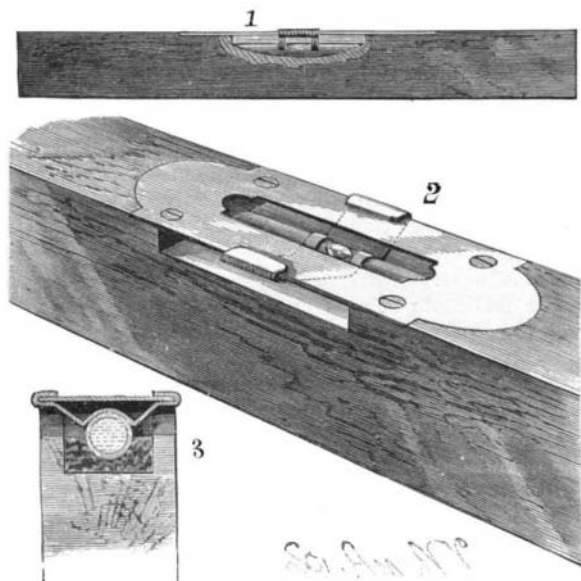


SPRIT LEVEL.

Secured on the level bar over the spirit tube is a guard plate, on which is held a slide that extends partly or entirely over the spirit tube, which it approaches very closely. The width of the slide is equal to the length of the bubble, or the slide can be formed with a slot equal to the bubble. The slide can be so adjusted that the ends of the slot will coincide with the ends of the bubble when the level is perfectly horizontal, thus facilitating the taking of true levels. If two inclined surfaces are to be arranged precisely parallel, the level



TYLER'S SPIRIT LEVEL.

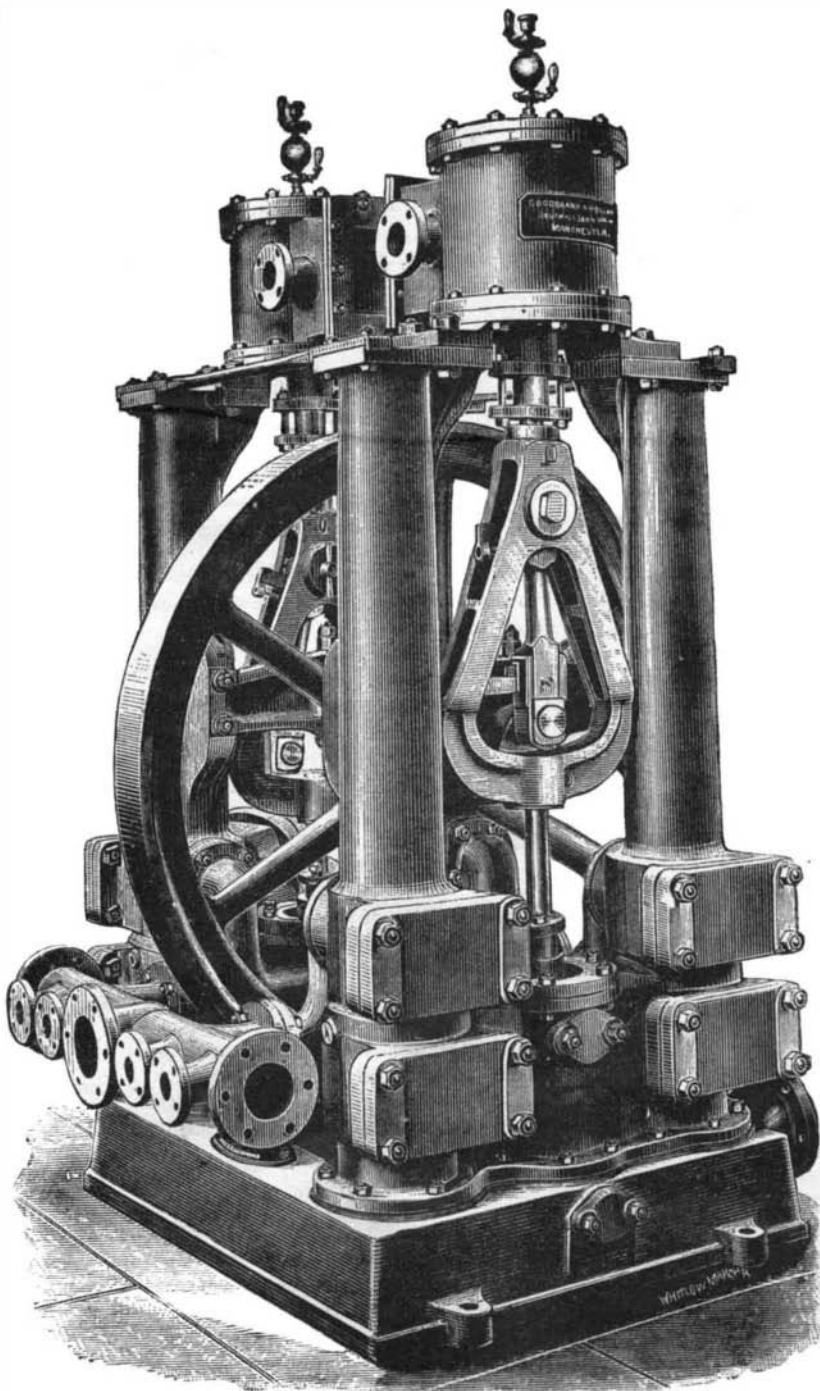
is placed on one of them, and the slide so adjusted that it will be over the bubble. The slide remains in this position, and the second surface can be adjusted until the bubble is below the slide. The uses to which surveyors and civil engineers can apply this instrument will be apparent.

