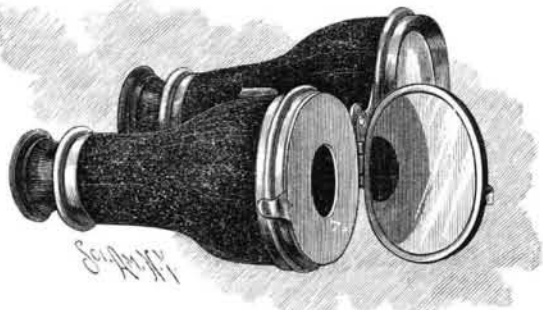


**A MIRROR ATTACHMENT FOR OPERA GLASSES, ETC.**

This device, readily applicable also to spy glasses or telescopes, consists in an adjustable reflector or mirror attachment, in front of the object lens, to provide means whereby the person using the glass can see objects at the side or in the rear without change of position. The invention has been patented by Mr. August Janzon, of 119 East Chicago Avenue, Chicago, Ill. The attachment consists of a circular metal or other plate, having a central contracted aperture fitting directly over the object lens, by means of a double jaw-like clamp or clip, and a hinged cover containing a mirror. This attachment is readily applied by springing the jaws, suitably shaped for that purpose, over or partly



**JANZON'S MIRROR ATTACHMENT FOR OPERA GLASSES, ETC.**

around the outer end portion of the tube containing the object lens, the mirror being then opened or adjusted to any desired angle. The opening in the plate resting against the object lens is made smaller than that lens to prevent disturbance of light rays emanating from the front. The device is readily detachable, and of a shape and size to be easily carried in a small pocket.

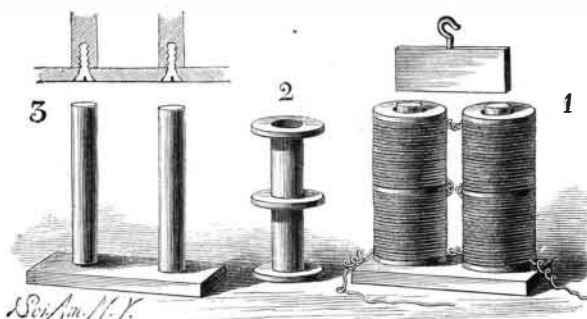
**A MAGNET FOR EXPERIMENTATION.**

BY GEO. M. HOPKINS.

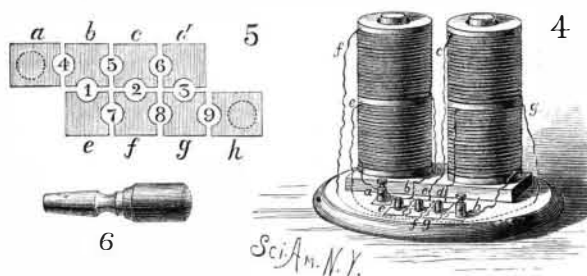
The annexed engravings represent a large magnet which is well adapted for experimental work. With a current from six medium sized bichromate battery cells it is capable of sustaining about one thousand pounds. It is provided with a switch, so that it may readily be adapted to a light or a heavy current by combining the several coils in series or in parallel. It is made separable, to permit of using the coils detached from the core.

For the construction of the magnet 18 pounds of No. 14 double-covered magnet wire are required, also two well annealed cylindrical bars of soft iron, 8 inches long and  $1\frac{1}{2}$  in. in diameter for the core, a flat, soft iron bar  $2\frac{1}{2}$  inches wide, 8 inches long, and  $\frac{3}{4}$  inch thick for the yoke, a bar of the same kind 7 inches long for the armature, two double wooden spools 4 inches in diameter and  $7\frac{3}{4}$  inches long, with flanges  $1\frac{1}{8}$  inch wide and  $\frac{1}{8}$  inch thick.

The walls of the spools are  $\frac{1}{8}$  inch thick. Each space in each spool is filled with the No. 14 magnet wire. There are two ways of winding the wire. According to one method a hole is drilled obliquely downward in the flange, and one end of the wire is passed from within



**Fig. 1.—MAGNET FOR EXPERIMENTATION.**



**Fig. 2.—MAGNET AND SWITCH.**

outward through the hole, and the spool is wound in the same manner as a spool of thread, the wires at the end of the coil being tied together with a stout thread to prevent unwinding. Each section of each spool is filled in the same manner.

