

A. V. K. asks: How can the horse power of a boiler of given dimensions be ascertained? Answer: Already answered in earlier numbers.

F. F. M. asks: 1. What diameter of cylinder and what length stroke must I give the engine for a horizontal boiler 12 x 30, of 1/2 inch iron, with no flues? The engine is to run 100 to 150 per minute.

H. C. J. asks: 1. Will a boiler, under which there may be the usual amount of fire, make or lose steam if the blow off or safety valve is suddenly opened wide, or the engine started in the same way?

J. T. says: I cannot understand the answer to the crank question: 1. What do you mean by a line perpendicular to both the lines of the shaft and of the crank? 2. Have I found the proper thickness of cylinders in the two following cases, according to Van Buren's formula, t = 0.8 sqrt(DP)?

J. G. H. says: I am using 3 plain cylinder boilers for grinding purposes, with a plain slide valve engine which works very well. The objection is that we use too much wood.

H. T. L. asks: How can I estimate centrifugal force? For instance, what will be the centrifugal force of a one pound weight, revolving at 100 revolutions per minute in a 4 foot circle around a perpendicular shaft, and what is the rule by which I can get at the force of any weight at any speed in any circle?

W. W. says: 1. My employers and I appeal to you to decide a question about the horse power of a first class horizontal steam engine, cutting off steam at a point that will give it the most power.

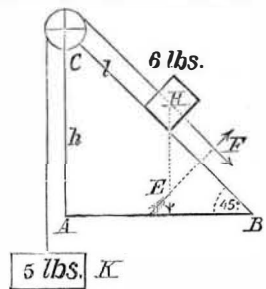
C. S. C. says: I have a small English toy locomotive, and I cannot make it go. It is eighteen inches in length, and runs on eight wheels; two of them are the drivers.

D. K. asks for an explanation of the phenomena of polar attraction and magnetic variation. In this latitude, 40° N., variation west has increased 1° in fourteen years.

J. R. L. says: We have a gin connected with our mill. Is it possible to extinguish fire in a lint room with steam? If so, how should it be applied, with stationary pipe entering at bottom or top of room, or with hose?

H. S. M. wishes to know where an indicator can be purchased, what it will probably cost, how it should be applied, and what the result will be. Answer: A treatise upon the construction, method of application, and the interpretation of the diagrams obtained by the steam engine indicator, would occupy far too much space for our columns.

C. B. N. sends the following solution of the problem proposed by E. C. M., who said: "A body weighing 5 lbs. descends vertically and draws a weight of 6 lbs. up a plane whose inclination is 45°."



plane, and H and K the weights, joined by a cord which works over a pulley at C. Let l=length of the plane, h=height of the plane. From H, draw a line H E, perpendicular to A B and let it represent the pressure of the weight at H. Then resolve H E into components, H F and F E, parallel and perpendicular to B C.

laws of falling bodies that the space through which the body falls is equal to the acceleration multiplied by the square of the time and divided by two, or s=1/2 at^2.

MINERALS.—Specimens have been received from the following correspondents, and examined with the results stated: H. W.—Bothare crystalline hornblende, of no value.

T. F. A.—Iron pyrites, of no value.

COMMUNICATIONS RECEIVED.

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

- On Fast Side Wheel Steamers. By M. N. L.
On the Million Dollar Telescope. By O. M. and by F. C. V.
On a Vacuum Balloon. By F.
On Deep Sea Soundings. By H. N. C.
On Increasing the Crops. By A. W.
On Diving Bells. By Q.
On the Wheel Question. By H. S.
On the Aurora Borealis. By A. C. C.
On Air and Gas Engines. By F. G. W.
On Sugar Boiling Apparatus. By A. W. J. M.
On Plows. By L. L. B.
On the Sea Urchin. By P. S.
On Tannate of Soda. By N. S. T.
On a Boiler Explosion. By W. J. S.
On Deep Sea Soundings. By A. R.
On Science and Revelation. By J. W.

Also enquiries from the following: E. J. M.—S. W. J.—E. W.—G. W. T.—H. N. J.—A. R.—D. J. R.—L. P. A.—C. F. S.—G. F. M.—C. M. B.—M. K.—C. K. C.—B. H. G.

[OFFICIAL]

Index of Inventions

FOR WHICH

Letters Patent of the United States

WERE GRANTED FOR THE WEEK ENDING

April 22, 1873,

AND EACH BEARING THAT DATE.

