Improvement in Turbine Water Wheels.

It is a well-known fact that whenever the flow of water through the buckets of a turbine wheel has its velocity diminished by the lowering of the head, a better result is obtained by diminishing the spaces between the buckets.

The writer has often descended, in such an emergency, into the wheel pit to adjust the buckets of one of these wheels which were supplied with movable plates at their outer border, held by set screws; a tedious operation and one requiring great judgment to perform with any approximation to accuracy.

The invention herewith illustrated is intended to furnish a simple and ready means whereby the buckets may be adjusted as the head varies, either while the wheel is in motion or at rest, by hand, or by the action of a regulator.

Fig. 1 is a perspective view of a center discharge wheel with portions of some parts broken away to show better the construction of other parts.

The toothed wheel, A, has a female screw cut through the hub, which plays on the male screw, B, elevating it or permitting it to fall as desired, through an oblong opening in the supporting framework, C. The oblong opening fitting over the oblong shank, D, of the screw, B, prevents its turning on its vertical axis, while it is free to move upward or downward as the wheel, A, is rotated one way or the other.

The head of the screw, B, is a rectangular frame, E, through the lower horizontal part of which an opening admits a shaft, F, which descends through the hollow shaft, G, of the water wheel, to the interior of the water wheel. An upper and an under collar, H and I, are fastened to the shaft, F, by set screws, as shown in the engraving, so that F must obey the motion of the screw, B. The water-wheel shaft, G, rests upon the usual step at the bottom of the wheel.

The lower end of the water-wheel shaft, G, is slotted to permit the passage of horizontal arms, J, attached to an enlarged portion, K, of the shaft, F. The arms, J, with the circular frame, L, and slotted brackets, M, attached to L, rise and fall with the shaft, F, as acted upon by the screw, A. The slotted brackets, M, are inclined to the circular frame, L. In the slots of these brackets (one to each bucket) play pins, N, fastened by a screw bolt to the top edge of the buckets, O. The receiving, or outer ends of these buckets are fixed, being cast with the rim of the wheel; the inner, or discharging ends are movable, being pivoted to the fixed ends of the buckets in the manner of a rule joint.

The operation of the parts is as follows: As the wheel, A, is turned to the left or right, the shaft, F, is lifted or depressed, carrying with it the parts, J, K, L, and the brackets, M. The inclined slots of these brackets act upon the pins, N, and these being attached to the movable inner, or discharging ends of the buckets, open them or close them as desired.

The upper part of the rim is recessed to allow the motion of the pins, and at the same time to allow the top of the bucket to move closely to the rim. The pins are thus placed above the current of water and out of its way.

Fig. 2 shows a plan of the buckets, pins, and slotted brackets, when the buckets are pivoted to swing horizontally.

