

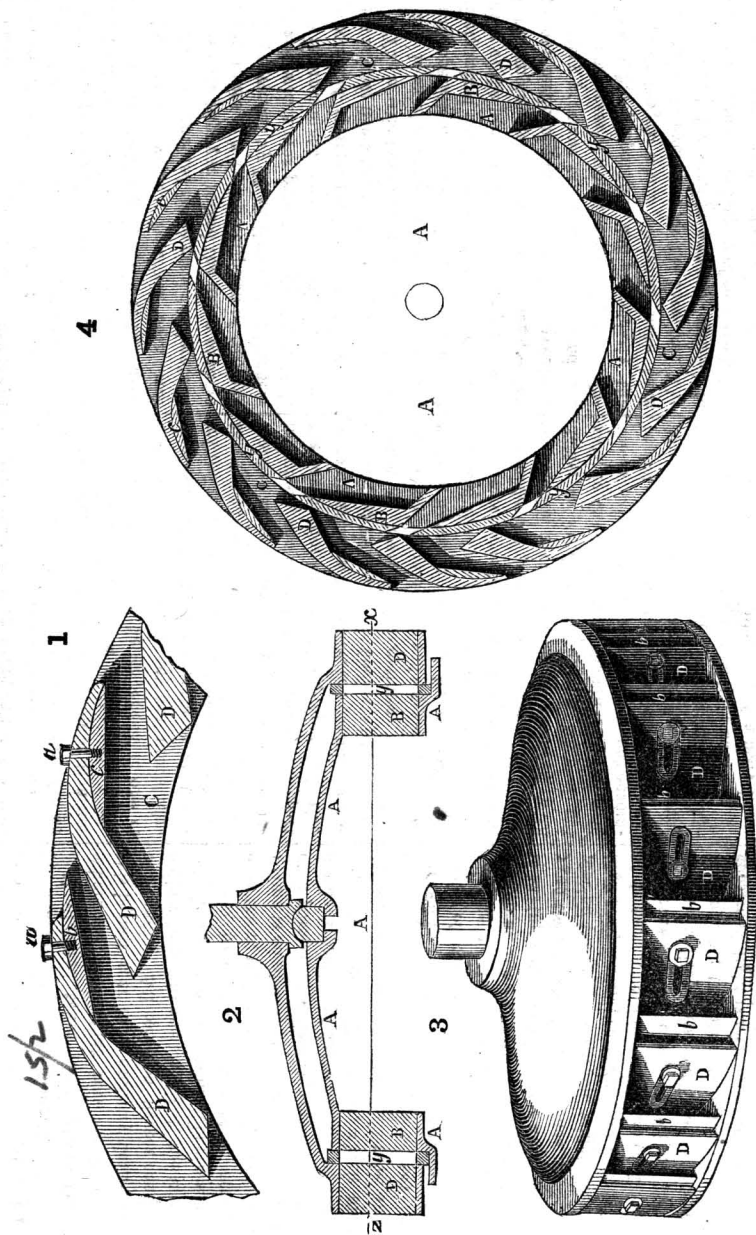


**This PDF is part of the
Philadelphia Water Department Historical Collection
Accession 2004.071.0001
Frederic Graff Jr. Scrapbook, 1854-1857**

**It was downloaded from
www.phillyh2o.org**



JAGGER'S PATENT TURBINE WHEEL.



A Driving Bell—One of these novel machines arrived at the Delaware Valley, from New York, and was manufactured by one of the British Ordnance Engineers in England, and is now in the possession of the late Mr. McIntosh, of the late Mr. Edwards, the sub-contractor for the excavation of Newton Hill, and those of Mr. W. Tredwell, sub-contractor for the Friar Park Farm cuttings, were purchased from the same parties at prices varying from 20*l.* to 35*l.* The former had been acting on the principle of getting out of the horses all he could, working them frequently 15 and 16 hours at a time; and the consequence was, that all his stock was in bad condition, and he would be glad to get 6*l.* or 7*l.* a-piece for them. On the other hand, Mr. W. Tredwell, who was an excellent horse-master, and who did not work his horses beyond their strength, would be able to sell them for about as much as he gave for them—indeed he had done so already for those that he had parted with. Having been a good many years in the service of the late Mr. McIntosh, Mr. Horne could state that it never was

* In 1837, a disease was prevalent among the horses; therefore that year is omitted.

† Fewer horses were bought during the year 1840; the old horses were better fed and harder worked.

The annexed engravings are views of an improvement in the French turbine water wheel, invented by Ira Jagger, of the city of Albany, N. Y., and for which a patent was granted on the 19th of last October (1852.) Figure 1 is an enlarged view of a part of the periphery of the wheel with some buckets; figure 2 is a profile section through the centre; figure 3 is a perspective view of the wheel as set in its proper position, and figure 4 is a plan or horizontal section taken through *x y*.—*A* being the fixed part or shute chamber, with the shutes, *B B*, and *C* the wheel with its adjustable buckets, the same letters refer to like parts. The improvement consists in a sliding gauge or lip secured to the extremity of each bucket, as shown at *a b c*, in the figures, for the extension of the bucket, and fitted to the concave surface of the interior of it, by means of which the orifice of discharge, and its direction is regulated according to the head, under which the wheel works, and the amount of work to be done, and thus obtain the maximum effect with every varying head of water, also adapting the wheel to the work to be done, which in many cases varies a great deal. The lip is a rectangular plate of iron reaching from the top to the bottom of the bucket; its back surface next the bucket is

