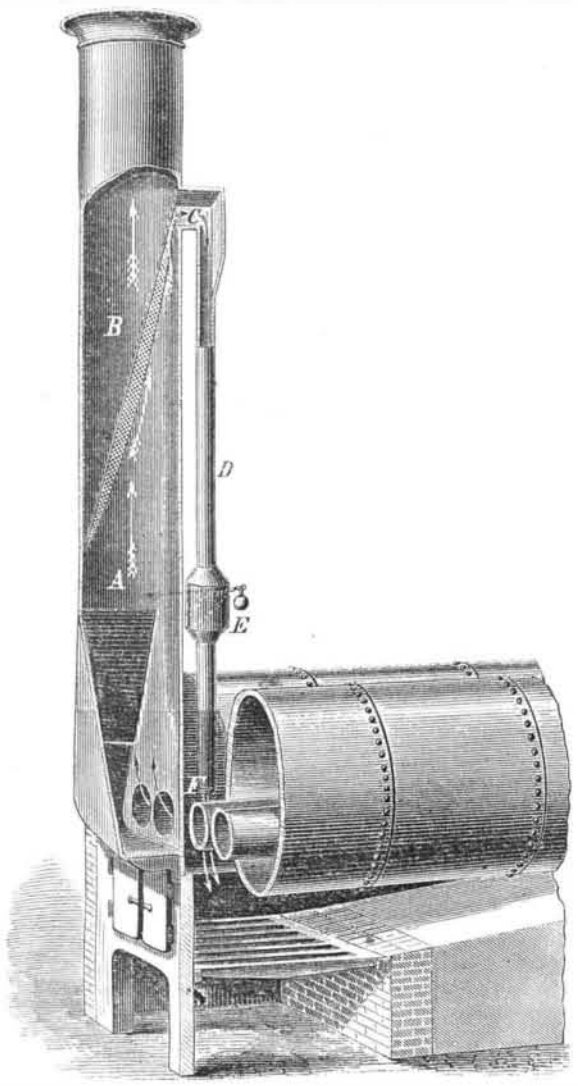
BEACH'S SPARK CATCHER AND CONSUMER.

It is entirely unnecessary to say anything in reference to the value of a good spark catcher and consumer. So much property has been destroyed in dry weather, by sparks from chimneys and locomotives, that the lesson has been sufficiently enforced. Our engraving illustrates an improved device of this kind, which has, we are informed, been quite extensively adopted, and has given universal satisfaction wherever used, being found especially serviceable in connection with sawing and planing mills, and, where steam is used, for thrashing grain.

The arrester, B, is placed in the uptake, A, at an angle of 80° from the horizontal; it is of wire gauze, and cut of oval



form to correspond with the section of the uptake made at the same angle. While the smoke and gases of combustion pass freely through it, it stops the sparks, which are directed by the upward current along its under inclined surface through the opening, C, into the flue, D, leading downward to the fire box. Falling upon a counterpoised valve, E, they accumulate till they are dropped, through F, into the fire box, where they are consumed.

The lower part of the spark flue is contracted, as shown.

It is proper to say, however, that the counterpoised valve is only needed for stacks into which the steam does not exhaust, as when the steam exhausts into the stack it creates a downward draft in the spark flue, so that the valve, the office of which is to stop the upward current, may be dispensed with.

When the valve is used, it should be merely balanced, the best thing for the purpose being a cup containing shot. We regard this as a good invention and worthy the attention of manufacturers employing steam as a motor.

Patented November 8, 1870, by Darwin Beach, whom address, for further information, Oshkosh, Wis.

Connect your Lightning Rods with the Water and Gas Mains.

Mr. Henry Wilde, a distinguished electrician, recently read a paper, before the Literary and Philosophical Society in London, upon the inductive influence of gas and water pipes in determining the direction of a discharge of lightning. In the course of his remarks, he gave several very interesting examples of this inductive influence, in the case of churches and other buildings which were furnished with lightning rods which terminated, as they usually do, a few feet down in the earth. In these examples, when the lightning struck it had followed the rod until within a short distance of the gas pipes, and had then leaped from the rod to follow the superior conducting path offered by the pipes. He said.

In my experiments on the electrical condition of the terrestrial globe I have already directed attention to the powerful influence which lines of metal, extended in contact with moist ground, exercise in promoting the discharge of electric currents of comparatively low tension into the earth's substance, and also that the amount of the discharge from an electromotor into the earth increases conjointly with the tension of the current and the length of the conductor extended in contact with the earth. It is not, therefore, surprising that atmospheric electricity, of a tension sufficient to strike through a stratum of air several hundred yards thick, should find an easier path to the earth by leaping from a lightning conductor through a few feet of air or stone to a great system of gas and water mains, extending in large towns for miles, than by the short line of metal extended in the ground which forms the usual termination of a lightning conductor.

