

**SPIDER ENGINEERING.**

BY GEO. M. HOPKINS.

If Cleopatra's Needle, now about to be erected in London, were animated and capable of a thousand contortions, and if it were required of a man to suspend it vertically without mechanical or other aid, we would then have a case parallel with the one described below.

Some time since it was the fortune of the writer to witness the curious scene illustrated by the accompanying engraving. A snake about twelve inches long, of the species *Coluber eximius*, commonly called the milk snake, became in some manner entangled in the web of a common house spider, which was doubtless prepared for smaller prey. The spider, with the utmost energy, began to throw its web about the head and mouth of the snake until the latter became stupefied and unable to detach itself from the snare of its captor. Whether this state was altogether due to suffocation or to bites inflicted by the spider, I cannot state. The web which was formed with such great rapidity was, for a short distance above the head of the snake, twisted into a stout thread, which was connected with guys and stays running in all possible directions, and attached to the shelf above and brackets on either side. These guys the spider constantly strengthened, and also shortened, so as to raise the snake from the floor, gradually but steadily and surely. The snake, although moving, seemed to be incapable of resisting the operations of the spider, and was raised until only about one fourth of its length rested on the floor.

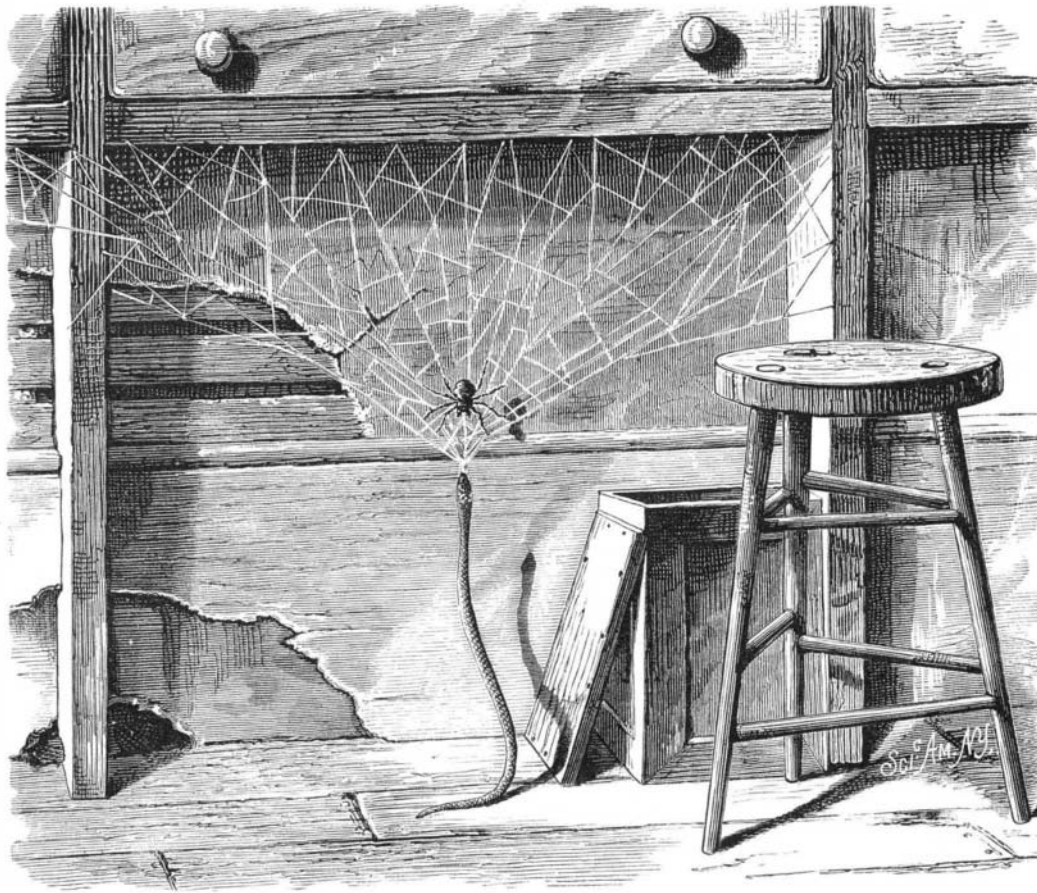
It would be interesting to know how the affair would have terminated had there been no interruption. The raising process continued for several hours, and the snake was finally released by one of the uninterested.

