STEAM BOILER NOTES.

On the 14th of October a locomotive used for yard work on the Wabash, St. Louis, and Pacific Railroad was damaged by the explosion of its boiler while crossing the Mississippi River at Keokuk, Iowa. The forward part of the boiler was blown open and torn in pieces, the bridge was considerably damaged, and three men who were in the cab were slightly injured. The boiler has the reputation of being more than twenty years old. The engineer says it gave way while the water stood at the upper gauge cock, and under a pressure of 120 pounds of steam.

Perhaps he is right. Hundreds of boilers have done relatively the same thing. Doubts might arise in the minds of thoughtful practical readers as to the perfect condition of his safety valve, the accuracy of his steam gauge, by which the safety valve may have been adjusted, and the time that elapsed after his noting its indication and before the explosion. It is not necessary, however, in order to account for explosions of this class, to suspect that other conditions existed than those stated by this engineer. It isthe result of natural laws and perfectly in accordance with practical experience that this twenty year old steam boiler should have acquired an obscure weakness of sufficient extent and so located as to allow a plate of its shell loaded with an internal pressure of nearly eight tons to the square foot to turn outward, as a door pressed by a high wind might burst open from steady depreciation of its fastenings, or as a flood-gate might give way when the rising pressure had overcome its resisting power. These similes are intended as illustrative of the manner of the breaking merely, and here the similarity ends, because the effect of the explosive expansion, the liberated water having a temperature of 138° Fah. above the atmospheric boiling point, is more like that of the burning of gunpowder than of winds or floods. The effects that follow its sudden release are similar to those that follow the firing of the powder.

On the morning of the 26th of October the engine of a freight train on the Indiana, Bloomington, and Western Road exploded its boiler just as it was starting from Champaign, Ill., with a freight train. The force of the explosion was downward, lifting the engine from the track and throwing it over. The fireman was fatally scalded and a brakeman hurt.

The boiler of a sugar house on John Dymond's plantation, at Belair, Plaquemines Parish, La., exploded November 24, completely wrecking the boiler house and badly wounding the following persons, who were taken to New Orleans by the steamer Daisey, and sent to the Charity Hospital: Joseph Meinker, foreman, leg broken and badly scalded, and Martin von Miller, Henry Clade, John McNorton, Edgar Batleye, Charles Creeland, and Ned Dunham, all badly scalded.

The October issue of the Hartford Steam Boiler Inspection and Insurance Company's circular contains the reports of their inspectors for the month of August, which shows that the total number of visits of inspection made during the month was 1,815, and thewhole number of boilers inspected was 3,539. Of this number 1,289 were thoroughly examined both externally and internally, and 419 others were subjected to the hydrostatic test.

The whole number of defects found was 1,414, of which number 388, or nearly 28 per cent, were dangerous.

The detailed statement of the defects is given, which includes the notable items of 140 fractured plates, morethan half of which were considered dangerous; 33 water gauges were defective; 18 safety valves were overloaded; and 121 steam gauges defective; while 40 boilers were found having no steam gauges whatever.

Although the modern steam gauge is now considered almost as much a necessity as the safety valve itself, yet it is questionable whether, as it is now often found telling a false story about the pressure in the boiler, it is not actually a dangerous appliance. It certainly should be kept in good order and be be of tentested, not only in its working range of indications, but above the limit, where it is very important that it should work freely. It is probable that the Hartford Company's inspectors rely upon the safety valves that have been adjusted by their own standard gauge, rather than upon such delicate and variable things as spring gauges. This is inferred from the fact that some of their risks have been continued from year to year on boilers having no pressure gauges at all. Time was within the remembrance of engineers now living when spring steam gauges were almost unknown. The safety valve was often consulted in those days, and was prompt to answer.

A New Variety of Glass.

