A SAFETY SEAL FOR CHECKS, BONDS, ETC.

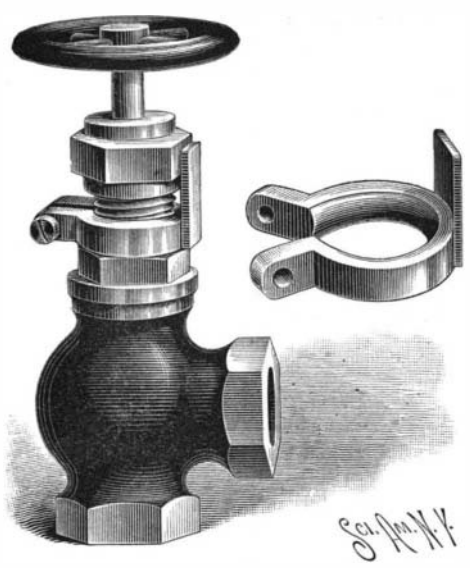
A specially devised seal, for application to the face of checks, bonds, notes, and other documents, to prevent altering or changing the figures showing the amounts for which the papers stand, is illustrated herewith, and has been patented by Miss Anna M. Woodhull, of Freehold, N. J. It is made of any proper kind of paper for such purposes, and preferably cut out by dies to such shape as shown in Fig. 2, the seals having serrated edges and being delivered from the die in sheets, the several seals of the sheets being united by narrow webs. The dies also cut out the central portion of each

WOODHULL'S SAFETY SEAL FOR CHECKS.

seal to leave a central aperture and a small auxiliary aperture at the side or top. The under faces of the seals are coated with any proper gum, and to each seal there is attached a semi-transparent flap, as shown in Fig. 3, such flap covering the apertures, but being disconnected from the main portion of the seal. When the number to be protected is written upon the check or other instrument, the seal is applied so that the number will be discernible through the semi-transparent flap, as shown in Fig. 1, and the check and the flap of the seal may be pierced through the side aperture of the seal, by a penknife or other convenient means, after the seal has been applied, so that any removal of the seal would direct the attention of the payee to the fact that the amount called for might have been changed or altered.

AN IMPROVED NUT LOCK FOR VALVES.

A device which is adjustable and attachable on a valve casing, and that will securely maintain a packing nut against unscrewing under the turning of the valve stem, is illustrated herewith, and has been patented by Mr. William H. Van Wart, of Stonington, Conn. The tubular neck of a valve casing usually receives upon its exteriorly screw-threaded end an apertured packing nut or gland, between the inner side of which and the end of the neck of the valve casing a suitable packing is employed to make a tight joint. Around a portion of the valve neck, or some other part of the valve, is placed a strap, yoke, or ring, such as shown in the small figure, the ends of which have lugs or ear pieces, through which a thumb or set screw is passed, to draw the ring



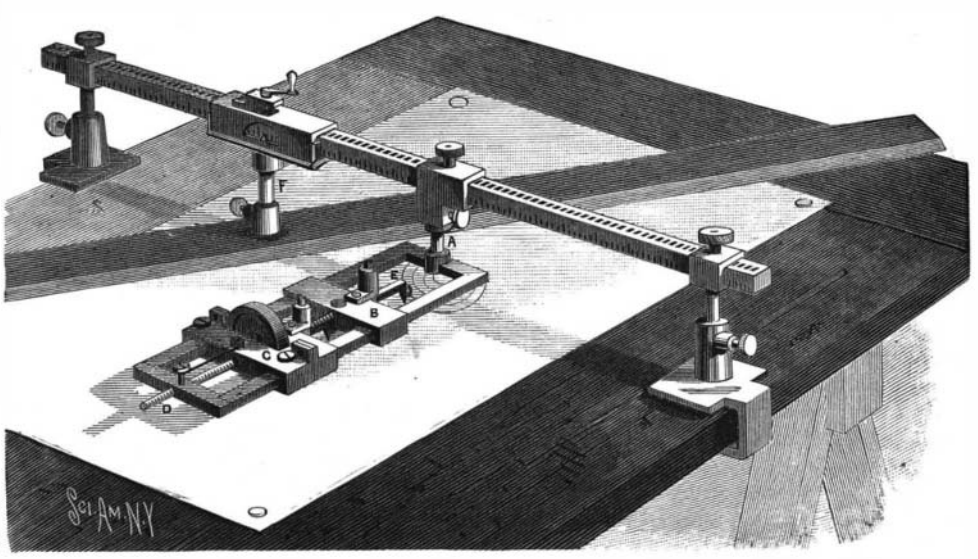
VAN WART'S NUT LOCK FOR VALVES.