**Gravity Indicator.**

A new apparatus for experimental verification of the laws of falling bodies is described in the *Journal de Physique*, by M. Lebourg. A flattened cylindrico-conical weight, guided in its fall, like that of General Morin's apparatus, carries, instead of a style, a vertical tuning fork, furnished with a

short and stiff metallic wire. The weight falls down a rule, graduated on one of its edges, and covered with smoke black. The tuning fork is set in vibration automatically at the commencement of its fall, and it inscribes on the fixed rule a sinuous line, inspection of which affords an easy demonstration of the laws of the fall of bodies. By mounting on the

rendering the structure an interesting architectural study as well as an ornament to the exposition grounds. In the interior are a courtyard and fountain, around which run the courts which will contain the Algerian exhibits. The accompanying engraving, which we copy from *Engineering*, conveys a good idea of this handsome building.



**MILK SNAKE AND SPIDER.**

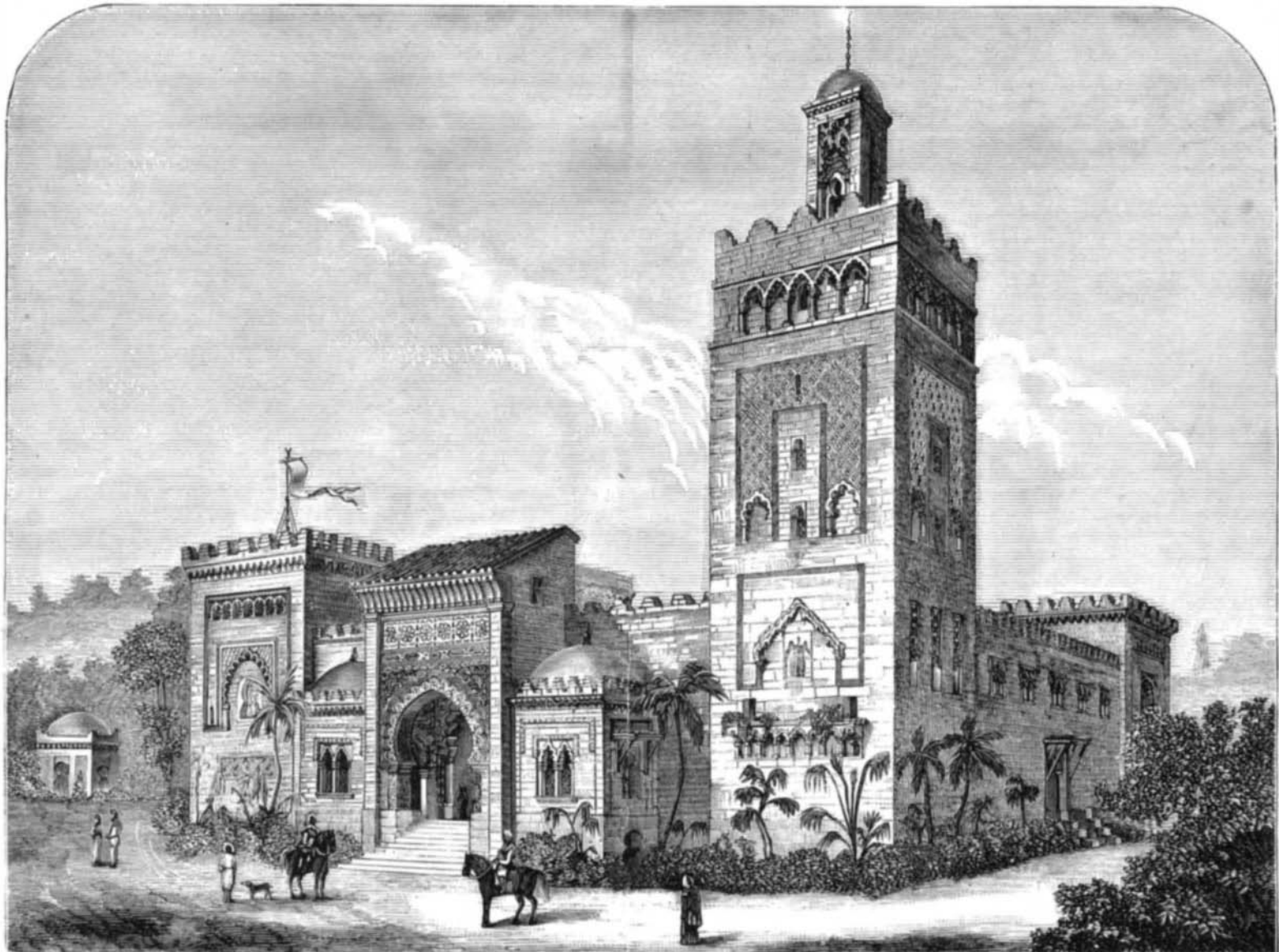
apparatus several tuning forks one may compare together their number of vibrations, and even determine the absolute height of the sound produced.

