NOVEL HOSE NOZZLE.

The effectiveness of water as a fire extinguisher depends altogether on the manner of its application. If it is thrown in a solid stream and covers only a limited area of the ignited material, its efficiency will be less than it would be if it were spread out over more surface, so as to extend the cooling effect as much as possible. The engraving represents a very effective nozzle for spraying the entire body of water thrown upon the fire, so that an enormously increased area is covered by the water, and this body of water being rapidly converted into steam carries away the heat and reduces the temperature, so that the fire goes out.

The construction of the nozzle will be understood by reference to the engraving, in which Fig. 1 gives the appearance of the nozzle when in use. Fig. 2 is a face view showing the annular spaces for the escape of water, and Fig. 3 is a side view of the nozzle, with a portion broken away to show the internal construction. Exteriorly the nozzle is bell-shaped, and in the mouth of the bell a number of concentric rings are supported by arms held in place by a central stud. Between the several rings and between the surfaces adjacent to the inner and outer ring, there are thin annular spaces, through which the water is projected in conical sheets, which break up into spray and cover a great amount of surface.

The nozzle is simple in its construction and capable of throwing a stream of the most efficient kind for the extinguishment of fires. Mr. Charles Oyston, of Little Falls, N. Y., is the inventor and patentee of this improvement.

Moderate Steam Expansion.

It is no little satisfaction to observe that not a few prominent engineers, who, not quite two years ago, publicly and repeatedly urged the advantage and use of high ratios of expansion have now come around to the view that moderate or low ratios contribute to real economy in steam practice. We do not think it will be many years before it will be generally understood and appreciated that this conclusion applies alike to single and compound engines. For marine purposes compound engines seem to have the advantage of uniformity in the distribution of steam pressure, and other incidental practical advantages, which entitle them to favor, though more than one low pressure cylinder for a high pressure cylinder must be regarded as a fallacy. But compounding is by no means synonymous with the use of high ratios of expansion, and when it is made so, the advantages of compounding referred to above are more than compensated by the uneconomical effects of high ratios of expansion. Triple compounding necessitates the use of too high ratios of expansion, and should be condemned on that account. The best steam engine builders for mill or other stationary power purposes do all they can at the present day to counteract the use of compound engines for such purposes, and only agree to build them when afraid of losing a sale, and after having been unable to convince the intending purchaser of the lack of economy of his project.

The builders of stationary engines are apt to reach correct practical conclusions as to the question of economical working, being forced to reach them by reason of the strong competition existing in stationary steam engine practice. This competition is felt to a much less degree in large pumping engine and marine practice, so that in these branches the recognition of the correct methods for economical working are apt to be reached at a later date. We are, of course, aware of the excellent results, as far as economy of fuel is concerned, which are attained in pumping engine practice, but these results are purchased at the expense of other concomitant greater expenses, so that real economy is not as a fact obtained. These other concomitant expenses are, however, beginning to be more generally appreciated, and the effect of commercial considerations as affecting the use of steam and the economy of steam devices is now preached by those who, two years ago, did not dream of nor care for any such considerations. Efficiency of steam or fluid was then the only watchword in steam engine practice, and all conditions of running or special devices were judged by the degree to which they contributed to such efficiency, independent at all of other considerations. Now, in this country at least, the old standard of current money cost of the power developed, and the economical value of a special method of running or of a special steam device, is judged on the basis of a decrease or increase of the current money expense of the developed horse power.—*American Engineer.*

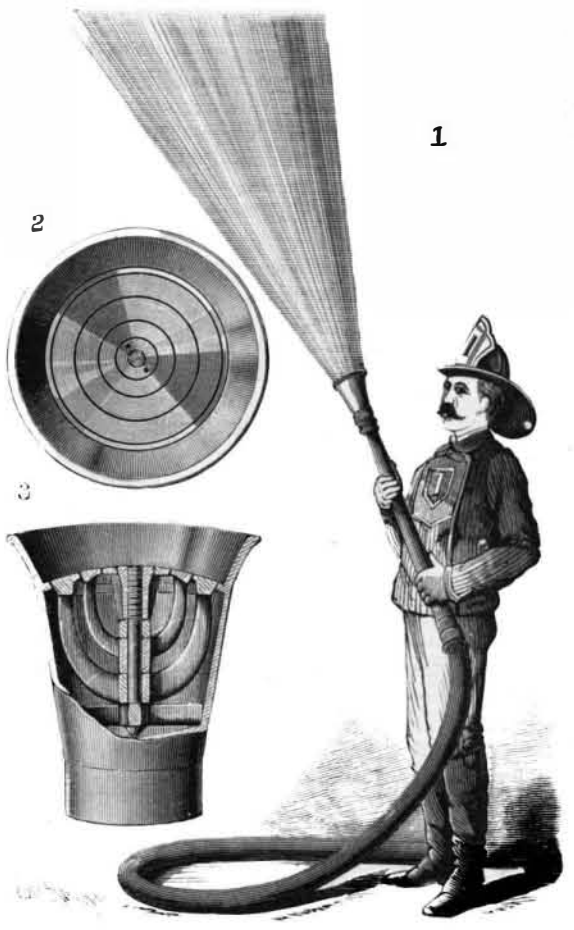
Paper from Bark.

