MELDE'S EXPERIMENT WITH THE TREVELYAN ROCKER.

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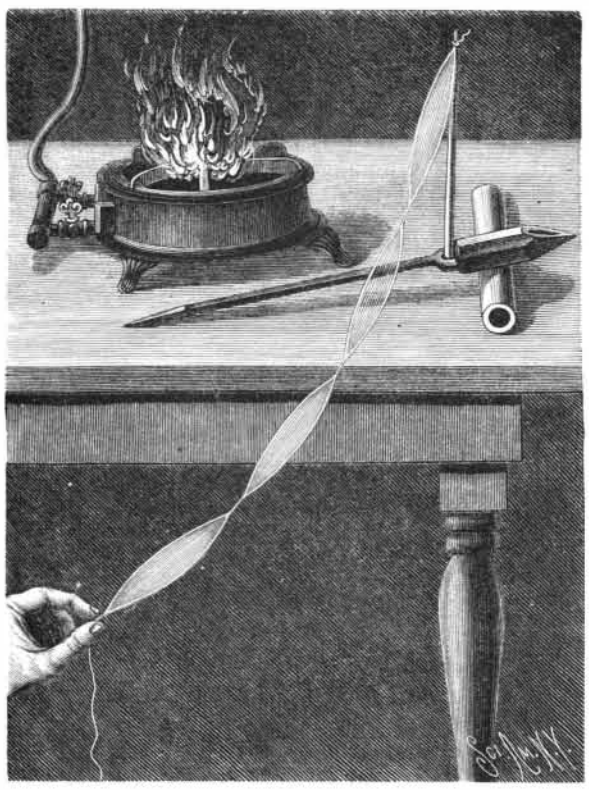
A very simple way of performing Melde's experiment, in which visible loops and nodes are produced upon a long thread, is shown in the cut accompanying this description. The well known phenomenon of the Trevelyan rocker is utilized and made to take the place of a vibrating diaphragm. As Melde's experiment



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is usually performed, a tuning fork is the source of vibration. A fine and very flexible thread is attached to the extremity of one leg of a tuning fork, and is held in a generally horizontal position, of course curving downward. If stretched to the right degree of tension, the thread, when the fork is vibrated, will be thrown into a beautiful series of loops and nodes. This is not all. By varying the tension of the thread, the nodes can be varied in number, two, three, or more loops being produced. The looser the thread is, the more loops will be developed.

