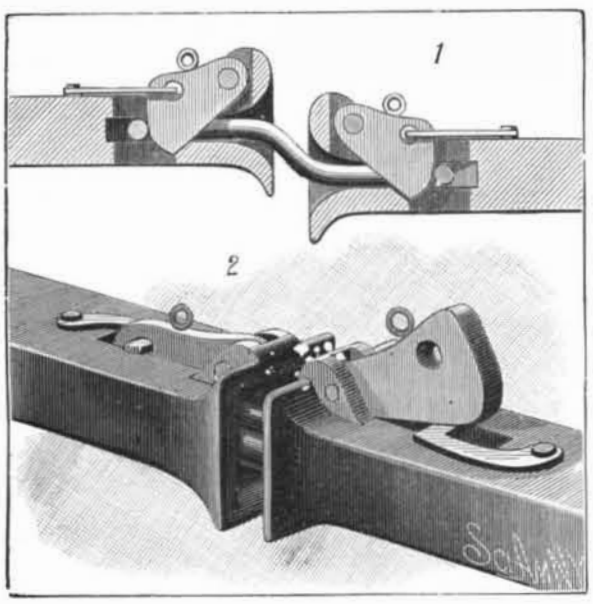
CAR CCUPLING.

At the top of the front end of the drawhead are jaws between which is a slot extending to the rear. Between the jaws is pivoted a coupling lug, formed as clearly shown in the cut, and free to swing up and down in the slot. The entering link strikes the bottom beveled edge of the lug and raises it; the lug then drops into the link. The lug is locked in place by the prong of a hook pivoted on top of the drawhead being passed into the hole in the lug. The hook is shifted by means of a hook on one end of a rod, whose other end is slightly curved and tapered. To uncouple, the prongs of the hooks are withdrawn, and the lugs are raised by means of the rod, the tapered end of which is passed into the eyes on the top edges of the lugs. By holding the lugs raised by placing the prongs of the hooks under them, the cars may be run together without coupling. This

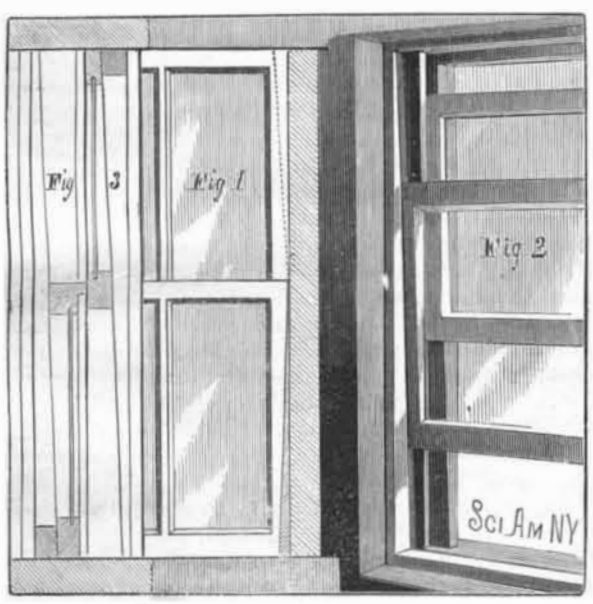


FIELD'S CAR COUPLING.

coupling—invented by Mr. Henry Field, Jr., of New Bedford, Mass.—may be strongly built, and does not require the brakeman to enter between the cars at any time.

WINDOW SASH AND FRAME.

