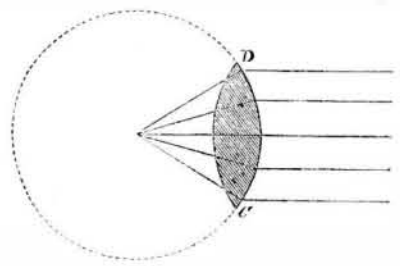
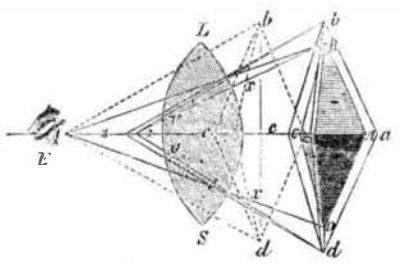
To continue the subject of lenses, in order that our readers may fully understand it, we present an engraving of a double-convex lens and it will be seen that the focus is nearly in



the center—in fact, exactly where we described it last week. The following figure will show the general principle on which a a convex lens magnifies:—

Let A B C D be an object, seen by an eye at E, through the lens, L S. The angle, B E D, is the *natural* angle under which the object would be seen if the lens were not there. But when the rays, B E and D E, arrive at the points, *x x*, they are refracted nearer to the perpendicular, and would meet in some point, 3, nearer the object than the eye is; and if the eye were not moved to that point, the object would not be distinctly seen.

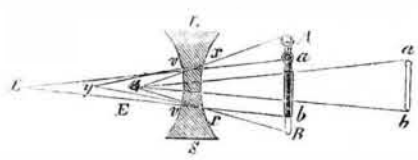
But, if the side of the lens toward the eye is also convex, as in the figure, the rays, *x* 1, *x* 1, will, in passing out of the denser convex medium into the rarer concave one at the points, *v v*, be again refracted towards the



axis, E C, and will meet at some point, 1, between the lens and 3; so that, in order that the object may be seen, the eye must be moved to the point, 1.

The ray which is made up of the three parts, B *x*, *x v*, and *v* 1, will appear to come in the last direction, that is, in the direction *v* 1, because the direction in which it falls on the eye is the only means that we can have of knowing the direction of light. But the direction of every ray from the object will be altered in the same proportion, and the outline through the lens will be the magnified outline, *a b c*; and if it be an object of which a particular magnitude has not been fixed by experience, it will seem magnified to that extent. But if it were one with the dimensions of which the observer was so familiar, that he assigned it the same magnitude whatever the distance were, then the impression would be that it had been brought nearer to the eye, as in the dotted lines, *a b c d*.

The following figure will in like manner illustrate the effect of concave lenses:—

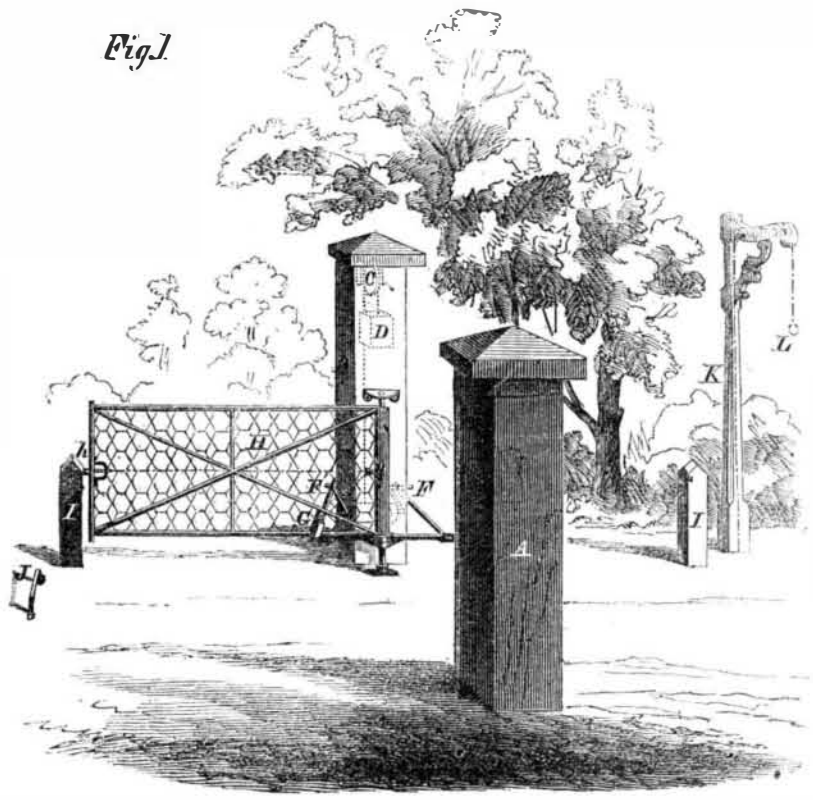


Let A B be an object, seen by an eye at E through the concave lense, L S. A E B would be the *natural* visual angle, if the lens were not there. But the rays, A *x* B *x*, falling upon the concave surface, *x x*, are refracted from the perpendicular, in the directions, *x v x v*, and would meet at the same point, *y*, behind the eye. But as they again fall upon the convex surface of the rarer medium (or, which is the same thing, pass out of the concave surface of the denser one) at *v* and *v*, they are again refracted from the perpendicular, and will meet at the same point, L, behind *y*.

