

THE LITTLE GIANT STEAM ENGINE.

Another motor, designed especially to meet the requirements of those who need light power for manufacturing or other purposes, is illustrated in the engravings given herewith. It is curious to remark that a few years ago there was almost a dearth of motors of this description, and calls for them arose from scores of trades and from amateur workshops all over the country. At the present time, the mechanic finds the lack well filled, and he may take his choice among motors driven by steam, by water, by hot air, by oil, by gas, and by electricity, from any one of which he may obtain power, generally under 5 horse, or just sufficient for his particular want, from the driving of a sewing machine up to the running of the machine tools of a moderate-sized workshop.

The engine described below is a simple horizontal machine, presenting nothing intrinsically novel in its construction, connected, however, with a boiler especially adapted for it, and well suited for the economical supply of the small amount of steam required. The feature which will, above others, commend the apparatus, in its entirety, to steam users, will be its very low cost, as we know of no other efficient engine and boiler of one horse power sold at the price of one hundred and fifty dollars.

The shape of the boiler, which occupies about as much floor space as a small stove, will be understood from Fig. 1, and from the external casing removed in Fig. 2. The body, B, is made of lap-welded tubing, 10 inches in diameter, and is closed below with a cast iron cap, D, and surmounted above by the head, A. Twenty-nine water tubes, C, projecting into the fire space, are expanded into the portion, B. These are each 15 inches in length and extend upward to a point just below the water line. The couplings, E and F, are for connecting the feed pipes and the three smaller couplings, at the upper part of the boiler, serve for the attachment of the gage cocks. The outside dimensions of the one horse boiler are: Height 3 feet 4 inches, and diameter 18 inches. The diameter of the engine cylinder is 2½ inches, stroke 4½ inches, and about 300 revolutions per minute are made. Two larger sizes of engine, of two and three horse power respectively, are constructed, with boilers suitably increased in dimensions.

The D of the engine valve is worked by a single eccentric, and the valve rod is flattened so as to spring, thus avoiding the necessity of a joint. The pump is of the locomotive pattern and is driven from the crosshead. The governor is driven by a belt from a pulley beside the eccentric. All the parts are neatly finished and fitted, and the machine, as a whole, is very far from being the mere toy which, at first sight, would seem probable.

In point of safety, the boiler appears to be well constructed. The manufacturer claims that the bursting pressure is some 1,200 lbs. per square inch, and tests every boiler to 300 lbs. before sale. The working pressure runs from 70 to 300 lbs. The consumption of fuel is a scuttle or two of coal per day—no more than that of a small stove. The boiler, in fact, is a stove in itself, and might well serve to warm a shop besides driving the engine.

The manufacturer is Mr. Ward B. Snyder, of 84 Fulton street, New York city, who may be addressed for further particulars.

A MECHANICAL PHOENIX.

The bird of the old mythology which not only endured roasting with complacency, but sprung up fresh, and vigorous, from its ashes immediately after it had suffered cremation, was tame, torpid, and quiescent compared to the idea the latest form of which we herewith illustrate. Searching once in Ewbank's "Hydraulics" for a particular design for

a rotary pump, we found accidentally an engraving of a cylindrical pump, which "consists of two concentric cylinders and drums, the annular space between them forming the pump chamber; but the inner one, instead of revolving, is immovable, being fixed to the sides of the outer one or case. The piston is a rectangular and loose piece of brass or other metal, accurately fitted to occupy and move in the space between the two cylinders. To drive the piston, and at the same time to form a butment between the orifices of the induction and eduction pipes, a third cylinder is employed, to which a revolving motion is imparted by a crank and axle in the usual way. This cylinder is eccentric to the

illustrated by exactly similar drawings, as are set forth in the Belgian patent of A. J. Works, now resident in this city. (This is an admirable comment on the value of the enormously expensive system of examinations as to novelty, in which our Patent Office indulges at the expense of the inventor, and which results in delaying the issue of his patent.) But referring to *The Repertory of Arts* for the description of John Trotter's invention, we stumble across an engraving of a rotary engine invented in 1843, by Thomas Cochrane, Earl of Dundonald, which is almost line for line identical with the pump of Trotter (1805), and that of the other mechanic mentioned by Ewbank, and with the engine

patented by Works, and afterwards by Myers. Thus up to a recent date the machine had been invented five times and patented four.

A very little search lays open a new field bristling with rotary engines and pumps of the same design. Our contemporary, the *English Mechanic*, republished our engraving of the Myers engine, and immediately Mr. E. L. Voice writes to point out that it is identical with an English patent issued to a Mr. Newton, in 1864, and Mr. Andrew Leighton shortly afterwards claims that it was an original production of Mr. A. Higginson, of Liverpool.

