THE H. P. OF ENGINES.

TORONTO, May 11th, 1891.

Editor ELECTRICAL NEWS.

SIR,—I see by Mr. D. W. Ross' letter in the last issue of the ELECTRICAL NEWS that he is still off on the H. P. of engines. I think Mr. Ross must have got the old rule for finding the nominal H. P. of engines somewhat mixed up with the rule for finding actual H. P. The rule adopted by the Admiralty to determine the N. H. P. of engines is based on an effective steam pressure of 7 lbs. per sq. inch with a piston travel of 220 ft. per minute, but I do not think this 220 ft. has anything to do with the rule for finding the actual H. P.

I had the pleasure of listening to Mr. J. Galt's lecture in the Free Library on "The Mechanical Principles of Work," and I must say that he made everything appertaining to his subject very plain indeed (to me at all events, and I am only a practical engineer, not an M. E. or C. E., though I wish I was). Friend Ross was there also, and he did not seem satisfied on this H. P. business, hence the discussion. Mr. Ross gives formula for finding H. P. of engine as follows: $\frac{A \times P \times S}{33{,}000 \times 220} = \text{H. P.}$ This is all right until he comes to multiply by 220. The correct formula is $\frac{A \times P \times S}{33{,}000} = \text{H. P.}$ All we require in this formula is the speed in feet per minute the piston is travelling, in order to find how many times 33,000 lbs. is raised 1 foot in 1 minute. There is no need for multiplying by the speed that any horse travels. I would like to ask Mr. Ross, if he were to indicate an engine and figure out the card, would he use his formula to do so, and if so, does he think he would be correct? I know this much, *i. e.*, if he thinks he would be correct, he is about the only man (engineer) in Canada who would think so.

Friend Ross, says. "We are all differently constructed, think, see, feel, &c., differently, and have different opinions." Well, I should say so! It would be a queer world if we did not. Any way, I'll wager anything that there is not an engineer in Canada but will differ from Mr. Ross on this question of H.P. of engines. Mr. Ross must get himself properly counter-balanced before he can act as an automatic governor to Mr. J. Galt, as I am afraid from present indications that his regulation is not perfect.

Any way the discussion will do no harm, and may put friend Ross on terra firma.

Yours respectfully,

"SAFETY."

(Practical Engineer.)

Editor ELECTRICAL NEWS.

DEAR SIR: In your last issue I see a letter from D. W. Ross, C. & M. E., in which he seems to have got somewhat mixed in his ideas of applying the foot pound to the h. p. of an engine. I had the pleasure of attending Mr. Galt's lecture in which he made the statements Mr. Ross has taken exception to. I thought Mr. Galt made the application of the foot pound, as used to measure power, quite plain—at least it seemed so to me The formula that Mr. Ross has constructed to demonstrate what 1 h. p. is, seems far-fetched, and is not correctly stated. Taking his statement and writing it correctly, using the h.p. of steam engine for numerator and the power of a horse for the denominator, we would have:

$$\frac{33{,}000 \text{ lbs.} \times 1 \text{ foot} \times 1 \text{ minute}}{33{,}000 \text{ lbs.} \times 1 \text{ foot} \times 1 \text{ minute}} = 1 \text{ h. p.}$$

That is, either the numerator or the denominator would equal 1 h. p.

If Mr. Ross wants to move the load faster than one foot in one minute, we can do so, and by reducing the number of pounds raised, increase the speed, still having the same result in work done, viz., 330 lbs. × 100 ft. × 1 minute = 1 h. p. If we raise 33,000 pounds 1 foot high per minute we have a horse power. If we raise 330 pounds 100 feet high per minute, we exert the same amount of power.

In steam engine practice we use a piston speed of say 600 ft. per minute. Now the value of 1 pound of steam pressure on a piston containing 110 square inches area would be $\frac{600 \times 110 \times 1}{33{,}000 \times 1}$ = 2 h. p.; and if the speed of the piston was only 300 feet per minute, it would be $\frac{300 \times 110 \times 1}{33{,}000 \times 1} = 1$ h. p.