The strongest and commonest of the several Japanese papers is made from the bark of the *Mitsuma*, a shrub which attains about a yard and a half in height, and blossoms in winter, thriving in a poor soil. When the stem has reached its full growth it is cut off close to the ground, when offshoots spring up, which are again cut as soon as they are large enough.

A paper of superior quality is made from the *Kozu*, a shrub of the mulberry family, which grows to the height of two yards and a half. It is a native of China, and has not long been imported into Japan, where it is now much cultivated. The stocks are planted two feet apart, often serving as hedges for separating the fields. The shoots which, under good conditions, attain their full size, are cut down in October, on the fourth or fifth year after planting.

Paper is made with these two descriptions of bark in the following manner: The twigs are steeped in water for a fortnight, when the outer portion becomes detached, and is carried away, if in running water. The inner bark is removed, washed and dried, and then subjected for three or four hours to the action of steam and boiling water, which softens it. It is then struck with staves, until a fine paste is formed, which, mixed with water, serves to make paper by a process similar to that employed in Europe.

Kozu paper is very strong in the direction of the fibers, and to obtain paper of equal resistance in every direction,

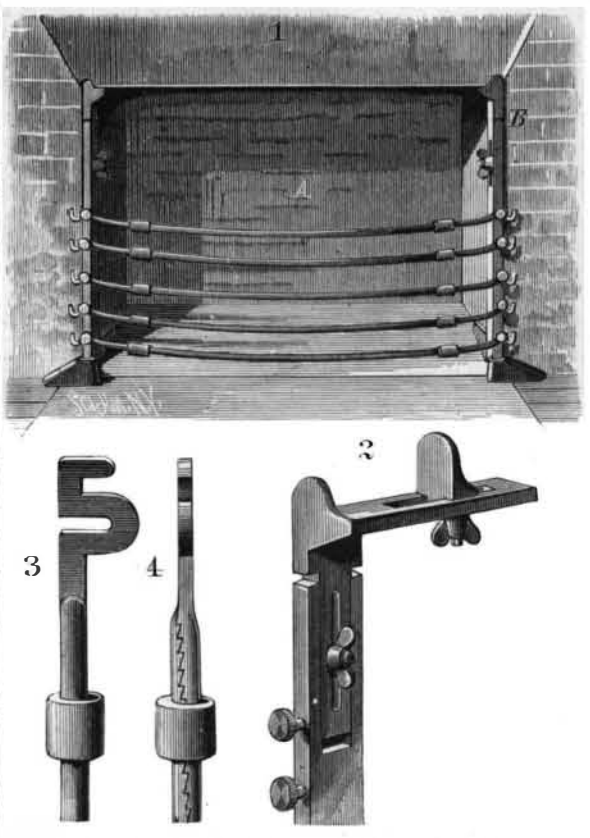


OYSTON'S IMPROVED HOSE NOZZLE.

two, three, or four thicknesses are superposed, with the fibers running in different directions. It is thus that the strong papers are obtained, that serve for covering umbrellas and other similar purposes, as well as artificial leather. The Japanese also make from the *Gampi* a transparent paper as strong as that from *Kozu*, but much finer and more supple.

ADJUSTABLE GUARD FOR FIREPLACES.

The improved safety guard for fireplaces or chimneys shown in the engraving is designed to prevent accidents to children, to keep ladies' dresses from the fire, and to retain the fuel should it from any cause tend to fall outward.



BETTS' ADJUSTABLE GUARD FOR FIREPLACES.

The invention consists of an adjustable stand or support clamped to the jambs on each side of the fireplace, in which are arranged suitable pins or screws, upon which safety or guard rods are supported. These rods are made adjustable (so that they can be applied to different widths of fireplaces) by suitable means.

