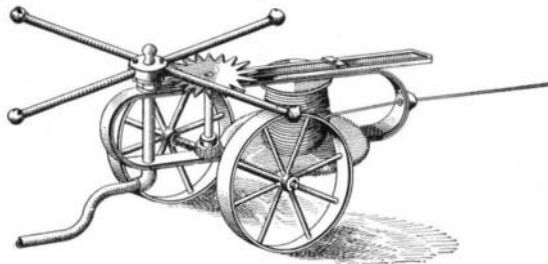


simplicity, durability, and low cost of construction, or the initial outlay for installation and subsequent expenses for repairs of the meter would overbalance the benefits which they would otherwise bring to the water supply company. The disk type of water meter has been found to fulfill these exactions more nearly than any other. This meter involves a mechanical motion which is very interesting. The principle was first applied to steam engines, and is said to have been invented in 1830. The invention was taken up by a number of persons, notably Bishop, an Englishman, who brought it more nearly to its present form. Although this mechanical movement is so old, we venture to say that few of our readers are familiar with it. The latest development of the invention is illustrated in section in the accompanying engraving. In this meter the water passes through a screened inlet at the left, enters the disk chamber through a port not shown in the illustration, and passing through this chamber flows out of the port shown at the right. In its passage through the chamber the water imparts to the disk a peculiar movement about its center, which may be described as a gyratory movement, with the exception that the disk does not rotate on its axis. The disk, it will be observed, is slightly dished, and at its center a ball is formed which finds bearings in the top and bottom walls of the disk chamber. The side walls of the chamber are curved so as to fit closely, but without friction, against the periphery of the disk throughout its entire cycle. The top and bottom walls are also so arranged as to provide a snug fit along the crest and trough respectively of the circular waves which the disk is constrained to describe. A vertical radial septum, formed at one side of the chamber, fits into a slit cut in the disk. This septum will be seen at the right, just back of the outlet port in our illustration, and serves to prevent the disk from rotating. It also separates the exhaust or outlet port from the inlet port, which opens into the chamber just behind the septum. A spindle projecting upward through a circular opening in the top wall of the cylinder, bears at its upper end against a conical block. This tips the disk to one side, so that its under surface at that side will come in contact with the bottom plate of the chamber, while the upper face on the opposite side will come in contact with the upper wall of the chamber. Now, by studying the illustration, it will be observed that the disk, no matter what its position, will at one point or another cut off the free passage between the inlet and outlet ports. With the disk in the position illustrated, water pours into the disk chamber against the under face of the disk, and as the water sweeps around the circular chamber in its course to the outlet port it exerts a forwardly-moving lifting or wedging force on the disk. The disk cannot be tipped to vertical position of its axis because of the conical control block against which the spindle bears. Therefore, it is constrained to follow the gyratory movement described above. That is, the upper end of the spindle describes a circle about the block while the upper and lower faces of the disk roll respectively along the top and bottom walls of the chamber. As the disk rolls around under the pressure of the water, its line of contact with the upper wall will pass the inlet port, whereupon water is admitted to the upper face of the disk, exerting a downward pressure thereon at points diametrically opposed to the upward pressure on the under surface of the disk and causing a continuous gyratory movement of the disk. The revolutions of the disk's spindle are communicated to the counter at the top of the meter through suitable step-down gearing. It will be observed that this form of mechanical movement is an ideal one for water meters, owing to its accuracy, and the simplicity of construction which it allows. The disk is made of hard rubber which has about the same specific gravity as water, and since the ball is exposed to the inlet pressure of the water through the openings in the top and bottom bearing sockets, a perfect water balance is secured, reducing wear to a minimum.

