

New Car Signal.

The Providence & Worcester Railroad has been supplying its cars with an apparatus enabling the conductor to signal to the engineer by blowing the whistle from any portion of the train. The appliance is described as being somewhat similar to the automatic air-brake, and consists of a pipe running underneath the cars, with couplings at either end. Attached to the pipe at one end of each car is a smaller pipe running to the top and across to the center, where a valve is fixed. Over this valve is the hole for the signal rope, which is attached to the valve. When the conductor wishes to signal he pulls the rope, which runs through the car, the same as he formerly pulled the bell rope. This opens the valve, the air escapes, and the whistle is sounded by the release of the air from the pipes. The advantage of the new arrangement is readily apparent. With a long train the conductor was formerly obliged to give a long pull at the bell rope, oftentimes bringing it half way to the floor of the car, and even then was not sure that the bell rang, or that it responded to his signal as he wished it to do, while, as a matter of fact, it often did not respond. Now he has only to pull a rope the length of the car at most, and can readily tell whether or not the valve responds, knowing that if it does the whistle is giving the desired signal to the engineer. In case one of the cars in the train is not provided with this new arrangement, the bell-rope is hitched as usual, and if the conductor wishes to signal from that car it is simply necessary to pull the rope, thus opening the valve in the next car. A number of the cars of the above road are said to have been fitted with the new arrangement, which, it is understood, will be applied to all.

NEW POTATO DIGGER.

We give an engraving of an improved potato digger recently patented by Mr. Charles W. Dutcher, of St. Andrews, New Brunswick, Canada. This machine is provided with a share attached by hinged connection to the main frame, and capable of being elevated or depressed by means of a lever near the driver's seat. The share is ribbed longitudinally in the middle to thoroughly break up the hills of potatoes, and is provided with a slotted rear extension, over which the potatoes are crowded on their way to a shaker pivoted at the rear of the share and capable of lateral motion.

Above the share there is a scraper for clearing the ground of weeds, potato tops, stones, etc., to prevent them from entering the separating devices and becoming mixed with the potatoes; above the share there is a paddle wheel driven by a chain from a sprocket wheel on one of the drive wheels. This paddle wheel pushes the earth and potatoes backward to the separating bars. The separator shaker consists of a number of bars bent at their rear ends toward the right hand side of the machine, and having a downward offset to facilitate the discharge of potatoes. The left hand side of the shaker is provided with a rim that prevents the potatoes from being discharged on that side, and so insures a clear track for the horses and machine on the next round.

The shaker receives its motion from a zigzag cam carried by one of the drive wheels, and its motion is more rapid toward the discharge side of the machine than it is toward the opposite side, the object being to insure a uniform and proper deposit of the potatoes after they are raised from the ground and cleaned.

The raising and lowering of the main frame together with the share is effected by turning the tongue in its socket by means of the hand lever before described, and by the same means the share is raised sufficiently high to clear the ground when it is desired to transport the machine from one field to another.

Another lever is provided for throwing the sprocket wheel that operates the paddle wheel in and out of gear.

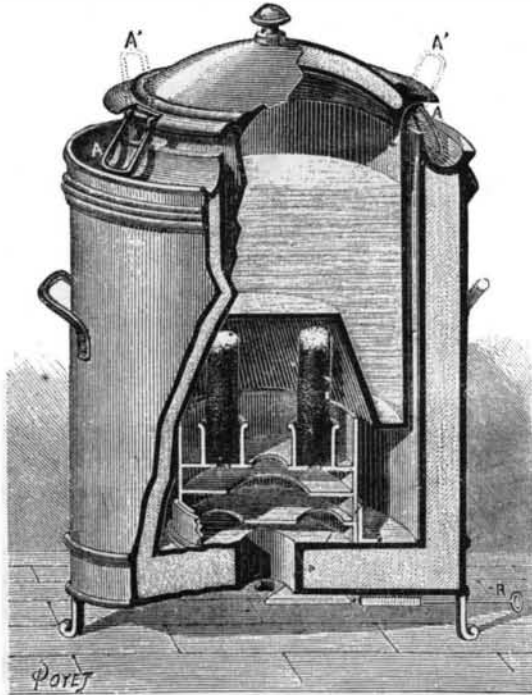
A guard consisting of a curved plate of iron is placed at the rear of the paddle wheel to protect the face of the driver from earth that might otherwise be thrown in his face. This machine is simple in its construction, rapid in its operation, and deposits the potatoes in a clean row on the surface of the ground, so that they may be readily picked up and placed in the baskets.

