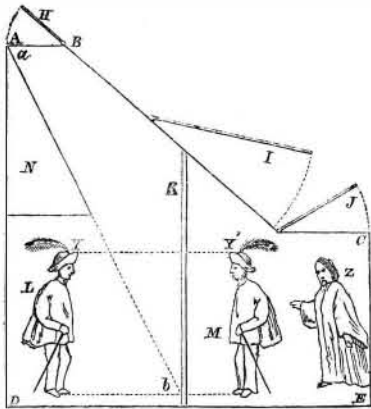


Science and Art.

A New Optical Illusion.

H. Dircks, Esq., in a paper communicated to the British Association, introduces a novel apparatus by which a sheet of plane plate glass is made to act as a mirror, and by whose powers many seemingly spectral illusions can be obtained. Its chief use will be as an adjunct to the stage, but as a home toy it will almost afford as much fun and wonderment as the magic lantern.

The arrangement of the apparatus is represented by the annexed diagram. A B C D E is a box closed on all sides, but provided on two sides with small doors, and on the top of the box are the flapped openings, H I J. The



interior of the box is divided centrally by the partition, K K, made of a good, clear, and even-surfaced piece of thin patent plate glass, kept in its place within two side grooves. The box is thereby divided into two separate chambers or compartments, L M, the former, L, having a ceiling or screen, N, to exclude any object therein from the direct view of the spectator, as shown by the line, a b.

If two figures be now introduced, one Y, the other, Z, and the eye of the spectator be fixed at A, he will observe two images, one the real figure Y, the other Y', the mere reflection of Y. By this arrangement it is evident that the plain unsilvered glass thus viewed at an angle of about 45° has all the properties of a mirror, but, owing to its transparency, two figures are seen possessing little or no distinguishable difference between them. Of course a person placed at Z sees only the figure Y; but as a piece of acting he may, under proper arrangements of a suitable stage, approach the situation apparently occupied by Y', and thus indicate to spectators placed at A any pre-arranged dramatic scene requiring Z to be in correspondence with the visionary figure, Y'.

In using the apparatus, the flap, H, must be open, but I may be shut, being mostly useful to get admission for inserting or withdrawing the screen or the figures. The flap, J, may be closed or opened to regulate the admission or exclusion of light. The two doors at the sides may both be wide open, though one is generally sufficient, provided it is turned as direct as possible to the light. A mirror placed at an angle close to the side doors will assist the illusion by illuminating the figure, Y, and thus heightening the effect of the reflection, Y'.

Some of our ingenious juvenile readers should set to work and construct one of these apparatuses, and see how it works.

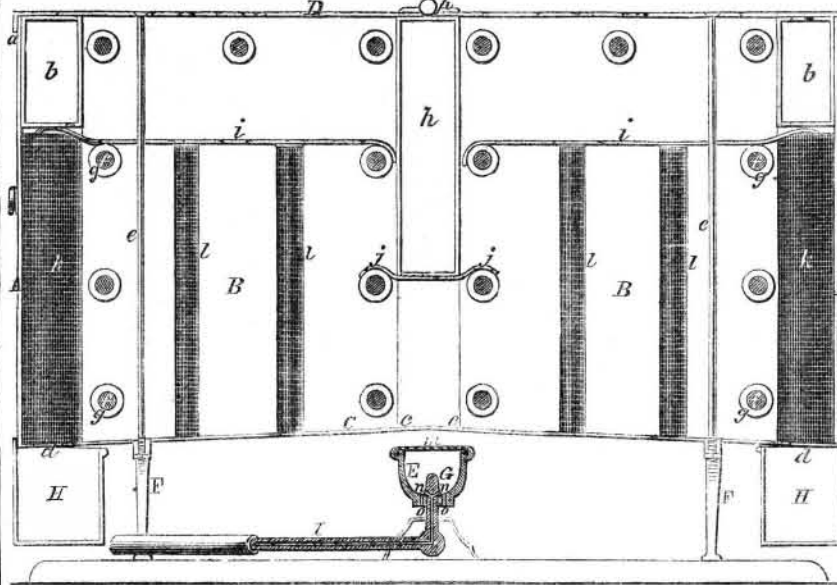
Improved Radiator.

Stove-fixing time is now upon us, and every one is discussing the question, "How shall I warm my room or store or office economically?" Gas and alcohol, although not by first cost the cheapest heaters, yet when their superior cleanliness and ease of management (thus saving labor) are taken into consideration, the expense greatly diminishes, so much so, indeed, that in many places and situations they are far preferable to wood or coal. There is, however, one objection to which they are both liable, and that is, the moisture

produced by their combustion renders the atmosphere unhealthy, but by the improved radiator the moisture is entirely condensed and the carbonic acid is also absorbed by the water of condensation so that no chimney is required, and gas or alcohol is made as healthy and convenient a heating material as any other.