to a more or less contracted circumference, and thus firmly bind it against rotation, the strap also having a rigid angular or outward extension adapted to engage one of the flat faces of the rim of the packing nut, preventing the unscrewing of the latter. The patent also provides a modified construction for valves of large size, in which the strap is made in two members hinged together, whereby a certain and easy adjustment and attachment may be secured on the valve casing.

AN IMPROVED DRAWING INSTRUMENT.

An improved instrument especially adapted for drawing section lines, and having an attachment by which ellipses, spirals, and other geometrical figures may be readily produced, is illustrated herewith, and has been patented by Mr. B. F. Hardaway, of Fort D. A. Russell, Wyoming Territory. The clamping posts of the instrument are secured by a set screw, or other suitable device, to the edges of a drawing board, and in each post is adjustably held a vertically sliding rod, these rods supporting above the drawing board a bar having a graduating index on one of its faces. On this bar slides a sleeve, on which is formed a downwardly extending rod, F, to which is adjustably secured a ruler, the sleeve having a pointer in an opening through which the graduation on the bar can be seen, while on top of the sleeve is mounted to rotate a vertical shaft, having on its outer end a crank arm, and on its inner end a bevel gear wheel, the latter meshing into a bevel gear wheel fastened on a shaft revolving horizontally, and formed with a worm meshing into a rack secured to the top of the bar held above the drawing board. The ruler is adjusted at the desired angle on the paper by means of the set screw, and, after the drawing of a line, is moved along any desired distance for the next line, by means of the crank arm extending from the top of the sliding sleeve, such distance being readily read on the graduation scale of the bar, while a device for taking up lost motion insures the holding of the sliding sleeve exactly at the desired point. After the second line is drawn, the operator again turns the crank arm the same distance as before, for making the lines all equidistant, or the distance is varied by turning the crank arm more or less.

The spiragraph attachment is connected with the bar supported above the drawing board by a sliding sleeve, a set screw screwing in the sleeve against the top of the bar, while in the sleeve is held to slide vertically a rod, A, in the lower end of which is held to turn between collars a rectangular frame, having sliding carriages, B C, the former being secured at its middle to one end of a screw rod, D, which passes loosely through the middle of carriage, C, and through the end bar of the frame, to which it can be secured by a screw. The carriage, C, is adapted to be secured to the side bars of the frame at any desired place by set screws, and on each of the carriages is held a drawing pen, as shown at E, so mounted as to be readily held in or out of contact with the paper on the drawing board whenever desired. In the middle of the carriage, C, is mounted a wheel with screw-threaded hub, the threads of which engage those on the screw rod, D, the wheel resting firmly on the paper on the drawing board, and an elastic band, secured by one end to the carriage, C, and by its other end to the end bar of the frame, tends to draw the carriage outward. To draw a parallel spiral, with uniform distances between its coils, the operator places the carriage, B, with its pen directly under the axial line of the rod, A, fastening the other carriage to the frame, with its pen out of contact, and then turns the frame on its fulcrum on the rod, A, whereby the rotation of the wheel in the carriage, C, imparts an outward sliding motion to the screw rod, D, moving the carriage, B, outward, with its pen drawing a spiral, as the frame is pushed around on its fulcrum. To draw a spiral which continually diverges, the carriage, B, is removed from the frame, the carriage, C, placed with its pen under the axial line of the rod, A, and the screw rod, D, secured at its outer end by the set screw to the end bar of the frame, when, by pushing the frame around its fulcrum, an outward sliding motion is imparted to the carriage, C, by the engagement of the screw-threaded axle of its wheel with the screw rod, which motion becomes more rapid as the carriage moves further outward, the wheel making more revolutions in each passage around as its distance from the axial point increases.



