Stearin from Fats.

Much attention has been attracted by our recent articles on the manufacture of artificial butter, and many of our correspondents have experimented on the separation of the constituents of fatty matters. The entire separation of the stearin from the fats is, however, a difficulty with some of them, and for their benefit, and that of others, we will give descriptions of the several methods in use.

The first is the saponification of the neutral fat with lime-water and steam, or with aluminate of soda, sold under the name of *natrona* or refined saponifier. Another method is by treatment with dilute and strong sulphuric acid and steam, at a high temperature. The third method is by chloride of zinc, and by dry decomposition and distillation with superheated steam alone. Perhaps the process most commonly employed on a small scale is that of the saponification with lime or aluminate of soda. Heat (in a large, lead-lined wooden vat or tub) the fat and water in the proportion of about 10 lbs. fat to 2 gallons water, by means of steam circulating through a coil of leaden pipes in the bottom of the vat. When all the tallow is melted, add 1½ gallons lime water containing 1¼ lbs. of lime (about 14 per cent. of the weight of tallow). Heat constantly nearly to the boiling point, with constant stirring, for from 6 to 8 hours. Run off the yellow glycerin solution, add 1¾ gallons dilute sulphuric acid at 12° Baumé (=1.086 specific gravity, containing 30 per cent. of sulphuric acid, $H_2 SO_4$) to the lime soap; stir, and heat as before until the reaction is complete, shut off steam, let the whole stand to settle, draw off the fatty acids from the top into similar smaller vats, add diluted sulphuric acid and heat, draw off the fatty acids, and wash repeatedly with hot water. The quantity of fatty acids obtainable from 100 lbs. good tallow are about 94.8 lbs. The average of solid fatty acids is about 45.9 per cent.

Let the washed acids stand for some time in a fused state to eliminate all mechanically adhering water, then allow to solidify by cooling. Press out the liquid oleic acid in an hydraulic press; then put the cake in a more powerful press, and subject to pressure again; after this, it is pressed again, as before, but between warm plates. It is then fused, cast in large porcelain-lined iron moulds, of about 5 lbs. capacity each, and set by to crystallize. This is accomplished in 12 hours in winter; but in summer it requires twice the time. The crystallized cakes are placed in bags of horsehair, between plates of iron or zinc, in a hydraulic press capable of exerting immense pressure. The cakes are once more subjected to pressure in a press placed horizontally, the plates inclosing the cake being heated in this case by steam; this removes the last trace of oleic acid. The stearic acid is then melted together with dilute oil of vitriol (3° Baumé, 1.02 specific gravity), washed with water containing oxalic acid, and cast into slabs for the candle maker.

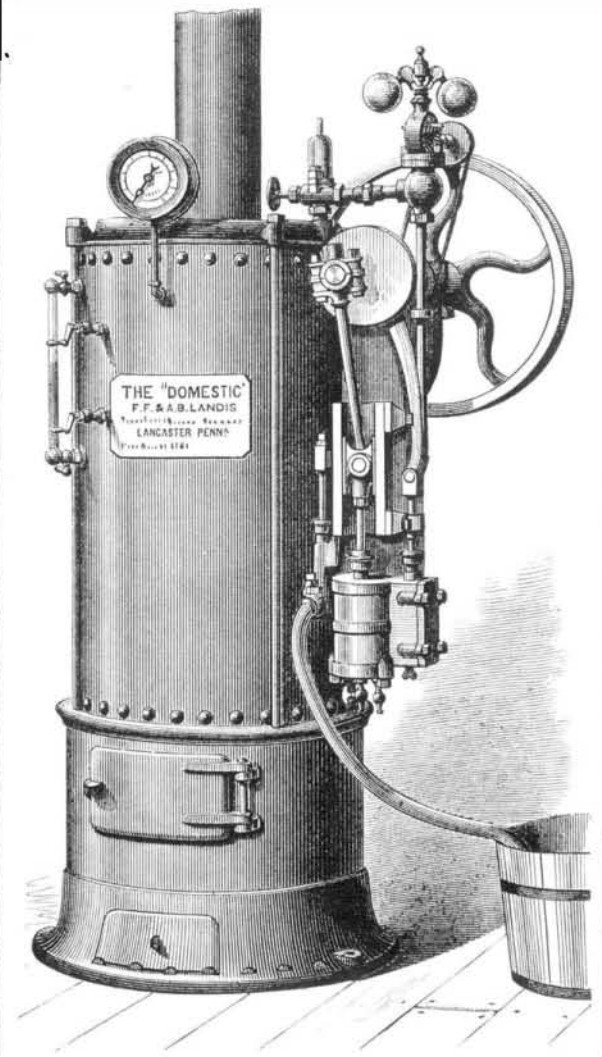
THE TANITE COMPANY'S NEW PLANER KNIFE AND STOVE PLATE GRINDERS.

