A NEW HYDRAULIC ENGINE.

We frequently receive queries from farmers relative to some simple motor adapted to pumping water from a stream and delivering it through pipes to the barn or dwelling. We usually recommend a windmill for this purpose, but in cases where that cannot be advantageously used, a small engine driven by the current of the stream may prove available. Such a motor is illustrated in the accompanying engraving. It was patented through the Scientific American Patent Agency, February 6, 1877, by Mr. Joseph D. Richardson, of Wheeler's Mills, Ky.

A, Figs. 1 and 2, represents a water wheel of any suitable construction, preferably an overshot wheel. The shaft of the water wheel, A, turns in bearings of a supporting frame, B, and intermeshes, by a pinion, *a*, with the gear wheel, *b*, of an intermediate shaft, *d*, which transmits again the power by a pinion, *e*, to a gear wheel, *f*, that is placed, by its sleeve, f^2, loosely on the pump-operating crank shaft, C. A flywheel, C^1, of considerable weight and size, is keyed to shaft, C, and thrown into operation by a spring, D, which is attached to the loose gear wheel, *f*, and, by its inner end, to the crank shaft, C. The rotation of the water wheel causes the turning of the spring-acted wheel, *f*, until the power stored up in the spring is sufficient to overcome the resistance of the crank shaft, so as to revolve the same and operate the pump, E, assisted by the flywheel. If the flywheel is not large enough, a brake, C^3, Fig. 3, may be used, which engages, by its hook-shaped end, studs, *g*, of the flywheel, and retains the same until the brake is released by a pin, *h*, on the sleeve of the gear wheel, *f*. The pin, *h*, bears on a spring-acted lever arm of the brake, so as to lift the same and admit thereby the turning of the crank shaft and flywheel. As soon as the contact of stud, *h*, and the brake arm is terminated, the brake is carried down again on the flywheel, and the power of the water wheel is again stored up by the spring until another full revolution of the wheel, *f*, is completed, and thereby the flywheel again released and the pump worked, and so on.

The power of the stream is thus utilized by being stored up by the spring, and intermittently applied to work the pump, furnishing thereby a supply of water to the house situated on elevated ground above.

Fig. 1.

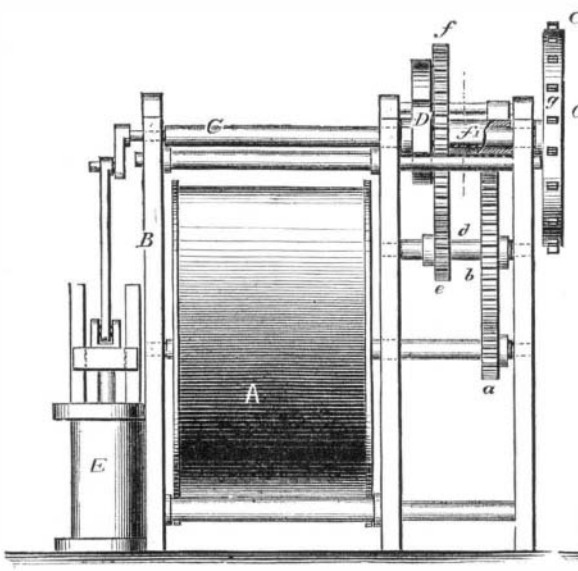


Fig. 2.

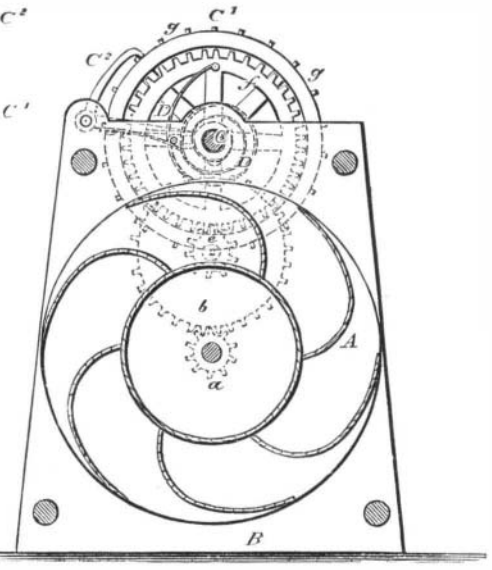
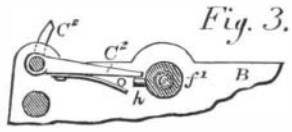