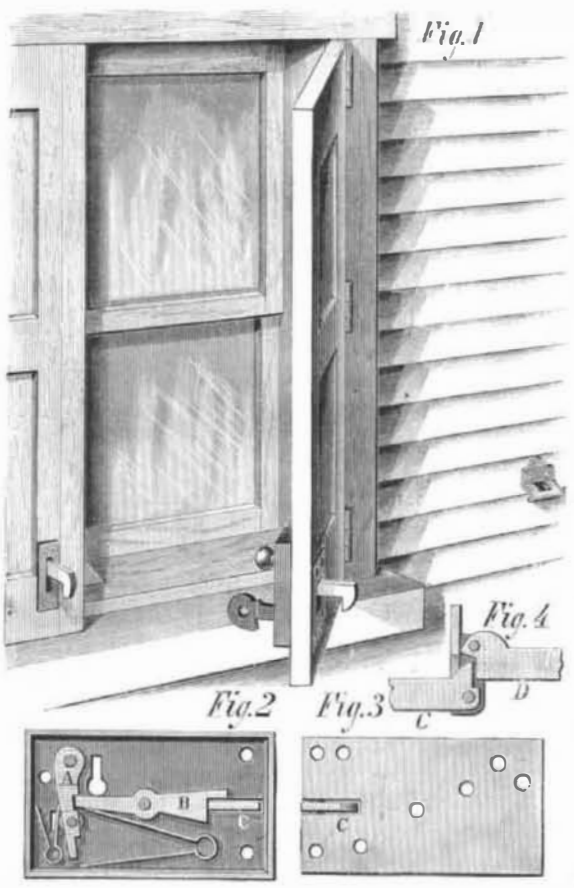
A Vienna chemist has recently discovered a new variety of glass. It does not contain any silica, boric acid, potash, soda, lime, or lead, and is likely to attract the attention of all professional persons on account of its peculiar composition. Externally it is exactly similar to glass, but its luster is higher and it has a greater refraction, of equal hardness, perfectly white, clear, transparent, can be ground and polished, completely insoluble in water, neutral, and it is only attacked by hydrochloric or nitric acid, and is not affected by hydrofluoric acid. It is easily fusible in the flame of a candle, and can be made of any color. Its most important property is that it can be readily fused on to zinc, brass, and iron. It can also be used for the glazing of articles of glass and porcelain. As hydrofluoric acid has no effect on the new glass it is likely to find employment for many technical purposes.—*Wiener Gewerbe Zeitung.*

IMPROVED SHUTTER FASTENER.

The engraving shows an improved fastener for blinds, shutters, and doors, which is so arranged that the inside catch for holding the shutter closed serves as a means for unfastening the outside catch from its wall loop. The inside catch can be locked securely with or without a key, but cannot be unlocked without the proper key.

Fig. 1 is a perspective view of a door, door frame, and a portion of the outside wall of a building, showing the improvement applied to the door; Fig. 2 is a view showing the locking bolt, pawl, and springs inside of the frame or case; Fig. 3 is an inside view of the back plate; Fig. 4 is a detail of the pivoted ends of the two catches and a part of the back plate of the case.

The frame or case of the fastening is composed of a rectangular box and a back plate. Inside of the case is a dog, A, provided with a spring, a locking bolt, B, and spring. The case has a keyhole and a slot for receiving the shank of the inside catch, C, and a slot for the neck of a knob or finger catch attached to the dog, A. On the back of the plate are two flanges to which are pivoted the inside catch, C, and directly above it the outside catch, D, as shown in Fig. 4. This catch extends through the shutter, and is designed for engaging with a wall loop and holding the shutter open. By raising the inside catch, C, the outside catch can be freed from its loop. The shank of catch, C, passes



AYER'S SHUTTER FASTENER.

freely through the casing, and has a loop for the finger, and a hook with a beveled nose to engage with the sill piece.

The bolt, B, is pivoted in the middle, and has a right angular notch in one end to engage with the shank of catch, C, as shown in Fig. 2, and safely lock this catch down.

The tapered end of the bolt, B, is designed to engage in a notch made in the edge of the dog, A, when the bolt, B, can only be moved by means of the key.

To unlock the bolt it is obvious that the key must be used, and when the bolt is held in an unlocked position to allow catch, C, to play freely, the tapered end of the bolt will be engaged by a shoulder near the free end of the dog. When the shutter is closed and the catch, C, is engaged with the sill piece by simply raising slightly the knob attached to the dog, A, the bolt, B, will lock the catch, so that it cannot be released from the sill piece except by the key.

This invention was recently patented by Mr. Henry B. Ayer, who should be addressed care of J. Hennessey & Bro., 123 Magazine street, New Orleans, La.

A New Steamship Project.—To Europe in Five Days.

A project is on foot in this city to establish a purely American line of fast passenger steamers to ply between New York and some port on the British coast. The plan, according to its projector, Mr. Jacob Lorillard, is to build ships which will take passengers from New York Monday morning and place them in London before Saturday night, making the trip from land to land in five or five and a half days.