**THE ALGERIAN PALACE AT THE PARIS EXPOSITION.**

The Algerian palace, on the grounds of the Trocadéro, is now nearly completed, and will form one of the finest of the exposition buildings. The plan is eminently appropriate, and the tiles and mosaics used so lavishly in the decoration are fac-similes of those employed in ancient Moorish palaces,

too numerous to mention, all, however, distantly related to the fact that the earth is an "explosive globe," which is balanced by motion, and that that motion is "the equivalent of cohesiveness." All of which, so far as any knowledge we possess to the contrary regarding electric lines and explosive earths, may be quite true.

KRUPP'S establishment at Essen employs in the foundry alone 8,500 men. In the works are 298 boilers and as many steam engines, having together 25,000 horse power.



**THE ALGERIAN PALACE AT THE PARIS EXPOSITION.**

**Curious Telephone Experiments.**

In a note to the French Academy, M. Brequet says that all the points of the telephone—the handle, the binding screws, the shell, etc., as well as the plate, may enable one to hear sounds. He demonstrates this with the string telephone. Attaching the string to any point of the Bell telephone, and using the parchment membrane, one may easily correspond with a person using a Bell telephone. Thus, by attaching several string telephones to a Bell telephone, several persons may hear the messages simultaneously.

To render string telephones more practically useful, M. Brequet fixes to the center of the membrane two or several strings meeting there at an angle. The sound carried by one of them is propagated by all the others. A thread is also passed through the centers of membranes, which then serve as supports for long, straight lines. A sort of relay is also formed by means of a brass cylinder with two membranes, to which strings are connected. This method of extending the string telephone has been in use in this country for the past three years.

**Communicating with Divers by Telephone.**

The telephone has found a valuable application as a means of communication with submarine divers. Signals have hitherto been transmitted by simple pulls on a line, but recently in England the instrument has been connected with divers' helmets. It recently was the means of saving the life of a diver who just before fainting called to be pulled up without making the additional signal with his rope.

**STEAM POWER MOULDING MACHINERY.**

We illustrate herewith a new machine for forming moulds in sand for metal castings, the novel features of which are the peculiar movement of the "pattern head and sectional follower," whereby the mould is formed by compression by the simultaneous movement of the two parts, and the withdrawal of the patterns while the moulded sand is held secure by the follower during such withdrawal. The follower then retires, leaving a perfect and complete mould ready for the metal.