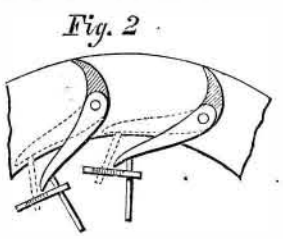


Fig. 2

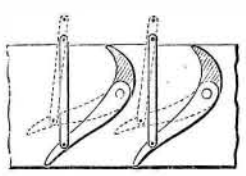
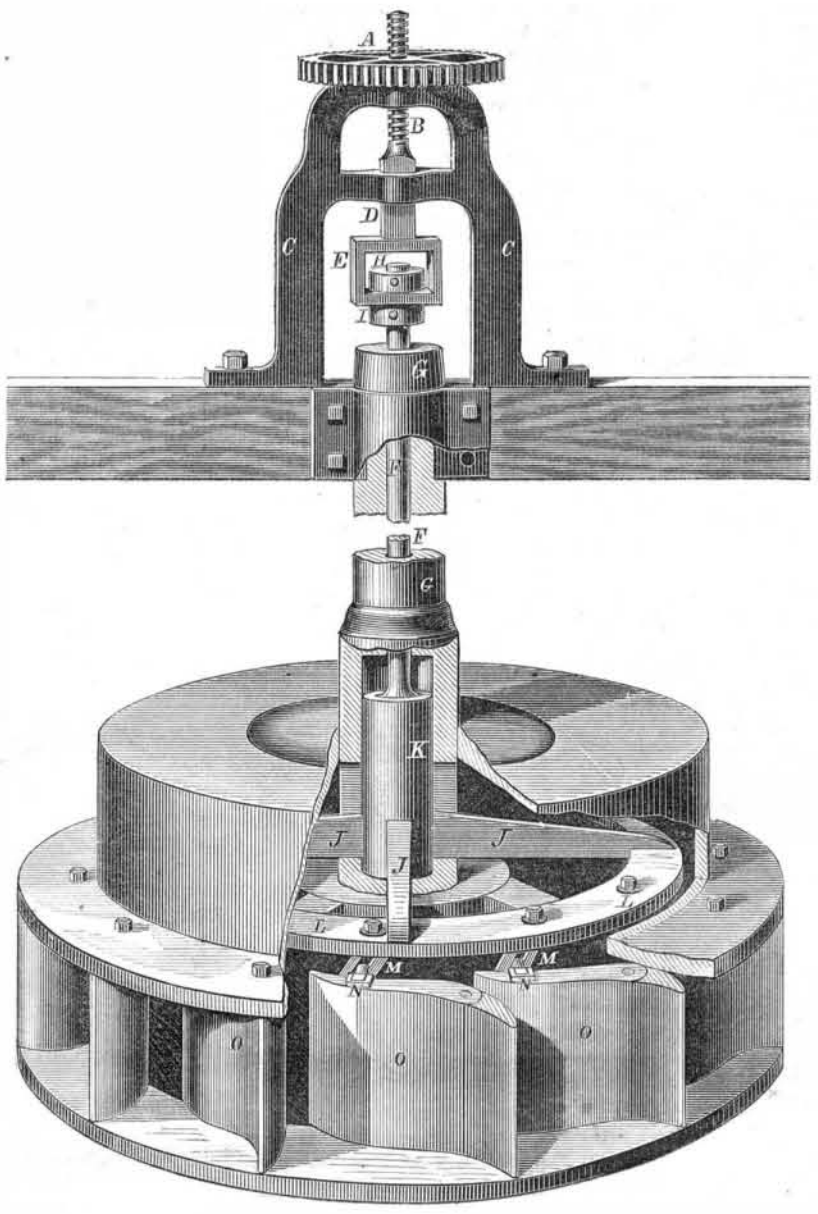


Fig. 3

Fig. 3 is an elevation of the buckets when pivoted to swing vertically, showing an extension of the principle to wheels of this description. It will thus be seen that the improvement is equally applicable to turbines of all kinds, and not only does away with a great inconvenience but adds to their efficiency.

Patented, March 9, 1869, by Jesse Newlin, whom address for further information, care N. W. Newlin, 2203 Cherry street, Philadelphia, Pa.



NEWLIN'S IMPROVED TURBINE WATER WHEEL.

THE SOIL, THE PLANT, AND THE ANIMAL.

How much stronger at every step becomes the likeness between the soil, the plant, and the animal; how much closer their connection, how much more indissoluble the union that binds them together. When dry bone is burned, the ash that remains behind amounts to two thirds its weight, and consists almost entirely of phosphates of lime and magnesia, which are so abundantly present in the ash of different varieties of grain This bone-earth must exist in the soil. The plant draws it from the earth by its roots, the cow eats it with the herbage she crops from the field, and parts with it again in the milk she produces to feed her young. The calf sucks the milk, and works up the phosphates it contains into the form of living bones, adding daily to their size and weight. Without bone our present races could not exist. It forms the skeleton to which the softer parts are attached and by which they are supported; but the life of the animal being at an end the bone as a living thing is discharged and falls to the earth, new plants taking up its phosphates again to send them forward on a new mission into the stomachs of other living and growing animals.

Improved Gas Process.

The *Evening Post*, of this city, reports that Professors Silliman and Wurtz have discovered a new and cheap method of producing a superior illuminating gas. The first step is to bring very highly heated steam into a clay retort, in which pure anthracite coal is burning. The coal is purely carbon; the steam, of course, consists of the same elements as water —that is, the two gases, oxygen and hydrogen. Now, the oxygen of the steam combines with the coal or carbon, and forms the gas known as oxide of carbon, leaving also the hydrogen gas free. These two gases are thus produced in equal volume. They are both easily combustible, and burn with an intense heat; although they give, when burning, hardly any light.

These gases are then mixed with the common illuminating gas, made by distilling bituminous coal. The mixture, it is found by experiment, forms a brilliantly-burning gas, which is better, in some respects, than the best of that with which our houses are usually lighted; for example, it is more permanent under exposure to severe cold. But the main advantage is in the saving of expense. It is plain that this method turns water, and the whole weight of anthracite coal used, into illuminating gas; while the old process yields in gas only the volatile part of the bituminous coal thrown off in distillation.

"Messrs. Silliman and Wurtz, assures us," says the *Post*, "that they are able practically to add fifty per cent to the amount of illuminating gas obtained from a given expenditure of coal, or, what is the same thing, to save one third of the fuel now used in making gas."

STREET CROSSING.—John Simpson of Cleveland proposes a a plan for street crossing by means of a bridge approached by double inclined planes instead of stairs, which are more easy of ascent, but the difficulty is still to be overcome. Property owners object to a bridge fronting their premises, and what is wanted, is some means of crossing that will take the place of a frowning structure above ground.

