

NEW STEAM MOTOR.

Among the novelties at the World's Fair, Vienna, is the steam motor of Friedrich Siemens, of Dresden, Saxony, which is worked without the use of pumps, valves, or special moving parts, but operates through the rotation of the steam generator itself. The exertion of power begins instantly with the development of steam, and is continued by the expansion of the steam until close to the vacuum, so that the greatest possible amount of power is developed from the steam pressure and made useful.

Our engraving, from the *Deutsche Industrie Zeitung*, represents such a motor, one tenth the natural size. The machine consists essentially of a rotating boiler placed in an inclined position. A is the boiler or shell, inside of which there is a worm or screw, *s*, made out of plates cut funnel shape, and attached to A. At the lower end the boiler, A, is provided with a double bottom, *d*, while the upper end is surrounded by a spiral tube, *c*, its spirals being in reverse of those of the interior worm or screw, *s*. The double bottom of the boiler forms a water space, K, which communicates through circular holes, *a*, with the inner space of the shell, A. The machine is mounted on a sloping axle-tree which is stepped at *t*, and supported above on the shaft, *l*, and bar, *b*. The motion of shaft, *l*, is transmitted to the horizontal shaft, *h*, by means of the flexible connection. The lower part of the shell, A, is surrounded by a furnace of clay, B; and fire is applied through an opening at *f*. In this example a gas flame is employed. The products of combustion rise from *f* and surround the shell, A, finally escaping through the upright pipe, at the upper end of B. The boiler, A, is filled with water at *i*, and here a fusible plug is used, which melts when the temperature of the steam rises above that of a given pressure, and permits the escape of steam into the atmosphere, thus ensuring the safety of the apparatus. When the fire is kindled at *f*, the steam which develops rises through the water and acts on the spirals, *s*, causing the turning of the whole machine. The steam continues to rise until it reaches and enters the spiral condensing pipe, *c*, which surrounds the upper exterior portion of the shell, A. In passing through the pipe, *c*, the steam is condensed, and the water of condensation is screwed back by the rotation of the pipe, *c*, down below the water level in the boiler, A, near *o*, where the water enters the boiler, and is again converted into steam. In starting the machine the steam must first be allowed to escape at *o*, out of the spiral condenser, in order to drive out all the air; then the opening, *o*, is closed, and the steam, then rising into the cooling pipes, *c*, is condensed as before described.

The machine, if once filled and made completely tight, continues to work without requiring any other attention, except to keep the fire going. No pumps to supply water, on

valves or other devices are required; but a constant use of the same water over and again takes place; the water being first converted into vapor, which is then condensed, then again evaporated, and so on.

In lieu of water other liquids may be employed, and it has been suggested that quicksilver might be advantageously used.

A Remarkable Poison.

This poison is obtained by pressure from the seeds of *strophanthus hispidus*, an apocynaceous plant, found in Afri-

Riggenbach, Naeff, and Zschokke, the first named gentleman having proposed the construction, an idea which was suggested to him by a visit to the Mount Washington railroad, in this country. We present an illustration which shows the general character of the work.

The Rigi line starts from Vitznau, on the borders of the lake, and rises up the mountain side to a station at Staffelhöhe, which is above the hotel and bath establishment, called Rigi Kaltbad and well known to most travelers in Switzerland. The length of the line is 5,760 yards (about 3 1/4 miles), and the height of the upper terminus above the lower is 3,937 feet, being an average ascending gradient of about 1 in 4 1/2. After leaving Vitznau, the grades vary from 1 in 5-56 to 1 in 4. Among the instances of bold and difficult construction exhibited by this work are a bridge of three spans over a defile in the mountain, the track going into the side of a rock and through a tunnel. The bridge and tunnel together are 525 feet long, the grade being 1 in 4 and the direction a very sharp curve. The track is very solid and well built, and the engines have vertical boilers placed in the middle of their length. The boilers maintain their perpendicularity even in ascending grades of 1 in 5 1/2.

It is proposed to continue the line to the Rigi Kulm, the summit of the mountain, and perhaps down the other side to Certh, at the eastern foot. The line at present existing was opened for public traffic on May 23, 1873.

