

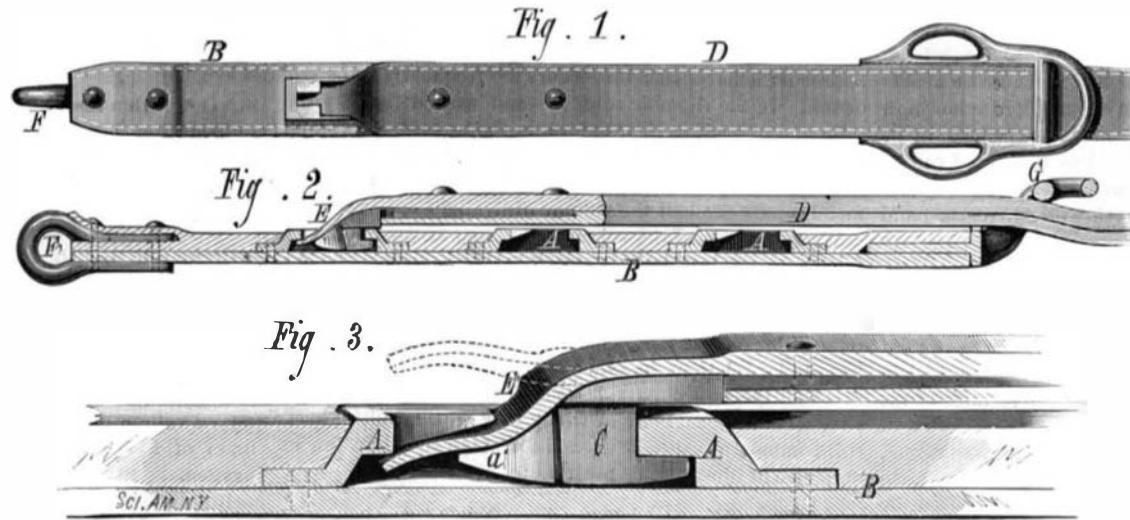
AN IMPROVED TUG COUPLING.

The annexed engraving represents an improved tug coupling recently patented by Mr. P. B. Hirsch, of 374 Blake street, Denver, Col. It is applicable to both light and heavy harness, and is easily coupled or uncoupled without twisting or turning the trace.

The metal boxes, A, are firmly embedded and riveted in the cockeye portion, B, of the coupling, and are slotted and recessed to receive the hooked metal tongue, C, secured to the trace portion, D, of the coupling. The shank of the tongue, C, is firmly riveted in the part, B, and turns downward and inward, forming a strong hook. When the tongue is inserted in one of the boxes, A, and pulled so that the hook enters the recess in the box the adjustment is complete. The flexible leather tongue, E, is then thrust into the wider part of the slot in the box, over the spur, a', to prevent the accidental disengagement of the hook.

The inventor claims important advantages in regard to strength, convenience, and durability, and appearance over the ordinary forms of coupling.

Further information may be obtained by addressing the inventor as above.



HIRSCH'S TUG COUPLING.

A NEW WATER METER.

It is a well known fact that three fourths of the water supplied to consumers in all cities is wasted through carelessness, leaky pipes, bad plumbing, and open faucets. The unsuccessful efforts of city authorities have shown that the waste cannot be regulated and the difficulties obviated except by the use of water meters. By their use the supply would be diminished, the water taxes reduced, and each consumer would pay only for what he used—not for what his neighbor wasted. The trouble has been in the past that meters could not be made so cheap that their use could be made general. A meter must be mechanically perfect; a perfect register; certain and positive in its motion; without a dead center and a disposition to stop. A machine of such peculiar and delicate essentials is not easily obtained at a small expense.

Mr. W. B. Mounteney, of the People's Gaslight and Coke Company, of Chicago, Ill., has after four years of thought and work invented a meter which he has named "The Mounteney Diaphragm Meter," and for which he claims all the excellences which such a machine should possess. It is said that the registering dial hand moved as regularly under the lightest as under the fullest pressure, and that a cubic foot of water is as accurately measured when drawn by drops as when drawn through a five eighths pipe with full pressure. The machine is noiseless and frictionless, and simple and durable in its construction, and as it is made of unfinished castings it can be made cheap.