THE HUDSON RIVER POWER and Paper Company have completed a new dam across the Hudson River at Mechanicsville, N. Y. It is 1,000 feet long, 16 feet high, 18 feet wide at base and 8 feet at top, with its canal it has cost \$200,000. It will furnish 4,000 horse power.

LABORATORY APPARATUS FOR HEATING WATER.

The accompanying cut represents a very useful little apparatus for laboratories that are unprovided with gas, and in which the heating of water by alcohol would cost too much. It is called the "American" kettle, and is heated very cheaply with an asbestos carbon. The laws of thermics are applied in this apparatus very intelligently.

The furnace consists of a double jacket, filled with materials that are poor conductors of heat. Above the aperture in the bottom for admitting air there is a small sheet iron fire-pan, having a double bottom pierced with alternating holes, so as to prevent the ashes from falling outside, and to heat the air of combustion better. In this fire-pan there

**APPARATUS FOR HEATING WATER.**

are fixed one, two, or several asbestos carbons, according to the number of holders. The boiler, the bottom of which is concave, descends on the fire-pan in such a way as to allow the escape of none of the heat that acts within the hollow part. A very thin annular space suffices for the draught. With two carbons, of 100 x 70 x 25 millimeters, three liters of water may be caused to boil in thirty minutes at an expense of ten centimes; and the heat may be kept up seven or eight hours on lowering the kettle and closing the lower register, *r*. The handles, *A*, of the kettle are calculated to give just the draught necessary when, on being turned down (as in the cut), they raise the apparatus on its furnace.—*La Nature*.

New Journal Bearing.

A recent improvement in linings for journal boxes, for car axles, and other purposes, of which Mr. Ferdinand E. Canda, of 52 William street, New York, is the author, consists in taking advantage of the well-known unguentous or anti-friction qualities of mercury. He makes an amalgam of tin in which any of the well-known metals or alloys used for bearings are employed as constituents with mercury.

While the mass is in a plastic state it is subjected to pressure to expel the superfluous quicksilver, and then allowed to harden; the journal box is then ready for use. Plumbago or other suitable anti-friction substances may also be introduced into the amalgam if desired. It has been found by experiment that this new journal box metal has superior qualities as an anti-friction substance, and it promises to form an economical, durable, and most useful material for railway axles, and bearings of every description.

Meteors.

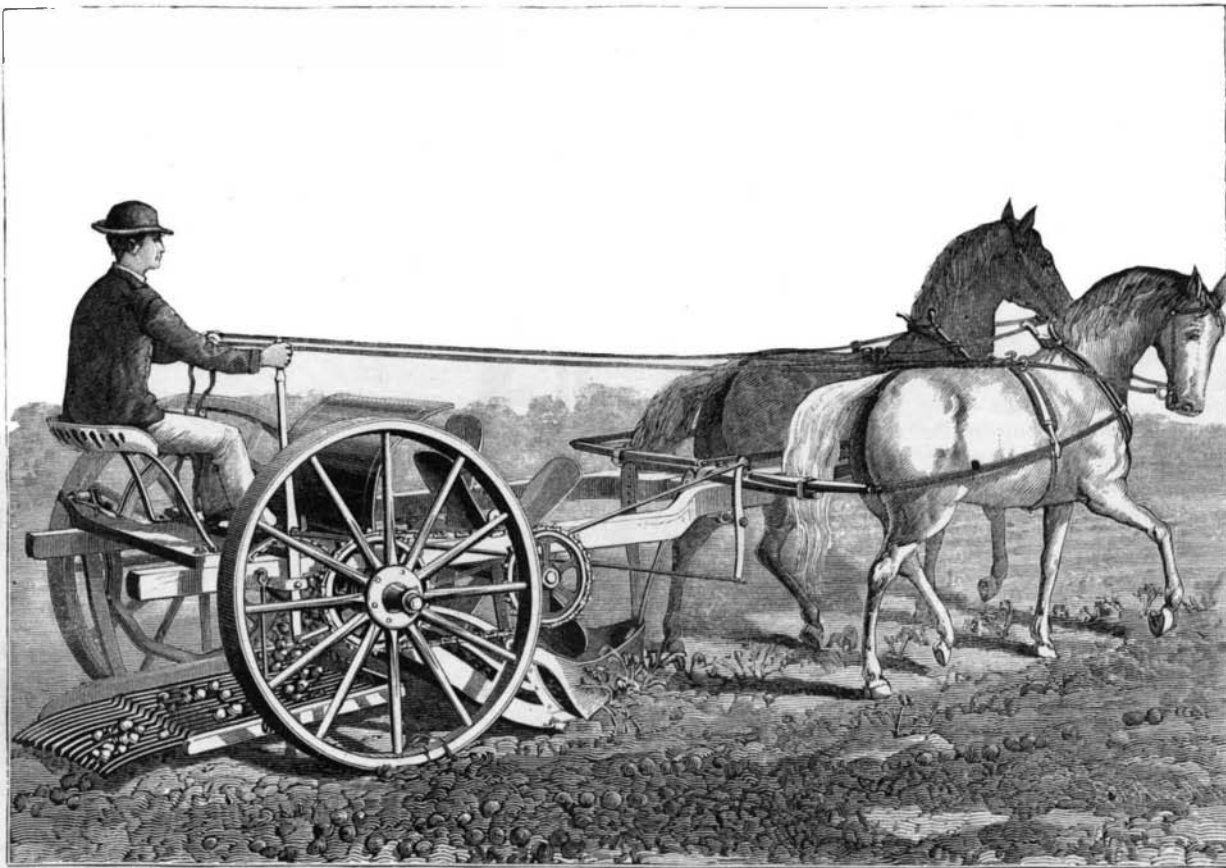
In a letter to a friend in Boston, an officer of the United States steamer Alaska gives an account of a meteor which was seen from the ship on the evening of December 12, 1882, a few minutes after sunset in latitude 38° 21', longitude 134° 7'. All at once a loud, rushing noise was heard, like that of a large rocket descending from the heavens with immense force and velocity. It proved to be a meteor, and when within ten degrees of the horizon, it exploded with much noise and flame, the fragments streaming down into the ocean like great sparks and sprays of fire. The most wonderful part of the phenomenon then followed, for at the point in the heavens where the meteor burst there appeared a figure shaped like an immense distaff, all aglow with a bluish light of intense brilliancy. It kept that form for perhaps two minutes, when it began to lengthen upward, and growing wavy and zigzag in outline, diminished in breadth until it became a fine, faint spiral line, at its upper end dissolving into gathering clouds. It remained for about ten minutes, when it began to fade, and finally disappeared.

