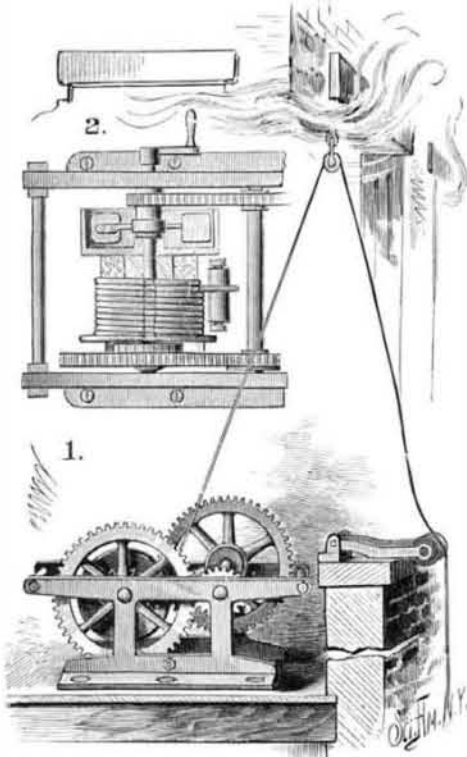


IMPROVED FIRE ESCAPE.

The frame consists of two side plates bolted together, and formed with flanges at their lower edges, through which the fire escape may be bolted to the floor near the window. Journaled in the frame are two shafts; on the crank shaft is a drum carrying the descending rope, and a loosely mounted large gear wheel. A properly arranged pawl and ratchet wheel turn the wheel when the drum is revolved by the drawing off of the rope. Upon the other end of the crank shaft is a

**DITTRICK'S IMPROVED FIRE ESCAPE.**

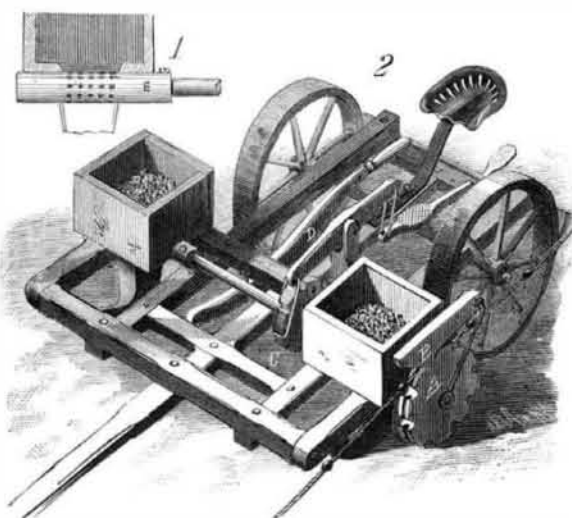
loosely placed fan inclosed in a circular casing fixed upon the shaft. The hub of the fan is formed with a small gear wheel meshing with a large wheel upon the end of the second shaft; upon the other end of this shaft is a pinion meshing with the large wheel on the crankshaft; when the latter wheel is revolved by the drawing off of the rope, the fan will be rapidly revolved, and will act as a governor to prevent the too rapid unwinding of the rope. The arrangement of the parts is clearly shown in the plan view. By turning the crank the rope may be wound upon the drum without turning any of the gearing. A simple device acts as a guide in winding up the rope, and also prevents any slacking of the rope when wound upon the drum.

The rope passes from the drum up over a pulley secured at the top of the window, so that in use a person to descend has simply to attach himself to the rope and swing out of the window, when his weight will draw the rope from the drum with a slow movement governed by the fan. The rewinding of the rope upon the drum can be quickly done. A hinged frame provided with a roller prevents the rope from chafing upon the window sill. The frame, being wider than the sill, the roller is held beyond the wall, and the rope is clear of the building.

This fire escape is the invention of Mr. John Dittrick; further particulars can be had from Mr. J. M. Millar, 12 Sherman St., Chicago, Ill.

IMPROVED CORN PLANTER.

The aim of the inventor of this corn planter has been to devise a machine simple in construction, strong and

**AGEE'S IMPROVED CORN PLANTER.**

durable in use, and reliable in operation. The main axle may revolve in bearings attached to the frame, or may be rigidly connected with the frame. The tongue is secured to the middle part of the frame. To the ends of the front cross bar are pivoted the forward ends of the top bars of the runners, the rear bars of the runners being made hollow to serve as spouts to conduct

the seeds to the ground, and being attached at their upper ends to the bottoms of the seed boxes, which are connected by a cross bar. Beneath the openings in the seed boxes are placed cylinders, E, on a shaft revolving in bearings attached to the boxes. Each cylinder has eight, more or less, rows of holes; each row has five holes, of such size as to contain a single kernel of corn, and formed with sloping sides to prevent the grains hanging. As the cylinders are revolved, the holes receive corn from the boxes and drop it to the ground. The cylinders are secured upon the shaft by set screws, so that they can be adjusted to leave any number of holes beneath the openings in the bottoms, and thus regulate the amount of seed planted.