The general form of the apparatus is shown in Fig. 1 which is a side elevation partly in section; the other figures represent details not clearly shown in Fig. 1.

The upper part of the meter chamber receives the water from the supply pipe, and contains the levers that actuate the registering mechanism and the rotary valve, C. The lower portion of the meter is divided into four compartments by a central rigid partition and the two flexible diaphragms, A. The latter are placed between concave metallic diaphragms, a, which are slotted to insure the easy detachment of the rubber diaphragm, and to agitate the water so as to prevent the accumulation of sediment. The rubber diaphragms are connected with the arms of the rock shafts, B, and the latter extend into the upper or receiving chamber through a sim-

ple and very effective stuffing box, and are provided with arms which are connected by links with a crank on the shaft of the valve, C. The registering mechanism at the top of the casing receives its motion from the crank on the valve shaft, and accurately records the oscillations of the diaphragms, and consequently indicates the amount of water consumed. The entrance and eduction of water to all of the compartments is controlled by the rotary valve, C, which is operated by the diaphragms through the medium of the shafts and levers already described. The water under pressure is alternately conducted to and allowed to flow from op-

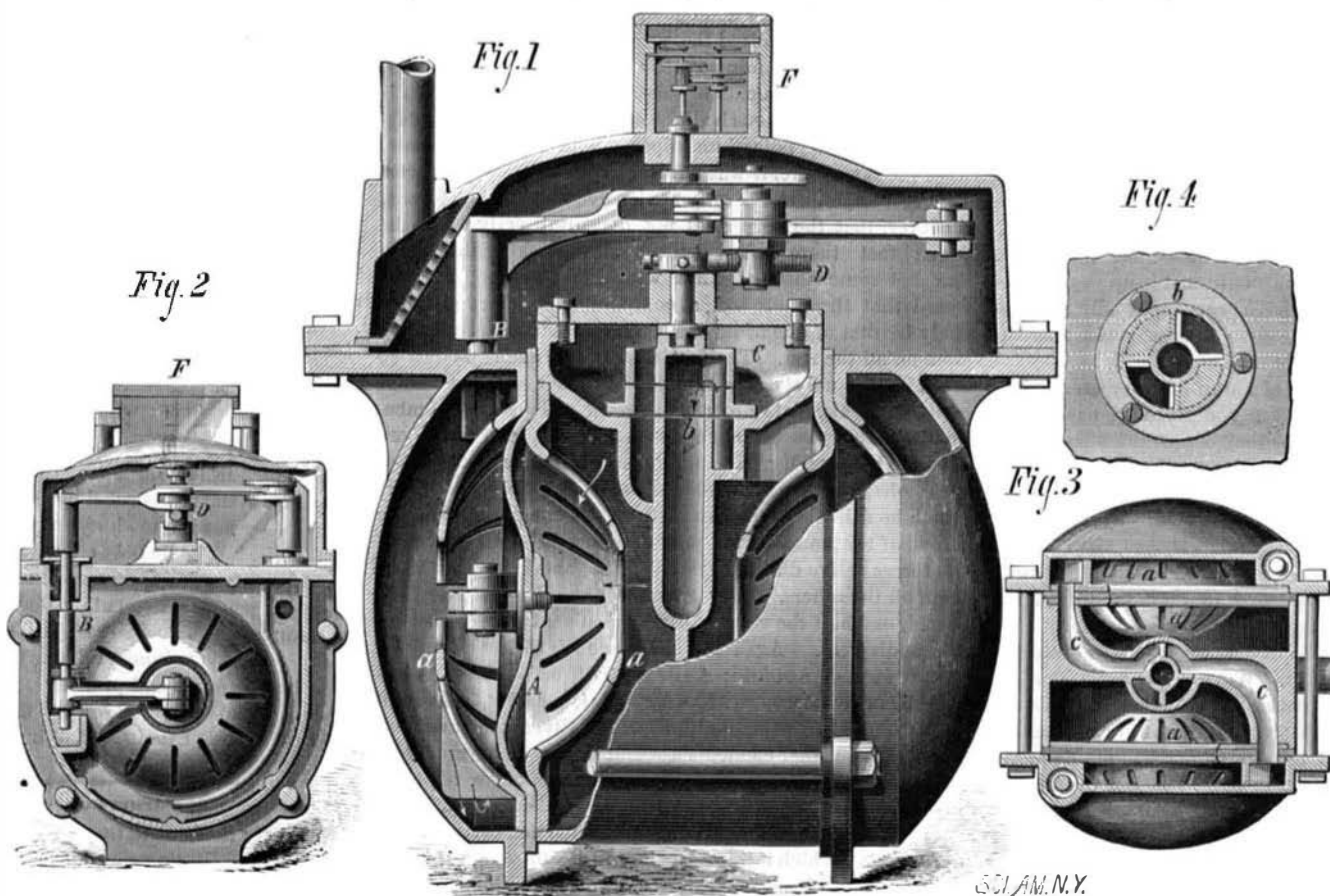
posite sides of the pair of diaphragms, so that both diaphragms are made to traverse alternately backward and forward as the chambers are alternately filled with a measured quantity of water, which will be accurately indicated by the index and dial of the registering apparatus.

