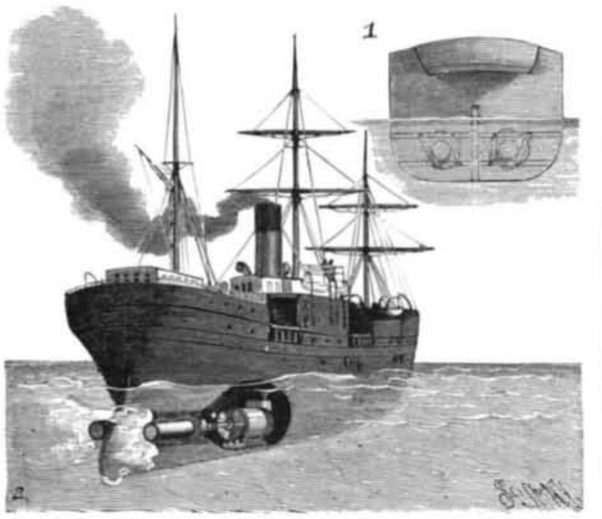
A CYLINDRICAL PROPELLER.

Two propellers are preferably employed, according to this improvement, one at each side of the keel, the propeller having the same weight as the water to be displaced, and being forced outward by steam power and returned by the pressure of the water in its rear. A patent has been issued for the invention to Mr. Lorenzo Julia y Puig, a captain in the Spanish merchant marine, of Barcelona, Spain. The propeller is a hollow cylinder, moving in a stuffing box through openings at each side of, and so as not to interfere with, the rudder, the major portion of the propeller when in its inner position being exposed and accessible from the

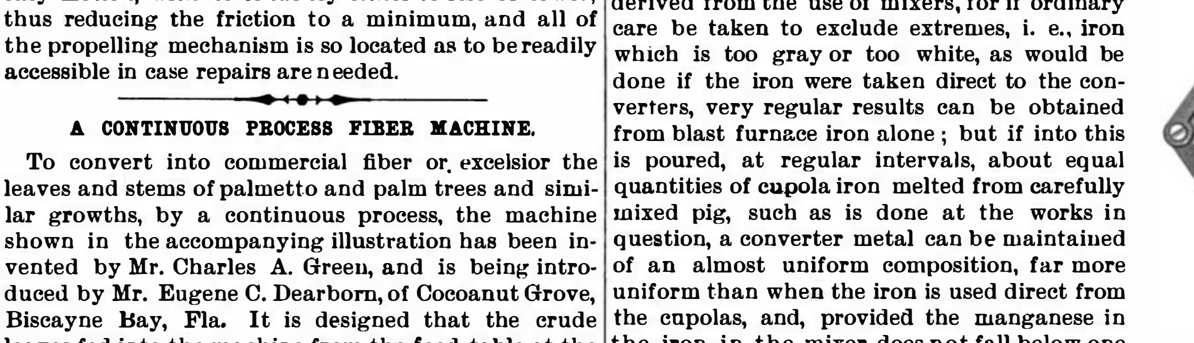


PUIG'S PROPELLER.

interior of the vessel. In front of each stuffing box is a steam cylinder, the piston head and propeller being connected by a rod, and steam being admitted only to the front of the piston head to force the propeller outward. The small figure represents the vessel's hull fitted with strengthening plates or bars to receive the propeller. The propeller is designed to have a very easy motion, with no tendency either to rise or lower, thus reducing the friction to a minimum, and all of the propelling mechanism is so located as to be readily accessible in case repairs are needed.

A CONTINUOUS PROCESS FIBER MACHINE.

To convert into commercial fiber or excelsior the leaves and stems of palmetto and palm trees and similar growths, by a continuous process, the machine shown in the accompanying illustration has been invented by Mr. Charles A. Green, and is being introduced by Mr. Eugene C. Dearborn, of Cocoanut Grove, Biscayne Bay, Fla. It is designed that the crude leaves fed into the machine from the feed table at the right shall emerge in the form of marketable fiber, shredded, crimped, and ready for use, the refuse material being discarded during the process. The leaves are first passed between adjustable crushing rolls, being straightened out by guides and novel devices being provided to prevent clogging, and from thence, by means of clutch rolls, they are fed to a beater cylinder having inclined teeth arranged in double spiral line around the cylinder, by which the fiber is longitudinally shredded. A slatted carrier then conveys the shredded leaves over an open structure, where trash and short fiber may fall through, to a hopper, across the bottom of which slides a plunger adapted at each stroke to double a portion of the fiber and deliver it to another plunger, on which are arranged prongs adapted to crimp the fiber and deliver it to a steam box, the fiber being also subjected in the process to an adjustable squeezing pressure in its crimped position. There are several steam chambers around the steam box, and the mass of fiber is held in the box in a series of compact folds, issuing thence in the form of a web upon an elevator to be conveyed to the upper part of a drier.



