

### THE ECLIPSE STEAM ENGINE.

We illustrate herewith the well known "Eclipse" steam engine, as mounted on sills or skids, adapted for running saw mills, flouring mills, cotton gins, hoisting machines, ore washers, small steamboats, and for many other purposes, where economy of space and fuel is an object, and where a semi-portable steam engine can be used. These engines, since illustrated in the *SCIENTIFIC AMERICAN* of February 17, 1877, have been very much improved, making them, we are informed, still more durable, economical, and simple in construction. By the use of special tools and machinery, adapted to this class of work, these engines can now be constructed in large numbers. Accuracy and uniformity in workmanship are thus secured, and any part may be quickly and cheaply replaced. We are also informed that although these engines have been in the market less than five years, about 500 of them have already been sold, in all parts of the United States and in the East and West India Islands.

Fig. 2 shows the Eclipse semi-portable steam engine, which is of the horizontal style. The frame or bed comprises the one cylinder head, guides for cross head, and the two bearings for crank shaft, all in one solid casting, thereby making it impossible for the important working parts of the engine to get out of line.

The shape of this bed is the half of a hollow cylinder, except a small portion of one end, which is an entire hollow cylinder, with its one end closed by the formation of a flange or cylinder head, to which are bolted the cylinder and steam chest, which is also one solid casting. All the exposed parts of the cylinder are jacketed to prevent loss of heat by radiation. By this plan of constructing the bed plate the working strain is directly through the center of cylinder and pillow blocks, thereby making a very strong engine with the least amount of material. By this arrangement no strain from the working of the engine is thrown on the boiler; neither are there strains of any kind thrown on the boiler from unequal expansion, as there is an expansion joint between the engine and boiler. By making the bed plate as described, which is trough-shaped under the working parts, all the drippings from the stuffing boxes, bearings, etc., are kept from the boiler, thereby making it much easier to keep the boiler and engine clean.

The crank shaft is double, and is made of the best forged wrought iron, without weld or seam, and is balanced by means of cast iron counterweights, so that the engine may be run at a high rate of speed without injury to any of its parts. The connecting rod is of the best forged wrought iron, and fitted with boxes made of the best copper and tin, and provided with all necessary arrangements for taking up all lost motion.

The crank shaft bearings are very large and long, and are lined with best quality of anti-friction metal, and provided with side brasses for taking up all lost motion.

The piston and valve rods are made of steel, and the piston has an improved self-adjusting metallic packing, which requires no adjusting until worn out.

The heater is formed by a separate cast iron pipe bolted near its one end to the steam cylinder, and supported at the other end by a bracket over the bed plate. The water pipe passes several times through this heater, and is of sufficient length to heat the water nearly to the boiling point before it enters the boiler. These engines are provided with all the necessary valves, cocks, etc., to make a complete outfit. The pump is so arranged that either of the valves can be removed and examined and repaired while the engine is in operation, and without disturbing the pipe connections.

The boiler is of the locomotive pattern, with the water space extending entirely around the bottom, forming a mud drum. The boiler front is made of cast iron in sections, and

so arranged that the draught in passing to the furnace passes over the inside lining of the front, thereby keeping it cool and less liable to crack or burn out. This engine can very easily be dismantled from the boiler and used as a stationary engine, as shown in Fig. 1, which shows the engine on separate foundations. As will be seen no expensive foundations or separate wall are needed for carrying the end of the crank shaft, as both ends are supported on the bed plate, which makes it impossible to get out of line, no matter how poor the foundations may be or in what position the engine may be placed. By having all the parts combined as shown, they are more easily and quickly set up and operated. Ten sizes

