

MOUNTAIN LOCOMOTIVE.

The very curious little engine illustrated in the annexed engraving was built for a line in Peru, the grades of which are 200 feet to the mile and over, for thirty miles; it is intended for use instead of hand cars, which cannot be used on such grade. The engine has room for ten or more men on the seats over the tanks on each side, and can also draw a small four-wheel car with materials for repairs of the track. The cylinders are 5 inches diameter by 12 inches stroke, the wheels are 30 inches in diameter, one pair only being driven. The boiler is of cast steel, $\frac{1}{2}$ inch thick. The furnace is 30 inches long, 25 inches wide, and 32 inches deep (inside), the crown of the furnace is stayed with screwed stay-

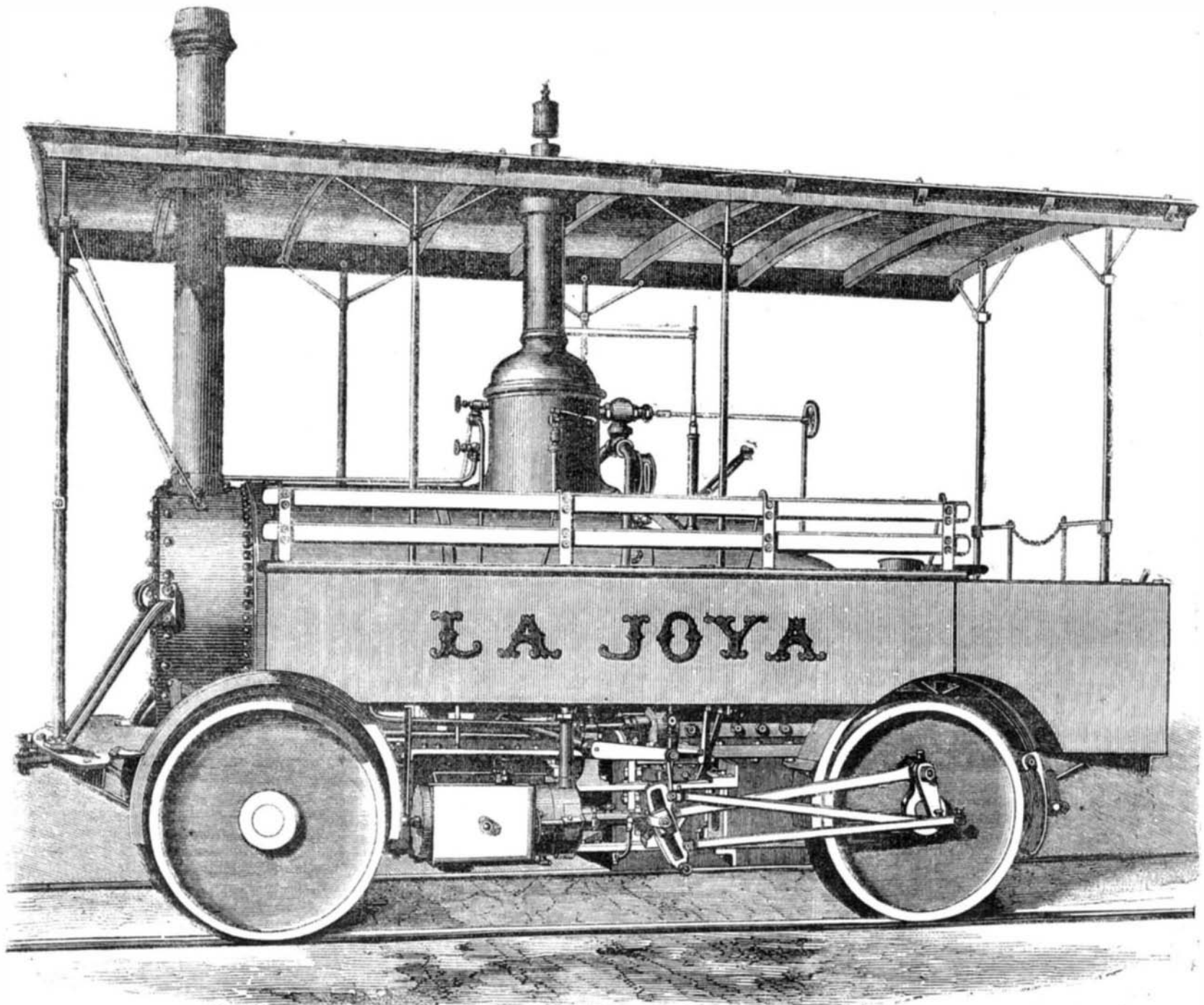
dry after having been used, have remained good and sound after twelve or fourteen years' use.

The nets used by the fishermen on the coast of Sussex are either hempen or cotton, and they are always prepared for service before being used. The mode of preparation is different with each description of net. Those made of hemp or flax are simply well tanned and dried before using. Those made of cotton are first well tanned and dried; they are then dressed well with linseed oil and again thoroughly dried; and finally, they are well tarred and again dried before they are fit for use.

