Mechanics.

STEEL IN THE BOILER OF THE FUTURE. --Steel can now be produced by either the "Bessemer" or the "Siemens" process, surpassing in tensile strength and in the power of bending and twisting, for flanging, any best brand iron known, the metal produced by either of these two processes being of a purer and more homogeneous nature that can be made by any of the older methods. The best American boiler plate is said to have a ruptring strain of 70,000 pounds, or 31 tons per square inch of section. The ordinary plate for locomotive boilers is stated to be capable of bearing a strain of 60,000 pounds, or 27 tons per square inch. Steel boiler plates, having very great cohesive properties, have been made in England and in South Wales. It is stated to be capable of producing the highest class of steam boilers. As a rule, England boiler plates are of two classes—Yorkshire and Staffordshire ; these, however, include the make of other districts. The maximum strengths for locomotive boiler plates are as follow: Best Yorkshire iron plates, 25 tons per square inch ; best American iron plates, 31 tons per square inch ; best American iron plates, 31 tons per square inch ; best American iron plates, 21 tons per square inch ; best American iron plates, 21 tons per square inch ; best American iron plates, 21 tons per square inch ; best American iron plates, 21 tons per square inch ; best American iron plates, 21 tons per square inch ; best tons per square inch.--*Universal Engineer*.

BARREL CLEANING MACHINE .- A brewery at Mouchain, in Prance, has been using for some time a patented machine for classic, has been using for some time a patented machine for cleaning barrels. Four barrels are washed at once inside and ^{outside}. In the center of the machine is a shaft on which is a place of metal so arranged that four iron hoops about three feet in diameter can be bolted on. These four hoops about the state and the state of the sheet iron plates mounted on pivots, and between these plates an attachment screw catches the barrels. Brushes fixed on springs are are placed on a hoop outside the machine, and so arranged as to touch the four barrels at the same time. The circle of brushes is secentric to the shaft. A reservoir under the machine has hot water a share a second state of the share a share brushes a share brush share brushes a share brush share brus water for washing the outside of the barrels. A chain brush is placed in the interior of the barrel. The machine is worked by an ordinary pulley fixed on the main shaft. This latter carries broshe barrels round, like the sails of windmill. The exterior broshe brushes being stationary, produce a friction on the barrels which canses them to rotate on their pivots, so that two circular movements are obtained at the same time. The tables of the screws throw water on the barrels when they come to the upper part, so that they are continually kept wet.

BRASS-FOUNDING.—If you want fine castings, dry the surface of your moulds well, dust them with bean flour tied up in a muslin bag, put them upright, and with a pair of common house-bellowa, blow out all the surplus flour; use a little care; screw your molds together well, mix your metal with a piece of red-hot iron, skim and pour as quickly as possible. I have heard casters say that the art of casting is in pouring in the metal—that is, the crucible should be held as high as possible over the gateway of the moulding box, and poured in with a firm hand, so that the metal may go down to the bottom at once. Practice will enable you to do this without letting the metal touch the sides of the gateway. When the gateway is full, give the box a few light flow the box, and you will have good and clean casting. If you want to cast very fine, such as a leaf, to show the voins, you must well powder the facing sand with a pestle and mortar; this then fill up with fine sifted sand.

PREPARING METAL SHEETS AND WIRE FOR COATING.- A special improved process of treating metal previously to its being coated with tin, lead or zinc, has been invented by Mr. Conway, of Pontnewydd, near Newport, England. The present method acid, but Mr. Conway's invention does away with the use of acid, and substitutes carbon or hydrocarbon, either in the form of mechanically or by manual labor, but he finds it advantageous to through a bath containing the carbon to be used, thus doing manufacture of tin and terne plates. After passing through the bath the plates or metal of other forms go through the usual process of annealing, cold rolling, white pickling and tinning, as is well understood.