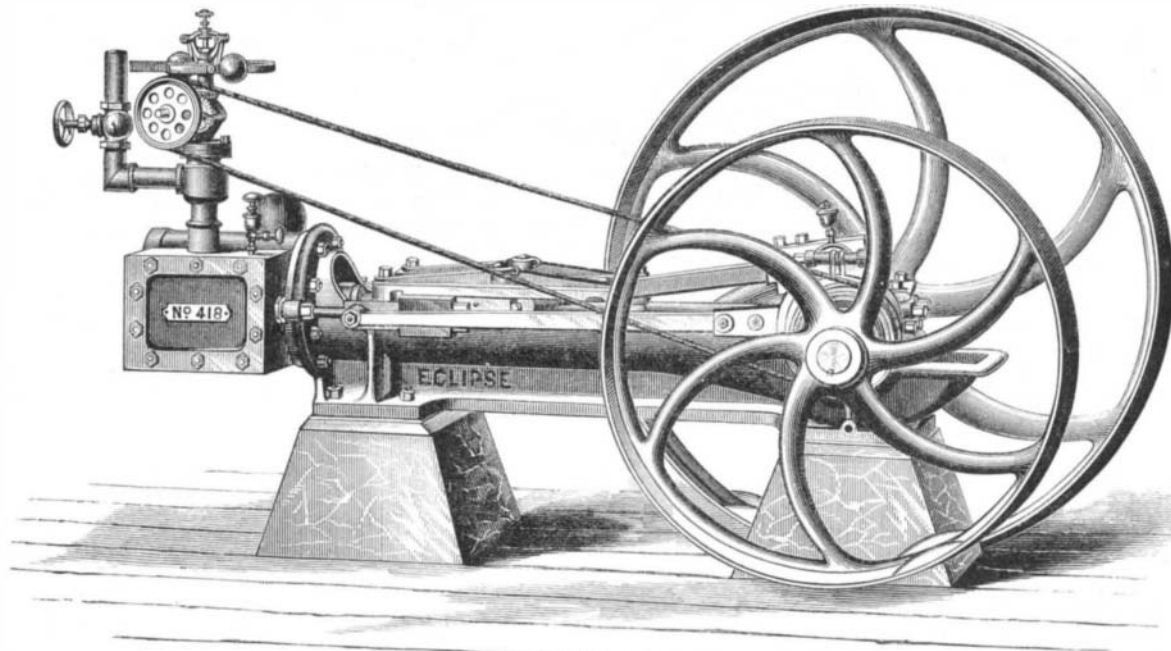


Fig. 1.—THE ECLIPSE STATIONARY ENGINE.

of these engines are manufactured, either as agricultural engines mounted on wheels for farm or plantation use, or mounted on sills or skids, and for stationary purposes, as may be wanted.

For further particulars of the Eclipse steam engines, and for illustrated and descriptive catalogues of stationary engines, boilers, and other machinery, address Frick & Co., Waynesboro, Franklin county, Pa.

### Oxalic Acid and Epsom Salts.

Some fatal cases have occurred caused by the great resemblance between these salts. They may, however, be readily

