### A Portable Leclanche Pile.

Mr. C. M. Gavill has recently presented to the Physical Society, in the name of Mr. Guerin, a pile whose liquids have been rendered immovable, and which is as a consequence portable. This result has been obtained by substituting for water a solution of agar-agar, an alga that comes from the extreme East. The liquid upon cooling becomes a solid and elastic jelly. The proportion of agar-agar may vary from one to five per cent, and depends upon the substances that are to be mixed with liquid. The model that Mr. Guerin has studied is the agglomerate Leclanche pile. Its electromotive force is slightly less (0·03 to 0·04 volt) than that of the ordinary styles of the pile. The resistance of one of these elements of medium dimensions is about 0·9 ohm. The same process may be applied to any other pile.—*La Nature.*

### OILER FOR ECCENTRICS, CRANKS, ETC.

This oiler may be applied to eccentrics, cranks, crossheads, dynamos, and all other stationary or moving bearings; the one shown in the cut is for a stationary



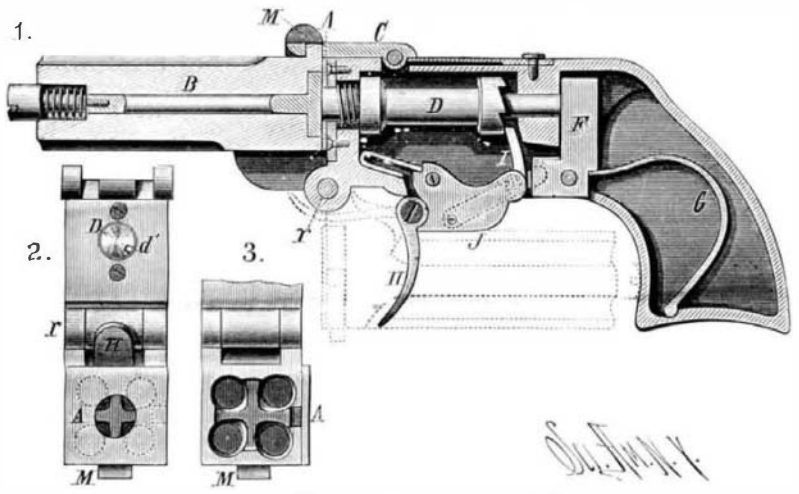
MERSHON'S IMPROVED OILER.

bearing, and is operated by a band from the pulley to shaft. Its operation may be easily understood from the engraving, which clearly shows the construction. It works automatically, and when the machine stops it is impossible for the oil to run to waste. The feed is positive and regular, and the flow is increased or diminished by the speed of the machine. It can be easily attached, and when once in position and adjusted it requires no attention except to fill, and, having glass sides, the amount of oil in the cup can be seen. The parts are few, and not liable to get out of order.

Further particulars can be had from Mr. S. D. Mershon, 95 Campbell Street, Rahway, N. J., or the Shelton Brass Hardware Company, of Birmingham, Conn.

### REPEATING FIREARM.

The invention herewith illustrated relates to repeating firearms, and more particularly to pistols having several barrels. The pistol occupies very little space in the pocket, as the barrels may be folded underneath the stock, and by reason of the multiplicity of barrels it presents the same advantages as the revolver at present in use. The four barrels are formed of a single piece of metal having four bores; this piece is provided, near its point of articulation with the stock, with a hinged cover plate, A, which can be turned around upon the rear end of the piece, so as to prevent the cartridges falling out when the pistol is folded, as shown by the dotted lines in Fig. 1. In the center of the barrel piece is an extractor rod, B, provided at its outer end with a spiral spring, which tends to hold the star-shaped opposite end in a recess in the rear end of the barrel piece; the star is properly recessed to receive the rim of the cartridge. By pressing upon the extremity of the rod, the star can at will be removed from the recess. When the pistol is in use, the barrel is held to the stock by a lug, M, engaging with a slot formed in a catch, C, pivoted to the stock. A spring holds the catch horizontally in such a way that in order to break down the pistol it is necessary to lift the free end of the catch, to release it from the lug. In the stock is a movable firing pin, D, having a firing point or striker at its forward end. By pressing upon the trigger, H, a pivoted piece, J, acts upon the hammer, F, so as to draw it back, the firing pin being retracted by its own spiral spring. When this pressure upon the trigger is discontinued, the mainspring, G, which has been bent by the movement of the hammer, unbends, drives the hammer forward, when the firing point strikes a cartridge in one of the barrels. Each time the trigger is pulled it actuates a pawl, I, which revolves the firing pin a quarter of a turn, to bring the firing point opposite the barrel next to that in which the cartridge has been fired. When the pressure upon the trigger is relaxed, a compressed spring forces it back to its original position. Fig. 2 is a front end view of the pistol folded, and Fig. 3 is the same view with the covering plate open.



CHUCHU'S REPEATING FIREARM.

This invention has been patented by Mr. Athanase Chuchu, whose address is care of H. H. Swift & Co., P. O. box 3399, New York city.

