Correspondence

Petroleum Gas for Engines.

MESSRS. EDITORS:—I propose to drive the engines in the oil regions by combustion of the gas arising at the mouth of the well, conveying it by a tube to the bottom of a tank of water under a tubular boiler, and inflaming this gas as it arises at the surface. The advantages of this plan will be, I think, these: No explosions from a volume of gas diffused in the atmosphere coming in contact with the furnaces; complete control of the amount of heat, which may be cut off in a moment, and as immediately re-applied, and an accumulation of force—the gas accumulating in the holders when the engine is not running; economy in the use of combustible material now wasted.

I propose to drive the machinery of a saw-mill, where there is but a small quantity of water but plenty of fall, by an overshot wheel with a drum beneath it, both covered by a band, to which the buckets shall be attached. In this case the weight of the water would act much longer than in the ordinary wheel.

I have read your paper for some years and have never met any suggestions of this kind. If in any way valuable I hope you will notice it in your next issue. W. S. H.

New York, March 4, 1865.

[Both good suggestions, but neither of them new. The plan of a water wheel, the same as a grain elevator reversed, has been a favorite one of ours for a small stream with great fall. In this situation we cannot see why it should not be a cheap, economical and efficient motor.—EDS.

Raw Pork and Tape-Worms.

MESSRS. EDITORS:—In your paper of Nov. 19th I noticed an article entitled "Beware of Raw Pork," and giving as the reason for the caution:—"Fortunately the tape-worm is very rare, but when it does occur, it is caused by eating raw pork."

Here in California the tape-worm is very common, and I should judge that two or three persons out of every hundred adults are troubled with them. All ages and both sexes, from 14 years and upward, and people of all classes and nationalities, are equally subject to them, so far as my observation extends. As for being caused by eating raw pork, that is about the last thing to which an intelligent observer who had resided any length of time in this southern part of California would attribute it. Many of the persons here who have a tape-worm have never eaten a mouthful of raw pork nor raw flesh of any kind. Not only this, but *herbivorous animals*—sheep, deer, antelopes, and neat cattle—after being killed, are frequently found with one or more tape-worms in the intestines. I once killed an antelope that had a tape-worm. In taking out the entrails, the small intestine was torn or cut, discovering the parasite still alive. Through this opening I drew out several yards of the worm. On inquiring of butchers who are reliable and observing men, I find also that they have frequently seen tape-worms in sheep and beef cattle.

Having been familiar with these facts for some time, it is difficult for me to understand how your Atlantic physicians could have adopted the theory stated by you. COLBERT A. CANFIELD, M. D.

Monterey, Cala., Dec. 26, 1864.

The Problem of Two Wheels.

MESSRS. EDITORS:—I noticed in your paper some time since a "Problem of Two Wheels," upon which, however, I had not bestowed much thought until I saw a reply in your last number. Your correspondent says that:—"The periphery of each wheel will, in rolling, require to travel a distance equal to twice that which the center moves," etc. A point in the circumference of a rolling wheel (rolling on a plane) generates a cycloid, and while the center of the wheel travels a distance equal to the circumference, a point in the periphery travels over the arc of a cycloid. Now the arc of a cycloid is proved by the higher mathematics to be four times the diameter of the generating circle. The distances passed over by the center and a point in the circumference of the wheel will therefore be to each other in the ratio of 3.14159 to 4. But this does not affect your correspondent's conclusions, and with regard to the motion of the two wheels I think he is right. For if two equal weights move over the same vertical space, impelled by gravity, one will perform precisely the same amount of work as the other, whatever may be their velocities. In the case under consideration, the work generated by the wheels in rolling down the plane, with the exception of the small amount necessary to overcome the rolling friction, is absorbed in imparting motion to the wheels, and will be given out when they come to a state of rest. As their weights are equal and the spaces passed over also equal, the amount of work accumulated will be equal. When the wheels roll along the horizontal plane, this accumulated work is used in overcoming the resistances, and, if the resistances encountered by each wheel are equal, both will come to rest at the same distance from the point of starting. As, however, more work is absorbed in imparting the rotary motion, and therefore less in imparting rectilinear motion to the wheel with the iron periphery than to the other, the former will reach the horizontal plane with less velocity and encounter less resistance from the air than the latter, and if the velocities be high enough for this difference to be appreciable, the former will be found to roll further than the latter along the horizontal plane. W. A. A.

Delaware Literary Institute, Franklin, N. Y., Feb. 27, 1865.

Loss of Heat in the Steam Engine.

