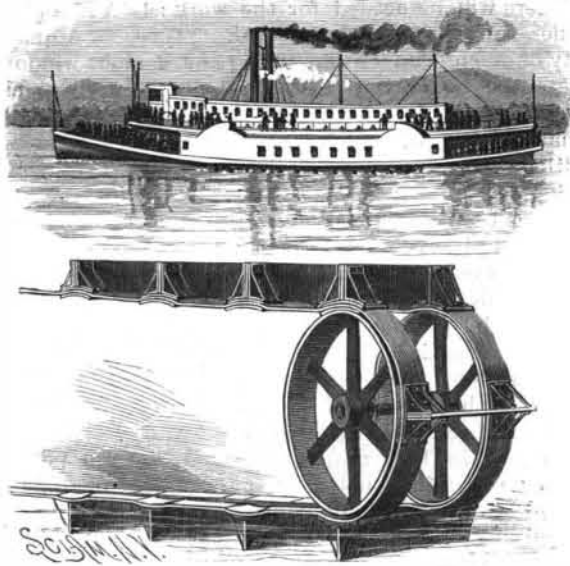


AN IMPROVED PADDLE-BELT.

A special construction of an endless belt armed with paddles, and adapted to run over end pulleys, to give a long, straight stroke in the water, in propelling vessels, is illustrated herewith, and has been patented by Mr. William H. Silsby, of Martin's Ferry, Cal. Beneath the ends of each paddle the belt is bent to the curve of the pulleys, and to this curved portion are riveted or

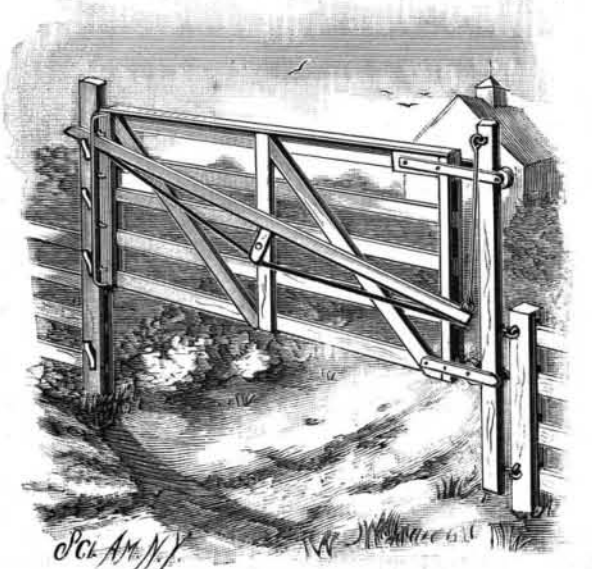
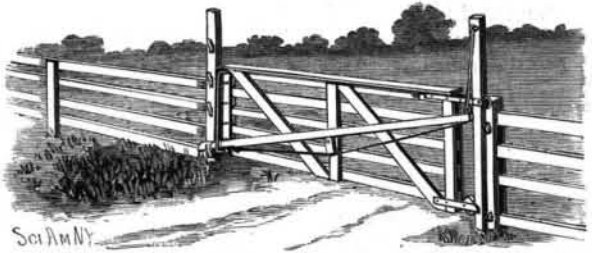


SILSBY'S PADDLE-BELT.

otherwise secured rigid plates, in the shape of cylindrical segments conforming to the pulleys, these plates serving as a base for the rigid attachment of paddles, while causing the bands in passing over the pulleys to embrace them as they would if wholly flexible. The paddles have their feet riveted to the middle part of the plates, and are further strengthened by inclined braces having their other ends secured to the outer ends of the plates, whereby they are firmly held in a position perpendicular to the bands. The straight draught of such a paddle belt gives a large hold on the water, and, where two of them are used on the bottom of a boat, great facility in turning is afforded by running one backward and the other forward.

AN IMPROVED GATE.

