AN AIR COMPRESSOR FOR VARIABLE PRESSURES.

At the recent meeting of the British Association, Leeds, a paper was read by Mr. Henry Davey "On a New Form of Air Compressor for Variable Pressures," which he has recently designed. It is illustrated and described by *Engineering* as follows:

When compressed air is stored for power, for blowing fog signals, or for other purposes, the work to be done is to fill receivers to a high pressure, beginning with a low pressure. Taking the case of a minimum of 20 pounds and a maximum of 200 pounds per square inch, it is evident that if an ordinary air pump were made so

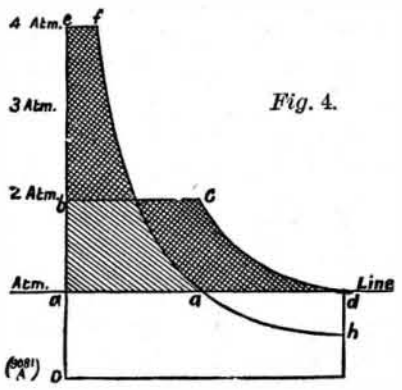

Fig. 4.

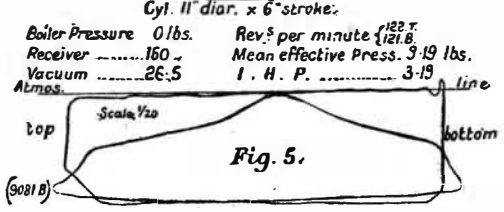

Fig. 5.

large that it would take up all the power of the engine at 20 pounds, it would be too large for any other pressure, and enormously too large for the 200 pound pressure. The old plan was to have two or more pumps, of different sizes, and put one or more pumps in gear with the engine, as the pressure varied. The plan was, however, complicated and non-automatic in its action. Mr. Davey's new pump is capable of being made of sufficient size to take up the full power of the engine at the lower pressure, automatically suiting its action to any higher pressure it may encounter, always utilizing the full power of the engine. By making the quantity of air to be compressed per stroke to vary inversely with the pressure, the air pump will encounter a constant resistance with varying pressures. The area of the air pump diagram should remain constant, as illustrated by the diagram, Fig. 4. The explanation of the diagram was given by the author as follows: Let the receiver pressure be two atmospheres, then the compression diagram would be *a*, *b*, *c*, *d*; but should the receiver pressure be anything greater, say four atmospheres, then the compression diagram would be *a*, *e*, *f*, *g*; the areas of the two figures being exactly the same, and that holds good for all pressures. In the first case the air pump would have taken in a full charge of air. In the second the supply of air to the pump would have been cut off at the point *g*, a partial vacuum being formed while the piston moved from *g* to *h*, the air being compressed along the same line on the return of the piston from *h* to *g*; the action and reaction, as far as this part of the curve is concerned, being equal.

The pump is proportional in size to the lower pressures and in strength for the higher pressures. At the first it takes a full charge of air during the suction stroke, but as the pressure rises, the admission on the suction stroke is cut off before the end of the stroke by means of a governor. The engine itself has no other governor than the resistance of the air pump. The steam is always full on, so that the maximum work is always got out of the engine.

In our illustrations, Figs. 1 and 2, a Davey hopper boiler and motor combined are shown with an air pump attached. This is one of several sets which have been made for working fog signals; a position in which the pressure often varies from 20 pounds to 200 pounds per square inch. The pump is reversible, and may be made an exhauster for producing various degrees of exhaustion. The combination of motor and hopper boiler make it especially applicable for working the pneumatic dispatch in offices and other places. Even with constant pressure the plan is valuable, because it admits of the employment of the largest air pump possible, which, if too large, adapts itself to the power of the engine. The compressors illustrated have been made to the order of the Trinity House authorities, to place on the Bishops Rock Lighthouse. They are, as stated above, worked by a pair of Mr. Davey's safety motors with hopper boilers. The base of the motor forms the surface condenser, which is kept cool by natural circulation from a tank formed on the parapet of the lighthouse. Fig. 5 shows diagrams from one engine. We may add that a pair of Mr. Davey's 10 horse power motors with compressors have been working the fog signals on the Kentish Knock Lightship for some time past.