The patterns being attached to the movable head and surrounded by a sectional follower, it is claimed to be nearly impossible to make anything but a perfect mould. The result is the producing of a casting an exact duplicate of the pattern, from the fact that there is no rapping of the patterns, no sponging or patching of the moulds required, as is the case in hand or press moulding.

These machines are adapted to make castings for stoves and hollowware, agricultural implements, gearing, pulleys, pumps, axle boxes, malleable iron, and general hardware. They are worked either by hand or steam power. One machine of a moulding capacity of one thousand flasks per day will be exhibited at the Paris Exposition.

For further information address Aikin & Drummond, patentees and sole manufacturers, Louisville, Ky.

**The Steering of Screw Steamers.**

At a recent meeting of the Liverpool Engineering Society the results were noted of some experiments recently made on the Clyde to test the steering capacity of screw steamers with the engines suddenly reversed when going full speed ahead, when it was found that the vessel's head turned in the contrary direction to that in which it should theoretically have gone, thus proving that in many cases collisions between two steamers meeting, which might have been avoided, were rendered inevitable by carrying out the Board of Trade directions to port the helm and reverse the engines of both steamers.

The loss of the Guion steamer "Dakotah" was given as an instance of a screw steamer going in a contrary direction to that intended when her engines were reversed and the helm put hard over with the intention of keeping her head off the shore.

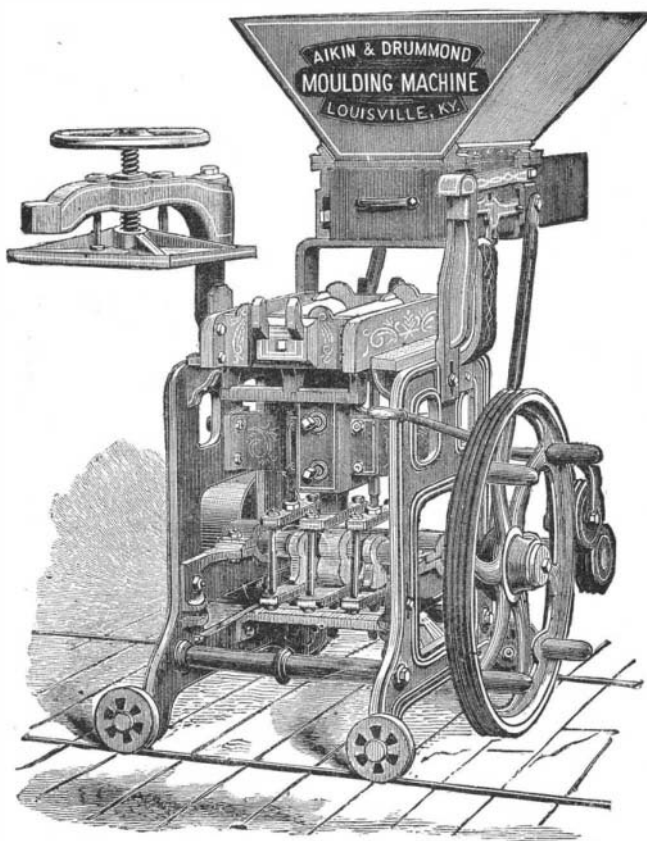
Attention was drawn to the advisability of having all screw propellers made either right or left handed, as the divergence in such case would always take place in the same known direction.

**Discomforts of the Sick.**

Those only who have passed weary days and wakeful nights in weakness and pain on a bed of sickness, with powers of endurance enfeebled, and every form of physical and mental sensibility acutely active, can comprehend the multitude and misery of the discomforts which beset the sick. Noise in its hideously infinite variety; creaking boards, which no deftly-made screw has been devised to secure; rattling china and ware, not yet replaced by ingeniously-devised substitutes—perhaps the old wooden bowl and platter on dumb waiter for food, and articles partially protected with rubber for general use; falling coals and cinders, surely preventable by the employment of wooden tongs and silent ash-pans; harsh door fastenings, possibly avoidable by special apparatus constructed for use with locks temporarily fastened back; glaring lights, that irritate the wakeful, and make the dozing dream and start; puzzling shadows, or lugubrious darkness, evils instantly remediable if only it were possible to secure a soft and shaded light. These are a few of the surface grievances of the first stage of illness, when

the head aches, the faculties of hearing and sight are preternaturally intensified, and a morbid fancy extracts suffering and bewilderment from every disturbing circumstance, however small.

