A NOVEL HAND CAMERA.

The remarkable progress that has been made within the past few years in the construction of hand cameras, whereby their cheapness, lightness, compactness, simplicity and accuracy are some of the predominant points, is well exemplified in the camera called the Adlake, which is the subject of our illustrations.

The well known box form of camera is adopted, and comprises at the front all of the important essentials for good work; as, for example, a lens easily removable for cleaning, a set of diaphragms quickly adjusted, a very simple yet rapid shutter, easily released, positive in its movement and quickly adjustable for time or instantaneous exposures. There are also the usual two finders for taking the picture in a vertical or horizontal position. On the rear is a space for holding twelve remarkably compact and simply constructed metal plate holders, plainly observable in Fig. 1 and in detail in Fig. 2. Each plate is exposed separately, withdrawn from the box and transferred to the rear of the series until all, or as many as desired, are exposed, each holder having stamped on it a separate number.

The construction of the plate holder and mode of operation will be observed in Fig. 2. Two vertical grooves in the box on each side hold a metal plate holder frame having a small recess cut out in each side, as will be noticed by a black space in the upper part of Fig. 2. The thin metal plate holder, just thick enough to hold one glass plate, provided with a hinge side, the latter having on its upper edge and outer corners light wire clamping or locking springs, is pushed down in the metal plate holder frame just described. Just in front of the frame are two skeleton fingers, having at their upper ends curved portions which fit into the black recess shown in the plate holder frame, and are attached to the axis of a revolving shaft at the bottom, at the end of which is also a push crank projecting through the box, the knob being seen in Fig. 1, on the side. To make an exposure the finger frame is turned into a vertical position until it fits snugly into the plate holder frame. The plate holder is then inserted, which brings the corner projecting clamping wires into the curved ends of the finger frame. The cover of the box is shut, then the knob on the outside is pushed down. This carries forward the finger frame downward in the arc of a circle which takes with it the door of the plate holder, leaving the latter in a horizontal position on the bottom of the camera. After the exposure is made the knob is pushed up tightly, which closes the door of the holder, it being secured by the three wire clamping springs. The cover of the camera is opened, the plate holder removed and another plate inserted. The plate holder is made with a thin rabbet edge, in which the edge of the plate holder door, or side, fits and excludes all light.

Referring to the mechanism of the shutter, Fig. 3, it will be noticed that the shutter is of the ordinary oscillating fan-shaped type, having an elongated aperture, working on a pivot from one side to the other in opposite directions, and that a very small movement just below its axis produces rapid movement above. To this portion is attached a link secured to the lower end of a long swinging vertical arm, or lever, pivoted at the top, seen on the left. A rapid movement of this lever near its fulcrum will give an extremely rapid motion to the shutter. Behind this lever will be seen the pivoted black operating swinging lever, on the end of which is secured the operating oscillating spring, having one end attached to the long vertical lever not far from the fulcrum.

When the operating lever is pushed in one direction by the knob on the outside the spring is partly rotated until its center is above the attached end, causing the shutter lever to be suddenly pushed in the opposite direction, giving a corresponding rapid movement to the shutter. Pushing the operating lever in the opposite direction makes the spring carry the long lever to the other side. In this way a slight side pressure on the push button quickly operates the shutter without a jar or difficulty. A second pivoted lever (shown at the right, Fig. 3) pivoted at the bottom, to the axis of which is a flat spring, has a horizontal arm projecting from its center which engages with a like short arm projecting from the shutter proper. It may be called a time lever. When the button on the outside is pushed toward the lens, the arm on the lever engages the arm on the shutter and stops its movement, leaving the aperture open for time exposures. When pushed away from the lens, the lever releases the shutter and allows the latter to close.

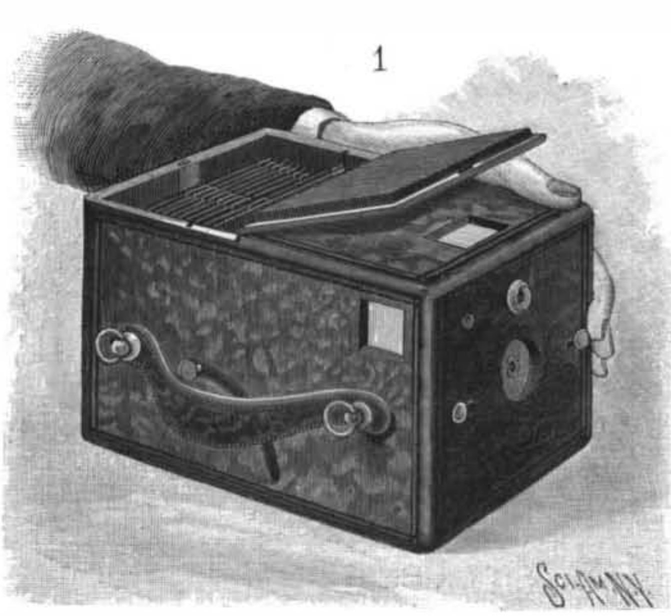
Above the shutter and working just behind the lens will be observed a star-shaped diaphragm plate turning around its center and having three different apertures. On the surface of the plate are slight indents, which engage in the end of the horizontal flat locking springs. The diaphragm plate is attached on the front to a rotating ring surrounding the finder lens, and is thus rotated from the outside to whatever working aperture is desired.