The illustrations herewith represent a patented gate of the Pearl Gate Company, of North Lansing, Mich., one of the views showing the gate elevated to allow small stock to pass under. A heel post is attached to the hinge post by means of an eye and staple hinge, and the upper and lower rear corners of the gate are provided with brackets, the upper one of which has an anti-friction roller which bears against the outer face



A LIFTING AND SWINGING GATE.

of the heel post, while the lower one has a similar roller bearing against the inner face of the heel post, these brackets loosely embracing the heel post, so that the gate can be readily raised and lowered. At about the center of the gate a lever is fulcrumed, its rear end being supported by a link from the upper end of the heel post, while the front stile of the gate has a series of staples, and a guide rod or bracket, between which and the gate the free end of the lever projects enough to overlap the latch post, having stops at varying heights, these stops being at different heights from the staples on the gate. As the weight of the gate is sustained by

the lever, it is provided with a truss rod, whereby it may be made lighter. When the free end of the lever rests upon any one of the stops on the front stile of the gate, the latter is prevented from sliding down to the ground, and may be swung upon its hinges. When the gate is closed, the lever should be detached from its rest and allowed to drop to its lowest position. The gate automatically latches itself as the free end of the lever strikes the latch post, the lever being thus thrown off from the stop on the outer stile of the gate, and being caught on the stop of the latch post next below. If it is desired to hold the gate in a higher or lower closed position, for allowing small stock to pass under, such adjustment is readily obtained by placing the free end of the lever in one stop or another, thus moving the gate vertically.

A Four Million Dollar Ship.

A great sensation was recently made at Newcastle-on-Tyne, when the new war ship Victoria was slowly towed from Elswick, down the river and out to sea, by seven steam tugs. The river banks were lined with people on both sides at all the more important centers of population. The voyage was accomplished without any hitch. At the Swing Bridge there were very few inches to spare in the width of the opening, and at one time fenders had to be used to soften down a slight collision. In crossing the bar, thanks to the work of the Tyne commissioners, there was plenty of depth of water, notwithstanding the heavy draught of the enormous vessel. On reaching the open sea several hours elapsed while the compasses were being adjusted, and then the vessel, propelled by her own engines, was quickly out of sight. On arriving at Sheerness, she was taken in charge by the Medway Steam Reserve authorities. Some time will elapse before she is fit for active service, but no efforts will be spared to finish her as soon as possible. Her cost to the country will be over \$4,000,000.

AN IMPROVED APPARATUS FOR EXAMINING ORES.

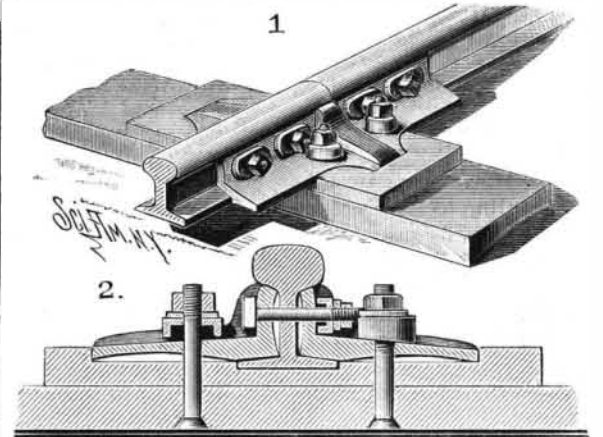
An apparatus for examining rocks, to determine whether they contain metallic ores, has been patented by Messrs. John R. Williamson, of Seattle, Washington Territory, and William W. Hickies, of Oakland, Cal., and is illustrated herewith, one view showing the examination thereby of rocks *in situ*, and the other representing the examination of detached rocks. One pole of a battery is connected with one terminal of a telephone receiver by means of a wire in the usual way, the remaining pole of the battery being connected by a conductor with a brush provided with a suitable handle, while the remaining terminal of the telephone receiver is connected by a conductor with a similar brush having a like handle. In examining rocks in place, the two brushes forming the terminals of the conductors connected with the telephone and battery are drawn along the face of the rock, while the telephone is held to the ear of the operator. If the rocks contain metals they conduct the current, and the movement of the brushes along the rough face of the rock causes variations therein, which are audible through the telephone, there being no sounds produced when the rock contains no minerals. In examining detached portions of rock, the latter are placed upon a conducting plate connected with the telephone through the battery, and the brush at the other terminal is touched to the rock, which, if it contains metal or metallic ores, will cause sounds to be heard in the telephone. Instead of using the conducting plate, the fragments of rock may be examined by being placed upon insulating material, and bringing both brushes in contact with each specimen. Other means of indicating the passage of the current may be employed instead of the telephone receiver, as the operator may place the conductors on his tongue and note the sensations due to the completion of the circuit, or a galvanometer may be employed, or a paper saturated with salt, which will be decomposed by the current, making marks on the paper, although the telephone receiver is preferable from its portability and effectiveness and the ease with which it is managed.

