New Inventions.

Preventing Boiler Explosions.

We have received a letter on this subject from Mr. Wm. K. Lewis, of the firm of Lewis & Brothers, Broad street, Boston, in which he states that "Clarke's Patent Self-Regulating Water Feed," and "Amsterdam's Fusible Plug," placed on a boiler will prevent explosions. "The *feed supply* will always work sure," he says, "if the engine is working, and the pump in good order." But if from any cause, the water should fall below the proper line, "the fusible plug will melt, and the steam escape through a tube into the fire-box and extinguish the fire." He recommends these safety apparatus for every boiler. The water feed apparatus has been attached to his boiler for several months, and it has never failed to perform its duty in a single instance..

In a recent number of the *London Engineer*, a new safety valve for boilers is described, and it appears to be a safety improvement. A small cylinder, occupying the place of the common safety valve, is bolted to the top of the boiler, and it has a small flange on its top, carrying a standard on which is secured the end of a lever working on a pin. In the small cylinder there is a packed piston, having its rod connected to the lever mentioned, a short distance from its jointed end. This lever is extended horizontally forward, and its other end secured to a spring balance, there is a small chamber in which there is a plunger valve inserted in a vertical tube passing down to the bottom of the boiler and open to the water. The rod of the valve is also connected to the lever mentioned. This valve covers the mouth of a bent tube, which passes down into the fire box. The spring balance is set at the pressure to be carried—60 or 80 lbs.—and the valve then covers the tube leading into the furnace. Whenever the pressure in the boiler on the small piston exceeds that at which the spring holds it down, the piston will rise, and also the valve which covers the mouth of the tube leading to the furnace. The superincumbent pressure of the steam then forces the water in the boiler through the tube into the furnace, and extinguishes the fire.

This apparatus differs from Amsterdam's fusible plug. The latter extinguishes the fire, when the heat of the boiler is increased by a deficiency of water: the former, when the pressure of the steam is increased.

Self-regulating Wind Mill.

Our engraving illustrates an improvement in Wind Mills, invented by Mr. James N. Brewster, of Princeton, N. J., for which application has been made for a patent. The improvement consists in a mode of regulating the angle of the sails or wings, so that if the wind increases in force and exceeds a given pressure, the wings will change position and present less resistance, thereby escaping injury.

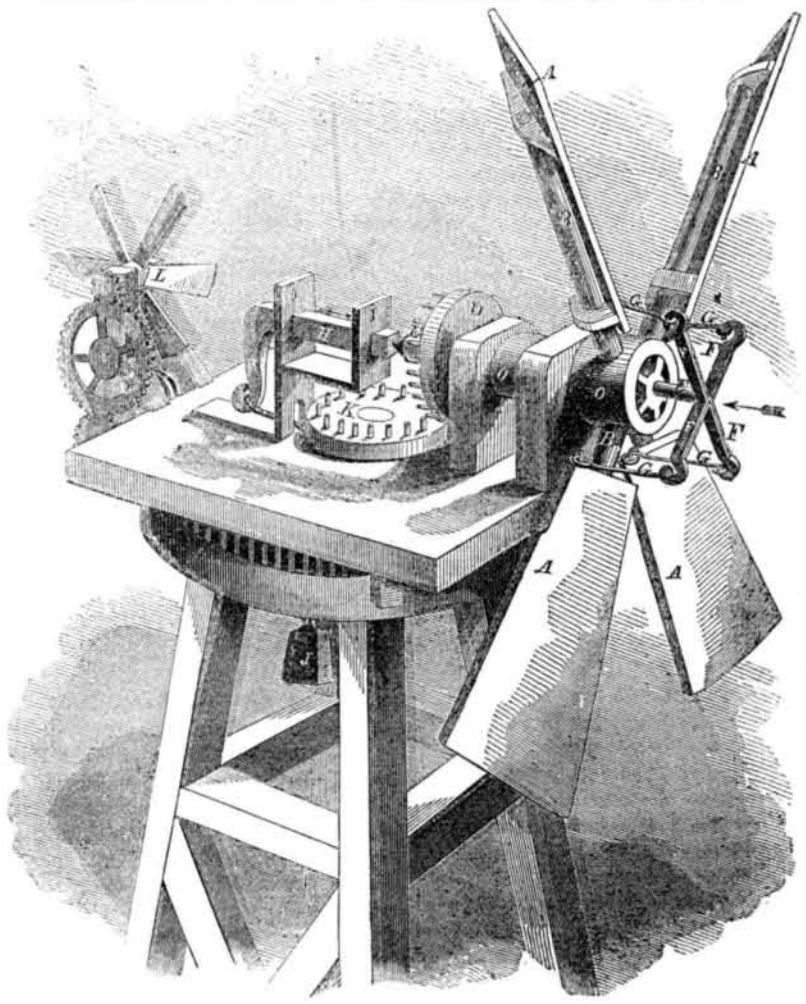
The wings, A, are pivoted to their arms, B. The hub, C, is hollow, its inner end being provided with a pinion, D. E is a rod passing through the center of hub, C, and terminating at its front or outer end in arms, F'. Each of these arms is connected by means of links, G, with the corner of one of the wings.