To the end of the shaft is secured a wheel, A, in the face of which are formed an annular groove to receive the check wire, and recesses at equal distances apart, and equal in number to the number of rows of holes in the cylinders. These recesses receive the balls on the check wire, so that the cylinders will be revolved through the space of one row of holes by the passage of each ball. The wheel is stopped at the proper point by a latch, B, which is grooved to permit the passage of the wire, and is formed with a projection to drop into each recess, and thus stop the wheel. Suitably arranged arms prevent the wire from becoming accidentally displaced. The catch can be thrown back, when the friction of the wire will run the wheel as a drill. On the middle of the shaft is a ratchet wheel, C, having as many teeth as there are holes in the cylinders. Engaging with these teeth is a link pawl hinged upon the forward end of a lever operated by a treadle pivoted to the rear part of the frame, as clearly shown in the cut. The seat can be moved forward or back, to cause the weight of the driver to properly balance the machine. By means of the lever, D, which is pivoted to the forward cross bar of the frame, the seed boxes and runners can be readily raised from the ground when desired. Scrapers secured to the ends of a shaft rocking in bearings on the rear part of the frame remove any soil that may adhere to the rims of the wheels; this shaft is operated by a foot lever.

This invention has been patented by Mr. George S. Agee, of Louisville, Kan.

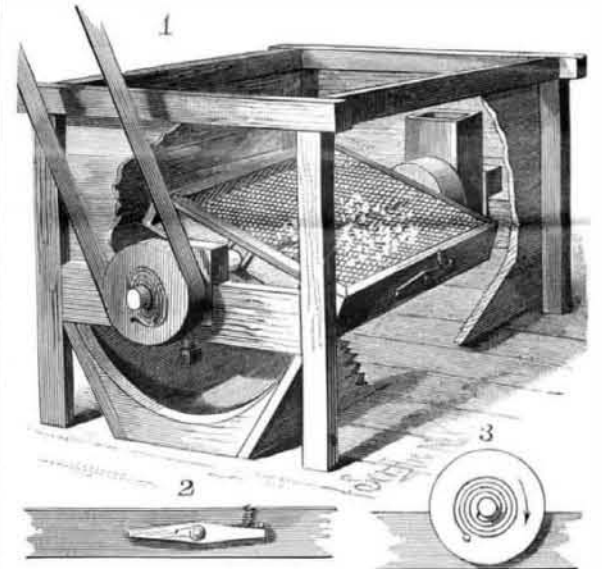
Canal Works.

Besides the works at Panama, we may mention the excavation of the canal through the Corinthian Isthmus, in Greece. Germany is completing improvements on the Main, by which Frankfort will be turned into an interior port town; it is intended also to connect Baltic and German seas by a canal 60 miles long, 30 feet deep, and 380 feet wide; this canal will pass from Brunsbittel on the Elbe into Kiel Bay, and will be of a great commercial and strategic importance. In Spain a private company is occupied with realization of an old project of the King Charles III., namely, the connection of the Cinca and Ezera rivers by a system of canals, which will benefit the provinces of Huesca and Lerida. In England, Manchester will be turned into a port town by a lock canal to Runcorn and regulation of the river Mersey; and there is a talk of connecting the Clyde and Forth rivers by a canal 30 miles long. In Egypt it is proposed to improve the Suez Canal by doubling its width. Even from such a remote country as Ceylon we hear that by deepening the canal in the strait between the island and mainland they will permit the vessels to pass directly from the Gulf of Manaar into Bengal Bay without going around the island.

IMPROVED FLOUR BOLT.

The bolt is composed of two parallel bolt cloths held about two inches apart in a light rectangular frame secured to a shaft by bolts. The shaft is journaled in blocks, fitted in the bolt chest, placed upon screws by which they may be moved vertically for adjusting the pitch of the bolt. The meal is fed into the bolt through a spout, the lower end of which enters a receiving chamber formed at the head end of the frame of the bolt. The shaft is revolved by a belt passing over a loosely mounted pulley connected with the shaft by a coiled spring (Fig. 3), the inner end of which is secured to the shaft and the outer end to the pulley. To each edge of the bolt frame is pivoted a knocker, shown in Fig. 2. These are normally held against pins by spiral springs, and in the sides of the bolt chest are pins, against which the ends of the knockers strike as the bolt revolves; upon passing the pins in the chest, the springs react and bring the knockers suddenly against the pins in the bolt frame, thereby jarring the bolt cloths and clearing the meshes. The jarring takes place while the bolt cloths are in horizontal position, which jars the specks and impurities from the upper cloth into the interior of the bolt, and does not affect the lower cloth, as the whole body of meal in the bolt is resting upon it at the time the strokes are delivered. When the bolt stands in a vertical position, the weight of the meal within will be below the shaft, so that as the pulley revolves it will turn upon the shaft and wind up the spring; this will continue until the tension of