It deserves to be noticed that, in the cases of lightning discharge which I have cited, the lightning conductors acted efficiently in protecting the buildings from damage of a mechanical nature, the trifling injury to the church tower at Kersal Moor being directly attributable to the presence of the gas pipe in proximity to the conductor. Nor would there have been any danger from fire by the ignition of the gas if all the pipes used in the interior of the buildings had been made of iron or brass instead of lead; for all the cases of the ignition of gas by lightning which have come under my observation have been brought about by the fusion of lead pipes in the line of discharge. I have, therefore, recommended that in all cases where lightning conductors are attached to buildings fitted up with gas and water pipes, the lower extremity of the lightning conductor should be bound in good metallic contact with one or other of such pipes outside the building. By attending to this precaution, the disruptive discharge between the lightning conductor and the gas and water pipes is prevented, and the fusible metal pipes in the interior of the building are placed out of the influence of the lightning discharge.

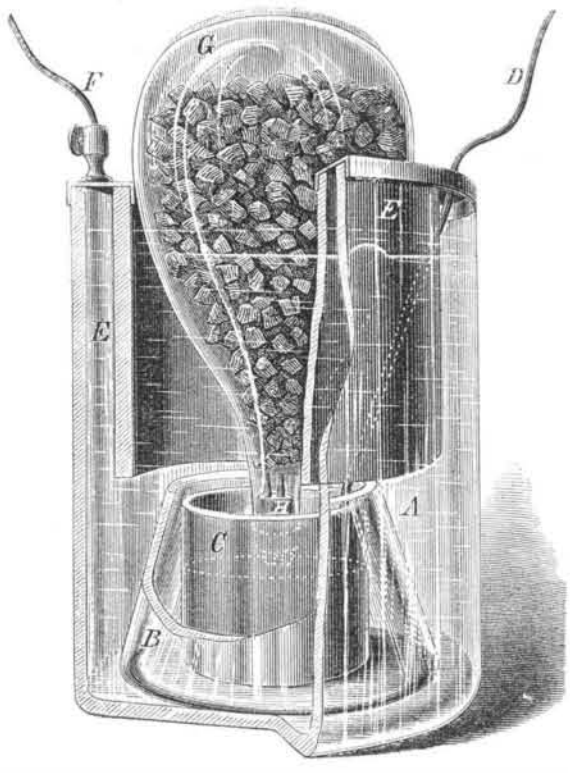
Objections have been raised, by some corporations, to the establishment of metallic connection between lightning conductors and gas mains, on the ground that damage might arise from ignition and explosion. These objections are most irrational, as gas will not ignite and explode unless mixed with atmospheric air, and the passage of lightning along continuous metallic conductors will not ignite gas even when mixed with air. Moreover, in every case of the ignition of gas by lightning, the discharge is actually transmitted along the mains, such objections notwithstanding. A grave responsibility, therefore, rests upon those who, after introducing a source of danger into a building, raise obstacles to the adoption of measures for averting this danger.

HIMMER'S ELECTRIC BATTERY.

On page 305, Vol. XXV., we gave a description of this battery without an illustration; we herewith give an engraving which will convey a better idea of the improvement.

A is the outside cup, containing and supporting all the other parts of the battery. Within the cup, A, is placed a smaller cup, B, of truncated conical form, which rests upon the bottom of A, and in which is placed the copper element, C, having the form of a thin hollow cylinder, to which the wire, D, passes. E is the zinc element, to which is attached a screw cup, for the reception of the wire, F.

The zinc element is cylindrical in form, and has an annular rim, which supports it from the top of the cup, A. A flask or bottle, G, of conoid form, is inverted, and supported by the internal edge of the rim of the zinc element, so that its neck enters the cup, B, as shown; the neck is supplied with a cork, H, having two glass tubes passed through it, the upper ends of the tubes being drawn down quite small, to prevent the dropping of the copper salt.



This flask is supplied with sulphate of copper, in crystals, and water, as shown. The outside cup is then filled with a solution of magnesium sulphate. The flask is then inverted into the position shown.

The water in the flask gradually dissolves the sulphate of copper which flows out into the cup, B, where, on account of balanced pressure, it can rise no higher than the ends of the glass tubes which pass through the perforated cork, H. That amount of the copper thus actually brought into contact with the solution of the sulphate will be active in the battery. The copper salt undergoes decomposition by electrolysis, its copper passing to the copper plate, which is thus thickened.

