

power of the glass composing the prisms. It happens, therefore, that in some object glasses that dispersion may be less than in some others, and in such lenses the variation of the two foci will be less observable. It appears, besides, that with the same glass the dispersion is greater or smaller according to the quality of light or other atmospheric influences, and also according to the angle of incidence. Sometimes the various screens intended to try the focus appear all well defined, although the screens are placed at different distances from the camera, in a range of twelve or fifteen inches. In this case it is not so important to find the very best focus, and the image may be well defined, whether the object is placed at twelve or fifteen inches nearer or further from the camera. But in some other circumstances, in setting the focus on one screen, the next, which is three inches distant, is confused, and the following still more; in those cases the dispersion is at its maximum, and it is then that it is of the greatest importance to attend to trying the focus before operating.

A. C.

#### SMOKE CONSUMERS.

It is gratifying to know that human ingenuity has at last devised a protection for Railroad travellers against the smoke and coal-cinders which render that mode of conveyance usually not only uncomfortable but dangerous. Multitudes of persons have had their eyes seriously injured by the cinders which are drawn into the cars by the eddying currents of air produced by the rapid motion of the Railway trains; and a general discomfort is often experienced, particularly in warm weather, from the necessity of closing the windows to avoid the annoyance. A patent smoke-consuming apparatus has been invented, and upon trial has proved to be perfectly effectual. It consists of what may be called an endless chain of bars; and this chain of bars forms the bottom of the furnace, on which the live coal blazes. The chain moves very

slowly forward—not more than at the rate of an inch in the minute—from the front to the back of the furnace, carrying the coal along with it. At the back or bridge of the furnace, the chain of bars moves round and comes back again. Thus it goes on endlessly, from morning to night. The apparatus is fixed on a carriage, which is run into the place on a species of railroad; and the whole—that is, the whole bottom of the furnace, can be dragged in or out at pleasure, by which means every facility is presented for cleaning, renovation, &c.

The chain of bars is moved by connecting gear from the steam engine. The coal is laid on a hopper at the mouth of the furnace, and is carried forward by the belt, the depth of coal that enters being regulated by an iron door, which is depressed or raised like a sluice. The principle of smoke consumption consists in the slow and regular admission of the coal. Instead of being heaved in with a shovel, so as to produce continual gusts of smoke, it is admitted, if it were, by hair-breadths. The ignition is therefore, little at a time; and what smoke is raised, having to go over the whole fire beyond, is necessarily consumed. Nothing gets up the chimney that is perceptible to the eye. The apparatus, we are told, has the further advantage of economizing fuel and attendance, while it sustains the steam equally with the common practice of firing. The whole invention is as simple as it is ingenious. More than a year ago one of these patents was applied for by Messrs. Chambers, of Edinburgh, to a five horse power engine, which they employ to drive their extensive printing machinery. No smoke, they say, is ever seen to issue from their chimneys, and, on a calculation as right as could be made, the saving is to be about one-twentieth of the fuel, or one tun to every twenty consumed without the patent. They have concluded that if a five horse power engine is any criterion, smoke is no longer an unavoidable nuisance in connection with locomotives and manufactories.