

## NEW AIR GUN.

The engraving shows a very simple and effective air gun recently patented, by Mr. A. G. Hyde, of this city. It is constructed so that the air may be compressed to a high pressure, and its entire volume released at each shot.

In a cavity in the breech of the barrel, there is a tube of the same caliber as the barrel, closed at its rear end, and provided with a pin for preventing the backward movement of the ball. This tube is provided with a handle by which it may be turned, and which projects through a slot in the breech. There are two holes in the tube, one for receiving the ball, which is dropped in through an opening in the top of the barrel, and the other for communicating with the air chamber, located below the barrel. The holes in the tube are arranged relatively to each other, so that when one is open the other will be closed.

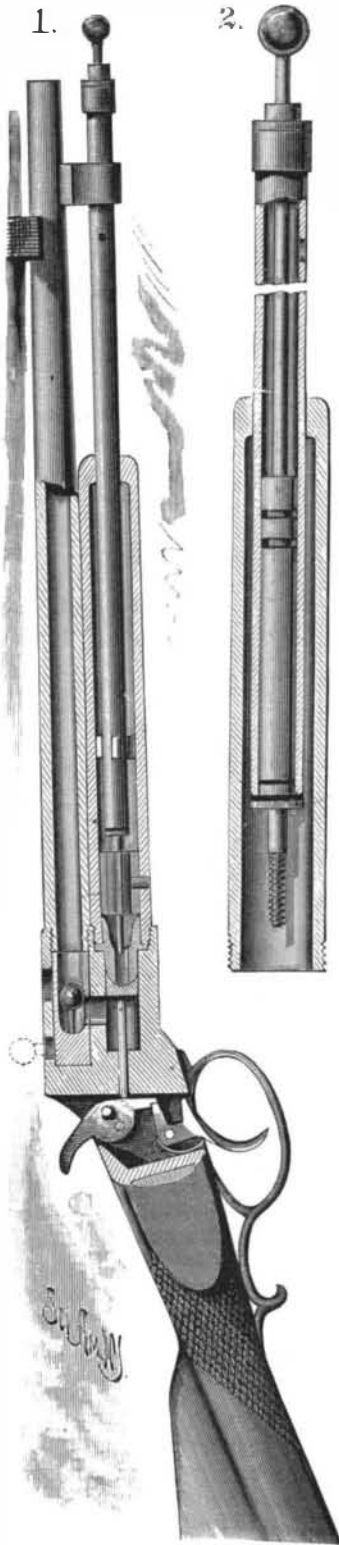
The air chamber contains a valve which is pressed against a packing at the end of the air reservoir, and is held in place by a dog, which, in turn, is retained by the trigger. The air-condensing pump projects into the air reservoir, and is provided with a single valve at its inner end, which prevents the air from re-entering the barrel after having been compressed. The air enters the compressing pump through a small aperture near its outer end. No valve is placed here, as communication between the external air and the space below the piston is shut off after the latter has moved inward a short distance. The piston rod of the air compressor is provided with a ball handle at the outer end.

The arrangement of the barrel and air reservoir may be clearly seen in Fig. 2.

When it is desired to use the gun it is only necessary to move the pump piston out and in a few times, when sufficient air will be compressed to project the ball with great force.

## THE STEAMER PITTSBURG.

The light draught stern-wheel steamer, now the predominant type used on the Ohio and Mississippi rivers and their tributaries, is peculiar in many respects to the West. In former years the stern-



NOVEL AIR GUN.

wheeler was considered, on account of slowness, unfit for the river traffic, but the rapid strides in its perfection which have been made on the Ohio in recent years have placed it almost beside its rival side-wheeler in point of speed. The exterior appearance of these boats is strikingly graceful, the long unbroken lines from stem to stern, together with their very slight sheer, giving them great beauty. The boilers are located on the main deck, about one third the boat's length from the bow. The wheel is never housed, but remains open. The engine room aft occupies but a small space, and the remainder of the deck room is devoted to freight. The cabin is on the upper deck, and on all of the boats in the passenger carrying trades is complete and elegant in every respect. The officers' cabin occupies the hurricane deck. The saloon extends nearly the entire length of the boat, and on many steamers is palatial in its appointments.