The wings are not hung with the arms, B, directly in their centers, but, a little on one side; when the wind blows, the tendency of the wings is to open back, draw the arms and rod, E, inward, in the direction of the arrow.

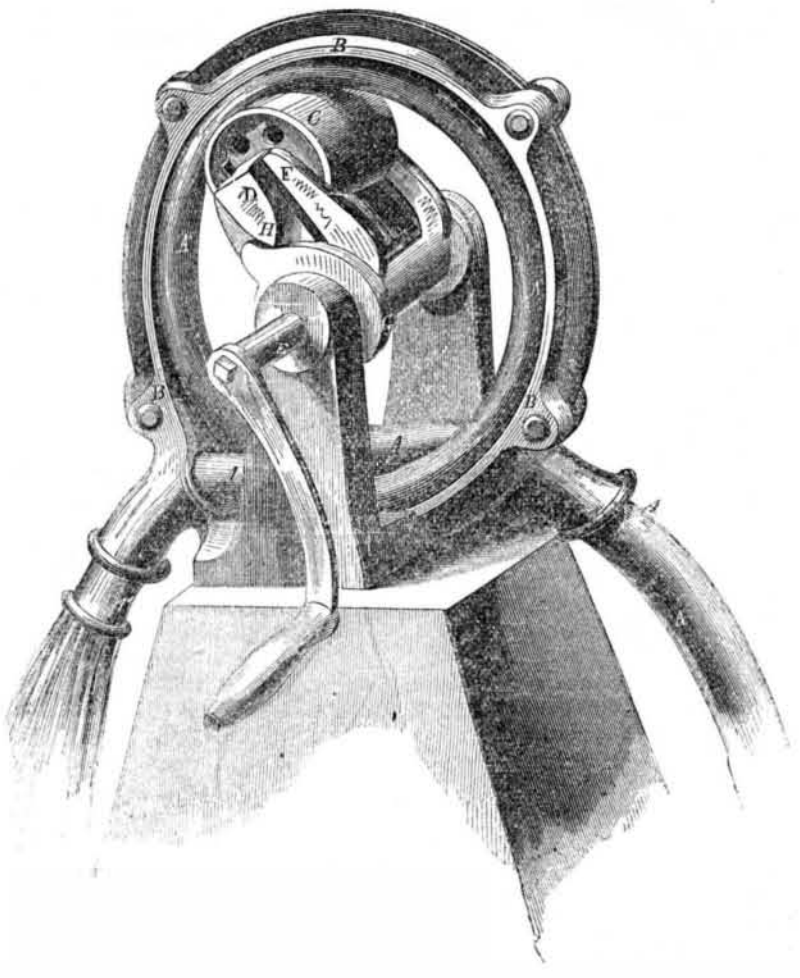
The inner end of E terminates in a point, which bears against another rod, H, which is supported in bearings, I; the crank part of rod H is connected by means of a cord, with weight J, the tendency of the meeting being to move slide H in direction of its arrow. The weight, J, is, in this manner, opposed to the pressure of the wind; when the latter exceeds the resistance offered by the weight, the wings will open and allow the current to pass by. A wind mill of this constrnction may be exposed to the violence of a hurricane, but its speed will not increase beyond a given number of revolutions. Weight J acts like the weight on safety valve, and only permits the accumulation of power up to a certain mark. K is a cog wheel that receives and transfers the power derived from D. L is a small auxiliary wind wheel which takes the place of the common vane or tail, and, by acting on the cog wheel, M, brings the arms, A, around so as to face the wind.