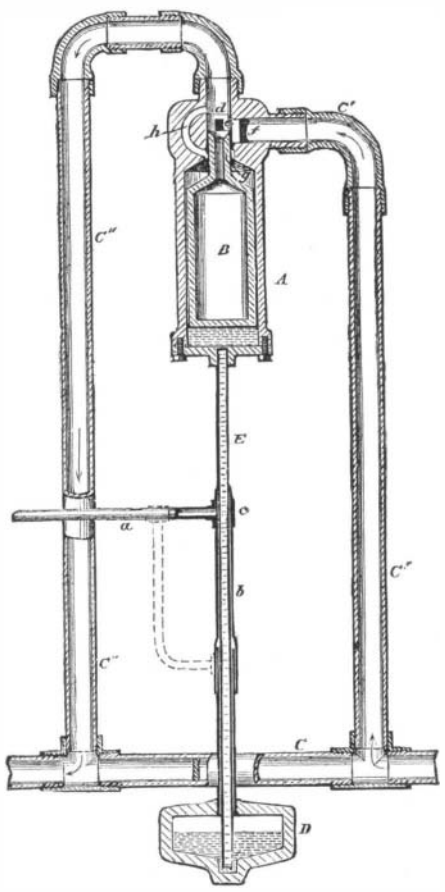
Fig. 3.



RICHARDSON'S HYDRAULIC ENGINE.

MARTIN'S GAS REGULATOR FOR STEAM BOILERS.

This invention is a gas regulator for controlling the supply of gas used in steam boilers as fuel. D, in the engraving, is a mercury chamber, which is connected with the steam room of the boiler by means of the pipes, *a b*, and into which a pipe, E, passes. There is sufficient space between the pipes, E and *b*, to form an open passage between the mercury chamber, D, and the steam room of the boiler. The pipe, E, extends upward, and is connected with a float chamber, A, that contains the float, B. Upon the upper end of the float chamber, A, a valve seat, *d*, is formed, in which the supply ports, *e e*, are made, which connect with a semi-annular passage, *f*, provided in the upper part of the casting of the chamber. A valve, *g*, is formed upon the upper end of the float, B, which is cylindrical and beveled downward toward its center, forming a sharp edge, which removes deposits made by the gas upon the valve seat. A passage, *h*, connects the space above the valve seat with the chamber, A, for the purpose of equalizing the pressure on the valve, *g*. C is a gas supply pipe, that leads directly to the boiler furnace, and C′ is a branch pipe leading to the supply ports, *e e*, of the regulator. C″ is a pipe leading from the gas regulator to the pipe, C. Stopcocks are placed in these pipes, by which the gas may be entirely shut off from the regulator, if required. The pipe, *a*, is connected with the boiler, so that the pressure upon the surface of the mercury contained in the chamber is the same as that carried by the boiler. The length of the pipe, E, is such that the column of mercury contained by it is counterbalanced by the pressure upon the surface of the mercury in the chamber, D. The pipe, C, is stopped between the pipes, C′ and C″, and the gas flows through the pipe, C′, through the ports of the regulator and pipe, C″, to the boiler furnace. If the supply of gas is too great, an increase of pressure in the boiler results, and an increased pressure is exerted upon the surface of the mercury in the chamber, D, which drives the mercury through the tube, E, into the float chamber, A, which raises the float, B, and causes the valve, *g*, to close the ports, *e*, more or less, allowing only enough gas to pass to the boiler furnace to maintain the required boiler pressure. When the pressure in the boiler decreases, the operation is the reverse of that just described.



This device was patented through the Scientific American Patent Agency, February 6, 1877, by Mr. E. O. Martin, of Greece City, Pa.

Plowing with Dynamite.

We have already mentioned that dynamite has been used for plowing; and agriculture will derive advantage from this and other compounds heretofore employed in engineering. At the works for the Exposition buildings, now going on at the Trocadero, Paris, passers-by may, at certain hours, be startled by a deep rumbling sound. This is caused by springing of dynamite mines, which, without any violent projection of materials, makes the obstacles crumble away, and breaks up the underground rocks, the fragments of which are used for the buildings. Now, dynamite will perform a similar service in the fields. The Duke of Sutherland, in Scotland, and Dr. Hamm, in Austria, have employed it for clearing land and for digging much deeper than any instrument could. A certain number of dynamite cartridges are buried at regular distances in the soil, and connected together by electric wires. The explosion is simultaneous; and, though nothing is thrown up, the field is effectually plowed.

Hide-Bound Trees.