### IMPROVED ENGINE GOVERNOR.

The governor shown in the cut is remarkable for quickness of action on the slightest variation in the speed of the engine. Two saucer-shaped shells, or hollow disks, fitted with curved blades, work face to face in a casing filled with water; one of these turbines is driven by the engine, and the other oscillates and works the throttle valve. In the engraving, the right hand figure shows the casing attached to the part of the steam pipe containing the throttle valve, and the oscillating turbine in its working position; the middle figure shows the revolving turbine removed, along with the casing cover, through which its axle works; to the left hand is shown a face view of the governor. The water in the revolving disk or turbine is thrown outward, forward, and sideways into the oscillating disk. The blades in the latter deflect the currents from an outward and forward direction into an inward and backward direction, and send the water back into the revolving disk. The reversing of the motion of the water by the blades of the oscillating disk gives it a tendency to revolve in the same direction as the other disk; this tendency is resisted by a chain attached to a pulley on the disk until the strain on the chain is sufficient to lift a balance weight, which keeps the throttle valve open. When that strain is exceeded it shuts the throttle, and when it falls short the weight opens it. It is claimed that by this arrangement a comparatively small velocity of the disk is required to get up much greater power than with any centrifugal arrangement; a sudden increase in the velocity produces an almost instantaneous action on the throttle, so that the whole load may be suddenly taken off the engine without any danger of running away. The durability of the apparatus is assured, since almost the only wearing part is the spindle of the revolving disk, upon which there is no strain.

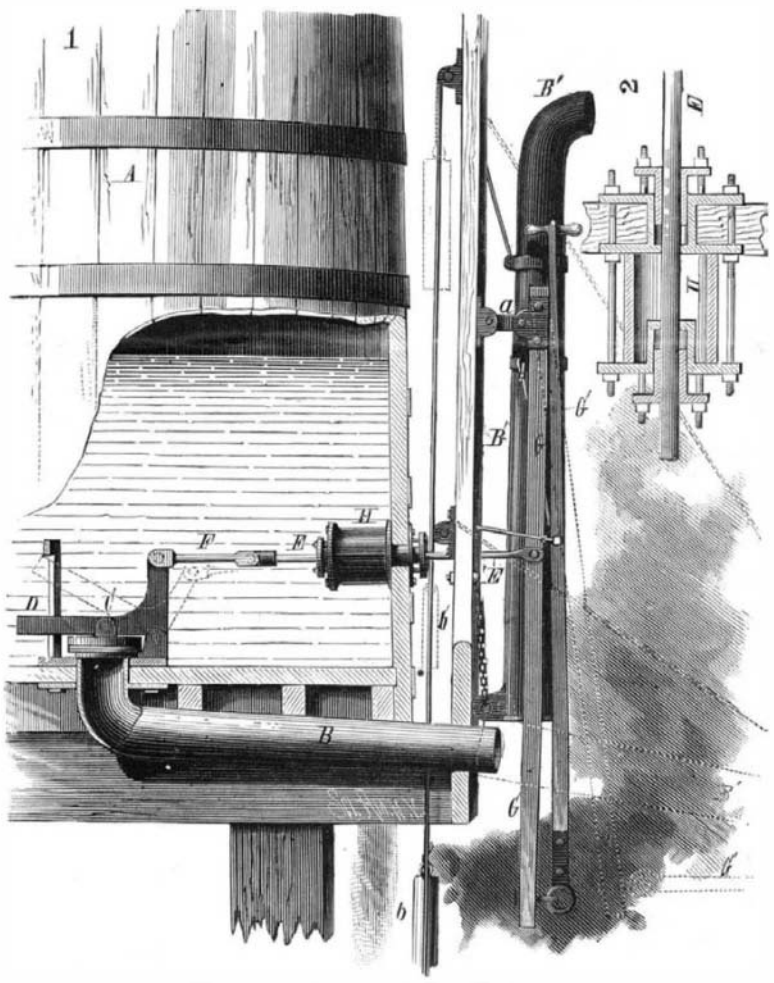
All further particulars concerning this governor, which has been most successfully used in Great Britain, can be obtained from Messrs. Napier Brothers, Windlass Engine Works, Glasgow, Scotland.




THE "CAT" ENGINE GOVERNOR.

### RAILWAY WATER TANK.

In the Northwestern States much trouble has been caused during the past few years by the freezing of the railway water tanks--a tank half full of solid ice has been a by no means uncommon occurrence. The engraving represents a water tank, the invention of Mr. Albert Roberts, of Marion, Ia., Supt. Water Supply of the C., M. & St. P. Railway, designed especially to overcome this difficulty. The arrangement for opening the valve is simple, convenient to work, and not liable to freeze up; all the parts of the tank are out of the way of passing trains. In the bottom of the tank, which is not unlike those in common use, is fitted the outlet pipe, B, adapted to connect with the swinging pipe, B′, in the usual way. Over the inner opening of the pipe is a valve or gate, arranged to lift on a lateral pivot by means of the bell crank, D, to the horizontal arm of which the valve is attached. The rod, E, is connected with the vertical arm of the crank by the rod, F, and, passing through the side of the tank, may be moved back and forth by the pivoted lever, G. In order to bring this lever within reach of the operator from the tender, it is provided with a hinged bar, G′, adapted to swing up and down with the sway spout. The short connecting rod, *a*, permits the necessary variation in position as the valve is moved. The lower end of the lever is some distance below the outlet pipe, so that when the spout is lowered to the position indicated by the dotted lines it is about level with the end of the spout, and the handle bar is horizontal, rendering the operation of the lever and its connections easy. The spout and lever may be connected by a chain, as shown. When the spout is elevated, the chain is drawn taut, and the handle bar is thereby held



ROBERTS' RAILWAY WATER TANK.