For further particulars with reference to this invention address Mr. John R. Williamson, Seattle, Washington Ter.

A COMBINED TIE, CHAIR, AND FISH PLATE.

A novel construction of tie, chair, and fish plate combined, for holding railway rails in position, and clamping them to the ties, is illustrated herewith, and has been patented by Messrs. Daniel Harrington and Morris A. Keane, of No. 149 Albany Street, New Brunswick, N. J. The chair has a com-

pound recess, in one division of which the rail fits, as shown in Fig. 2, while in the other division fits a horizontal member of an angular fish plate having its under surface partially conformed to the contour of the rail flange and partially concaved, its vertical member being also concaved on its inner bearing surface. The means for binding the fish plate to the rail and to the chain will be readily seen from the sectional



HARRINGTON & KEANE'S CHAIR AND FISH PLATE.

view, the under surface of the sleeper being concaved. When the device is applied simply as a chair for clamping rails at any part of their length, the construction is similar, except that the vertical member found in the fish plate is omitted. The sleeper may be made of any suitable material, but iron is preferred.

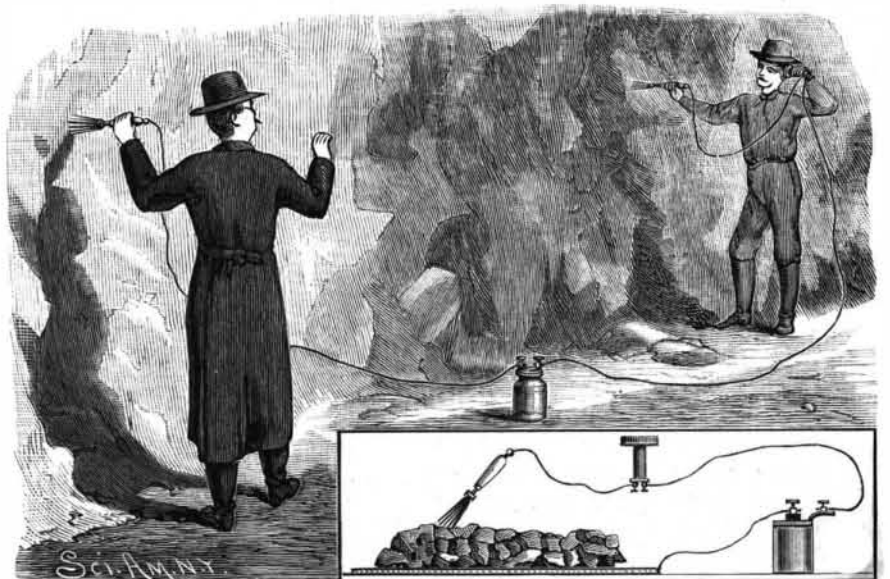
AN IMPROVED FRUIT JAR.

A fruit jar combined with an adjustable ring to complete or form the sealing groove for the cap is illustrated herewith, and has been patented by Messrs. John B. and Robert Johns, of Massillon, Ohio. The jar has a sealing surface blown or formed on the outside of its neck, in such way that it will not have to be taken back to the furnace to form the rim or groove. The cap is preferably made of thin metal, and made to



JOHNS' FRUIT JAR.

slope downward and outward on the exterior of the neck to a point below which is an annular groove, wherein the wax or sealing composition passes under the edge of the cap in closing the jar. The adjustable ring which forms the sealing groove for the cap inclines outward in an upward direction when in place, its ends being preferably made to overlap one another, and the outer end bent outward to form a lip for convenience in opening the ring, which is a spring one, self-adjustable to the jar. The ring is applied to the jar after the latter has been charged with fruit or other contents, the cap being then put in place and the sealing composition subsequently filled in. To unseal the jar the ring is first removed, thereby exposing the wax or sealing composition so that it can be readily knocked or picked off.



