IMPROVED CURRENT WATER WHEEL.

The means of utilizing the power afforded by the current of a river, where sufficient fall cannot be obtained to run a turbine wheel successfully, have been brought to comparative perfection within a few years by the improvements which have been made in this class of devices. Necessarily, where even the best form of current wheel is used, the application of the power of the stream is made in but an imperfect degree as regards economy, a large proportion of it running to waste, and only the effect of the water directly in contact with the wheel being gained; but as no other expense than that of constructing and setting the wheel is incurred, the investment is often a very profitable one. To obtain all the power which the volume of water in the stream would afford would require the building of a dam, and consequently the employment of capital, frequently to a very liberal extent, in securing the primary facilities for doing business; and where the capital is not at command, or a large business is not contemplated, an ample return may be realized on a moderate investment by putting in a current wheel of the most approved construction. Such a wheel is illustrated in the engraving on the preceding page, which shows a basin made in the bank at right angles with the stream, its sides being protected by planking, for which stone may be substituted if cheaper or more convenient. In this basin floats the raft which carries the wheel, the frame of the raft being so made as to balance the weight of the wheel. The basin or slip is dug deep enough to float the raft and wheel at low water, and extends into the bank a distance equal to the length of the whole apparatus, which may thus be drawn back entirely out of the current. This is a point of special value, as by means of this arrangement the wheel and raft can be withdrawn out of reach of drift wood and thus be protected from injury when the stream is swollen by heavy rain or melting snows.

The wheel, which is an undershot, is shown projecting into the current and in operation, its motion being communicated through the gearing A, to the horizontal shaft B. On this shaft slides a loose pulley, C, having on the left hand side of its hub an annular recess and a clutch, by which, when desired, it is engaged with the shaft B. The annular recess receives one end of the shipper lever D, the other end of which is made fast on the bank, and by means of a hinge the lever is rendered adaptable to the position of the raft at any stage of water. The shaft E, which is rotated by a wheel at one end as shown, has chains wound around it, leading to the opposite ends of the raft; and thus, by turning the wheel toward the bank, the raft is drawn in, while by turning in the other direction it is moved out into the stream. When the raft is run out, the wheel is held in position by a pawl which drops into a recess in the shaft E. The rollers F, on the sides of the raft, only one of which is shown in the engraving, facilitate the moving of the raft by their contact with the planking of the basin, preventing the friction which would result from the raft being forced by the current against the side of the slip.

It will be seen that when the raft is moved out, the lever D will draw the clutch into action, and the motion of the shaft B, received from the water wheel, will be transmitted through the loose pulley, C, and its belt to the machinery of the mill. On the other hand, when the raft is drawn in, the lever D, remaining rigid, will push the parts of the clutch asunder and the loose pulley will cease to turn. By this arrangement, the same appliances by which the raft is moved in and out serve to regulate the transmission of power and the starting and stopping of the machinery.—*Scientific American.*

THE *Builder* has the following: Many have seen working on the Thames a steam dredger, named the *Sampson*, with an endless chain of laden buckets rising at a low level and disappearing at a higher altitude. The *Sampson* of the Thames has, it seems, been moored at Hartlepool, and as it works by tide Sundays are perforce called in as working days. Miners are an inquisitive body of men, and on their leisure day a number watched the *Sampson's* buckets go up and down, and tried to count them. Having reached 1,000, they gave up their task, exclaiming, "Sampson was a strong man, but, by gum, lads, he never lifted so many buckets of mud as this fellow, and kept at it as he does; when will the last bucket stop, eh?"

PROF. FLEEMING JENKIN ON PATENTS AND THE PATENT LAWS.

At the University of Edinburgh, on Nov. 3rd, Prof Fleeming Jenkin delivered to the Engineering class a lecture on Patents and the Patent Laws, of which the following is an abstract:—

In the outset he referred to the vulgar error that a man of mere native shrewdness could make some great discovery in a branch of engineering of which he knew nothing practically or theoretically. Yet a whole tribe of patentees, miscalled inventors, really did exist, who believed that they had almost fortuitously, without effort to themselves, picked up some great nugget which must have lain staring in the face of the practical workers of the ground for years. Two classes of men made valuable inventions, the men who by practical experience in a given manufacture knew the defects of existing mechanism and the requirements of some special manufacture, or the men whose theoretical knowledge of a subject was such that they could understand the conditions of success in a machine or manufacture better than those who had a mere practical acquaintance with the subject. There was a popular idea that if patents cost only a few shillings the poor inventor would be greatly benefited. He thought the cases were very few where an invention of real merit was lost to the inventor in consequence of the expense of a patent. If a poor man could not persuade any one to invest the cost of a patent in his idea, he would certainly find it equally difficult to induce men to invest money in experimental manufacture after he had secured the patent. The real difficulty was the want of money to introduce the invention in most cases, and this difficulty did lead poor men who had valuable patents occasionally to part with them for a price disproportionate to what was ultimately found to be the value of the invention. No doubt, if these men paid less for their patents they would have more money left for experiments, but, on the other hand, it must be remembered that cheapness would lead to the vexatious multiplication of trifling and dishonest patents, and this led to the consideration of the grounds on which patents were granted by the State.

Patents were not granted as rewards of merit, but purely on grounds of public utility. The State followed the simple principle of paying for results, either actual or in prospect. A monopoly for a limited number of years was offered as an inducement to make inventions, to disclose them, and to apply them. All who wished that the patent laws should remain in force ought to contend that without this inducement men would invent less and carry out fewer useful inventions. If they could not persuade the Legislature of this, patent laws would be abandoned, for it was certain that the restrictions they imposed caused some hindrance to the improvement and extension of manufactures. There were many trifling improvements which manufacturers would adopt if they had to pay no royalty, but for which they refused to pay a penny while the patent lasted. The sum of many trifling improvements would often be equivalent to a single great improvement, and by preventing this, patents injured the community. Moreover, many patents were taken out for trifles which were certain to be reinvented by dozens of men as soon as the want for the article was felt. Whenever a manufacturer was stopped by a previous patent from carrying out some little improvement of his own, he began to consider as monstrous the proposition that a man should have a monopoly in an idea merely because he thought of it first. These were excellent arguments against granting patents for trifling or obvious improvements, and these vexatious patents would be much multiplied if their cost were lessened, but they left quite untouched the reasons for granting temporary monopolies of really valuable inventions. The mere publication of an idea was a very different thing from the introduction of a successful invention. It was a mistake to think that when a valuable idea was published capitalists and engineers flew to seize it, and struggled fiercely as to who should have the honour and profit of carrying it into effect. Perhaps if Watt had published the idea of a separate condenser in a scientific journal and stopped there, we might have been without our present form of steam-engine to this day, but if this be thought too daring an hypothesis he (the Professor) could nevertheless insist that the inventor of any invention, however excellent, had to force it upon the public at much expense and much labour and vexation. Very few men indeed would risk money, time, and peace of mind in the struggle but for the