Improvement in Engine Governors.

For all stationary engines the governor is absolutely necessary. So much importance is attached to its proper action that it is not surprising that it has been the subject of numerous patents. The governor, to be effective under all circumstances, should act quickly, if not instantly, when resistant force is suddenly added to, or suddenly thrown off the engine; it should maintain an equable speed under occasional and moderate variations in the force to be overcome, and should entirely close the inlet valve should the belt that drives the governor be thrown off or break. It would seem, from an examination of the governor shown in the engravings that these requisites are fully met in this improvement, and this opinion is borne out by letters from the managers of concerns in which this governor has been used for months.

A brief description of the invention aided by a reference to the engravings, will enable the engineer or mechanic to easily understand its construction and operation. Fig. 1 is a perspective view of the governor with its attachments complete and Fig. 2 a vertical section of the valve chamber and its parts. The valve chamber, A, may be either rectangular, as seen, or of other external form, as may be desired. Interiorly the chamber is divided by a partition of an angular S-form, the horizontal portions of which are connected by vertical walls and by the walls of the valve chamber. The two upper horizontals of the diaphragm are bored to form seats for the valve, which consists of three disks attached to the upright valve stem and connected by wings or ribs, being either straight bars or of a spiral form; the latter preferable, as the movement of the valve or combined disks is similar to that of a piston in a cylinder, and the spiral form of connection insures an even bearing and wear against the sides of the apertures forming the valve seats.

In the sectional engraving the valve is shown open. B being the inlet for the steam, the arrows show the directions the steam will take, when admitted, and its escape through the passage, C, to the steam chest. It will be seen that by the provision of double ports for the valve a much smaller valve than is usually employed can be used, which, of course, is an improvement, as its movement can be much more easily governed. The inventor says that the area of an ordinary governor valve of two inches diameter is 3·1416 square inches and that this area may be obtained by the use of one of his improved valves of only one and a half inches diameter.

The valve stem coupling is connected to the governor stem by the ordinary swivel. In this coupling is a slot to receive the end of a lever, D, carrying an adjustable weight seen in Fig. 1, the fulcrum of the lever being on a stand rising from the valve chamber. It is evident that this weighted lever may be used to give a variety of speeds to the engine, or to adjust the speed to the number of revolutions. It is plainly seen, also, that the weight of this lever, when not counterbalanced by the centrifugal motion of the governor balls, will effectually close the valve and prevent the inlet of steam. Thus, if the governor belt should break, or be suddenly thrown off, the valve would close and the steam be cut off. So, also, when the engine is stopped no steam could reach the steam chest and cylinder through the valve chamber. To keep the valve open when about to start the engine, a weighted catch, E, is used to hold the lever, D, up. Soon, however as the velocity of the governor is sufficient to raise the balls and the lever, the catch is released, and falls by its own weight to the position shown in the dotted lines at E, Fig. 2, leaving the lever ready to act in case of accident.

Patented June 9, 1868, by William Bellis, whom address for additional particulars at Richmond, Ind.