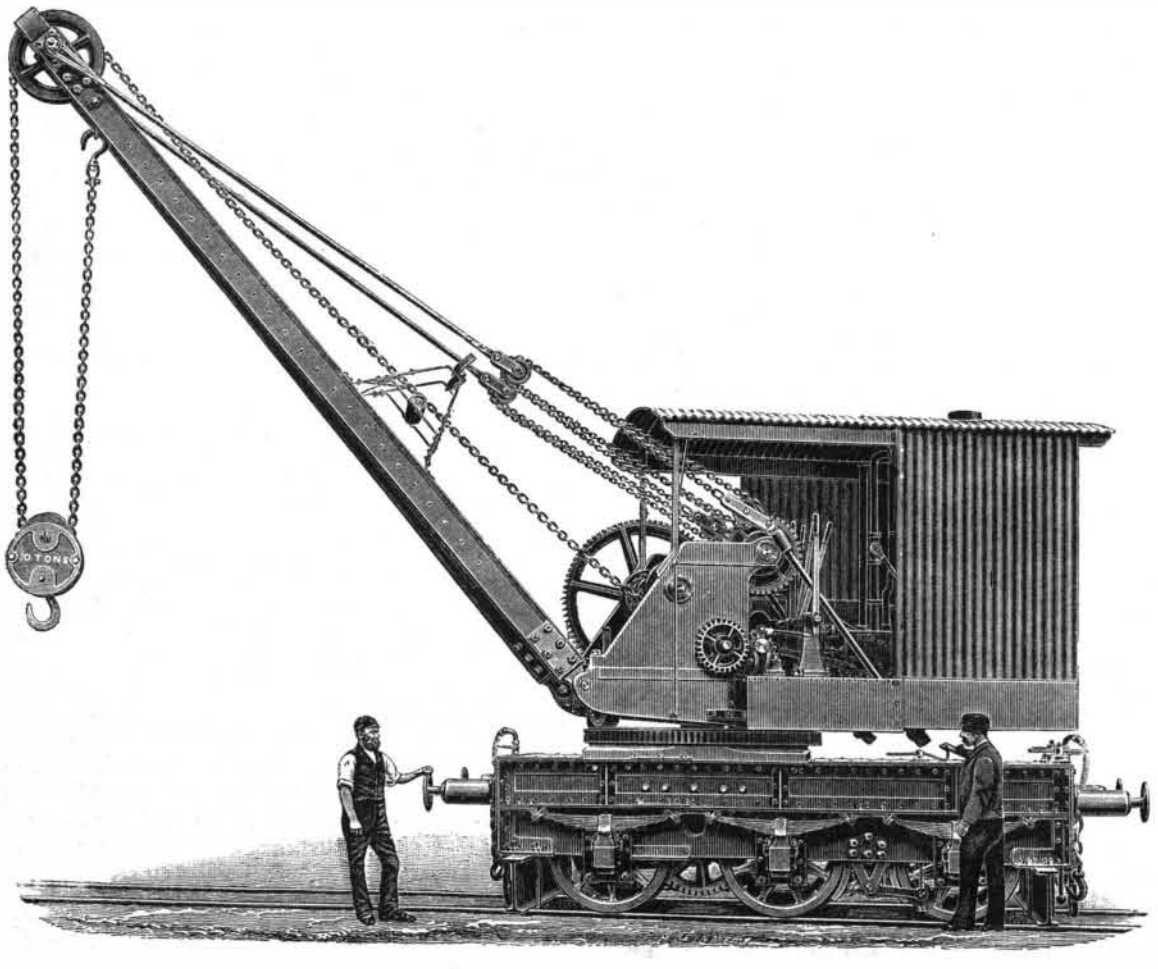
It will be evident that some adjustment is required, and it is in this respect that the common tuning fork is a failure. It will only vibrate for a short period, and gives little time for adjustment. While it is sounding, its note cannot be changed. In the Trevelyan rocker is found an extremely simple way of producing vibratory motion that will continue for many minutes. If a soldering iron is heated and laid with its head upon a piece of lead pipe, and the end of the iron handle resting on the surface on which the pipe lies, a very efficient rocker is produced. If the bolt is tilted a little to one side and released, it falls back to its first position, and at once begins to rock back and forth very rapidly, producing a musical note. The usual explanation of the phenomenon is that the lead is heated as the iron strikes it, and throwing up little elevations, first at one and then at the other corner of the bolt, under thermic expansion, keeps the bolt in oscillation. Another feature will be observed. A soldering iron of octagon section should be used. It has sides of two sizes, its cross section being a square with truncated corners. If placed upon a narrow side, it rocks slowly through a considerable amplitude; if placed on the wide side, it rocks much quicker and with less amplitude. Furthermore, the note can be changed by pressing with the point of a penknife vertically down upon a point over its axis.

To produce loops and nodes a stick about five inches long is secured to the hot iron by driving into the fork of the iron handle. A silk thread is tied to the end of the stick, and the rocker is started. The other end of the string is now held in one hand and the tension varied until the right point is reached, when suddenly the thread, hitherto quiet, starts into action, and is thrown into a series of beautiful loops, as shown in the illustration. The string may be ten or fifteen feet long. By increasing or diminishing the tension, the thread will again become quiet, and again will move, producing a different number of loops. As the rocker will keep moving for ten minutes or more, there is time during a single experiment to vary the effect indefinitely. The rocker may be used upon its short or wide side, with different results in each case.

Another way of changing the number of loops may be tried. The thread in this case is stretched across the room and secured at such tension as to produce one series. Then, by pressing on the iron with the point of a knife as described, its note may be raised, and the loops will cease to appear. If a still further variation is produced, a different series may appear. It is easy by this change to throw a quiescent string into motion, or to stop a moving one; but it is difficult to successfully carry the thread through two phases of vibration. In the time afforded for experimenting, and the variations that can be produced, the method is far superior to the ordinary one.

If the string is held as shown, it makes two vibrations for one of the rocker. If held in the prolongation of the axis, so that the stick swings across its line, its vibrations correspond in number with the oscillations of the bolt.

An experiment of some interest can be performed by placing a microphone and battery in circuit with the lead pipe and rocker. One end of the wire should be in contact with the pipe, the other with the end of the handle of the rocker. The telephone then reproduces the sound very loudly, showing that if not an absolute make and break, a very great change of contact is produced by the motion. The telephone may then be placed in circuit with a microphone, and the pipe may be placed upon the base of the latter. Upon starting the rocker into action on the pipe, the telephone responds loudly with much the same note as when the rocker was in the direct circuit. These supplementary experiments go to show that there is a certain field of experiment open for the rocker. It will be found an admirable producer of rapid oscillatory motion, so that it can be utilized in many other experiments than that of Melde.