It will be noticed that this meter contains no pistons or other parts that are liable to corrode, and stick or get out of repair.

Further information may be obtained from Mr. William B. Mounteney, 39 and 41 So. Halsted street, Chicago, Ill.

New French Torpedo Vessel.

The Compagnie des Forges at Chantiers de la Méditerranée have just supplied to the arsenal at Toulon a torpedo boat, whose length is 110 feet and width only 10 feet, the draught of water not exceeding 28 inches. The speed attained by this vessel at the official trials is stated to have averaged 19 knots



MOUNTENEY'S DIAPHRAGM METER.

per hour. In the front of the vessel is a chamber furnished with a tube to receive a Whitehead torpedo of the largest dimensions. When it is desired to launch the projectile the front of the vessel is opened by special mechanism, and the torpedo is projected into the water, either by means of a jet of steam or compressed air. As soon as the Whitehead torpedo has left the projecting tube it is propelled automatically by means of the motor contained within it, and pursues its course toward the object of attack at a speed exceeding 20 knots an hour.

Threatened Failure of the European Silk Crop.

The London *Saturday Review* reports that serious fears are entertained of a failure in the European silk crop. The countries which grow silk are Italy, France, and Spain, in Europe; and in Asia, China, Japan, India, Asia Minor, and Syria; to which has lately been added America. The American production, however, is so small that it may be left out of account. Asia Minor and Syria were once producers on a very large scale, but have long ceased to be so, and the Spanish crop has also become insignificant. Even France is rapidly falling off in her cultivation of the silkworm. Practically, therefore, manufacturers now depend for their supply on Italy and the far East. In Europe, we may say roughly, the Italian crop exceeds the French, upon an average, nearly four times, while the French exceeds the Spanish in a still greater proportion. We may further illustrate the important position occupied by Italy in this industry by saying that, while a good Italian crop is expected to yield about 80,000 bales, the average import from China to Europe falls short of that amount by about 15,000 bales. A failure of the Italian crop means, therefore, in effect, a failure of the European supply. Now, it is said that not only in Italy, but in France and Spain also, the intense frosts of the spring have fatally injured the cocoon. The badness of the

weather, moreover, has so checked vegetation that there are not sufficient leaves for the worms, among which there is, in consequence, very great mortality. And, in addition to all this, it is feared that if heat now sets in the damage will become irremediable, as the leaves of the mulberry will be dried up altogether.

To a large extent the excitement that prevails is founded upon mere apprehension, and it is possible that matters may not turn out nearly as badly as is feared. Much may happen before harvest. But it is not to be forgotten that the injury done by the severe frost on the night of April 14, 1876, was never repaired. During the two months which followed that disaster reports were in circulation similar to those now current, but they were set down to the designs of speculators. At the end of June, however, they were found to be correct, and a sudden and extraordinary rise of price was the result. Persons interested in the trade remember all this, and are

resolved not to be caught a second time. There has, therefore, been a great deal of speculative buying, and in consequence a sharp upward movement of the market during the past fortnight. Yet it does not necessarily follow that the experience of three years ago is about to be repeated.