Mr. Charles E. Moss, of Dublin, Ireland, a correspondent of the *Engineer*, sends a drawing of the same device, which is published in that journal, page 118, August 13, 1875. Mr. Moss does not appear to have heard of any other inventor of the engine or pump, but merely says: "It is superior to anything yet produced. I invented it and made a model of it in 1868." Total to date, eight inventors of the same device, six of which (and perhaps more) have received letters patent.

The McFarland rotary pump is substantially the same device, as will be seen

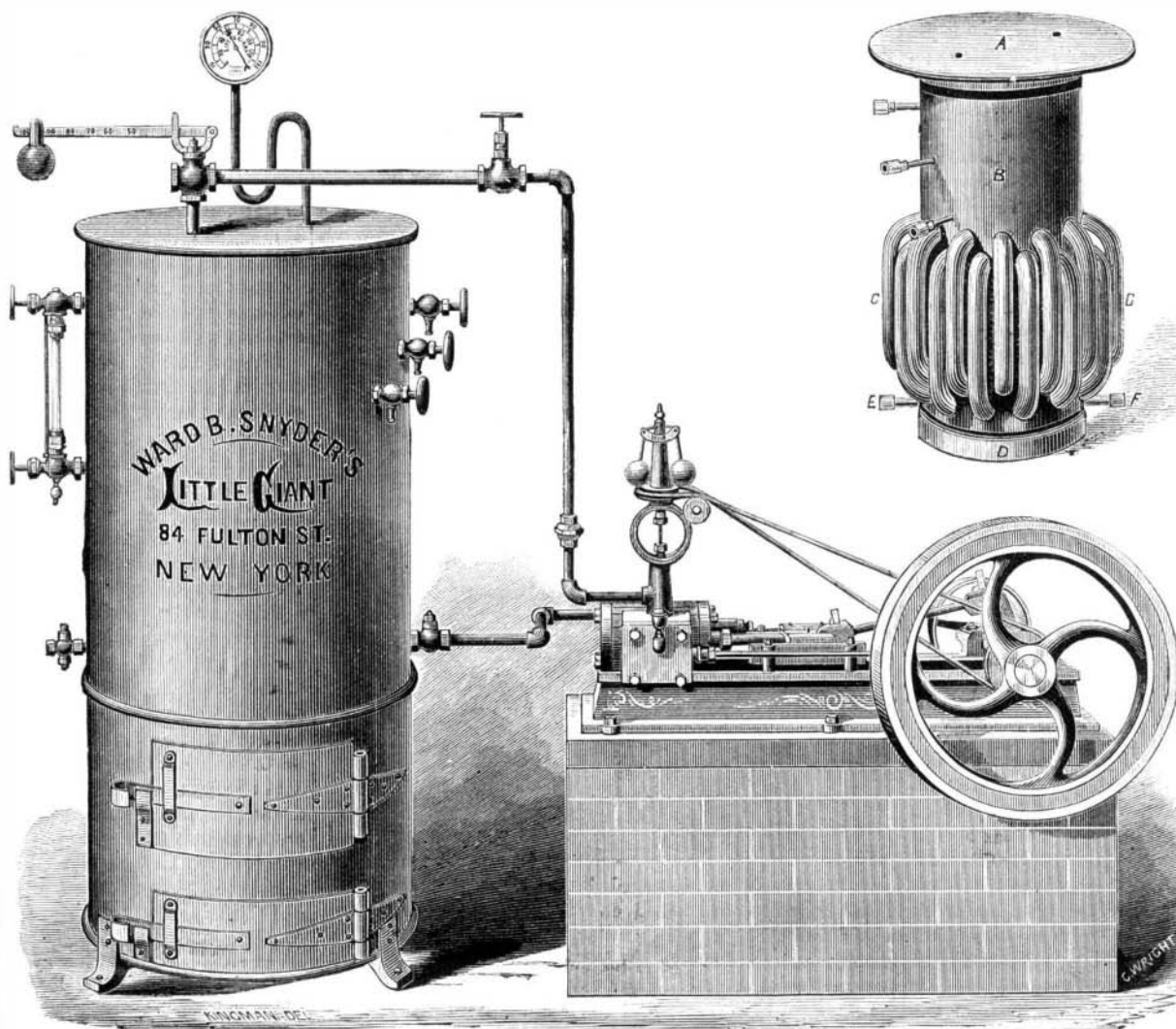
on comparing our engraving herewith with the Myers engine alluded to above. It is only fair to Messrs. McFarland, however, to say that, while the other patents are dead, their machine appears to be doing good work and giving general satisfaction. But the comparison of the following description (selected from *Engineering*) with the details of the Trotter engine, given above, will be sufficient to establish its identity.