The Diffusion of Scientific Information.

In an able address delivered before the graduating class of the Cambridge Divinity School at the close of the summer term this year, John Weiss said a great many forcible and brilliant things. Among these, none has struck us as showing so exact an appreciation of the tendencies of the age as the following remarks upon the general diffusion of scientific information in a popular form, and the avidity with which this information is sought by the American mind.

"Human nature is learning to ask very intelligent and embarrassing questions, while its religious exigences are the same that they ever were, and have to be harmonized with knowledge. Here you may have been taught to gage and appreciate past epochs of spiritual development, and to note their connection with various mental states, and you have indulged religious feelings. But now you are about to discern, by contact with men in vital society, what is essential religion, in order that your service may be timely for this race and country. The past may be the soil that holds your roots, but not a ball and chain around the ankle. If you undertake to drag the dogmatic life of nineteen centuries across the face of the country, your traces will be marked by denudation of the fertility that would prefer your bold husbandry. You go forth to quicken the native germs that lie waiting to succeed the old crops, when decay or the ax shall clear the land. "Instead of the thorn shall come up the fir tree, and instead of the brier, shall come up the myrtle tree."

"Cheap publications of every kind spread the moods of the period far and wide. Their range passes through all the speculative forms, and all the emotions which the world at any time has known. The very richness is a cause of the distraction. Thought is unconsciously embarrassed as so many departments throw wide their doors at once, and display their collections. And there is no statement too scientific to resist the intentions of popular treatment. It is macerated, dissected, volatilized, put up in packages for the trapper and emigrant. Every condition of half knowledge appropriates it. People who are troubled with imperfect nutrition will snatch, at every railway station, a gulp of spectrum analysis, primeval man, the correlation of forces, spontaneous generation, social statics, Carl Vogt's impetuous atheism, Mr. Darwin's pangenesis, Professor Huxley's non-committal protoplasm, and the last message from the summer land.

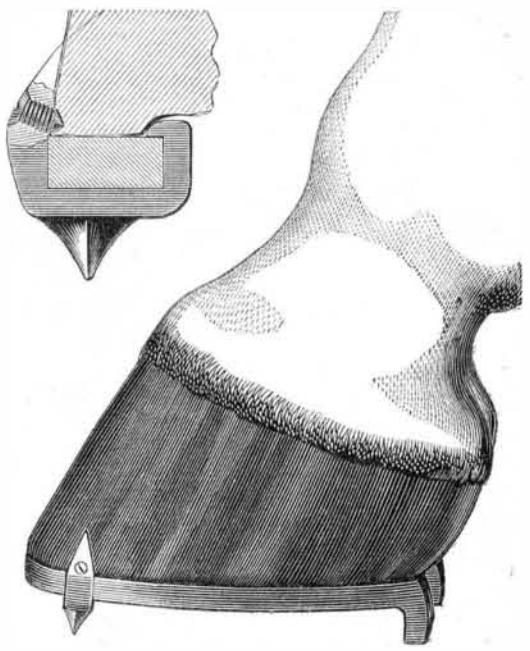
"The scientific mind is making the whole world at once its laboratory and auditorium; and among the hearers there is no distinction of person, color, sex, or previous preparation."

GODDARD'S DETACHABLE CALKS FOR HORSESHOES.

The object of this invention is to furnish a cheap, durable, and efficient calk, easily adjustable, which shall prove a protection against slipping, and shall bear entirely on the shoe, not injure the hoof, or cause discomfort to the horse when shod according to the method proposed.

The inventor claims that it will not cost as much as the blacksmith's charge for calking a shoe as now performed; that it will keep sharp and will prove a great saving of time, as every driver can adjust his own calks as he needs them.

The engraving illustrates the appearance of this calk when fastened to the shoe or the foot of a horse, and also gives a sectional detail showing the construction of the calk and the mode of fastening it to the shoe.



The shoe proper is of the ordinary form, minus the toe calk, in the place of which two of the adjustable calks are used, one on each side of the toe.

The calk is provided with two clasps, as shown in the sectional detail, one of which passes over the inner side of the shoe, and clasps down upon the top of the shoe on the inner side. The other passes upward across the outside of the shoe, and rests not only against the shoe but the outer side of the hoof. It is held in this position by a screw passing obliquely downward through the outer clasp till its point reaches and rests upon the top of the shoe. The calk is made of material best adapted to withstand wear, and of a form best calculated to give a firm hold to the foot in traveling.

This improvement was patented through the Scientific American Patent Agency, May 25, 1869, by Rev. Kingston Goddard, D. D., of Richmond, Richmond county, Staten Island, N. Y., who may be addressed for State, county, or shop rights