A B C D is the outer shell composed of two parallel metal plate walls, having circular enlargements, A A, at each end and in the center. The space between the sides, B, is very

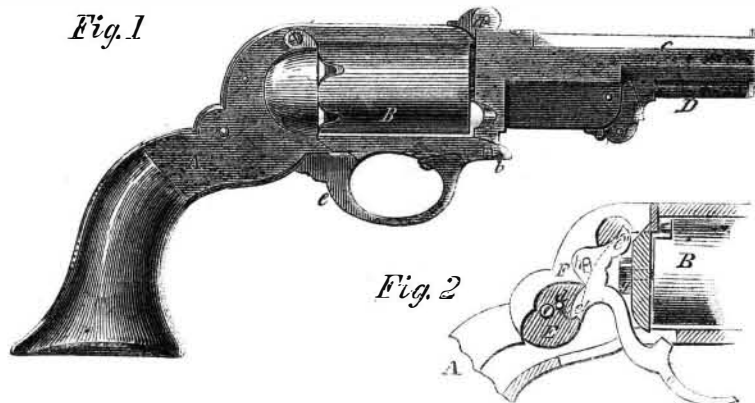
CHESTER'S RADIATOR.



number of holes, o o, admit air into the burner, and when the air and gas are thoroughly mixed, they burn on the wire gauze, m. I is the pipe that conveys the gas to the burner. The operation is as follows:—The flame and heated gaseous products of combustion entering the radiator from the burner strike the deflectors, j j and i, and are spread in opposite directions, and the gases are caused to circulate between the sides of the radiator and through the wire gauze cylinders l l, yielding their heat as they pass, and leaving much of the water condensed upon the surfaces before they arrive at the cooler parts of the radiator, namely, the end enlargements, upon the surfaces of which and upon the cylinders, k k, the condensation is completed as the final absorption of heat takes place. The water trickles down to the holes, d d, and from that passes into the vessels, H H, as from the direction of the incline it cannot accumulate around the burner, where it would be likely again to evaporate.

This compact and excellent radiator is the invention of I. H. Chester, of 272 Sixth street, Cincinnati, Ohio, who will be happy to furnish any further information. It was patented July 13, 1858.

NEWBURY'S REVOLVER.



We are told by the most sound of social philosophers that the more certainly fatal we render war, the nearer we approach that "consummation, devoutly to be wished," universal peace, and from this point of view, which certainly has historic evidence to support it, every improver of firearms is a true philanthropist. Indeed, if we trace the history of war, we find that the discovery of gunpowder

at once elevated it from being a mere test of physical or brute force to a science and an art, and now the victory is not with the strong, but with the intelligent. Perhaps nothing will tend to confirm the certainty of death in war, and so insure the conquest for the most progressive nation as the introduction of the revolver, by which the first charge of a battle will be rendered so deadly that

few will be got to oppose the army provided with them, while at the same time as a weapon of self-defense the revolver is unequalled. The numbers of these weapons now in use prove their efficiency, but the majority are complicated in their construction, and very difficult to repair when they once get out of order.

The subject of our illustration is free from both these objections, being simple, and can be repaired by any blacksmith who can temper a piece of steel.

Fig. 1 is a perspective view of the pistol, A being the wrist and stock, B the chambered breech, C the barrel, and D the lever, that operates the ramrod. The barrel is hinged to the breech frame by a pivot, a, being kept in position by a spring catch, b, which being released, the barrel can be raised and the chambered breech taken out to be cleaned or for other purposes; e is the trigger, which is of the shape shown by Fig. 2 that shows the arrangement of the lock. The trigger has a slot, h, in it, through which passes a pin secured to the piece, F, that forms part of the wrist. As the trigger is pulled back, the pawl-shaped projection, e', catching the ratchet wheel, g, on the axis of the chambered breech, revolves it in one chamber, and at the same time the rounded part of the trigger near e', moving against the pin, d, on the hammer, E, elevates it until the pin, d, falls into the angular groove, e', by which it is securely held cocked. When it is desired to fire, the trigger is pulled a little further; d is released from the notch, and the main spring brings the hammer down. The trigger in coming back to its original position slides up the pin by means of the slot, h, so that the groove and projection, e', pass over the pin, d, without obstruction. When it is desired to fire the piece quickly, it is only necessary to pull the trigger promptly beyond the cocking point. The simplicity of the lock is at once evident, there being in it only a hammer, trigger, main and sere springs, and the force required to operate it is very small.

It is the invention of F. B. Newbury, of Albany, N. Y., and was patented June 29, 1858, and any further information can be obtained by addressing the agent and assignee, R. V. Dewitt, of the same place,



INVENTORS, MILLWRIGHTS, FARMERS AND MANUFACTURERS.

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