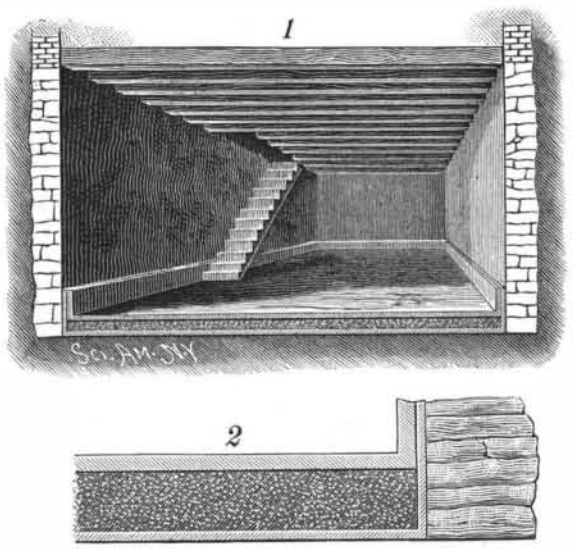
HARDAWAY'S PARALLEL RULER WITH SPIRAGRAPH ATTACHMENT.

Central Pacific.

The Central Pacific has ordered one hundred new locomotives within the last few months, and is building some heavy ten wheel locomotives at the Sacramento shops. The engines have an extended front and straight stack, and weigh 111,500 pounds in working order. Fifteen hundred 34 foot freight cars, of 50,000 pounds capacity, have been added to the equipment lately, 1,000 box and 500 flat cars. The standard rail now used weighs 60 pounds per yard.

A WATERPROOF LINING FOR CELLARS.

A waterproof lining adapted for use beneath pavements in cellars and engine rooms, and similar places, and also in mines and tunnels, has been patented by Mr. Frank J. De Borger, and is illustrated herewith. At the bottom of the cellar excavation is placed a watertight casing, composed of plates of metal, united to form a continuous bottom, and vertical side walls, to fit against the regular masonry walls. Upon this casing is placed a layer or bed of gravel, sand, or dry earth, as shown in the sectional view, Fig. 2, and upon this is laid the usual floor, of cement, wood, or brick,



DE BORGER'S WATERPROOF LINING FOR CELLARS.

with vertical walls to the height of the walls of the metal casing.

For further information relative to this invention, address Mr. T. F. Neville, No. 67 William Street, New York City, or Mr. Frank J. De Borger, Babylon, L. I., N. Y.

Collecting Diatoms.

In an interesting article in the *Bulletin of the Torrey Botanical Club*, Mr. C. Henry Kain discusses the "Diatoms of Atlantic City and Vicinity." Speaking of the bright brown patches of diatoms frequently seen covering the surface of mud, he recommends that they be collected in the following manner: Half fill a bottle with water. Touch one of these brown patches lightly with the tip of the finger, and the diatoms will adhere; then place the finger over the mouth of the bottle and shake. The diatoms are, of course, washed off and remain. By repeating this process again and again, the water finally becomes quite brown. By the time the collector reaches home the diatoms will have settled to the bottom, and the water may be poured off and the diatoms cleaned. It is worth while to examine under the collecting lens every promising patch of brown mud, for very pure gatherings of quite different species may often be collected within a few feet of each other.

The Death of Cleopatra.

Dr. Viaud Grand-Marais, of Nantes, has been holding an inquest on the sudden death of Cleopatra. He rejects the theory that her death was caused by the bite of a viper. She was accustomed to test the effects of various poisons on her slaves, in order to ascertain which caused the easiest death. Having shown that no viper was found in the room of the fair suicide, that her body presented no traces of bites, and that her two maid servants were found dead or dying at the foot of her bed, he comes to the conclusion that her death was caused by carbonic oxide.—*Bulletin General de Therapeutique.*

A Ship of Logs.

We are familiar with the log cabin, but a ship made of logs is something of a novelty. Such a vessel has lately been built in Nova Scotia by Mr. Leary, the owner of the great timber raft that was lost at sea last year. The new log ship is shortly to be launched, and will then sail for New York. Finges Board, N. S., is the little village where the curious boat is now located.

