Fifty sleighs were destroyed in this work. Open sea near the depot at Teplitz Bay prevented us from reaching the Duke of Abruzzi's headquarters, and poor ice conditions in 1901 prevented us from establishing depots north of 80 deg. 22 min. In this connection the death of half of our dogs necessitated the postponement of going to the Pole. Nothing favored returning by way of Greenland.

"I believe the record of being the 'farthest north' could have been broken, but it would have exhausted our supplies and destroyed the hope of finally reaching the Pole.

"Sailing Master Johannssen's demands to become the 'America's' captain were untenable and unbearable. His threat December 15 to take possession of the ship as captain, and deal with the crew in accordance with his own will, might have spoiled the expedition's plan if enforced. The ice pilot, as well as the first mate, who had long experience in polar ice, were entitled to recognition. Johannssen's refusal to obey the ice pilot's orders, and his declared unwillingness to take the advice of my representatives on the sleigh expedition, together with other well-founded reasons stated to the American consul now here, caused his discharge and the promotion of three of his countrymen, who all followed me in the sleigh expedition and obeyed with pleasure the orders given by myself, my representatives and the ice pilot.

"(Signed) BALDWIN."

Moving Vans for Transoceanic Use.

Vans for moving household furniture from one city to another are much more common in Germany and other parts of Europe than in the United States. These vans, which are owned by companies with agents in different cities, are loaded with furniture and other household goods at residences, hauled on trucks to the railroad, and loaded on flat cars for their destination. Here, they are received by the company's local agents and are unloaded at the house where the furniture is to go. When possible, the van is reloaded in the same vicinity and sent back to the place of starting. Thus, one may see in Italy or France furniture vans from Berlin or Dresden.

The saving in packing, the avoidance of extra drayage, and of the danger of breakage have made the system popular, especially in Germany. The vans in use there vary somewhat in size, many of them being almost as large as an American box car.

Recently, efforts have been made to extend the system so as to provide for the shipment of household goods across the ocean. A New York storage and van company has established connections in various parts of Europe and proposes to send vans abroad

when satisfactory arrangements can be made. If a man living in New York, for example, wishes to remove to a city of Germany, he will be furnished with one or more vans, in which his household goods are placed. The van is transferred to the ship, and, on landing at the foreign port, is again transferred to the car or river boat and carried to its destination.

The agent of the New York company, who recently made a tour of the Continent, claims that in the short trial made, the use of the vans has proved highly satisfactory, both in cost and convenience.

The vans employed by this company are 16 feet long by 8 feet wide and about 6 feet high. They are solidly built of wood, specially selected for protection against dampness, and are covered with thin sheet steel. They are readily conveyed onto and from ships and railway cars by the usual hoisting apparatus.

As a new phase of international commerce the matter will be watched with interest.

M. Perrier has patented a special apparatus for obtaining by means of petroleum, of the weight of 650 grammes per liter, a gas of an illuminating power much superior to that of coal gas. This apparatus consists of a bellows of plaited leather, whose design is to cause the air to pass between into the three saturators, each provided with a level; and in order to keep account of the quantity of petroleum which they contain, they have on the inside different plates for shifting. The air arriving by the pressure produced by the bellows traverses the first saturator, then the second, and finally the third, and then passes into a gasometer. By this means 2,600 liters of gas, or 2½ cubic meters per liter of petroleum should be obtained. We would suggest that petroleum of the weight of 650 grammes a liter is not really petroleum, but gasoline. We think the weight should read 850 grammes.

A SHUTTER ATTACHMENT.

A simple little device which will be found very useful in any house has been invented by Mr. G. J. Eppright, of Manor, Travis County, Tex. The device comprises a small spacer which may be inserted at will between the slats of a shutter to hold them open to the wind. Shutters as ordinarily made may be secured in two positions: The closed position, in which the slats are inclined at such an angle as to overlap each other and to exclude both light and air, or the opposite open position, in which the slats permit the light to pass downward diagonally into the room but interfere with the passage of a breeze. These two positions do not fulfill all requirements, for there are often times when one desires to exclude the sunlight without obstructing the circulation of the air. This may be done by the employment of Mr. Eppright's device, whereby the slats are locked in horizontal position so that the sunlight is practically excluded while no obstruction is offered to the air currents.

