

change in their construction, adapting them with little expense from low grinding to high grinding, or Hungarian mills, thereby increasing their capacity and usefulness. It is designed, also, to make the best quality of flour while making the greatest possible amount of middlings in disintegrating grain, and to be applied in and take the place of the ordinary French burr stone now in use.

**STATIONARY AND PORTABLE ENGINES.**

The requisites of a good engine are that it shall be self-contained, simple in its design and construction, direct in its action, having its bearing surfaces ample and all of its parts accessible, beside being so proportioned and constructed as to yield the best results from the steam furnished to it. These important features are possessed by the engine which we illustrate herewith.

The frame of this engine is cast in one piece with the front cylinder head and main shaft boxes, and the center line of the bed lies in the same plane with the line of centers of the engine, thus insuring direct action and avoiding the evil of getting out of line so common to engines having their different pieces bolted to the bed. The bearings are of unusual size, and all of the moving parts are made adjustable, so that any wear may be readily taken up without throwing any of the parts out of line. The guides and crosshead are particularly well arranged in this respect. Every engineer or owner of an engine likes to have his engine and boiler clean and bright. In this engine particular attention is given to the arrangement of the different parts so as to render this convenient. Drip pans are provided which receive any oil and water which may drip from the pump or other parts, and conveys it away through a single pipe.

The pump is driven by the crosshead, and has interchangeable brass valve seats. It is arranged so that all parts may be examined without disturbing the rest of the engine. The stop valve placed between the pump and boiler is contrived so that should the pump be started with this valve shut no damage can be done to either pump or valves, as communication between the pump and atmosphere is established when the stop valve is closed. This is a very simple and effective arrangement.

The engines are provided with safety stop governors, which prevent the engine from "running away" should the governor belt be broken by any accident, or slip off. These and many other good points are found in this engine.

The portable engine is in all respects like the stationary, and its boiler is of the best design for safety and durability. They are complete, self-contained, manageable, and safe.

These engines are made in various sizes, from 5 to 20 horse power, by Messrs. Skinner & Wood, of Erie, Pa.

**The Chicago Breakwater.**

On January 12, 1881, the Board of United States Engineers decided upon the location for the proposed exterior breakwater of Chicago. The construction of the new, exterior, or detached breakwater, will be commenced this spring. It will be about 5,400 feet in length and 30 feet wide, having a direction of about E. S. E. Its westerly end will be at a point 4,850 feet due north of the east (or outer) end of the present "North Pier," and its easterly extremity at a point 2,200 feet north, by 4,700 feet east from the above mentioned point on the north point, or 4,200 feet south by 1,100 feet west of the water works crib. This work will be done by hired labor, and materials furnished by contracts, with Major G. J. Lydecker, Corps of Engineers, U. S. A., as the U. S. Engineer in charge. It will be formed of cribs 100 feet in length and sunk directly upon the bottom, no piling being considered necessary, as examinations give a clay bottom covered with a shallow stratum of sand and stones. —*Amer. Engineer.*

**New Geysers in Montana.**

According to the *North Montana River Press*, two new geysers have appeared in a strip of that Territory known as "Sag." The first was seen about a month ago, but has only lately assumed remarkable proportions. It is situated in a small cañon running out from the wall of rocks on the east

of Alkali Lake, and throws up a jet of hot water and steam over a hundred feet high. The height of the other geyser is only fifty feet, but the diameter of the spout is larger. The geysers are, of course, intermittent, and seem specially active in the morning. The formation of the country is a sandstone and gneiss, and has all the appearance of being an ancient river bed.