(Those marked (r) are reissued patents)

Table listing various inventions and their patent numbers, including items like 'Acid vessel cap, J. Matthews', 'Baby jumper, A. F. Spooner', 'Barrels, etc., rolling, B. V. Tamplin', 'Bed bottom, spring, Thompson & Kendrick', 'Bed spring fastener, D. A. Scott', 'Bedstead, invalid, G. W. Grote', 'Bell door, J. Harrison', 'Belt fastening, J. E. Richard', 'Boats, detaching, J. M. Kilner', 'Boats, detaching, F. M. Munger', 'Boiler, wash, R. Langenbach', 'Bolt mechanism, T. R. & J. Pullis', 'Boot heel stiffening, Darrow & Wait', 'Book case, folding, E. Haskell', 'Book, pocket, L. Wendt', 'Boot, plow, C. H. Ricker', 'Bottle, nursing, G. R. White', 'Bottle washing apparatus, Schlich & Feyh', 'Box cover, blacking, J. B. Shaler', 'Box opener, L. Mills', 'Button, F. Washbourne', 'Bridge, draw, L. Schneider', 'Bridge baluster, Sellers & Manly', 'Brush, P. Wagner', 'Canal, H. Hill', 'Car brake, J. N. Brush', 'Car brake, E. Farnsworth', 'Car, convertible freight, T. Fogg', 'Car heater and ventilator, C. F. Whorf', 'Car wheel, H. Merrill', 'Card machine, postal, J. M. D. Keating', 'Carriage axle box, Jones & Dunkerley', 'Carriage door, J. Cunningham', 'Cart, dumping, B. Fitzhugh', 'Cartridges, etc., capping, J. F. Nettleton', 'Cement roofing, G. Howland', 'Chair, folding, A. C. Boyd', 'Chfir, school, E. J. Piper', 'Chocolate, soluble, J. Corell', 'Churn, W. H. Holdam', 'Churn, reciprocating, M. Litt', 'Cigar holder, T. J. Lewis', 'Clothes pounder, S. Hinkel', 'Clothes pounder, D. W. Rawson', 'Clothes wringer, R. S. Cathcart', 'Clutch for machinery, W. B. Duckworth', 'Clutch, friction, J. J. Coburn', 'Cock, etc., blow off, E. G. Cushing', 'Coffin handle, C. Strong', 'Cooler, beer, A. F. Rick', 'Cooler, milk, W. Hodgdon', 'Corn sheller, Brown & Shangle', 'Coupling, universal, H. S. Leland', 'Cradle, automatic, I. Goldman', 'Cultivator, J. Helm', 'Curtain fixture, T. Symonds', 'Curtain roller holder, B. G. Fitzhugh', 'Cutter bars, holding, W. H. Daniels', 'Dentist's tool, C. P. Grout', 'Derrick, J. E. Walsh', 'Desk and seat, A. E. Roberts', 'Drawer, B. J. Greely', 'Dredger, E. B. Bishop', 'Drill, grain, J. King', 'Door lock, J. Scott'

