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Contents:

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as 'Improved Cut-off in Engines', 'The Late Explosion in New York City', 'Artesian Wells in Illinois', etc., with corresponding page numbers.

ONE CAUSE OF BOILER EXPLOSIONS.

Whenever a boiler explosion occurs, the attention of the coroner's jury is directed to the discovery of imperfection in the material or workmanship, or a wrong principle in the form and arrangement of the parts.

A correspondent, himself a practical engineer, says that it is surprising there are not more explosions. He says that in Connecticut the engineer is often required to be his own fireman, to split his wood, do every "chore" in and around the engine house, and oil the shafting, mend the belts, etc., for the whole establishment for from \$1.50 to \$2 per day.

"Now why don't our State Legislature make a law prohibiting any one from running an engine who shall not prove he is a competent engineer, and so stop the loss of life which follows these explosions?"

RAISING OF WATER BY CREATING A VACUUM.

Even before the time of James Watt it was well known that by creating a vacuum in a closed vessel, by condensing the steam with which the vessel was filled, the pressure of the atmosphere would carry water through a pipe to the vessel; yet it is singular that this mechanical fact has never, until lately, been turned to practical account.

There is in this city a model of a contrivance by which water is raised and discharged on a wheel, the same water being used over and over again, the only loss being that occasioned by evaporation, which is easily made good by a small pump.

servo, and thence lead to a wheel. It is surprising how much water a quarter-inch steam pipe will furnish the power for raising. A flour mill, we are told, is now running by this method in Virginia, not far from Chambersburg, Pa. This method of utilizing the waste steam of engines seems to promise very satisfactory results.

PLASTER OF PARIS--GYPSUM.

This substance possesses some peculiar properties. It consists of sulphuric acid, lime, and water, its composition, or rather the proportion of its component parts being similar to that of alabaster. Its abundance in the tertiary basins around Paris has given it the name of plaster of Paris.

It is used extensively for making plaster casts and for stucco. It is prepared for these purposes by calcining, which is simply heating it in kilns or kettles until the water is expelled. It is then a fine powder, like wheat flour, and to be used must have the water which it previously held returned to it.

It is used to some extent in glazing porcelain; but it is more largely used as a fertilizer of soils than for any other purpose. Containing a large proportion of sulphate of lime, it is extensively used as a manure. It is excellent for grass of all kinds, furnishing just the nutriment needed.

Petroleum for Steam Fire Engines.

We notice that at a late fire in Boston one of the steamers was run by petroleum oil instead of coal. The Traveler says: "When the alarm was given the steamer started in the direction of the fire, and arriving at the scene of conflagration, her steam gage indicated 100 pounds of steam.

While we have doubts as to the advantage of substituting petroleum for coal on steamships, we believe that it is possible to contrive an apparatus for its combustion which will be of real value in such cases as the above.

Tortoise Shell.

A correspondent inquires as to the production and manufacture of tortoise shell. It is the product of a marine tortoise or turtle generally known as the "hawk's bill." The shell, so called, is in reality only the outer covering of the shell proper, and is found simply as scales or plates.

Comets and their Tails.

A correspondent from Galveston, Texas, sends a well written, illustrated article on the above subject in which he advances the idea that the comet has "no tail at all; only by darting along with the utmost rapidity, its sphere yields to the impression of atmospheric air and assumes the shape generally seen."

Navigating the Air.

Mr. Frank Oliver of Biddeford, Me. writes that he has constructed a machine by which he can sustain himself in the air by working a crank, and sees no reason why larger machines propelled by steam power could not work.

American vs. English Muscle--The Yankee Wins.

We see by a cable telegram of the 11th inst. to our daily papers that the jury who had the matter of testing the Chatwood and Herring safes at the recent farcical trial in Paris, have decided our countryman the winner of the wager. What will Mr. Bull say to that?

FAIR OF THE AMERICAN INSTITUTE.

DEPARTMENT OF THE DWELLING.

Entering the exhibition halls by the main door, and turning either to the right or left, the visitor finds himself in the section allotted to the display of articles of domestic utility, an extensive and varied collection, embracing all apparatus for warming, lighting, cooling, and ventilation; all kitchen utensils and machines for washing and preparing clothes; cabinet and table furniture; ornaments for the dwelling, and building accessories and permanent attachments.

In the section allotted to the exhibition of cooking and warming apparatus is the Imperial Range, made by Moneuse & Duparquet, measuring 27 1/2 feet long by 5 feet 9 inches wide. There are eight fire-places, two broilers on one end, fourteen baking and eight warming ovens. The flues are led off below the floor and the range is accessible on all sides.

The Francestown soapstone works show several soapstone stoves, which from their novelty attract considerable attention. A stove having several new features and rejoicing in a somewhat pretentious title, is Calvin Pepper's Radical Cooking Stove. The air is here fed to the fire through a perforated metal plate covering the entire upper surface of the fire, so that the combustion actually proceeds from above downward.

Before leaving this group we must notice the case of grates, fenders, and fire irons exhibited by Messrs. Jackson & Co. Theirs is conceded to be the handsomest display made by any exhibitor in the section.

Messrs. Jackson & Co. have on exhibition at their new and elegant warerooms in Union Square an arrangement for heating rooms by burning gas in an open fireplace which is very ingenious and attractive. The gas jets are so concealed in imitations of logs of split wood that when ignited the fireplace has the appearance of containing a glowing wood fire.

For lighting our dwellings, the petroleum lamp makers present for inspection a varied collection of their wares, Julius Ives & Co. having perhaps the largest assortment. One of the good points in the Ives lamp is the arrangement of a tube in the burner, providing thereby a means for filling without the inconvenience of unscrewing or removing any of its parts.

Next to the stoves and heating apparatus, by way of contrast, are placed the refrigerators. One of these household necessities exhibited by Stephens & Ritchie has slate substituted for charcoal, as a non-conducting medium, thereby doing away with the dampness and musty odor which often arises from refrigerators lined with other substances.

Confronting the visitor at his entrance into the main hall is one of Frink's double-cone reflectors. This is but one of an assortment of these contrivances, which are intended for economizing, by concentration, of gas, kerosene, and daylight. The body, of the form required, is made of tin, and is covered with plates of glass corrugated upon one side.

Mr. A. S. Lyman presents for public approval a bedstead constructed on the principle illustrated in these columns some time ago. The object of his invention, it will be remembered, is to filter and purify the impure air supplied to the sleeper for respiration, to dry it when too damp, and in summer to cool it. To effect this the head board is made