MESSRS. EDITORS:—In our present modes of converting heat into mechanical power, and vice versa, it seems that one of two facts must exist. Either that our present modes of converting heat into power by mechanical means are very defective, or else there must be some error in the tables set down for the reconversion of mechanical power into heat. There is an irreconcilable disparity between the two processes. For instance, according to Joule's equivalent, the heat expended in raising the temperature of one pound of water one degree is equivalent to the mechanical work of raising the same weight of water 772 feet. Now taking this as a basis, let us see how much power there is in a pound of coal. Some boilers evaporate as high as 12 pounds of water for each pound of coal. It requires not less than 1,000° of heat to evaporate each pound of water—making 12,000° of heat given out by one pound of coal in evaporating 12 pounds of water. Now if we multiply these 12,000° of heat by Joule's equivalent for one degree, we have 12,000° multiplied by 772 foot-pounds, which gives 9,264,000 foot pounds—which reduced to horse-power is 4½ horse-power per hour for each pound of coal. Few engines give a better result than one horse-power for two pounds of coal; or, in other words, few engines give a better result than $\frac{1}{9}$th part of the above indicated power of fuel.

Joule's equivalent may be correct; if so, it does not seem possible that we are always to continue to use fuel on so wasteful a plan, and it looks quite improbable that we must remain content for all time with a fragment only. A few bushels of coal used on the basis of Joule's equivalent would indeed work wonders.

The same amount of power can be derived from a degree of heat expended on water to form steam as though the degree of heat were expended on atmospheric air. The idea that a degree of heat expended on air gives four times the effect that it does on water is fallacious. This I hope to conclusively substantiate in a future article. F. A. MORLEY.

New York, March 8, 1865.

[It is not claimed that a *degree* of heat expended on air will give four times the effect that it does on water, but that a *unit* of heat will. The quantity of heat that will raise the temperature of a pound of water one degree will raise the temperature of a pound of air four degrees. Still we shall be pleased to see our correspondent's argument.—EDS.

Burgh's Rules for the Steam Engine.

MESSRS. EDITORS:—Please correct the error in regard to "Burgh's Rules" recently noticed in the SCIENTIFIC AMERICAN. The notice stated that the price is $2 by mail, free of postage. The application for free copies, *postage paid*, is becoming quite a nuisance, and I fear that those who have paid $2 will imagine they have been swindled. I presume the balance of the demand—certainly the entire demand created by that notice—will be for free copies. The demand promises to be unprecedented, and thus far one man has sent about half money enough to pay postage. All others have preferred free postage.

HENRY C. BAIRD.

Philadelphia, March 9, 1865.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Riveting Buttons to Cloth.—This invention consists in constructing an automatic machine for riveting buttons to cloth or other material, whereby the cloth is pierced to receive the body of the rivet and the various movements and operations necessary to feed the rivet and the button, and insert the rivet in the cloth and through the center of the button, and clinch them together are performed automatically. W. J. Gordon, of Philadelphia, is the inventor.

Improved Padlock.—This invention consists in providing a padlock with a series of tumblers, having hooks at each side of them, and arranged in such a relation with the eye of the shackle that each tumbler, in unlocking the lock, will required to be moved in a certain position relatively with the eye, in order to release the shackle, a slight deviation from this position rendering it impossible to withdraw the shackle. The object of the invention is to obtain a padlock of simple and economical construction which cannot be readily picked or illegitimately opened. Edward Coyle, of Albany, N. Y., is the inventor.

Gas Stove.—This invention relates to a stove for heating apartments, cooking, etc., by gas, such as is used for illuminating purposes. The invention consists in the employment of a gas-chamber or reservoir in connection with a combined air and gas receiver and a series of flues, all arranged and combined in such a manner as to insure the perfect combustion of all the gas which passes into the stove and the radiation of all the heat generated by said combustion. The stove is very simple in construction and may be afforded at a moderate cost, and will prove an economical heat-diffusing device. Luther Erving, New York city, is the inventor.

Combustion Pump.—This invention is an improvement on that class of pumps or water elevators in which, by the combustion of a hydro-carbon liquid, a vacuum is produced whereby the water or other liquid is caused to rise through the suction pipe and to discharge at the desired point. The invention consists in the use of steam combined with the hydrocarbon liquid in the interior of the reservoir or chamber, in which the vacuum is to be produced in such a manner that, by the condensation of the steam, the intensity of the vacuum is considerably increased and the raising or elevating of the water is materially facilitated. The water from which the steam is to be formed is placed in a shallow pan over a similar pan containing the hydrocarbon liquids in such a manner that the heat evolved by the construction of the hydrocarbon liquid volatilizes the water and a sufficient quantity of steam is obtained to produce the desired result. The hydrocarbon liquid is measured by means of a bell-shaped or other vessel or spout attached to the supply tube, and it is ignited by introducing into said spout, after the pan in the interior of the reservoir has been filled, a small quantity of hydrocarbon liquid, and lighting the same, so that it runs into the reservoirs while burning, and ignites that portion of the liquid in the pan. The gaseous products of combustion are allowed to escape through the reservoir pipe, which is provided with a hinged drop valve fitting into a cavity filled with liquid in such a manner that, so soon as the gases have escaped, the valve can be dropped and an air-tight joint is obtained, whereby the operation of the apparatus is not disturbed. Thomas J. Linton, of Providence, R. I., is the inventor.

Machine for Gathering Quicksilver.—The water running off from amalgamators contains a large quantity of quicksilver mixed with the rock in a fine spray, and this quantity of quicksilver has hith-