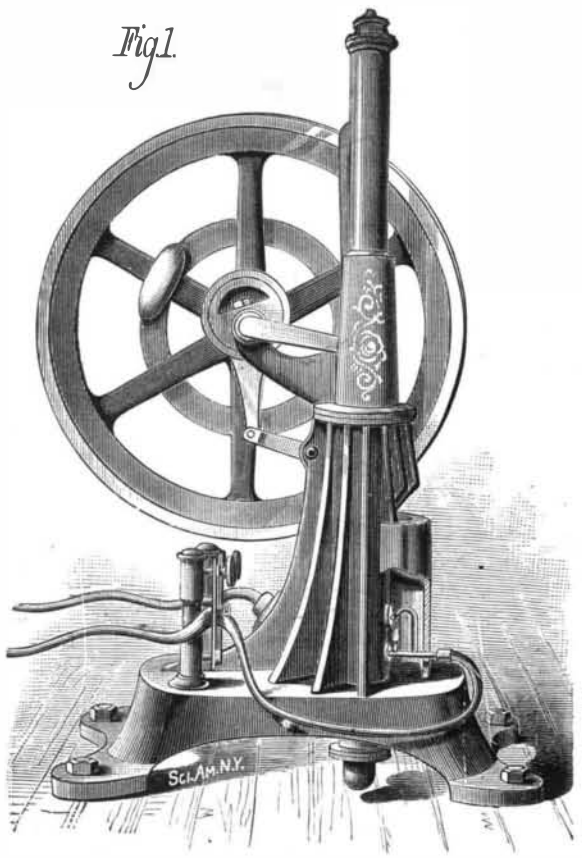
A NEW GAS ENGINE.

A workman who has a lathe or two to keep going in his own house, or any other such small machines, commonly worked by hand or foot power, requires often enough not a tenth of a horse power to keep his work going, while the price of a suitable motor quite puts it beyond his reach. Bisschof's engines, one of which we illustrate in Figs. 1 and 2, have been designed to meet these wants both as to size and price. Quite a number of them were shown at the Paris Exhibition, not only those specially exhibited by the makers, Messrs. Mignon & Rouart, of Paris, but also others actually at

Fig.1.



BISSCHOF'S GAS ENGINE.

work in different parts of the building, placed there in connection with the small machines which they were driving. It is intended for working at the rate of "one man power," or about 1-12·5 of a horse power, and its price is about $110. A larger size, "four man power," about one third of a horse power, is also made, at a price of about $190.

The construction of the machine, as shown in our engravings, is exceedingly simple. It has only two principal castings—a base plate, with which the vertical cylinder is cast, as well as the valve chamber—and the cylinder cover and stuffing box, prolonged above to form a guide for the piston rod head, and having the bearing bracket for the shaft cast along with it. The space above the piston communicates freely with the air by the rectangular opening in the sides of the cylinder near the top. The bottom of the cylinder has a single port communicating with the chamber of a plain piston valve, the only valve used, which when raised opens communication with the exhaust, and when down (as in position shown in Fig. 2), puts the cylinder in connection with the gas and air inlet openings. This valve is worked by an ordinary eccentric through the intervention of a rocking lever. The eccentric is placed about 135° in advance of the crank. About a third of the stroke up the cylinder there is a little opening on one side of the latter, opposite which, outside, is the nozzle of a small gas pipe; and directly below this nozzle there is an ordinary burner, connected with the same pipe, the gas at which is kept always lighted. The arrangement is seen best in Fig. 1, from which also it will be seen that the two burners are protected from draughts by inclosure in a box casing. The upper burner is the real ignition jet; the function of the lower one, which is burning continuously, is simply to relight the other when it is blown out. The gas supply pipe is on the side next the fly wheel, and on the other side is the pipe of the ignition jet just mentioned. The crank shaft lies across the machine, a considerable distance from its axis, the apparent irregularity of action of this arrangement being ingeniously taken advantage of, as will be seen.