The Tanite Company's "Automatic Planer Knife Grinder," illustrated in Fig. 1, is made in three sizes: No. 1 for 24 inch, No. 2 for 36 inch, and No. 3 for 48 inch knives. This company claims to be the first to conceive and bring into use the cup wheel, by which the unequal concave grinding, caused by the wear of wheel when used on its face or edge, is avoided. In this machine, the knife is ground with a straight bevel with no change until the wheel is worn out. This apparatus stands about 2 feet 11 inches high to top of wheel, and is 3 feet wide, No. 1 being 3 feet 3 inches, and No. 3, 5 feet 8 inches, long. It has a 1¼ inches steel arbor fitted with self-oiling boxes, with 3½ inches bearings; and it runs, we are informed, perfectly steadily when the wheel is making 1,500 revolutions per minute. It grinds smoothly, leaving no chatter marks upon the knife. Owing to their peculiar process of manufacture, the Tanite Company are enabled to furnish wheels that cut rapidly and with a very small degree of heat. The stove plate machine, which is represented in Fig. 2 is designed to meet the needs of stove manufacturers. It weighs about 720 lbs. The top of table, when horizontal, is 2 feet 9 inches from floor, and in area measures 24½ by 41½ inches; the front end of table can be elevated by means of a hand wheel and screw, so as to obtain, in combination with a cone wheel, any desired angle. The arbor is made of 1¾ inches steel, and has two bearings, one 6 inches, the other 8½ inches, long; and by means of the rack, pinion, and lever, it can be raised 6 inches if desired. The overhead work is very complete, the hangers having adjustable self-oiling boxes.

Both of these machines are of excellent workmanship, and of strong and durable material. For further particulars address the Tanite Company, Stroudsburg, Pa.

THE DOMESTIC STEAM ENGINE.

A new domestic steam engine of 3 horse-power, which is furnished at a very low price, is illustrated in the engraving



herewith given. In construction, this machine embodies many advantageous features. The bed, cylinder, steam-chest, both crank shaft bearings, and the guide lug are all cast in a single piece. The bed is oval in form and hollow, and the portion on which the cylinder is made serves as a feed water heater, wherein the exhaust steam is utilized. In order to protect the crank bearings from heating, due to their proximity to the boiler, they are made of the best Babbitt metal; and a chamber is provided beneath them into which the cold feed water is forced prior to its entering the heater. The chamber also tends to keep the other parts of the engine (except the cylinder, steam chest and heater, which should of course be as hot as possible) in a cool state. The crosshead, connecting rod, eccentric strap, and rod are constructed of cast steel. The crank shaft is of cold rolled iron; the pump barrel, stuffing box, valves, and chambers are of brass, and are disposed so that easy access to the packing may be had. The valves may be reached for repacking and adjustment by slacking one set screw without removing any of the pipes. The tops of the stuffing boxes are cupped so as to prevent water and oil running down over the engine. The piston is a solid casting; and in two grooves in its face are sprung metal rings, turned eccentrically, and larger than the cylinder. This is claimed to form an excellent self-adjusting packing. Lastly, the necessary drain cocks and an efficient governor are provided.

The cylinder diameter is 3 inches; stroke, 4 inches; diameter of fly wheel, 18 inches; and weight, 65 to 70 lbs. At 260 revolutions per minute, and under a pressure of about 100 lbs. of steam, the engine develops (per dynamometer) a little over 3 horse power. It is sold as of 1½ to 2 horse power, with a working speed of 300 revolutions. It may be attached to the boiler by bolts, or to a separate post.

The boiler has a cast iron base, forming fire box and ash pit. There is a fire brick lining which, it is claimed, on becoming heated tends to consume the gas generated. Holes through the smoke bonnet above the tubes are provided, so that the latter can be cleaned without removing the bonnet. Above the bonnet is a circular plate with corresponding apertures, which are, all but one, smaller than those through the smoke bonnet. By turning the plate so that the one large hole is successively brought over the tubes, the latter may be cleaned one at a time. The small holes serve as a damper, admitting cold air into the stack, and so checking the draft, and thus avoiding the necessity of opening the fire door. The boiler has all necessary attachments, and all parts of the engine are duplicated, so that they may be easily replaced.

For further information address the manufacturers, Messrs. F. F. & A. B. Landis, Lancaster, Pa.

Distance Indicator.

This improvement is by Captain Henry Watkin, R. A., being a hydro-clinometer designed for use in coast batteries, having a height of 90 feet and upwards above the sea level. It consists of a piece of wood about 2 feet 6 inches long, 3 inches deep and 1 inch thick. Imbedded in one side is a tube containing colored spirit, there being above the tube a scale graduated for yards. A small telescope is fixed at the top of the instrument at one end, the telescope having cross hairs similar to those in a theodolite. In using the instrument, the end furthest from the observer rests on the top of the box in which it is carried, the end next the observer, and which carries the telescope, being elevated by means of an adjustable brass arm or support. In taking a range all that is necessary is to sight the object and bring the cross hairs to cut the water line. The exact range is then ascertained by reading the figures on the scale at the level of the spirit, which gives it without any calculation whatever. The time required for the operation is about eight seconds, after which the object, if moving, can be continuously followed. After full trial, both at home and abroad, this instrument has been sealed for adoption in the British service.