#### ODDITIES IN INVENTIONS.

**TRAVELING LAWN SPRINKLER.**—In order to distribute water more generally over the entire lawn, a Minnesota inventor has devised a lawn sprinkler which is actuated by the pressure of the water to travel slowly over the lawn in any predetermined direction. The lawn sprinkler is mounted on wheels. The garden hose is coupled to a vertical pipe on the sprinkler. At the top of the pipe is a revolvable head provided with hollow radial arms formed with discharge nozzles at their ends set at an angle with the arms. Back pressure of the water on the arms in flowing out of the discharge nozzles tends to rotate the head in the usual manner. Pins on this head engage the teeth of a star wheel, which by means of suitable gearing communicates the motion to a reel at the front of the sprinkler. One end of the wire is fastened to this reel, and the other end is secured to a stake driven into the lawn at any desired point. As the reel rotates, this wire is coiled up, drawing the sprinkler forward. When the

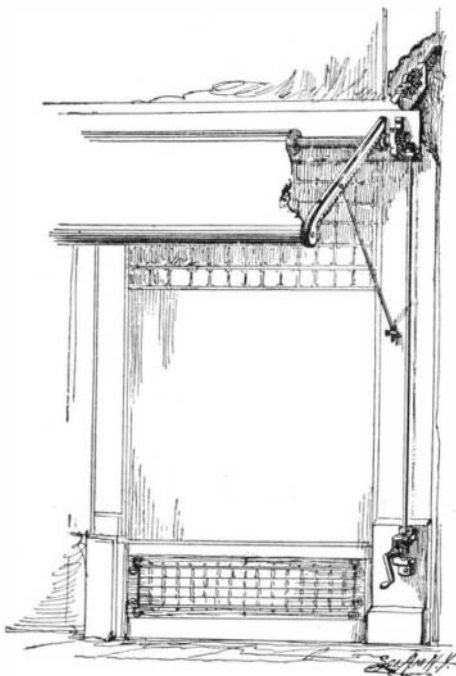
end of the wire is reached, a projecting plate on the sprinkler strikes the stake to which the wire is secured, and the plate is thus forced back. This motion is utilized to lift a small pinion out of mesh with the



TRAVELING LAWN SPRINKLER.

gearing mechanism, thus stopping the rotation of the reel. By varying the number of pins in the revolvable head of the sprinkler, its rate of travel over the lawn may be controlled.

**AN IMPROVED AWNING.**—The present slow and cumbersome manner of handling awnings has suggested to a Californian the need of an improved construction. The arrangement which he has devised is illustrated herewith, and may be described as follows: The awning frame comprises two bars, which project from openings in the wall of the building, where guides are provided to receive them. The projecting ends of the bars are connected by a cross bar, and stretched from this to a shaft or roller mounted above the door or window which is to be screened, is the fabric of the awning. The awning may be rolled up by means of



AN IMPROVED AWNING.

a crank lying within easy reach of the operator, and connected by suitable gearing with the roller. Each side bar of the awning frame is formed with a rack on its lower edge, and these racks are adapted to mesh with pinions on the roller, so that when the crank is operated, the bars are fed back in the openings in the wall, causing the awning to be evenly rolled up on the roller. The additional brace for the side bars, which is shown in our illustration, is not ordinarily necessary, but will be found useful under certain circumstances.

**SHAVING MUG.**—A Yankee inventor has devised a shaving mug, which is provided with a simple means for holding the cake of shaving soap normally out of contact with the water, but in such manner that it may readily be dipped into the water when desired.

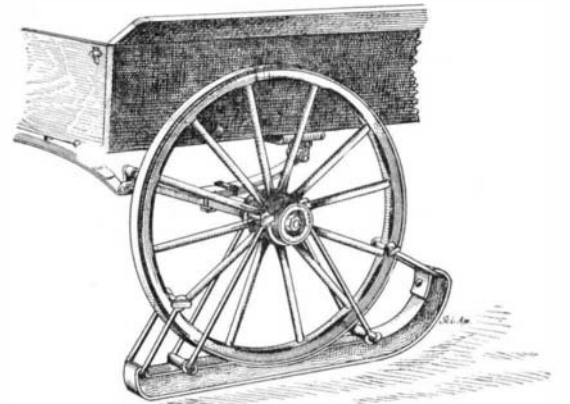


IMPROVED SHAVING MUG.