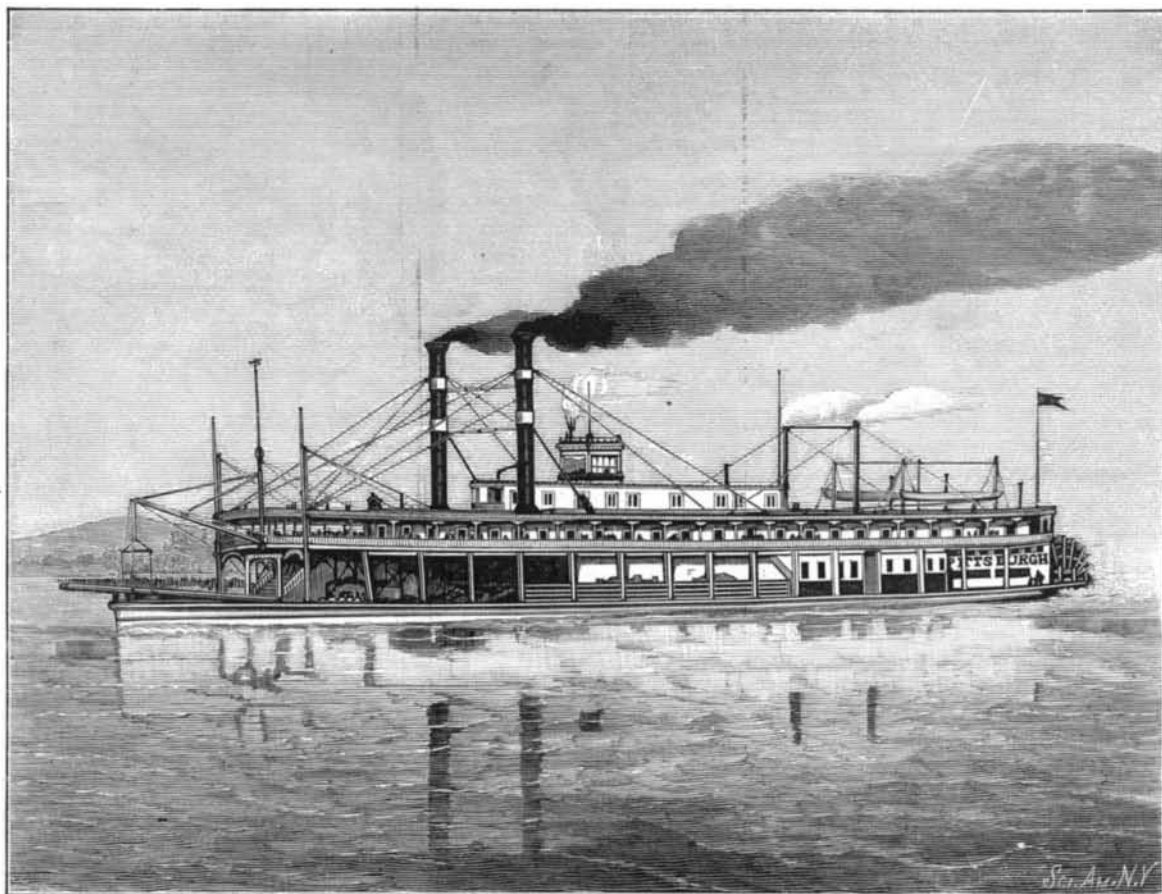
The desideratum, of course, in all steam vessels is economy of power. In Western steamboats the very extreme of light draught is necessary. The hulls must be flat bottomed, and built as lightly as practicable with the requisite strength for large cargo carrying. The machinery must be as light as can be made, and for this reason the simple, high pressure, horizontal, lever engine has been found to meet the requirements better than any other. The long return-flue boilers, which, on all boats of late build, are made of steel of the highest tensile strength, are better adapted for several reasons to these boats on account of mud, etc. Besides, their shape distributes their weight over a larger area. There is no doubt that, for the weight of machinery used, the improved boats of the Ohio and Mississippi rivers develop a greater power and speed than any other class of steam vessels.

Among the remarkable specimens of the stern-wheeler on the Ohio may be mentioned the Pittsburg, built at Cincinnati in 1879. Her hull measures 252 feet in length, 39 feet beam, 6 feet hold. She has three steel boilers, 70,000 lb. tensile strength, 47 inches diameter, 28 feet long, 6 flues. Engines, 21 inches diameter, 7 feet stroke, working a wheel 21 feet diameter, 28 feet face. With fuel on board and steam up this boat draws only 24 inches water, and will carry 1,000 tons. She is one of the fastest steamers on the river. The large Golden City, plying between Cincinnati and New Orleans, is 276 feet long, 40 feet beam, 7 feet hold, and carries 1,600 tons. The steamer Buckeye State, of the Upper Ohio, is 240 feet long, and can carry a large cargo on 4 feet water.

These boats are complete with all the modern appliances of steam stages, capstans, windlasses, headlights, etc. The electric light has been applied with great success to several steamers during this year.