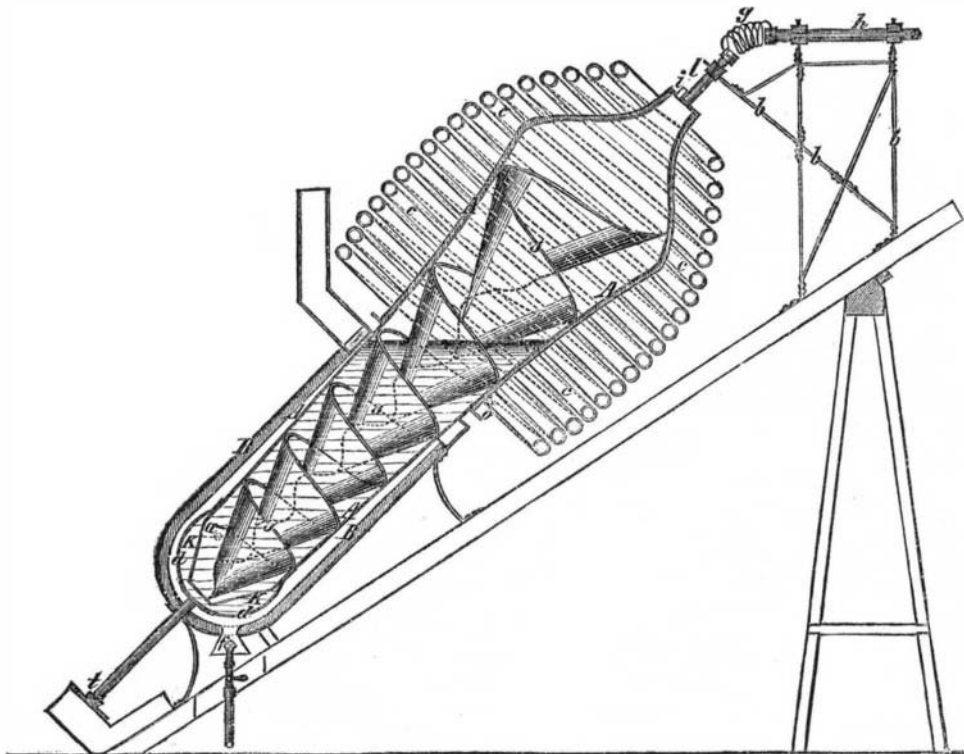
Slate Roofing Paint.

Our attention has been called to the superiority of a new paint compound, advertised on another page of this issue, which consists largely of pulverized slate. We have not tried the article, but we have the evidence of acquaintances who have used it, and speak of its merit in the strongest terms. It is equally adapted for new and old shingle roofs, rendering them impregnable to sparks; and it preserves the shingles equal to any other paint.

We have received a letter from "Some of Your Readers" who are shocked at our incredulity respecting the miracles at Lourdes, France. They call our attention to the fact that a French gentleman has offered a reward of 10,000 francs (\$2,000) to any one who can explain away the facts stated in a published book which gives an account of the miraculous cures, etc. This is a liberal and courageous offer, and it proves nothing but the public spirit and implicit faith of the gentleman who makes it.

The annual exhibition of the American Institute in this city is now open; but some days will elapse before the machinery department will be in full blast.