the spring is sufficient to turn the unevenly loaded bolt. As the bolt passes a horizontal position, and the meal begins to shift to the other side, the strain on the spring will be lessened, and it will react on the shaft and bolt, and give them a sudden forward motion, which will throw the meal against the opposite cloth, down which it will slide. The meal is thrown from one side to the other twice during every revolution. The bolt may be run at about twenty revolutions a minute, which is one of its chief advantages, as, with this slow motion, sticks, nails, and dough balls will not break the cloths, while the bolting is quite as rapid as with rapid motion bolts.

**HALLIDAY'S IMPROVED FLOUR BOLT.**

This invention has been patented by Mr. George Halliday, of Winnebago City, Minn.

GAS DETECTOR FOR MINES.

This device is designed to automatically send an alarm when explosive gas, such as coal gas, natural gas, or fire damp, accumulates at the place where it is located. An oil lamp or gas burner is secured to the bottom of a wire netting cylinder, provided at its upper end with diametrically opposite pins, which project into eyes formed near the lower ends of pivoted angular levers. The upper ends of the levers carry electric contact points connected with wires leading to a battery, and are pulled toward each other by a spring; the lower ends of the levers are united by a cord or highly fusible wire. The cylinder is held above a vessel containing water. The gas, fire damp, etc., passes through the wire netting and is ignited, and burns the cord or melts the wire, thereby permitting the spring to pull the lower ends of the levers from each other, when the lamp drops into the water, and is extinguished. At the same time the contact points are brought together, the current is closed, and an electric bell in the circuit is sounded. The remaining gas does not explode, as only the gas in the cylinder is burned. In the modification shown in Fig. 2, the upper ends of the levers are held in a ring suspended by a stirrup hung on one end of a pivoted lever, the other end of which engages with a ratchet wheel provided with a drum on which a weighted cord is wound. A spring hammer, operated by the ratchet wheel, strikes a gong. The lower ends of the lever are kept from

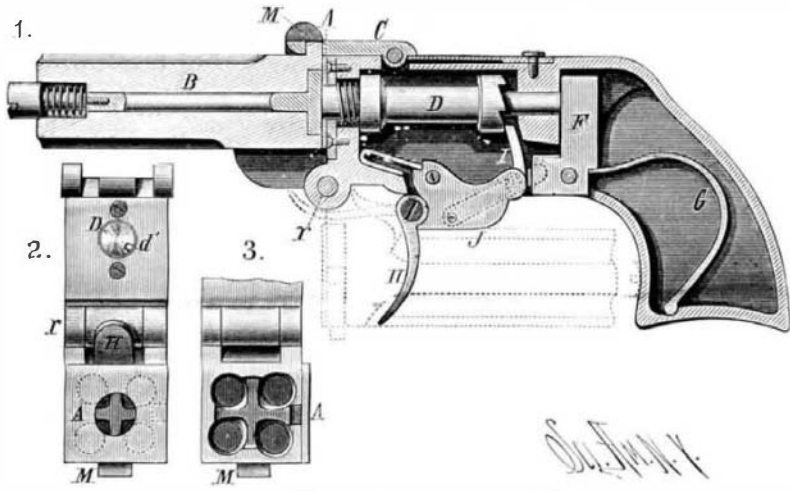
**LYON'S GAS DETECTOR FOR MINES.**

spreading by a wire or cord. When the cord is burned, the upper ends of the lever swing toward each other and drop through the ring. The lever, being relieved of its weight, releases the wheel, which operates the hammer.

This invention has been patented by Mr. James A. Lyon, of Clarksville, Tenn.

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

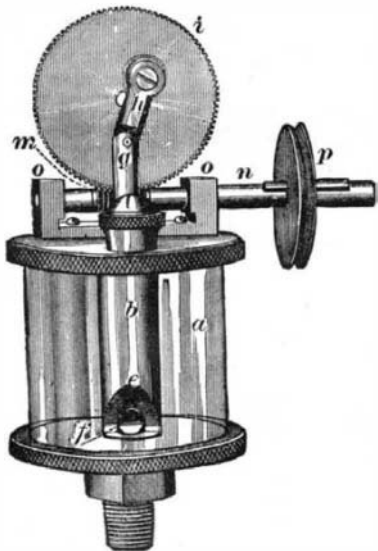


CHUCHU'S REPEATING FIREARM.

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, cross-heads, 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.

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.