An invention lately patented by Mr. George W. Henry, of 195 Broadway, New York city, consists of a window frame and sash so constructed with inclined or wedge-shaped surfaces as to make perfectly air-tight joints at all points between the frame and sash when the latter is closed. Fig. 1 is a sectional elevation of half the window, Fig. 2 is a perspective view, and Fig. 3 is a transverse sectional elevation. The lower strip of the upper sash is thicker horizontally than the upper one, and the side strips are inclined at their outer surfaces, being thickest at their



HENRY'S WINDOW SASH AND FRAME.

bottoms, as shown in Fig. 3. The edges of the side strips are also inclined, as indicated by the dotted line in Fig. 1. The sash is thus formed with inclined surfaces in all directions, front, back, and edgewise. The lower sash is made in the same way, and the two sashes are placed in the frame with their widest parts at the center. The upper and lower portions of the frame are so formed that when the sashes are closed there will be a wedge fit at all points, whereby all dust, snow, and water will be excluded, and there will be no rattling of the sash. This invention may also be applied to solid sliding hatchways or doors, and to other frames placed in openings and adapted to slide.

THE SKIAGRAPH.

Wood engraving, although undoubtedly still preferred by most publishers for illustrating books and periodicals, has of recent years been to a great extent superseded by photo-electrotyping. In this process the pen takes the place of the graving tool, and an artist thoroughly familiar with this kind of work can produce most pleasing effects at a cost below that of wood engraving. The skiagraph (shade delineator) has been devised for the use of such artists, and with its aid an endless variety of shades can be introduced on a pen and ink sketch.

Its capacity in this respect is almost unlimited; as many different shades or tints can be produced as designs can be by the kaleidoscope. For artists engaged on sketching illustrations for manufacturers' catalogues this instrument will be found to be a most valuable auxiliary, and in the hands of those who know how to use it to the best advantage, all kinds of artistic work can be executed in a manner comparing favorably with engraving.

In the accompanying cut, *a* is a bed plate having on its upper surface a central socket; *b* is a revolving plate having on its lower surface a central pin fitting in the socket; *c* is the tint plate carrier, resting on the revolving plate; *d* is the tint plate, resting on the carrier; *e* is the tint screw, by which the carrier and tint plate can be moved backward and forward. By this movement tint lines can be thickened up to any desired shade. The tint plate and carrier can be locked at any angle at which they may be placed by means of the locking screw, *f*; *g* is the surface plate, on which is screwed the hardwood sketch frame, *i*; *h h* are adjusting screws to regulate the distance of the surface of the pen and ink sketch from the surface of the tint plate.

The artist first makes a light pencil sketch on the upper surface of a sheet of drawing paper stretched on the frame, *i*. Then with pen and ink he makes the outlines and does all the other pen and ink work, except that to be done by the skiagraph. The next step is to screw the frame, with the face of the sketch down, on to the surface plate, which can be lifted on or off the instrument as often as may be required. The drawing paper being semi-transparent, the artist then, on the back surface of his sketch, makes a pencil outline of the surface on which he wishes to produce a certain tint. The tint plate, having been inked over with printer's ink, is put in position, and that part of the drawing designed to receive the tint is pressed down to obtain the desired impression. By using the tint screw for thickening lines, the revolving plate for cross lines, and combining the shades produced by several tint plates, almost any desired effect can be attained. The sketch when finished is placed in the hands of the photo-engraver, and a plate ready to print from can be had in a very short time.

This invention has been patented by Mr. Edward H. Brown, of 7 Warren Street, New York city, who will furnish particulars regarding United States and foreign patents.

BROWN'S SKIAGRAPH.

Waters of Sugar Works.

