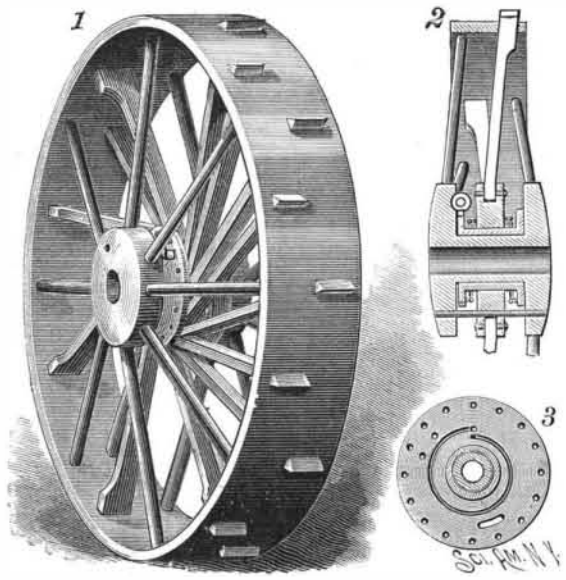
A TRACTION WHEEL FOR HARVESTERS, TRACTION ENGINES, ETC.

In this wheel the projections of the rim are yieldingly held, or they may be withdrawn entirely from the surface or held locked in outermost position. The improvement has been patented by Messrs. Sylvester Warner and Owen E. Cook, of West Union, Ind. Permanent spokes connect the rim with outer and inner flanges of the wheel hub, while a sleeve fitted loosely on the hub between the flanges carries a loosely rotating wheel on which are pivoted the inner ends of slidable arms, whose outer ends are beveled and pass through openings in the rim, as shown in Fig. 2. The

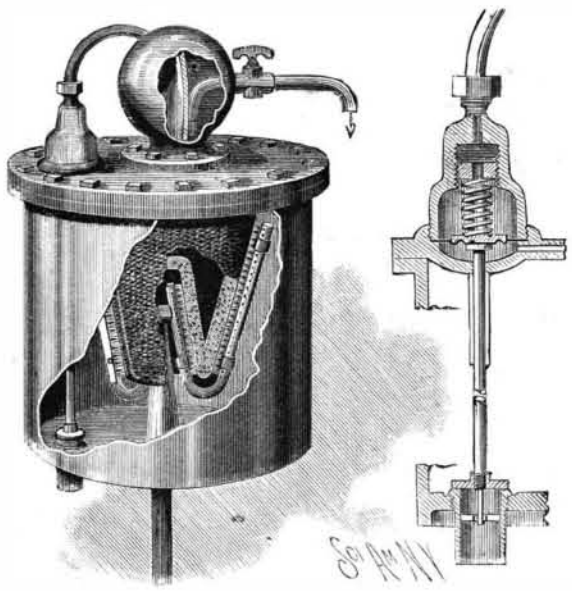


WARNER & COOK'S TRACTION WHEEL.

opposite faces of the wheel on which the arms are pivoted are connected with coil springs fastened on the flanges of the sleeve, as shown in Fig. 3, making a yielding connection between the wheel and the sleeve, whereby the sliding arms will normally be held in outermost position, but in traveling over hard ground the projecting ends will be forced inward. One flange of the sleeve has teeth engaged by a worm on a shaft in bearings attached to one of the hub flanges, and this worm shaft may be conveniently turned by a wrench to move the sleeve so as to tighten or loosen the springs, also locking the sleeve in place. To fasten the sliding arms in either an inner or outer position, a pin is passed transversely through apertures in the hub flanges and through one of several apertures in the wheel on which the sliding arms are pivoted, the wheel being turned to the proper position before inserting the pin, while the passing of a pin through the hub flanges and an elongated aperture in the wheel restricts the latter to a limited turning in either direction. The improvement is designed to afford proper traction over all kinds of ground for the machine on which the wheel is employed.

AN AUTOMATIC SELF-CLEANSING WATER FILTER.