Fig. 1

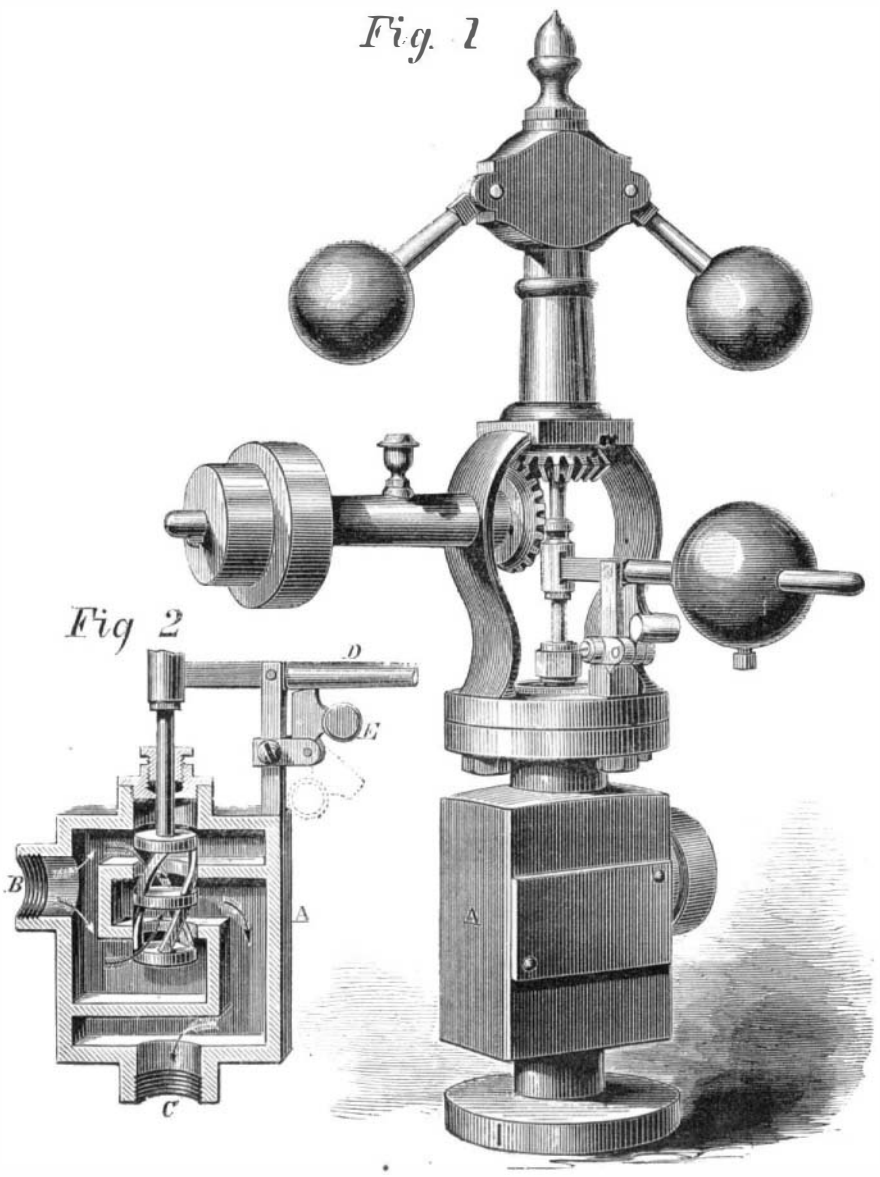


Fig 2

BELLIS' PATENT ENGINE GOVERNOR.

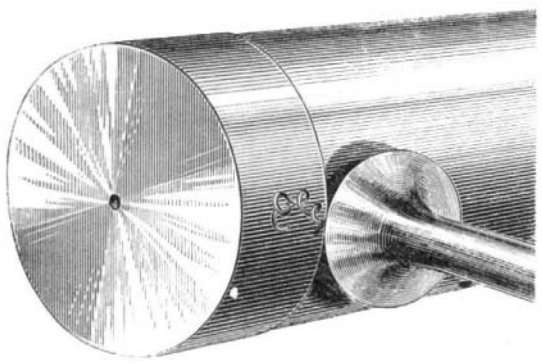
MECHANICAL PRACTICE AT HOME---THE FOOT LATHE.

Foremen of machine shops get their best material for apprentices from the farm. In this statement all managers of shops who have had a lengthy experience will coincide. Why is it? These farmer boys perhaps never saw a machine shop or foundery, yet they betray an aptitude and a liking for the work of the machine shop seldom shown by the city bred boy. To be sure, the lad whose early life has been spent in a manufacturing town or village where the hum of the spindle and the clatter of the loom, or the detonations of the hammer daily assaulted his ears, takes readily to the duties and discipline of the machinist's apprentice; yet frequently the farmer's boy becomes the most intelligent and successful workman. We answer our question by the simple statement that farmers' boys are compelled to practice mechanics in their daily labor. It is not always convenient to stop work and run or ride to the blacksmith's shop whenever any portion of a implement gives out by breakage or wear; and the farmer's boy is compelled to repair the break, often by the use of very inferior tools. He is largely employed in mending, repairing, and making on rainy days and in winter. Even his playthings are more frequently made by himself than bought at the "store." He thus becomes, insensibly perhaps, a mechanic; at least he learns the first lesson of the mechanic's apprentice, the use of tools.

Every farmer should have a shop room fitted up with such tools as are used by the carpenter, joiner, machinist, and blacksmith, or with those that would be valuable in making repairs. Above all, we consider a good foot lathe very desirable. It would be impossible within the limits of a newspaper article to merely notice the advantages of this machine and its varied uses. A good foot lathe costs from sixty to one hundred dollars and the money is well expended in the purchase. Articles of use and ornament made of wood, ivory, and metal may be turned out by the foot lathe convenient for use in the house or on the farm. The practice on the lathe is one of the most fascinating pastimes for a stormy day or an unemployed evening. Apart from its use in making and repairing, the foot lathe is a pleasant companion for the business haunted and brain weary. One who adopts it as a companion of his leisure hours will soon become an adept, and the more he uses and becomes acquainted with his machine the better he will like it. He will be surprised at the number and elegance of the little articles of use and ornament he can produce from the rough material, and at the pleasure that the practice of a mechanical art will afford.

HAND TOOLING---THE BUTTON TOOL.