In the trade itself the accepted estimate is that one third of the Italian crop is irreparably damaged. From Lyons the reports are equally unfavorable. If this estimate proves correct, the European supply will fall short by, at the least, 30,000 bales. In other words, the average annual import from China would need to be increased fifty per cent to make up for the loss in Europe.

Of course we say this merely by way of illustration. The silks of India and Japan are more like those of Europe than the Chinese, and they would naturally be drawn upon more largely by European manufacturers. All these countries would therefore contribute their quotas; yet, even so, it is not to be expected that they would be able to furnish anything like the full amount. The harvest in the far East is already completed, and is said to be abundant in quantity and excellent in quality. But the cultivation was adjusted to meet an average demand. The European failure was not, and could

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 C₂₃H₄₄O₁₉. 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.

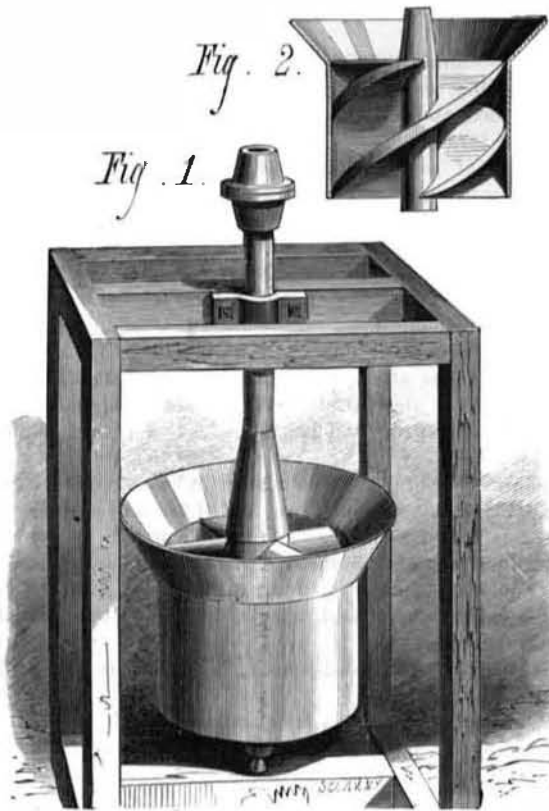
Fluorescence.

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.

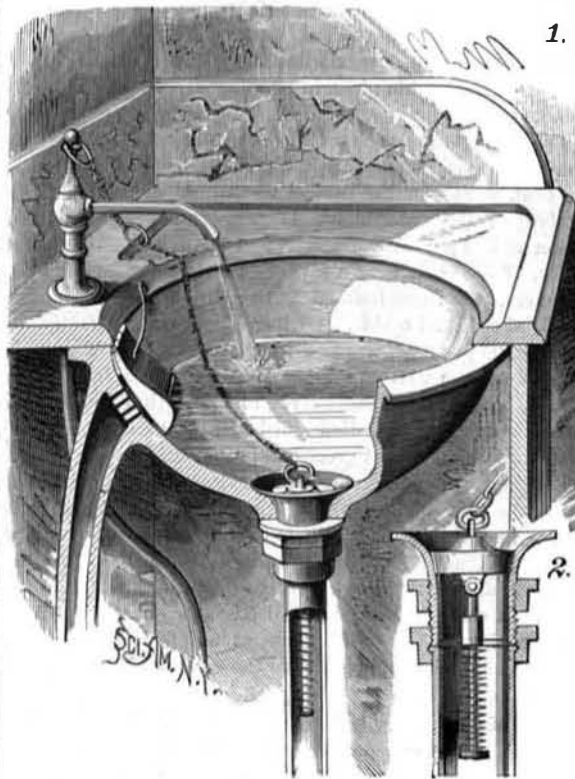


COUCH'S WATER WHEEL.

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.