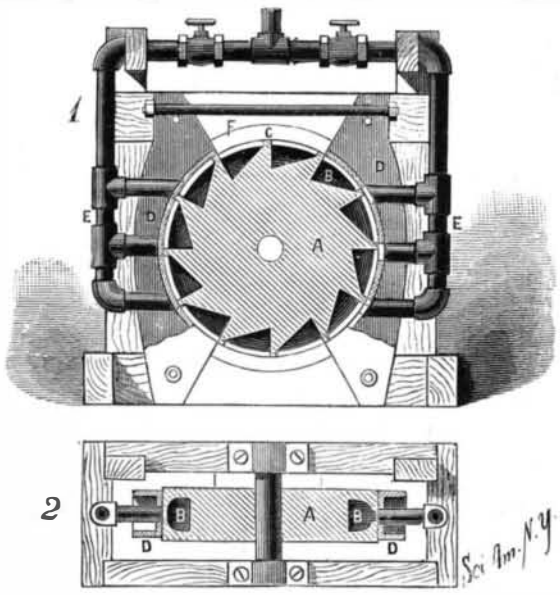
A STEAM WHEEL, OR ROTARY ENGINE.

The illustration herewith clearly indicates the principal details of construction and arrangement of parts in a rotary engine, or steam wheel, which has been patented by Mr. Robert Powers, of Charleston, Miss. In our engraving, Fig. 1 shows a transverse sectional elevation, and Fig. 2 a horizontal section. A represents a cast metal disk of any approved size, with cavities or pockets, B, in the face, separated from each other by narrow bridges, C, there being narrow slit openings through the face of the disk to the cavities



POWERS' STEAM WHEEL.

or pockets. One or more covers, D, are fitted steam-tight to the face of the disk, having passages through which steam is admitted to the cavities from the boiler by the pipes, E, while F represents exhaust spaces, between the covers, D, on opposite sides of the wheel, for the escape of the steam after it has done its work. These exhaust spaces are arranged at such distance from the last inlet passage that the exhaust will not open until the steam pocket has passed entirely beyond the inlet, and the inlet is cut off from the exhaust by the bridge between it and the next cavity. The covers, D, are strongly bolted to the bed-frame, and are connected by rods having nuts, to draw them tight up against the face of the disk, from time to time, these covers to be also faced with a lining, so they may be taken off and refitted as required, or renewed when worn out. It is provided, further, that instead of covers there may be a continuous case surrounding the disk, with proper inlets and exhaust cavities, the invention contemplating a practical working rotary engine which shall have as few parts as possible and the utmost simplicity of detail.

Feat of the Divining Rod.

The question as to the magical or the scientific value of the "divining rod" has just been reopened by the success which has attended its use at the Fletton Wagon Works of the Midland Railway Company, England, with reference to the discovery of a permanent supply of water. According to *The Sanitary World* (London), the company requires to use about 500 or 600 gallons of water every day, and the well on their premises yielded only one-half of that quantity. It was necessary, therefore, to supplement the supply by the sinking of other wells or by the construction of an expensive system of piping. The former plan was preferred, and two new wells were sunk to no purpose. The services of a gentleman of the district, who bore the reputation of being skilled in the art of discovering water by means of the "divining rod," were then called in. This wizard or expert employed for his purpose a forked hazel twig, holding one prong of the fork in each hand, the points of the fork being directed to the sky. After walking about the premises for some time, the point of the fork suddenly began to bend down, purely, as the best evidence goes, of its own accord, and to point to the earth. The wielder of the wand declared that here would be found a plentiful supply of water. The same indications were repeated at another spot, where the twig snapped from the violence of its spontaneous and sympathetic motion, and the same confident assertions were made with reference to the occurrence of water—assertions which the results obtained by actually sinking wells amply justified, the quantity of water to be obtained being apparently inexhaustible. Other persons essayed to use the wand, but it rebelled against the usurpation of its owner's functions, and remained contumacious and irresponsive. If any persons, adds the writer, require water in unlikely localities, it might be well to secure the services of this diviner before he volunteers for a patriotic mission in favor of the troops in the thirsty wilds of the Soudan.

SAFETY GAS BURNER.

