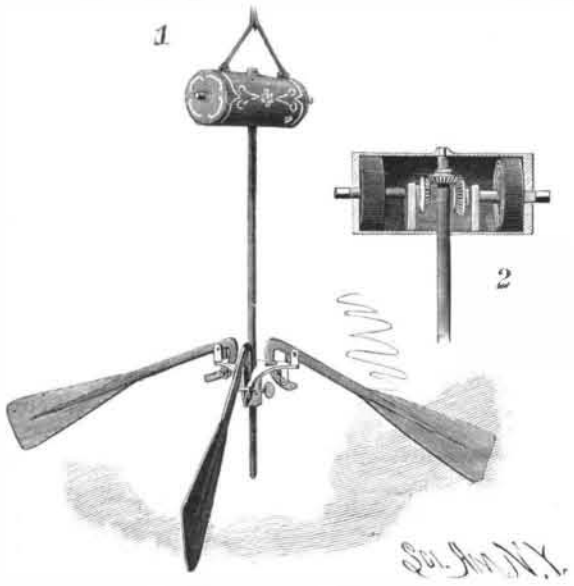
AUTOMATIC FAN.

The fan shown in the cut is suspended from the ceiling, and is for keeping flies away from the head of a person or from food placed beneath the fan. In the ends of the box, Fig. 2, are coiled springs for operating the fan from opposite sides of its shaft, thus doing away with one-sided pressure on the shaft. The inner ends of the springs are secured to spindles, each of which carries at its inner end a beveled pinion meshing with a beveled pinion on the fan shaft, which is free to slightly rise and fall in its bearings, thereby making the pinion throw its own weight as well as that of the shaft and



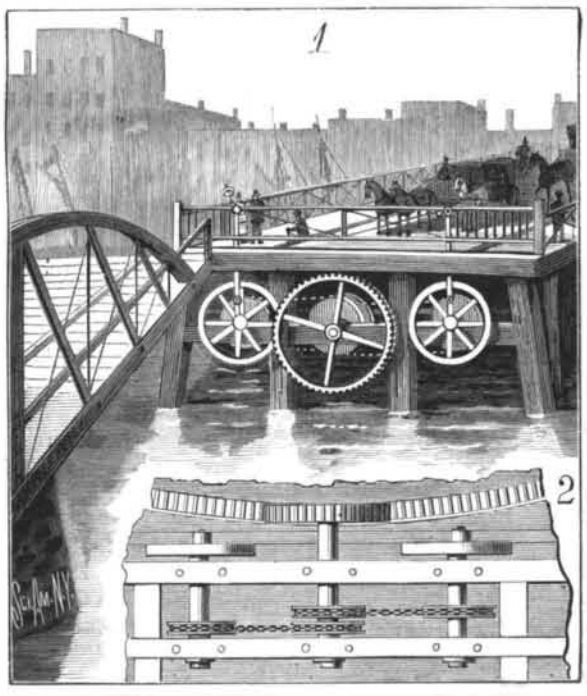
PITTMAN'S AUTOMATIC FAN.

fans on the side pinions, to give the necessary retarding action on the springs to prevent a too rapid movement of the fan. Fitted on the shaft is a sliding socket carrying the fan blades, any number of which may be used. These blades project laterally from the socket, to which their shanks are pivoted, to provide for varying the vertical working angle of the blades and to increase or decrease the length of their sweep horizontally. The ends of the shanks are formed with an arc-shaped tail piece, which, in moving the blade vertically, slides through a slotted projection of the socket provided with a set screw for holding the blade when adjusted. The fan is put in operation by winding up the springs by a key applied to either spindle.

This invention has been patented by Mr. W. H. Pittman, whose address is care of Mr. T. J. Pittman, 550 Grand Street, New York city.

AUTOMATIC DRAWBRIDGE GATE.

The gate is arranged to slide vertically on the end of the draw opening, and is attached to two connecting rods pivoted to the gate near the top, and at their lower ends to the sides of two wheels mounted on the outer ends of shafts arranged under the end of the permanent part of the bridge. On each shaft is a sprocket wheel. Between the shafts is a third, on the outer end



MEUZE'S AUTOMATIC DRAWBRIDGE GATE.

of which is rigidly mounted a cog wheel, engaging with a segmental rack on the under part of the end of the draw. On this shaft are two sprocket wheels, over which pass endless chains, also passing over the wheels on the side shafts.