It will be observed that this wind mill is very simple in its parts, not likely to become disordered, and economical of manufacture. It strikes us as an excellent invention. Self-acting wind mills are coming extensively into use; every improvement in them is a public benefit. Address the inventor for further information.

IMPROVED SELF-REGULATING WIND MILLS.



NOVEL ROTARY PUMP.



New Rotary Pump.

Our engraving illustrates an improvement in pumps of a rather novel character. No piston or valves of any kind are employed. The invention consists of a coil of india rubber pipe, A, placed within a metallic ring, B. The suction necessary to raise the water is produced by compressing the rubber by means of roller, C, against the ring, B. The roller is attached to bearings, D, in the arms, F, on shaft, E, rotary motion being given by the crank.

As the roller revolves in the direction of the arrow it presses the rubber tube, forces out the water in front, at A', and thus produces a vacuum behind, which the water fills as fast as the roller advances. Cam G presses the roller, C, up against the rubber tube, B; the set screws, H, serve to adjust the degree of pressure given to roller, C. When the pump is not in use the handle is turned backwards from the direction of the arrow, which at once presents the lower side of the cam to the set screws, H, and thus removes the pressure of roller, C, upon the elastic tube.

This is both a suction and force pump. It is extremely simple in construction, said to be very durable, and to possess, among others, the following advantages:—

It is not liable to get out of repair, and in case it should, it can be repaired by any one who can use a screw-driver. It has no valves, and can be used in pumping any kind of liquid substance, and can be put up easily without the aid of a plumber; it discharges the water after use, so that it will not freeze in winter; it can be put in the house if the well is out of doors, while the chain pump must be put directly over the well; it is a fire-engine for every house, although only costing about the same as an ordinary suction pump; being rotary, it can be easily driven by power. It is not affected by steam or any kind of acids, and will stand any climate. Messrs. George Denison and D. S Mcnamara are the inventors of the described improvements in this apparatus, for which application has been made for a patent. A part of the invention was patented to Denison & Bradley, April 17th, 1855. Foreign patents are in process of being secured. For further information apply to Asa Farr, Jr, No. 55 Cliff st., New York City.

Softening Hard Water.

In many parts of our country, the waters of the wells, springs, and some of the creeks, contain carbonate of lime (chalk) in solution, which makes them what is termed *hard*. There are also other substances in the water, such as sulphate of lime and the carbonate of magnesia—the latter prevailing in many parts of Ohio, &c.—but the carbonate of lime is the most common salt. An alkali like soda or potash renders water *soft*, but this is simply by neutralizing the carbonic acid in the water. We suppose that few persons are aware of an acid being the cause of all hardness of water, but such is the case. Such water curdles soap, and renders it unsuitable for washing, for supplying steam boilers, and when it is in excess it cannot be healthy as a beverage. A cheap and simple method of softening hard water, by the use of a little quicklime, according to Prof. Clark's process, discovered by him about fifteen years ago, was described in a former volume of the Scientific American, and has been of great value to many of our readers. As we now have many new subscribers, to whom the information must also be very useful, and as Prof. Clark has recently read a paper on the subject before the London Society of Arts, we give his process as follows in his own language:

"Supposing it was a moderate quantity of well water from the chalk strata around London that we had to soften, say 400 gallons. This quantity would contain 1 lb. of chalk, and would fill a vessel four feet square. We would then proceed by taking 9 oz. of burnt lime, made from soft upper chalk; and first slack it into a hydrate, by adding a little water. When this is done, we would put the slacked lime into the vessel where we intend to soften; then gradually add some of the water in order to form lime water. For this purpose, at least forty gallons are necessary, but we may add water gradually till we have added thrice as much as this; afterwards, we may add the water more freely, taking care to mix intimately the water and the lime water, or lime. Or we might previously form saturated lime water, which is very easy to form, and then make use of this lime water, instead of lime, putting in the lime water first, and adding the water to be softened. The proportion in this case wonld be one bulk of lime water to ten bulks of the hard water.

The manufacture of locomotives has been commenced at Rome, Ga., by Messrs. Noble. The Georgia railroad managers are models of sagacity, prudence, and honesty. The roads are all owned in the State, and free from debt.

Models must not exceed 12 inches in any of their dimensions. Inventors must be very careful to observe is, as the P. O. is sure to refuse them unless they conform to the rule.