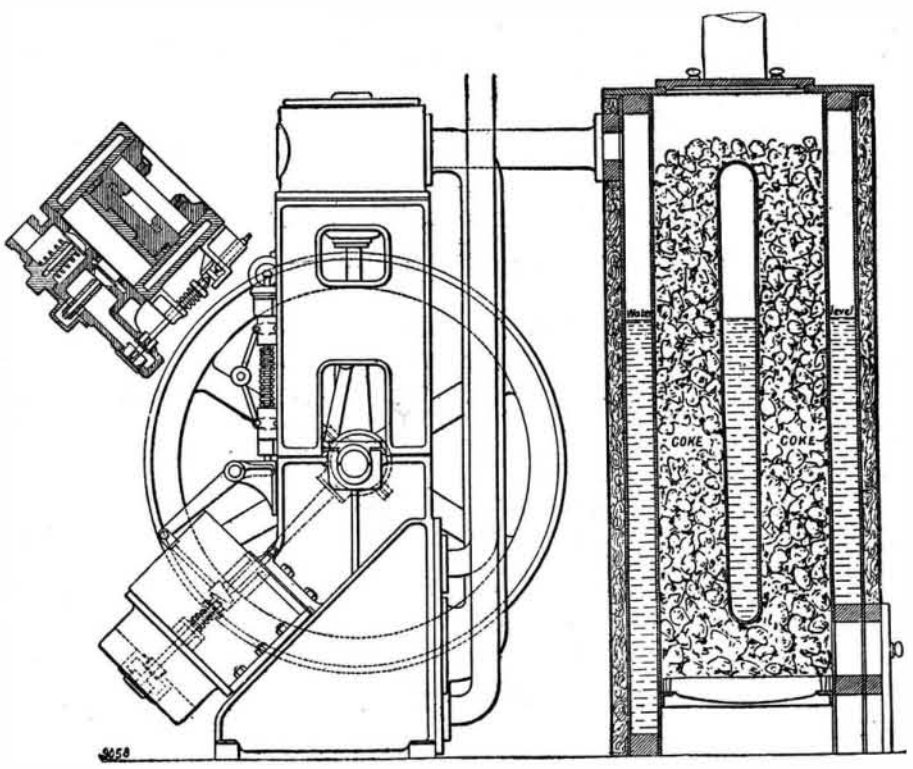

Fig. 3. Fig. 2.

