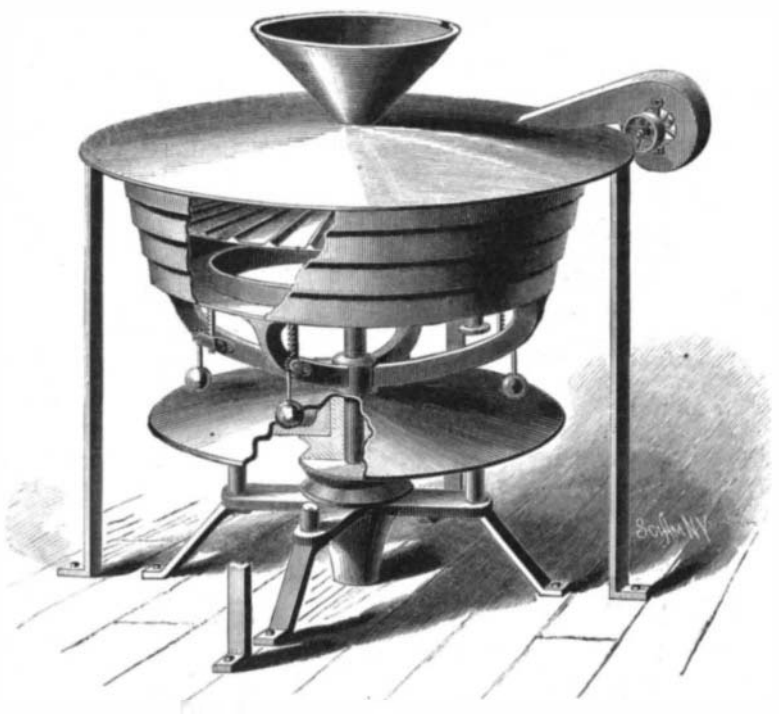
NEW GOLD SEPARATOR.

The rotary shell of the gold separator shown in the engraving is made with annular offsets upon its inner surface to facilitate the support of the mercury upon the inner surface of the shell. The base flange of the shell is provided with a movable rim, having racks and pinions for raising and lowering it, so that the height of the rim may be graduated to the amount of mercury on the flange; this rim is lowered automatically by means of the weighted arms thrown out by centrifugal force, which also causes the mercury to pass up the inner surface of the shell. The vertical drive shaft is provided with a pulley, and carries the distributer on its upper end. In using the separator mercury is placed in the ring trough at the bottom of the outer shell, and as the shell is revolved the mercury is driven up its inner surface by centrifugal force, the ascent of the mercury being facilitated by the offsets of the outer shell, the mercury being supported by centrifugal force, the flare of the shell, and the off-sets or steps. As the sand is introduced into the machine by the fan blower it falls upon the conical grooved distributing plate; it is evenly distributed by centrifugal force against the coating of mercury spread over the inner surface of the outer shell, and the particles of gold in the sand will be taken up or amalgamated by the mercury, while the sand slides down the inner surface of the outer shell and over the upper edge of the movable rim. As the sand falls from this rim it is received upon the conical discharge plate below, and is thrown out of the machine by centrifugal force. It is claimed that by this construction every particle of gold will be withdrawn from the sand and held by the mercury, while the sand is discharged freely from the machine.

This invention has been patented by Mr. Horace E. Henwood, of Kansas City, Mo.



HENWOOD'S GOLD SEPARATOR.

New Disinfectant.

Professor Carlo Pavesi, of Italy, proposes as an improved disinfectant a solution composed of chloride of lime, camphor, and glycerine. This mixture is capable of being used in all cases in which phenic acid is now employed, and its odor is less disagreeable, less irritating, and less toxic than that of the latter. It is said to at once arrest the putrefaction of animal bodies, and is highly commended by the *London Medical Record.*