They will have the last directions, *v z*, *v z*, so that in order to see them, the eye must be removed back to L, and the object will be diminished to the size, *a b*, or if size has been associated with it, it appears as if removed to the position of the distant *a b*.

HOWARD'S APPROACH OPENING GATE.

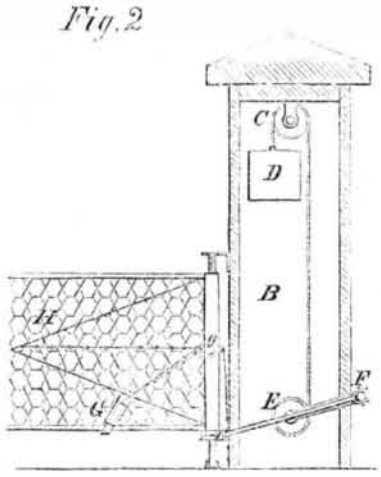
Fig. 1



The advantages and particular value of these gates have been so often expressed in the SCIENTIFIC AMERICAN that it is unnecessary now to reiterate them. The gate we are about to describe—the invention of Charles A. Howard, of Pontiac, Mich.—possesses over the advantages common to its class, the great merit of simplicity, and as our engraving shows, it can be made an ornament to a park or road without in any way detracting from its utility.

Fig. 1 is a perspective view of the gate, open, and Fig. 2 is a section through the hinge post. A is the latch post, and B the hinge post, in which there is a pulley, C, carrying a cord and weight, D. The other end of this cord is attached to, and wound up upon a shaft, E, from which, outside the post,

Fig. 2

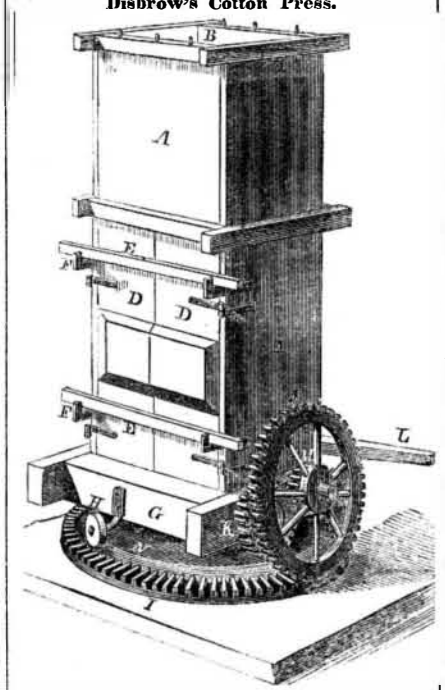


project the two cranks, F. The cord may either be wound upon the crank shaft directly or may be coiled on another wheel, and impart motion to the cranks by means of a cog-wheel. G are two small latches which are lifted up from either the handle, L, on the post, K, or the projecting piece, J, by means of the wires, *g*. H is the gate, and *h* a spring latch that is also pulled back when either of the latches, G, are lifted, so that it can be released automatically from either of the posts, I or A.

The operation of the gate is as follows: The weight, D, is wound up by a handle on one of the cranks, and the gate is then closed. The weight causes the cranks to meet under the latches, G, where they are held, and hold the gate in its shut position. From which ever side a person approaches, either by the carriage wheel passing over J, of which there can be two, one on each side, or by pulling the handle, L, the latch, *h*, is released, and and the latch, G, nearest the operator or carriage is lifted up, leaving the crank and weight to act on the opposite one, and so pull the gate open. When through, by again pulling the handle or pressing on J, the other crank operates and again shuts the gate.

It was patented Sept. 29, 1857, and any further information may be obtained by addressing the inventor as above.

Disbrow's Cotton Press.



On page 56, Vol. XII, of the SCIENTIFIC AMERICAN, we illustrated and described an improved cotton press invented by J. A. Disbrow, of Poughkeepsie, N. Y., and to that page we must refer the reader who wishes to obtain an intimate knowledge of the interior construction of the one now under consideration, as in that respect they are similar. It may be well to state that the follower is drawn down by ropes, which in some measure relieve the sides of the box from the great pressure of the cotton or hay on the sides. The invention in the present modification is in the mode of operating the drums on which the ropes are wound, and this will be seen from the accompanying engraving and description.

A is the box, being secured at the top, B, and having two doors, D, for the admission of the material to be pressed; when full, these are kept quite close by bars, E, fitting into catches, F. G is the base, provided with a small guide wheel, H, which steadies the press on the circular cog wheel, I, by moving in a smooth way, N. The press can be moved round this circle on a pivot in its center, by the lever, L. When the press is moved round, the large wheel, J, is rotated, and with it the small one, M, on its shaft. This gears into K, the shaft of which also carries the drum that winds up the rope and draws down the follower, so that by moving E the press is operated.

It is a convenient press, and was patented by the inventor February 2, 1858, by addressing whom, or R. L. Allen, 189 and 191 Water street, New York, more information can be obtained.

New Curtain Fixture.

J. F. Hall, of Bangor, Me., has invented a new attachment for fixing curtains. It is a curved spring attached to the upper half of the pulley (to which one end of the cord is attached), thereby creating a friction bearing upon its periphery, holding the curtain in place, and preventing the escape of the cord in drawing down the curtain. It was patented March 9, 1858.