

bined shutter and diaphragm, attracted much attention. It consisted in having two light thin strips of gutta-percha pass in slits through the lens tube in the place usually occupied by the diaphragm. The principle of the movement was "go and return," and the strips were operated by a toggle joint and a coiled watchspring. Diamond-shaped openings were made in the strips, and the size of the diaphragm was regulated according as the strips were drawn apart or closed together. The whole was neatly encased in a gutta-percha box. It possessed the advantage of enabling the operator to make a time or an instantaneous exposure at will, with any sized diaphragm he might desire to use. It also tended to make pictures taken instantaneously much sharper and more distinct than is usually the case. When the spring was placed at its highest tension it was estimated an exposure of the mere fraction of a second could be made. Another feature of the invention was the absence of any jar.

Messrs. W. H. Walmsley and Co., of Philadelphia, Pa., exhibited a new rotary snap shutter, which was placed on the end of the lens tube. A circular rotary plate, with an aperture in it to match the lens tube, was propelled at its axis by a flat coiled spiral spring, in front of a stationary plate, which was secured to the lens tube. When the rotary plate was released, by a simple trigger or pneumatic device, its aperture rapidly revolved past the lens tube, making the exposure; after passing the aperture, the plate, instead of coming to a quick stop, was constructed to ride up on a metal incline arranged on the periphery face of the circular stationary plate. In this way the jar which usually accompanies such shutters was avoided. Suitable mechanism was arranged to increase or decrease the tension on the spring, and thereby vary the speed of rotation.

A shutter intended for a studio camera, styled Van Sickle's perfection shutter, and exhibited by Geo. F. Green, Kalamazoo, Mich., worked very easy, and was quite simple in construction. It was arranged on the interior of the camera behind the lens-board, and was composed of two broad quarter moon-shaped thin gutta-percha discs or wings, connected together by a pivot at their lower ends, and provided also with peculiar shaped slots, which engaged with a certain pin attached to the face of one wing, which served as a locking device to assist in holding the wings open. The weight of the wings was exactly the same, so that they always balanced, in whatever position they were placed. They were actuated by a novel pneumatic piston, which consisted merely of a vertical metal tube attached to the end of a rubber tube; sliding over and outside the metal tube was a metal cap, having a horizontal projection at its lower end, which engaged in a hole at the lower end of one of the wings. The metal cap took the place of a piston. As the air in rubber bulb was compressed it elevated the metal cap piston, and it in turn opened the wings quickly; on releasing the bulb the vacuum drew down the cap, which was also assisted by its weight, and the wings were closed. The rubber bulb was connected by metal tube to the rubber tubing, and was provided with a small hole near its extremity. To hold the wings open for focussing it was only necessary to compress the bulb, and slip off for a quarter of an inch on the metal tube the rubber tubing until the whole of the metal tube was exposed. Air was thus admitted, and when the bulb was released the wings would not close. The manufacturer had several other forms of the same shutter on exhibition, illustrating the various stages of improvement. He appeared to have a very simple and perfect pneumatic device in the latest invention. By suddenly pounding on the bulb, it was possible to make an instantaneous exposure.

One of the most complicated shutters for studio work was exhibited by S. S. Benster, of Toledo, Ohio, known as the Benster shutter. It could be placed either at the rear of the lens in the camera, or in the centre of the lens tube in the place occupied by the diaphragm. Some fifteen thin, diamond-shaped metal leaf plates were pivoted at their extreme angle to a permanent stationary metal ring, and to a rotary ring which revolved inside of the stationary one. A vertical projection on the rotary ring engaged in the horizontal piston rod of a pneumatic piston connected by flexible tubing to the usual rubber bulb.

The elongated portion of each diamond-shaped leaf plate joined and covered each other at the centre of the lens aperture, closing the same. When the rotary ring is actuated or revolved the elongated point of each overlapping plate is by the motion, in connection with the pivot on the stationary ring, carried away from the centre, making a gradual opening; and when it has reached its greatest extent, each leaf plate is thrown to one side. When the bulb is released, the piston flies back, and the leaf

plates return to the centre, closing the aperture. The principle of the shutter is quite ingenious. Owing to the great number of leaf plates, there seems to be danger of its occasionally leaking light.

