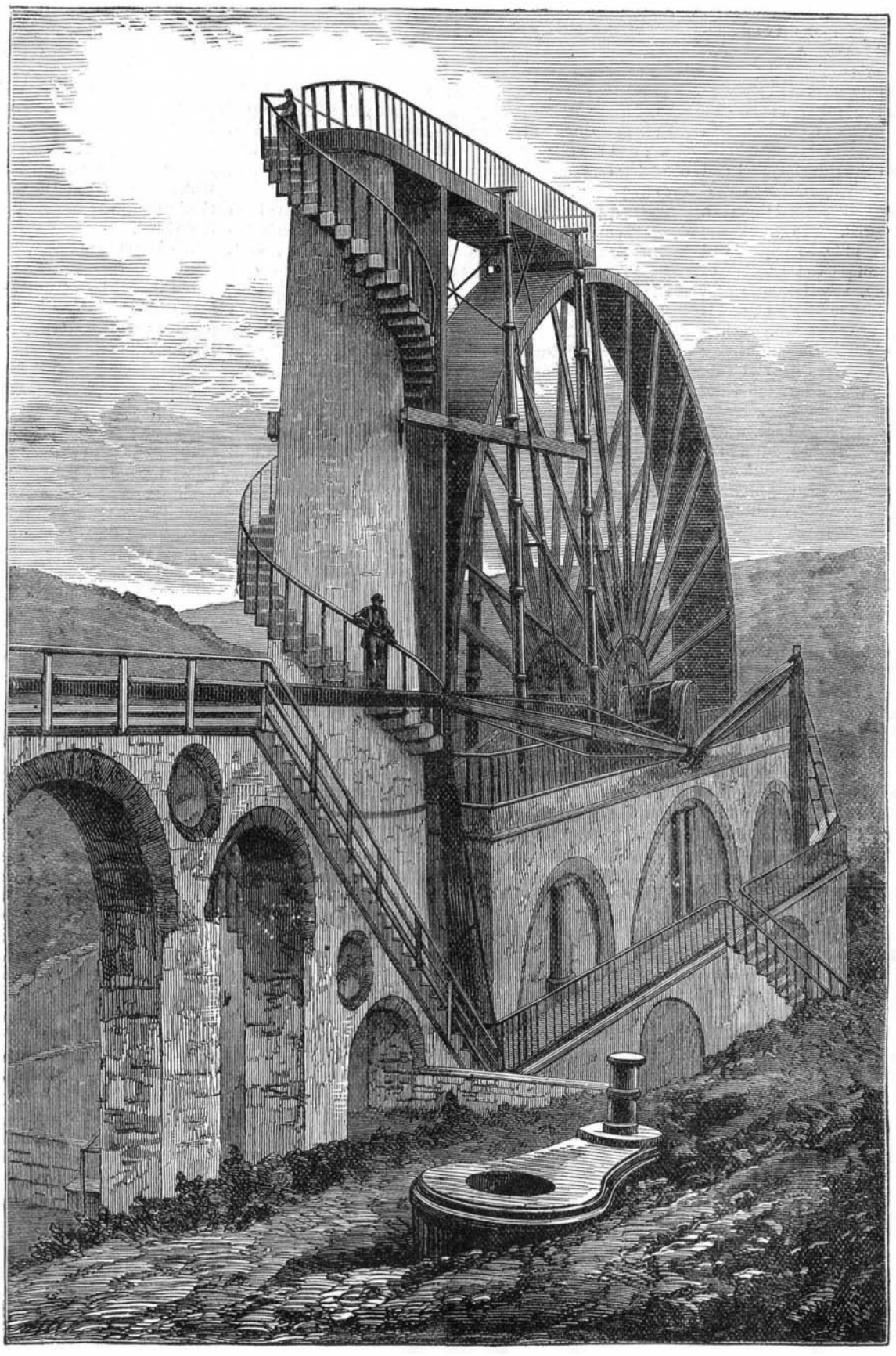
THE GREAT LAXEY WATER WHEEL.

Probably the largest water wheel in the world is that represented in our illustration. It is located at Laxey, Isle of Man, in which village are extensive mines which have now been worked for several centuries, and which are noted for their richness in copper, lead, and silver ores. The deepest workings extend 1,380 feet below the surface, and are drained chiefly by the powerful pumps operated by this immense motor.

The wheel was erected by Mr. Casement, a Manx engineer. It is known as the "Lady Isabella," after the wife of a former governor of the island, and was started September 27, 1854. It is of about 200 horse power, and can pump 250 gallons of water per minute from a depth of 400 yards. Its diameter is 72 feet 6 inches; circumference 217 feet 6 inches. Its breadth is 6 feet, and it has a crank stroke of 10 feet. The water for driving it is brought from a reservoir on a neighboring hill. The wheel and its fittings are, as represented in our engraving, supported on an elegant structure of iron and masonry formed in open galleries.

The only water wheel approaching the one above described in magnitude, in the United States, of which we are at present aware, is that which supplies power to the Burden Iron Works, in Troy, N. Y. This is an overshot wheel, 50 feet in diameter and 22 feet in breadth.



THE GREAT LAXEY WATER WHEEL.

A Suggestion for Electro-platers.

We would throw out a suggestion, says the *Building News*, which has occurred to us in connection with electro gilding, namely, we cannot see why a pattern or ornament (similar in character to the old style called damascening) could not be either printed or penciled upon the articles to be plated, with a varnish or medium which would prevent the deposit of the electro silver or gold upon the parts which it covers, and which would be easily removed after the article has been electro gilt. If this could be done a wide field would be opened up for its application, as, for instance, supposing an article was first plated with silver, and then a damascene pattern was put on the silver in the manner above described, and then the parts left uncovered were plated with gold, we should have a work of art of a very high class, at a comparatively low cost, the pattern being gold upon silver, or *vice versâ*. As to the practicability of the operation, we have no manner of doubt whatever, and, therefore, commend the hint to those whom it may concern.

