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This Boiler is formed of a combination of cast-iron hollow spheres—each sphere eight inches external diameter, and three-eighths of an inch thick. These are held together by wrought-iron bolts with caps at the ends.

It is not affected by corrosion, which soon destroys the wrought-iron boiler. More explosions are traced to this cause than any other.

It gets up steam quickly from cold water and with little fuel. It produces very dry superheated steam, and is not liable to priming or foaming.

It is easily transported, can be erected by ordinary workmen, and is more readily kept clean, inside and out. It requires no special skill in its management.

Under ordinary circumstances, it is kept free from permanent deposit by merely blowing the water entirely out once a week.

Injured parts can be renewed with great facility, as they are uniform in shape and size. A boiler can be increased to any extent by simply adding to its width.

It has less weight, and takes much less ground area than the ordinary boiler, without being increased in height.

They can be sold at less cost than ordinary boilers. Drawings and Specifications furnished free of charge.

STEAM GAGES—BATES'S PATENT—GOVERNMENT Standard.—The Cheapest and Best Steam Gage ever offered in this market.

REFERENCES.—Messrs. Hopper & Douglass, United States Inspectors; Capt. Lord, M. P., Inspector; Messrs. Todd & Rafferty, No. 4 Dev Street; New York Steam Engine Works, Twenty-third street, East River.

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IF YOU WANT A SMALL, SELF-CENTERING Chuck, that is easily attached to any Lathe, and will hold drills or small articles, from one-half inch down, address THOS. H. WORRAL, Lawrence, Mass.

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There is no complex machinery in its construction, and it can be manufactured as cheap as the ordinary wooden seat. Can be placed in any Water Closet in thirty minutes.

For Descriptive Circular and full particulars address the inventor, J. N. DAVIS, Georgetown, Brown Co., Ohio.

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The sale will commence at 11 o'clock, A. M., and continue from day to day until completed.

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**Improved Horse-power.**

In many places it is inexpedient to use steam power on account of the danger from fire, and the expense of keeping costly machinery for only occasional service. Farmers and others are always requiring power for different purposes, either for sawing wood, thrashing grain, or cutting hay. For such purposes, or for small manufacturers, the machine here shown will be found useful.

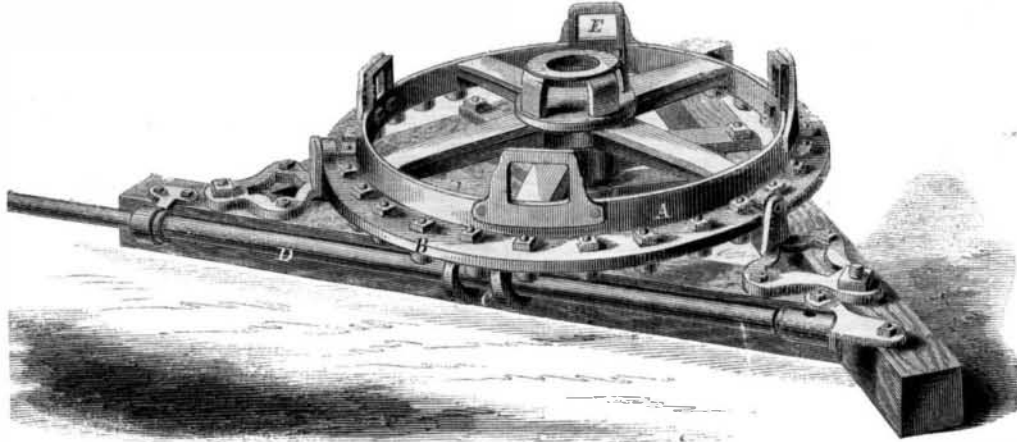
It consists in detail of a wheel, A, armed with pins, B, on which are friction rollers. These pins work against a helix, C, on the shaft, D, and, by pressing on the sides thereof, cause the shaft to rotate most rapidly.

ends of the lever just mentioned, to pull them down by.

When the gate is to be opened, the line, H, is pulled down, which raises the slide and the gate. The latter then runs back on the lever, D, and is prevented from running off by the inclined plane at the end.

When the operator has passed through, the gate shuts itself, or if it should fail to do so can be started by elevating the opposite lever slightly, which will depress the slide so as to allow it to run down to the closing point.

This gate was patented through the Scientific American Patent Agency by S. Grenell, G. Bez, and H. C. Stoll, of Mokena, Illinois, on Sept. 5, 1865.



**SWEETLAND'S HORSE-POWER.**

In the rim of the wheel, A, there are sockets E, cast, which carry levers not shown, and to these the horse is attached; any number can thus be accommodated by increasing the levers. The present machine is for four horses.