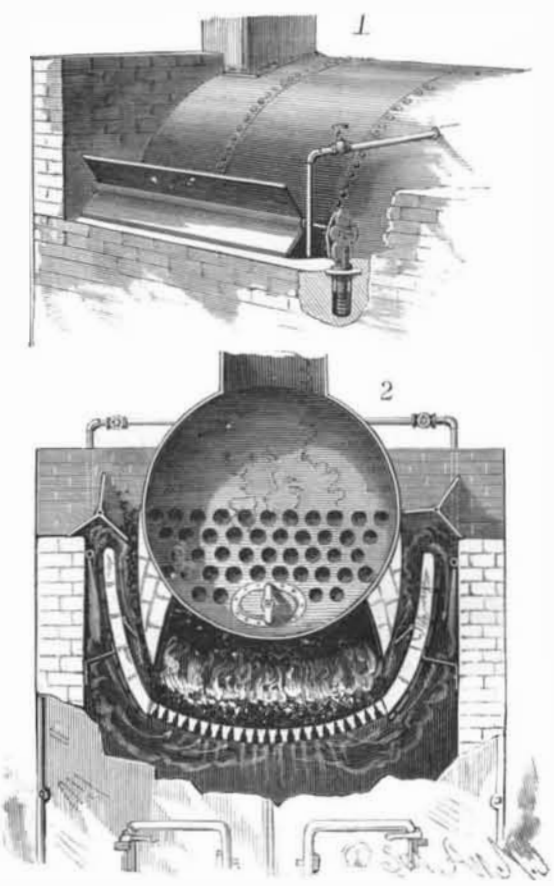
It is remarked that a sugar works consuming daily 4,000 cwt. of beets furnishes as much foul water as a town of 20,000 inhabitants, and discharges as much organic impurity as a town of 50,000 inhabitants. The waste waters contain suspended matters, *i. e.*, fragments of beets, dissolved organic matter, both nitrogenous and non-nitrogenous, and salts, sulphates, chlorides, and phosphates. Hence all conditions for energetic putrefaction and the multiplication of bacteria are present. The author recommends precipitation followed by irrigation, except when the effluent can be conveyed into a large river, "the water of which will play the part of the soil."—*A. Bodenbaender.*

SMOKE-CONSUMING FURNACE.

Much inventive genius has been expended upon the suppression of the smoke nuisance, and a great number of plans, more or less effective, have, from time to time, been brought forward for this purpose. The device which we illustrate is one which has been suggested by Mr. John L. Peslin, of Appleton, Wis., who built a a small experimental furnace several years ago, and succeeded in obtaining very satisfactory results. The first figure shows the self-closing fire door in perspective. The central axis, about which it rotates, is provided on its end with a clover-leaf cam working against a small roller which is pressed upward by a spring. In consequence of this construction, when the fire door is partly revolved to admit the coals, as shown at the left of the second figure, the clover-leaf cam presses the roller down, and the spring is brought into greater tension. As soon as the fire door is relieved of pressure, therefore, the action of the spring on the cam returns it to its first position, and the door is closed automatically.

The second figure illustrates the general action of the furnace. The grate is curved in cross section, and is fed with coals from each side. The body of the fire is constantly red and glowing, for the supply of fuel being added from the sides and not from the top, as ordinarily, there is no sudden lowering of the temperature, and consequently no evolution of smoke in the main fire chamber over the grate. Smoke, nevertheless, is produced, and in quite large quantities, but its generation is limited to the coal chambers at the side of the fire box, and it is fully disposed of without having a chance to find its way to the smoke stack. Its course is illustrated by the arrows. Jets of steam at each side create a strong downward draught, and force the smoke to find an outlet through the layer of burning coals. By this baptism of fire the finely divided particles of carbon, whose suspension in the mass constitutes smoke, are brought to the temperature of combustion, and pass off through the stack as carbonic acid chiefly, though if there be insufficient air, carbon monoxide will also be among the products, and will be a source of lost energy, but quite invisible, and without the disagreeable qualities of smoke.

Dampers are provided in each fuel chamber, as



PESLIN'S SMOKE-CONSUMING FURNACE.

shown. By this preliminary heating, the coal is deprived in a large measure of its volatile constituents, and by the time it reaches the zone of combustion on the grate, will be reduced to the condition of an imperfect coke, and therefore incapable of generating smoke. Doors are provided at the front of the fire box, both to admit the necessary air and to permit of stoking the fire. It has not been our pleasure to see this furnace in operation, but its plan embodies correct chemical principles, and on independent grounds we are quite prepared to believe the inventor's statement that it is very effective in preventing the contamination of the atmosphere by smoke.