Gilbert's automatic retoucher for retouching negatives rapidly was arranged to run for half an hour by clock work, and gave a rapid reciprocating motion to the pencil. It weighed but fourteen ounces, and was suspended and balanced near the operator by a pulley and cord. The inventor stated that it saved much labour, and was largely used.

A very large assortment of backgrounds, artificial stumps, trees, vine covered doors, and devices for beautifying photographic pictures, were exhibited. Mr. Seavey, of this city, displayed several novelties in the way of glass foregrounds made under Moreno's patent. Clouds are painted on a large sheet of glass held upright on a wood stand, behind which the sitter is posed; an appropriate background of clouds is arranged behind. The resulting negative makes the person appear as if he or she were floating in the clouds. In place of clouds, water waves, a burning fire, and other novel effects painted on the glass could be used. By means of this improvement, the double printing of negatives to obtain similar effects was avoided.

The Mallinckrodt Chemical Works of St. Louis, Mo., made a large, well-arranged, and creditable exhibit of many of the principal chemicals used by photographers.

We noticed a simple but effective paper stretcher and drier, to keep sensitized sheets of paper from curling up, invented by Kuhn, of St. Louis. A wire plate lifter to take plates out of the different baths or trays, and a compact portable dark-room lamp, were shown by the Scovill Manufacturing Company, of this city.

As the dry pyro is largely used in the development of dry plates, many ways of using it have been devised; we noticed one firm put it up in homoeopathic papers, five grains to the paper; another compressed it into tablets of two grains each. A pyro auger was a third and novel way to obtain exact quantities of the chemical. The pyro was held in a glass cylinder, through one end of which passed a rod having auger-shaped leaves attached to its inner end, which fitted tightly against the interior of the cylinder. A small metal scale was cemented lengthwise on the exterior surface of the cylinder, having degrees marked on it for 1, 2, 3, 5, 10, or 15 grains of pyro. All that was necessary was to revolve the auger against the pyro, holding the cylinder in an upright position until the auger came opposite to the number of required grains on the scale. The proper amount was then taken out and mixed with the developer.

An improvement in large-sized dark-room lanterns was shown by the Seed Dry Plate Company, of St. Louis, Mo. It consisted in having a long wick shaft project through one of the flat sides of the lantern, properly protected to prevent the leakage of white light. The object of the device was to enable the operator to control the light without opening the lantern door.

A large majority of specimen photographs shown consisted of portraits. Mr. James Inglis exhibited specimens of instantaneous work, and enlargements therefrom, which were excellent. C. Cramer, of St. Louis, Mo., made the best general exhibit. W. A. Armstrong, of Milwaukee, Wis., exhibited fine landscape effects, and Mr. Geo. Barker's large collection of assorted sizes and styles of Niagara Falls elicited general commendation for the technical skill displayed, and the variety of effects produced. We were privately shown a new device for rapidly packing gelatine plates by the inventor, of Mr. F. D. Sull, of St. Louis, Mo., which was in some respects quite novel. Corrugated cardboard partitions were made to fit into each end of a paste-board box, two plates being packed edgewise back to back between each groove.

In order to slip the corrugated strips between the plates, the latter were piled above each other between two sets of vertical rods, and each pair of plates was separated along its length by a metal plate, forked at each end equivalent in space to the groove in the corrugated paper strip. Metal guides containing grooves similar to the corrugated paper strips were arranged in a vertical plane obliquely to the edge of the tier of glass plates, and after they had been piled up to the requisite number, the paper corrugated strips were very quickly slid over the metal corrugated guides in between the edges of the glass plates. Then pressure on a treadle below, actuating a lever, withdrew, by a horizontal sliding motion, the separating metal plates from between the glass plates, and allowed the latter, having the corrugated paper strips between them at each end, to be removed,