

results have been got by printing mordants on calico, aging, dunging, and dyeing with quebracho extract or cutch; in all cases the quebracho shades being identical with those of cutch, not only for the tone of color, but also in regard to fastness.

#### STEAM BOILER NOTES.

We learn from Chief Engineer McDougal's annual report for 1881 that the French decree relating to inspection of stationary steam boilers requires that all new boilers pass a test which consists of subjecting them to hydraulic pressure superior to the working pressure allowed, to be maintained during the examination of every part of the boiler. As a general rule the pressure to be double the working pressure, but never to be less than 7 pounds nor more than 85 pounds above such pressure. There must be two safety valves, so loaded that the steam will escape at maximum limit, which is stamped upon the boiler in a conspicuous place, together with the date of the last test.

The area of each safety valve (two on each boiler) must be sufficient to prevent the pressure exceeding the limit, whatever may be the intensity of the fire.

Every boiler must have a pressure gauge in good order, marked plainly to show the point that must not be exceeded by the pressure; a check valve, a steam stop valve on the boiler itself, and two water gauges independent of each other, one of which must be a glass gauge, so constructed that the tube may be readily cleaned, and its casing conspicuously marked for the low water level.

All boiler plates (not in separate superheaters, or small, and so located that they cannot become red hot) exposed to the flame on one side must be in contact with water on the other side.

The registry of all "fixed" boilers must be made before they can be put to work. It must show the origin of the boiler, the place where it is fixed, its shape and heating surface, its official and special number, and the purpose for which it is used.

A table is annexed to the decree that shows the temperature of the water in any given boiler when working at limited pressure, and all boilers are classified by multiplying their capacity in cubic meters by the temperature in excess of the atmospheric boiling point in degrees centigrade. Boilers giving a product greater than 200 are denominated first class; those from 50 to 200, second; and those at or below 50, third class.

Boilers of the first class must be fixed in one story buildings, and if not protected by heavy walls, 50 meters must intervene between them and any dwelling house, but in no case are they to be nearer than 3 meters, except when located with their top line 1 meter or more below the ground line.

Boilers of the second class may be fixed in workshops of any kind if no part of them are dwellings.

Boilers of the third class may be placed in shops or dwellings, provided the furnace is half a meter clear space from neighboring houses.

Portable boilers, or such as do not require special fixing or setting in brick, must, in addition to the above, be provided with an engraved plate, on which plainly appears the owner's boiler number and his business address. The attendant must be able to show a copy of the registry declaration whenever required to do so.

All the regulations, except those specially applicable to stationary, apply also to locomotive boilers, but some special rules relating to the rights of locomotion are provided.

Detached vessels that may be heated by steam to above the atmospheric pressure of a capacity greater than 22 gallons (English) must also be registered and stamped, and the test pressure must be 50 per cent in excess of the working pressure, but never more than 57 pounds per square inch. They must be provided with safety valves that will, when lifted, prevent the pressure from rising above that indicated on the stamp.

Tanks in which water is confined at high temperatures, serving as storage reservoirs of power or heat, are subject to the same rules as receivers of steam.

Users of steam apparatus must see that they are kept in good working order, and report to the official engineer any important repairs that are made after inspection.

In case of accident, by which injury to any person is caused, the owner or his representative must at once report to the local police and the government inspecting officer, who will proceed as soon as possible to the scene of accident, and report to the *Procureur* of the Republic and the Chief Engineer, who will inform the proper magistrate.

The building must not be repaired nor the fragments of the exploded boiler removed or altered before the engineer makes his official inspection.

In 1878 there were 79,071 land boilers and steam vessels under surveillance in France, of which 32 exploded during that year, or nearly 1 in 2,200, while there were among marine boilers in the same year 1 explosion in every 614 boilers.

J. McM. asks: "Is there any difference between the bursting and explosion of steam boilers?" It may be said in response that by common acceptance among engineers bursting means rupture, while explosion implies rupture, but it is also accompanied by detonation. The terms as applied to bombshells are used indiscriminately by many writers. As applied to steam boilers "bursting" may be considered a rupture from internal pressure, and "explosion" the loud noise and flying to pieces of the boiler after the rupture. This last will always occur with ordinary working pressures

if the initial rupture is of sufficient size and suddenness to instantly relieve the contained water of pressure. Every elementary atom of the water then gives up its quota of steam, which causes an expansion of the mass of such suddenness that it may be characterized as explosive.