In our engravings, Figs. 1 and 2 are respectively a longitudinal and transverse section of one of these pumps adapted for lifts up to about 60 feet, while Fig. 3 shows the slightly modified construction adapted for higher lifts. Referring to Figs. 1 and 2, it will be seen that the pump consists of an outer casing, into one side of which a shaft enters eccentrically, this shaft having keyed upon it a drum of such diameter that it just touches the interior of the casing on one side, as shown in the engravings. On the cover which closes the outer casing, on the side opposite to that on which the shaft enters it is formed a long boss which is concentric with the casing, and which passes into the driving drum already mentioned as being keyed to the shaft. On this boss are mounted three arms which are capable of revolving freely, and which pass out through three slots formed to receive them in the driving drum. The outer extremities of these arms fit against the interior of the casing, as shown in Fig. 2.

It will be seen from the engravings that, as the shaft revolves in the direction of the arrows, the driving drum carries round with it the

arms turning on the boss of the cover, and each arm as it passes through the upper third of its revolution sweeps before it a charge of water, filling the upper part of the pump. In the earlier pumps two chambers were used, each being fitted with two arms; as now made, however, but one chamber is employed, this being fitted with three arms as we have explained. It will be seen on reference to Fig. 2 that, owing to these arms only acting through the upper third of their

Fig. 1.



SNYDER'S LITTLE GIANT STEAM ENGINE

others, and is of such a diameter and thickness that its interior and exterior surfaces touch the inner and outer cylinders, the places of contact preventing water from passing. . . . This machine was originally designed, like most rotary pumps, for a steam engine. It was patented in England by John Trotter, in 1805, and is described in *The Re-*

Fig. 2.

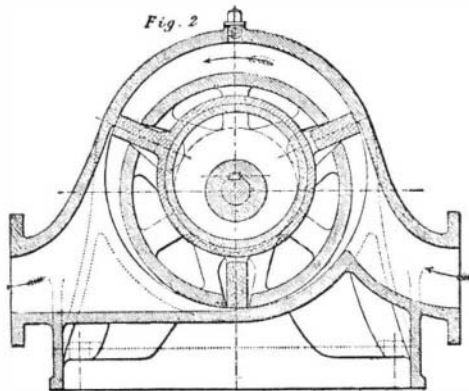


Fig. 3.

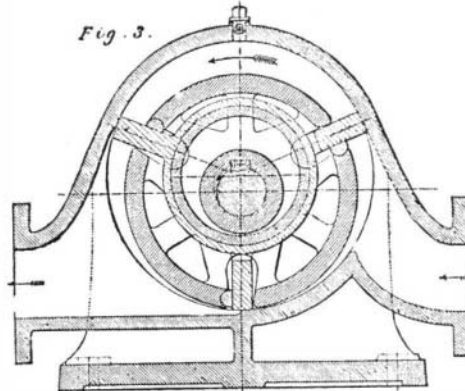
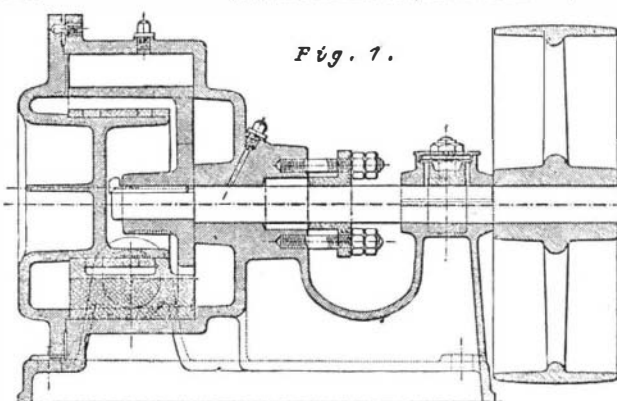


Fig. 1.



THE MCFARLAND ROTARY PUMP.

pertory of Arts, volume IX., second series." Ewbank further states that it was re-invented afterwards by a mechanic who was greatly distressed on finding that he had been anticipated.

A glance at the engraving in Ewbank's work shows that the invention is almost identical with the Myers rotary engine, illustrated on page 303 of our volume XXXI; and Myers obtained an American patent for exactly the same claims,