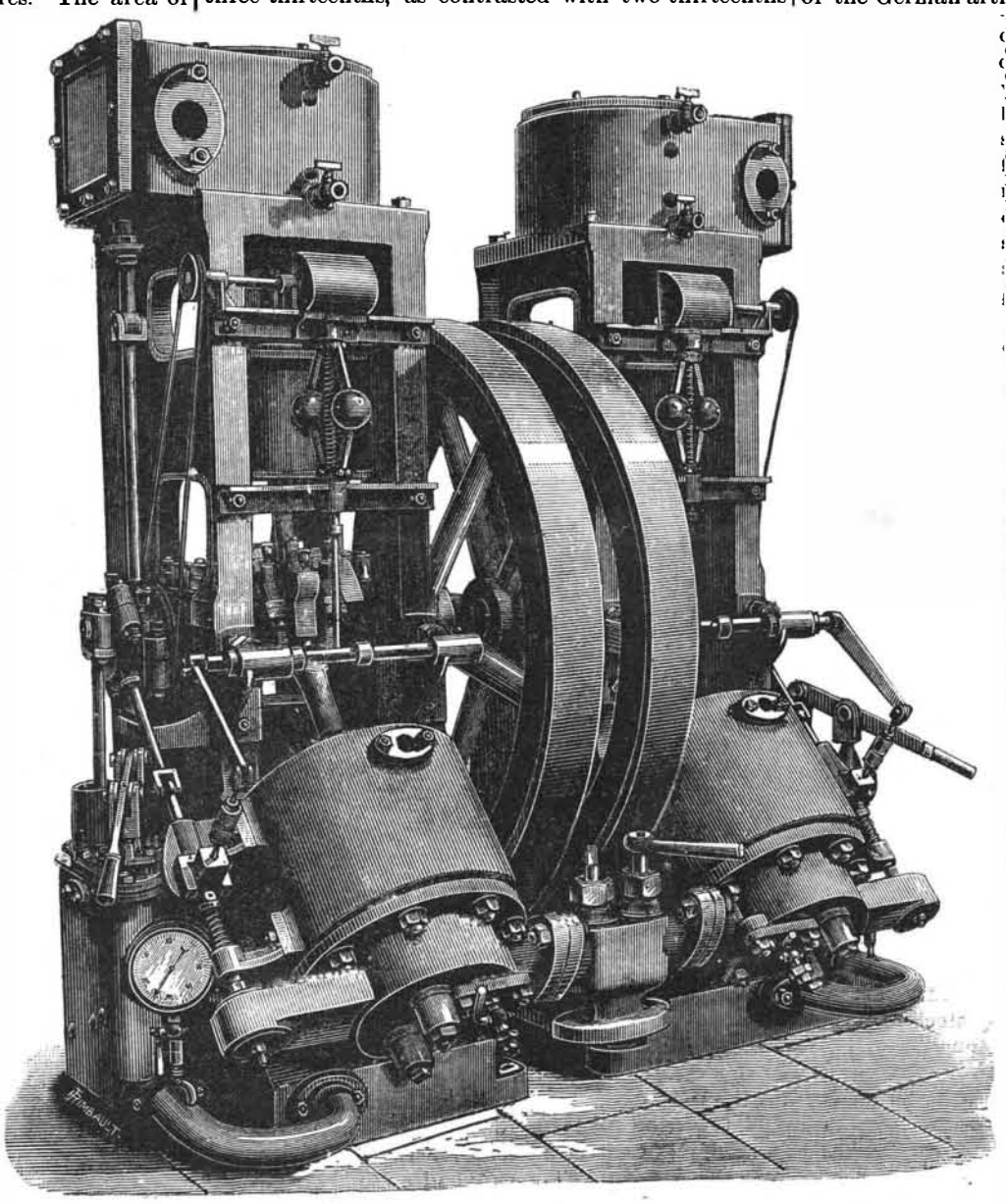

Fig. 1.—DAVEY'S MOTOR AND AIR COMPRESSOR FOR VARIABLE PRESSURES.

Our Foreign Flour Trade.

Of the total British import of flour in the first nine months of this year, amounting to 12,9[illegible]8,322 hundredweights, the United States supplied 10,174,675 hundredweights, or between four-fifths and five-sixths. This, too, at a time when the complaints of the trade of small business have been long, loud, and deep. This flour exportation from the United States has been about 1,100,000 hundredweights less than for the same time last year; but, on the other hand, Great Britain's imports were some 400,000 hundredweights larger in 1887, which diminishes the disparity in the percentage considerably. So we find that Great Britain has taken some ten-thirteenths of her flour supplies from us this year, as against a little less than eleven-thirteenths last. Her supplies from all other sources so far this year have thus been about three-thirteenths, as contrasted with two-thirteenths last. Great Britain is experiencing a revival in her milling trade which is quite remarkable. Not only are old mills being improved and started up, but new ones are being built to some extent, and in many cases of good size.

It is very probable that in the ordinary state of things we should be able to undersell these mills largely on their own grounds, for this is what we have been doing for years past. But we have to consider that it is not the large and improved British mills which have suffered so greatly from our competition, but the small and old-fashioned ones. In case the work of remodeling becomes general throughout the kingdom, and the average British mill is put on a basis with the average American mill, as to mechanical construction, the whole question of our ability to compete will depend on comparative cheapness of the raw material.—*Northwestern Miller.*

Changes in the German Artillery.

The *Allgemeine Militar-Zeitung* announces as probable several considerable changes in the organization of the German artillery, to be effected from April 1 next. The field artillery will become an integral part of the army corps, its inspectorates and staff will be suppressed, and there will be created in their place a new and supreme authority to control the force, but dealing solely with technical questions. Some reduction in cost will thus be secured, but the saving will probably be more than swallowed up by the increase in guns, carriages, etc. Our contemporary gives also some particulars of a curious experiment that is being made with a view of enabling artillery to approach the enemy and act effectively in difficult situations. It is proposed to place two different guns on one carriage, the first an ordinary field gun of eight or nine centimeters, the other a mortar of eight centimeters. These will be fixed in opposite directions, and a rotary movement can be given to the supporting framework, so that either can be used. Further details are not yet made public.

Is Dry Rot Contagious?

There appears to be such a thing as a diagnosis of disease in wood, and the botanical physicians, according to the *Northwestern Lumberman*, profess to know that it may be contagious or sporadic. Dry rot is called contagious, and it is said that the germ of that disease may be communicated to sound wood by tools which have been at work in diseased wood. It is thought possible that this theory accounts for many incomprehensible breakages of timbers. The suggestion is that sound lumber should not be cut with the same saw that has passed through stuff affected by dry rot without cleaning.

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