It is constructed of 30,000 logs, varying in size from a pine tree 200 feet long to a short spar 25 feet in length. These logs are placed together in the shape of a ship's hull, and they are firmly bolted, besides being lashed into a compact mass with thirty-five tons of wire rope. The ship is 700 feet long—nearly as long as the Great Eastern—and 65 feet broad and 35 feet deep. It draws about 22 feet of water. All the inside logs are in the rough, but built about it all is a shell of thick, smooth planks, coming to a sharp point at the bow with a heavy cutwater. The bows are very full, and running aft to the waist the ship widens to 65 feet. From there aft the lines follow those of a clipper ship. Six spars about 70 feet high are built into the ship to serve as masts. Five of these masts will be fitted with a heavy yard, which will be rigged with a big square sail. The mizzenmast will be fitted with a spanker. The masts will carry an immense spread of canvas.

The logs are laid in tiers lapping over one another, the whole resting in an enormous cradle built of spiles. A massive chain runs through the center of the logs for its entire length. This chain is made of welded iron, the links being 1¾ inches thick. Aft, a distance of 10 feet, are cross chains, with links 4 inches long and 3 inches wide. These run in all directions, and are clamped on the outside by cross arms of wood. The towing line will be attached to the main chain, and the transverse chains are so arranged that the draught on the main chain binds the whole mass together in a grip that will make it next to impossible for it to go to pieces. The greater the strain on the main chain, the tighter the raft will be held together. Still further precautions are taken by the use of thick wire rope, which will be bound about the logs midway between each cross chain. The raft will thus be bound together by chains and steel wire at every five feet. The mass will be almost as solid as the trunk of a tree. Its weight is estimated at 20,000 tons.

Should the towing steamer, through any cause, drop the ship, the sails will be used to keep steerage way. It is claimed that the driving power of the sails will be sufficient to sail the ship, but this is doubted by sailors. The sails will also be spread whenever the wind is favorable, using them as an auxiliary to the steam power. A comfortable deck house has been built aft for the shelter of the crew, which will be made up of fifteen able-bodied seamen. The New York *World* says the log ship will be towed by the powerful ocean tug M. B. Morse. The Morse has been thoroughly fitted out for the voyage. With favorable winds, Mr. Leary expects the log ship to make the run to New York in seven days. A straight course will be laid from the Bay of Fundy to Long Island Sound.

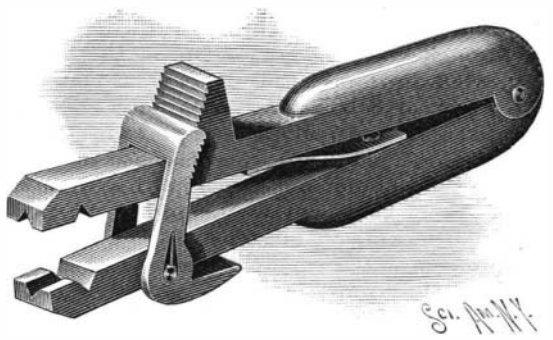
The timbers of the ship, if sawed on the Bay of Fundy, would require a fleet of 100 schooners to transport them to New York. Vessel owners are very antagonistic to the scheme, and the Legislature will be appealed to for the purpose of having a law enacted to prohibit the building and sailing of such craft. The owners of hundreds of schooners and other small vessels that bring lumber from Canada on their return voyages are also bitterly opposed to the shipping of heavy logs in bulk, as the log ship, if successful, will destroy their trade. Dealers who depend on the railroads will also be utterly unable to compete with the lumber brought by the raft. It would take fifty trains of fifty cars each to transport the lumber contained in Mr. Leary's log ship.

The ship will be launched this month, at a time when the tide is highest in the Bay of Fundy. At that time 100 feet of the ship will be in the water, and the supports will be knocked away and the enormous fabric slide gracefully into the water. The cost of this log ship, if landed successfully in New York, is as follows: The timbers cost in Nova Scotia $13,000; the towage will cost $100 per day. The logs can be sold in New York for $50,000.

THE steamer Greenwood, plying between Portland and Peak's Island, is the pioneer boat in electric lighting in that section of the country. The Greenwood is 14½ tons burden and carries 150 to 200 passengers. The "plant" consists of a small upright engine, a dynamo constructed from drawings in the SCIENTIFIC AMERICAN SUPPLEMENT, and eleven lamps. The side lights are 10 candles each, and the head light and one on top of flag staff 16 candles each. The remainder are 10 and 16 candle lamps. The lamp on the stern flag staff stands upright on the top of the same, and shows finely at night. Everything works well, and all agree that the lights are a great improvement over lanterns.