There is little doubt that the practice of hand-tooling for turning metals is not so extensively practiced in this country as it might be with benefit. The superiority of hand tooling over the absolute action of the fixed tool in the engine lathe,



under some circumstances, is as apparent as is the hand turning of wood over the work performed on the automatic lathe. In our experience as a practical workman we derived great benefit from our knowledge of the use of hand tools. There are various forms of these tools, and they can be made from worn out files or from steel bars, as may be desired. The ordinary triangular file makes a very handy turning tool—in fact it may be ground in three forms, each of which are useful in particular cases. The ordinary flat file is very useful in smoothing or finishing. A square file or square bar, ground at an angle across the corners, is a valuable tool. We show, however, one not so frequently employed as its merits deserve. It is called the "button tool," from the form of the head or cutting portion. (The artist has made the head a graceful bell shape, which is not absolutely necessary). The tool is made by upsetting the end of a steel bar or rod and forming the head in a die. The shape of the head is precisely like that of a common wood screw, and the shank being cylindrical no obstruction to its gradual rotation in the hands of the workman is offered. The tool being fastened in a common chisel handle engages with the work as shown, and while the shank bears upon the rest the hand keeps it against the work and steadily rotates it. In sharpening it the face of the tool is placed against the grindstone and is turned gradually until a perfect edge is secured around the whole circumference. Further description is unnecessary.

CONDENSATION IN STEAM PIPES---LOW PRESSURE.

A correspondent says: "I notice on page 375, last volume, your three line article on steam pressure in the boiler and cylinder being necessarily unlike. How much is the allowance for friction and condensation in the pipes? Please show the probable and actual differences between boiler and piston pressure." Our correspondent misquotes our statement, which was: "Steam pressure in the boiler and steam pressure on the engine piston are not necessarily alike. Allowance must be made for condensation in conveyance by pipes." Our object in stating this self-evident truth was to intimate to engineers and others that in estimating the pressure upon the piston of the engine, as that shown by the gage on the boiler, they may not be correct. Indeed, they are frequently far out of the way. The condensation of the steam in the connecting pipe between boiler and engine is more or less, according to circumstances. If the steam is led through a pipe undefended from the atmosphere, the pipe being fifty or a hundred feet long, as is sometimes the case, it is evident that quite a large percentage of the steam will be condensed, and reach the cylinder in a state of mere vapor, the whole body of steam being lowered in temperature, and its pressure consequently diminished. But if the steam is taken directly from the boiler into the cylinder, as in those portable engines where the engine and boiler are closely connected (the cylinder attached to the top or side of the boiler, and the connecting pipe being only a few inches long), the loss of heat and consequent pressure would be inappreciable, and, therefore, the boiler pressure could be safely taken as an indication of that in the cylinder.

Our correspondent's question as to the amount of condensation and friction is sufficiently answered by the above. As no two circumstances are alike, no unvarying rule can be given; it must be left to the judgment of the experienced engineer or millwright. It is safe, however, to observe the following suggestions, or to approximate to them: Place the engine as near the boiler as possible. Use steam pipe of generous size, with the elbows of much larger transverse area than the straight pipe. If gates are used, let them have large apertures, so as not to "cramp" the steam, and, finally, insulate the steam pipe thoroughly by good non-conducting lagging, or by boxing it with sawdust, tan, or some similar substance. It is well, also, to have a little drip pipe, through which the condensed steam may be drawn off before starting the engine, so as not to depend entirely on the cylinder pet cocks. The working of water in a cylinder is terribly straining.

The Herring Fishery of 1868.

Dr. Louis Feuchtwanger has lately returned from a trip "Down East," and sends us some facts in regard to the eastern herring fishery. He says this season has been one of the most prolific of herrings known for many years, 50,000 herrings being taken at one haul. On the 12th of October 80 hogsheads of herrings were taken at one haul and 30 hogsheads two tides before. Every two hogsheads will yield one barrel of fish oil worth in the market $22·50 per barrel, the oil being used in currying leather and for mixing with other fish and lubricating oils. Beside this product the remains of five hogsheads of fish will produce one tun of pumice or fish guano, the best fertilizer known, and used to mix with inferior guanos and the superphosphates of the various brands, and worth by itself $20 per tun. If mixed with sulphate of soda or even plaster (sulphate of lime) intended for absorbing the ammonia produced by their decomposition, it is not excelled in value by the best Peruvian guano. These facts prove the profitableness of this branch of industry.

The Dunderberg Not a Failure.

The ram, *Dunderberg*, which was sold to the French government a year ago last summer, has withstood batteries of adverse criticism, to which, unlike the more solid compliments of an armed enemy, she was unable to reply. In addition to the attacks made upon her when she was the property of her builder, it was stated, after her sale to the Emperor of the French, that she was a mere tub for sailing qualities, and a mere eggshell for defensive purposes. Time and trial have, however, refuted one of these calumnies, as we learn that the *Rochambeau neé Dunderberg* performs her fourteen measured miles with ease. We are glad to hear that the reputation of her enterprising builder has been sustained.