**MISCELLANEOUS INVENTIONS.**

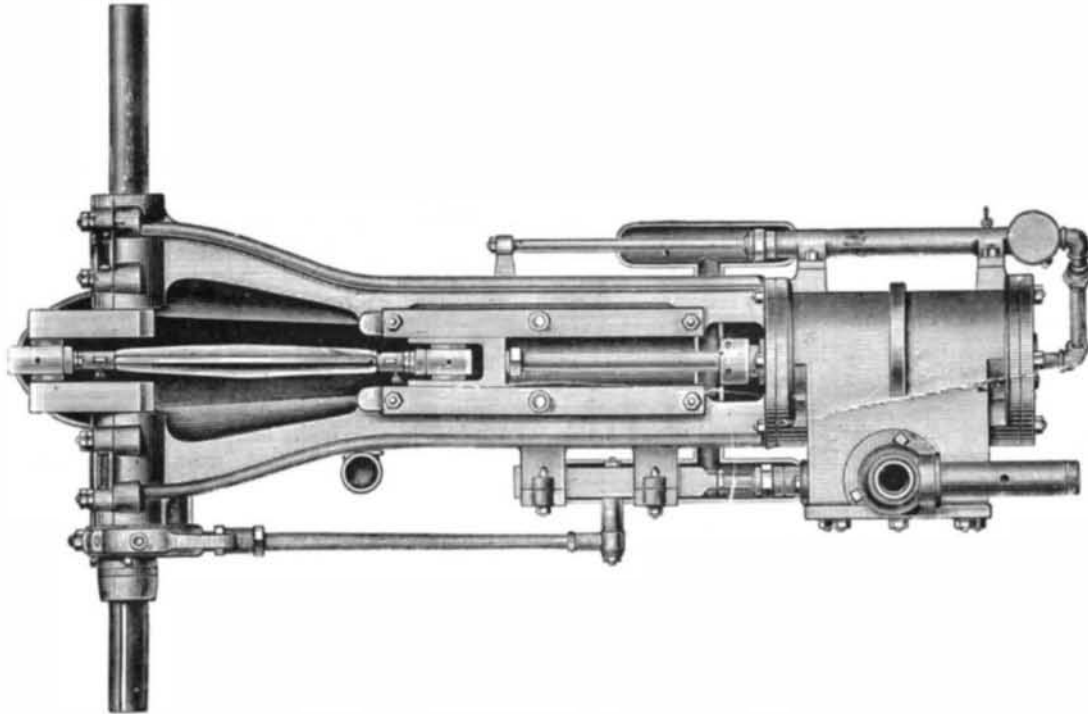
An improved cabinet has been patented by Mr. John Sorenson, of Leavenworth, Kan. The object of this inven-

India-rubber, to prevent the dust from passing through the cloth and gathering upon the table.

A simple and effective device, designed especially for use in sprinkling cotton plants with poisonous solutions, to protect them against the ravages of injurious insects and worms, has been patented by Mr. Alois J. Polansky, of Fayetteville, Texas. The invention consists of a portable force pump provided with a capacious air chamber, and having on the end of its discharge pipe a sprinkler of novel form, which causes the liquid to be ejected in fine spray.

An improved grain meter has been patented by Messrs.

Reuben R. James and Mirabeau N. Lynn, of Rising Sun, Ind. This invention relates to apparatus for weighing and measuring and registering the amount of grain that passes through it by means of apparatus actuated solely by the weights of the grain, and thereby be automatic in its operation; and the improvement consists in employing double-balanced measuring buckets suspended from a balance beam that is supported upon a vibrating lever operated upon alternately by the weight of the grain in one of the buckets, and the weight of a scale beam connected with the free end of the vibrating lever, to hold the receiving bucket in its raised position until the proper weight or quantity of grain shall have been delivered to it, when it will be allowed to drop of its weight at once in a peculiar manner, and in so doing close the receiving valve and open the discharge valve connected to the full bucket, to allow the grain to discharge there-



**SKINNER & WOOD'S STATIONARY ENGINE.**

tion is to construct cabinets and other articles of furniture without nails, screws, or glue, so that they can be knocked down and packed in small compass and easily set up again for use.

An improved millstone-dress has been patented by Mr. Burrell C. Lambeth, of Thomasville, N. C. The object of this invention is to dress a millstone so that it will run with less friction at the skirt, will be less liable to heat or choke, and will grind faster and more evenly, and keep in face longer than stones dressed in the ordinary way.

Mr. Sidney Crowley, of Manchester, County of Lancaster, England, has patented a heel plate provided with a central screw perforation and projecting studs upon the upper surface.

