

**New Inventions.**

In a new Process of Making Ice, the floor of a tank is flooded with water, which is allowed to freeze. A quantity of snow is spread upon the ice thus formed, and the surface of such layer of snow is sprinkled with water to form an icy crust thereon. Water is then admitted to cover the snow and allowed to freeze. Another layer of snow is spread upon this second body of ice; and so the operation goes on until the tank is full of alternating layers of ice and snow. The ice layers may be a foot or more in thickness, but the snow layer will be as thin as practicable. The snow layer enables the ice to be easily cut up into pieces of any required size. Patented by Mr. A. C. Call, of Algona, Iowa.

Mr. M. T. Durkin, of New York city, has invented an improved Skylight, in which the glass-supporting bar is made of sheet metal, and the cap is secured by a peculiar arrangement of clips. No putty is required, and the arrangement is neat and sufficiently strong.

Mr. W. S. Montgomery, of Marshalltown, Iowa, has invented a combined Lock Bolt and Handle, consisting of a combination of a pivoted handle and a connecting link with a sliding bolt, the handle and link being arranged so that by swinging the handle on its pivot the bolt may be moved in or out.

A combined Chair, Cot, and Crib, all in one piece of furniture, is the invention of Mr. H. C. Hayman, of Van Buren, Ark. The device is readily adjusted to perform either of these functions.

Mr. F. Goff, of Chicago, Ill., the inventor of an improvement in the Manufacture of Boots and Shoes, employs a waterproof filling composed of fine particles of cork and rubber mixed together, and applied to a boot or shoe so as to fill the space between the outer and inner sole.

An improved Clothes Line Hanger, patented by Messrs. G. S. Sayers and T. Galligan, of Hyde Park, Pa., is so constructed as to permit the line to be readily detached, and by adjusting the bearing of a pulley, by means of a screw, the slack of the rope may be taken up as required.

Mrs. M. Bowie, of Houma, La., has secured by patent the formula of a Remedy for Pneumonia, Coughs, Colds, etc., which she claims to be unusually efficient.

A new patent Bit for Horses, intended as a cure for shying and bolting, has been invented by Mr. J. H. Robinson, of Manchester Bridge, N. Y. The cross bars of the bit have points which are protected by arched springs until the side pressure forces the points to project through slots in the springs and pierce the horse's mouth. The inventor thinks that a little experience with this bit will enable a horse to be driven safely with an ordinary bit.

Mr. C. A. Kirtland, of New York city, has invented a Plate Glass Face Protector, for screening off the heat from cooking ranges, etc., while permitting the vessels on the range to be seen. The frame containing the glass is pivoted and counterbalanced in such manner as to remain stationary in any position.

An Umbrella Holder, patented by Mr. J. H. Bowers, of Cowan, Tenn., is an arrangement intended to support an umbrella and permit the free use of both hands. It consists of a belt carrying a socket in which the umbrella stick is held, and a chest strap supporting it above, in connection with a single shoulder strap.

Mr. J. Bowman, of Somerset, Ohio, has introduced a number of improvements in the Running Gear of Buggies and other vehicles, which are intended to lessen the expense of manufacture and to allow the stays to be put on and taken off without taking the gear apart.

A new Percussion Shell, invented by Mr. J. M. Urquhart, of Jefferson, Tex., is made in independent sections screwed together and connected by a fuse so as to furnish a number of successive explosions. The tapering point is also charged with powder, and has a number of anvils for caps, inclosed by an outer sheet metal case which explodes the caps on striking an object. Mr. Urquhart has also invented a hand grenade, which may be thrown from a balloon, and which is exploded in the same manner by the yielding of its sheet metal case.

Mr. E. Ridge, of Frankford, Pa., has invented an envelope for Transmitting Samples of flour, sugar, tea and other substances at third class rates through the mails in such a manner that the contents may readily be inspected by the postmaster. It has a supplementary piece gummed to it, inside, and furnishing two end flaps, one of which is sealed in mailing and the other left for resealing after examination by the postmaster.

A new Reverberatory Furnace for metallurgical operations has been invented by Mr. W. Mann, of Newcastle, Pa. It belongs to that form of reverberatory furnace in which the fuel is charged first to one compartment of the furnace, where the gases are partially driven off, and the remaining coke afterward pushed into the main fire chamber. The improvement consists in combining with an ordinary furnace a supplemental furnace and retort, arranged in front of the fire chamber, which retort opens laterally into the fire chamber, and the supplemental furnace opening also into the fire chamber through the retort, and having in the same, beneath the retort, a slow fire with little draught.