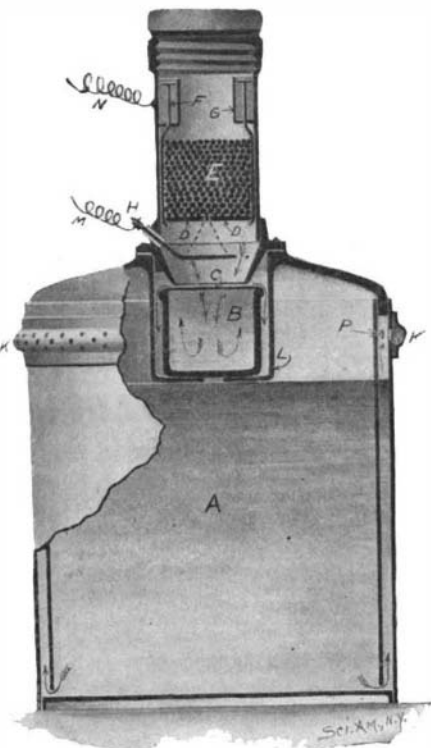
As clearly indicated in our illustration, the spacer consists of a wire bent to an approximate U-shape;

**SHUTTER ATTACHMENT.**

this spacer is pivotally mounted on the slat bar through the medium of a sleeve. When not in use the spacer may be swung out of engagement with the slats. It is evident that but a single spacer is required for each shutter, since the slats are all connected with the same slat bar, and the whole series will be held in horizontal position if any one of the slats is so secured.

The "Kaiser Wilhelm's" New Record.

On her last trip to New York, the "Kaiser Wilhelm der Grosse" broke her western record, making the trip in 5 days 15 hours and 20 minutes. The vessel has beaten that time on her eastern trip.

**AUTOMATIC CHEMICAL FIRE EXTINGUISHER.**

into this funnel is connected with one pole of an electric alarm, while the metallic neck of the flask is connected to the opposite pole. Upon either side of the neck are disposed the rods, F, slightly hooked at their lower ends to tentatively uphold two gates, D, on which a quantity of shot, E, is supported. In the neck are the receptacles, G, containing wax or any other readily fusible substance, in which the rods, F, are embedded. So long as the wax does not melt, the gates will be supported. When, however, the heat is great enough to melt the wax, the rods drop slightly,

Hydraulic Mining at Nome.

BY WILLIAM H. HALE, PH.D.

The primitive, haphazard methods of mining for gold by hand near Nome, Alaska, are rapidly giving way to improved and systematic work, and notably to hydraulicking.

It was my good fortune to be present at the installation and preliminary tests of the great pumping plant just completed by Charles D. Lane, which is one of the largest works of that kind in the world, and especially remarkable because all the ponderous machinery had to be landed across the surf in lighters. Not a piece was missing, however, when they were all collected and put together.

These preliminary tests were made in the presence of a few invited guests on July 30, and the works are now in regular operation, forcing water to the height of 764 feet, and giving a constant supply of 250 miner's inches. The intake is from Snake River, near its mouth; also some pure water is received from drainage of the tundra, the water of Snake River being very muddy. It is forced through a strong steel pipe 18 inches in diameter nearly to the summit of Anvil Mountain, and thence distributed to numerous places, and used to wash out the gold.

The pumping building rests on a bed of concrete, which is built upon a foundation of ice and frozen gravel. In order to prevent heat from the fires and machinery from thawing the ice and thus unsettling the building, air passages are constructed through the concrete, ventilating it thoroughly. This is doubtless the only great structure ever erected on such a foundation.

The cost of building, machinery and pipe is about \$350,000, and it is believed that it will more than pay for itself every year.

Encouraged by the success of this enterprise, Mr. J. W. Kelly and the Pioneer Mining Company are about to build a plant to pump water through four pipes, of the diameter of 6 inches each, from Nome River to the summit of King Mountain, which lies a little to the rear of Anvil Mountain and is also somewhat higher. Crude petroleum will be used as fuel.

The Miocene Ditch, so named from the geological formation which it traverses, is another enterprise which takes water by gravity, without pumping, from Hobson, Banner and Glacier creeks. The entire length of this ditch will be twenty-four miles. It was commenced last year, and in its unfinished state it is already furnishing water to wash the rich gravel of Snow Gulch. A tunnel of 1,900 feet will next year pierce the mountain which divides this gulch from Anvil Creek, and will supply many rich claims with power. It has been found that the tundra, mixed with shale or pebbles, makes an ideal bed and walls for the aqueduct, being both strong and impermeable. It is also very cheap to build, because the materials are everywhere at hand.

