

(24) J. F. asks: If I condense ten volumes of atmospheric air into one volume, and cool it, say, to 40°, then allow it to suddenly expand to the original ten volumes, what will be its temperature? A. The following formulæ are applicable to such cases, provided there is no loss of heat by radiation or conduction: T=absolute temperature of air before compression; t=absolute temperature of air after compression; V=volume of air before compression; v=volume of air after compression; P=pressure of air before compression; p=pressure of air after compression. Then  $\frac{t}{T} \left(\frac{v}{V}\right)^{0.408} = \left(\frac{p}{P}\right)^{0.29}$

(25) E. M. F. writes: I wish to have some metallic cylinders cast, about 10 inches long, 2 1/4 inches in diameter, and 1/8 inch thick. Lead is too soft. What cheap metal can be moulded as thin and be moderately strong? A. Soft or yellow brass, or solid drawn brass tubing, might answer.

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

A. T. B.—Principally a ferruginous clay. May be used as a cheap paint if properly calcined.—T. J. H.—It is a bituminous shale or clay slate. It will yield a small quantity of oil illuminating gas by destructive distillation.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges with much pleasure the receipt of original papers and contributions on the following subjects:

- Locomotive Strokes. By W. G.
Protection against Torpedoes. By F. P.
The Towne Scientific School. By H. H., Jr.
Is the Nation Safe from Invasion? By C. S.
The Weather and Rheumatism. By J. H.
Treatment of "Rusty" Gold. By J. T.
Claude Bernard. By H. M. D.
Galvanic Action. By C. P.

OFFICIAL.

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending March 19, 1878,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, 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.

Table listing various inventions such as Alloy, bronze, E. C. Kirk, 201,536; Amalgamator, L. M. Boardman, 201,531; Animal trap, J. McMahel, 201,546; Ashes, separating breeze from, J. Coyne, 201,390; Axle box, R. E. Bason, 201,393; Axle box, J. A. P. Vanclain, 201,469; Bag machine, G. O. Lackey, 201,425; Bale band tightener, Sevey & Manz, 201,361; Bale tie, F. M. Logue, 201,431; Bed, camp, M. A. Stevens, 201,463; Bedstead fastening, C. H. Goebel, 201,343; Bedstead, wardrobe, W. Fay, 201,387; Bevel, square, and level, W. P. Walter, 201,371; Billiard cushion, H. W. Collender (r), 8,133; Billiard table cushion, H. W. Collender (r), 8,132; Bit brace, C. H. Amidon, 201,379; Blanks, receiving and arranging, H. W. Bassett, 201,483; Blasting powder, Graham & Ward, 201,520; Blind, outside window, J. Hester, 201,415; Blind stile mortising machine, Doane & Bugbee, 201,506; Boiler, sectional steam, J. W. Hard, 201,412; Boilers, removing sediment from, T. C. Purves, 201,446; Book binding, I. 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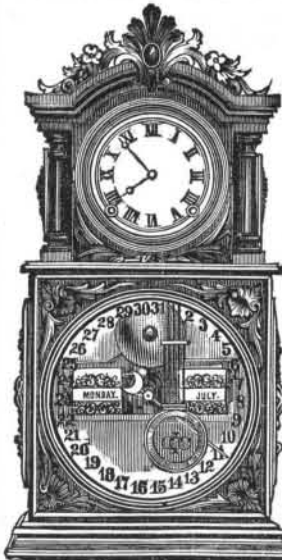
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