

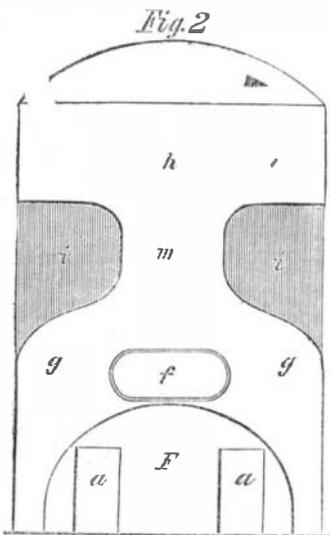
**HOOPER'S IMPROVED STEAM BOILER.**

This boiler contains several valuable improvements tending to save fuel by creating a rapid circulation of the water, and to lessen the danger of an explosion for want of water, by contracting the evaporating surface towards the flues.

The former object is obtained by forming a water-circulating passage below, in rear and above the fire-box, and nearly or wholly isolating said passage from the fire-box by means of an open space existing between the walls of the fire-box and the partition walls of said water-circulating passage, whereby, after the boiler is supplied with water and the generation of steam is going on, the water passes upward from the hottest part of the fire-box to the passage above and to the rear, where it loses some of its heat, so that it rapidly descends through the passage behind the open space by reason of its superior gravity, and the draught or partial vacuum created near the fire or at the heating surface by the rising of the more intensely heated water causes the descending water to pass along through the lower isolated passage to the fire-box, where it mingles with the highly heated water surrounding the heating surfaces, and where it is again intensely heated so that it passes up and that it commences to circulate again as above described.

The other object of this invention is to lessen the danger of an explosion for want of water. This is obtained by contracting the boiler immediately above the fire-flues, that part of the same which is beyond or above and in the rear of the fire-box being widened, so that a sort of throat is formed and a greater depth of water over the fire-flues is obtained, even when the quality of water in the boiler is greatly lessened; and at the same time such a small generation of steam is accomplished, that the slow running of the machinery will give warning to the engineer that the water is getting low, while a free and perfect generation of steam is effected when the water is at the proper level by the more extended evaporating surface above said throat.

The boiler is represented in the accompanying engravings, in which Fig. 1 represents a longitudinal vertical section and Fig. 2 is a front view of the same.

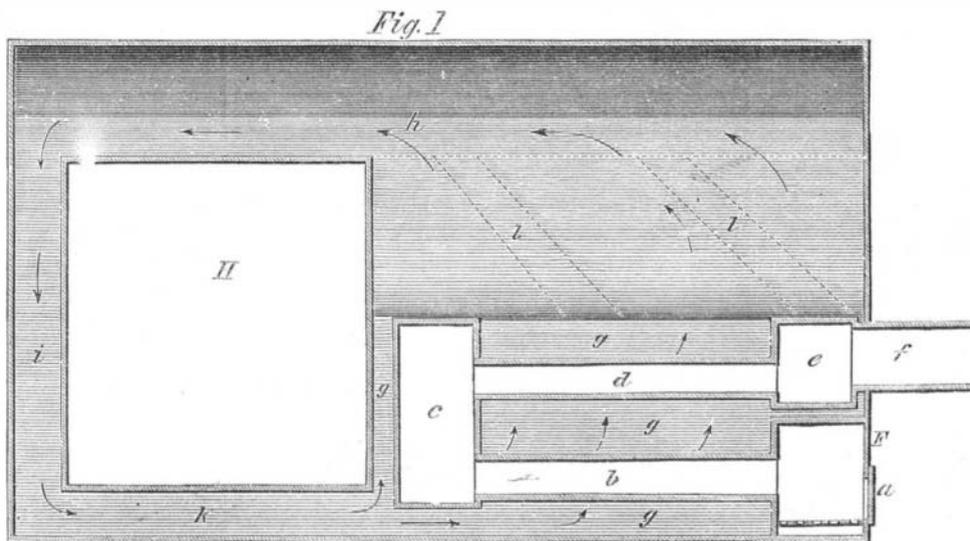


F represents the furnace, having the usual fire-doors, a. The back of the furnace is perforated for the reception of fire-flues or tubes, b, which conduct the products of combustion into the chamber, C, from which they are conducted by similar flues, d, into the chamber, E, and from thence by the smoke-pipe, f, into the chimney. A water-space, g, entirely surrounds the furnace and fire-flues. The upper part, h, of the boiler connects by the water passages, i and k, with the water-space, g. The upper part of the boiler may be connected with the water-space, g, by means of water tubes, l l. Immediately

above the fire-flues, d, the boiler is contracted so as to form a throat, m. When the water gets low a greater height of water is obtained over the flues and the evaporating surface is reduced, so that the danger of explosion from want of water is greatly reduced.

The passages, i and k, are separated from the fire-box by an open space, H.

The circulation of the water in this boiler is indicated by the arrows. It rises from the fire-box through the throat, m, to the evaporating surface, where some of it forms into steam. The rest passes through the upper part, h, of the boiler over the open space, H, where it is partially cooled, so that it sinks down through the passage, i, passing back to the water-space, g, by the passage, k. The water, which is thus kept in continuous circulation, takes up or absorbs the caloric much more



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rapidly, and consequently it forms into steam quicker and more economically than when kept in a state of rest.