This invention has been patented by Mr. B. F. Tyler, of Bridgeton, N. J.

IMPROVED QUADRUPLE PUMP.

We have lately examined a very powerful pump made by Messrs. Goodbrand & Holland, of the Southall Street Works, Manchester, and give herewith a perspective view of it. This pump has several novel features which tend to increase its efficiency and durability, in both of which respects very satisfactory evidence was submitted to us. The pump is described as quadruple acting, that is to say, it has two double acting cylinders, as shown in the engraving. It is provided with two separate suction pipes, which may draw their water from one source or from two sources, as may be desired, the change being rapidly effected while the pump is at work. A very useful adjunct is found in the provision of air valves to each end of the water cylinders. The suction is led to a hollow base plate which forms the foundation for the pump. The internal arrangement of this suction chamber, as we may be allowed to call it, is somewhat peculiar. The inlets to the upper and lower sides of the pump are in the form of nozzles projecting some distance into the chamber. Between each pair of nozzles is a kind of inverted flattened dome, carrying the pump barrel above, and supported below by a web connecting it to the bottom plate of the base. The result of this arrangement is the formation of a chamber on the suction side, securing a steady flow of water, while the comparatively contracted ways prevent oscillation of water from one pump to the other. All the water passages have large areas, and especial care has been taken to avoid air traps. The valves are of the circular grid type, the ways being arranged at an angle in such a manner as to give a whirling motion to the water.

Two purposes are effected by this simple contrivance: first, a larger volume of water is delivered in a given time than when the usual straight ways are used; and second, the rubber valve cover is slightly advanced or turned at each beat, and therefore presents a fresh surface at every stroke, and wears more uniformly, and for a greater length of time. Another advantage resulting from the use of this modified form of valve is that the pump may be run at greater speed than when the ordinary brass valves are used; 250 feet per minute being the ordinary rate of working. The delivery pipe, as will be seen, has seven outlets, the central one being prepared as a main discharge. As usual in pumps of this description, the columns are utilized as air chambers. The



IMPROVED QUADRUPLE PUMP.

steam cylinders are inverted, 14 inches in diameter, the stroke is 10 inches, and the two engines are connected to the crank shaft at a right angle, so that the pump may be instantly started from any position. The water cylinders are each 8 inches in diameter, and are capable of delivering 224 tons of water per hour. The working parts are all unusually easy of access, and an idea of the compactness of the pump may be gained when it is stated that the floor space occupied is only 6 feet by 5 feet 6 inches.—*Textile Manufacturer.*

Chlorine as a Disinfectant.

