the table and for projection, and the exquisite specimens arranged to be used with these instruments.

The new form of Toepler-Holtz machine made in this establishment deserves more than a passing notice. It generates electricity in all weathers, is always ready for immediate use, and yields torrents of sparks.

In this department we also notice a new air pump, which gives a vacuum of 99¾.

In this department may also be found a large collection of instruments for very accurate measurements. Among these are the standard meters, such as are used at the Bureau of Weights and Measures at Sevres, comparators, dividing engines, cathetometers, micrometers, spherometers, and other instruments of precision of the highest class.

In the chemical department a specialty is made of the importation of balances for all purposes, including very fine analytical balances, some of them sensible to the twentieth of a milligramme. The stock of chemical glassware, pure chemicals for technical work, platinum, etc., is large and complete.

In the department of engineering are found transits for railroad engineers, city work and general surveying, engineers' and architects' levelers, plane tables, surveyors' compasses, leveling rods, chains, and all other instruments required to complete the outfit of the engineer, either for reconnaissance or for the final work of laying out the line of a railway or boring a tunnel. We are informed that these instruments are sent to every part of the world. In this department are also made the elaborate and costly instruments of precision used principally by the United States government, such as standard comparators for the testing room in the United States Signal Service, standard ruling and engraving machines for the United States hydrographic office, the instruments of precision for the engineer corps, etc. The firm, besides being large manufacturers of engineering and drawing instruments, are large importers of these articles, as well as the stationery and other materials required by draughtsmen and engineers.

The ophthalmic department, which is known as department No. 1, embraces all the apparatus and appliances used for the examination of the eye, and includes spectacles, eye glasses, opera glasses, etc. It is one of the largest branches of the business. The lens-grinding room, a part of which is shown in one of the engravings, is devoted almost exclusively to making what are known as "prescription glasses," which are required to be ground specially to order. This department is particularly interesting, as here the process of making lenses can be traced from beginning to end. The number of prescriptions which come in daily through the mails and otherwise from all parts of the country indicates the importance of this branch of the business. It is surprising to note the variety of defects in the eye which are corrected by special glasses. These prescriptions are prepared from measurements. The old way of fitting the eye by trial is now almost discarded. In this department are made ophthalmoscopes, by means of which the interior of the eye is illuminated and examined by the physician. In this department are also made other ophthalmological apparatus, such as perimeters, trial frames, test cases, prisms, etc.

In the department known as No. 5 may be found astronomical instruments and apparatus for projection. The astronomical branch comprises refracting and reflecting telescopes, the stands and other accessories required for practical observation; microscopes, helioscopes, spectrum attachments, eye pieces, etc., transits, sidereal clocks and chronographs, which are particularly designed for schools and colleges. In the branch devoted to projection there are various forms of lanterns, which are known under the names of sciopticons, stereopticons, college lanterns, for entertainment as well as for instruction. Some of these lanterns are provided with powerful petroleum lamps of new design, which compare favorably with other illuminators. As might be expected in an establishment like this, a large stock of pictures for use with the lanterns, embracing educational views, diagrams, and pictures of various physic l apparatus, are kept on hand.

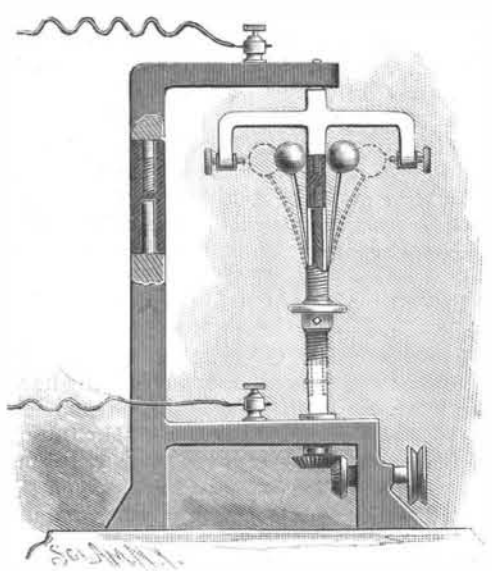
The photographic department, although a comparatively new one, shows all the spirit and enterprise which characterizes this establishment, having within five years introduced many articles of value to photographers, the most important of which are the well known Queen-Francais photographic lenses, indorsed by the highest authorities, and the Queen pantagraph lenses, which are designed to supply a lens of good quality at a reasonable price.