The zinc sulphate, which deposits outside of the cup, B, in the bottom of the exterior cup, A. The battery is thus only exhausted when the copper salt has been wholly decomposed, provided the zinc has not been wholly consumed.

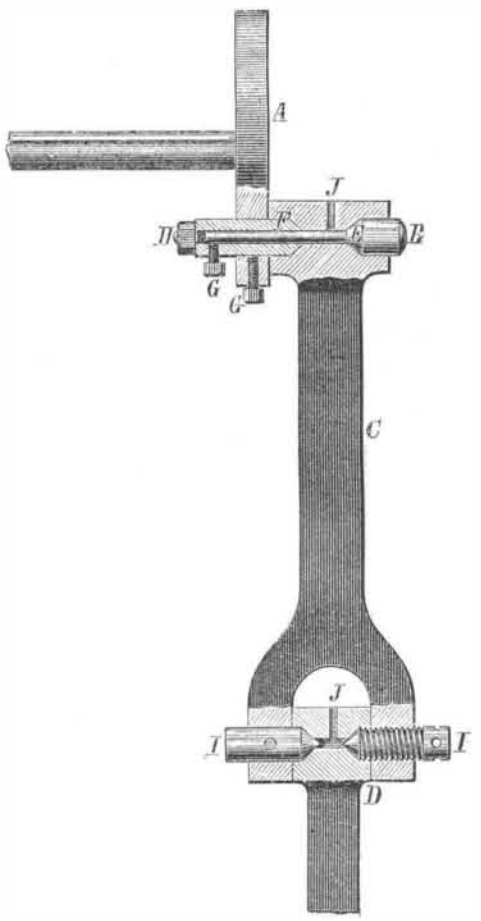
If, just previous to this period, the flask be removed and supplied with sulphate of copper crystals, enough of the solution of the latter will remain in the cup, B, to maintain the action of the battery during the process of filling, so that the duration of the action is practically limited only by the consumption of the zinc.

A battery of this kind has run for eighteen months without stopping, driving an electric clock during the period named. For all purposes where continuous and uniform action is desirable, it is doubtless an excellent arrangement.

Patented through the Scientific American Patent Agency Oct. 10, 1871. For further particulars, address Autenrieth & Himmer, 371 Pearl street, New York.

KETCHUM'S PITMAN CONNECTION.

Our engraving exhibits a method of constructing connections of pitmans, for harvesters or other machinery, so as to make and maintain a positive action therein, and prevent the



working loose of the parts. The construction obviates the jar consequent upon loose connections, and also affords ease in repairing, providing for ample and continuous lubrication and protection of the bearing parts from grit and dust.

In the engraving, A is the crank wheel, B the wrist, C the pitman, and D the connection of the pitman to the cutter bar or other reciprocating part of machinery.

The wrist consists of two parts, E and F, held from turning in their bearings by set screws, G. The inner end of F is conical, coresponding in form to the shoulder on E, opposite it. F also has a longitudinal hole, through which the smaller part of E passes and is secured by the nut, H, the turning of which takes up all the wear which may occur in the conical shoulders of the connection.

The connection of the pitman at the other end also consists of two conical pointed center bearings, I, one of which is held by a pin or set screw, while the other is screwed in to adjust the bearing and render the motion positive.

Oil holes, J, are formed in the pitman and cutter bar, in which oil being placed, the oil flows to the bearing surfaces as required. Thus noiseless and thoroughly lubricated bearings are secured.

We are told that a pitman of this kind has run in the shop of the inventor for four months, and the connections are as perfect as when first started, although the motion is excessively rapid. The improvement is applicable to eccentric pitmans, cut off valve rods, etc., in which great accuracy of movement is desired.

The invention was patented through the Scientific American Patent Agency, Dec. 12, 1871, by Amos Ketchum, of Estherville, Emmet Co., Iowa. Address as above for further information.

THE GREAT PYRAMID OF EGYPT.—At a recent meeting of the King's College Engineering Society, a paper by Mr. Jacob "On the Great Pyramid" was read. The author first gave a general description of the pyramid, as to its position, foundation, internal and external masonry, and the chambers and passages which it contains. He then propounded the theory originated by Mr. Taylor, of London, and which has been recently more fully developed by the Astronomer Royal for Scotland. This theory supposes the Great Pyramid to have been built for a standard of weights and measures, from the wonderful relations, existing in the dimensions of this stupendous structure, almost inexplicable on any other hypothesis.

OVER three thousand five hundred new books appeared in England last year.