The body of the burner, A, is fitted with a diaphragm, B, in its lowest portion, formed with holes to allow the gas to pass to the tip. Upon the under side of the diaphragm is a slide valve, D, held to its seat by a flat spring attached to the diaphragm. The valve stem, G, of spring metal, rests in notches in the valve, in which its end is screwed to permit it to be adjusted; the stem passes out at the side of the burner, and upon its outer end is a nut. A spiral spring presses the valve to open it. At opposite sides of the burner are arms, I, extending above the tip; to one arm is pivoted a lever whose long arm is forked at its end to take upon the nut on the stem. A small rod, M, of brass, silver, or other metal having a high rate of expansion, is connected to the short arm of the lever and to the arm at the opposite side of the burner. By adjusting the nut, the valve is moved over the apertures, and thus retained when the burner is not in use. When the gas is to be lighted, the nut may be turned out so that the spring will open the valve, and then screwed up against the lever when the flame has been burning long enough to fully expand the rod, M. But it is better not to change the adjustment of the nut, the valve being opened by pushing the stem inward. In case the flame is blown out, the valve will be moved and the apparatus closed by the contraction of the silver rod.

This invention has been patented by Mr. Merry L. Pence of Lexington, Ky.

COMBINED GRAIN DRIER AND COOLER.

In our issue of Sept. 30, 1882, we published an illustrated article describing a new invention for drying and cooling grain, seeds, coffee, etc., in one continuous operation; this machine went into immediate use, and has been operating very successfully ever since. The maker's claim of durability has been fully sustained, the first machine, after running three seasons, now being in good order and not having required a total expenditure

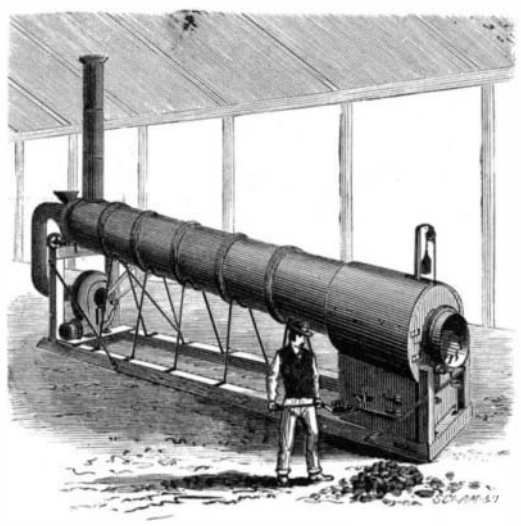
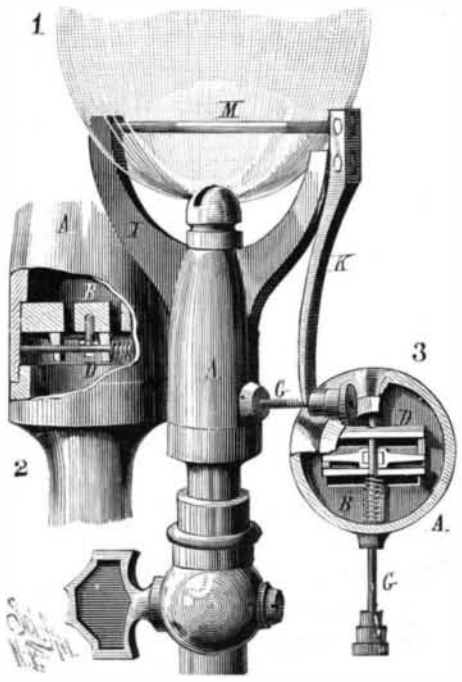


Fig. 1.—COMBINED GRAIN DRIER AND COOLER.

of five dollars for repairs. The inventor has recently added some improvements which increase the capacity and efficiency of the drier in further reducing the temperature of the delivered products; this is an important matter in warm climates, and also during a few summer months in the Northern States. These changes consist in increasing the heating surface by adding to the length of the furnace, thus saving fuel, and also in adding a supplementary cooling cylinder and exhaust fan, thus doubling the air current. The inventor has lately completed two new machines, which are illustrated so plainly in the engravings as to need but a short description.