When the draw swings open, the rack turns the cog wheel, and by means of the chains and side wheels the gate is raised. When the draw swings back into a position parallel with the axis of the bridge, the cog wheel is turned in the inverse direction and the gate is lowered. The gates at the ends of the draw are thus opened and closed automatically, and cannot be tampered with, as they can only be operated by the swinging draw.

This invention has been patented by Mr. F. W. Meuze, and further information can be obtained from Messrs. F. W. Meuze and C. Hahn, of 1117 Madison Street, Bay City, Mich.

The Magnesia Gas Light.

As the result of experiments carried on by a Swedish engineer, a very beautiful light is obtained by incandescence of magnesia, the great heat obtained on burning Strong's water gas sufficing for this purpose.

It appears that, so far, bituminous fuel has not been used in this plant, and those in charge of it are apparently not disposed to look with favor on the gas that would be produced when the "water gas" became mixed with hydrocarbons from the distillation of coal. It is stated that for the purpose of lighting by means of magnesia combs, the pure water gas alone is suitable, and that the light would be spoiled by admixture of common gas.

The best results are obtained by using very thin rods of magnesia, thinner than the leads in ordinary pencils. These are made by making magnesia into a paste with gum, or some such material, pressing out the little rods, and heating them to a very intense heat in crucibles in a gas furnace. They are hard and firm and of a semi-porcelain nature. A number of these are arranged in a metal holder, in double rows, like the teeth of a coarse comb, and this holder is secured over the flame obtained by burning water gas in an ordinary gas burner. After a few seconds, the magnesia rod emits a beautiful and steady white light.

Engineering says the entire works of Schultz, Knaudt & Co., at Essen, Germany, are lighted in this manner. The pipes and burners previously used for ordinary illuminating gas are now used for the water gas, each jet having one of the magnesia combs placed over it. It is stated that the lighting of the works is most excellent, as indeed a visit to the works indicates. The amount of light obtained by the above means from any ordinary sized well-made burner is truly surprising, and its steadiness leaves nothing to be desired. The arrangements for fixing the magnesia combs on to a burner are of the simplest description. The rods of magnesia are slowly consumed, one set lasting from 80 to 100 hours in use. Each comb costs, as supplied by the company ready for fixing, 5 cents, so that the cost per night for illumination is very small indeed, considering the amount of light obtained from each comb, during at least 80 hours. The gas plant at work produces from 220,000 to 250,000 cubic feet of water gas per twenty-four hours. The fuel used, as above described, yields as nearly as may be 16 cubic feet of gas per pound of fuel consumed. The cost of an apparatus of the above capacity, that is, producer, two generators, fan engine for ditto, and small boiler, with all valve gear and cooler, with gas holder of about 18,000 cubic feet capacity, or roughly speaking, equal to two hours' gas production, all ready for work, is $10,500.

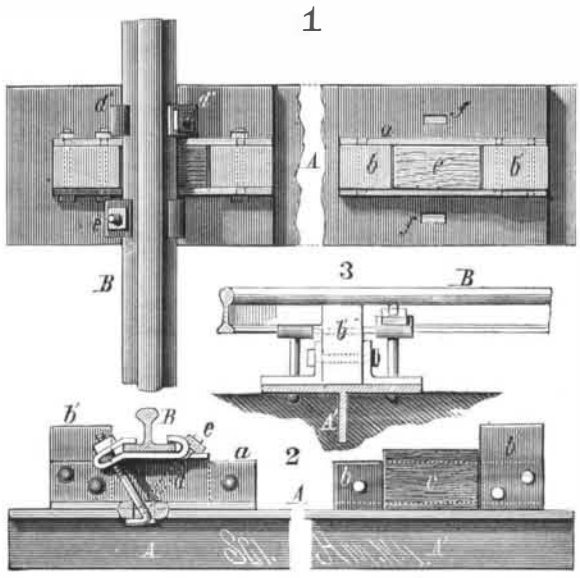
The current costs are very small, but little attendance being required. It is stated that the gas costs at the rate of 1 cent for 150 cubic feet, charging $1.25 per ton for the fuel and allowing 15 per cent on the cost of plant for interest and amortization.

