

not have been foreseen, and consequently means do not exist of supplying this year in full measure the European deficiency, supposing it to occur. Assuming, therefore, that there is not an extraordinary falling off in the consumption, there must be a very great rise in the price of raw material.

In New York the prices of silk goods have lately been advanced.

**Coal on the Pacific Coast.**

The San Francisco *Journal of Commerce* reports a prospect of an abundant supply of high grade bituminous coal from Washington Territory. Among the latest beds discovered are the Carbon Mines, on Carbon River, Pierce County, 1½ to 3 miles southwest of the Northern Pacific Railroad at Wilkinson Station. They consist of five claims of 160 acres each, on which twelve coal veins have been opened. All of these can be worked by a cross cut of less than 600 feet. The coal beds, as far as they have been exposed, extend 2½ miles in length and have a thickness of 115½ feet.

The quantity of coal that can be moved without pumping is estimated at 26,000,000 tons. At the present rate of consumption in California this would last over forty-seven years. The coal is of all grades, from the semi-anthracite to the richest bituminous, and will supply qualities for steam, grate, domestic, forge, gas, and smelting purposes. These coals are all free from sulphur, and make from 64 to 75 per cent of splendid coke for smelting purposes. The cost of mining and delivering in San Francisco will be \$4.50 to \$5 per ton, so that selling at \$6 per ton a very handsome profit will be made. An assay made by Henry G. Hanks, gives the following as the composition of this coal:

	Per cent.
Fixed carbon.....	57.9
Volatile combustible matter.....	35.0
Ash.....	5.8
Water.....	1.3
Total.....	100.0

"This shows," the *Journal of Commerce* remarks, "that they are equal in quality to any coals ever sold in San Francisco, and they may by and by be expected to lead the market. The thickness of the veins now open to view is 115½ feet, as against 85 feet for that of all the other veins yet opened on the Pacific Coast."

**The Way to Wealth.**

The Rev. Dr. R. D. Hitchcock, who is not only a prominent theologian, but a profound thinker, says: "Suppose no muscle is put into the land; no sweat moistens it; it goes back into its original wilderness, and that which formerly supported one hundred civilized men, affords support for one savage. The value which land possesses has developed by labor. Have you considered how short-lived labor is? Crops last no more than a year. Railways, so long as you stop work upon them, go to pieces rapidly and cease to be valuable. Houses have to be made over constantly. St. Peter's Church, at Rome, one of the most solid of structures, is repaired annually at a cost of \$30,000. [The Reverend Doctor might have added, mechanics actually live in houses erected on the top of St. Peter's, that they may watch for any defect and attend to any leak in the roof.—Eds.] A great part of the wealth of the world is only 12 months old; when men stop working it passes away. Suppose you earn \$1.25 a day and spend the same, at the end of the year you are no better off than at the beginning. You have only lived. Suppose you spend \$1, or, better still, 85 cents; then you have become a capitalist. Capital is wages saved, and every man can become a capitalist. I began to preach at \$550 a year; I've been there, and know what it is. My rule was then, and has been ever since, to live within my income. So it would have been, no matter what my business. Spend less than you earn; then you will acquire capital, and your capital will be as good as that of any other man."

**Seeds of Camellia Japonica.**

The seeds, after being freed from their oil by pressure, are exhausted with alcohol, the alcoholic solution precipitated by lead acetate, and the yellow precipitate thus produced decomposed by sulphureted hydrogen; on evaporation, a bluish-white powder of bitter taste is obtained, which the author calls "camellin." This substance is almost insoluble in water, and, when boiled with sulphuric acid, reduces alkaline copper solutions; it appears by other reactions to resemble digitalin, and has the molecular formula C<sub>23</sub>H<sub>44</sub>O<sub>12</sub>. Boiled with dilute sulphuric acid it yields only a small amount of sugar, showing that it is decomposed only with great difficulty or else that other substances are produced. The alcoholic filtrate, after separation of the precipitate produced by lead acetate, leaves, when evaporated, a residue of a yellow color and bitter taste, which contains sugar and tannin, and perhaps another glucoside. The Japanese consider the seeds to be a poison, and the oil was formerly used to oil the swords of Japanese warriors.

