RECENT INVENTIONS.

Mr. Nelson G. Northup, of Eaton Rapids, Mich., has patented a simple but improved extension step for cars. The object of this invention is to provide a convenient device whereby the steps of cars and other vehicles may, when desired, be quickly lengthened and shortened. The invention consists of a step secured to and combined with the ordinary car or vehicle steps, and made vertically adjustable for the purpose of extending the steps downward to any desired point, and thus affording an auxiliary step under the lower fixed step of the car or vehicle. This auxiliary step may be raised or lowered by means of hangers arranged to slide up and down within tubular guides on the outer faces of the sides of the regular steps, said hangers being formed with racks, with which pinions on a cross shaft operated by a handle or crank are made to engage.

An improved rocking grate, especially applicable to loco motive engines, and designed to prevent ice from collecting on the under side of the grate when the engine is running through snow, has been patented by Mr. John R. Fish, of Grand Rapids, Mich. The invention consists in a combination, in a rocking grate, of bars arched from their ends to their centers with bars which are straight on both their upper and lower faces, each and all of the several bars being journaled and formed with vertical parallel ribs on their sides, and preferably provided with depending legs connected with a shaker bar arranged to extend through the ash pan. The crowns of the arched bars, which alternate with the straight bars, extend considerably above the upper faces of the latter, thus exposing the arched bars to a high degree of heat, which prevents the accumulation of snow and formation of ice thereon. A free passage for air between the bars is insured, fine coal may be burned on the grate, and the latter be readily rocked.

An improvement in machines for the manufacture of ice, which is both economical and gives a large working capacity, has been patented by Mr. Charles W. Gelett, of Oakland, Cal. This invention relates to that part of an ice machine known as the "congealer;" and it consists of a thin, hollow, rectangular plate having stops at intervals between the two freezing surfaces, so that the flow of the refrigerant will meet with more or less impediment in passing through the plate, and a more rapid congelation of the water which is directed upon the outside of the plates will take place. These stops are preferably arranged in rows, the stops of each row being at an angle of forty-five degrees to those of the next row, thus keeping up a more thorough agitation of the refrigerating vapor and insuring its contact with the entire side surfaces of the congealer. Any number of such congealers are so arranged within a frame and combined with the gas or vapor reservoir, air pump, pipes, and water-spraying devices of the machine, that ice is formed upon both sides of said congealers.

Mr. Hans J. Müller, of New York city, has patented an improved ore separator. The object of this invention is to provide a new and improved device for separating particles of iron, steel, etc., from granulated or pulverized ore or other material. In this apparatus the pulverized material is placed in a hopper and dropped from there upon a platform or shelf which is vibrated by a ratchet wheel, fast on the shaft of a rotating magnetized cylinder, and engaging with a lever, on the shaft of which is an arm that connects with the shelf. The sand or granulated material slides down said shelf, which is slightly inclined. The particles of iron or steel cling to the cylinder and are scraped from the same by a plate, and drop into a slot or into a receptacle below it, while the particles of sand or granulated material drop from the edge of the shelf into another slot or receptacle beneath it. The apparatus, although simple, is effective.

Mr. James B. Gillham, of Merritt, Ill., has patented an improved car coupling. This invention pertains to self-couplers; and it consists of a drawhead having tongues projecting rearward into corresponding sockets or slots in the drawbar and carrying springs on their ends, and provided, also, with a square collar fitting over the end of the drawbar, said tongues having vertical perforations corresponding with the openings in the drawbar for the reception of the coupling pin, which latter, when coupling, holds both drawhead and coupling link in position; and it further consists of a coupling pin reduced near its point and having a conical extremity for use in connection with the drawhead and drawbar constructed as above, whereby the pin is prevented from being too far withdrawn and the drawhead is retained in position. The pin may be uncoupled, and held when disengaged by an attached rod reaching above the top of the car and capable of suspension on a pin projecting from the front of the car. The invention is an ingenious one.

Mr. Justin J. Langles, of New Orleans, La., has patented a simple but useful adjunct to show boxes. The object of this invention is to provide an ornamental and removable cover for grocery and other boxes, which, while exposing the contents of the box to view, shall be preservative of its contents, and is provided with a lid that may be automatically held open at any point. The invention comprises a frame, which is preferably made of ornamental wood, constructed to fit over and receive within it the upper edges of the box, and provided with inside strips which support the frame upon the top of the box. A lid, which may be also of ornamental wood and has a glass top, is attached to the frame by hinges formed of angular plates which bind the corners of the lid and frame. Pivoted to this lid is an arm, and pivoted to one of the side bars of the frame is a slotted plate, through which said arm passes at an angle, that causes the plate to act as a clutch upon the downward movement of the arm, except when specially relieved, but permits of a free upward movement of the arm when raising the lid.

