New Inventions.

Improvement in Windmills.

The annexed views represent the windmill of Dr. F. G. Johnson, of Brooklyn, for which a patent was granted on the 9th of January last.

Fig. 1 is a perspective view of the windmill; fig. 2 is a view of the regulating wheel and weighted levers, and fig. 3 is a vertical side section of the wind wheel and adjuncts. This wind wheel, that is the sails and devices connected with it on its shaft, will regulate its own velocity, wholly independent of any other connection.

DESCRIPTION—Fig. 1 : O O and P represent the standards and braces of a strong frame to support the machinery. They may be of timber or cast iron. L is a hollow post, through the center of which passes the vertical shaft, M, which receives motion from the wind shaft by bevel gearing, and conveys it by a band from pulley, T, to other machines. R is the step bearing of shaft, M, which has also a crank, U, upon it. S is a screw bolt in the bottom of the bearing box of M, to elevate or depress said shaft. N is the horizontal shaft of the wind wheel; it is supported in proper bearings in a small iron frame, K, springing out from a strong hollow band on the top of the hollow post, L. A A are the wind sails or fans; there are sixteen shown in the figure and represented with their edges turned to the wind. B is the wind vane. It is made of oiled canvas, C, laced into an iron frame, *d d*. The iron rods, *h h*, are fastened to the vane and frame, K, and serve as braces. Each fan, A, is composed of a wooden frame, and a sail surface of oiled canvas. It is secured on a central spindle or axis, which at one end plays in the rim, F, of the wheel, and its inner end in a metal plate which has a slot in it to receive a metal pin on the periphery of the regulating wheel, to turn the axis of the fan so as to allow the sail to be exposed full to the wind, or at any angle according to the velocity of the wind wheel. E E are spokes, equal in number to the sails. These are fastened securely in a hub, and into the tire or band, F. *a a a* are wires to brace the spokes. X X X are weighted levers of the regulating wheel.

On the shaft, N, of the wind wheel, there are placed three iron wheels, (fig. 3,) *h* is the spoke wheel, *c* is the regulating wheel, and *d* is the brake wheel. The hub, *h*, is firmly secured on shaft N; the other two wheels are not keyed, but free to move back and forth. The regulating wheel and brake wheel revolve with shaft N.

In fig. 2, *c c* represent the iron regulating wheel on shaft N. *b b* are pins in its periphery. *x x x* are three levers, having their fulcrum pins *q q q*, at *d d d*, secured in the hub, *h*.—These levers are weighted at their long ends by weights, Z Z Z, (fig. 1,) fastened by thumb screws, *y y y*. *e e e* are bolts fastened to the short arms, *g g g*, of the levers. These have spiral springs, *o o o*, secured to them, and they pass out nearly to the periphery of the hub, *h*, and are attached to it for the purpose of keeping the short arms drawn back, and to drag back the regulating wheel, *c*, which, by pins, *b*, in its periphery inserted in slots (at *a*, fig. 3) in the plates which receive the spindles of the fans, keeps them properly adjusted. *j j j* are cords fastened to the extremities of the short arms, *g g g*, and to the grooved rim, *m*, of the brake wheel.

In fig. 3, *h* is the fixed iron hub on shaft N. In it are fastened the inner ends of spokes E. *c* is the regulating wheel, and *d* is the brake wheel—the two latter are not keyed to the shaft. *l* is an iron bar fastened into the shaft, N. To the end of this bar are secured iron wire braces (*a a a*, fig. 1.) *k* is the iron frame to support the wind wheel. It is united to the sleeve, *y y*, in the hollow metal band, *v*, on the top of the hollow post, into which it extends down three or four feet, and terminates in a washer, and is capable of turning round on the post to turn the wheel to the wind in whichsoever direction it may be blowing. *h f* are bevel wheels. *j j* are cords, and *p p* is a brake to act upon wheel *d*, at the point, *o*, by a person pulling the cord, *i*, seen in fig. 1. A screw bolt tightens the braces, *h h*, fig. 1, and to give the vane, B, a greater or less angle with the shaft, N.