curved so as to fit the curved surface of the bucket, its front surface being flat, and a chord to the curve of the back surface. This lip is secured in its place by a screw belt, *a*, sliding through a slot in the bucket, and tapped into a lip and is regulated by sliding the said lip to or from the bucket directly in front of it, so as to diminish or increase the space between it and that bucket as shown in figures 1 and 3, where the lip, *b* is shown as nearly closing the exit passage, and the lip, *c*, as leaving the space between the buckets entirely open. A gate is placed between the shute chamber and the wheel, by which to regulate the supply of water to the wheel, so that there may be a due proportion between the quantity of water pressing into the wheel and that flowing out. There is also a movable cylindrical metal ring fitting accurately and occupying the centre space between the outside of the shute chamber and the inner periphery of the wheel as shown in figures 2 and 4, at *y*. It is pierced with slots equal in size and corresponding in form to the external openings of the shutes, and has the edges of the slots bevelled so as to deliver the water with as little interruption as possible, in whatever situation they may be in reference to the openings in the shutes. The ring is moved or shifted round horizontally so

as to close to a greater or less degree, the openings of the shutes, by any mechanical device.

A very important object is claimed and obtained in this patent, viz., the adjustable lip, sliding on the inner face of the buckets to regulate the openings between the outer edges of the buckets, and thereby the flow of water from the wheel, thus adapting the lines of this turbine to the head of water and amount of work to be done, however varying these may be. The water is taken in at the bottom of the wheel and every inch of head is made available. In some situations at different times of the year, the head and quantity of water vary greatly; this wheel is specially adapted for such places. The wheel is simple, strong and durable, and not liable to be obstructed by ice. The inventor is of the firm of Jagger, Treadwell, & Perry, Eagle Foundry, Beaver street, Albany, N. Y., where good castings can always be assured, and from whom more information can be obtained by letter or otherwise. We would state here that we have seen some *unsolicited* letters from respectable persons who have been using this improved wheel, who speak in terms of the highest praise respecting its performances.

loughing, which were tried at Lord Ducie's and by Mr Pusey, it was shown that any increase of speed diminished the amount of work done, in a greater ratio than it was affected by an increase of the load. In drawing loads the weight of the animal was a point of considerable importance; and when extra exertion and muscular action were required, the nearer horses approached to "thorough bred," the greater was the result.

Mr Davidson gave the following statement of the work performed by a London brewer's horse per day; the cost of feed and of wear and tear per horse per annum, being derived from actual experience among a large number of horses at Messrs Truman, Hanbury, and Co.'s brewery. The feed, &c., is supposed to have cost the same per quarter, per truss, &c., each year.

Years	Lb. weight drawn six and a half miles per horse per day.	Lb. weight drawn six and a half miles per horse returning per day.	Average lb. weight drawn 18 miles per horse per day.	Cost of feed and straw per horse per annum.	Difference per horse, after bought and sold per annum.
1835	lb. 5148	lb. 1716	lb. 3432	£ s. d. 43 2 7	£ s. d. 10 0 3
1836	5072	1707	3389	43 16 6	9 18 0
1837*					
1838	5057	1698	3377	41 18 0	9 15 9
1839	5287	1740	3513	42 9 11	9 7 1
1840†	5786	1820	3803	46 11 7	7 17 11
1841	5311	1750	3530	45 0 1	10 16 11
1842	5263	1740	3501	47 0 9	10 8 0
Total	36,924	12,171	54,545	309 19 5	68 3 11
Average for seven years nearly.	5275	1738	3506	44 5 7	9 14 10

Mr Horne stated that Messrs Tredwell had a contract on the South-Eastern Railway, near where Mr Simms' experiments were made; they had upwards of 100 horses, whose average cost was about 30*l.*; they were worked 10 hours per day, and were well fed, so that their value was but little reduced, and they were eventually sold for nearly the same prices as they originally cost. These contractors had about 400 horses on the Southampton Railway, which cost them about 25*l.* each. The same course of not over-working, and feeding them well, was pursued from motives of economy; and they found it answer. It was Mr Jackson's practice to keep so many horses for his work as not to be under the necessity of working them more than 10 hours per day: he gave to each a peck of corn a-day; by this means he has been able to keep up their value. On the Chester and Crewe Railway he had about 300 horses at work, and towards the end of the contract, owing to circumstances over which he had no control, he was obliged to work them 14 or 15 hours per day; and in the course of four months, horses that had been worth 25*l.* were so reduced as not to be valued at above 7*l.* He is a great advocate for steady work and good keep. On the Tame Valley Canal there had been sometimes between 300 and 400 horses, but as the work was nearly finished many had been sold. Those sub-contractors who had kept a sufficient number of horses for the work, so as not to have them in harness more than 12 hours per day, had realized nearly the same prices they had given for them in the first instance. The horses belonging to Mr Edwards, the sub-contractor for the excavation of Newton Hill, and those of Mr W. Tredwell, sub-contractor for the Friar Park Farm cuttings, were purchased from the same parties at prices varying from 20*l.* to 35*l.* The former had been acting on the principle of getting out of the horses all he could, working them frequently 15 and 16 hours at a time; and the consequence was, that all his stock was in bad condition, and he would be glad to get 6*l.* or 7*l.* a-piece for them. On the other hand, Mr W. Tredwell, who was an excellent horse-master, and who did not work his horses beyond their strength, would be able to sell them for about as much as he gave for them—indeed he had done so already for those that he had parted with. Having been a good many years in the service of the late Mr McIntosh, Mr Horne could state that it never was