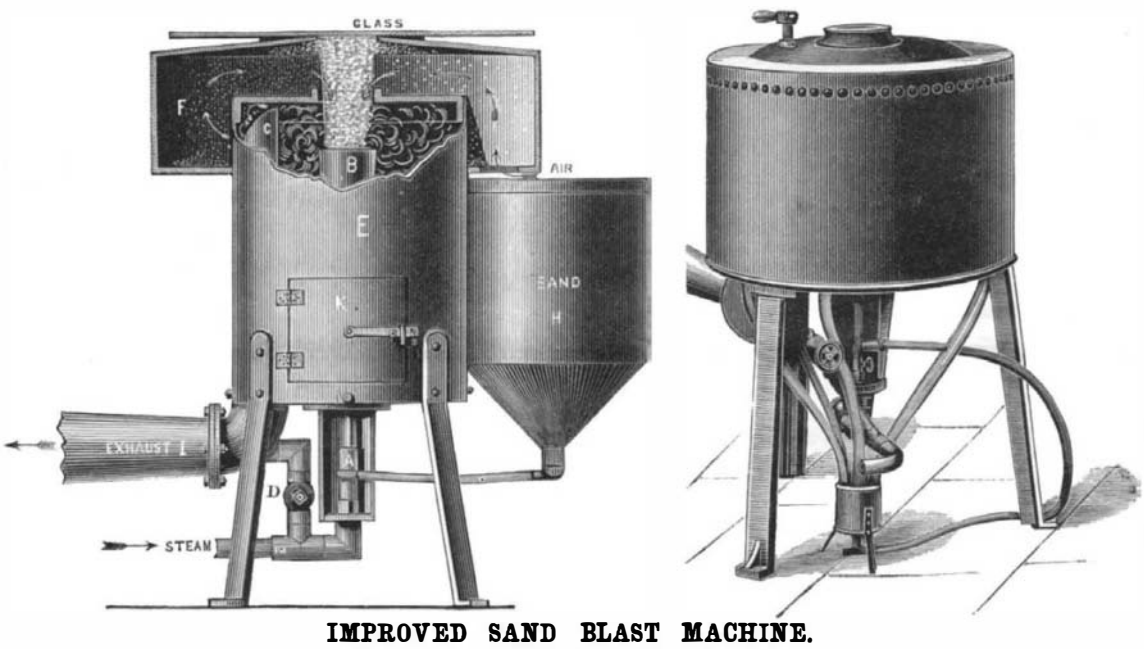
IMPROVED SAND BLAST MACHINE.

We give an illustration of an improved form of the Tilghman sand blast as designed by Mr. Mathewson, of London, in which the difficulties occasioned by the use of steam for driving the sand are in great measure overcome. Heretofore, by the sand blast process of cutting, boring, frosting, or ornamenting stone, metal, or glass, the use of steam as the propelling force is in most cases impracticable, owing to the condensation of the latter and the difficulty of manipulating the articles. Further, the stencil plates are liable to become clogged by the damp sand, and glass articles in particular are in danger of being broken from the heat of the condensed steam; the cheapest and most manageable substances are precluded from being used as patterns; and the waste sand must be dried each time it has been used. These objections have been overcome by Mr. Mathewson, by the use of an exhaust arrangement, which draws off all the steam before it reaches the article under operation, and at the same time dries the sand. The method of accomplishing this will be readily understood from the illustrations. The steam enters by the pipe, M, but by opening a cock, D, a small portion is deflected and enters the exhaust pipe, I, which terminates near the top of the chamber, E, the upper portion of the pipe being shown at C. This rush of steam produces a strong current of air in the direction shown by the arrows, which effectually dries the sand, and carries along with it all the steam and moisture through the exhaust pipe to the chimney. We have witnessed this apparatus at work, and can testify to the genuineness of the claims of the patentee, Sand blasting appears to be coming to the front more and more every year, and is now used for a great variety of purposes. We have seen sheet steel which was rolled in the ordinary manner, and then sand-blasted to remove the scale, and afterward heated and rolled again, which had thereby received a very high polish, and a surface capable of withstanding the effects of the weather. This system offers itself as a ready and effectual means of cleaning the surfaces of metal of all kinds from scale, etc., which is now effected by the use of acids, which penetrate metals and reduce their value for many purposes; also for incising ornaments with astonishing rapidity in granite and other stone.