## They Had all Had It!

A health officer writes to a Canadian medical journal as follows: "Inspected a house in the country at the request of the attending physician, as the general health of the family had been bad for a long time, they having suffered from a class of complaints that would indicate bad drainage, etc. Found under the floor a wooden drain with rotten cover, and soil saturated with sewage; trap on water-closet non-effective; water-closet foul; situation very bad; ventilation so arranged as to poison the room above it, a sleeping apartment occupied by a young man suffering for a long time from general ill health. No trap on kitchen sink; water supply, cistern connected directly with the sewer without traps in the overflow pipe. On my reporting the latter fact to the family, and expressing my surprise that they had not all had typhoid fever, they exclaimed in chorus, 'Oh, we have all had it!'"



THE LIGHT DRAUGHT STEAMER PITTSBURG.

## THE GLYCERINE BAROMETER.

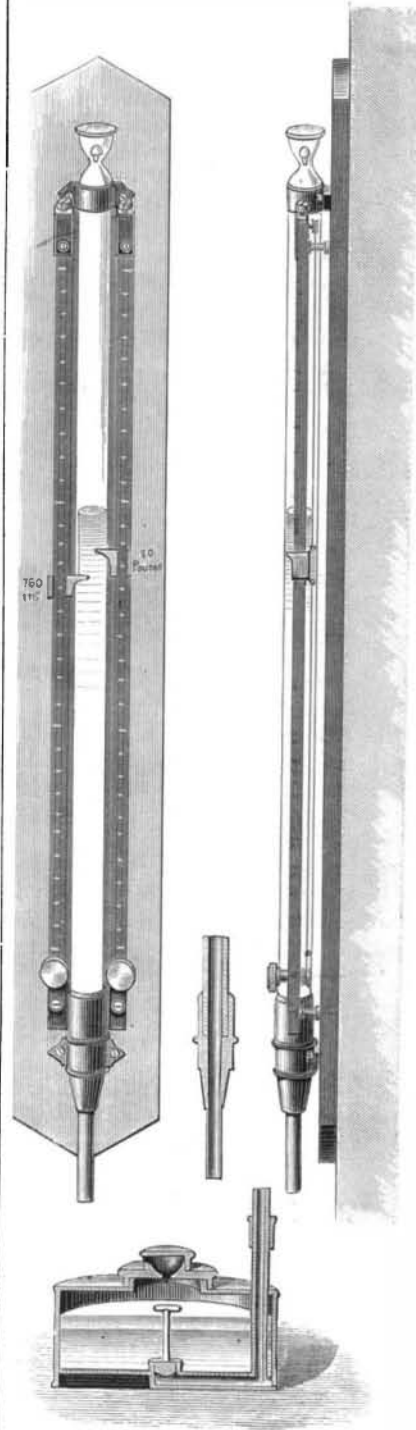
The marked influence of the variations in the pressure of the atmosphere upon the disengagement of carbureted gases in coal mines, has led the English engineers to devise a new barometer that will not only indicate the most minute variation of atmospheric pressure, but will indicate it so plainly that miners and others not experienced in making barometric observations can readily detect the variations.

Among the instruments of this class one of the most interesting is the large water barometer constructed for the Royal Society by Prof. Daniell, in 1830, which, however, was not a success, as the effects of the pressure were annulled by the effect of the temperature upon the vapor found in the Torricellian vacuum.

Mr. B. Jordan, a member of the office of the English mining archives, has spent several years in studying the different liquids that might possibly be applicable in constructing an accurate and highly sensitive barometer, and finally found that glycerine produced the best results. A glycerine barometer constructed by Mr. Jordan, 1870, is still in use. The glycerine, which is very pure, is manufactured by

Price & Co., and has a specific gravity of 1.26, and on account of its high point of ebullition the vapors have no perceptible tension at the ordinary temperature, and it will only congeal at a very low temperature. The height of a column of glycerine is 26 feet 9 inches, and a variation of 1-16th of an inch of mercury corresponds to a variation of about 1 inch in the column of glycerine. As glycerine is very apt to absorb the moisture of the air, it is covered with a thin layer of prepared thickened petroleum in the cistern of the barometer. Mr. Jordan has constructed barometers for the South Kensington and Jermyn Street Museums; both have given perfect satisfaction, and to show the scientific value of the instrument the Royal Society has built one at the Kew Observatory.

This instrument is shown in the annexed engraving, and consists of a cylindrical cistern of tinned copper, about six inches high and ten inches in diameter, provided with a screw cover or cap, having a small opening leading into a recess containing cotton to act as filter and keep out the dust. The large barometric tube is made of



THE GLYCERINE BAROMETER AT THE KEW OBSERVATORY.

Price & Co., and has a specific gravity of 1.26, and on account of its high point of ebullition the vapors have no perceptible tension at the ordinary temperature, and it will only congeal at a very low temperature. The height of a column