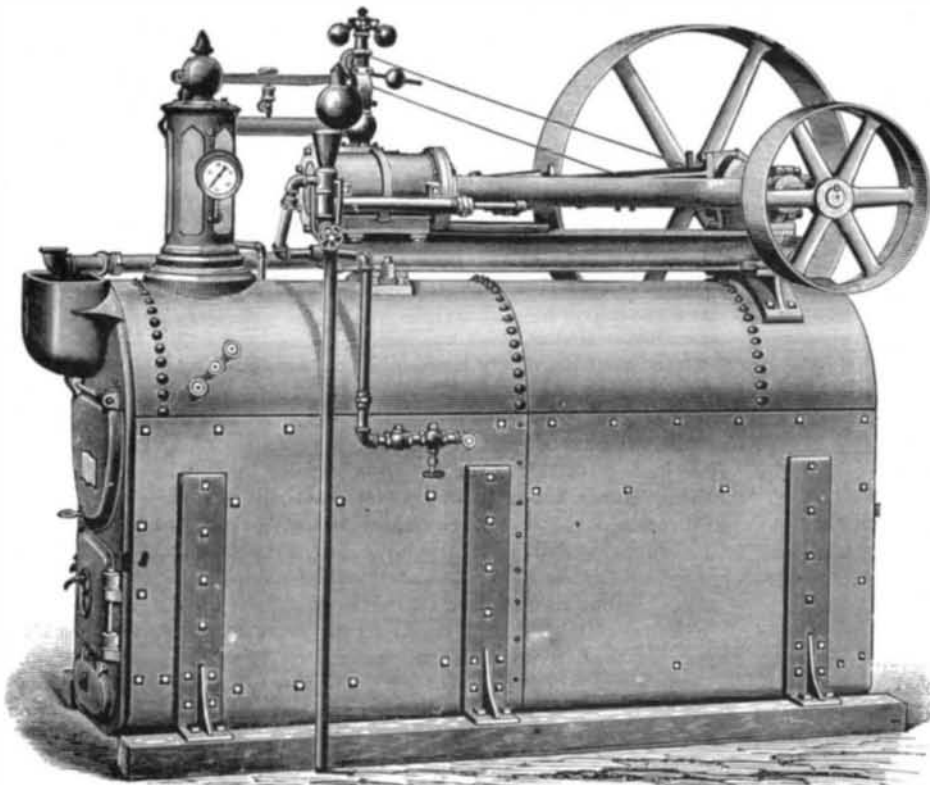
Mr. Isaac Heine, of Leipsic, Saxony, Germany, has patented an atomizing tube that can be bent into any desired shape, which it will retain. The invention consists in constructing

from, while the other measuring bucket is by the same movement raised and acts upon its receiving and delivery valves—to respectively open the one and close the other, and become, in turn, the receiving bucket—the operation above described to continue so that one bucket will operate upon the other so long as grain is allowed to pass the receiving valves.

**Artificial Indigo.**

The following is Bayer's synthetical process, described by himself: I take orthonitrophenylpropionic acid, and in the cold I mix the said acid with sulphuric acid, as, for instance, with from about ten to twenty parts, by weight, of sulphuric acid, of about 1.84 specific gravity to every one part, by weight, of orthonitrophenylpropionic acid employed. In effecting the said mixture care is to be taken to avoid

a considerable rise of temperature, say, 20° Cent. The mixture thus obtained quickly assumes a bright yellow or orange color, and the reaction is allowed to proceed in the cold until a sample of the mixture, upon being tested for the presence of orthonitrophenylpropionic acid by means of glucose and alkalis, no longer contains any appreciable quantity of the said acid. The sulphuric acid mixture thus produced is then submitted to the action of suitable reducing or deoxidizing agents in order to effect the conversion into artificial indigo. In practice I have found a great number of substances belonging to various classes of chemical compounds which act as deoxidizing agents upon the above-mentioned new product, and I may especially mention ferrous sulphate (green vitriol, copperas). As an example of the manner in which I prefer to conduct the aforesaid operation, I take the orange colored mixture resulting from the treatment of one part, by weight, of orthonitrophenylpropionic acid with about from ten to twenty parts sulphuric acid, as above described, and I mix the same with a solution containing about five parts, by weight, of ferrous sulphate. The mixture is then allowed to stand at the ordinary temperature until the blue color, which it quickly assumes, is fully developed, and the dyestuff or coloring matter thus produced may be separated



**SKINNER & WOOD'S PORTABLE ENGINE.**

an atomizing tube of such materials as may allow it to be flexible, to remain in any desired position, and at the same time prevent the vapor from coming in contact with the metallic constituent of the tube.

An improved sunshade-fan, which is simple and can be folded very compactly, and may be used as a fan or as a sunshade, as may be desired, has been patented by Mr. James H. Dennis, of Newark, N. J.

Mr. Samuel May, of Toronto, Ontario, Canada, has patented a billiard-table cloth covered on one side with a coating of

out of the mass by diluting the result of the operation with water, by which the new dyestuff is precipitated, and may be filtered and washed. The dyestuff is then ready for use. The characteristics of my new dyestuff or coloring matter, prepared according to the above process, are the following: The dyestuff or coloring matter resembles in appearance vegetable indigo, and it can be used in dyeing in a manner similar to it; but it is in a great part soluble in aniline at an ordinary temperature, and also in an aqueous solution of sulphurous acid.