An improved form of this apparatus is also shown. In this case, the sand after use falls into the hopper, and thence finds its way again through the four India rubber tubes shown into the small box below, from whence it is again ejected by the steam, and so on. The latest machines have a foot lever, by depressing which the operator makes the connection between the sand and the steam jet, but immediately the foot is removed from the lever this connection is broken, and the sand of course ceases to pass. We may also mention that a deflector is arranged in the interior of the case, which, by means of the handle shown on the top, can be brought in the course of the sand, and so deflect it, while the operator is adjusting the work. The velocity of the sand, of course, depends on the pressure of steam used, and so can be regulated to any desired degree. With steam at 60 pounds per square inch, and coarse sand, a hole 2 inches in diameter can be perforated through plate glass half an inch thick in two minutes.—*Mechanical World.*



IMPROVED SAND BLAST MACHINE.

THE CYCLOIDOTROPE.

BY GEO. M. HOPKINS.

The new and very pleasing and interesting lantern slide shown in the annexed engraving is of English origin. The maker's name is unknown to us, nevertheless we give him credit for having produced a simple device capable of illustrating on a large scale the intricate operation of engine engraving.

The figures shown in the smaller engraving were photo-engraved directly from plates, traced in the apparatus. They show some of the simpler forms of curves. By changing the adjustment of the tracing needle or the arms which support and guide it, an infinite variety of figures may be produced.

The ring, which revolves on the plate, is recessed around its inner edge, and lined with soft rubber for

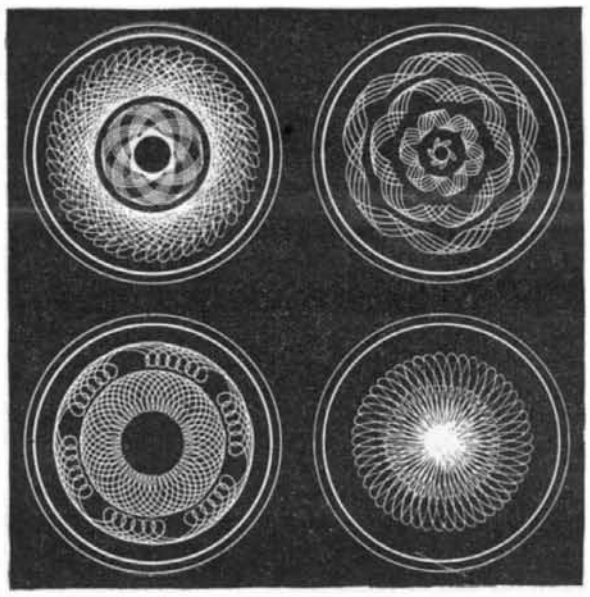


Fig. 2.—TRACINGS PRODUCED BY THE CYCLOIDOTROPE.

the reception of the glass disk, upon which the tracing is to be made. The glass is held in place by the pressure of two springs carrying rollers which bear upon the face of the glass at diametrically opposite points.

The face of the ring has a toothed rim, which is engaged by a small pinion on the crank shaft, and the periphery of the ring is provided with 202 spur teeth, which engage a pinion having 33 teeth and turning on a stud projecting from the base plate.

The spur pinion carries an adjustable crank, the pin of which turns in the crank arm, and is apertured transversely to receive the tracing rod, which may be clamped therein by the thumb screw.

The tracing rod passes through a stud arranged to turn in the end of the movable arm pivoted to the base plate. The tracing rod is hollow, and upon the end which projects over the toothed ring it carries a curved spring, provided at its extremity with a steel tracing point. A wire passing through the hollow tracing rod engages the under side of the curved spring, and lifts the point from the glass.

The glass is prepared for tracing by smoking it over a candle, lamp, or gas jet, or, better, by coating it with collodion to which some aniline has been added to give it the desired tint.

The glass having been secured in place in the toothed ring in the manner described, the tracing point is let down upon the glass by drawing out the wire in the hollow tracing rod. The toothed ring is then rotated by means of the crank, when a cycloidal curve will be traced on the glass. By continued rotation the curves will be duplicated; and as the number of teeth in the periphery of the ring is not an exact multiple of the number of teeth in the pinion, the ring will, by the differential movement, continually fall behind the movements of the pinion and tracer carried by the crank on the pinion, so that a small space is left between the lines of successive series. By continuing the operation the lines will intersect, until finally a beautiful, symmetrical network of lines will be formed.