WILLIAMSON & HICKIES' APPARATUS FOR EXAMINING ORES.

The Master Car Builders' Committee on Standards and Appliances for the Safety of Trainmen.

The railroad commissioners of the State of New York report that during the year ending September 30, 1887, there were 199 railroad employes killed and 896 more or less severely injured in the performance of their duties. These accidents are classified as follows:

	Killed.	Injured.
Fell from train, engine, or cars, or getting on or off trains.....	48	152
Striking low bridges, switches, tunnels, etc.....	8	9
Coupling or uncoupling cars.....	20	437
Walking or being on the track.....	102	88
Catching foot in frog or between rails.....	4	7
Derailment.....	1	19
Collisions.....	6	40
Other causes.....	10	144
	199	896

According to Poor's Manual, the number of locomotives owned by railroads in the State of New York in 1886 was 2,722, and in the whole country 26,415. It will be quite safe to say that there were ten times as many locomotives in the whole country as there were in New York during the period covered by the railroad commissioners' report. If the average number of persons killed or injured per locomotive is the same elsewhere, the number of casualties to railroad employes in the whole country would be ten times the above figures, or a total in round numbers of 2,000 killed and 9,000 injured.

No pretense is made that this estimate gives the number of employes killed and injured with anything more than an approximation to accuracy. It must be remembered, though, that whatever errors there may be in the reports of accidents to the railroad commissioners, and of the number of locomotives in the country, are errors of omission, and that probably both the number of accidents and of locomotives are greater than reported, which would make the above estimate too low rather than too high. Nevertheless, with any reasonable deduction the record of frightful suffering, pain, and sorrow will be more than sufficient to emphasize the following inquiries, the aim of which is to elicit information that will indicate how the number of such accidents may be diminished.

All railroad officers and employes, whether members of the Master Car Builders' Association or not, are therefore requested to answer the following questions:

1. What defects are there in the present construction of cars and locomotives which cause accidents to railroad employes by falling from trains, engines, or cars, or of accidents of getting on or off trains?
2. What changes could be made in cars or locomotives which would diminish the number of such accidents?
3. What kind of couplers and dead blocks are the most dangerous to employes in coupling cars?
4. What kind of coupler and dead blocks do you think are the least dangerous to employes?
5. Has the introduction of automatic couplers thus far lessened the danger of coupling cars?
6. Would the general introduction of automatic couplers in your opinion diminish the danger of coupling cars?
7. Can you suggest any way of lessening the number of accidents to employes from "walking or being on the track"?
8. How can employes be prevented from "catching their feet in frogs or between rails"?
9. In what way may any other kinds of accidents to employes be prevented or the number lessened?

All railway officers and employes who see this circular are earnestly solicited to answer it, and thus add the weight of their testimony in helping to reduce the terrible sacrifice of life and limb which is annually exacted from our railroad employes.

Soapstone Paint for Iron.

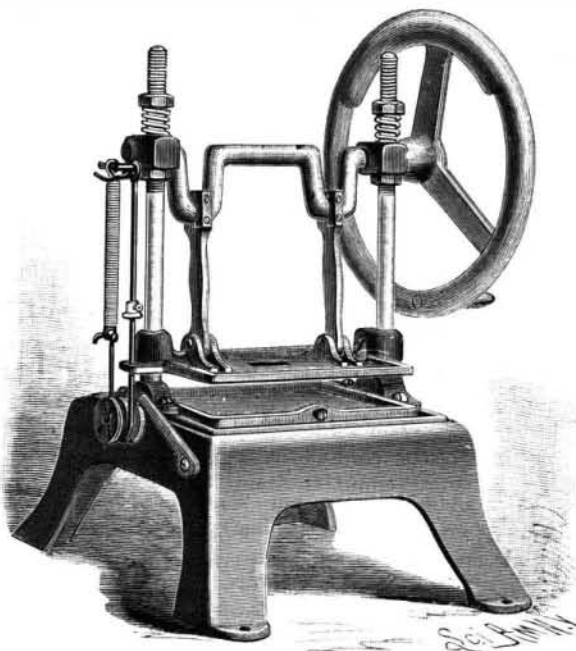
Both in China and Japan, soapstone has long been largely used for protecting structures built of soft stone and other materials specially liable to atmospheric influences. It has been found that powdered soapstone in the form of paint has preserved obelisks formed of stone for hundreds of years, which would, unprotected, have long ago crumbled away. Seeing what a preservative quality this material has, it is specially of interest to shipowners to learn that Mr. Goodall has, in the course of many experiments, "found nothing to take hold of the fiber of iron and steel so easily and firmly as soapstone." For the inside painting of steel and iron ships, it is found to be excellent. It has no anti-fouling quality, but is anti-corrosive.

