AN AUTOMATIC REDUCING VALVE OF NOVEL FORM.

In order to control the flow of illuminating gas, or of compressed air used as a motive agent, or of any fluid under pressure, a highly sensitive valve is required which automatically maintains a constant current. As a highly efficient type of such valves we have selected for illustration the very ingenious device made by the Automatic Reducing Valve Co., 125 La Salle Street, Chicago, Ill.

The valve comprises essentially a pressure-chamber, provided with an inlet and an outlet; a closure for the inlet; and a spring-pressed diaphragm controlling the closure.

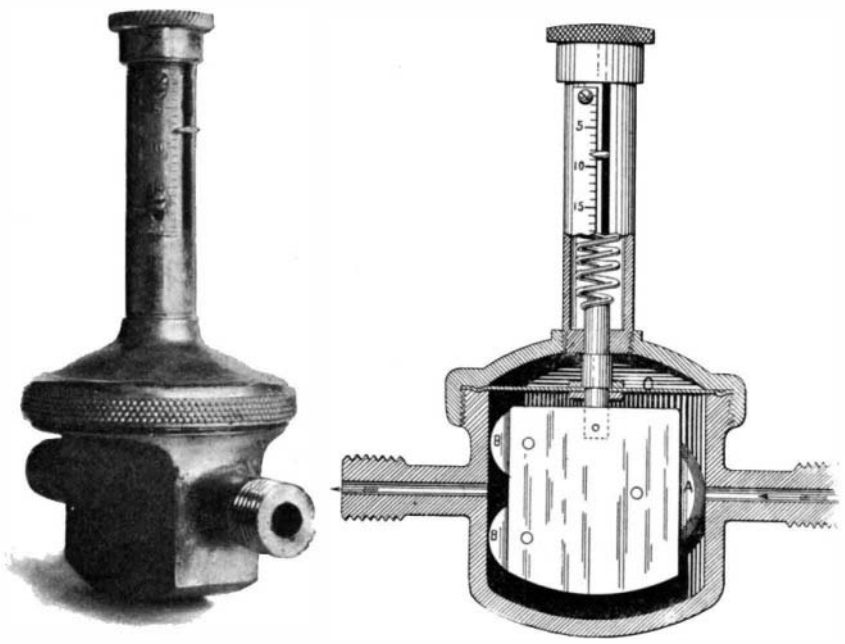
As shown in one of our illustrations, the closure consists of a carrier, in one side of which a single large elastic roller, *A*, is mounted, and in the other side of which two small metallic rollers, *B*, are journaled. The large rubber roller serves as a valve for the inlet; while the two small rollers serve primarily as anti-friction devices to facilitate the movement of the carrier.

Mounted on the carrier is a flexible diaphragm, *C*, clamped in place by a cap threaded on the pressure-chamber and utilized to regulate the inflow of gas. Within a tube screwing in the cap a coiled spring is inclosed, which bears upon a plunger projecting from the carrier and upon a disk secured to a screw-shaft formed on a milled head. The disk is provided with a pointer projecting through a slot in the tube and playing over a scale. By turning the milled head the pressure of the spring on the carrier-plunger can be varied.

Whatever may be the pressure within the tank or pipe to which the device is applied, the roller, *A*, will close the inlet, the pressure being sustained or supported by the carrier and its rollers, *B*. Upon turning the milled head, the spring is made to press upon the carrier-plunger, so that the roller, *A*, is moved to uncover the inlet, and to allow an amount of gas to pass which is proportionate to the degree of compression of the spring. When the pressure becomes excessive, the diaphragm, *C*, will be forced outwardly, thereby moving the carrier and causing the roller, *A*, to close the inlet. When the pressure falls again the diaphragm moves the roller, *A*, away from the inlet.

The novel feature of this reducing valve is the rolling closure, which is far more delicate in its opera ion than the ordinary sliding closure. For it is evident that as the roller, *A*, moves the inlets are opened or closed in a constantly increasing ratio. Hence a very slight movement of the diaphragm is so considerably multiplied at the roller, that the least increase or decrease of pressure is sufficient to close or open the inlet.