Then comes the stage of helplessness, when the sick person lies in the paralyzing grip of his malady, perhaps unconscious or delirious, and those about want all the aids which skill and thought can bring to their assistance to minister to his necessities safely, promptly, and with the least distress or disturbance to the patient and his surroundings. It is seldom possible to say precisely how little or how much the surroundings of a seemingly unconscious person affect him. In this period of an illness, apparatus, contrivances, and arrangements of every class, for the ministrations of comforts to the sick, play a not unimportant part in the treatment, and should be so regarded. It is discouraging to observe the meager results of the enterprise bestowed by designers and producers of appliances useful in this phase of sickness. For example, a thoroughly efficient feeder suitable for use in the case of an adult does not exist, and expert nurses revive the old-fashioned butter boat. A shaded hand lamp, of no greater weight than may be borne on a finger, and so contrived that the light will fall at the point required, without assailing the eyes of the patient, is not yet devised. Complicated and costly beds, quite out of the reach of any middle class family, and therefore available only for the wealthy, or the fortunate inmates of hospitals, alone meet the requirement of cleanliness without discomfort. The like is true of nearly all the apparatus for the relief of pain by change of posture, and for securing immunity from pressure, or steadiness in a particular position. The rich and the poor are provided, but not the multitude in narrow circumstances with small and inelastic financial resources.



STEAM POWER MOULDING MACHINE.

The stage of convalescence is in many respects the most trying of all. It is then that petty annoyances, such as arise from noises, draughts, smoke, foul vapors, bad or ill managed light, improperly cooked food, nauseous remedies administered in uncleanly and uncomfortable cups or glasses, knives, forks, and spoons that turn over with a clatter, things that fall or are readily knocked down, irritating wall papers, hard, lumpy, or too soft beds, burdensome or cold bedclothes, beds that can only be put in order with labor and confusion. There is scarcely an article or piece of apparatus for the sick chamber which is not obviously susceptible of improvement, and would not repay the thought expended upon it, if placed within reach of families with small incomes, who feel the cost of comfort in sickness. None of these matters are beneath the consideration of the medical practitioner. In no small proportion of cases they are relatively of high moment. It is neither wise nor safe to leave the care of such details to nurses, whether trained or domestic. The physician should be able to direct those in charge of the sick what to provide, where to obtain all necessary appliances, and how to use them when at hand. This is a matter of more than common importance, and it is with the view of reminding the profession and the producers of special apparatus—efficient and inexpensive—of the conspicuous part their enterprise should play in minimizing the discomforts of the sick, we bring the subject under notice.—*Lancet.*

ACCORDING to Dr. Bertherand, there are 166 centenarians in Algeria, thus proportioned: eighty-eight persons are 100 years old, one of 101, seven of 102, nine of 103, fifteen of 104, six of 105, six of 106, five of 107, one of 108, three of 109, eight of 110, two of 111, two of 112, one of 113, two of 114, four of 115, one of 117, and one of 118 years.

**New Mechanical Inventions.**

A Link and Cross Head of novel construction have been invented by Mr. William Jackson, of Millerstown, Pa. By means of a cord attached to an eye in the upper end of the link the valve reversing mechanism of steam engines may be controlled from a distant point, as the cord may be led any required distance and in any direction by means of pulleys, etc.

Mr. W. E. Stearns, of Rutland, Vt., has invented a Machine for Measuring, Bending, and Cutting Wire, for binding sheet metal vessels of various descriptions. These functions are performed by a combination of rolls for bending the wire, a feeding device for delivering the wire in proper lengths to the bending rolls, a cutter, and a clutch for reversing the action of the machine.