OPERATION—The principle upon which the regulator of this windmill operates is centrifugal force acting against the tension of the spiral springs, *o o o*, fig. 2, attached to the short arms of the weighted levers, X X, and to the hub. The tension of the springs keeps the sails set to receive the wind, and the centrifugal force of the weights turns the sails out of face or edgewise, to the wind, whenever the velocity of the wheel becomes too great. Thus, suppose the wind wheel to commence and revolve at its greater velocity, the weights, Z, by centrifugal force, would be thrown out to their greatest distance from the center of motion, which would have the effect, through the medium of the levers, X X, and regulating wheel, to turn all the sails edgewise to the wind. The tendency of the wind wheel now will be to revolve slower and slower, until the tension of the springs, *o o o*, fig. 2, shall overcome the centrifugal force of the weights, and turn all the sails back with their surfaces presented to the wind again, thus giving the mill (whenever the wind is sufficiently strong) a uniform velocity, irrespective of the amount or variation of resistance presented to it; for, an increase of resistance having the tendency to lessen the velocity, simultaneously diminishes the centrifugal force of the weights, thereby giving a corresponding increase to the motive power, by presenting more surface of sail to the wind, and vice versa.

The sails being pivoted at each end nearly in the center, allows them to be easily controlled by the regulation wheel. In strong and sudden gusts of wind, the regulator is not dependent upon the velocity of the mill for its operation, but upon the inertia of the weights. Thus, if a sudden rush of wind strikes the sails, the wheel will instantaneously start, but the weights, by their inertia, will not start with it, so that the sails are as instantaneously, or simultaneously, turned edgewise to the wind. Otherwise, before the necessary velocity for operating the regulator could be obtained, the mill might sustain injury.

To stop and start the mill at pleasure, a four or five pound weight (*i*, fig. 1) hung upon a wire, passing over a small pulley, crowds the break upon the stop wheel at the point (*o*, fig. 3,) which, partially stopping, or rather holding back the stop wheel while the main wheel revolves on, has the effect to wind the cords, *j*, around the grooved rim of the stop wheel, which throws the weights out, and turns the sails edgewise to the wind, and the mill stops. By taking off the weight, *i*, the springs turn the sails back to the wind, and the mill instantly starts.

To give the mill a greater or less velocity at any time, it is only necessary to move the weights, Z, by means of the thumb screws, *y*, at a less or greater distance from the center of motion. To provide against the mill being turned out of the wind by its own force acting on the perpendicular shaft or resistance, the vane is set at a slight angle with the line of the horizontal shaft, which has the effect, when the mill is at work, to bring the wind wheel directly facing the wind.

JOHNSON'S PATENT SELF-REGULATING WINDMILL.

