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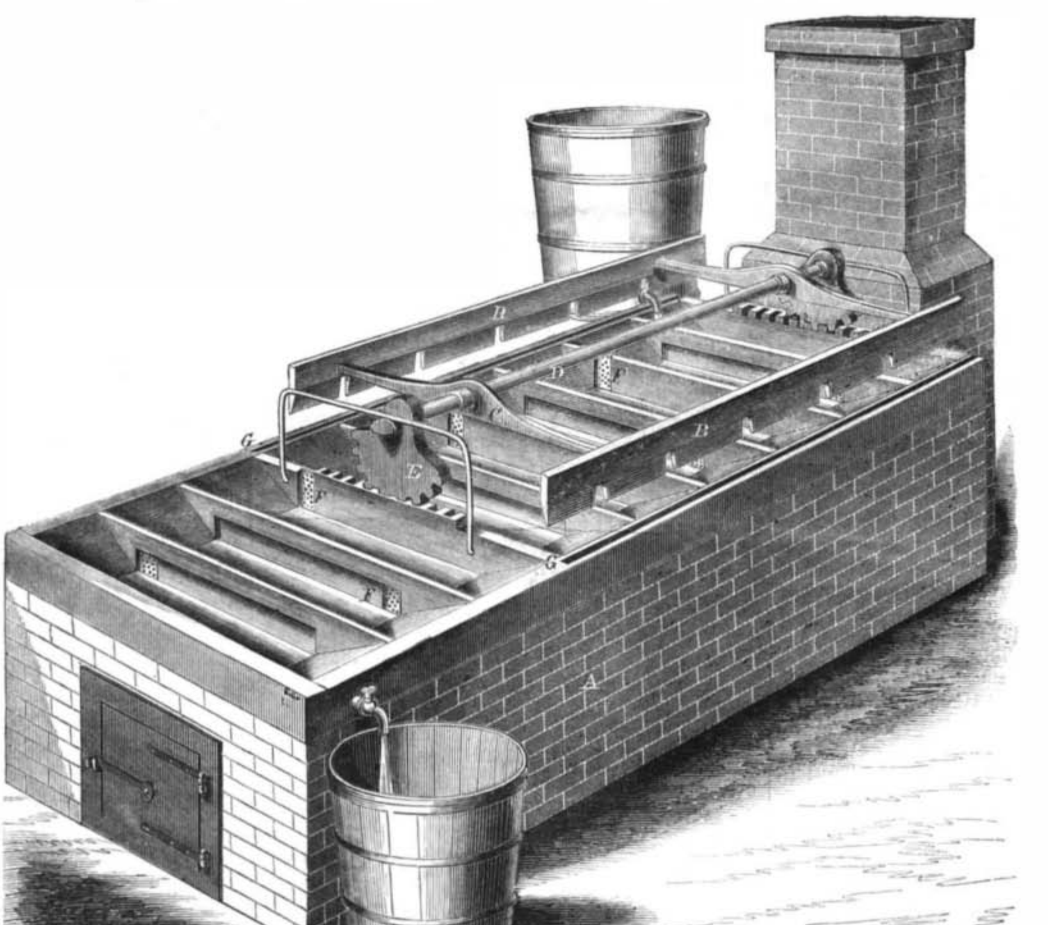
Improved Evaporating Pan.

The interests of a large portion of the community are at present turned toward manufacturing sugar from sorghum or northern cane. The article thus far produced has not been brought to market in sufficient quantities to be ranked as a staple, but it is increasing in importance every year, and after the growing crop is reaped it will be manufactured extensively. We illustrate this week an improved apparatus for boiling the juice, which presents some novel features. The pan is set in the furnace, A, and has a metallic bottom which is divided by a number of wooden partitions into several compartments. In the partitions devoted to boiling the juice, there is a skimmer, B, fitted. This skimmer consists of two long boards fastened to projecting arms, C. These arms proceed from a central shaft, D, on which is keyed two toothed quadrants, E, working in racks placed on one of the partitions. There are a number of perforated plates placed over the apertures, F, in in the partitions, which, through the medium of a gate, regulate the quantity of juice admitted from one compartment to the other. The inclined sides of the pan form an important part of the invention, as it is asserted that the natural tendency of the boiling liquid is to deposit the scum and sediment on these, from whence it is easily removed in an obvious manner by the skimmer. The operator takes hold of one side of this appliance, and inserting the board in the scum, draws it toward him and throws it into the trough, G, on the side, from whence it flows into a proper receptacle. The same process can be repeated as to the other side of the pan without leaving the spot, so that by the addition of this skimmer the condition of the liquid is at all times under control. The sugaring-off is completed in the pans over the furnaces, and the height of the chimney can be increased if required. These features are novel and practical, and facilitate very much the operation of boiling down.