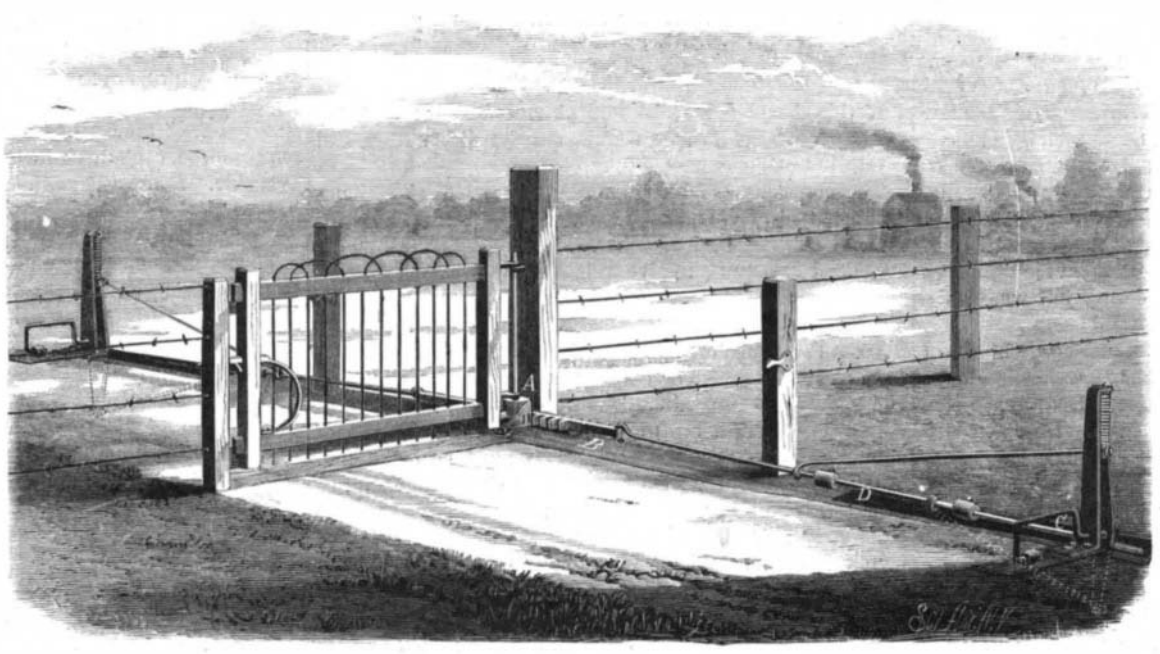
IMPROVED AUTOMATIC GATE.

This gate is opened and closed by the vehicle which passes through it without compelling the driver to alight. It is an improvement upon the form of automatic gate in which a sliding toothed bar acts upon a set of segmental teeth connected with the gate post to open or close the gate by the longitudinal movement of the sliding bar, the latter being actuated by rods on opposite sides of the gate connected with double-cranked shafts that are struck and deflected by the vehicle wheels.

To each end of the sliding toothed bar, B, is attached a horizontal rod, D, which is arranged in guides on the bed frame so as to have a free longitudinal movement. These rods extend at right angles to the closed position of the gate. Near the ends of these rods, on each side, is arranged a crank shaft, C, whose looped or cranked portion is normally held in a vertical position, so as to be struck and turned down by a vehicle wheel. On the other end of this crank shaft (on each side of the gate) is rigidly secured a lever, which is fastened about its middle to the shaft, and which lever, together with the bend of the crank shaft, is held in vertical position by a spiral spring attached to the top of the lever at one end and to the top of a vertical bar at the other. This spring will be housed in a suitable case or tubing. From the opposite ends of each lever pull rods extend, both terminating in their ends next to the gate in eyes that loosely encircle the main rod, D.

On the main rods, D, are stop blocks, against one of which the upper pull rod pulls when the crank shaft is deflected in one direction. When the crank shaft is deflected in the other direction the lower pull rod is operative. In operating the gate automatically by the passage of the vehicle, it will be seen that when the wheels of the vehicle strike the first crank shaft and deflect it toward the gate the lower pull rod pulls on the stop block, and the toothed bar is pulled toward the vehicle, turning the toothed wheel which carries a cam in which a roller attached to the gate rests. This raises the gate bodily until the latch is released, when the roller rolls down the incline of the cam, and the gate is opened by its own gravity. Closing the gate is simply the reverse of this operation. The gate operates in the same way when approached from either direction, and it may be opened by hand whenever necessary.

It will be seen that as all of the strain on the toothed bar is a pulling strain the rods may be made very small, like wires, or even chains or other flexible connections might be used.



NEW AUTOMATIC GATE.

This useful invention has been patented by Messrs. J. Austin and R. Chamberlain, of East Liberty, Ohio.

Lightning Rods.

