PROTECTOR FOR BUILDINGS.

A novel device for protecting buildings against destruction by storms has been patented by Messrs. Ezra Crowell and Elisha C. Dawson, of Dawson, Neb. This apparatus is designed as a temporary or permanent attachment to a building for preventing it from being blown over during wind storms, and to protect it from lightning. As will be seen by reference to the engraving, the building is secured by wire ropes of suitable strength passing over the house and connected with threaded rods extending into the earth, and secured to suitable anchorages. The tension of the ropes is adjustable by means of the nuts on the rods, which permit of putting on or taking strain off from the ropes, or of removing them altogether, as occasion may require.

The building is provided with brackets at the side, and with a saddle at the top, over which the wire cable passes. These bearings for the cable are placed in the vicinity of the corners of the building, or otherwise located over the end

APPARATUS FOR PROTECTING BUILDINGS.

framing and studding of the structure, where the strain is greatest.

A lightning rod point attached to the saddle permits of utilizing the cables and anchorages as a protection against lightning.

This invention is especially adapted to the portions of the country periodically visited by wind storms, and its adoption will preserve many buildings from destruction, and prevent loss of life and bodily injury during such storms.

BOYS' POWER METER.

We annex engravings of a new form of engine power meter which has been recently designed by Professor C. Vernon Boys. The object of the engine power meter is to find automatically the amount of work done by steam or other fluid under pressure, such as gas, water, etc., upon the piston of an engine, whether single or double acting, and to record the result on a dial during any period of time, so that the total amount of work done in one or any number of strokes may be found by inspection and without calculation.

As in an ordinary indicator, there is in the apparatus illustrated a piston controlled by a spring, the displacement of which is a measure of the steam pressure in the cylinder of the engine at every moment. When used with a double acting engine, if the total work is required, each end of the indicating cylinder is connected with one end of the cylinder of the engine, so that the displacement is a measure of the difference of pressure or the effective pressure. To find the work done, this varying pressure must be integrated with respect to the motion of the piston of the engine. In the ordinary indicator the process of integration is represented by a "diagram," the area of which is a measure of the work. In order to make the diagram on a sufficient scale, the motion of the piston is multiplied. Now the inertia of the piston alone, which cannot be obviated, tends to slightly modify the diagram, but that of the parallel motion and pencil, light though they be, has a greater effect than is often supposed, owing to the fact that the energy of motion varies as the square of the velocity.

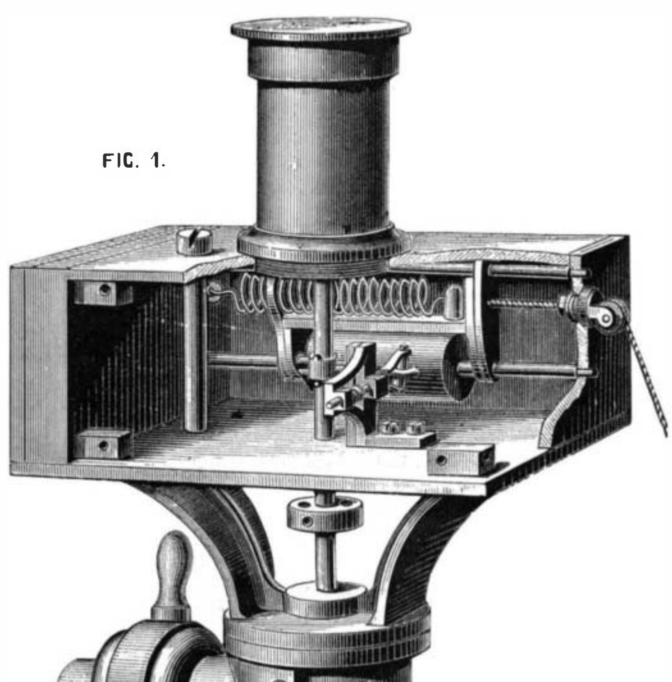
In the engine power meter there is no multiplication of motion, and all errors due to this cause are removed. Instead of having to move a pencil at a higher speed than itself in contact with paper, all the work that the spring piston has to perform is to turn an excessively light and delicately mounted disk on a swivel axis more or less in accordance with the movement of the piston, a motion in which sliding friction is absent. This disk rests against a cylinder, which is capable of moving longitudinally on its axis, but which, if turned, causes the axis to revolve also. The cylinder is moved longitudinally on its axis in time and in proportion to the motion of the piston of the engine. The plane of the disk is parallel to the axis of the cylinder when the spring piston is in its normal position, in which case longitudinal movement of the cylinder is unaccompanied by rotation, for the little disk rolls straight along it; if, however, in consequence of steam pressure, the disk is inclined, it will tend to run in a spiral line round the cylinder, thus causing the cylinder to rotate to a proportionate amount. Now the rate of rotation of the cylinder is directly proportional to the rate of its longitudinal motion multiplied by the tangent of the inclination of the disk; or, as the longitudinal motion of the cylinder is directly proportional to the piston of the engine, and the tangent of the inclination of the disk to the effective pressure, and the product of these two is the rate of doing work, the rate of rotation of the cylinder is at every moment directly proportional to the rate at which work is being done in the cylinder of the engine, and the number of turns recorded on the dial is a measure of the total work done.