Figure 1 is a portable drier, styled No. 1, of moderate capacity, adapted to the wants of small dealers. No cooling arrangement is shown, not being positively required in a machine of this size unless the room is limited. A new departure is taken in constituting the entire furnace of fire clay material, this being of much lighter weight and giving a better appearance than the conventional furnace of sheet iron lined with



PENCE'S SAFETY GAS BURNER.

brick. It is compact, occupying a floor space of only 2 feet by 20 feet, and strongly braced, so as to stand distant shipment and frequent removals. Motion is transmitted to the drying cylinder in the same manner as in the larger machine, by two grooved friction wheels of chilled iron or steel, each revolved by a sprocket wheel, and both being connected by one link-belt chain to the shaft back of the drier. This is an advantage over the former method of belts and pulleys, and has been adopted in all of these machines.

The exhaust fan is driven from the same shaft. A gate is placed in the air pipe for gauging the current to any required strength. The feeding hopper is shown at the left of the smoke stack. At the right can be seen the lifting screws for raising or lowering the end of the cylinder, to increase or shorten the time of the passage of the material through it, which should be varied according to the amount of moisture to be removed. The numerous troughs shown at this end extend the entire length of the case, lifting and dividing the grain into a number of thin falling sheets, thereby presenting a large surface for the air to come in contact with, in order to absorb and remove the moisture. Scorching cannot occur as long as the cylinder and fan are in motion. This machine has a capacity of 40 bushels of ordinarily damp grain per hour, weighs 4,000 pounds, and requires 2 horse power, consuming 60 pounds of coal; coke, charcoal, or wood can be used as fuel. The machine is well adapted for drying granulated tobacco and roasting coffee, for which purposes some slight changes are necessary.

Figure 2 illustrates the No. 2 improved driers and coolers, run in a gang, to meet the requirements of elevators or large operators. It has a capacity of 5,000 bushels damp grain per day of twenty-four hours, or double that amount if used alone for cooling purposes. No motive power is shown, as it is customary to locate plants of this size adjoining an elevator or warehouse, which furnishes power and storage facilities. As shown, it is arranged for drying damp grain supplied to it by the conveyer at the left, under which are seen the feed gates and spouts for dropping the grain through the suction bonnets into the drying cylinders, arranged as described above. Owing to the inclination of these revolving cases, it is gradually carried to the lower ends, being at the same time constantly subjected to the current of air drawn through the cylinders in the opposite direction by the exhaust fan.

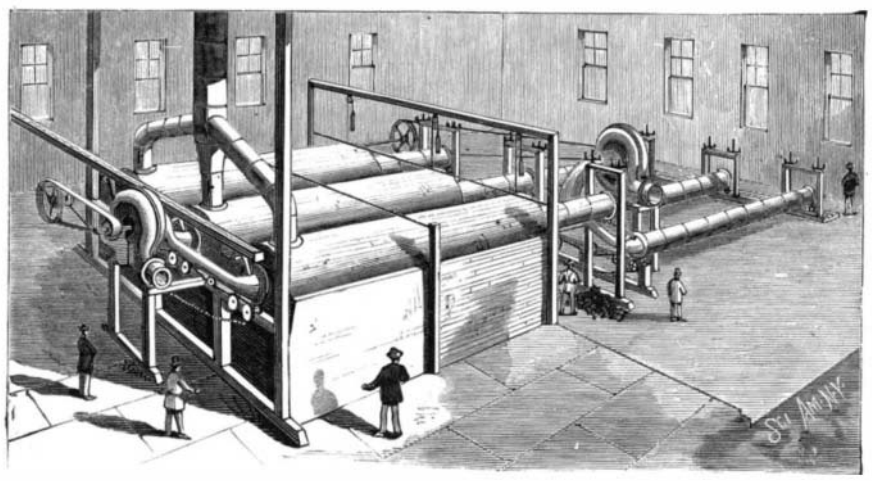


Fig. 2.—COMBINED GRAIN DRIER AND COOLER.

The grain now falls into the cooling cases and undergoes the same treatment, omitting the heat, after which it is discharged into the conveyer at the extreme right of the cut in a dry, clean condition (the continued friction and attrition with the metal surface scouring off the dust, which is removed by the current of air), ready for immediate grinding, shipment, or storage in bulk, with no taint, or so slight as to escape the notice of inspectors or millers. The patentee has a number of letters from millers who have used it for the highest grade flour. A single countershaft, carrying two pulleys and two sprocket wheels, drives the whole machine. The maker lays particular stress upon its very perfect