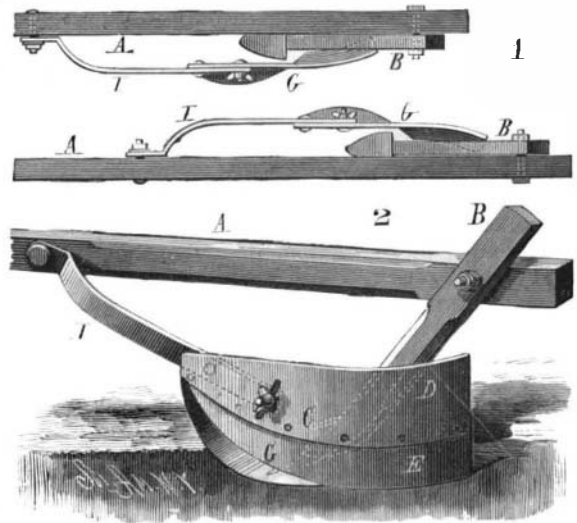
An investigation reported upon by Dr. Klein is the application of chlorine as an air disinfectant, especially in respect to swine disease. It has been shown that this disease is highly infectious, and that the infection is easily conveyed by the air, which is the usual manner of the communication of the disease. It was therefore considered by Dr. Klein to be specially suited for ascertaining experimentally the gaseous substance by which it could best be combated. It is known that a healthy pig placed in the same stable with a diseased one is sure to take the disease, though the animals are carefully kept apart from each other. Dr. Klein therefore experimented as to the extent to which this atmospheric communicability obtained in an atmosphere impregnated with as much chlorine as the animals could endure without evincing discomfort. It was found that a healthy animal could with safety be placed in the same compartment with a diseased pig, even for so long a time as six hours, for five successive days, provided the air in the compartment was maintained well fumigated with chlorine gas, two good fumigations up to a marked pungency in the six hours being required. It was also found that one fumigation with chlorine neutralized effectually the virus in a compartment from which a diseased pig had been removed, so that another animal could be placed in it without danger of infection.

Four Engines in Collision.

Two heavy freight trains on the Nickel Plate road, each drawn by two engines, collided near Grand Crossing on Jan. 20, badly damaging the four engines; and killing an engineer named Charles Ellis. The loss is \$20,000.

COMBINED GUARD AND WEEDER.

The accompanying cuts (Fig. 1 is a plan view of the device as applied to the right and left hand beams of a cultivator, and Fig. 2 is a side elevation) show a combined guard and weeder, lately patented by Mr. Oscar Elce, of Parker, Dakota, the object of which is to protect small plants from clods thrown by the forward shovels, and to destroy weeds and grass that may be growing near. Attached to the beams, A, of an ordinary cultivator are the forward standards, B, and the forward shovels, C. The forward end of the plate, D,



ELCE'S COMBINED GUARD AND WEEDER.

which is about 8 inches high and of any suitable length, is straight, and has its lower edge rounded, as shown in Fig. 2. To its lower edge is riveted a narrow steel plate, E, the forward part of the lower edge of which is rounded, and its lower forward part is inclined inward toward the plants. The middle part, G, of the plate is vertical, and its rear part has an outwardly projecting horizontal flange, as shown in Fig. 1.

When the cultivator is drawn forward, the inclined part of the plate, E, runs close to the plants, from which the weeds are pushed back, while the flange cuts off the roots of the weeds. The curved rear parts of the plates push the weeds below the forward shovels, forming a low ridge, which the rear shovels (not shown in the drawings) level down. The weeder is drawn by the bar, I, the forward end of which is bolted to the beam, and the rear end to the plate, D. At the extreme lower end of the bar is a clamping bolt that passes through a slot in the plate, and by means of which the guard and weeder can be adjusted to work at any desired depth in the ground.

Cleaning Clock and Watch Movements.

A bath can be prepared as follows, which will cleanse the movements of clocks and watches to perfection: One quart of water, about one teaspoonful or five grains of liquid ammonia or alkali; into this liquid should be grated or scraped fine, five grains of common soap.

These proportions can be varied as desired, if the following remarks are kept in view:

The articles to be cleaned should be plunged into this bath, where they should be allowed to remain at least ten minutes. Twenty or thirty minutes is better, especially for clocks. The articles should be wiped dry when removed from the bath, or polished up with a brush dipped in some polishing powder. The articles ought then to look like new; if this is not the case, they should be placed again in the bath, to which a small quantity of alkali must be added, as it may have lost some of its strength in the bath.

Remark.—The alkali has the great advantage of not attacking the pieces of steel; when pure, it leaves the temper in all its purity. If the quantity of alkali is increased, the copper will become black, but the steel will not suffer in the slightest. When pure, if used very quickly, the alkali will clean instantaneously gold and silver watch cases, a brush dipped in polishing powder being used to dry the article and brighten the polish.

This bath can be corked and set aside for future use, as it keeps very well. If it loses its strength all that is necessary is to add more alkali.

A PIANOFORTE railroad car is being built in Birmingham, England, for the London and Northwestern Railway. "Appliances will be provided by which the sound of the carriage wheels will be deadened, so as to preserve the harmony of the music."