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Improved Turbine.

The employment of turbine wheels seems to be on the increase, and numbers of manufacturers are investigating the merits of the several kinds brought before the public with the view of adopting those which yield the largest percentage of the water power. For factories of all kinds, and in places where steady power is required, turbines are fast superseding breast and over-shot wheels. The engravings here published (Figs. 1 and 2) represent a turbine wheel of peculiar construction. The wheel itself, shown isolated in Fig. 2, gives a clear idea of the conformation of the buckets—the principal feature—and the case broken out discloses the wheel as it stands when in use. The advantages of it are thus set forth by the inventor:—

"One of the principal advantages of this turbine is the construction of the buckets, as plainly seen in the engraving, which, being the most important part of the whole machinery for the water to act upon, are prominently shown. In order to gain more power with the same quantity of water used in other turbines, and more fall or head of water, the friction must be reduced and the pit made deeper. To obtain a wheel of the class specified, the buckets must be so constructed that they will admit of the water being discharged immediately after it has acted upon or against the bucket, and without coming in contact with any part of the wheel which would detract from the effect or power of water obtained by its first impact with the buckets.

"This cheap and economical wheel can be put in the place of another wheel of its class in the same scroll or case without any trouble."

This invention was patented through the Scientific American Patent Agency on the 23d of September, 1862, by H. N. Gallagher. For further information address Messrs. Fuller & Lafely, manufacturers, Cohoes, N. Y.

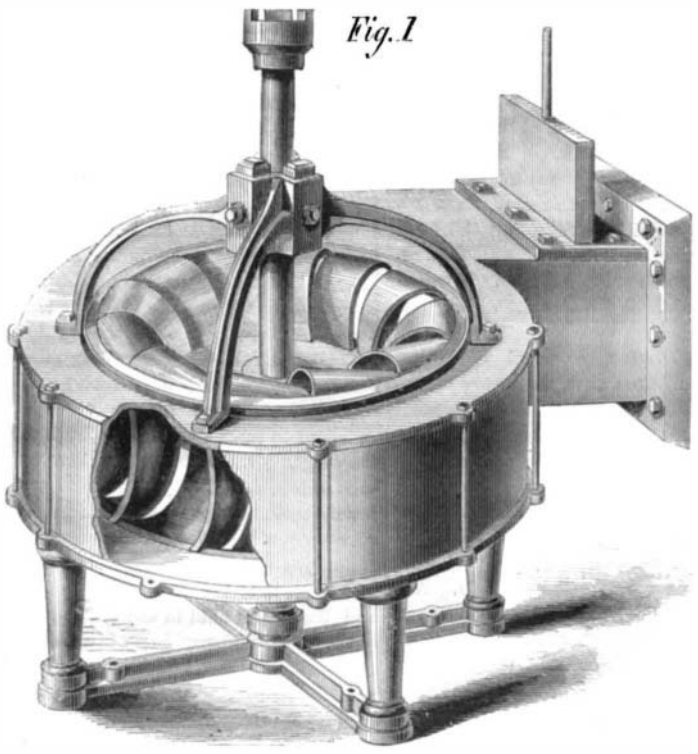
Fig. 1

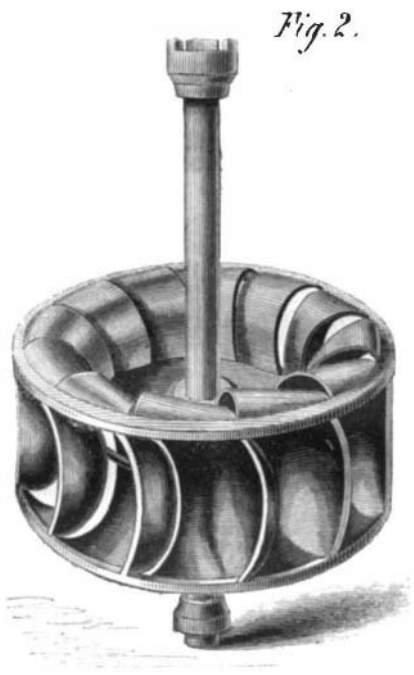
Fig. 2.

GALLAGHER'S TURBINE.

A New French Steamer.

It seems that even in these days of engineering progress there are firms who build side-lever engines. A new French vessel built in Scotland has just received a pair of the dimensions stated below:—The *Europe* is 3,400 tuns B. M., and a sister ship to the *Washington* and *Lafayette*, at present plying between New York and Havre. The machinery of the *Europe*, like her sister ships, was made by the Greenock Foundery Company. The engines are side-levers of 800 nominal horse-power. The diameter of the cylinders is 94½ inches, with a stroke of 108 inches. The levers are 24 feet long, and 7 feet broad at the center. The paddles are 37½ feet in diameter. The fact that the start of these three vessels' engines was so successful, and that no after alterations had to be made on them, reflects credit on the engineering department of the company. The boilers of the *Europe* are six in number; four of them are for working the engine, the other two are donkey boilers. The four large boilers weigh, when empty, 60 tuns each. They are 22 feet long, 14 feet high, and 12 feet broad. The four boilers have collectively 1,131 brass tubes, each 7 feet long and 3 inches in diameter. They are fired by 24 furnaces, each 10 feet long.

How the Elswick, Eng., Colliery is Ventilated.

The *London Mining Journal* has the following:—"The ventilator is upon the principle of an exhausting fan; it consists of eight vanes, each of which is formed of 1¼ in. oak cleading, secured by bolts to a pair of bars and angle irons, which are bolted to two cast-iron octagonal bosses, keyed on the main shaft, and interlaced, as shown in an accompanying drawing, forming a very firm structure, at the same time simple and inexpensive, admitting of a speed of as much as 150 or 200 revolutions per minute without danger.

"The outside diameter of the vanes is 23 feet, the width 6 feet 6·75 inches, and each vane extends about 8 feet into the interior of the fan, being inclined at an angle of 67·5° to a radial line through the apex of the octagonal boss. The main shaft is driven by a vertical direct-acting engine-cylinder, 23⅝ in. internal diameter, 19 11-16 in. stroke, worked high-pressure. A wall is built on each side of the fan, giving about 1 in. clearance to the side of the vanes.

Outside of one wall the engine is fixed, and in the other an inlet orifice of proper size is left—in the Elswick arrangement 10 feet diameter, such inlet being connected with the upcast-shaft.

"An arch is carried over the face, giving about 2 in. clearance to the vanes, and in continuation of this arch an invert to a point about one-eighth of the circumference below the center line, at which point the 2-in. clearance is increased gradually, expanding the lower curve of the casting till it ends in the sloping side of a chimney formed between the continuation of the side walls of the fan. A sliding shutter is fitted into cast-iron grooved rails for about one-fifth of the circumference, which enables the concentric circle of the top arch to be completed nearly round the fan—that is, giving the 2-in. clearance to the vanes. This shutter is worked by a chain passing over sheaves at the top of the chimney and to the outside. For convenience a man-hole door is left at the foot of the sloping side of the chimney. The fan being set in motion, the air is drawn through the inlet from the mine, and discharged below the shutter into the chimney, from the top of which it is seen to issue at no great velocity. This system, called from the inventor the Guibal Ventilator, possesses important advantages over other machine ventilators—1. In the simplicity of construction;—2. In the arrangements for covering in of the fan;—and 3. In the shutter chimney. Experimental trials, however, are necessary to determine the best size of outlet for any particular mine. The fan at Elswick was constructed specially for the circulation of 50,000 cubic feet of air per minute, with a water-gage of 1·5 in., which is guaranteed to yield at 60 revolutions; and the generally satisfactory working of the ventilator has been established."