A Hero of the Throttle.

In the recent accident at Huntington, says the Philadelphia Ledger, Engineer Robert Gardner, perceiving that a collision between his own train and another was inevitable, stayed at his post, kept his hands on the throttle and brake, and so met his death. While being lifted from the wreck, he asked if any of his "passengers" had been killed, and when informed that they had all escaped, he said, regardless of his own mortal hurt: "That's good, lay me down. Goodby, boys."

AN IMPROVED SELF-INKING PRINTING PRESS.

A press which has a revolving bed adapted to serve as an inking pad upon one face and platen on the other face is illustrated herewith, and has been patented by Mr. Thomas H. Cole, of 396 Broadway, East Albany, N. Y. The rubber or metal type are firmly fixed, face downward, on the under surface of the type carrier, which moves up and down between the vertical standards as the crank shaft is operated by the hand wheel. Centrally under the type carrier is journaled a block,

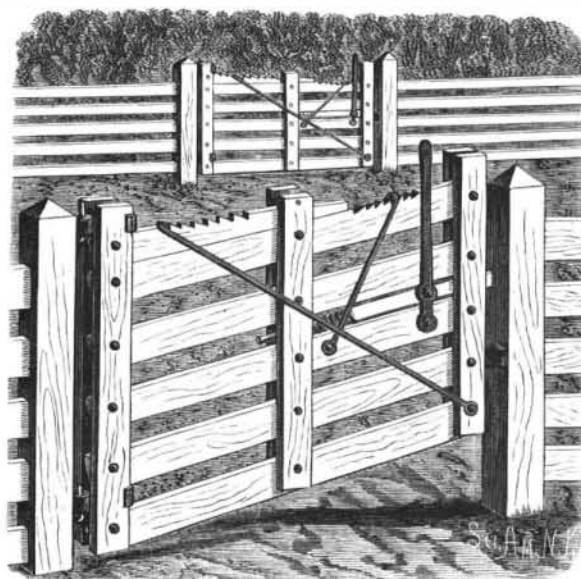


COLE'S PRINTING PRESS.

upon one trunnion of which is keyed a grooved wheel, around which passes a cord attached to one end of a spiral spring, the other end of the cord being fastened to the end of the type carrier, the arrangement being such that on each upward motion of the carrier the block is caused to make one-half of a revolution, remaining stationary on the downward motion. One side of this revolving block forming an ink pad, the type on the carrier are inked by one down stroke. As the carrier rises, the other side of the block is presented, on which the card or paper to be printed is placed, when the impression is given by the next down stroke, the following reversal of the revolving block, to present the inking pad uppermost, operating also to deposit the printed matter in any suitable receptacle beneath the revolving block.

AN IMPROVED GATE.

A gate adapted to open fully sidewise, or to afford a partial opening below the gate, is illustrated herewith, and has been patented by Mr. Judson N. Hatcher, of Americus, Mo. Its longitudinal rails are pivotally connected to three pairs of uprights, and a metal rod, bent double to form a stirrup, is pivotally connected to the lower outer corner of the gate, its upper cross-bar being adapted to engage any one of a series of notches or teeth on the upper edge of a board pivotally held on



HATCHER'S GATE.

top of the gate between the inner uprights. This board moves freely on the top rail as the gate is raised or lowered, the stirrup rod engaging the different notches to hold the gate in a raised position. A similar stirrup rod, pivotally connected near the middle of the gate, is adapted to engage notches or teeth in the upper edge of the outer part of the top rail of the gate, the engagement of both stirrups distributing the strain and increasing the strength of the gate. The gate latch is surrounded by a spiral spring on its inner end, to hold the latch in its outer position, the latch being fulcrumed on one of the gate rails.