The patent for this invention was procured through the Scientific American Patent Agency, on April 28, 1863, by J. A. Bowlus, of Fremont, Ohio. Further information can be obtained by addressing him as above.



BOWLUS'S PATENT EVAPORATING PAN.

WITH DISPATCH!—Quite recently the steamer *Scotia* was captured while endeavoring to run the blockade; she was condemned at a prize court and sold by the Government. Mr. Ben. Wier, of Halifax, purchased her and she is now ready to run the blockade again. We hope a similar fate to her previous one awaits her.

SCIENCE IN SHIPBUILDING.

It has hitherto been the common theory respecting naval architecture, that the speed of a vessel under a given power is mainly dependent upon what are known as her "water-lines," or shape from stem to stern. The main study of shipbuilders has, therefore, been to perfect these lines so as to diminish resistance and avoid the formation of eddies while the vessel is in motion. Probably they have reached perfection of model in this respect; but much room was still left for improvement in another important particular. The weight and inertia of the water to be displaced by the vessel, does not constitute the whole of the resistance to be overcome. A large additional amount arises from the friction between the water and the entire submerged surface of the vessel. This is due to the viscidity which water possesses in common with all fluids. A film of water adheres to the entire submerged surface, and when the vessel is moved there is a resistance to be overcome, arising from the cohesion of the particles constituting the film with the particles lying next to them. Of course, this resistance will be overcome in proportion as the submerged surface is diminished. It thus seems highly important to form such transverse sections of a vessel as shall, with the maximum area or contents below the water-line, afford the minimum extent of boundary line or wetted surface. This problem forms the subject of a paper lately read before the Glasgow Philosophical Society by James R. Napier. In the construction of vessels whose breadth and depth of water are not limited, the question reduces itself to the common mathematical problem of passing a curve of given length through two points, so as to enclose the greatest area between the curve and the straight line joining the points. But when the breadth and draft of water are limited, as by the width of dock entrances and the depth of rivers, the problem is far more complicated. The given dimensions of breadth and depth afford a rectangular space within which it is required to enclose the greatest area with the least extent of boundary—wetted surface of the vessel. A transverse section of a vessel thus constructed will afford the greatest displacement or capacity below the water-line, with the least surface for friction. The breadth and draft being thus given, the problem is to find the radius of curvature, or radius of bilge, which will afford the shortest boundary enclosing the greatest area—the line which will secure the greatest carrying capacity with the least frictional surface. As this radius is formed in terms of the breadth and depth, it can be applied to the construction of all the transverse sections from the stem to the stern of a vessel. It does not interfere with the water-lines, and thus these "sections of least resistance" may be introduced into a vessel having water-lines of any desired model. We can scarcely do more in this article than indicate the general process by which this "radius of bilge" is found. Such a curve is to be found as will enclose the greatest area with the least boundary. Of course this area, divided by the proposed boundary, must be a maximum. By the methods of analytical geometry we first find this proposed area in terms of the proposed breadth and depth and radius (the latter as yet being an unknown quantity). In the same manner we find the proposed boundary in the same terms, the unknown radius being likewise involved. Placing the value of the area as a numerator, and the value of the boundary as denominator, we have a fraction of which we have now to find the maximum value. This is readily done by the methods of the differential calculus. A quadratic equation appears in which the radius is the unknown quantity. Solving this equation, we find the value of the radius in the known terms of breadth and draft. This is the radius of curvature which will afford a maximum area below the water-line of a vessel with a minimum amount of surface. The following are some values of this radius, for given breadths and depths :—

1. When D (depth)=4 B (breadth), then *r* (radius)