G. A. P. writes to say that he has a preserved specimen of the devil fish measuring 4 feet from tip to tip of the arms.

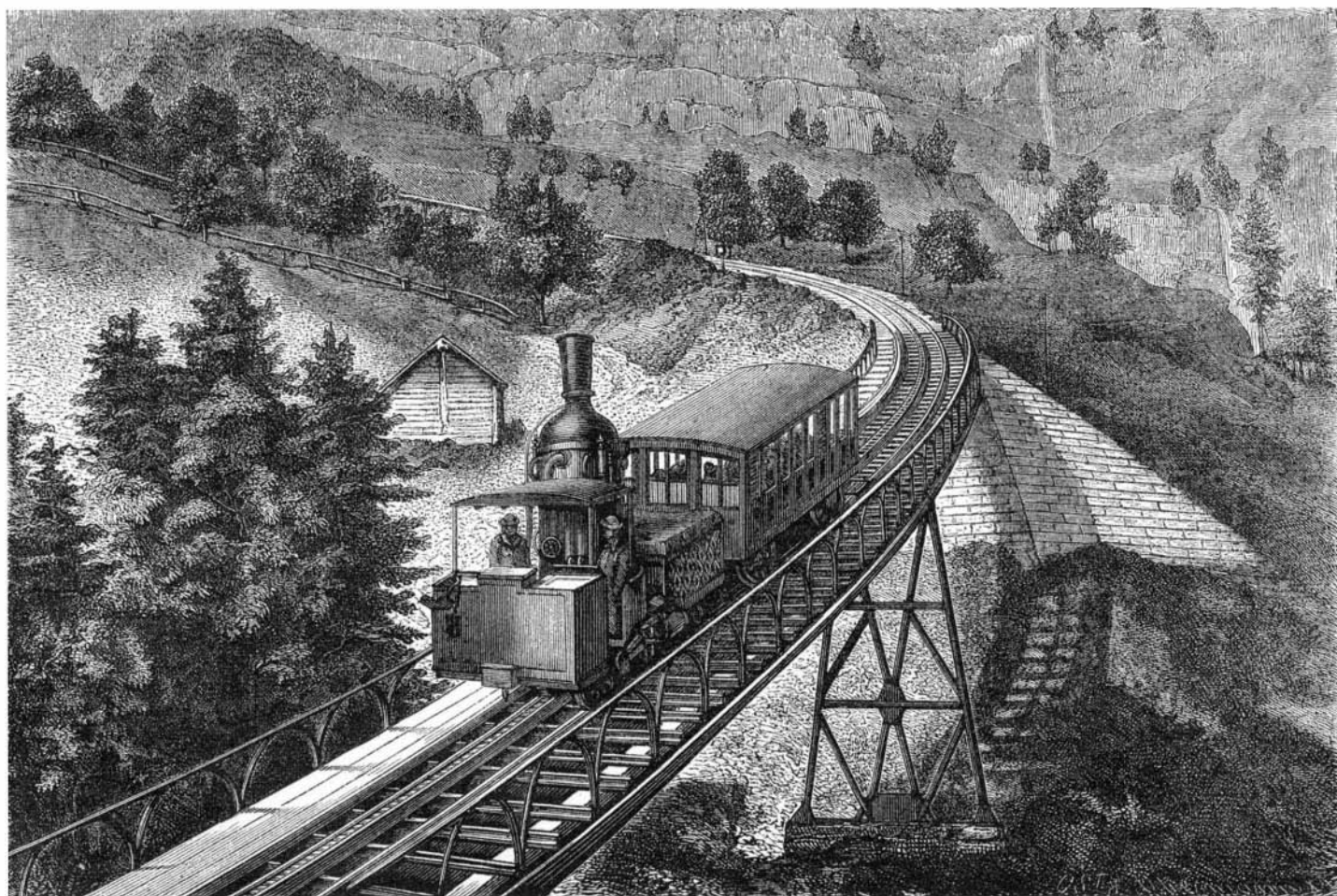


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ca; and from experiments made with samples of it, taken from arrows upon which the natives place it, it appears that it acts more powerfully than digitaline or antiarine, and quickly paralyzes the heart. The 1/7000 of a grain will kill a frog, a sparrow, or a dog, though the resistance of certain animals varies. A snail, for instance, requires 1/10000 of a grain; a mouse has withstood 1/17000 of the extract (obtained by macerating the seeds in alcohol), while the latter dose kills a dog nearly a thousand times heavier than the mouse. The heart comes to a complete standstill after a few irregular efforts.

THE RIGI RAILWAY.

The construction of railroads over mountains has made wonderful progress in the last year or two, and some of the greatest achievements of modern engineering science have been made in developing the plans for such schemes. The railway up the Rigi (in Switzerland, on the borders of Lake Lucerne) is the work of three German engineers, Herren



RAILWAY ON THE RIGI MOUNTAIN, SWITZERLAND.