Convenient strap rings are attached to the handle of the camera for carrying it over the shoulder or on a bicycle. Pictures we have seen made with it are clear cut and distinct, showing that its cheapness is no bar to the production of good work.

Its simplicity and certainty of working are its salient features, while at the same time its strength of structure is such as to permit of rough handling without detriment.

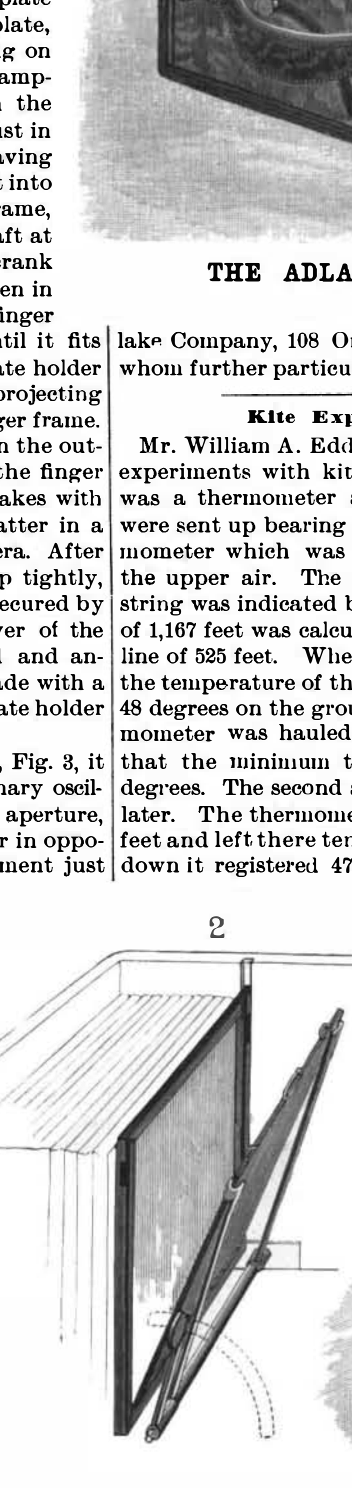
The camera is manufactured by the Adams & Westlake Company, 108 Ontario Street, Chicago, Ill., from whom further particulars may be had.

1



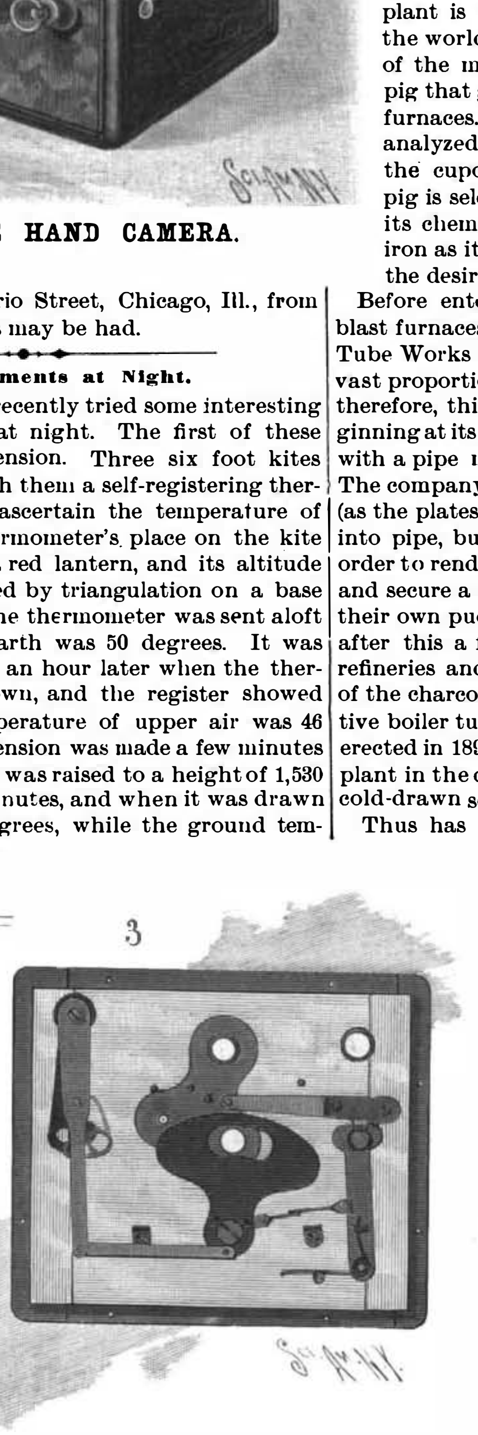
THE ADLAKE HAND CAMERA.

2



THE PLATE HOLDER DEVICE.

3



THE SHUTTER.

Kite Experiments at Night.