A meeting was recently held at the rooms of the Meteorological Society, London, at which delegates were present from the Royal Institute of British Architects, the Physical Society, and the Society of Telegraph Engineers, to consider the desirability of issuing a code of rules for the erection of lightning conductors. After discussion, a set of rules was promulgated, in which it is set forth that "the rod should not be bent abruptly around sharp corners, and in no case should the length of the rod between the points be more than one and a half times as long as a straight line joining them. Where a string course or other projecting stonework will permit, the rod may be carried through instead of around the projection." In keeping with this, "the rod is not to be kept from the building by glass or other insulators, but attached to it by metal fastenings. Rods should, preferentially, be taken down the side of the building which is most exposed to rain. They should be held firmly, but the holdfasts should allow for contraction and expansion."

This non-insistance on insulation, as to lightning rods, is to many persons strange, as adequate insulation is required for the safe use of electric-light wires. Lightning will always follow directly the best—not necessarily the shortest—conductor, in its passage to or from the earth; to use a figurative expression, it may be said *not to have time* to turn off at right-angles from a metal rod, properly joined and continuous, to enter a building. While, however, the lightning flashes instantaneously through the rod, and the quicker it passes the better, the electricity passes as a steady, constant stream to the carbons of lamps, and thence to the earth. There may be said to be a kind of "storage" of it in the wires, through its being allowed to pass only as it can inflame the carbon points of the arc light, or render incandescent the slender carbon thread. In the case of the rod, insulation as a resistant is to be first considered; in the case of the wire, insulation as a non-conductivity is the chief point.

NEW INVENTIONS.

A novel thill coupling has been patented by Mr. Elias Hoxie, of Red Creek, N. Y. This invention consists of an adjustable brace, secured to the under side of the thill and to the bolt by which the coupling is accomplished, the object being to prevent noise by the rattling of the parts against each other.

It is desirable that the covers of jars of pickle casters and analogous articles of table ware shall be permanently connected with the caster, so that they may not become misplaced or lost and yet be capable of being removed from and replaced on the jars quickly and conveniently. Mr. Thomas Leach, of Taunton, Mass., has devised an improvement in which the cover is attached to a curved or crank rod, that is adapted to slide vertically in a tubular guide forming a fixed portion of the frame of the caster and located above the jars.

Mr. James F. Edwards, of Washington, D. C., has patented an angle brick for bay windows and other obtuse-angled structures, in which the bricks at the angle shall be substantially tied with lap joints, and in which all cutting of brick is avoided, while the angle may be changed as desired.

A novel barber's paper clip has been patented by Mr. Moses Cohen, of Hallettsville, Texas. This invention relates to clips for holding slips of paper upon which razors are to be wiped in shaving the beard. It is formed by doubling upon itself a strip of metal, preferably spring brass, in such a manner that the central bent portion shall serve as a spring to hold the two straight portions in contact with each other.

Mr. Lloyd W. Gates, of Calhoun, Ky., has patented an improved car coupling the principal features of which consist of a concentric coupling hook, which is adapted to engage with a link automatically.

An improvement in hydraulic elevators has been patented by Mr. Charles T. Widstrand, of Minneapolis, Minn. This invention consists in an elevator provided with a hydraulic rotary engine, pressure wheel, or pump having an inlet pipe leading to one side of the pistons and an outlet pipe leading from the opposite side, a reservoir communicating with the outlet pipe, and an induction valve located between the pipes, and which is adapted to connect them with each other, so that the cylinder may be kept full of water, and the descent of the cab regulated by the free or retarded circulation of the water through the port of the induction valve.

Mr. Thomas N. Lupton, of Winchester, Va., has patented an improvement in shutter workers for moving and locking an outside shutter from inside the sash. The shutter is operated by a horizontal bar extending through the side facing of the window, and connected with a lever which moves above a toothed sector into which it locks to secure the shutter in the required position.

Mr. John G. Trenear, of Huntington, W. Va., has patented an improved mode of ventilating sewers and traps by which all gas will be removed from the sewer by passing through a vertical pipe into an air pipe, and thence to a furnace, where the gas is consumed. If any gas passes up through the lower end of the waste pipe, it will pass thence through another pipe into the air pipe and be carried thence to the furnace and consumed.

A novel agitator or egg beater has been patented by Mr. Gus. W. Richardson, of Hill Grove, Ky. This is an ingenious arrangement of a hollow cover apertured on its sides and inclosing a set of agitating wheels, by which the eggs are rapidly and thoroughly beaten.

Mr. George F. Goodell, of Fulton, Ill., has patented a calendar adapted for continuous use for indicating days and months, and also for finding the day of the week and months of years past, present, and future. This invention consists in the combination of changeable week and month rollers and a calendar card having upon it a monthly calendar and a key calendar for use in setting the rollers.