The filter shown in the illustration is designed for use where the water is supplied under pressure, as in



LYNN'S AUTOMATIC WATER FILTER.

its service from the mains of a city water works, and its construction is such that it is self-cleansing and automatic in its action, without the necessity of removing or handling any of its parts. The improvement has been patented by Mr. Elmore P. Lynn, of Cincinnati, Ohio. The filter proper is a tight metal vessel, and, as shown, is cylindrical, with a spherical chamber at its top divided into two compartments, the spherical chamber being united to the main vessel by bolts, which also hold up a frusto-conoidal filtering chamber of porous earthenware centrally in the filter. The filtering chamber has a frusto-conoidal cavity and a neck on its upper end engaged by a packed collar into which the bolts are screwed. In the center of the bottom is a tubular boss, in which is the water supply pipe, and journaled in this boss is a hollow sleeve having a horizontal pipe on its upper end, to which at each end is attached a pipe bent to conform to the shape of the earthenware filtering chamber. These pipes have perforations at an angle to the surface of the filter chamber, directing entering water against it, and thus causing the rotation of the pipes, the latter also carrying brushes in close proximity to the surfaces of the filter chamber. At the bottom of the main chamber, at one side, is an exit pipe for impure water, closed by a valve whose stem passes up through a sleeve into a chamber at the top, as shown in detail in the sectional view at the right.

The upper end of the valve stem is secured to a diaphragm with a disk held down by an adjustable coiled spring, normally holding the outlet valve closed. The tension of the spring is regulated by a hollow nut, and the upper end of the chamber communicates by a pipe with the filtered water discharge compartment of the spherical chamber at the top of the filter, while a port connects its lower part, below the diaphragm, with the other compartment of the spherical chamber, which is for both water and compressed air. The entrance to the exit pipe for filtered water is restricted by a bush to maintain, with the valve open, a certain proportionate lower pressure in the discharge chamber as compared with that in the lower chamber. With a pressure from the mains of forty pounds and a pressure in the discharge chamber of twenty pounds, with the cock open, the pipes carrying the brushes will be slowly revolved around the filtering chamber. The pressure in the other half of the spherical chamber will at the same time equal that in the lower portion of the filter, and the valve closing the outlet for impure water will be held down by the spring, aided by the pressure upon the diaphragm through the pipe connection with the discharge opening. But with the clogging of the filtering material by impurities, the diminished passage of water and the lowering of the pressure in the discharge chamber, the spring ceases to hold down the diaphragm, and the valve at the bottom is opened. This immediately removes all pressure in the lower chamber, and the pressure of the water entering from the mains causes an accelerated movement of the pipes and brushes and forces them into close contact with the surface of the filtering chamber to effectually clean it. The pressure in the discharge chamber also causes a reversal of the current through the filtering medium, the pressure in the compressed air and water chamber meanwhile falling slowly by the escape of water through the small port discharging under the diaphragm, until the force of the spring overcomes this pressure and closes the valve at the bottom, the surface of the filtering medium having been effectually cleaned during the time between the opening and closing of the valve.

Ice from Natural Gas.

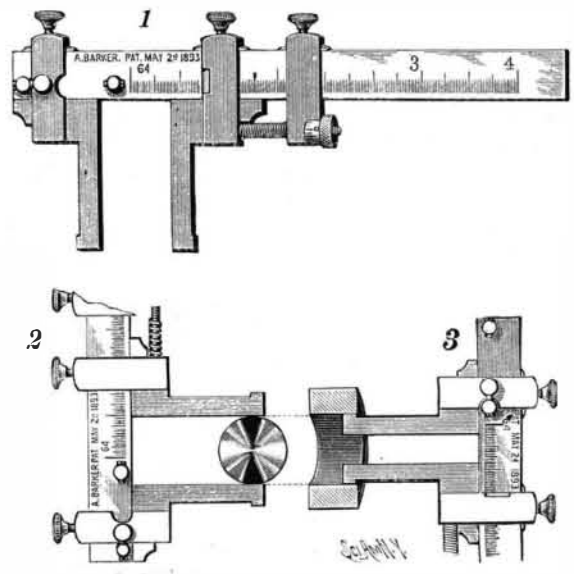
It is probable that, before the natural gas supply of certain parts of the United States is exhausted, this gift of nature will be better utilized than has hitherto been the case. Indeed, it would not be surprising if the advantages of the natural gas supply were only to become fully appreciated just before it ceases for ever. It appears, from a recent contribution to an Indianapolis newspaper, that a local firm have constructed a refrigerator for making ice by means of the cold produced by the expansion of natural gas to atmospheric pressure. This is the principle of all artificial ice machines; yet it seems to have only just occurred to some American engineers that natural gas as it issues from the wells at pressures amounting in some instances to 20 atmospheres, and at a temperature of 42° Fah., presents the sole physical condition necessary for the production of cold by gaseous expansion. Assuming the density of the gas to be only half that of the surrounding air, 1,000 cubic feet of it will weigh 38·5 pounds.