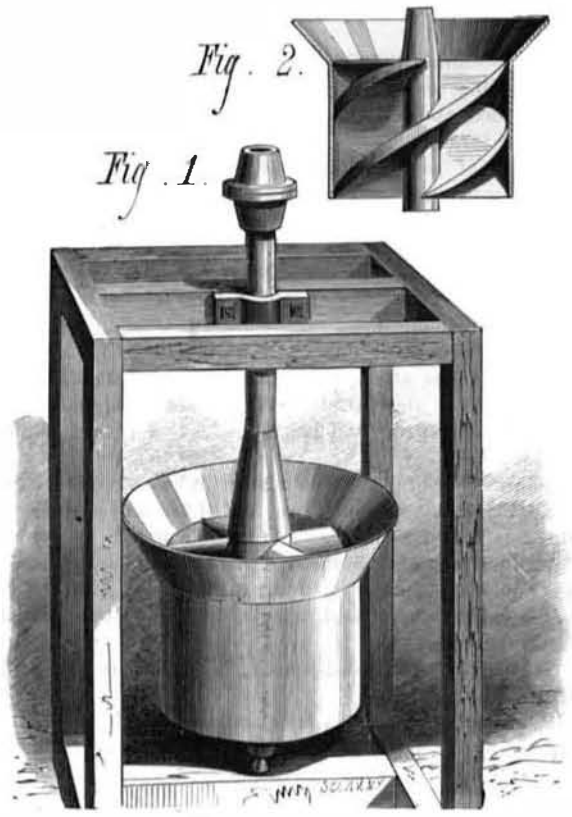
**Fluorescence.**

J. L. Soret has already pointed out the beautiful violet fluorescence of solutions of cerium sulphate and chloride elicited only by the extreme ultra violet rays of the induction spark, the solar rays not being sufficiently refrangible for its production. He has since found that the solutions of many salts of the earthy metals possess analogous properties. He enumerates lanthanum chloride, didymium chloride and sulphate; terbium, yttrium, erbium, ytterbium chlorides; phosphorium chloride; thorium sulphate; zirconium sulphate and chloride; aluminum and glucinium chlorides.

**IMPROVED WATER WHEEL.**

The engraving given herewith represents an improved water wheel recently patented by Mr. Albert B. Couch, of Newnan, Ga. It is designed to run perpendicularly or horizontally, or at any desired angle, and it has the advantage of being very simple and inexpensive.

The wheel consists of a spiral or screw of any desired pitch, mounted upon the shaft, and inclosed by a casing which revolves with it. The upper portion of the casing is flared, forming a funnel for receiving the water, which is delivered to the wheel in quantities just sufficient to fill the funnel without overflowing it. Figure 2 shows the internal construction.

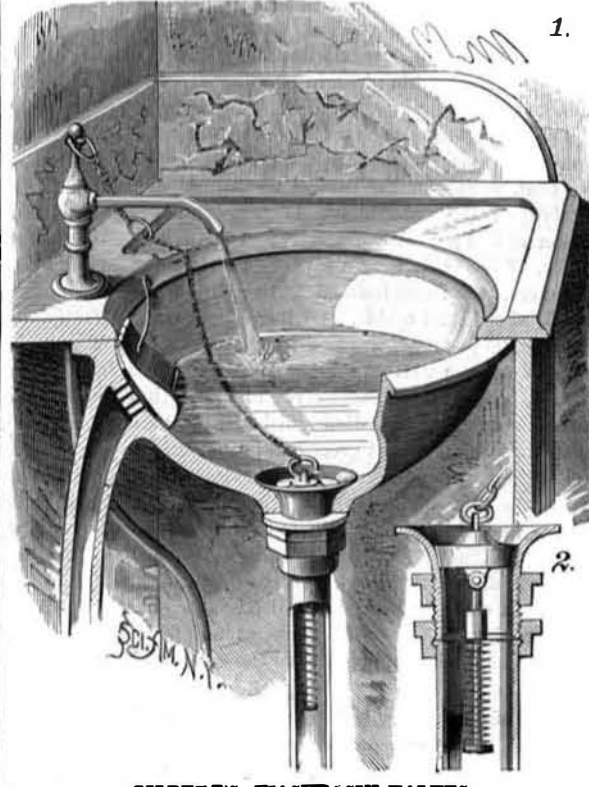


COUCH'S WATER WHEEL.

Motion is taken from the wheel by a belt which runs on the outside of the casing, or by attaching a cog wheel. The inventor claims that he realizes a percentage of power which will compare well with the best wheels in market.

**IMPROVED WASHBASIN VALVES.**

The plumbing of a house consists, practically, of two pipes—one connected with the water supply and the other with the sewer. Great care is taken to have the water pipes tight, so that there shall be no leakage, while comparatively little attention is paid to the drain pipes, which, in many cases, are pouring into the dwelling a flood of sewer gas.



GILBERT'S WASHBASIN VALVES.