Many minor hydraulic enterprises indicate that this system will be in general use throughout much of the Seward Peninsula by 1903, resulting in large production of gold at comparatively little expense.

The rapid adoption of hydraulic systems is illustrated by the beginning of work on a canal to be fifteen miles long, and to bring water from Nome River to points along the left bank, which will require a year to complete. The property comprises sixty-four claims along Nome River, which take in also the river bed. At one point is a large bend in the river, and between points of the bend is a low divide, evidently the old channel. This will be washed out and the gold extracted, forming a new channel, or rather the restoration of the old one; then the entire bed of the present bend will be washed for gold.

Pupin's Latest Invention.

As the result of the continuation of his investigations of the propagation of electric waves along conductors, Prof. Pupin has taken out two more patents on a system of multiple telegraphy based on resonance. It is the object of the invention to send a number of messages simultaneously over a single conductor by means of currents of different periodicities. Given a periodic electromotive force acting upon a conductor of adjustable capacity, self-induction and resistance, it is possible, by varying the capacity or self-induction, so to proportion these electro-magnetic constants to each other that the natural period of the conductor is made equal to the period of the electromotive force. When this occurs the conductor and the electromotive force are in electrical resonance. A resonant conductor offers less resistance to the electromotive force with which it is in resonance than to any other, from which it follows that a resonant conductor can serve as a current selector. If the conductor forms part of a system comprising a number of electromotive forces of various periodicities its resistance will be less to that electromotive force with which it is in resonance. In a system of conductors having adjustable self-induction coils and condensers, the coils and condensers can be so adjusted that each conductor will have a different predetermined natural period, and, therefore,

each part will respond to a periodic electromotive force of its own pitch independently of the presence of other electromotive forces. Such a system will, therefore, act as a set of current selectors, and this forms the essential feature of the invention of Prof. Pupin. The system described by Dr. Pupin in his patents has no moving synchronous parts. It is applicable either to selective single or to multiplex telegraphy.

BORING CLAMS OF THE NORTHWEST COAST.

BY JAMES G. M'CURDY.

One of the strangest mollusks known to science is the Piddock, or "Boring clam," belonging to the family of Pholes. The members of this curious family bore



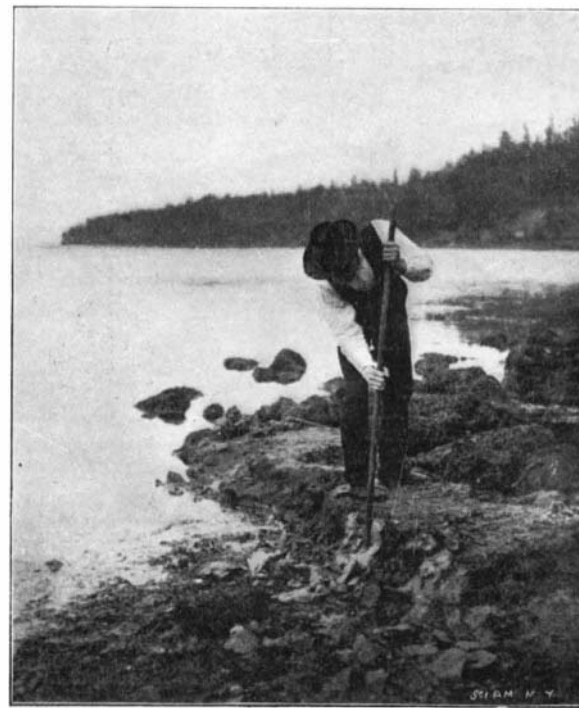
PIDDOCKS IN THEIR ROCK-DWELLING

into the sandstone ledges skirting the sea, and there take up a permanent abode, where they can be found embedded at varying depths in the rock.

Belonging to a family that is scattered world-wide, Piddocks have received considerable attention at the hands of naturalists from the earliest times. But inhabiting as they do only those portions of the ledges that are never laid bare save at extreme low tide, their movements are so screened from man's prying eye that to this day they remain somewhat of an enigma.

Many old ruins along the sea, as well as the rocky coast itself, bear traces of this indefatigable miner of the lower world. The marble columns of the ancient temple of Jupiter Serapis, standing upon the shores of the Mediterranean Sea, are said to be chiseled deep by the Piddocks of by-gone days.

"How do they get into the rock?" is a question invariably asked by those who for the first time see the Piddocks in their peculiar habitations. Authorities have been greatly divided upon the subject. Some have held that the creatures secreted an acid that



DIGGING OUT BORING CLAMS.

ate the rock, while others have declared that it was by long-continued action of the tongue that the burrows were excavated.