The frame of the machine is triangular, and shafts can be applied on three sides, so that work of different kinds can go on at the same time. It is claimed to be one of the most efficient horse-powers in use, and capable of exerting the most force for its weight and size.

The construction of the machine is very simple and easily understood from the engraving without further comment.

For additional information apply to J. B. Sweetland, Pontiac, Mich. by whom it was patented through the Scientific American Patent Agency on July 4, 1865.

**Improved Gate.**

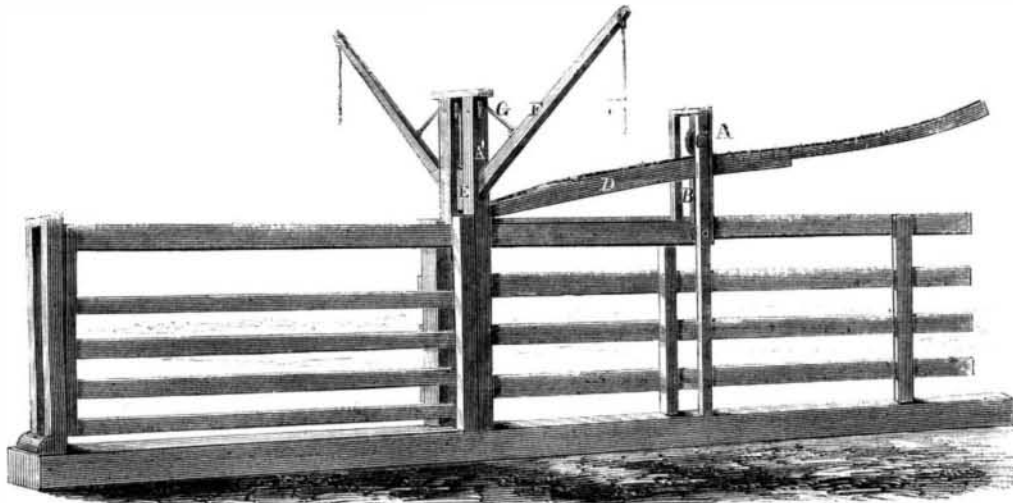
This gate is one of that class which can be opened by a person on horseback or from a wagon. By this

For further information address Geo. Bez, Mokena, Illinois.

**Expansion of Ice.**

In *Silliman's Journal of Science* is a report of experiments made by Rev. Frederic Gardiner on the ice of the Kennebec river. By inserting a line of stakes in the ice across the river in the early part of February, he found, in the middle of March, that there had been an expansion of the ice of over twelve feet in a breadth of five hundred feet. As during this time the temperature of the water was nearly equal, the expansion must have been due to the sun's rays, which was proved by the fact that there was the least expansion on the eastern side, where the ice was partially shielded from the sun by a high bank.

**A PROPOSITION.**—The *Boston Daily Advertiser* says:—"Efforts are in progress to have a congress of steam-engine builders, with a view of ascertaining the relative value of new steam engines. It is proposed to fit up a large room, in which the competitors will place their engines. A large boiler or



**GRENELL, BEZ & STOLL'S GATE.**

plan the trouble of alighting is avoided. The operation is also much easier than in gates that have to be lifted bodily before they can be swung round.

In construction this gate is hung between uprights, A and A', and has a vertical arm, B, which is fitted with a roller, C. This roller runs on a lever, D. Between the upright, A', is a slide, E, to which the gate is hung and to which the levers, F, are attached by means of cords, G; a line, H, depends from the

tank will be provided, which will be filled with air at a given pressure. Each engine, in turn, will be connected with the tank, and the compressed air turned on, and the revolutions of the engine noted. The engine which makes the greatest number will be judged the best."

This sounds something like the school-boy's test of merit—"Whoever eats the most is the best feller." Try compressed molasses.—Eds.

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OF THE  
*Scientific American.*

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Make a substantial model, not over one foot in size. When finished, put your name upon it, then pack it carefully in a box, upon which mark our address; prepay charges, and forward it by express. Send full description of your invention, either in box with model, or by mail; and at the same time forward \$16, first patent fee and stamp taxes. As soon as practicable after the model and funds reach us, we proceed to prepare the drawings, petition, oath and specification, and forward the latter for signature and oath.

Read the following testimonial from the Hon. Joseph Holt, formerly Commissioner of Patents, afterwards Secretary of War, and now Judge Advocate General of the Army of the United States:—

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,  
J. HOLT.

For further particulars see advertisement inside, or send for Pamphlet of Instruction. Address **MUNN & CO.,**  
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FROM THE STEAM PRESS OF JOHN A. GRAF AND GREEN.