The inventor of this steam boiler, Mr. Robert Hooper, will be happy to furnish any further information. He may be addressed at No. 16 Light-street, Baltimore, Md. He obtained a patent on his improvements August 9, 1859.

**GRAIN AND RICE HULLING MACHINE.**

We had the pleasure of examining, a few days ago, at the office of S. A. Heath & Co., No. 37 Park-row, this city, an invention for the above purpose, patented by T. F. Wagoner of Trenton, N. J., which seems to present some novel and useful features.

Its construction is quite simple, consisting of a stationary base-stone, through which a moveable spindle passes. A revolving rubber, or muller is secured to the spindle, and this is faced with india-rubber, vulcanized by a new process without sulphur. The peculiar adhesiveness and softness of the india-rubber adapts it, in a remarkable degree, to cleanse the seed or grain, at the same time polishing and beautifying it without injuring the form of the grain—a most important consideration. The rigidity of the materials heretofore employed in the construction of hulling and smut machines has been a serious difficulty, but the substitution of the rubber face upon the running muller seems to remove all objections, and produces a more perfect result, cleansing and preserving the grain in a most satisfactory manner. Considering the great amount and value of our rice crops, as well as those of buckwheat and other grains, the invention of Mr. Wagoner is likely to prove useful and valuable.

THE ILLINOIS STATE FAIR closed at Freeport on the 9th inst., and is reported as a complete success. No less than 25,000 people were on the ground, and the receipts for a single day amounted to upwards of \$5,000. At the steam-plowing exhibition, on the 7th inst., Fawkes' machine (illustrated in our last number) plowed an acre in eleven minutes. The number of agricultural implements was larger than at any previous fair, which speaks well for the progress of invention in this department. The premiums awarded were extremely liberal, amounting to \$16,500. We expect to receive a full report from our special correspondent "Helix," in time for our next issue.

**REAPING-MACHINE TRIAL—LETTER FROM MR. McCORMICK.**

MESSRS. EDITORS:—I have just observed, in the SCIENTIFIC AMERICAN of the 3d inst., an error in your notice of the "great trial of reaping and mowing machines which recently took place at one of the royal farms in France," where "the Emperor awarded the prizes in person." You stated as follows:—"After a very few turns in the field, the contest lay between Burgess and Key's (Allen's Patent) and Wood's (stated to be Manny's Patent) reapers, in which the former took the lead, and was unanimously awarded the first prize; the latter the second." I herewith send you an extract from the "Paris Correspondence" of the *New York Tribune*, in regard to the trial referred to, the publication of which extract in your journal will correct the previous

error, and be only an act of justice to myself. I have also observed a similar error in recent Irish and English journals. The Paris letter-writer states:—"Three prizes were to be given to each class; a large gold medal, entitled the 'prize of honor,' was to be given (in addition) to the incontestably best machine among them all. This prize of honor, and the first of the three prizes for foreigners, were handed over to that very worthy American, Mr. McKenzie, who ran with the machine sent by Burgess & Key from London, which is the original McCormick reaper."

As may be inferred from the above extract, Burgess & Key, of London, are licensees

and manufacturers of my reaping and mowing machine.

C. H. McC.

St. Nicholas Hotel, New York, Sept. 7, 1859.

[We have no doubt of the correctness of Mr. McCormick's statement. Our English exchanges have jumbled up the names of the machines with singular infelicity.—Eds.]

DIAL FOR DETERMINING THE VARIATION OF THE COMPASS.—We have before us a simple but very useful contrivance, the invention of Captain Toovey, of the mercantile marine, for determining the true variation of the compass. It is a simple dial, inscribed with an inner and an outer circle, having the quadrants and eight points of the compass worked off on each. In the center is fixed a gnomon, to the foot of which is attached a moveable hand that travels round the dial. This hand, in using the instrument, is made to indicate the direction of the ship's head, and her course. The dial is then placed in a horizontal position on the capstan-head, the ship's side, the poop-rail, or any other convenient place. The bearings of the sun are then ascertained, and the shadow cast by the gnomon indicates with accuracy the angle of variation of the compass, which is read off on the inner or outer circle with perfect ease. We may add that Captain Toovey has not patented this clever invention, his desire being that, if found to answer the purpose designed, it may be generally adopted in the service. The dial is fitted with a moveable sight for ascertaining the bearings of any object in the heavens or on the horizon.—*London Engineer*.

A CHANGEABLE CLIMATE.—The occurrence of a succession of very dry seasons in Texas has induced dependency among the farmers of that State, as regards its future fruitfulness. Texas is a land of very variable weather. From 1742 to 1758, there were 15 very wet years, which were succeeded by three very dry seasons. From 1806 to 1813 there were six very dry years succeeded by seven very wet seasons. The number of wet and average seasons far exceeds that of those in which drouths were experienced; so it may be very reasonably predicted that the next year will be one of a very different character from the present in Texas, and that a luxuriant abundance will reign in 1860, where sterility is experienced in 1859.