Envelope Making.

At the recent International Exhibition in London, a series of machines were exhibited by Messrs. Dickenson, manufacturing envelopes from the roll of paper to the finished article, gummed and counted into packets. In this series the web, as the roll of paper is called, is drawn along by suitable rollers and cut into sheets, one of the chief features of the machine being the method of varying the rate of advance of the web, or, in other words, the size of the sheets. On the roll shaft and that of the knife are deeply flanged pulleys, the rings of which are in segments; the radial arms carrying these segments are operated on by wedges attached to a collar which can be slid along the shaft, so that, when the wedges are brought into play, and to just the extent to which they are advanced or withdrawn, the pulley is increased or decreased in diameter. The circumferential proportions of these pulleys are preserved by an ingenious piece of mechanism, so that the driving belt in connection with them is always at the same tension. When the sheets are cut to size they are passed through milling rolls, where they are glazed, and are then piled to about an inch in thickness under a shaping press consisting of a series of punches, which cut the heaps into the shape of an opened envelope. The operations of gumming and folding are accomplished by ingenious mechanism which could not be explained without elaborate drawings. Several machines were exhibited for effecting these operations, one of which lifts each envelope from the heap by a pneumatic plunger, and hands it over to the gumming mechanism. The lip of the envelope is sometimes embossed by the cutters at the same operation as the cutting, but special embossing is performed by a separate machine, as are also the black borders and the folding. As may be supposed, these machines, from their complicated construction, are expensive, but they are models of mechanical ingenuity. Bookfolding and newspaper folding machines were also exhibited, but these do not afford so remarkable a saving of labor and time as to insure their general adoption.

To the New York and New Haven and Hartford Railroad Company is accredited the following brilliant plan for keeping switchmen awake: It is proposed to have the lever of the switch in a sentry box, so arranged that when the switch is open the door is shut and locked, and can only be opened by closing the switch. If a train comes along while the switch is open, it is sure to smash the sentry box first, and the switchman can only save his life by attending to his business. He is not likely to sleep much when trains are due on his track.

TURNING THE TABLES.—An Irish gentleman, of a mechanical turn, took off his gas meter to repair it himself, and put it on again upside down, so that at the end of the quarter it was proved that the gas company owed him £3 7s. 6d.!

PITTSBURGH has eleven blast furnaces in operation. At present prices of iron the proprietors of these furnaces must be a cheerful class of persons.

Continuous Expansion Engines.

At a recent meeting of the London Association of Foremen Engineers, Mr. Nicholson referred to the continuous expansion engine, made by Mr. John Stewart, Blackwall Iron Works, which, he stated, is the only engine on the compound principle now in the market as a competitor to the Woolf machine. The steam is worked in a different channel from any other engine. It is cut off at about half stroke on the small piston. At the time the small piston passes the cellular ports in the sides of the small cylinder, the two pistons begin to share the steam between them. At the same time they begin to expand the steam, when the small piston has finished its up or down stroke. The large piston continues to expand the steam until nearly at the end of its stroke, which causes it to be, as its name indicates, really a continuous expansion engine. The steam is a less time exposed to the atmosphere than in the ordinary compound engine; it gives out a steady motion, and each cylinder can be worked separately at pleasure, which is a great consideration in case of a break down.

This engine is applicable to all purposes, and more particularly where a steady motion is required, such as flour or cotton mills. It is nearly as economical when working non-condensing—commonly called high pressure—as the ordinary condensing engine, and is well adapted for American rivers. The steam could always be worked to within one pound of the atmosphere, and no more noise would be heard than from a condensing engine.

The difference between the continuous expansion engine and the ordinary compound engine is that, in the latter the steam has to expand in the first cylinder until nearly the end of the stroke: then the steam passes to the second cylinder. If cut off at half stroke, the steam would then be half of the boiler pressure, before it entered into the apertures prepared to receive the steam previous to acting on the second piston. In the continuous expansion engine (the steam going through a different channel, and as soon as the piston passes the cellular ports in the side of the first cylinder, the two pistons sharing the steam between them), it is therefore absolutely necessary to proportion the engine with minimum ports and not to throttle, in order to get the maximum power. That is the reason why the hollow valve or traveling steam chest is introduced between the two cylinders, to receive the steam from the first and pass it to the second. The steam does not enter the chest; it passes through the hollow valve, which is nothing more than the continuing of the steam ports from the one cylinder to the other. Both pistons are running in the same direction, and the pressure of the steam on the large piston is just in proportion to the space that is filled; the smaller the spaces, the greater the pressure, that is, minimum spaces and maximum power. In the compound or, rather, Woolf system of working, the greater the pressure on the large piston, the greater the resistance on the small piston. Not so in the continuous expansion engine. Instead of a resistance, there is a great assistance by a vacuum being formed in the first cylinder as well as the second. Very long stroked engines, working from 12 to 14 strokes per minute, would not give such good results by being connected to the condenser; but engines running from 60 to 100 strokes do not allow time enough for the cooling to take place in the cylinder; therefore the continuous expansion engine will give out considerably more power with the same area than any other compound engine yet discovered.

A CORRESPONDENT, J. W., of Ill., in writing on the criminal negligence of large corporations, states that the superintendent of a railroad in his State has been heard to say, when applied to for employment: "Wait a while; there will be a vacancy soon. We kill or cripple a man every day."