Mr. A. A. Danzig, of New York city, has obtained a patent for an improved arrangement of Underwear for Women, greatly simplifying the same.

An ingenious Trundling Toy, invented by Mr. G. W. Craig, of Baltimore, Md., consists of a hoop or wheel having a forked pendulum or bar attached to its hub, and carrying an automaton and bell, or signal, which are so applied

that they are respectively moved and sounded as the hoop revolves. A forked handle is used to direct and roll the hoop.

Mr. M. Powe, of Phillipsburg, N. J., has made improvements in the construction of the Fifth Wheels of Vehicles, by which, it is claimed, the forward end of the vehicle body will be firmly supported in any position of the fore wheels, the device being light and strong, with wide bearing surfaces, and a secure locking arrangement of the king bolt.

Mr. A. Zerban, of New York city, has originated a convenient Sample Card for exhibiting silks, jewelry, laces, etc., which permits the ready removal, exchange, or adjustment of samples, thus making it possible to rearrange the latter so as to observe the effect of new combinations and contrasts of colors and patterns.

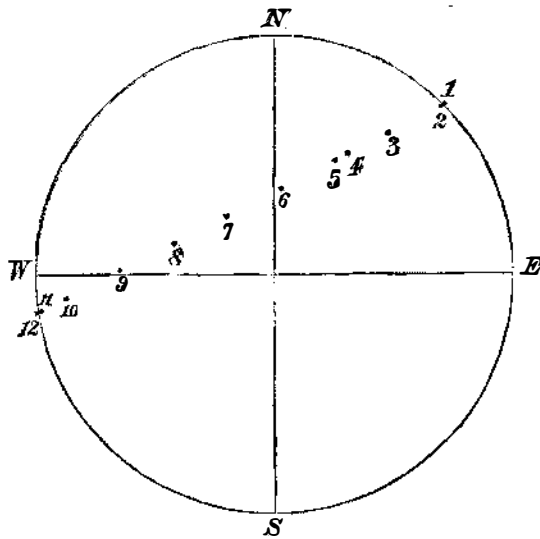
An improved Sandal, for the protection of the feet in wet weather and as a substitute for ice creepers to prevent slipping, has been invented by Miss A. M. Woodhull, of Freehold, N. J. The sole is made of wood, cork, or leather, and has on its under side a piece of rubber which keeps the moisture of the ground from the foot. The sandal is held in position by a toe tip, a strap buckled over the instep, and a wire loop around the heel.

In a new Railway Switch, invented by Mr. R. Gray, of Bloomington, Ill., the improvement consists chiefly in attaching the ends of the switch rails to the ties or sleepers, leaving the body of the rails free or movable and in combining with them a device by which they can be bent or sprung laterally, in order to cause, by centrifugal action, a train of cars to continue on the main line or pass to the side track, as may be desired. Suitable means are provided for operating the switch rails and locking them in either position, which result is effected by an ordinary switch lever, or through the medium of devices attached to the locomotive. The invention further consists in combining the flexible switch rails, fixed at their ends only with tapered and fixed side and main track rails, which are preferably extended past the ends of the switch rails.

**OBSERVATIONS ON THE TRANSIT OF MERCURY OF MAY 6, 1878.**

MADE BY J. WALTER WOOD AND ALFRED M. MAYER, On the slope of South Orange Mountain, opposite Montrose, N. J.

These observations were made by projecting the image of the sun on a screen carried by a light frame attached to the eyepiece of the telescope. On the screen were drawn



POSITIONS OF MERCURY DURING THE TRANSIT.

two lines at right angles and parallel to the edges of the board. Around the intersection of these lines was drawn a circle of 3 1/4 inches in diameter. The image of the sun exactly fitted this diameter. The aperture of the telescope is 3 inches.

Before each observation a level was placed on the upper edge of the screen, and thus one of the lines on the screen was made truly vertical. Of course, at apparent noon this vertical line and the meridian hour circle were coincident. The point of first contact on the circle was determined in reference to the vertical drawn across the circle, and this place was marked. The top edge of the screen was leveled two minutes before the expected time of contact.

The accompanying figure shows the position of Mercury, marked 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12. Number 1 is first contact, 2 is second contact, 11 is third, and 12 is fourth contact. The New York time of the positions of Mercury corresponding to the above numbered loci is as follows, according to our observations:

1	.....	10h.	17m.	12sec.
2	.....	10h.	19m.	35sec.
3	.....	11h.	17m.	00sec.
4	.....	12h.	5m.	04sec.
5	.....	12h.	17m.	00sec.
6	.....	1h.	17m.	00sec.
7	.....	2h.	17m.	00sec.
8	.....	3h.	17m.	00sec.
9	.....	4h.	17m.	00sec.
10	.....	5h.	17m.	00sec.
11	.....	5h.	46m.	03sec.
12	.....	5h.	48m.	12sec.