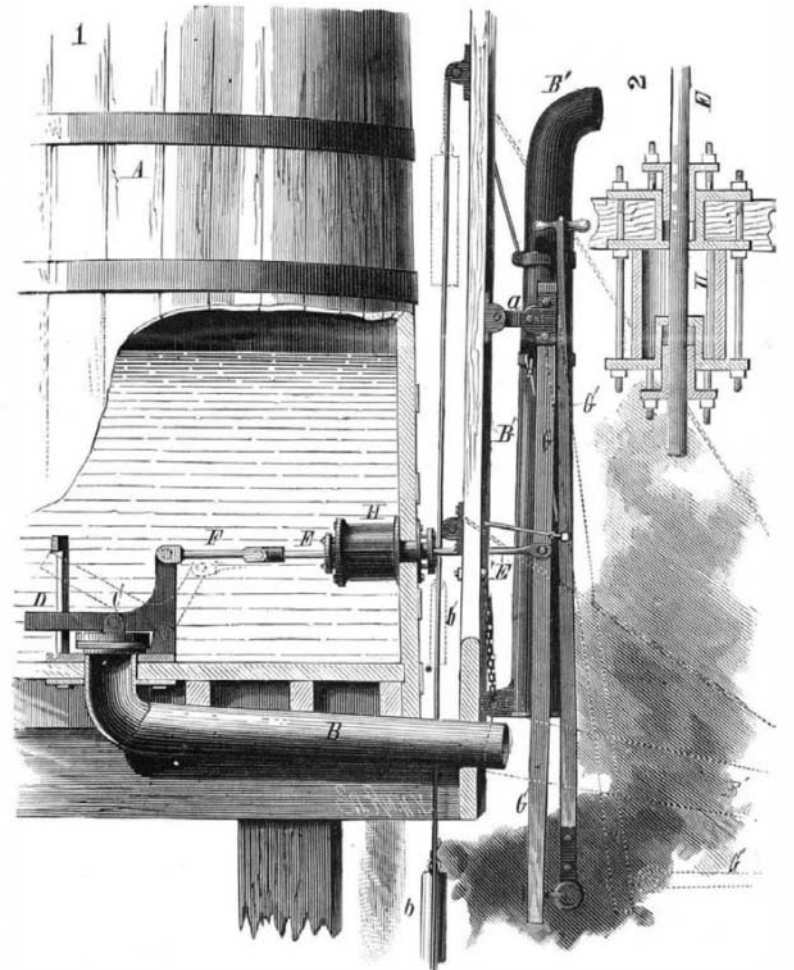
The governor shown in the cut is remarkable for quickness of action on the slightest variation in the speed of the engine. Two saucer-shaped shells, or hollow disks, fitted with curved blades, work face to face in a casing filled with water; one of these turbines is driven by the engine, and the other 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 out-

ward, 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.

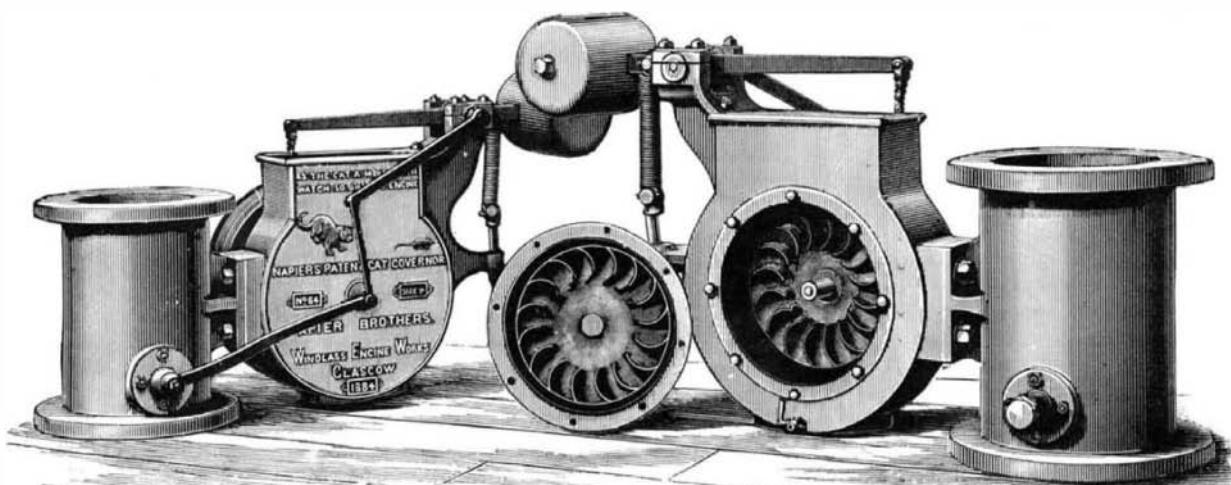
RAILWAY WATER TANK.

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



ROBERTS' RAILWAY WATER TANK.

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



THE "CAT" ENGINE GOVERNOR.