The action of the machine is as follows: The piston being at the bottom of its stroke is at first raised by the energy stored in the fly wheel and counterweight, and draws into the cylinder the mixture of air and gas through the valve. As soon as the bottom of the piston rises above the opening in the cylinder side above mentioned, the jet outside explodes the mixture, and the explosion drives the piston to the top of its stroke. In the expansion thus brought about the pressure under the piston falls below that of the atmosphere, so that in its descending course the piston is at first driven downwards by the atmosphere acting upon it. This helps to make the machine work more uniformly, although, of course, it is in reality only a single acting. The position of the connecting rod is so adjusted that it has a very direct pull on the crank just when this is most wanted, during the time when the explosion drives the piston upwards. Its oblique position comes only when the piston is descending, and for the most part when the connecting rod is doing no work, being simply carried down by the fly wheel. So far, therefore, as oblique pressures are concerned, the skew action of the connecting rod and its extreme shortness do not do any harm, while the arrangement adopted reduces the space occupied by the engine to very small dimensions.

Each of the two India rubber gas pipes is carried through a spring closer, as shown in Fig. 1. This consists simply of an upright bracket, having a thin flat spring carried up beside it, adjustable at the top by a milled finger nut. The pipe is held between the spring and the standard, and can be closed at will by turning the nut, which gives a very fine adjustment for regulating the quantity of gas passing. An eye is attached to the center of the spring for the purpose of carrying away a cord from it, so that the workman can adjust the gas supply without leaving any machine at which he is occupied.

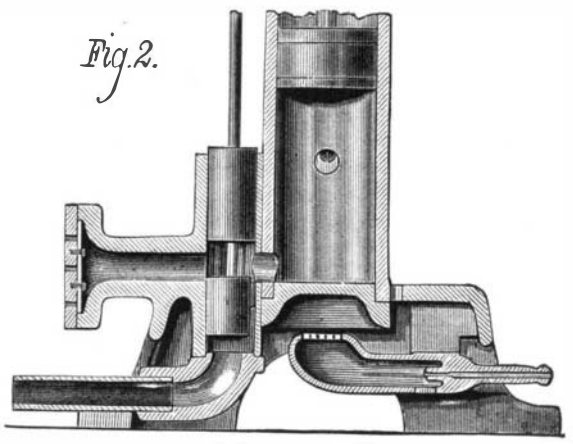
This machine works without grease or other lubricant on either valve or piston; it requires no water for cooling. The heat from the cylinder is got rid of sufficiently quickly by radiation, a number of radial ribs being cast from the cylinder to increase its surface for this purpose, with results, we understand, quite satisfactory. We are informed that on one occasion one of these engines ran 47 days and nights without stoppage and without attention, certainly no small feat for such a machine, and one which seems to bear out the points in its working just mentioned.

The little apparatus shown below the cylinder in Fig. 2 is a burner for heating it before starting. The India rubber pipe for the ignition jet is slipped over the nozzle shown to the right of the figure, and about eight minutes' burning is sufficient to heat the engine, if it has been previously quite cold, as much as is required. If the machine has been working, but has been standing for more than about twenty minutes, it is also advisable to apply the heater; in this case a couple of minutes suffice.

When working at its nominal power the engine should run from 100 to 120 revolutions a minute; for a much less power, say $\frac{1}{25}$ horse power, at from 60 to 70 turns; $\frac{1}{8}$ to $\frac{1}{10}$ horse power, at 130 to 145 turns per minute. To get the machine to work steadily at very small powers, it is necessary to carry a weighted cord round the fly wheel to act as a brake and increase the resistance.

The machine illustrated is said to use 11·6 cubic feet of gas per hour when doing work at the rate of one man power. This is equivalent to about 145 cubic feet per horse power per hour. This is of course a vastly higher consumption than that of some of the other forms of gas engine, as is inevitable from the less perfect design of the machine, but still it only amounts to a cost of about 3 cents an hour for gas, at the rate of $2.50 per 1,000 cubic feet. We are very glad to be able to illustrate such a machine as M. de Bisschof's, which, however rough its construction may be, meets with reasonable efficiency the great want of a prime motor at once cheap

Fig.2.



BISSCHOF'S GAS ENGINE.

in first cost, suitable for use in common houses, and capable of working at very small powers with something like a correspondingly small expense, and free from all risk of explosion.

Useful if not New.

The following simple rules for preserving health and promoting personal comfort, if not new to some of our readers, are none the less important to every one.