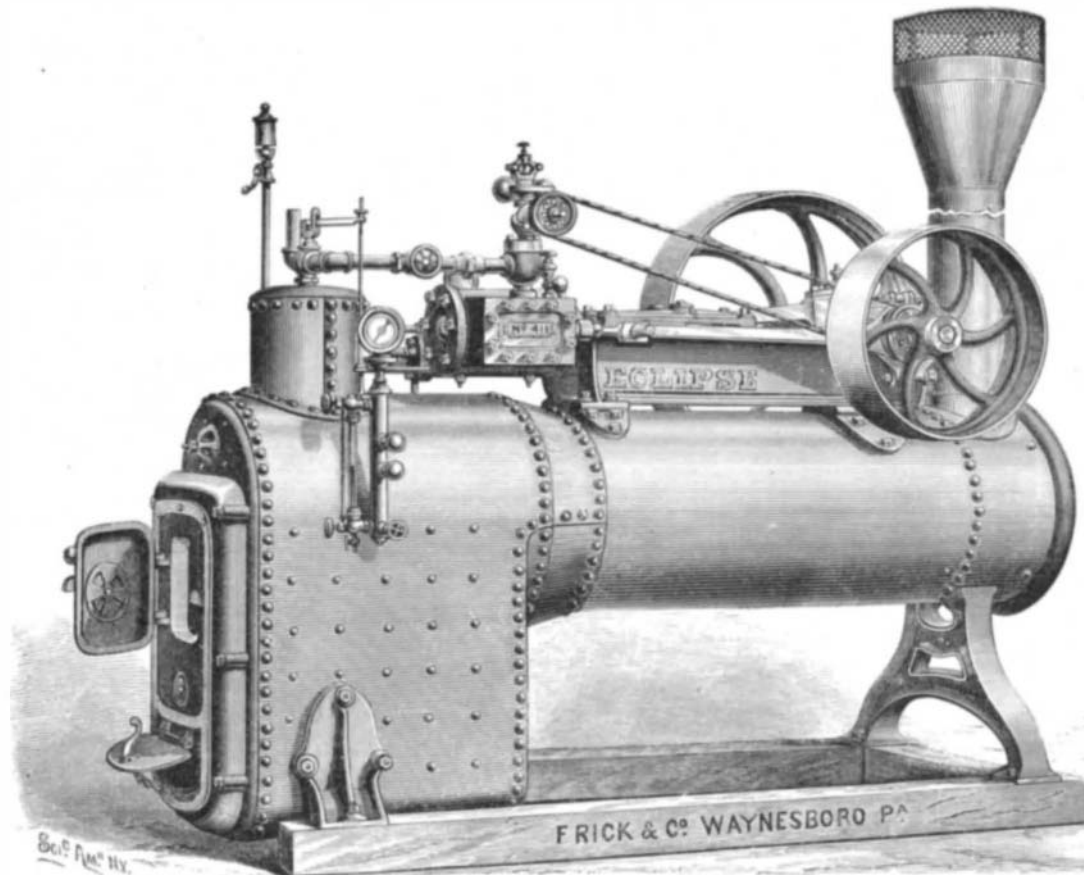


Fig. 2.—THE ECLIPSE SEMI-PORTABLE ENGINE.

distinguished from each other. The most simple test is by taste, oxalic acid being extremely sour, while Epsom salts is very bitter. Again: Oxalic acid mixed with carbonate of soda or of potash effervesces, and the liquid becomes transparent. On the other hand, Epsom salts thus treated turns the liquid milky and deposits a white precipitate.

LETTERS from our correspondents in various parts of the country show that a large number of small boats, propelled by steam, and built after the plans and suggestions given in the *SCIENTIFIC AMERICAN SUPPLEMENT*, will be tried this summer.

### How some Mysterious Boiler Explosions may Occur.

Every few months the community is shocked by a terrible boiler explosion, by means of which a large amount of valuable property and many human lives are sacrificed. We scarcely remember any investigation which resulted in bringing the blame clearly home to any one in particular. From the mystery usually thrown around these holocausts we have had numerous theories as to some inexplicable means by which the water is said to become decomposed, or the steam turn to gas, etc. There never was proved to have been a totally incompetent engineer at the bottom of the matter; and we suppose that if at any time during the past three

months the steam boiler at the armory of the Fourteenth Regiment in Kings county had exploded, the gaseous or some other equally mysterious theory would have been assigned as the cause. It almost makes one shudder to read the following, which we take from the *New York Herald* of March 19:

"At a meeting of the Military Committee of the Kings County (Long Island) Board of Supervisors yesterday, James McLeer, Colonel of the Fourteenth Regiment, stated that he had employed Charles E. Palmer to take charge of the boilers at the armory of the regiment because William McClosky, appointed by the Board in January last to attend to them, had asked where the safety valve was, and when told that it was in the ash pan he had looked there

for it. Colonel Briggs, of the Thirteenth Regiment, said that a Mr. Shepherd had been employed as engineer in his regiment's armory in place of Thomas Coyne, who was appointed by the Board of Supervisors, the latter having been found incompetent."

It is a matter of congratulation that engineers who look in ash pans for the boiler safety valves are scarce. It is sincerely to be hoped that the examiners who gave such an engineer (?) a certificate of competency forgot to question him upon either the location or use of the safety valve, otherwise some others of their licensees may very soon have to look for their boiler safety valves in the East River or upon a neighboring farm, or whithersoever the exploding steam may happen to send them or their fragments.

### New Inventions.

A device for Reefing Jibs, intended to obviate the necessity of going out on the bowsprit to furl the bonnet, has been patented by Mr. Edward Rowell, 2d. It consists in an arrangement of eyelets in the foot of the jib, and bull's-eyes attached to the upper edge of the bonnet, which are fitted to the jib eyelets and secured by a lace line which runs through all the bull's-eyes. The lacing is provided with a metallic end piece, fitted to a tack lock which is connected with the bolt rope and the bonnet.

An improved Ventilator has been patented by Messrs. I. W. Canfield, Jr., and C. H. Demarest, of Nyack, N. Y. A globular shell is carried upon guide arms at the top of the chimney or pipe, and it is extended rearwardly into a pipe through which the wind passes. At the mouth toward the wind a flaring conical pipe is inserted, the rear end of which passes the orifice of

the chimney and enters into the exit pipe mentioned. A vane regulates the direction of the apparatus.

Mr. C. J. Smith, of Norfolk, Va., has invented a Safety Stove, for use in railroad cars, etc., which he claims is practically indestructible, and may be inverted and rolled about without permitting the fire to escape. In addition to devices for securely closing the doors, flues, and other openings, the special feature is the addition of an annular air chamber at the bottom of the stove, formed between the stove cylinder and a surrounding casting, both of which are perforated, the object being to prevent burning of the floor.