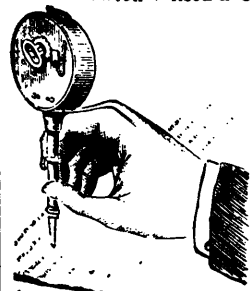


THE "HOROGRAPH."

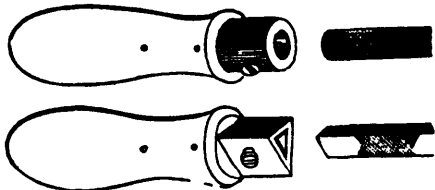
Among the thousand-and-one interesting items, not strictly agricultural, shown at the Royal Agricultural Society's International Exhibition at Kilburn, we noticed on the stand of Messrs. Newton Wilson & Co., of High Holborn, a little portable instrument for producing rapidly and cheaply any desired number of circulars, notes, or other writings. As its name—The "Horograph"—implies, it may be said to be writing by clock-work, the mechanism and the moving power, clock-work, being all contained in the head of the instrument. This consists of a holder about 4 in. long, and of the thickness of a pencil-case, upon which is mounted a metallic casing about $2\frac{1}{2}$ in. in diameter, and $\frac{3}{4}$ in. thick. Within this casing is a train of



clock-work, which actuates a needle carried in the tube, and to which a rapid reciprocating motion is imparted. As the point of the needle is thus alternately thrust beyond the lower end of the tube, and withdrawn again, it follows that if traversed over the surface of a sheet of paper, a line composed of a series of small punctures will be produced. This is in fact the principle of "Horographic" writing, the punctures being produced at an estimated rate of nearly 10,000 per minute, and the instrument being held vertically in the hand during the process of writing. On commencing to use the instrument, the clock-work is first wound up by means of a small key projecting from the cylindrical casing. On pressing a small spring lever near the needle point the mechanism is started, and continues running, so long as the lever is kept down by the thumb which covers the lever when the instrument is held in the ordinary position of writing. On releasing the lever the mechanism stops. The letter having been written, or, in other words, the stencil having been completed, it is placed in a frame over a sheet of ordinary paper. The passage of an ink roller over the stencil produces a *fac simile* of the subject of the stencil on the paper. In this way a large number of copies may be taken in a very short time.

HANDLES FOR FILES.

Will you allow me to call the attention of your readers to a patent recently taken out by Mr. Gray, of Sheffield, for improvements in files and in hafts for the same! The patentee says that files made on his plan are reduced in cost and are rendered more convenient for carrying about by the workmen employed in using them. The improvement consists in constructing the files without tangs, and in the employment of hafts or holders, each having a socket or recess corresponding in shape to the section of the file to be used, into which the end of the file is inserted. The file may be secured in the socket or recess in the haft or holder either by means of a screw passing through a hole in the file, or by wedging the file in the socket. The improvement is more particularly applicable to files intended for sharpening the



knives of reaping machines—why, I cannot pretend to guess; but it is obvious that the arrangement of the holder and the file-end will facilitate changing when files have been used up on brass, and if the ferrules are made of different metals, it will be easy to keep the files sorted for the work to which they are suited. The illustration explains itself. The file is constructed without a tang, and is of similar section throughout; the haft or holder having a socket corresponding in shape to the section of the file to be used into which the end of the file is inserted. The extremity of the file is perforated, and a tapped hole is provided in the haft or handle for the reception of a screw-pin which passes through the haft and the hole in the file, thus securing the file in the socket.

VICEMAN.

[Some of our hardware merchants should introduce them.—Ed. S. C.]

DESCRIPTION OF A PAPER DOME FOR AN ASTRONOMICAL OBSERVATORY.

BY PROF. GREENE, IN THE "AMERICAN JOURNAL OF SCIENCE AND ART."

An astronomical observatory has recently been erected for the Rensselaer Polytechnic Institute, through the liberality of Mr. E. Proudfit, of this city. In maturing the plans and supervising the erection of the building, I have introduced an improved method of constructing revolving domes, a brief account of which may not be without interest. While making the preliminary inquiries, I ascertained that a dome of the dimensions required, constructed in any of the methods in common use, would weigh from five to ten tons, and require the aid of cumbersome machinery to revolve it. It therefore occurred to me to obviate this objection by making the framework of wood, of the greatest lightness consistent with the requisite strength, and covering it with paper of a quality similar to that used in the manufacture of paper boats; the principal advantages in the use of these materials being that they admit of great perfection of form and finish, and give extreme lightness, strength, and stiffness in the structure,—prime qualities in a movable dome.

The dome is a hemisphere with an outside diameter of twenty-nine feet. The framework consists primarily of a circular sill which forms the base, and two semi-circular arch girders set parallel to each other, four feet apart in the clear, and spanning the entire dome. These are firmly attached to the sill, and kept in a vertical position by means of knee-braces. The sill and girders are of seasoned pine, the former being $8\frac{1}{2}$ inches by $3\frac{1}{2}$ tick, and the latter each $4\frac{1}{2}$ by 3 inches. The paper covering of the dome is made in sixteen equal sections, such that when set up side by side, their bases on the sill, and their extremities meeting at the top, they form a complete hemispherical surface. The framework of each section consists of three vertical ribs of pine each $3\frac{1}{2}$ inches in width, and $\frac{3}{4}$ of an inch thick, one at each side, and one midway between and meeting at the apex. The paper was stretched over this framework as follows:—

A wooden model of full size being made of that portion of the dome included within one of the sections, with a surface truly spherical, the framework of a section was placed in its proper position on the model, so that its outer edges formed part of the same spherical surface, and covered with shellac where it was to be in contact with the paper. The sheet of paper cut in the proper form was then laid on the model while moist, the edges turned down over the side ribs, and the whole placed in a hot chamber, and left until thoroughly dry. In this way the several sections were dried in succession over the same model. The paper used is of a very superior quality, manufactured expressly for the purpose. Its thickness, after drying, one-sixth of an inch, and it has a structure as compact as that of the hardest wood, which it greatly excels in strength, toughness, and freedom from any liability to fracture. After being thoroughly painted, the several sections were ready to be set up side by side on the sill, and connected together by bolting through the adjacent ribs. The space between the arch girders being left uncovered on one side from the sill to a distance of two feet beyond the zenith, the upper ends of the sections required to be cut off and accurately fitted to the girders. The joints between sections were made weather-proof by inserting a double thickness of heavy cotton cloth saturated with white-lead paint. The adjacent side ribs were then bolted firmly together through the paper and cloth, the lower ends attached to the sill by angle irons, the upper ends bolted to the girders, and the lower edge of the paper turned under the sill and securely nailed. The joints were afterwards painted over on the outside. As the entire surface exposed is free from nail-holes or other abrasions in the paper, the structure promises, with an occasional coat of paint, to last for many years, and to form an effective and serviceable roof. The four-foot opening between the arch girders is covered by a shutter, which is also of paper stretched over a wooden frame. With the exception of about two feet at the lower extremity, this shutter is in a single piece. Attached to its sides are a series of iron rollers which run on a railway track of band iron laid down on the girders, by which means the shutter can be moved over to the opposite side of the dome. The wooden sides of the shutter have iron flanges attached to their lower edges, which project under the railway tracks, making the whole weather-proof. The shutter is opened and closed by means of a windlass and wire rope. The weight of the dome and its appurtenances is about 4,000 pounds. It is supported on six eight-inch balls which roll between grooved iron tracks, and can be easily revolved by a moderate pressure applied directly, without the aid of machinery.