According to Pictet's formula, by expanding a gas from a pressure of 20 atmospheres to that of 1 atmosphere, its temperature would be reduced 318° Fah. below freezing; and by expanding 1,000 cubic feet of gas per minute, there would be a cooling effect of 318° × 38·5 pounds, which would make 72 pounds of ice per minute from water at 62° Fah. Hence a very ordinary gas well, supplying 1½ million cubic feet per diem, is theoretically capable of producing 51 tons of ice daily at a cost of not more than 50 cents per ton; and, after all, if delivered in its expanded state to furnaces, etc., the gas would produce, on burning, as much heat as if it were delivered for fuel direct from the well. Hence, by proper management, the natural gas supply of Indiana and Ohio should supply all the ice wanted by these States during the hot season, as it actually furnishes most of the heat required all the year round.—*Journal of Gas Lighting.*

IT would require 12,000 cholera microbes to form a procession an inch long.

AN IMPROVED CALIPER.

This is a combined inside and outside caliper, with graduated beam and micrometer attachment, which at once and accurately transfers distances from outside to inside or inside to outside. It is designed to afford a first class tool for machinists, and one which does not call for special skill in its use. Mr. J. F. Getman, of Richfield Springs, N. Y., is the sole agent for this tool. It will caliper work from one-half inch to three inches in diameter, making tight or loose fits, and varying the fit by one-thousandth of an inch. The micrometer screw has 50 threads to the inch and the graduated nut has 20 graduations, so that by turning the nut one degree it will move the right hand jaw one-thousandth of an inch, or by turning the nut half round, or ten degrees, it will move the jaw one-hundredth of an inch (when of course the bind-

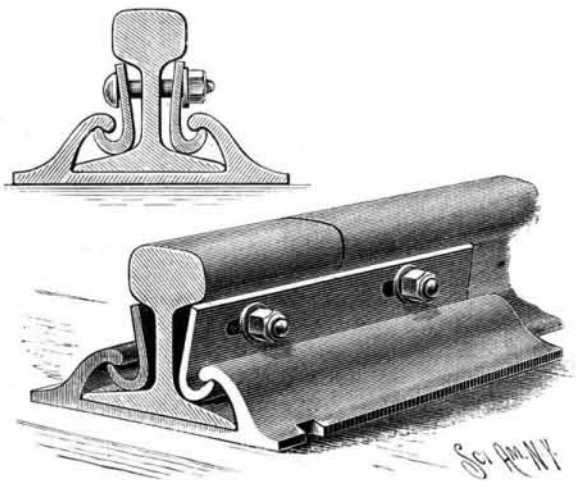


BARKER'S PATENT BEAM CALIPER.

ing screw is loosened and the one on the nut clamp tight), making the fit tight or loose by that amount, depending on which way the nut is turned. The beam is graduated in 64ths and 50ths of an inch. To transfer measures from outside to inside, or inside to outside, it will at once be seen by the above cut that the left hand jaw slides on the bar between two posts which have adjusting screws, so that the movement of the jaw between them is just the combined width of the feet of the two legs; therefore if the left hand jaw is set against the outside post and a shaft or piece of work is calipered outside (as in Fig. 2), and the jaw loosened and moved against the inside post, you will have the exact size of a hole to fit it, as in Fig. 3. The reverse of this operation will caliper a hole to fit a plug or shaft (see Fig. 3). The changes can be made almost instantly without looking.

AN IMPROVED RAIL JOINT.

This improvement, patented by Dr. M. O. Perkins, dentist, of Galveston. Tex., is designed to be a complete automatic rail joint, operating efficiently, also, as a nut lock. The rails to be joined are embraced by a chair and spring side plates, the latter being fastened together and to the web of the rail by bolts, as more plainly shown in the small sectional view. The side plates are made of spring steel, and are so shaped and engaged in the chair that when the nuts are tightened the rails are pressed to the bottom of the chair, and the chair is drawn up to the bottom of the rails. The spring tension thus acts to recover all wear, and the plates press continually against the backs of the nuts, thus completely locking them. It is claimed by the inventor that after this joint is once properly placed it will not need readjusting.



PERKINS' RAIL JOINT.