Another correspondent asks: "Does it take more fuel to run an engine with steam at a given pressure than to keep the same pressure without running the engine?" A. Yes. To maintain a given pressure already existing in a steam boiler no fuel at all would be required when no steam is withdrawn from or condensed within the boiler. Banked fires will usually keep up the pressure even in unprotected boilers when the engine is stopped.

Steel boilers appear to be making slow progress in France, as shown by a paper recently read by M. Jourdain before the Societe des Ingenieurs Civils. In response to an inquiry by the president of that body, M. Jourdain, whose paper discussed the subject of boiler inspection associations, stated, according to *Engineering*, that a certain number of makers were employing steel plates for parts directly exposed to the fire, but that he did not know of any stationary boiler constructed entirely of steel. As M. Jourdain is in a position to be well acquainted with French practice, we conclude that our neighbors are greatly behind us in the use of steel for steam boilers.

A large steam pipe connecting the boilers with the engine at Foster & Merriam's shop in Meriden, Conn., is reported to have recently burst with a noise like the explosion of a cannon. John Leary, who was in the vicinity, was badly scalded, and a boy named Doran was knocked senseless. The engineer is reported as saying that the pipe was too tightly bound in the brickwork, hence the explosion. If he had told us that water had collected in the cast iron pipe and had cooled during the night, so that unequal expansion occurred on opening his valve in the morning, he would have made a reasonable statement. Many a cast iron pipe has done so before.

#### Striking Oil in a Titusville Garden.

A dispatch to the *New York Sun*, dated Titusville, Pa., July 16, says that a month or so ago, Sebastian Haehn, a blacksmith, living in Mechanic street, this city, was spading in his garden after a heavy rain. As he turned up the earth, he noticed that little pools of crude petroleum formed in the cavities made by the spade. He dug a pit four feet deep. It filled up with oil to such an extent that he dipped out five barrells. The oil was of excellent quality, and Haehn sold his five barrels to the Octave Oil Refinery. Week before last, Haehn dug another "well" in his garden. It responded with a yield of two barrels an hour. The well attracted great attention. It produced eighty barrels, and then ceased to flow. The excitement over the novel oil territory died out soon afterward.

On Monday last, the news spread through the city that Haehn had opened another well in his garden, and that it was yielding at the rate of thirty-six barrels a day. Hundreds flocked to the scene of the new oil operations. The well was located in the southwestern corner of Haehn's potato patch. With a large tin hand pump, the owner was taking out of the "hole" two barrels of oil an hour. His previous well had also started again. From that, one of Haehn's sons was taking oil at the rate of twenty barrels a day.

Immediately following this strike of the lucky blacksmith, a great demand for leases of adjoining gardens arose. Such an oil field had never been heard of before. Without capital, and with no tool but a shovel, an operator could sink a well and strike the "sand" in half an hour. The right to dig on four feet of a man's garden became worth \$5 bonus and one-quarter of the oil. For three days Mechanic and adjacent streets have been thronged with excited spectators of the new operation in oil production, and parties anxious to get a "piece of the territory."

On Tuesday night, Theodore Avery, who had a coal yard adjoining Haehn's garden, put down a well. At the depth of four feet he struck oil. The yield was a barrel an hour. He has put down four more wells since. The five wells were yesterday yielding eight barrels an hour.

The success of the Haehn and Avery ventures led to a wide extension of this strange territory. A vacant lot on Washington street, southeast from Haehn's, was yesterday the scene of active operations. Three producing wells were put down. The rest were "busters." Captain Pickering went to "wild-cattin'" under a shed near the Buffalo, Pittsburg, and Warren Railroad track, south of Haehn's. He dug to a depth of eight feet, and got a well good for ten barrels a day. Two wells were put down on the ground of the Octave Refinery. At five feet oil was found. One of the wells is pumping twenty-five barrels a day. The McKeown Garden, east of the refinery, was leased by J. P. Thomas, William McKenzie, and J. M. Brinton. Thomas took the northern half of the garden. He got two five-barrel wells of excellent green oil. The other parties struck oil, but it was of a red hue, and had the appearance of being mixed with tar. In the gardens along the east side of Washington street, several wells "came in" as good producers, but the oil was of an inferior quality. All the property along Oil Creek, between Washington and Franklin streets, has been leased by A. J. Krafft. He will develop it on a large scale. The original Haehn territory maintains its yield, and is being further developed. Haehn has made a trench all around his garden and one through the center. In these

the oil collects rapidly. The operator is putting up tanks to receive his oil, as there is a great scarcity in barrels. Haehn's garden is now yielding one hundred barrels a day. He expects to increase it to two hundred. The oil is worth, at the refineries, \$1.10 a barrel. The price of one barrel defrays all the expense of putting down a well. Operations are carried on day and night. That part of the city is lighted up all night by the flaming torches of the oil men. The weird scene is witnessed nightly by hundreds of people.