As the line N S was always vertical it followed that the

north point of the sun was in a different position in reference to the line N S at successive observations. These various positions of Mercury in reference to the vertical were, after the transit, reduced in reference to the N and S points on the sun, and in that manner the path and positions of Mercury were obtained in the accompanying figure.

About the middle of the transit we took off the screen, and looked at the limb of the sun through the ocular and a colored glass (London fog). The limb of the sun was brought to a sharp focus. On bringing Mercury into the center of the field he appeared with a hazy border, and we did not succeed by any adjustment in getting a sharp definition. This would seem to indicate an atmosphere surrounding the planet.

The size of Mercury was determined by drawing a series of small circles till one was made which exactly contained the disk of the planet. We thus found that the diameter of Mercury was 1/150 of that of the sun.

**The Mississippi Jetties.**

A report is going the rounds of the press that Captain Eads has asked to be released from his engagement to create a channel of thirty feet through the jetties, and has abandoned the undertaking as a failure. This report rose from the fact that the Captain is now in Washington advising that a modification of the plan be made, which will not require the 30 foot channel to be more than 100 feet in width. With such width, the 24 foot channel would probably be not less than 400 feet wide, and the 22 foot channel about 500 feet. The act under which Captain Eads is operating requires a channel nowhere less than 30 feet deep for a width of 350 feet, and it is thought that to create such a width of 30 feet water between the jetties will be injudicious and tend to injure them. Captain Eads expressed this to the committee when the original bill was being drawn, and he is confirmed in his opinion by observation at the jetties, and therefore proposes the modification referred to above. As an increase of the flow into the pass can be readily obtained, not one tenth of the whole discharge being used, it remains entirely for the government to say whether the stipulated size shall be adhered to or not. There is now a depth of 23 1/2 feet in the whole length of the channel, and in one part a hollow of 80 feet in depth has been created by the current through the jetties. By the terms of the law the contractor has until September of next year to create a channel of 24 feet deep, but so fast has the work advanced that it is probable that a channel 250 feet wide, of a depth of 24 feet, will be obtained during this month, as but 3,740 cubic yards of material is in the way of its realization.

Captain Eads also asks for a modification of the mode of paying him for the work done. Upwards of 80 per cent of the work required to complete the jetties has been done, and less than 20 per cent of the contract price has been paid by the government. The delay in payments under the present act is so great that it is impossible to push the work as rapidly as the public interests require. The work is now so far advanced and the success so pronounced that it is for the interests of the government and the country that the work shall be pushed with the utmost vigor to such a point as shall insure the utmost efficiency of action in increasing the capacity of the channel. The board of engineers to whom the question of the modification of the terms of the act was referred approves of it, and it would certainly seem to be good policy to give Captain Eads all the facilities he needs in forwarding the work, due regard being had to the proper progress of the channel, that the money be not advanced faster than the work is performed and the permanent depth of the water assured.

**Extending American Commerce.**

The agitation of the subject of extending our commerce to South America has had the effect to start two lines of steamers from New York to Brazil, touching at intermediate ports, and a line will soon be put on from New York to Brazil. These lines, it is hoped, will enable us to successfully compete with the Europeans for the large and constantly increasing trade of South America. A line of steamers is also advertised from New York to the Azores, which will soon be extended to the west coast of Africa. In addition to these efforts to extend our commerce, Congress has under consideration the Watson expeditionary survey of a railroad from our colony of Liberia one or two thousand miles into the interior of Africa, with the view of opening up our trade with these populous regions; the road should be built to connect with lines of steamers running to our ports. Great Britain has now two lines of twenty large steamers to Sierra Leone, Liberia, and the west coast, and it is hoped by our railway and steamers to divert a large share of this trade to the United States. It may be objected that the people of Africa are of a much lower grade of civilization than those of South America, and that therefore their trade would be comparatively small; but it should be considered that the Africans number nearly six times as many as the inhabitants of South America, and that were there means of supplying them with our manufactures a large trade would doubtless spring up as they produce many articles which we could profitably take in exchange for our commodities. It is to be hoped also that our colony of Liberia, now increasing with considerable rapidity, will help to extend the trade with that region, and that the colony itself will be helped by the opening up of the country by the railroad and shipping, and its resultant commerce.