The cake of soap rests on a perforated plate, which is supported by coiled springs extending upward from the bottom of the mug. The side wall of the mug extends somewhat below the bottom, and fits snugly into a pan, thereby forming a closed chamber. Two ports

in the bottom of the shaving mug open into the chamber, but are normally closed by valve plates controlled by a rod extending outward through the wall of the cup. The valves are opened when it is desired to clean the mug, fresh water being poured in at the top until the parts are thoroughly clean. In use, when it is desired to dampen or wet the soap, it may be forced downward into the water by pressure of the lather brush and, of course, upon releasing this pressure, the coil springs will move the soap upward out of the water.

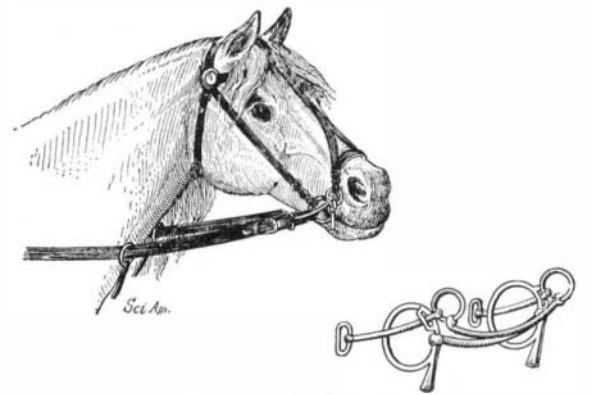
**DETACHABLE SLEIGH-RUNNER.**—In territories where the winter season brings only occasional snows it will be found very useful to have on hand a set of detachable sleigh-runners which can readily be applied to the wheels of a wagon, thus converting it tempor-



DETACHABLE SLEIGH RUNNER.

arily into a sleigh. Such an attachment we show herewith. It will be observed that the runner can be applied in an instant. The wheel is drawn up onto the runner and seated in a hollow therein. The runner is provided with hinged braces which are swung up against the wheel and secured by bolts passing through eyes formed in the ends of the braces. The bolts pass over spokes of the wheels and thus rigidly secure the wheel to the runner. Key-bolts are used instead of the usual threaded bolts. By this arrangement a driver can in a very short space of time convert his wagon into a sleigh without requiring any tools other than a hammer or bar with which to drive the keys in place.

**BRIDLE BIT.**—The accompanying illustration shows a bridle bit which may be used on such animals as have tender mouths or the reverse, and it affords means for the control of the animal in case it becomes fractious, which, however, will ordinarily serve to guide an animal without hurting the mouth. The improved bit really consists of two bits so connected that by a gentle pull on the lines the horse may be guided as usual, but when necessary hard pulling upon the bit will bring into service the check bit, which will put a severe strain on the animal's mouth and arrest the attempt to run away before injury is done to the ani-



COMBINATION DRIVING AND CHECK BIT.

mal or driver. A very advantageous feature of the improved bit consists in the safety afforded in case of the accidental breakage of the jointed driving-bit, as the check-bit will remain in the mouth of the animal and enable the driver to control the animal, which otherwise would be released from control if the two separate bits, both connected with the driving-lines, were not employed. The inventor of this combination driving and check bit is Mr. William T. Temple, of Trenton, N. J.

A single telegraph company has long enjoyed the monopoly of making the connections between the fire stations of the great English metropolis, and their demand made recently for a proposed connection of this character was regarded as exorbitant by the city officials, who circumvented the telegraph company by installing the Marconi system between the two points. This was done as an experiment, and was soon found to be so satisfactory that it will be extended, and it is proposed now to install instruments on some of the apparatus, so that the fire department officials on the fire grounds may be in direct and constant communication with those at headquarters.