GREEN'S MACHINE FOR PREPARING FIBER OF THE PALMETTO, PALM, ETC.

In the drier is a series of carriers, all driven by a single chain belt, over which the fiber is continuously conveyed until it reaches the point of discharge at the lower rear end of the machine, from which it may be delivered to any preferred style of baling apparatus. The heating of the drier is preferably accomplished by steam pipes in connection with a blower and heater, arranged as shown under the elevator belt.

Iron Notes.

At a recent meeting of the Iron and Steel Institute, London, Mr. Arthur Cooper read a paper on "Metal Mixers," as used at the Northeastern Steel Company's works. A mixer was erected of 150 tons capacity. Instead of a hydraulic cylinder fixed underneath the vessel, as at Hœrde, the plan designed by the Northeastern Steel Company for tipping provided for fixing the hydraulic cylinder overhead, the piston rod of which is attached to a crosshead coupled up to each side of the back end of the mixer by long links. This arrangement was devised because it was considered to be safer in case of a break-out than the hydraulic cylinder placed underneath.

The early experiments were so encouraging that an additional mixer was at once erected, the same in every respect as the first one, so that with two vessels the lining of one could be repaired while the other was working, and in order to save labor and time in discharging the ladles into the mixer, a small pair of engines and shafting were fixed on the wall at the back of the two vessels, by means of which, and an endless rope of spun yarn placed upon a grooved pulley on the ladle gearing, a ladle containing about fourteen tons of molten iron is tipped in less than one minute.

From the beginning of May, 1893, the whole of the molten iron used, consisting of about 2,000 tons of blast furnace iron and 1,800 to 2,000 tons of cupola iron each week, has passed through one or other of the two vessels, and the results have fully justified the company's expectations. It must not be for one moment thought that a mixer will cure all the ills which beset a steelmaker; that by its use inferior and unsuitable iron can be made into good steel at a reduced cost. Such is not by any means the case. If very gray or very common white iron be admitted, it is almost certain that several casts of inferior steel will follow. It must also be remembered that there are certain charges to be defrayed, such as royalty, labor, maintenance of plant and tools, and haulage of molten metal, which together amount to a considerable item per ton of finished product. Still, notwithstanding this, there are certain great advantages to be derived from the use of mixers, for if ordinary care be taken to exclude extremes, i. e., iron which is too gray or too white, as would be done if the iron were taken direct to the converters, very regular results can be obtained from blast furnace iron alone; but if into this is poured, at regular intervals, about equal quantities of cupola iron melted from carefully mixed pig, such as is done at the works in question, a converter metal can be maintained of an almost uniform composition, far more uniform than when the iron is used direct from the cupolas, and, provided the manganese in the iron in the mixer does not fall below one per cent, a considerable reduction in the sulphur is effected. Again, with a reserve of molten iron always available, the converting plant can be run to better advantage than when it has to depend upon the cupola or blast furnace. Lastly, by use of the methods above described, the weight of each individual charge from the mixer can be controlled within a few hundredweights with far greater certainty than is practicable when each charge is tapped separately from a blast furnace or cupola, and thus, with an almost absolutely constant weight of charge in the converter, carburizing can be effected with much greater precision.

Mr. David Evans said it was only fair to say that the first mixer capable of dealing with large quantities of metals was designed and erected by his friend the late Captain W. R. Jones, the general superintendent of Messrs. Carnegie's works. At his visit to England, in 1888, he pointed out the great advantages they were deriving at Messrs. Carnegie's works by the adoption of them. At Eston they had two metal mixers of similar design and of like capacity to those of the Northeastern, the only difference being that they used the ram below.