Both of these theories can be safely discarded, as it is now universally believed that the clam bores into the rock by aid of its sharp shell, which is replaced by secretions as fast as it is worn away. The muscular foot, which can be thrust forth at will in the working form, being clamped to the rock, forms a fulcrum about which the sharp shell can be brought to bear in any direction. Raspings on the walls of the burrow show conclusively that the shell is used in drilling.

Several species of Piddocks are found on the shores of Puget Sound, some inhabiting the hard clay banks bordering on the sea, while others select exclusively the

sandstone ledges as places of abode. Those living in the clay banks are larger and tougher than the rock-dwellers. The latter are usually about three inches long, and are as a rule buried about six inches in the ledge. I have found specimens over four inches long, embedded fully eight inches deep.

They are roughly oblong in shape, the inner end being large and rounded, while the outer end is flattened and terminates in a long tongue or siphon. The siphon lies in the small, tube-like passage which affords the Piddock its only means of communication with the outside world, and is usually thrust out to the surface ready to extract the animalcules from the sea-water, upon which the clam feeds. At the first approach of danger, the siphon is withdrawn and the burrow closed to intruders by means of the long, leathery continuations of the shell.

The shell of the mollusk is thin and brittle. The flesh is very tender and palatable, and along the Oregon coast, where the Piddock is plentiful, "Rock Oyster Soup," as it is called, is considered a great delicacy.

That the creature does its boring while small is evidenced by the burrow, which is rarely over one-quarter of an inch in diameter at the surface of the rock. The passage-way increases in size at a uniform rate, and contains no lateral indentations, showing that the Piddock had not stopped for any length of time at any given spot, while continuing its boring operations.

When the desired depth is attained, the clam ceases from its labors, excepting to enlarge the cavity in which it lies, as its growth necessitates. After discontinuing its boring, its muscular foot is gradually absorbed and the orifice through which it formerly protruded closes up.

As far as the writer can ascertain, no one has been able to watch a Piddock actually at work. All the forms described by naturalists were at rest, having the foot more or less absorbed. The writer in his investigations has been no more fortunate than others, as all his endeavors to secure a working form ended in failure.

Like other marine borers, Piddocks show remarkable engineering skill. If a portion of rock be broken off, it may be found honey-combed by burrows dug by the enterprising creatures, yet no passage will be found breaking into that of another.

As may be surmised, digging out boring clams from the rocky ledges in which they lie domiciled is no easy task. On the Oregon coast, when the demand from the neighboring sea-side resorts warrants, portions of the ledges are loosened with dynamite, and the clams secured with but little additional effort. But elsewhere, a pick and crow-bar are the implements commonly used.

Being desirous of obtaining some specimens to photograph, the writer made a visit to the Piddock bed lying at the head of Port Townsend Bay, during the low summer tides. In spite of his care, every clam secured from the ledge had the shell broken or was otherwise mutilated.

He was about to give up the quest, when he noticed a fragment of rock lying close by which had been detached from the ledge some time before. A blow with the crow-bar shattered the rock and in the fragments a number of the coveted Piddocks were found intact. These were photographed in their original rock-dwelling, while still alive.

Geologically considered, these mollusks are of considerable importance, as they undermine and gradually break down rock shores and reefs. Breakwaters and harbor works have also suffered from their incursions.

Sails for the Seven-Masted Schooner.

The recently launched seven-masted schooner "Thomas H. Lawson" will probably receive the most remarkable canvas equipment ever prepared. Eighty-three thousand square feet of duck will be used. Of this quantity, 43,000 square feet will be employed for the twenty-five sails of the vessel, while the rest will be utilized for sail covers and awnings. Three tons of pure manila belt rope made from special stock have been used in making the ropes. When it is considered that the sails will be subjected to an enormous strain, it becomes evident that special precautions were taken in designing particularly strong fastening devices. The thimbles are retained in place by wire cringles instead of sewn tar rope. The clew rings are said to be unusually large and heavy. Eight thicknesses of heavy duck were put into the clew patches at the corners of the sails.

Over fifty species of fish never before known to scientists were discovered by the United States Fish Commission steamer in the Hawaiian waters. Most of the specimens were hauled from depths to which the light of the sun can never penetrate. Still the fish were equipped with eyes, from which the scientists of the party inferred that they saw by phosphorescence. At a depth of 1,500 fathoms a rare specimen only four inches long was captured.