

and pistons, but also of the gas entering and leaving the cylinder; and the net efficiency is the quantity that interests the person who pays the bills for fuel. The mechanical efficiency has its use in showing the extent of machine friction losses, but unless the engine efficiency is also stated, it tends to obscure the real magnitude of the more or less avoidable friction losses in an engine.

OTHER ADVANTAGES OF SUGGESTED SYSTEM.

There would be certain incidental advantages from the use of total h.p. as the unit of measurement apart from the more important scientific advantages of a unit which means a single definite thing—and not the sum of two quantities of very different kinds. In ordinary practice there is more complexity and greater possibility of inaccuracy in the measurement of the indicated h.p. of gas and oil engines than is the case with steam engines. The greater complexity arises from the fact that it is necessary in the two-cycle engine to take indicator cards not only from the main cylinder but also from the auxiliary gas and air pumps or from the crank case, and for a Diesel engine, it is necessary to take cards from the air compressor as well as the main cylinder. The greater inaccuracy results from the fact that in going round the negative area of the four-cycle, or Diesel-cycle cards, the probable planimeter error has the same absolute magnitude as in going round the positive area, and these two errors may both be of the same sign. If, to avoid this, a weak spring diagram is taken of the work of the exhaust and suction strokes, we have the complexity of another indicator. Of course when scientific results are needed, in which case the gas friction h.p. must be obtained, it will be necessary to take cards from all the auxiliary cylinders, and the greater complexity cannot be avoided; but for ordinary commercial purposes, if any measurement of power is required beside the brake h.p., the total h.p. would serve quite as well as the indicated h.p., and it could be obtained more easily and with

count in calculating the indicated h.p.: i.e., a different practice exists from that which this society recommends as proper for the determination of the indicated h.p. for gas and oil engines. The history of the steam engine is probably more in the past than in the future, so that a change in the practice is not particularly desirable, even if practicable; but the history of the gas and oil engines is almost entirely in the future, and a proper choice of the units of power may help to make their history more clear.

In conclusion, the writer wishes to submit to the

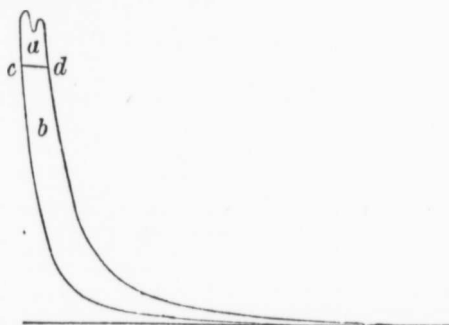


FIG. 8—Indicator Card of Air Compressor Diesel Engine

society the desirability of an early revision of the code of rules for carrying out and reporting gas and oil engine tests. The remarkable extension in the use of the gas engine, the growth of the large variety of types which that has stimulated, the considerable body of research throwing light on that motor which has been published since the appearance of the code, have made it apparent that the code is deficient in certain respects, and have rendered it desirable that many changes should be made.

When such revision is made, the writer hopes that there may be incorporated in it the suggestions as to h.p. and efficiencies which he has presented above.

Do the Thing Right

The first thing in the common sense creed is obedience. Do your work with a whole heart. Revolt is sometimes necessary, but the man who mixes revolt and obedience is doomed to disappoint himself and everybody with whom he has dealings. To flavor work with protest is to fail absolutely. When you revolt, why revolt—climb, get out, hike, defy—tell everybody and everything to go to Hell! That disposes of the case. You thus separate yourself entirely from those you have served—no one misunderstands you—you have declared yourself. But to pretend to obey, and yet carry in your heart the spirit of revolt is to do half-hearted slipshod work.—Elbert Hubbard.

An Irishman was returning to his native land. As the steamer came in sight of the coast of the Emerald Isle, his joy became so intense that the son of Erin shouted, "Hurrah for Ireland!"

This so disgusted an Englishman standing near that he sneeringly remarked, "Hurrah for Ireland—Hurrah for Hell!"

"That's right," retorted the Irishman, "every man for his own country."—Silent Partner.

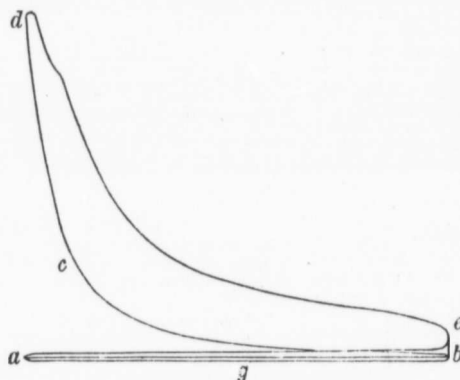


FIG. 7—Indicator Card of Diesel Engine

more accuracy. Commercially, the indicated h.p. is of no particular use when the brake h.p. is known, and scientifically it is less useful than the total h.p.

SYSTEM CANNOT BE APPLIED TO STEAM.

The proposed new measure of power cannot be conveniently applied to the steam engine, nor does it seem desirable to so apply it, since the practice in that case is firmly fixed. In the steam engine, part of the compression work is carried out in the air and feed pumps, but the indicated work in these auxiliaries is not taken into ac-