AN IMPROVED WRENCH.

A wrench which may be readily closed to fit a nut or other object, but cannot be opened except by releasing a pawl, is illustrated herewith, and has been patented by Mr. Richard L. Mabrey, of Doniphan, Mo. The head ends of the wrench bars have V-shaped transverse notches on their inner faces, and to the lower bar is pivoted a bail-shaped pawl, the cross bar of which overlaps and engages the upper arm. To insure a proper engagement between the pawl and the upper arm of the wrench, the latter is formed with a lug having a serrated edge, the cross bar of the pawl being also serrated. The pawl has a handle at its lower edge, by



MABREY'S WRENCH.

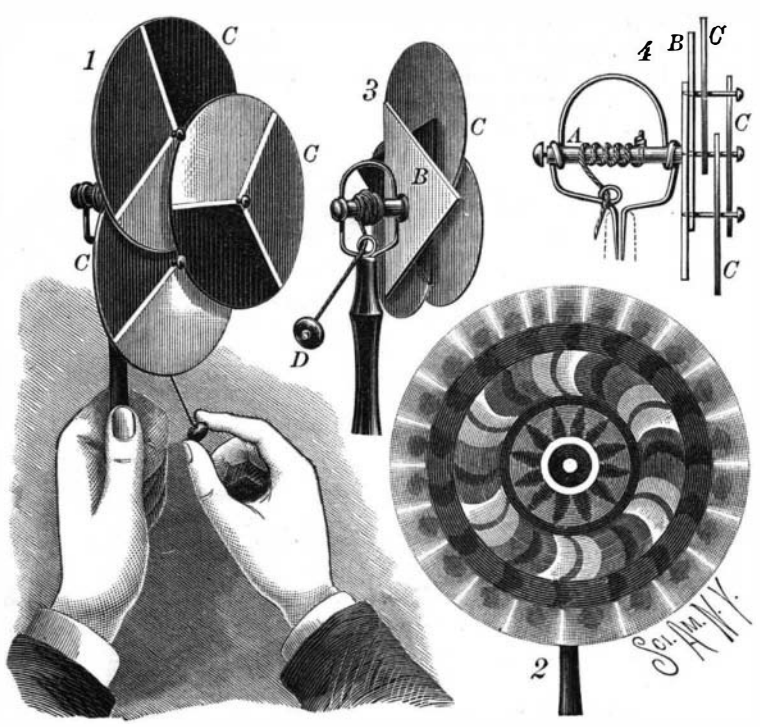
which it may be moved out of engagement with the serrations of the wrench bar, in which it is normally held by a spring secured to one of the studs on which the pawl is pivoted.

NEW CHROMATROPE.

We give an engraving of a novel toy which illustrates some of the phenomena of color. Upon the spindle, A, is secured a star, B, formed of two triangular pieces of pasteboard arranged so that their points alternate. One triangle is red, the other green—complementary colors—which produce white when they are blended by the rotation of the star. In the angles of one of the stars are secured wire nails, which serve as pivots for the three disks, C, as shown in Figs. 1 and 4. Each disk is divided into three equal parts, which are colored respectively red, blue, and yellow. The disks overlap at the center of the star, B.

Around the spindle, A, is wound a cord which passes through the loop formed in the star frame in which the spindle is journaled, and is provided at its end with a button, D. By pulling the cord, the star, B, is whirled first in one direction and then in the other. As the series of disks, C, turn, the colors are blended in different ways according to the relative arrangement of the different sections. All the phenomena of the blending of surface colors are illustrated by this simple toy. At times the center will be a beautiful purple, while the outer part is green. At other times some portions of the color disk presented by the rotating disks are white, showing that a proper mixture of the three primary colors yields white light.

At the instant of the change of rotation from one direction to the other, the arrangement of the disks is such as to present beautiful symmetrical figures. All



TOY CHROMATROPE.

the changes of color in the toy in its normal condition are, of course, accidental.