There are no indications of any decline in the yield of this oil, and Haehn, the lucky discoverer of the field, is laying away not less than \$100 a day as clear profit.

There are many theories in regard to this unheard-of presence of petroleum in large quantities so near the surface. One is that the oil is the leakage of tanks and pipe lines, which has sunk into the earth until it reached the gravelly deposit, in which it is now found in pools. Another is that this deposit has been forced up from the true petroleum sand stratum by some unknown agency, and caught and retained in the stratum where it now lies.

#### MECHANICAL INVENTIONS.

An improved cotton press has been patented by Mr. Charles E. Macarthy, of Forsyth, Ga. This invention relates to certain improvements in presses for baling cotton or other analogous material, of that type in which the box is made to revolve, and the follower is forced down in the same by the action of a screw stem. The improvement consists in the peculiar means for throwing the screw stem and follower to one side of the mouth of the box, to permit the packer to have free access to the same to pack the cotton therein.

Mr. John Flanagan, of Newburg, N. Y., has patented an improved pipe wrench with an angular stationary jaw, a slotted shank, and an inclined handle made in one piece, a movable jaw having a concaved outer end, and a fastening nut, and a swiveled screw for adjusting the movable jaw, whereby the wrench can be adjusted to grasp pipes of different sizes.

An improved grounding machine for paper hangings and other materials has been patented by Mr. Thomas B. Smith, of West New Brighton, N. Y. The object of this invention is to apply the ground color to paper hangings and other materials rapidly and uniformly. The invention consists in giving to the rotary brushes that distribute the color a longitudinal movement by eccentrics and levers, to insure a uniform application of the color to the paper, and also in attaching the fulcrum studs of the levers to the bearings of the brushes, so that the brushes can be adjusted without disarranging the connection between the levers and brushes.

An improved hub for wheels, which will not shrink and warp, and which is durable, has been patented by Messrs. Alonzo Gandy and Rusinus M. Black, of Freeport, Ohio. The invention consists in a hub constructed with a central ring of wood into which the inner ends of the spokes are mortised, and which is provided with a conical continuation or sleeve toward the outside of the wheel, upon which central ring of wood a flanged ring is placed at each side. These flanged rings are bolted or riveted together, so that the inner ends of the spokes will be held between the flanges. The axle box passes through the central ring and the conical sleeve, and is held in this hub by lugs fitting in grooves in the flanged rings.

#### The New Comet.

The comet discovered by Professor Schaeberle, of Ann Arbor, July 13 (Comet C, 1881), is now visible through an opera glass, and will soon be to the naked eye. Its identity is still uncertain; most probably there is no record of its previous appearance. It is expected to be one of the most conspicuous comets of the century. Under date of July 22, Mr. Henry M. Parkhurst says: "It may not equal Gould's comet in brightness, for the nucleus may not be brighter than the north star, and yet it is not uncommon for the brightness of a comet after passing its perihelion to much exceed that computed from its appearance before its perihelion passage. It has already developed a tail as marked as that of Donati's comet an equal time before its perihelion passage, and it would now be visible to the naked eye but for the presence of the moon, although perhaps not distinguishable from a star. Up to the 15th of August the comet will be visible in the morning in a direct line between Aldebaran and Theta Ursa Major, being now midway between them. On August 15 it will be near Theta, with its tail pointing toward the north star. It will then cease to be visible in the morning, not rising until after twilight begins. It now sets at the same time with the sun, but will gradually set later, so that it will become visible in the evening before it is entirely lost in the morning. On August 19 it will be near Nu Ursa Major, with its tail pointing toward and perhaps reaching Gould's comet, then visible only in the telescope in the Little Dipper. On August 25 it will be in the constellation Coma Berenices, the tail probably passing over or near Arcturus. Early in September the comet and its tail will both pass below our horizon, still as bright as Coggia's comet at its best."

Prof. Swift says, under the same date: "Of course it is impossible yet to predict with certainty, but it would seem as if it would eclipse the glories of Comet B" (Gould's Comet).