The object of brushing the teeth is to remove the destructive particles of food which by their decomposition generate decay. To neutralize the acid resulting from this chemical change is the object of dentifrice. A stiff brush should be used after every meal, and a thread of silk floss or India rubber passed through between the teeth to remove particles of food. Rinsing the month in lime water neutralizes the acid.

Living and sleeping in a room in which the sun never enters is a slow form of suicide. A sun bath is the most refreshing and life giving bath that can possibly be taken.

Always keep the feet warm, and thus avoid colds. To this end, never sit in damp shoes or wear foot coverings fitting and pressing closely.

The best time to eat fruit is half an hour before breakfast.

A full bath should not be taken less than three hours after a meal. Never drink cold water before bathing. Do not take a cold bath when tired.

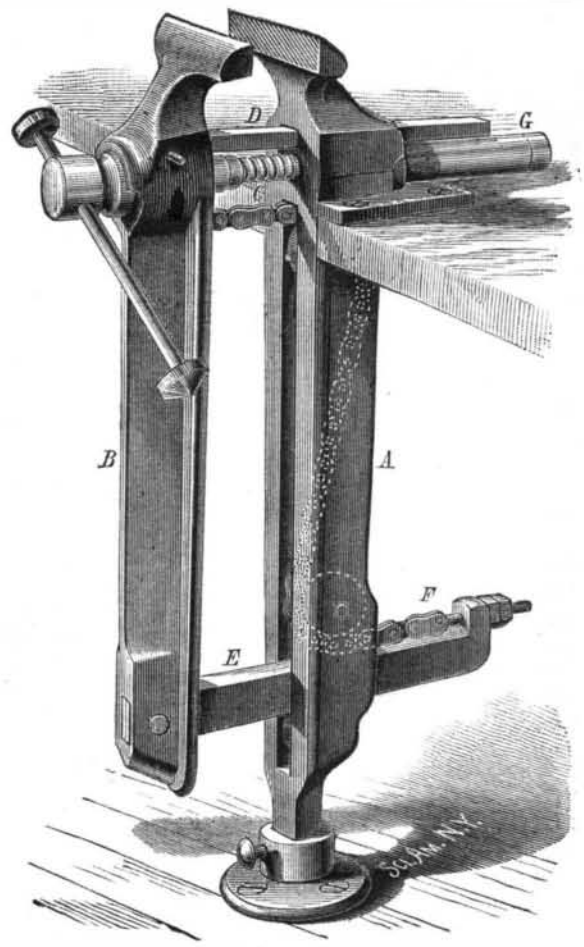
Keep a box of powdered starch on the washstand; and after washing, rub a pinch over the hands. It will prevent chapping.

If feeling cold before going to bed, exercise; do not roast over a fire.

A NEW PARALLEL VISE.

No tool in the shop receives the hard usage that naturally comes on the vise, and no tool is of greater utility, and yet, strangely enough, it is rarely that a vise can be found that is in really good order. This is partly due to faulty design, partly to poor materials and workmanship, and partly to the user.

The accompanying engraving represents a vise having



SOLOMON'S PARALLEL VISE.

many good qualities, and which received at the last Exhibition of the American Institute a medal of superiority.

This vise was recently patented by Mr. J. K. B. Solomon, and is manufactured by Messrs. Taylor & Corser, of Riegelsville, Warren Co., N. J.

The jaws, A B, which are of the long pattern, are drawn together by the screw, C, and guided by the bars, D E, which are fixed in the jaw, B, and pass through mortises in the jaw, A. A chain, F, is attached to the jaw, B, just below the screw, and passes over a pulley in the upper part of a slot in the jaw, A, and under a pulley in the lower end of the same slot, and is provided with a threaded rod which passes through an ear formed on the end of the bar, E. By means of this rod the chain is adjusted. The lower bar, E, rests upon a roller journaled in the lower end of the slot in jaw, A. The box, G, which contains an internal thread for receiving the screw, C, has a flange which drops into a socket in the back of the jaw, A, and is prevented from turning by the bar, D.

It is obvious that when the jaws are opened the chain, E, will cause the lower end of the jaw, B, to move as rapidly as its upper end. It is claimed by the manufacturers that this construction not only secures the parallelism of jaws, but it also renders them very effective.