In theory the instrument depends nowhere on approximations. It is mathematically perfect in every respect. In practice it is exceeding simple. The one adjustment that might be expected to be important and troublesome, viz., making the plane of the disk parallel with the axis of the cylinder when there is no steam pressure, is of no consequence whatever, for if it is not parallel, any error that may be made during a forward stroke is absolutely removed during the return stroke, because the tangent of the angle is as much too great in one as it is too little in the other, and therefore no accumulating error can result.

As constructed, the calculating mechanism is inclosed in a box separated from the indicating cylinder by an air space, and is so protected from injury by dirt and heat. One spring can be removed, and replaced by another instantly.

Our illustration is a perspective view of the instrument, showing the dial plate on the left, the spring cover at the top, and the integrating mechanism within, part of the casing being shown broken away. The axis of the cylinder carries the first index on the dial plate.—*Engineering.*

FIG. 1.



BOYS' POWER METER.

One of General Washington's Patents.

We were recently favored with an inspection of an original patent, which ranks among the earliest documents of the kind that were issued by the United States. We allude to the letters patent granted on May 4, 1796, to Peter Zacharie, of Maryland, for a new and useful mode of making nails and brads from cold iron. A good description of the machine is given in the patent, and the inventor says he can make with the machine eight millions of nails a day. Pretty good for 1796. The patent is written upon parchment in a large clear hand. The front page bears, in large type, an official certificate of the fact of the granting of the patent, the wording being almost identical with the official form that is to-day used by the Patent Office. At the bottom of the certificate is the well-known bold signature of George Washington, President; it is attested by the signature of Timothy Pickering, Secretary of State; and is countersigned and certified by Charles Lee, Attorney-General. It is dated at Philadelphia, which was then the seat of government.

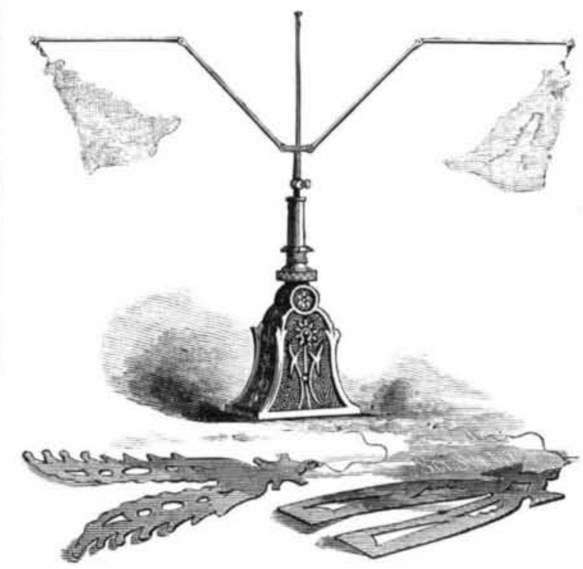
Taken altogether, it is a most interesting old document. It was shown to us recently by Mr. R. S. Chilton, formerly (from 1849 to 1851) librarian of the Patent Office. He now resides at St. Catharines, Ontario, but was appointed from New Jersey.