Mr. Neil Malmquist, of New York city, has invented an improved Lift and Force Pump for raising water out of mines, deep wells, and other places where the water is to be conveyed to a great height, and has introduced some novel innovations upon the ordinary systems of construction.

An improved Shingle Cutting Machine, invented by Mr. A. I. Hogan, of Mason, Ill., has a sliding gate, carrying a knife, and a rocking shaft connected with the gate and operated by cams or tappets on the periphery of a horizontal wheel, which is rotated by animal power.

A principal advantage in a new Washing Machine is the fact that it is put together without nails, so that the various parts are not liable to become loose by the rusting off of the nails, and the fabrics not injured by rust stains. This point, with other details, is included in the machine recently patented by Mr. B. F. Comstock, of Lincoln, Ill.

Mr. A. C. Fuller, of Middletown, N. Y., has made certain improvements in Hat Pressing Machines which enable them to be used, with slight modifications, for casting the female die and shell. The base of the press is made hollow and with a close inner wall, to adapt it to serve as a mould, and is heated by means of a steam chest. The pressure is applied by a screw working in upright standards.

An improved Crane, invented by Mr. J. M. de Célis, of New York city, automatically balances the weight hoisted, leaving the crane free from danger of upsetting, and admitting easy swinging upon its pivot. This is accomplished by a lever system connected to the hoisting pulley and chain and to a balancing counterpoise which travels on rails of braced and slightly inclined rear arms. The leverage exercised by the counterpoise is determined automatically by the weight of the load, and the position of the counterpoise also affords a means of measuring the weight hoisted.

Mr. Simon Tragheim, of New York City, has patented a Screw Propeller, which is claimed to admit of almost instant reversing, and at the same time pass through the water with facility. The blades are strengthened by an outer frame extending at both sides obliquely from the hub and across the outer center point of the blade. The front and rear edges of these frames are beveled, so as to cut through the water easily.

Mr. J. S. Schofield, of Little Sioux, Iowa, has invented an improved Saw Mill Head Block and Carriage, in which the carriage is made in two sections, adjustably secured, so that the head blocks are operated simultaneously. The latter carry short beveled and mortised knees, the bevel striking the log directly under the circle and close to the point where it rests upon the blocks, and driving the dog into the log. The details are ingeniously arranged.

A new Car Axle Box, containing an improved device for oiling the journals of the axles of railroad cars, has been patented by Messrs. W. H. and F. C. Burdett, of Cleveland, Ohio. The invention consists of the combination, with a journal and oil receptacle in an axle box, of a friction roller or rollers, and an oil guard mounted on sliding bearings supported by springs. The use of cotton waste or similar material is prevented with, and the escape of oil prevented.

A new Adding Machine, invented by Mr. M. W. Hinkle, of Memphis, Tenn., is formed by the combination of a system of wheels provided with numbered pins and teeth, contained in a small case, and is intended for convenient use in adding columns of figures and keeping the tally of things to be counted.

**Soap Bubble Experiments.**

M. Remsen, of the Berlin Chemical Society, improves on the ordinary method of igniting soap bubbles filled with hydrogen, or oxygen and hydrogen, as they rise in the air, thus: At a height of 5 or 6 feet above the experimental table is suspended from the roof a large glass funnel in inverted position. A gas burner is fixed in the middle of the lower part of the funnel, so that the flame when formed is in a horizontal plane. It is now only necessary to liberate the soap bubbles somewhere about vertically under the funnel. They come with certainty into contact with the flame. If they contain hydrogen the whole funnel is often filled with the flame, and presents a curious sight.

A PAIR of Siberian hares has arrived at the Jardin d'Acclimatation in Paris. The peculiarity of these animals is that they are gray in summer and white in winter. The French naturalists want to ascertain what effect the temperate climate of France will have on this change of color.