The common water trap, when full of water, is the only device that will close a sewer pipe perfectly airtight; but the water trap is liable to be siphoned out by the rush of water through other waste pipes, permitting the entrance of gas, and when it remains full it becomes saturated with sewer gas, and is almost as pernicious as the sewer itself. In other contrivances an obstruction of the thickness of a piece of paper will allow the gas to enter. The principal thing to be accomplished is to prevent siphoning, and thus to admit of the use of the best form of trap. This is accomplished by the devices shown in the accompanying engraving, in which Fig. 1 represents a washbasin having a side broken to show

the improvements in place. Fig. 2 is a vertical section of the escape valve, which is provided with a jointed stem, and a spring for holding it to its seat. The valve is opened by means of the chain, and as soon as the chain is released it closes automatically. When it is desired to hold it open for any purpose the extra ring in the chain is slipped over the top of the faucet. The joint in the valve stem permits of tipping the valve so that any obstruction in the pipe may be readily removed. The float valve, which covers the overflow, rises when the water in the basin exceeds a certain limit and allows it to escape, but when the water is below the overflow the valve closes the overflow openings, so that no air can enter the waste pipe. This being the case there can be no siphoning, and the water required to seal the S traps will remain and prevent the gas from passing, and the basin valves will prevent any emanations from the water in the trap from entering the room.

We are informed that these valves can be applied to basins already in use, and that basins are made having the valves attached.

Further information may be obtained from Mr. James McQuiston, 102 West 14th street, New York city.

**RECENT AMERICAN PATENTS.**

An improved life preserver and swimming plate or paddle, consisting of a disk or plate made of cork, having a mitten attached to it, and provided with a strap and buckle for securing it to the wrist, has been patented by Mr. Charles Primbs, of United States Army.

Mr. Joseph Truax, of Mount Gilead, O., has patented an improved bee-hive, having honey-boxes with loose comb guides that insure the formation of a straight comb, which may be easily removed without cutting or breaking the box.

An improved device for holding up the thills of wagons, sleighs, and other vehicles, to keep them out of the way and prevent them from being broken, has been patented by Messrs. George H. Pitcher and Leonard Young, of Lewiston, Me. It consists of a forked arm rising from and extending over the yoke, having its branches curved and made elastic for the reception of the thills.

Mr. Michael P. Low, of New York, N. Y., has patented a cheap and effective mode of fastening mica to the doors of stoves, ranges, and furnaces. The invention consists in casting on the inner side of the door, above and below the openings, lugs of peculiar form for holding the mica.

An improved ballast-log for vessels has been patented by Mr. Cesare Leparelli, of New York, N. Y. It is formed of a heavy and lighter upper part, and is designed to furnish an improved means of ballasting vessels when in port and empty.

A wardrobe hook, having at the upper part a tenon and a lip or flange for receiving a shelf, has been patented by Mr. Lewis F. Ward, of Marathon, N. Y., the object being to adapt the ordinary wardrobe-hooks for use as brackets or supports for shelves.

An improved machine for shaving the sides and edges of hoops has been patented by Messrs. A. J. Philpott & G. W. Horton, of Owensborough, Ky. The invention consists in two pairs of upright knives and a pair of horizontal knives, between which the hoop is drawn by a wheel and sweep.

An improved lamp attachment for preventing combustible dust from entering the flame, has been patented by Mr. Louis W. Peck, of Minneapolis, Minn. The device consists of a tube or box having a diaphragm or partition that causes the deposit of the dust before it reaches the flame.

An improved knocking-over bit for knitting machines, which consists in a slitted and mortised frame for holding the bits, which are of novel form, and are provided with a yielding support, has been patented by Mr. W. D. Ormsby, of Waltham, Mass.

**Small Vessels for War.**

A letter of Hobart Pasha to Mr. Brassey, M.P., is published in the *London Times*, reiterating his opinion that small vessels are best for fighting purposes. He says: "What we want are small, heavily-armed, fast vessels, that can, as it were, 'hop round their enemy like a cooper round a cask,' hitting him on every vulnerable point, shelling his decks at long range, and worrying him to death. Of course, the small vessels would be liable to a hard knock now and then; but you cannot go to war in kid gloves. As to bombarding forts, rely on it, in these days of 35 tons in masked batteries, or batteries cased with 30 inches of iron, the idea is obsolete—no sane man would think of such a thing. Fleets' guns can only be used against land defenses in making a diversion while landing troops. Remember, also, the immense cost of losing by torpedoes or otherwise, one of the new monsters such as Italy has built."

**Palmetto Fiber for Paper.**

The *Fernandina (Fla.) Mirror* reports that the machinery, lately brought to that place by Professor Loomis, for the preparation of palmetto fiber is working satisfactorily, and that the experiment is an assured success. The stalks of the scrub palmetto are used. It is said that the fiber is likely to prove useful for cordage, paper, tubs, pails, flour barrels, boats, powder kegs, and no end of other articles of general use. A portion of the fiber shipped to paper mills is intended for the manufacture of a high grade paper to be used by the Canadian Government in the printing of bank notes. Ultimately, it is said, the various grades of paper fiber will be made into pulp in Florida.