Although this is the quickest way to wind the magnet, it is not the best way, as the inner end of the coil is liable to be broken off, when the entire coil must be rewound to secure a new connection with the inner end. The correct way to wind the wire is to take a sufficient length and wind it from opposite ends on two

bobbins. Wind the wire once over the spool from one of the bobbins, then wind from the ends of the coil thus formed toward the middle, first with wire from one bobbin, then from the other bobbin, then wind from the middle back each way toward the ends in the same way, then again toward the center, and so on.

By this method both terminals of the coil are made to come out on the outer layer.

Fig. 1 of the illustration shows the completed magnet and its armature. Fig. 2 is a detail view of the spool. Fig. 3 shows the cores and yoke, both in perspective and section, the sectional view exhibiting the method of fastening the cores to the yoke by means of screws. Fig. 4 shows the magnet mounted on a wooden base provided with a plug switch for connecting the coils in parallel or in series. Fig. 5 is an enlarged view of the switch, and Fig. 6 shows one of the plugs by which the connections are made.

The switch is formed of brass blocks, *a, b, c, d, e, f, g, h*, arranged in two series as shown in Fig. 5. The blocks, *a, h*, are provided with binding posts for receiving the battery wires. The blocks are provided with semicircular notches forming the plug holes, 1, 2, 3, 4, 5, 6, 7, 8, 9.

The block, *a*, is connected with the lower terminal of the lower left hand coil, and the block, *e*, is connected with the upper terminal of the same coil. The block, *b*, is connected with the lower terminal of the upper left hand coil, and the block, *f*, is connected with the upper terminal of the same coil. The block, *h*, is connected with the lower terminal of the lower right hand coil, and the block, *d*, is connected with the upper terminal of the same coil. The block, *g*, is connected with the lower terminal of the upper right hand coil, and the block, *c*, is connected with the upper terminal of the same coil. When the holes, 1, 2, and 3, are plugged, the current goes in series through all the coils. By plugging the holes, 4, 7, 2, 6, and 9, the current goes through the coils two in parallel and two in series, reducing the resistance to a quarter the original amount. By plugging the holes, 4, 5, 6 and 7, 8, 9, the current goes through all the coils in parallel, and the resistance is reduced to  $\frac{1}{8}$  the original amount.

The polar extremities of the magnet are drilled axially and tapped to receive screws by which are attached extension pieces for diamagnetic experiments.

To retain the spools on the cores when the magnet is in an inverted position, a thin brass ring is screwed on the end of each core. The armature is provided with a hook for receiving a rope or chain, and the yoke has a threaded hole at the center for securing the eye for suspending the magnet.

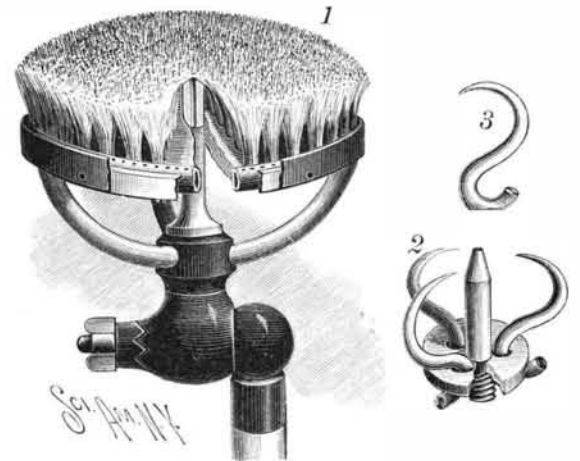
**AN IMPROVED CULTIVATOR.**

The illustration herewith represents a roller cultivator specially adapted for use with listed corn or other plants growing in furrows, being designed to crush the clods in the furrows as well as upon the ridges, and leave the soil and trash in the same position as when left by the listing plow or any other furrow implement. The invention has been patented by Mr. Harrison Staggs, of Valencia, Kans. The frame is constructed with parallel spaced beams, extending longitudinally, and other shorter parallel beams outside of these, such beams carrying transversely-aligning standards, in which ridge rollers are centrally journaled, while an outer extensible furrow roller is journaled in the sliding standards. From the standards supporting the driver's seat two horizontal arms are rearwardly extended, between which a drum is journaled carrying a rope or chain attached by one end to a lever by the driver's seat, by means of which the drag plows, which may also be located at the front of the machine, may be elevated in turning corners. Downwardly and outwardly curved plates are adjustably secured to the inner faces of the plow beams, and to the lower end of these plates a vertical cultivator blade is pivoted which at one side is bent upon itself at the bottom, and carried inward in the form of a triangle, while above the triangular share is an essentially right-angled blade or scraper rigidly secured to the inner face of the cultivator blade. The furrow roller may be conveniently elevated as high as desirable, or the ridge roller may be entirely removed from the machine, which is designed to be used to cultivate listed corn when just appearing, or when five or six inches high, and is adapted to be adjusted to furrows of different width or depth.