This department has also commenced the publication of a magazine entitled "Science of Photography," which is full of interest and covers a wide range of subjects.

It is impossible to fitly describe in detail all the departments of a great establishment like this. Each department is a little world in itself, covering many branches, each of which in turn includes many subbranches, so that it would require volumes to adequately describe everything that may be seen at the store and wareroom.

Any one desiring further information than we have been able to give, can readily obtain it by securing one or more of the large number of catalogues published by this house, relative to the different departments.

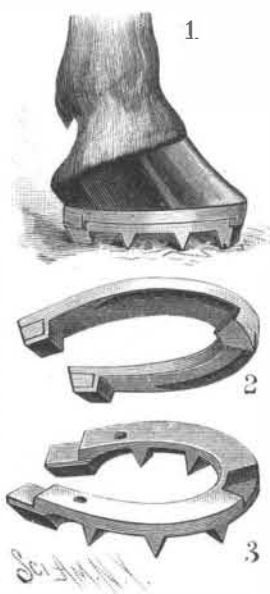
The firm, in addition to the catalogues of their own productions, make a specialty of securing catalogues of all foreign makers of apparatus in different branches of science, and of keeping informed as to the scientific and practical knowledge and apparatus of the day, so that they may properly be considered a bureau of information for those who choose to avail themselves of its advantages.



SCHLEPEGRELL'S ELECTRICAL SPEED INDICATOR.

AN IMPROVED HORSESHOE.

A horseshoe which is designed to combine the advantages of a smooth or a flat calk shoe and a sharp calk shoe has been patented by Mr. Israel G. Howell, of Hopewell, N. J., and is illustrated herewith. The shoe proper, or main shoe, to be attached with nails in the usual way to the horse's hoof, is shown in Fig. 2, a supplemental or over shoe being shown in Fig. 3, and being adapted to be attached to and detached from the main shoe. The supplemental shoe has on its inner side flat surfaces corresponding with the flat surfaces of the main shoe, and it has recesses, one in its forward end and one at each of its rear ends, corresponding with the wedge-shaped and dovetailed toe calk and the heel calks of the main shoe. The supplemental shoe has sharp or pointed calks on its bottom, and is adapted to be secured to the main shoe by screws passed through suitable screw holes provided therefor. By this invention a shoe having one or the other forms of calks may be readily fitted without the necessity of withdrawing nails from the hoof and renailing, and the changing may be performed by unskilled persons.



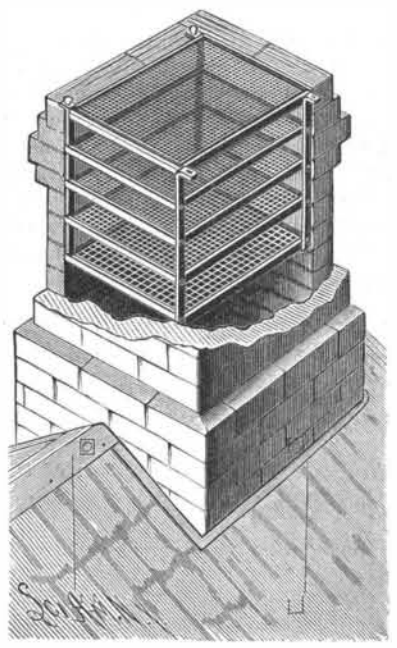
HOWELL'S HORSESHOE.

AN IMPROVED ELECTRICAL SPEED INDICATOR.