Trees that have long stems, exposed to hot suns or drying winds, become hide-bound. That is, the old bark becomes indurated—cannot expand—and the tree suffers much in consequence. Such an evil is usually indicated by gray lichens, which feed on the decaying bark. In these cases, says the *Gardener's Monthly*, a washing of weak lye or of lime water is very useful; indeed, where the bark is healthy, it is beneficial thus to wash trees, as many eggs of insects are thereby destroyed. We would, however, again refer to linseed oil as a wash, as far more effective for insects, and it would, perhaps, do as well for moss and lichens. After all, these seldom come when trees are well cultivated. It is neglect that makes poor growth, and it is poor growth that makes lichens.

Great Eruptions.

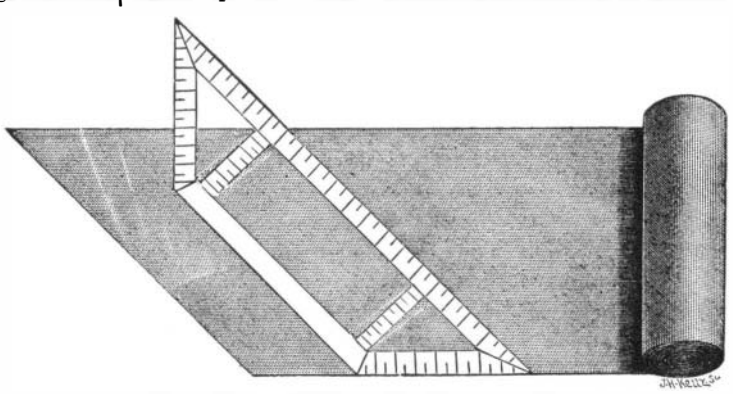
Two tremendous volcanic eruptions have lately occurred in the Hawaiian islands, which contain the most remarkable group of volcanoes in the world. Mauna Loa, which is 14,000 feet high, has great eruptions once in seven years, which are very energetic during the brief period over which they continue. On February 14, this volcano burst forth. During the preceding afternoon, a heavy cloud of black smoke had enveloped the top of the mountain, and in the forenoon of the day above mentioned five distinct columns of fire could be seen. The smoke masses, one observer says, were ejected to a height of not less than 16,000 feet, rising with such velocity that an elevation of 5,000 feet was reached within a minute. The sky was darkened over an area of 100 square miles, and at night the illumination was so brilliant that all parts of the island were lighted up. This tremendous eruption lasted but a short time, having spent its force in about six hours.

On February 24, a submarine volcano appeared near the harbor of Honolulu. Columns of smoke arose from the surface of the sea, and large masses of lava were ejected. This volcano seemed to be upheaved by a submarine rupture, running in a straight line for nearly a mile. Several very severe earthquake shocks were felt along the neighboring land.

IMPROVED YARD STICK AND BIAS MEASURE.

The annexed engraving represents a novel and very handy implement, either for the drygoods salesman or the dressmaker. It enables the latter to solve graphically—as the mathematicians say—a geometrical problem which often vexes the feminine mind, and allows of stuff being cut to the best advantage—an important item in these days when the average female robe is a structure rivaling a suspension bridge in intricacy and requiring engineering ability of a high order to construct. Besides, the invention is calculated to secure considerable saving for the retail drygoods dealer, as the inaccurate measuring of expensive fabrics may in time aggregate a waste which figures prominently on the wrong side of the profit and loss account.

The object of the device is to insure the marking of a true bias or angle of 45° to the selvage. A yard stick is suitably divided and has two arms attached to it at exactly the angle above mentioned. There are crossbars showing the width of a bias strip. The inner bar serves to give strength, and to enable a double bias to be marked. For example, to cut off a band 3¼ inches wide, a common width for trimmings, etc., the inner bar is adjusted parallel to the end of the cloth, as shown in the engraving. A line is then ruled by the yard stick and the measure is moved a corresponding distance, as indicated by the crossbars. These lines are ruled both by the yard stick and the inner bar. In this way, three strips are marked with one movement of the measure.



SOMES' YARD STICK AND BIAS MEASURE.

It is then certain that the stuff will be accurately cut, while the whole operation is done very quickly. The yard stick and arms are marked on both sides, so that the measure can be used on either side of the cloth.

The invention was patented October 10, 1876, by Mr. John K. Somes, a silk salesman of long experience. For further particulars regarding agencies, rights, etc., address J. K, Somes & Co., Springfield, Mass.

THE Missouri Senate has passed a bill offering $10,000 reward for the discovery of a sure cure for hog cholera. Such a handsome prize should certainly stimulate the faculties of scientific men, especially those who are practical farmers.