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AUTOMATIC SPEED REGULATOR.—A contrivance has been invented by Messrs. Dufilhot & Duprat, of Bordeaux, for regulating the speed of machinery. It consists of a spindle to which rotary motion is imparted by the machine to which it is attached; on the spindle is fitted a sliding cone, and under the latter is a cross-head, bearing bent and counterpoised arms jointed thereou. When the spindle is revolved by the machine, the arms are thrown outwards at their lover extremities, but impinge upon the cone with their upper extremities, and by means of their varying friction on the cone, which increases with the velocity of the motion of the spindle, the speed of the latter is controlled, and its means and that of the machinery, with which it is connected by gearing-wheels.—Universal Engineer.

BLACKENING ZINC.—A process for chemically blackening zinc has been devised by M. Fuscher, of Frankfort. The inventor first scours the zinc to be operated on with fine sand and very dilute hydrochloric acid, and then plunges it into a solution of equal parts of chlorate of potash and sulphate of copper in thirtysix parts of water. When withdrawn, after a short interval, it is found to have taken up a fine coating of velvetry black, which, however, at this stage, very readily comes off. To ensure its permanency, the zinc thus coated is quickly washed with water, allowed to dry, and then plunged into a weak solution of asphalte in benzole. The excess of this fluid is allowed to drain off, and the colour can then be fixed by rubbing the sheet with a cotton plug. Zinc thus blacked is found to be particularly suitable for covering in roofing.

PETROLEUM FUEL FOR STEAMBOATS.—On July 15th, the first known attempt to use petroleum as fuel on board a steamer was tried at Pittsburg, and the result was very satisfactory. The *Telegraph* says: "The little steamer *Billy Collins* lay in the Alleghany river this morning with 80 pounds of steam in her boilers, and not a bit of smoke in her stacks, ashes in her pens or clinkers in her fire-box. A few gallons of 63 cent crude oil had run out of a barrel on her guards, and was converted into a waving flame 10 feet long under her boiler, by a little device recently patented." The trip was made a few days ago, and everything passed off satisfactorily. The patent is the invention of a Pittsburg man.

THE USE OF FILES.— A new file should always be used with a light pressure until the very thin sharp edges of the teeth are worn off, after which a heavier pressure may be used with less danger of the teeth crumbling at the top or breaking off at the base. Every filer should keep a partially worn file to use first on the chilled or gritty skin of castings, or on a weld where borax or similar fluxes have been employed, or on the glazed surface of saws after gumming. In filing high tempered steel it will generally be found more profitable to use the finer grades of files, called 2d cut, and particularly where anything like a fine finish is required.

SAILING ON THE RAILS.—The Sioux City (Iowa) Journal says: Mr. John McMillan, the enterprising roadmaster of the Sioux City and St. Paul railroad, came here a short time since with his hand-car rigged with canvas, sloop style. The experiment of sailing cars on railroads seems to be a new departure, and the success attending the trial was well marked. The car has been in use about two months, and gives perfect satisfaction, having made, with moderate breezes, upwards of 18 miles per hour, and with its "leg of mutton" sail can sail close up to the wind.

GILDING ON STEEL.—An old process,—which, however, is by no means universally known,—is as follows :—By shaking a solution of gold leaf in aqua regia with ether, or naptha, the gold will leave the acids to combine with the other liquids. Polished steel surfaces, such as knives, scissors, &c., on being plunged in this solution, when dry become covered with a coat of gold, which is an excellent preservative from rust. Letters, designs, &c., may be traced by means of a pen, pointed stick, or brush, and as the ether evaporates, the gold will remain fixed.

RESTORING STEEL.—A German magazine gives a simple method of restoring burned steel to a workable condition. This consists in immersing it in a preparation made by melting three parts of pure rosin in a crucible, and after it has become perfectly fluid, adding, with continued stirring, two parts of boiled linseed oil—care being taken to prevent the mixture taking fire, of which there is danger should the temperature be too high.