Mr. Lorillard said to a *Times* reporter: "Our vessels will be 500 feet long, and will be built of steel to reduce weight. They will be provided with power three times as great in proportion to their displacement as is obtained by ships now afloat. These features mean speed. They will be divided into water-tight compartments, rendering them absolutely unsinkable. There will be fifty such compartments in each ship. That means safety. We shall carry no freight of any sort. We shall provide no accommodations for emigrants. Everything is to be in first-class style. Our vessels will be virtually floating palaces. What Pullman's parlor coaches are in the railway service our ships will be on the ocean.

"We shall build three ships to start with. Each ship will have accommodations for 500 passengers, and each will probably cost over $1,000,000, probably $1,250,000. As yet it is impossible to quote exact figures. The estimates we desire are not yet given us. We shall not run to Liverpool. Our landing place will be Milford Haven, in Wales, which is 200 miles nearer London than is Liverpool. Its harbor, too, can be entered on all tides. Upon this side of the ocean we shall save thousands of dollars yearly by the fact that we shall be able to escape wharfage assessments. Carrying only passengers, it will be our plan to anchor in mid-stream, as do men-of-war, and have shore communication by means of tenders. Lying off the Battery, we would be as easily accessible as are vessels at the city piers."

"When will you be ready for business?" asked the reporter.

"By the spring of 1883, but not before. Our vessels are yet to be built, and the greater part of our arrangements in other matters are still incomplete. But by the date I mention we shall certainly be in perfect readiness. Our success is assured so far as capital goes."

The line will be called the "American Express Line."

PROPOSED STORAGE OF LIGHTNING.

A correspondent suggests that Faure batteries be connected with lightning rods to accumulate the electricity of storms. In this way, he thinks, a vast amount of electricity might be stored for mechanical uses, "with results exceeding anything ever dreamed of in perpetual motion."

There are several objections to the plan.

In the first place an electrical condenser would be better adapted for the storage of the high tension currents developed in storms than the Faure battery is. The metal plates and acidulated water of the Faure battery would form so good a conductor for lightning that very little chemical work would be done in it; and it is this chemical work by the electric current which "charges" the battery, and thus prepares it for the subsequent redevelopment of electric energy under proper conditions. Experiments which we have made with the high tension currents developed by a Holtz machine show that such currents do have an appreciable effect upon the Faure battery, but the quantity of energy stored is comparatively very small.

By the use of condensers lightning might be stored, but such high tension electricity is as ill adapted for the operation of mechanical motors as dynamite is as a fuel for the steam engine.

Even if the sudden and violent energy of lightning could all be locked up by chemical action, and subsequently redeveloped in a quantity current, as in the Faure battery, the quantity of electricity to be had from storms is too small to pay for storage.

In one of his experimental investigations, Faraday determined that to decompose a grain of acidulated water an electric current powerful enough to keep red hot a platinum wire one one-hundred-and-fourth part of an inch in thickness, must be sent through the water for the space of three minutes and three-quarters.

This quantity of electricity he shows to be equal to 800,000 charges of a Leyden battery of fifteen jars, each containing 184 square inches of glass coated on both sides, equivalent to a "powerful flash of lightning." In other words the quantity of electricity involved in the lightning stroke—and it is quantity alone that is available for mechanical use—is very small.

In another connection Mr. Faraday demonstrates the fact that the electricity which decomposes a certain quantity of matter—a grain of water, for example—is exactly equal to that which is evolved by the decomposition of the same matter.

An ordinary galvanic cell, therefore, must evolve as large a quantity of electricity as would suffice for a respectable storm. For so small a quantity of electricity it obviously would not pay to set an expensive trap in the form of Faure batteries and lightning rods, even if the electricity of storms could all be captured that way. It would be vastly cheaper to generate the same quantity of electricity by means of galvanic batteries; and there are many cheaper sources of mechanical energy than the galvanic battery is.

Lead in Cider and Vinegar.

A recent report of the Connecticut State Board of Health mentions a remarkable series of cases of lead poisoning in Fairfield County, of that State. The source of the poison was finally traced to the barrels which the thrifty farmers had used for the storage of cider. The barrels had been used for holding boiled linseed oil. Some of the litharge (oxide of lead) employed in preparing the oil had been deposited on the inside of the barrels as a sedimentary coating, which the cider had dissolved. Obviously the proportion of dissolved lead was increased when the cider was kept long enough to turn to vinegar. In this case, as in so many others, the evil wrought by want of thought was serious if not fatal.

The Otto Gas Engines at Paris.

In the distribution of awards at the Exhibition of Electricity, in Paris, the Otto motor received a gold medal, the highest award given to machines of this class. As an indication of the success of these motors, it is said that over seven thousand of them have been put in operation during the past four years.