To the jambs on each side of the fireplace are clamped two standards or supports, provided at their lower ends with feet resting on the hearth. The standards are clamped to the arch or upper side of the front of the fireplace by a clamp, which can be adjusted to suit the different thicknesses of walls by means of a slot and set screw, while at the front side is arranged a small upward projecting lug which fits against the face of the wall.

At the front side of the supports are arranged a number of pins or screws, upon which the guard rods are supported when in position. These rods are made adjustable, so that they may be fitted to fireplaces of different widths.

To prevent sparks from being thrown in a room or apartment and setting fire to carpets, etc., any suitable fender can be placed on the outside of the safety rods.

If desired, the supports, as well as the rods, can be made highly ornamental.

The rods might also be made to conform to the exact width of the fireplace, and be then provided with heads at their ends.

Where this safety guard is used small children cannot get near the fire, the dresses of ladies cannot be drawn toward and into the fire by the draught of the chimney, large sticks of burning wood cannot roll out into the room, and when the wire screen fender is applied sparks cannot be thrown out. This invention has been patented by Mr. Elisha Betts, of Lombardy Grove, Va.

Vanderbilt on Fast Locomotives.

A provincial paper prints a story that Mr. William H. Vanderbilt, the President of the New York Central and Hudson River Railroad, has ordered his master mechanics to devise large and fast locomotives, capable of hauling 15 heavy drawing room cars at the rate of 60 miles an hour. In it the statement is made that he offers a prize of $50,000 for the best plan for an engine that will accomplish this work.

When asked by a *Times* reporter if the statement were correct, Mr. Vanderbilt replied:

"There is no truth in that story. Why," said he, "engines leave the Grand Central Depot every day that haul 13 cars and run at the rate of 60 miles an hour. We are not going to pound the road to pieces by putting on larger engines. If one engine will not haul a train we will put on two, and, if necessary, add more trains; that is all. If a train is run by schedule 40 miles an hour, the rate is 60. Suppose a stop of 20 minutes is made for refreshments, and the train is late. The conductor will wait the full time at the station, and let the engineer make it up. I do believe," said Mr. Vanderbilt, smiling at his supposition, "that if an engine could run 140 miles an hour, and could cover a certain distance at the rate of 30 miles, the conductor would hold the train in order to run at the full 140. If an admonishment is administered, the operation is repeated as soon as your back is turned. No, we have engines that are fast enough."

Preservation of Butter.

Dr. W. Hagemann has been investigating the cause of butter becoming rancid, which is the immediate result of the liberation of butyric acid. He says it is not the result of butyric fermentation, but is due to the formation of lactic acid from milk sugar, which is present in butter to the extent of 0·5 to 0·6 per cent. The lactic acid liberates an equivalent quantity of acids from the glycerides of higher carbon percentage. This, he thinks, explains why summer butter gets rancid more quickly than winter butter, and that artificial butter gives less cause of complaint than natural butter from spoiling.

To preserve butter, one of two methods may be chosen. Either the lower fatty acids are neutralized by caustic soda, which process was perfected by Prof. Adolf Mayer and Dr. Clausnitzer, or care is taken to remove the milk sugar, preventing its decomposition. The decomposition of sugar in cow's butter is caused by lactic acid bacteria, so that the first problem in the preservation of butter is to find some method for suppressing these bacteria.

Electric Lighting in Trains.

The Pullman train to Brighton is now lit with 40 instead of 18 incandescent lamps, owing to the employment of the new Faure-Sellon-Volckmar accumulator supplied by the Electrical Power Storage Company. In the first instance 70 Faure accumulators (original pattern) were required for the 18 lamps, whereas now there are only 30 Faure-Sellon-Volckmar cells used for the 40 lights, their total weight being considerably less than half that of the cells originally employed.

The Next Denver Exhibition.

The National Mining and Industrial Association announce that the next exhibition in Denver, Colorado, will open July 17, 1883, to continue during July, August, and September. The newly elected officers are: H. A. W. Tabor, President; Herman Silver, Vice President; O. L. Haskell, Secretary; Joseph J. Cornforth, Treasurer; and W. A. Loveland, General Manager.

LEONARDO DA VINCI thus foreshadowed the telephone:

"When one is upon a lake, if he puts the opening of a trumpet into the water and holds the point of the tube to his ear, he can perceive whether ships are moving at a remote distance; the same thing occurs if he thrust the tube into the ground, for then, also, he will hear what is going on far away."