Mr. William Hassel, of Brussels, Ill., has patented an improved animal shears. The device comprises a sharp-edged tooth plate arranged to slide on a similar sharp-edged toothed plate which is adjustably fastened to a like toothed bed-plate. This bed-plate has a rigid handle that is provided with a spring which presses against a handle pivoted to the bed-plate and which has a connecting bar pivoted to its upper end. This connecting bar is attached to a strip arranged to slide in a longitudinally slotted guide plate on the bed plate, and having the sliding knife-plate adjustably fastened to it. In this improved shears for clipping wool, etc., a clean cut, with but little risk of injury to the animal, is practicable, and the cutting blades or plates of the instrument may readily be removed when required to be sharpened or replaced.

A novel improvement in bathing tubs has been patented by Mr. Henry Costello, of Brooklyn, N. Y. The invention consists of a corrugated or roughened plate or band of rubber, fabric of wool, horsehair, or other suitable material, permanently or adjustably fixed in or on the sloping back-piece of the tub, where the bather's back naturally rests, so that by gently moving the body from side to side the bather may, with little effort, rub and cleanse his back. In some instances said plate may be an insulated metal one, and an electric current be passed through it, which will have a therapeutic effect on the bather.

A practicable and very useful improvement in drag-saws has been patented by Mr. Marion L. Nichols, of Center Township, Mich. This invention relates to portable sawing machines, and is more particularly applicable to sawing trees or logs. It may be operated by hand through a crank or handle and suitable gearing connected with a reciprocating saw. The invention consists in a combination with the main frame of a saw carrier adjustable about a vertical pivot on a block supported by horizontal trunnions on top of the main frame, locking nuts and convenient adjusting devices being provided to hold the saw carrier in any desired position. The apparatus may be used to saw either vertically, horizontally, or in any intermediate direction, or it may have a universal motion. The feed of the saw may be effected by moving its carrier with one hand while the other hand is applied to reciprocating the saw.

An improvement in ventilators for dwellings and other structures, and which is somewhat diversified in its application, has been patented by Mr. Joseph Patchett, of Lawrence, Mass. The leading peculiarities of this ventilator are the covering of the inlet flue at its top and forming it with side openings, and arranging the top or outer opening of the outlet flue on a higher level than the side opening of the inlet flue, also surrounding the top of both flues with a rim which is secured a small distance from the upper ends of the flues, likewise providing the upper end of either or both flues with a perforated flange and deflector, and other parts or details, the whole serving to give to the outgoing current as direct a course as possible and to provide a circuitous passage for the incoming current. By the use of this improved ventilator the vitiated air of a room or building will be rapidly replaced by the external air without creating cold currents or draughts.

Making Carbon Transparencies.

The method to be described for making transparencies for this purpose is equally applicable to the production of those for the magic lantern, but with this difference, namely, that the pictures must not be printed nearly so deeply, otherwise they will prove too dark and heavy when projected on the screen. We will assume that the negatives are of the ordinary density, and that the tissue selected is that specially prepared for the purpose; but whether it be, or whether another containing less pigment be chosen—the method of using it is the same in either case. One great precaution to be taken throughout all the operations is cleanliness and the avoidance of floating particles, either in the atmosphere or in the developing waters. For sensitizing the tissue a bath should be prepared as follows: Bichromate of potash, 1 ounce; water, 1 pint; liquor ammonia, 15 minims.

When the bichromate is dissolved the ammonia is added and the solution carefully filtered. At this season, when the light is bad or the negatives contain very strong contrasts, the proportion of bichromate may with advantage be increased to one ounce and a quarter and the ammonia to twenty minims, provided the tissue is treated in the way we direct. But if it be simply removed from the bath and suspended to dry in the ordinary manner this proportion will be too great, whatever the character of the negative may happen to be.

The bath being ready, we take some glass plates of convenient size—say twelve inches by ten, or larger—and having rubbed them over with powdered talc and finally dusted them, they are coated with plain collodion of not too horny a kind, which is allowed to set well. The plates are then washed in a dish of water or under the tap to free the film from the ether and alcohol, and are then reared on end to drain somewhat closely (but not to dry) in some place free from dust. It must be borne in mind that any particles which may be allowed to subside on this film or on the tissue when sensitizing will show as specks in the finished transparency. The plates being ready the tissue is cut into pieces rather smaller than the glass plates, and is then sensitized by immersion in the bichromate solution, which should have been poured into a porcelain dish.