Fig. 1

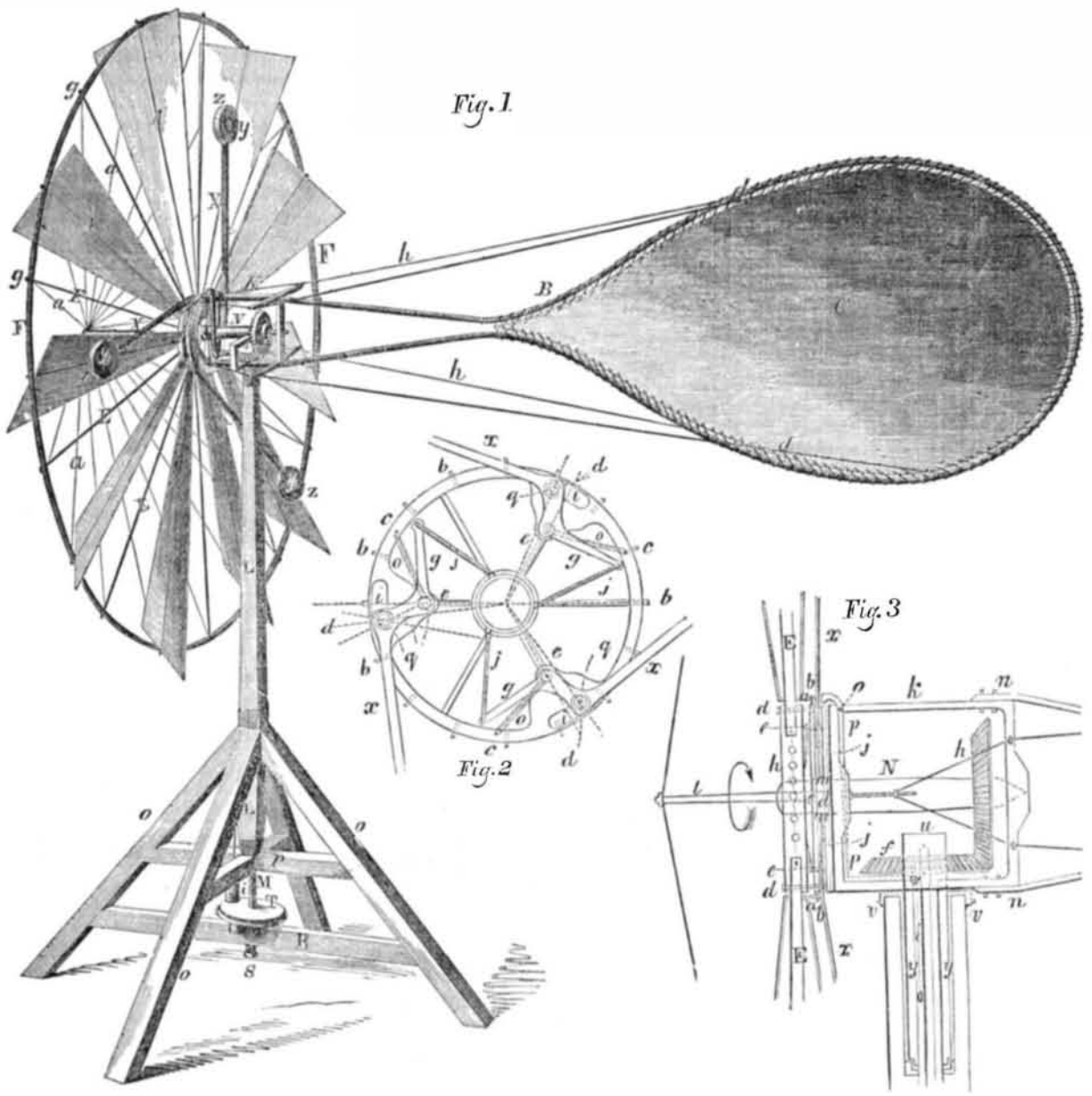

Fig. 2

Fig. 3

The connection between the sails and regulating wheel may be made by means of a slotted projection on each sail plate, slipped upon iron pins in the periphery or edge of the regulating wheel, as described; or by cogs on the edge of the projections working in cogs on the regulating wheel. They can be made both ways, according to the size of the mill. The patentee informs us that a mill of from 16 to 20 feet in diameter, and of from 4 to 6 horse power will cost from $135 to $200.

Further information can be had by addressing Dr. F. G. Johnson, 196 Bridge st., Brooklyn, N. Y.

New Air Spring for Railroad Cars.

A trial of a new air spring was lately made on a car belonging to the Harlem Railroad, running from this city. The inventor is James F. Hayward, of Wilmington, Del. Patent granted Dec. 12, 1854. The improvement consists in providing a metallic cup, over the top of which a strong elastic diaphram, of rubber and leather, is stretched—like the skin of a drum-head. The car bottom is furnished with rounded projections, which rest on these diaphrams.

The use of air springs on railroads has heretofore been abandoned, owing to the impossibility of rendering the air cylinders and plungers sufficiently tight. In the present improvement no plungers are employed. The air within each cup is compressed to 150 lbs. pressure.

The experiment is said to have been very successful. The superiority of this spring, over those composed of metal or rubber, is stated to have been very sensible. The cost of application is only about 50 per cent. as much as the other kinds.

This spring appears to be somewhat similar to that invented by Mr. William Beers, of New Haven, Conn., illustrated and described on page 332, Vol. 4 (1849) SCIENTIFIC AMERICAN. The only difference is, that the vessel containing the air was made wholly of yielding or elastic material, instead of partly, as in Hayward's plan. Mr. Beers employed an air cushion placed inside of a cup with the supporting plungers resting on the cushions.

Types of Hard Metal.

The Middlesex, Mass., *Journal* states that Mr. Samuel Weed, of that place, has invented a machine for making types out of copper, iron, brass, &c. Many attempts have been before made to do the same thing, both in this country and in Europe, but without practical success, on account of the expense of production. A successful improvement of this kind would confer vast benefits to the art of printing. At present, types are cast in soft metal, and they soon wear out.

Bailey's patent car seats are being tried on the night express trains of the New York and Erie Railroad. These seats are made so as to be convertible into reclining lounges when desired.

A correspondent of the New York *Tribune* states that a scheme is on foot in Boston to establish an Inventors and Industrialists' Exhibition,—the proceeds to be distributed among the contributors. This is a good project.