I cannot find anything in "The Mechanic's Own Book," Rankine's "Manual of the Steam Engine," Roper's "Marine and Land Engines," Reid's "Engineer's Hand-Book," or any other mechanical publication that tells me I must multiply 33,000 by 220 to get a h. p.

I am very sorry that I cannot write C. and M. E. after my name, but I hope this will assist Mr. Ross to see the h. p. of an engine in its correct light.

N. GINERE.

TORONTO, May 25th, 1891.

Editor ELECTRICAL NEWS.

DEAR SIR,—I am getting mixed somewhat regarding the horse power of an engine. If Mr. Ross is right, I am wrong. I am running an engine 10" x 28", revolutions 90, steam 85 lbs. The indicator man says I have 32 lbs. mean effective pressure. The diameter of my cylinder area = 78·54 and 90 revolutions = 420 feet. The formula is:

$$\frac{10^2 \times .7854 = 78.54 \times 420 \times 32}{\text{H.P.} = 33{,}000 = 31{\cdot}9168 \text{ H.P.}}$$

Our engine was sold to us for 35 H. P., and I am of the opinion that it is capable of doing 10 H.P. more than we are doing at present if speeded up some. I am at a loss to know the reason that Mr. Ross multiplies by 220, for in his formula it is thus:

$$10^2 \times 78{\cdot}54 = 78{\cdot}50 \times 420 \times 32$$
$$33000 \times 220 = 726000 = {\cdot}1453$$

nearly 7-16 of a H.P. I cannot understand it. I want to be right. Will Mr. Ross please explain? I should be most happy to meet him any evening he could conveniently appoint, in order that I might be put right, or that I might put him right.

ONE WHO WANTS TO BE RIGHT.

QUESTIONS AND ANSWERS.

"W. H. K." writes: I have a common plunger pump as a feed pump, and it is pumping cold water through a National feed water heater. The size of plunger is 3", stroke 8", suction and discharge pipes 1½", suction lift about 10 feet, with a horizontal distance of 200 feet to the water. The pump valves are new and in good order. Our trouble is, that the pump pounds so badly that the valves soon give out, besides making a very disagreeable noise that is heard all over the factory. I would like to know the cause and remedy for this, if there is one.

ANS. You do not state the speed of the pump, but supposing the speed is 60 strokes per minute, your 1½ column of water would have a speed of 40 feet per minute. Now this body of water must be started and stopped 60 times each minute, and will most likely cause the pounding you complain of. Put an air chamber in the suction pipe close to the pump valves and you will get over the trouble; you can make one by putting a T in the suction pipe, say with a 2" central hole, then screw a piece of 2" pipe, standing perpendicular, into it. Make it about 5 feet long and put a cap on the top of it.

Will the judges in your recent competition for engineers show through your paper how they get at the amount of fuel saved in question No. 9? Mr. Edkins' answer is 55 lbs; Mr. Mooring says 87. If they will show how to work these two problems out, they will very much oblige

MEMBER C. A. S. E.

"ENGINEER," Toronto, writes: Will you please answer the following question through the columns of your valuable paper. I have a back pressure valve, 6" diameter, with a spindle through centre on which it swings, and a lever 24 long keyed to spindle. On the end of lever is a 40-lb. ball. What pressure would be required under the valve to raise it? Please give formula for this, and oblige.

ANS.—There seems to be something wrong with your description of the construction of your valve. You say it is 6" diameter and swings on a spindle through centre. If it swings on a spindle passing through the centre, there will be as much pressure on one side of the spindle as on the other, and being thus balanced, the pressure will neither open it nor close it. Better give a fuller description of the inside arrangement, and we will try and answer your question.

A charter has been applied for by parties desirous of operating electric light in Kentville, Nova Scotia.