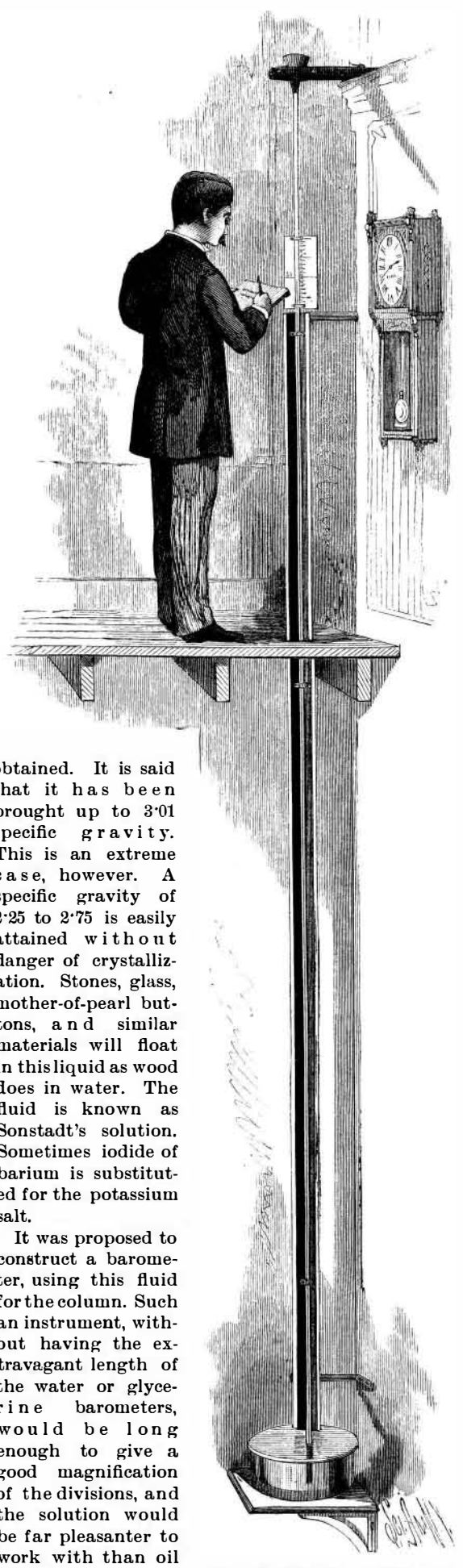


IMPROVED TEN TON LOCOMOTIVE CRANE.

FOR DESCRIPTION SEE PAGE 136.

THE SCIENTIFIC AMERICAN IODIDE OF MERCURY BAROMETER.

If iodide of mercury is dissolved in iodide of potassium and water, a liquid of very high specific gravity can be obtained. It is said that it has been brought up to 3·01 specific gravity. This is an extreme case, however. A specific gravity of 2·25 to 2·75 is easily attained without danger of crystallization. Stones, glass, mother-of-pearl buttons, and similar materials will float in this liquid as wood does in water. The fluid is known as Sonstadt's solution. Sometimes iodide of barium is substituted for the potassium salt.



THE SCIENTIFIC AMERICAN IODIDE OF MERCURY BAROMETER.

It was proposed to construct a barometer, using this fluid for the column. Such an instrument, without having the extravagant length of the water or glycerine barometers, would be long enough to give a good magnification of the divisions, and the solution would be far pleasanter to work with than oil of vitriol, the next liquid practically available that approaches it in weight. The details of the barometer are shown in the cut. It was constructed for and stands in the SCIENTIFIC AMERICAN offices.

The tube is in one piece, and is about ⅜ in. internal diameter. At its upper end it expands so as to form a funnel. It was made open at both ends. As cistern, a cylindrical glass vessel, 9 in. wide and 4¾ in. deep, is used. A round plate of glass is provided for cover. The upper edge of the cistern is ground off so as to form a tight joint with the under surface of the plate. A hole through the plate admits the end of the tube, which, carried by a wooden frame and brackets, rises vertically from the cistern. The latter stands upon a shelf. The tube rising from it passes through a hole in the ceiling and terminates about six feet from the floor