When it is desired to try the blending of any of the colors, when arranged in a particular way, the disks may be prevented from turning on their pivots by stretching over each disk a small rubber band.

The maker of this simple toy has succeeded in securing colors which produce remarkably good effects.

Fast Ships Wanted in the British Navy.

Although utterly unfit to fight at close action with a belted ship, and running many risks of destruction from raking and other fire, the Blake and Blenheim, by virtue of their enormous speed, 22 knots, will be valuable additions to the naval service, and it is a satisfaction to know that at last we are to have two very fast ships of some sort to outstrip in speed the existing seagoing vessels of every other country. Sir Edward J. Reed draws attention to the waste of public money which has taken place and is in contemplation in the production of ships of insufficient speed. He states his object in drawing attention to them is to show how unwise our experience shows it to be to lay down vessels of a speed which cannot be useful for war purposes, should war arise. I am afraid that the same error is about to be repeated, but I wish to take the sense of naval officers on the question, and to ask them whether, looking to the utter disproportion of our fast cruisers to the services which will be required of them in war, it is or is not wise to go on lavishing money in this way upon vessels not a single one of which reaches a 15 knot speed, and most of which are to be of only about 13 knots at their very best, which means only about 10 knots in regular sea service. In view of the mighty interests concerned, and of the fact that at present £140,000,000 worth of our imports are food, it is incumbent upon all of us to do the best we can to face and to assist in solving the problem of its protection. One effectual way of doing this will be to get all the money allowed by the country and Parliament for the purpose spent upon efficient and speedy ships.—*Captain Colomb.*

Mummies from Mexico.

In the Ethnological Department of the California State Mining Bureau are now on exhibition four mummies, which form the subject of a paper by Dr. Winslow Anderson in a recent bulletin published by the Bureau. These interesting remains were discovered by Signor S. Marghieri on the eastern face of the Sierra Madre Mountains, Mexico, in a cave, the mouth of which had been so skillfully sealed with adobe plaster and natural rocks from the mountain as to almost escape detection. At the extreme end of this natural sepulcher these bodies—a man, woman, little boy, and infant girl, of which no inscriptions or other evidences exist to reveal their race—had been placed with faces turned toward the rising sun. No artificial means of preservation had been employed. They were simply wrapped in burial shrouds, woven of various materials, cotton, hair, and grasses, and their mummification had been brought about by the natural action of the extremely dry atmosphere of that region, which prevents decay. They have dried in the sitting posture, with hands crossed and knees drawn toward the chin, and are remarkably well preserved, the brain, heart, lungs, abdominal and pelvic viscera being intact, and dried to a solid consistency.

The man is large and well developed, with a large head and broad shoulders, but has small hands and feet, with high arched instep. The woman is even better preserved. A heavy suit of hair still remains. Her hands and feet are small, the latter measuring only 8½ inches in length, and her skull gives unmistakable evidence of a high degree of intelligence. The facial angle of the man is 71 degrees and of the woman 69 degrees. The skull of the little boy, who is supposed to have been about seven years of age, is unusually well shaped, and indicative of no meager mental capacity, and the facial angle is 71 degrees. These cranial features are superior to those of the inhabitants of the same region to-day. Moreover, the hair of the woman is soft, silky, and brown in color, wholly unlike that of the Indian races. In some respects these bodies approach the Aztec type; but, whatever the race may have been, it was one of superior development. The mummies were secretly transported from Mexico, to avoid trouble with the superstitious Indians of that locality, and were purchased by Mr. J. Z. Davis, who presented them to the California State Mining Bureau.

A Colorado Line of Two Feet Gauge.

The experiment of building a railroad of two feet gauge was undertaken a few years ago in Massachusetts, but the road (the Billerica and Bedford) was not a financial success, and the rails and rolling stock were removed and laid down in Maine, where a line of some length is now in operation. The first road of this miniature gauge in the West has just been opened in Colorado, running some ten miles from Black Hawk into a mountain mining region. The average grade is about 190 feet to the mile, reaching in some places as much as 264 feet; and curves as short as 90 degrees are operated. The largest locomotive, with tender loaded with fuel and water, weighs only 20 tons, and another is half that weight. This little road carries a good deal of ore, and is expected also to develop a considerable excursion traffic.