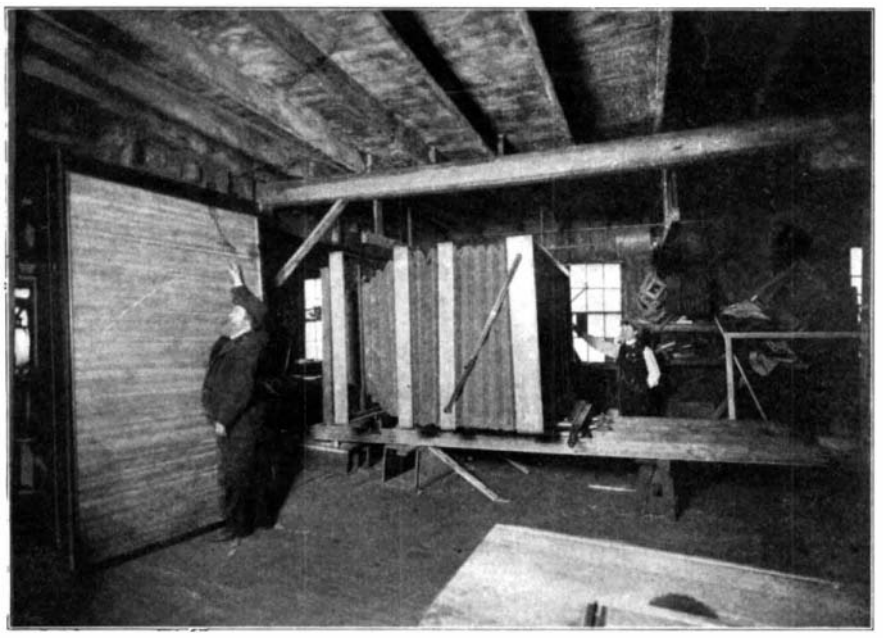
Another pre-eminent feature of this valve is its ability to maintain automatically a uniform low pressure independent of the varying high pressure.



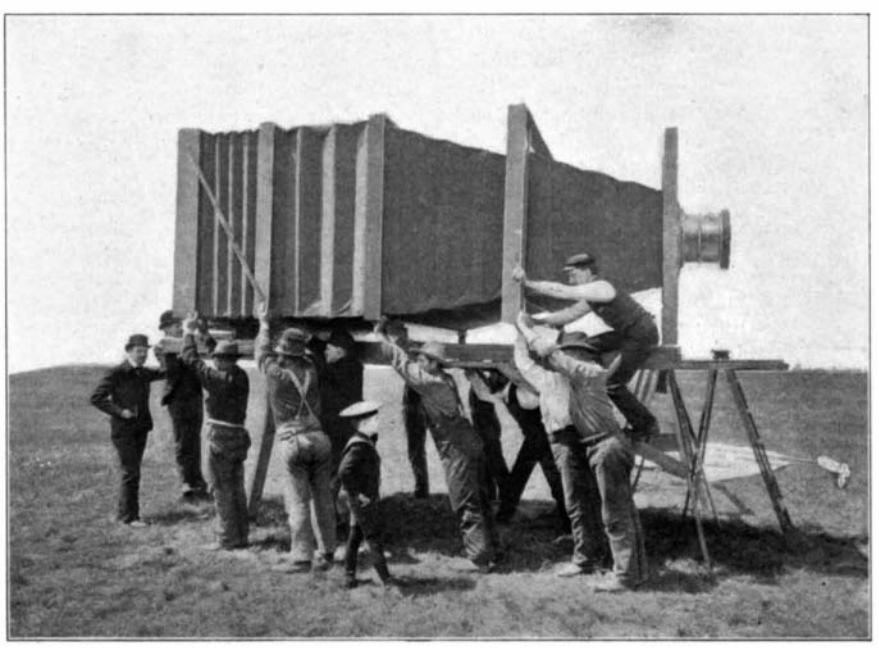
AN AUTOMATIC REDUCING VALVE.

THE LARGEST CAMERA IN THE WORLD.