Liquid Gunpowder.

One of the greatest difficulties encountered in the manufacture of gunpowder is the intimate admixture of the constituent parts, the combustion of which produces the explosion. Mr. Nordenfelt has advanced a very ingenious and novel idea, for which he has applied for letters patent. He proposes, instead of grinding together the primary substances, sulphur, charcoal, and saltpeter, in their solid state, to employ the following process instead: Sulphur, in the proper proportion, is put in solution as sulphate of carbon; this is mixed with carbonaceous matter, which in this case is not charcoal, but cotton or cellulose fiber, ground to an impalpable powder. Finally, a saturated solution of saltpeter is added to this mixture in the required proportion. There remains now nothing to be done except to evaporate under disturbed crystallization, or in vacuo, to obtain a powder the elements of which, according to the statements of the inventor, are thoroughly mixed, and, therefore, in condition to furnish the maximum useful effect. Almost a liquid gunpowder is thus obtained.

METALLIC RAILROAD TIE.

The tie herewith shown is of wrought or cast iron, and is made of considerable width to prevent its being pressed down into the roadbed. It is formed with a rib, A', along its under surface, which strengthens the tie, and entering the roadbed prevents all lateral movement. Upon the upper surface, near the ends, the tie is formed with short flanges, *a*, between which are held by bolts the blocks, *b b'*, that hold in place the blocks or cushions, *c*, of wood or other suitable material for supporting the rails, B. The blocks, *b'*, are somewhat higher than the flanges, so that they form abutments to keep the rails from spreading and to permit the rail to be raised by thin blocks of wood. The blocks, *b*, are detachably secured, so that they may be removed and the cushions taken out without disturbing the rail or tie. The rails are held in place by plates and bolts, as shown in Fig. 2. These plates are folded to clasp the base of the rail at both edges, and each plate receives but one bolt, which passes through a hole made in the fold, and is attached to the tie by the hook of the bolt entering a suitable slot in the tie, the bolts being removable by unhooking without disturbing the tie. The slots being made in line with the center of the rail, the bolts stand at an angle. The short fold in each plate is put in with a sledge at the time of laying the track. With this construction, by removing the nuts



VAN ORDEN'S METALLIC RAILROAD TIE.

from the bolts and straightening out the short folds in the plates, the rails may be removed and new ones put down without disturbing the ties.

Further particulars regarding this tie may be obtained from the inventor, Mr. Charles H. Van Orden, of Catskill, N. Y.

A NOVEL SOAP HOLDER.

The handle of the soap holder is formed by the doubled end of a wire, the lower end of which is bent at one side and then upward to receive a flanged thimble. The frame receiving the soap box is formed of a wire bent double, twisted in its upper portion and entered into a tube on the handle wire; its lower portion is firmly locked to the thimble, which turns with the frame on the lower end of the handle wire. The soap box, Figs. 2 and 3, is made of wire cloth, and has a flanged band of sheet metal around its edge, through which the twisted wires pass. On the flange of the band is a cover, notched to allow it to pass projections on the band when it is to be removed, and held in place at other times by the projections. On the straight portion of the wire is a sliding nut fitting the twisted portion. By moving this nut up and down while the device is held in hand by the handle, the soap box is caused to rotate rapidly in alternate directions. The currents and agitation of the water thus created are most effective in dissolving the soap and carrying out the dissolved portion.

BRYANT'S NOVEL SOAP HOLDER.

This invention has been patented by Mr. Charles A. Bryant, P. O. box 61, Wakefield, Mass.

ICE cold water sprinkled upon cabbage plants infested by the imported cabbage worm is claimed to be sure death to that insect. The water should be sprinkled upon the cabbages during the heat of the day, when the worms will roll off and die. The discovery of the remedy is credited to Mr. Charles H. Erwin, of Painted Post, N. Y., and is communicated to the *Rural New-Yorker* by Prof. C. V. Riley.