

(14) A. C. asks: 1. What is the variation of pressure in the steam chest of a locomotive engine when she is running at regular speed with throttle open full and lever set to cut-off at half stroke, steam pressure on boiler 100 lb.? A. The variation in pressure will be from full boiler pressure, when steam is cut off, to a minimum pressure, depending upon proportions, pressure, and speed of piston. 2. How much will water compress under a pressure of 100 lb. to square inch? How much will oil compress under the same pressure? A. Compression scarcely appreciable with either water or oil. 3. How much will air compress under 100 lb. pressure? A. 100 lb. pressure above the atmosphere is = 7.7 atmospheres—hence bulk = 1-7.7 or a little more than $\frac{1}{8}$.

(15) W. T. S. asks: 1. About how many horse power do we get with our engine, 7x10 inches, running at about 40 revolutions per minute, with 1½ inch feed pipe, pressure 80 lb. per square inch? A. With 80 lb. pressure on the piston and 400 revolutions per minute, 46 horse power. 2. If the throttle valve of an engine be set to run it at 100 revolutions per minute, with 20 lb. of steam, would it not require about 80 lb. of steam to run it 200 revolutions per minute, the valve being the same as for 20 lb.? A. If 20 lb. is sufficient to overcome the resistance at 100 revolutions, it will be approximately the same (leaving out friction) at 200 revolutions, but you must supply double the quantity of steam at that pressure.

(16) E. A. G. writes: It is said that even "Homer sometimes nods," but the SCIENTIFIC does not often so much as wink. But please tell me, is it not as wise to bore a hole in the bottom of a boat to let the water out as to put a stop cock at the highest part of a siphon "to let the air out?" See SCIENTIFIC AMERICAN, April 10, page 235, answer to C. W. W., No. 35. Some one may be misled by it. A. Your criticism applied to an ordinary siphon is very pertinent, but we do not think it applies to the conditions in this case. The stop cock should be applied in connection with some means of taking out the air accumulating from leaks. Of course it was an error to say briefly stop cock. A pump or some other device for removing the air must be applied outside the stop cock.

(17) "Walter" asks: Which travels the greater distance, any given point on the face or tread of a locomotive driving wheel, or any fixed part of the locomotive, the boiler for instance? The wheel is not supposed to slip on the rail during the journey. A. The lower point of the wheel in contact with the rail has no forward motion relative to the rail; the upper point has twice the forward motion of the boiler.

(18) "Constant Reader" asks: Does a fly wheel increase the power of the engine to which it is applied? A. No.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

T. C. W.—It consists chiefly of a semi decomposed syenitic rock with a little hematite. It cannot be called an iron ore; such an ore may occur in the vicinity.—M. D. M.—It is a fair quality of kaolin, used for making porcelain, "white ware," and pottery.—G. C. R.—It is limonite, an excellent ore of iron.—J. H. B.—The button is composed chiefly of lead, carrying a trace of silver. It probably occurs as galena—sulphide of lead.

COMMUNICATIONS RECEIVED.

On a Remarkable Group of Sun Spots. By W. R. B.
On a Freak of Lightning. By F. M. G.
On Tide Water Pipe Line. By G. L. B.
On the Cause of Thunder. By G. H. E.
On Examples of Pseudo-Crystallization. By A. L.
On Gravitation. By W. L. T.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were
Granted in the Week Ending
April 20, 1880,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for one dollar. In ordering please state the number and date of the patent desired, and remit to Munn & Co., 37 Park Row, New York city. We also furnish copies of patents granted prior to 1866, but at increased cost, as the specifications not being printed, must be copied by hand.

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