Mr. William A. Eddy recently tried some interesting experiments with kites at night. The first of these was a thermometer ascension. Three six foot kites were sent up bearing with them a self-registering thermometer which was to ascertain the temperature of the upper air. The thermometer's place on the kite string was indicated by a red lantern, and its altitude of 1,167 feet was calculated by triangulation on a base line of 525 feet. When the thermometer was sent aloft the temperature of the earth was 50 degrees. It was 48 degrees on the ground an hour later when the thermometer was hauled down, and the register showed that the minimum temperature of upper air was 46 degrees. The second ascension was made a few minutes later. The thermometer was raised to a height of 1,530 feet and left there ten minutes, and when it was drawn down it registered 47 degrees, while the ground temperature was 44 degrees. The minimum temperature registered in the highest strata was 43 degrees. Mr. Eddy and his associates next raised a triangular reflector, 24 by 5 inches, covered with silver paper, to watch its operation in the light of a full moon and see what it would do with the rays. One of Mr. Eddy's associates went to a point a quarter of a mile distant, and from there could plainly see the reflector, although at first it was difficult to distinguish it from the stars.

A COMPANY has been organized at Seattle, Washington, to develop the coal and oil fields recently discovered in Alaska, some 350 miles west of Juneau. Thirty thousand feet of piping has been ordered for this purpose from the Pittsburg district.

THE STEEL PIPE AND TUBE INDUSTRY.

I.—THE MANUFACTURE OF THE PIG IRON.

The manufacture of pipe and tubing is one of those branches of the iron industry that have been slow to discard puddled iron in favor of Bessemer steel as the raw material of manufacture. This reluctance to use the new material has been due to the difficulty in producing lap and butt welded steel pipe that would be as strong at the weld as in the body of the pipe, and it is undeniable that the earlier attempts were marked by repeated failure. The obvious advantages of strength and smaller cost in the use of steel were so great, however, as to stimulate the manufacturers to an earnest study of the problem, and of late years it has been so completely solved that welded steel pipe and tubing can now be made, and is made, that shows a larger percentage of strength at the weld than at any other point. It has been found that to procure a perfectly reliable weld a special grade of steel must be used, and that the chemical composition of the pig iron itself must be made the subject of careful study. Under the old system the manufacturers of steel tubing were apt to purchase their raw material in the shape of pig iron with very little, if any, regard to its composition; whereas it is now the practice of the best manufacturers to exercise the greatest care in the selection and mixture of the pig before it is melted down for treatment in the converters.

The National Tube Works Company, whose plant is the largest and most representative in the world, attach much importance to this branch of the manufacture, and they make every ton of pig that goes to their steel plant in their own blast furnaces. Every lot of pig that is cast is carefully analyzed and its composition recorded, and when the cupolas at the steel plant are charged the pig is selected from various casts with reference to its chemical composition, so that the molten cast iron as it is poured into the converters shall have the desired chemical proportions.

Before entering into a detailed description of the blast furnaces, it may be mentioned that the National Tube Works Company, whose plant has grown to such vast proportions, was formed in Boston in 1865, and is, therefore, thirty-two years old. It made a modest beginning at its present location, McKeesport, Pa., in 1872, with a pipe mill which employed two hundred men. The company at that time merely rolled the "skelp" (as the plates from which the pipe is made are called) into pipe, buying the skelp in the open market. In order to render themselves independent of the market and secure a more reliable material, they built in 1879 their own puddling furnaces and rolling mills. Shortly after this a forge was added, together with Swedish refineries and "knobbling" fires for the manufacture of the charcoal iron, of which the company's locomotive boiler tubes are made. The present steel plant was erected in 1893, and there is at present an entirely new plant in the course of erection for the manufacture of cold-drawn seamless tubing.

Thus has been built up the present vast establishment, which can claim to be not only the largest tube works in the world, but also one of the largest steel works of any kind in this country. Those of our readers who have never had an opportunity to visit a works of this magnitude can form some idea of its size from the following statistics: The combined steel plant and rolling mills cover an area of 90 acres and give steady employment to an army of 7,000 men. The raw material brought into the works and consumed every day averages 1,000 tons of ore, 1,500 tons of coal, 700 tons of coke and 300 tons of limestone, not to mention other material in lesser quantities. For the intershipment of material within the works there are 12½ miles of standard gage track and one mile of narrow gage. The rolling stock of this system of railroads consists of 350 cars and 11 locomotives, the latter varying in size from the smallest of their kind up to machines of 75 tons weight. The total output of tubular goods for the year is 200,000 tons.

The raw material—coke, limestone and iron ore—is brought into the works on cars and run up onto raised trestles, from which it is dumped into long rows of bins. From these it is drawn off, as will be explained later, for charging the blast furnaces. The plant contains two blast furnaces, known as the Monongahela furnaces, of the latest type, with a capacity of about 700 tons per 24 hours. These furnaces, with the elevators for raising the ore, coke, etc., to the charging platform, the hot blast stoves and the foundry in which the pig iron is cast, are shown on the front page engraving. Each furnace consists of a massive cylindrical structure of brick and steel 80 feet in height and of varying diameter. At its mouth it has an internal diameter of 16 feet, and it increases in the first 60 feet of its depth to a diameter of 20 feet, the taper being