AUTOMATIC FLY FAN.

The engraving shows a novel spring-actuated fly fan for driving flies from the table or from a sleeping person or invalid. The spring mechanism in the base of the apparatus revolves the vertical spindle, which carries two jointed arms, each having at its outer extremity a swivel for receiving a paper flier like those in the foreground of the engraving.

These fliers may be cut from ordinary plain or fancy paper by any one according to taste, and may be renewed from time to time, so that the wings of the fan are always fresh and clean.

The arms may be extended more or less, and as they are revolved by the spring gearing, the fliers are revolved on the swivels, giving the apparatus a very curious appearance.



COFER'S AUTOMATIC FLY FAN.

The fan is compact, ornamental, and inexpensive, and avoids the objection of having dirty, unsightly wings.

This invention has been patented by Mr. Thomas W. Cofer, of Portsmouth, Va.

Curious Facts about Precious Stones.

In his lecture on precious stones, Professor Egleston, of the Columbia School of Mines, says there is in Paris a diamond so hard that the usual process for cutting and polishing made no impression upon it. The black diamond is mostly used for tools. In Russia it is broken into flakes, polished, and worn as court mourning. The historic diamonds have no more luster than a piece of glass. The sham diamond was more beautiful than the genuine stone, but it has a tendency to decomposition and does not retain luster.

The diamond mines of Brazil were first opened in 1727. It is estimated that since that time they have produced at least two tons of diamonds. In England, a stone weighing one carat and of the purest water is worth, when cut and polished, about $60. The dealers in rough stones acquire the habit of distinguishing the water of a rough stone by simply breathing upon it. Among the historic diamonds, the Rajah weighed 367 carats, and the Great Mogul 280. Before it was cut the latter weighed 900 carats. From the composition of the diamond we see what costly things Nature makes from common material. All the diamond fields of the world are not worth the anthracite fields of Pennsylvania.

A ruby of five carats is double the value of a diamond of that size, and one of ten carats is worth three times as much as a diamond of corresponding size. A perfect ruby is the rarest of all stones. Rubies are often imitated with real stones, the most common being spinel. But it is not difficult to distinguish the imitation, as the ruby is the only stone having a pigeon blood color. Another precious stone is the sapphire, which is like the ruby, with the exception of the color. He had seen a small stone which was ruby on one side and sapphire on the other. The emerald is a deep green, the deeper the better. It loses no brilliancy in an artificial light, but its color may be expelled by a gentle heat.

Most of our emeralds come from New Granada, and will always have flaws. In imitations it is not the hardness nor the color that is sought, so much as the flaw. The first eye-glasses were made in England of emeralds.

Bands from Sheep's Entrails.

The mode of manufacturing bands from sheep-guts is described as follows in the *Shoe and Leather Reporter:* The entrails, which are about 15 yards long, are well cleaned, and laid for a few days in salt water. They are then not thicker than ordinary cotton yarn, but will bear a strain of nearly 12 pounds, and are wound upon spools like yarn. If it is required to make round bands, the procedure is the same as in the making of ordinary rope; if, however, broad flat bands are required, this must be done in a loom, and in 5 strands, as in the making of ribbon. Flat bands can be made of any size; round ones have various diameters. The round ones have either the form of a smooth cord or that of a cord of from 3 to 5 strands.