**A FOUNTAIN BRUSH AND SPONGE HOLDER.**

The illustration herewith represents a device for holding a brush or sponge, and supplying the water for use therewith through the tubular handle, the device being especially adapted for use in cleaning windows and similar purposes. The wooden brush head is secured upon a central metal nozzle, a circular metal tube, with small apertures on its upper side, surrounding the brush head, and this tube being connected by side tubes to a thimble from which the central nozzle is extended. Surrounding the circular tube is a thin metal band holding in position an outer rubber band projecting beyond the edge of the holder, and designed to protect the object being washed from contact with the metal part of the head. When a sponge is to be

used, the brush is removed with its central attached nozzle, and the sponge forced on the sponge holder nozzle, by connecting which with the central thimble the lower ends of the hooks are forced upward as shown in Fig. 2, forcing the upper points around the nozzle, and thus holding the sponge securely in position. Fig.



**THOMPSON'S FOUNTAIN BRUSH AND SPONGE HOLDER.**

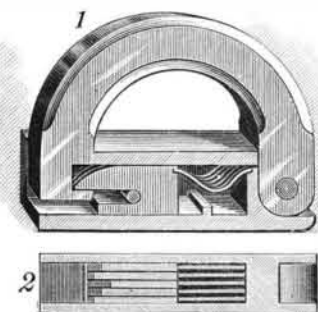
3 represents one of the sponge holder hooks. This invention has been patented by Mr. Samuel Thompson, of No. 47 River Street, Chicago, Ill.

**Another Remarkable Gas Well.**

The largest natural gas well ever struck was bought in April 15, by the Philadelphia Company, near Belle Vernon, 26 miles from Pittsburg. It is running off 40,000,000 feet a day, the pressure being 800 pounds to the inch. It is one of the most significant wells ever struck, as it shows there are millions of new fields and that the supply is good for many years to come.

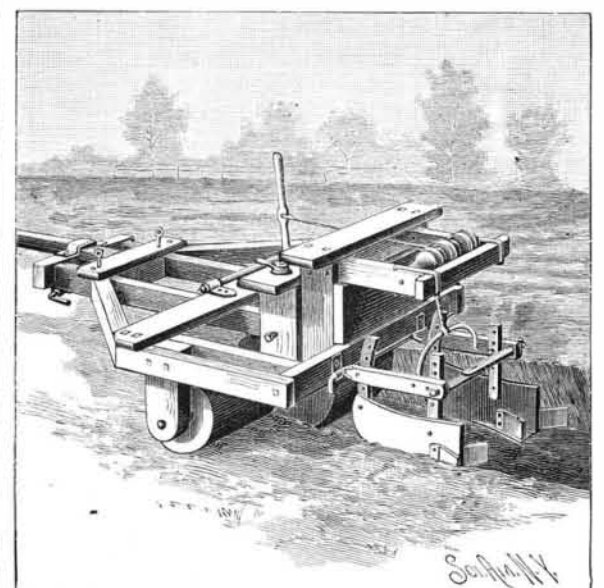
**AN IMPROVED PADLOCK.**

The padlock shown in the accompanying illustration forms the subject of a patent recently issued to Mr. Grant Brambel, of Detroit, Becker County, Minn. The bow or shackle is formed, at its outer end, with a



**BRAMBEL'S PADLOCK.**

recess, and an inclined bearing face upon a projection below the recess, the downward movement of the shackle being limited by a shoulder bearing against the upper plate of the case. Within the case are mounted any desired number of tumblers, formed with central slots and upper forward curved faces, partly shown in the sectional view, Fig. 1. The sections below the slots are of different lengths, as shown in Fig. 2. In the rear of each tumbler a spring is arranged, and there is also a stop to limit their rearward movement. In placing the tumblers in the case they are forced inward against the springs, after which a retaining pin is passed through apertures in the case and the slots in the tumblers, so that the springs will normally act to force the tumblers to the position shown in Fig. 1. The locking is effected by simply pushing the outer end of the bow or shackle into the case, when the tumblers are forced backward until the tongue on the lower end of the shackle has passed below the tumbler sections. The end of the key is stepped, as shown in Fig. 3, to coact with the tumblers employed in the construction of the lock.



**STAGGS' CULTIVATOR.**