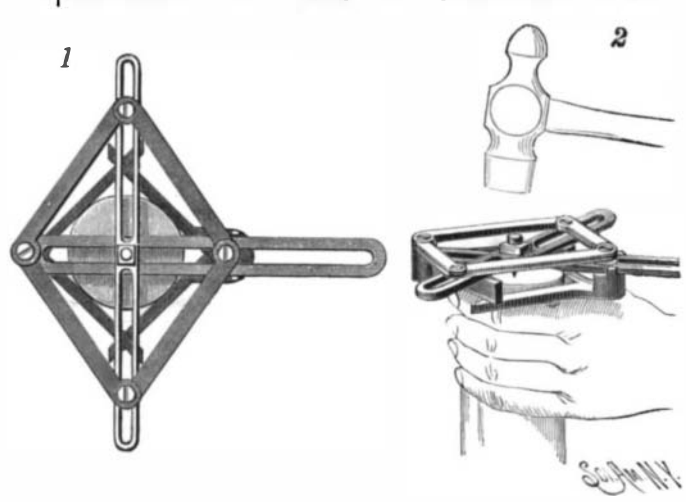
One of the greatest advantages derived from the use of the mixers was that the carbon and manganese were more uniform. There were also a large number of mixers in use on the Continent which were giving satisfactory results.

Mr. Andrew Carnegie said that at his works they were now prepared to put up a mixer containing 600 tons instead of one of 200 tons.

Mr. E. Windsor Richards explained why Mr. Carnegie wanted a large mixer. He was at Mr. Carnegie's works in October last, and saw a furnace tapped, and there were twelve ladles all in a row, and they carried 10 tons each, and he saw 120 tons put at once into these ladles. There were nine blast furnaces at the Edgar Thomson works, and the week that he was there they made 18,500 tons of iron—one of those furnaces being spiegeleisen and the other ferromanganese—so that with seven furnaces he was making 17,600 tons a week of hematite iron. It would be readily understood, therefore, that this 150 ton mixer was very much too small for Mr. Carnegie's works. Since he was there Mr. Carnegie had even put in larger furnaces than before—15 tons each. When he was there they turned out from one mill 8,000 tons of rails. He sat down in the mill and watched them working, and was perfectly satisfied that the figures he was given were correct. Another astonishing figure—they would scarcely believe it, but it was a fact nevertheless—was that during the month he was there, Mr. Carnegie made at his Edgar Thomson works and the Ducane works and the Homestead works 128,000 tons of ingots.

A DEVICE FOR CENTERING WORK.

An extremely simple device, whereby a workman may quickly and accurately mark with a punch the center in the end of any work in hand, is shown in the accompanying illustration. The improvement has been patented by Mr. Michael Kolb, of No. 143 Willis Avenue, New York City. Fig. 1 represents the device in plan view and Fig. 2 illustrates the facility with which it may be employed. As will be seen, the device consists of a longitudinal slotted bar carrying two oppositely arranged gage arms, one of which is movable, while both are adapted to peripherally engage



KOLB'S CENTERING DEVICE.

the work at opposite sides. A transverse bar carries the centering punch, and a quadrilateral link frame pivotally connected with the gage arms has a sliding connection with the transverse bar, whereby the centering punch will always be moved in the center of the gage arms.

Paper Sails.

The Marine Record says: An innovation in yachting circles is now being talked of, nothing less than sails made of compressed paper, the sheets being cemented and riveted together in such way as to form a smooth and strong seam. It appears that the first process of manufacturing consists in preparing the pulp in the regular way, to a ton of which is added 1 pound of bichromate of potash, 25 pounds of glue, 32 pounds of alum, 1½ pounds of soluble glass, and 40 pounds of prime tallow, these ingredients being thoroughly mixed with the pulp. Next, the pulp is made into sheets by regular paper-making machinery, and two sheets are pressed together with a glutinous compound between, so as to retain the pieces firmly, making the whole practically homogeneous.

The next operation is quite important and requires a specially built machine of great power, which is used in compressing the paper from a thick, sticky sheet to a very thin, tough one. The now solid sheet is run through a bath of sulphuric acid to which 10 per cent of distilled water has been added, from which it emerges to pass between glass rollers, then through a bath of ammonia, then clear water, and finally through felt rollers, after which it is dried and polished between heated metal cylinders. The paper resulting from this process is in sheets of ordinary width and thickness of cotton duck, it is elastic, airtight, durable, light, and possessed of other needed qualifications to make it available for light sail making.

The mode of putting the sheets together is by having a split on the edges of the sheet or cloth so as to admit the edge of the other sheet. When the split is closed, cemented, and riveted or sewed, it closes completely and firmly.