[BOTANICAL GAZETTE.]

How to Make Leaf Prints.

Several years ago, I devised a method of taking leaf prints of marked beauty, and a specimen of the work recently sent to Dr. Gray elicited the reply: "It is a new way. Better send account of it to *Botanical Gazette*," etc. I do so, prompted by the belief that the method may be of actual usefulness to the botanist, as well as a refining recreation for those who love nature "on general principles."

There will be needed for the work: 1. A small ink roller, such as printers use for inking type. 2. A quantity of green printer's ink. 3. A pane of stout window glass (the larger the better), fastened securely to an evenly planed board twice the size of the glass. A small quantity of the ink is put on the glass and spread with a knife, after which it is distributed evenly by going over in all directions with the ink roller. When this has been carefully done, the leaf to be copied is laid on a piece of waste paper and inked by applying the roller once or twice with moderate pressure. This leaves a film of ink on the veins and network of the leaf, and by placing it on a piece of blank paper and applying considerable pressure for a few moments, the work is done, and when the leaf is lifted from the paper, the impress remains with all its delicate tracery, faithful in color and outline to the original.

To get the best results, however, several points must be carefully noted. Get a quarter or half a pound of dark green ink, which is put up in collapsible tubes, costing from 50 cents to \$2 a pound, according to quality. As sold, it is invariably too thick for this purpose, and should be thinned by adding several drops of balsam copaiba to as much ink as may be taken on a salt spoon.

Much depends on the proper consistency of the ink. In inking, the leaf is apt to curl on the roller, but it should part readily from it. In case it sticks tightly, the ink is too thick. Take care that the ink is evenly distributed on the glass and roller, as it is essential that each part of the leaf receives an equal coating of ink. If the leaf is large, ink it part by part, keeping the roller supplied frequently. A roller three inches long, costing 40 cents, will answer for all small leaves and branches of plants. (Clean the roller with benzine after using.) If the leaf is finely veined, the lower surface makes the better print, but if the veins are coarse and large, the upper surface may be used. If the specimen is fleshy or brittle, allow it to wilt until it becomes more pliable, or, if necessary, it may be pressed and dried first. In most cases the best copy is obtained after taking one or two impressions, as the leaf takes the ink better after several applications. A good quality of unsized paper that is made slightly damp by putting in a cellar several hours before using is best for general work, but in other cases well sized paper will take a copy that will allow a foliotype (may I coin the word?) to bear inspection side by side with a good lithograph. I find a copying press very valuable in making the impression, especially if the leaf is at all coriaceous. If it be soft, it should be covered with a few thicknesses of newspaper. If it is irregular in thickness, paper may be laid over the thin parts, so that equal pressure is received. This is necessary with all leaves that have thick stems. If the leaf or branch is very irregular or delicate, or in the absence of a press of any kind, the specimen may be covered with several layers of paper, and held in place with one hand while the pressure is applied with the thumb or palm of the other hand, as required.

These particulars are as complete as practicable. Experiment will lead to many improvements in details. Employ tact and neatness, and you will be surprised at the result. For illustrating monographs and similar papers where the number is too limited to warrant an expensive lithograph, for identifying a rare specimen, or as an adjunct to an herbarium combining portability, unalterability, and beauty withal, the method seems particularly fitted. But aside from this, others may find a delightful and instructive recreation in taking prints of the entire flora of the old farm, the trees of a certain grove, the native annuals of a county, the ferns of a State, or any other special field that seems most inviting. Such copies may be taken in a blank book suited to the purpose, or, better, take them on single sheets of uniform size, as in this way imperfect copies may be thrown out, and when the work is completed they may be named, classified, and bound, making a volume of real value and worthy of just pride. I would esteem it a favor as well as a pleasure to hear personally from any who may employ this method in any way, the coming season, concerning the progress of their work, with its attendant imperfections and successes.

HORACE M. ENGLE.

Marietta, Pa.

Silver Plating Solution.

Dissolve in a pint of distilled water 50 grains of silver nitrate and 8½ oz. av. of potassium iodide. Employ a current of moderate strength. When a sufficiently thick deposit has been obtained, wash the object with a solution of potassium iodide in water (1:4), then with pure water, and burnish.