A simple device by which the increase or diminution of speed in machinery above or below its normal rate may be indicated electrically, is illustrated herewith, and has been patented by Mr. Frederick W. Schlepegrell, of No. 20 Ashton Street, Charleston, S. C. The indicator shaft, arranged to receive motion conveniently from the machine whose speed is to be indicated, is formed of two parts connected together by an insulating sleeve, and is journaled in a frame whose upper and lower parts are also connected by a threaded insulating sleeve, binding posts, connected with an electric bell or alarm, being secured to the lower and upper parts of the frame. In grooves on opposite sides of the indicator shaft are secured flat springs, with a weight, preferably of spherical form, on the outer extremity of each spring, a nut being fitted to move up or down on the shaft to vary the length of the free ends of the spring arms. The weights are adjusted relative to the motion of the indicator shaft when driven by a machine, so that when the machine runs at its normal speed the weights will revolve in a position between the upper part of the shaft and the contact screws on either side, the variation in the throw of the spring arms being indicated by the dotted lines. When the speed of the machine increases so that the weights touch the contact screws, the circuit is completed and an alarm is given, a like effect being also produced when the machine runs slower than its normal speed, or when it stops, as the weights are then brought into contact with the upper part of the indicator shaft, thus completing the circuit. The indicator may be adjusted to adapt it to higher or lower speeds by turning the nut on the lower portion of the indicator shaft, thus shortening or lengthening the spring arms, and also by turning the contact screws in or out.

AN IMPROVED SPARK ARRESTER.

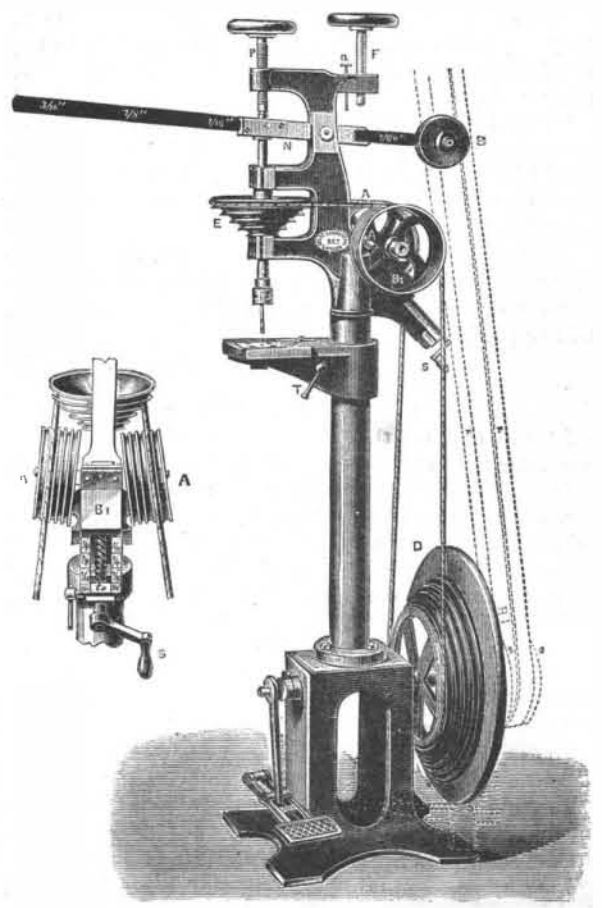
A device adapted for application to chimneys, stove pipes, and smoke stacks, to prevent sparks and cinders from passing out, and whereby they will be thrown downward to the base of the chimney, is illustrated herewith, and has been patented by Messrs. Frederick Bruhn and Jerome Raum, of Fort Shaw, Montana Ter. Two or more, but preferably five, frames are made of double strap iron, of a size equal to the inner dimensions of the chimney stack or pipe, and across the top of each frame wire netting is stretched, the ends of the netting being carried down in a space between the opposing members of the frame. The screens are made of very thin wire, the meshes of one screen being very fine and the meshes of the others increasing in size, the screens being retained in horizontal position one above the other, about four inches apart, by their attachment at each corner to vertical rods. With this arrangement any sparks or cinders passing through the bottom screen are checked at the upper one and deflected downward to the base of the chimney. In placing the series of screens in a chimney they are manipulated by means of knobs on the vertical rods, and are supported by projections from the rods resting on the top of the chimney. This spark arrester can be readily taken apart and put up in a very small space for shipment, and can be manufactured very economically.



BRUHN & RAUM'S SPARK ARRESTER.

IMPROVED DRILLING MACHINE.

We illustrate a handy drilling machine, capable of being driven either by foot or power, which we find in *Engineering*. The driving band runs from a large cone



HIGH SPEED DRILLING MACHINE.