Photographic progress has been so rapid in the last few years that we have arrived at the point when we are not surprised at any new developments in processes, but the idea of a negative 8 by 10 feet, or 96 by 120 inches, is certainly startling. The camera which we illustrate is by far the largest ever constructed, and in all probability it will hold this distinction for many years to come. During the summer of 1899, the workmen at the Pullman Works at Pullman, Ill., were busy building two trains, the plans for which differed materially from anything which had hitherto been built. These trains were for the Chicago and Alton Railway, and they were to be the handsomest trains in existence. The company desired fine photographs for exhibition at the Paris Exposition and elsewhere, and Mr. George R. Lawrence, their photographer, was requested to build the largest camera in the world, especially to photograph the "Alton Limited." Mr. Lawrence was given *carte blanche*, and in two and a half months the great camera was completed. It was designed and built in Chicago and it is finished throughout in natural cherry. The bed is composed of four 2 by 6 inch cherry beams, and is about 20 feet long when fully extended. The bellows is made with an outside covering of heavy rubber, each fold being stiffened by a piece of whitewood a quarter of an inch thick. It was then lined inside with heavy black canvas and an additional lining of thick black, opaque material. In the construction of this bellows over 40 gallons of cement, two bolts of wide rubber cloth and 500 feet of quarter-inch whitewood were used. The bellows is divided into four sections, as shown in our engraving, and between each section is a supporting frame mounted on small wheels which run on a steel track; the back supporting the plate-holder is operated as easily as in an ordinary camera. The instrument has double-swing front and back and at the rear is a small track on which two focusing screens are moved back and forth like a sliding door. The plate-holder is of the roller-curtain type. This curtain contains about 80 square feet of ash ¾ of an inch thick, and is lined with three thicknesses of light-proof material. Over ten gallons of cement were used in the construction of this curtain, and it is mounted on a ball-bearing roller.



CAMERA AND PLATEHOLDER.



"FOCUSING" THE CAMERA.

Ball-bearing rollers are also mounted every 2 inches in the grooves in which the edge of the curtain slides, thereby reducing the friction to almost nothing. The weight of the camera is 900 pounds and the plate-holder when loaded weighs 500 pounds, making the total weight 1,400 pounds. The camera is so constructed that after a long journey the plate may be dusted in a unique manner. The holder is put in position, the large front board, or front door, as it may be called, is swung open; the operator passes inside, the door is then closed and a ruby glass cap is placed over the lens, the curtain slide is drawn and the operator dusts the plate in a portable dark room, after which the slide is closed and he passes out in the same way as he entered.

The Zeiss lenses for this camera are the largest photographic lenses ever made, one being a wide angle lens with an equivalent focus of 5½ feet and the other being a telescopic rectilinear lens of 10 feet equivalent focus, the latter being the one used in taking the photograph of the Alton Limited.

Early one morning last spring the camera was transferred from a padded van to a flat car, and the start was made for Brighton Park, at which point the first exposure was made. The services of no less than fifteen men were required. The day was clear and a perfect negative was secured after an exposure of two and a half minutes, on a Cramer isochromatic plate, this special plate being used to preserve the color value of the train. The first three prints were sent to the Paris Exposition. One of them was placed in the railway section, another was hung in the photographic section, while a third was accorded a place of honor in the United States government building. The stir which the immense picture created in Paris is shown by the fact that affidavits were required before the Exposition officials consented to label the exhibit the largest photograph ever made on one plate. The picture of the Alton Limited was to visitors at the Paris Exposition what the exhibition of English trains was to Americans at the World's Fair, Chicago.

Boat for South Polar Expedition.—The ship which is to be used in the coming South Polar expedition, organized under the patronage of the Emperor William, is now being built at the Howaldt works at Kiel. The boat is to be 150 feet long and 36 feet maximum width. It will be provided with a triple covering of wood no less than 30 inches thick; this has been found necessary in order to resist the pressure of the ice. It will have no port-holes or windows. At the start the coal provision will be 400 tons and this is to be replenished at Capetown and Kerguelen by coaling vessels which will go to meet the ship. A full rigging of sails will be provided, besides the engine, and a speed of 7 knots an hour is allowed for. The expedition will include four scientific men, and for these two laboratories will be provided, which will be fitted up with the best available instruments. The personnel includes 5 officers and a crew of 20 men. The boat is to take along a captive balloon and 50 Siberian dogs for the sleighs; the kennels for the dogs are placed on deck. It is expected that the boat will be finished by May 1, 1901, and that the expedition will be enabled to start for the South Pole in the early part of next August.

An Expedition to Labrador.—A geological and geographical expedition to Labrador, Iceland and Greenland is being planned for the coming summer. Last summer five Harvard men went to Labrador with Dr. R. A. Daly, of the University Museum. This year's expedition will also be in charge of Dr. Daly, and will be larger than the previous one. The expedition will embark on a large steamer, and sixty men will probably be members of it, including students of geology, geography, botany, zoology, mineralogy, and all branches of natural history. The expedition will visit Iceland and the glaciers of West Greenland. A hunting party will be landed on the west coast of Greenland and in Labrador. The expedition will start June 26, and return September 20.