By clamping the tracing rod in the crank pin, an approximately true cycloid curve will be formed; and by clamping the tracing rod in the stud projecting from the adjustable arm, and allowing the crank pin to slide on the rod, curves of another kind will be formed. Moving the arm on its pivot makes another change, and the figure is still further modified by changing the working field of the point from one edge of the glass disk to the other.

To render the tracing still more intricate, opposite sides of the glass disk may be coated with collodion differently colored. For example, red may be used on one side and blue on the other. The color of the ground when projected on the screen will then be purple. When the tracing is done on the blue side, red lines will appear on a purple ground; and when the tracing is made on the red side, blue lines will appear on the purple ground; and where the tracings of opposite sides of the glass cross each other, the lines will, of course, be white.

Besides the remarkable effects secured by the use of two colors, the thickness of the glass which intervenes between the two tracings produces a curious optical illusion on the screen. The tracing last made, if in focus, appears to stand out several inches from the screen, and seems to float in the air.

Another interesting optical illusion is noticed when, after rather rapid rotation, the disk is stopped. By the bias of the optic nerve the figures appear to turn backward.

The disks traced in this apparatus produce striking effects when used in a chromatrope in place of the ordinary painted disks.

This device has been exhibited at some of the places of amusement in this city for some weeks past. It universally creates among the spectators a murmur of satisfaction and surprise.

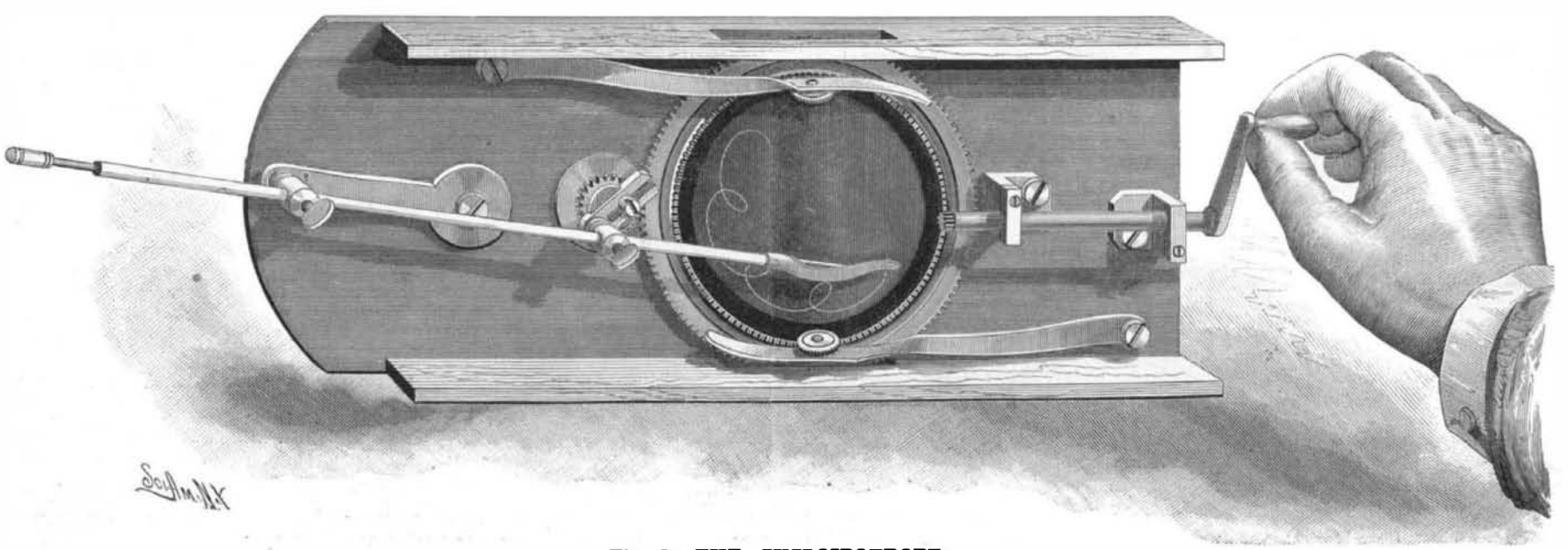


Fig. 1.—THE CYCLOIDOTROPE.