The captain of the Bark Gemsbok, arrived at this port from Auckland, December 27, reported that on October 9, during a southwest gale and thick snow squall, a ball of fire passed across the ship, injuring three seamen and breaking both gunwales, and ripping the planks from the stern of the starboard boat, and exploded about twenty yards from the ship with a loud report, sparks flying from it like rockets. There was no lightning or thunder at the time.

A large and brilliant meteor was seen at Concord, N. H., on the afternoon of December 20, between four and five o'clock. It passed across the northern sky from west to east, and was as plainly visible as meteors usually are after dark.

Improvements in Letter Copying.

The process utilizes the well-known glue plate, consisting of glue, water, and glycerine, but with rather more glue than in the hektograph. For writing, a strong alum solution is used, colored slightly with an aniline color to render it visible. The glue plate is moistened with a sponge, and after a few minutes the written paper to be copied is laid down upon it; in taking it off after a minute or two, the characters are seen to be etched or engraved in the glue. By means of a caoutchouc roller a little printer's ink is spread over the plate. Impressions may then be taken off on slightly damp paper. The ink roller requires to be passed over previous to each impression being taken. Herm O. Lehn, of Charlottenburg, has also recently patented an improved copying apparatus, in which a specially prepared moistened paper is stretched in a frame, the original writing is placed upon it, and left for one to two minutes; after removing it again, the negative or prepared paper is spread over with ink, and the copies are taken. The following process is patented by Komaromy in Buda-Pesth: The follow-

**DUTCHER'S POTATO DIGGER.**

GLASS SHINGLES.—The *Brick, Tile, and Metal Review* reports a new use of glass for shingles. It is claimed that glass roofing is at once better, more durable and cheaper than slate. The glass is usually opaque, but may be translucent or clear as desired. The exposed parts of the shingles are corrugated. The shingles lap at the sides, are closely interlocked, and one rivet suffices for a pair of shingles. It takes but 150 of these shingles 8 by 12 inches to cover a square of 100 square feet, the waste is so small; whereas of slates of the same size 800 are required.

ing mixture is painted over paper impervious to water—1 part gelatine, 5 glycerine, 0.2 Chinese gelatine, and 1 water. The manuscript is written with the following solution—100 parts water, 10 chrome alum, 5H₂SO₄, 10 gum arabic, and then laid on the first paper. An aniline color solution is now poured over it, and the excess removed with silk paper. Those parts which have been touched by the prepared ink become hard and incapable of taking up the aniline color solution, and the remainder becomes deeply colored. By placing clean paper over it, negative impressions are obtained.