This process not only preserves the net, but gives a stiffness to the meshes which makes them work better when in use. The cotton nets, the fishermen say, are more apt to

previous to wearing, which makes them last at least twice as long. To prepare such articles, an ounce or two of catechu is bruised and boiled in a large saucepan or small copper, in which the clothes are immersed in the same manner as the nets.

Of the Acacia catechu there are two varieties—a white and a red kind; but the cutch, or catechu is almost always prepared from the red kind, the white being seldom cut down. Cutch, or catechu, is prepared thus: The tree is cut down to about six to twelve inches from the ground, and chopped into small pieces, the smaller branches and bark being rejected. The chopped wood is then taken to the place of manufacture generally under trees in the open air, and placed over a brisk fire in mud jars, called *gharras*, filled with about two third



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bolts, the same as the sides. The boiler contains 58 $1\frac{1}{2}$ inch iron tubes, $4\frac{1}{2}$ feet long. The axles are cast steel; the tanks hold 142 gallons—they are under the seats; the coal boxes—one on each side, at the rear of the tanks—contain 500 lbs. of coal.

The engines of which this is a type are expected to run from twenty to thirty miles an hour.

The first engine of this kind was built by the Rogers Locomotive Works, Paterson, N. J., for the Copiapo Railroad in Chili. It was smaller than the one described above, having cylinders $3\frac{1}{2}$ inches diameter; 10 inches stroke; four wheels, 30 inches diameter, one pair only being drivers. This engine has been run fifty miles in an hour and a quarter with 270 lbs. of soft coal. This seems a very high speed for so small a wheel, but we do not doubt the story, as it comes to us from Mr. E. P. Gould, who was superintendent of machinery of the Copiapo Railway at the time. The company were so well pleased with its performance that the Rogers Works have since built them another one, with cylinders $4\frac{1}{2} \times 12$, and 4×28 inch wheels.

The Tanning and Preservation of Fishing Nets.

The fishing nets on the south coast of England are according to the *Journal of Applied Science*, all well tanned with catechu. There is a boiling house with a large copper, into which they are plunged, and thus dyed a dull brown color. One of the most fertile causes of the rotting of nets is letting them lie in a heap while wet. The fishermen at Scarborough and on the Sussex coast are very particular in drying them as early as possible after they have been used. A few hours lying in heaps causes them to heat, and then destruction commences. Nets that are always immediately hung up to

heat when left in a mass than the hempen ones. The process of tanning is carried on in a good-sized square building, furnished with two large coppers, each five feet in diameter and three feet four inches deep.

The material used is catechu. Besides the large copper there are several square tanks of about the same capacity as the coppers, and several puncheons with one head out; these are used for the maceration of the nets when they are too busy to allow them to remain in the coppers.

When the nets are new they proceed as follows: They put into a copper one-and-a-half cwt. of catechu, broken up into small pieces, and a sufficiency of water to admit the nets. This charge of catechu is enough to a fleet of nets; that is, about 106 nets, each net thirty-five yards long. The nets are boiled and then allowed to remain in the fluid twenty-four hours. They are then taken out, well drained, and thoroughly dried. After having been used for six or seven weeks the tanning is repeated, but the charge of the copper on the repetition of the process of tanning is only about one cwt. of catechu to the fleet of nets.

The repetition of the tanning is continued as long as the nets last (they say from five to six years if proper care be taken of them), and all necessary repairs are made with netting twine properly tanned for that purpose. The fishermen say, when they come in, in the morning, and go out again the same day, they do not attempt to dry their nets, but they never suffer them to lie in bulk in the boat, but cast them out on shingle and open them out widely, so that there be not bulk enough together for them to heat. When the season is over they tan them again thoroughly, and then store them away.

The fishermen's clothing, when made of canvas, is tanned

of water. This is allowed to boil down, till, with the extracted matter, it forms a liquid of sirupy consistence. The contents of several jars are then poured into a larger jar and again placed over a brisk fire for a period of from two to four hours, and, when sufficiently boiled down, it is poured out over mats covered with ashes of cow dung, and allowed to dry. The wood, when dry, is used for fuel.

ABSTRACT HYPOTHESES.—I have come to the conclusion, says Prof. Vander Weyde, in a recent discussion with Prof. Walling, an equally learned antagonist, that the true road to progress in the science of physics lies not towards abstract hypotheses of caloric fluids, luminiferous or electric ethers, or forces capable of moving bodies, all having an independent existence in space. The index-hand of modern science points in a very different direction; namely, towards the study of matter and motion of matter, and nothing else, dropping all metaphysical assumptions of which matter is not the basis.

AMBER BEADS.—Many of these ornaments sold for genuine amber are mere imitations. Beads sold for clouded amber are often but a mixture of gums, which are soft and also easily amalgamated with fatty matters and become dull and dirty on the surface as well as scratched. The false amber is easily shown. Scrape a small portion of the suspected material to powder, and if it dissolves in turpentine, whether hot or cold, it is not amber. Real amber has a smooth, clean feel, and does not scratch readily. Putty powder will restore the polish to real amber.

DR. R. J. GATLING, the inventor of the celebrated Gatling gun, left for Europe on Saturday, the 6th inst., in the steamer *Itala*.