Fig 1.

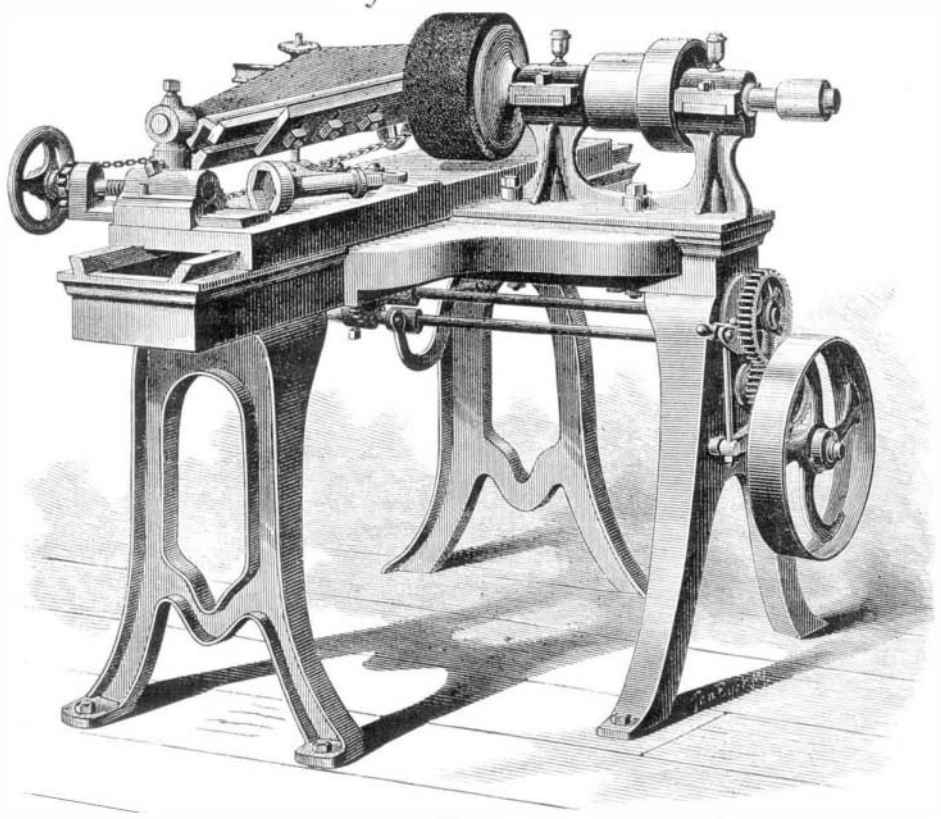
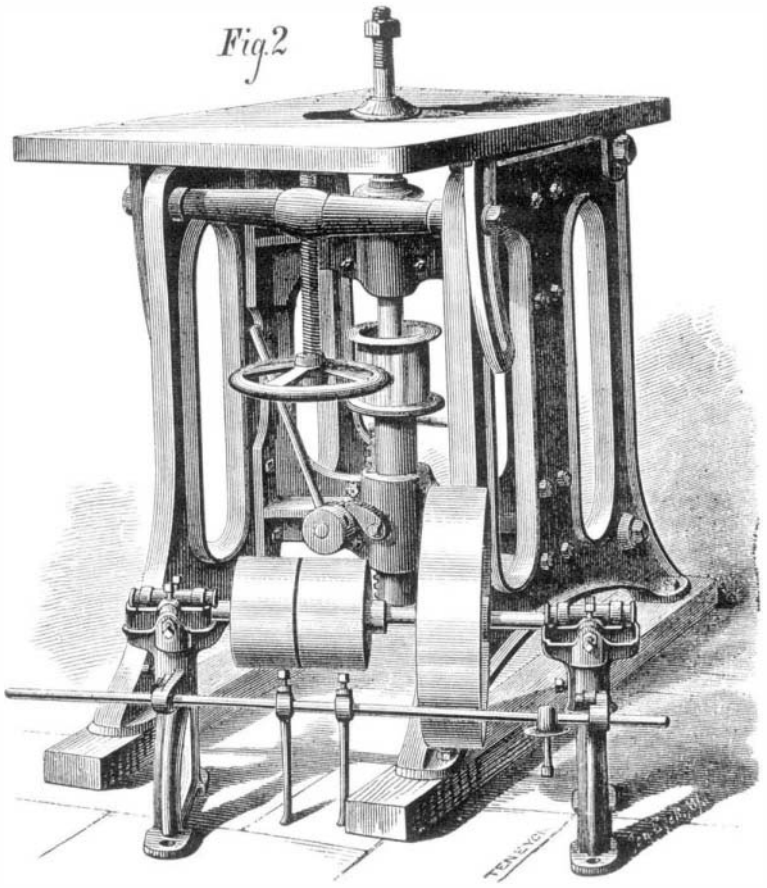


Fig. 2



THE TANITE COMPANY'S PLANER KNIFE AND STOVE PLATE GRINDERS