After immersion for a time sufficient to render the tissue quite limp and pliable it is removed and placed face downward on the collodionized glass, and the superfluous solution removed by passing a squeegee somewhat firmly over the back of the tissue. This will also expel the air bubbles and insure perfect contact between the tissue and the collodion film. The plates carrying the tissue are now placed in a warm and dry situation. When the tissue is dry, and not before, a penknife is passed round the edges and the tissue stripped off, which will, of course, bring the collodion film with it, and will possess the polished surface of the glass. It may then be cut into convenient sizes and preserved in an air-tight case; but a better plan is to allow it to remain on the glass until required for use.

The advantages of this mode of preparing the tissue are manifold. First, the tissue dries from the back; hence the front—that part which forms the picture—remains moist the longest, and, consequently, is less soluble then that in contact with the paper. Secondly, dust has no opportunity of settling on the gelatinous surface during drying. Thirdly, the tissue will not require to be coated with collodion before mounting for development, which it frequently does if it be not in good working condition. Also, its surface being perfectly smooth, better contact with the negative is secured during the printing. It is important that the tissue should be thoroughly dry before it is placed on the negative, or small dark patches—"damp marks"—may be produced. The printing should be carried to at least double the depth required for an ordinary paper print, and, in some instances, as much as three times the exposure may be given with advantage, the development being carried to a proportionate extent to compensate for it. In the finished print no part of the picture should be clear glass, except, perhaps, the *extreme* highest light. We are now speaking of transparencies for enlarging from. For the magic lantern the printing should not be carried nearly so far; from one and a half times to twice the depth for a paper print will be ample.

We now come to the development. Some plates should be in readiness prepared with one of the substrata. That with the chrome alum and gelatine or the bichromate of potash and gelatine, with subsequent exposure to light, will answer the purpose equally well, it being simply a matter of taste or convenience which is employed. The exposed tissue, together with one of the prepared plates, is now immersed in clean cold water until the tissue becomes limp. The two are then brought into contact under the water, removed, and well squeegeed, taking care that no particles of foreign matter get inclosed between them. After remaining for five or ten minutes the print is immersed in water at a temperature of about 90°, and the development conducted as in ordinary carbon printing, except that toward the end of the operation the temperature of the water may be much increased with advantage.

When the development is complete the transparencies are placed in a dish of filtered water, where they are allowed to soak for ten minutes or a quarter of an hour. They are then taken out and placed on blotting-paper or in a rack to dry. It is very important that the gelatinous surface should be protected from dust during the drying, as any particles getting into contact with it will be sure to adhere and show in the enlargement. As the printing is carried to so great a depth and the development effected with hotter water than usual the film is rendered sufficiently insoluble for all practical purposes. Hence the prints will not require fixing in alum solution.—*British Journal of Photography.*

Iron from Black Sand.

A valuable iron ore, in the form of black sand, exists in large deposits on the east beach of Block Island, R. I. D. C. McCotter uses it in making steel. New processes and a machine for separating the iron from the sand have been invented, which clear 100 tons of sand in ten hours. The separation is done by magnets. As the mineral ore pours out of the chutes it is placed in bags, each holding 112 pounds, and shipped to Hoboken, and thence to Rockaway. N. J. There it is loaded on wagons and afterward taken to the furnace. It is mixed with charcoal, taken by elevator into the hopper, and distributed into sixteen large cylinders holding about ten tons, and heated to a red heat; then it is tapped at the bottom and let down into a large oven still kept at a red heat, and there burns out all the charcoal. The iron doors are opened, the sand is hauled out into a large charcoal fire, and forms a mass which is hammered by large steam hammers into blooms, weighing from 200 to 300 pounds.

Nutritive Value of Gelatin.

A dog weighing 11 kilos was kept for three days fasting, and received then daily for nine days 45 grms. gelatin and 200 c.c. water. The excretion of nitrogen in the urine during the fast was daily 2·385 grms.; during the gelatin diet, 7·105 grms. This latter quantity exceeded that present in the daily ration by 0·785 grm. Hence during the gelatin diet 1·600 grms. of the nitrogen of the system was economized, and accordingly the animal lost weight in a smaller proportion than when fasting. The experiment was repeated with an increase of the daily ration of gelatin to 50 grms., but the results were still in accordance with those of Voit, that gelatin indeed economizes albuminoids, but can never entirely cover the waste of albuminoids in the system, and has therefore a much lower dietetic value than albumen.—*N. P. Oerum and Dr. Dittel.*