Table listing various inventions and their patent numbers, including items like 'Dyeing aniline black, J. Higgin', 'Eggbeater, N. C. Miller', 'Elevator, A. C. Herron', 'Elevator, grain, H. Merrill', 'Eyelet, S. W. Young', 'Fabric selvages, uniting, T. Beven', 'Faucet, self-closing, A. & E. Buckman', 'File, paper, R. Henning', 'Fire arm, Holt & Marshall', 'Fire arm, D. Smith', 'Fire arm, revolving, G. W. Schofield', 'Fireescape, G. H. Shaw', 'Fire extinguisher, J. D. Bresnahan', 'Fire place back, G. W. Cummings', 'Fireproof ceiling, etc., J. W. Bassett', 'Fireproof floor, etc., W. Neracher', 'Fork, horse hay, H. C. Stouffer', 'Fruit basket, S. B. Conover', 'Furnace, cupola, J. B. Pearce', 'Furnace, hot air, C. L. Pierce', 'Furnace, hot air, C. L. Pierce', 'Gas light indicator, etc., W. W. Goodwin', 'Gate, automatic, N. Long', 'Gate, iron fence, C. T. Bush', 'Generator, gas, D. H. Ireland', 'Generator injector, steam, S. Rue, Jr.', 'Generator injector, steam, S. Rue, Jr.', 'Generator, steam, R. Hooper', 'Grater, G. Booth', 'Grater, nutmeg, A. L. Platt', 'Grater, vegetable, G. Booth', 'Gun lock, C. Gordon', 'Hame tug clip, J. P. Welpton', 'Harness collar, H. B. Morrison', 'Harness check hook, H. A. Carlton', 'Harvester, S. L. McCollock', 'Harvester, corn, S. Patton', 'Harvester, cutter, C. Pomeroy', 'Hat ear covering, B. R. Morse', 'Heater, steam, E. Russell', 'Hedge trimmer, S. B. Turner', 'Hemmer, E. S. Yentzer', 'Hinge, gate, W. G. Franklin', 'Hinge, lock, M. C. Lee', 'Horse hoofs, paring, G. W. Schafer', 'Horse power, A. G. Waterhouse', 'Horse fly guards, suspender, G. Shelton', 'Hub, vehicle, A. Warner', 'Injector, engine, S. Rue, Jr.', 'Injector, engine, S. Rue, Jr.', 'Iron beam, wrought, L. Kirkup', 'Iron and steel, puddling, J. G. Blunt', 'Jack, lifting, W. M. Doty', 'Jack, lifting, H. H. Warren', 'Journal, anti-friction, M. E. Dayton', 'Knife, corn stalk, J. M. Brick', 'Knife, pocket, H. Staude', 'Lamp, G. Brownlee', 'Lamp, J. A. Pease', 'Latch handle, Ambrun & Olfermann', 'Lathe for wood, C. A. Blessing', 'Leather, boarding, O. Coogan', 'Lock for drawers, etc., E. G. Gory', 'Loom shuttle binder, Hammond & Tucker', 'Loom, lappet, F. W. Newton', 'Loom temple, N. Chapman', 'Loom for wire, S. Holdsworth', 'Lubricator, Lunkenheimer & Meehan', 'Marble, molding edges of, J. Finn', 'Mill hopper, grinding, G. S. Thompson', 'Mill pick, E. S. Forgy', 'Mill, rolling, J. E. Atwood', 'Millstone dress, J. P. Harris', 'Millstone spindles, oiling, J. J. Chubb', 'Millstones, cooling, Shanton & Shaver', 'Miner's bar, R. B. Platt', 'Mirror, signaling, M. M. Kenney', 'Molding machine, J. W. Gheen', 'Music notation, E. P. Stewart', 'Neck tie, R. R. Parker', 'Nut lock, W. B. Wait', 'Nut machine, J. Braun', 'Ordnance, C. Gordon', 'Ordnance, E. A. Sutcliffe', 'Oven, bake, J. J. Piggott', 'Oyster dredge, I. A. Ketcham', 'Paper machine suction, W. McLaughlin', 'Pavement, D. C. Heller', 'Pavement, concrete, J. W. & H. W. Krause, Jr.', 'Photographs, cutting out, J. Schofield', 'Pianoforte bridge, W. C. Ellis', 'Piano hammers, capping, I. Bullard', 'Pipe tongs, A. H. Jarecki', 'Pipes, mold for earthen, P. McIntyre', 'Pipes, etc., heating, Grimm & Corvin', 'Planter, corn, G. O. Houck', 'Planter, cotton, W. Price', 'Planter, seed, I. T. Suggs', 'Plow, J. M. Cobb', 'Plow, J. Roop', 'Pools, etc., cleaning cess, W. C. McCarthy', 'Press, embossing, G. Clisbee', 'Press, hay and cotton, G. W. Stewart', 'Propeller, screw, J. Montgomery', 'Propeller, operating screw, A. Lee', 'Pump, mining, G. E. Mills', 'Punch, portable, J. J. Safely', 'Railway snow plow, O. D. Baird', 'Rake and tedder, R. J. Colvin', 'Refrigerator, D. Mulcahy', 'Rule, square and bevel, C. M. Heffron', 'Sash holder, L. A. Tuttle', 'Saw mill carriage, B. F. & J. B. Smith', 'Saw scroll, H. B. Smith', 'Saws, sharpening, Davidson & Wittingham', 'Sawing machine, band, O. Bonney, Jr.', 'Scissors, A. Wilmomore', 'Scow, dumping, A. T. Morris', 'Screw making machine, J. Braun', 'Scrolls, drawing, E. E. Stebbins', 'Scrubbing machine, S. H. Bush', 'Scythes, rolling, H. Waters', 'Seat, J. Peard', 'Separator, middlings, A. R. Guilder', 'Sewing machine, M. H. Kernaul', 'Sewing machine chair, F. Chichester', 'Sewing machine ruffler, D. C. Carey', 'Sewing machine shuttle, W. Cooney', 'Sewing machine thread cutter, Henry & Wood', 'Shaft hanger, W. Bellis', 'Shafting bearings, casting, J. Miller', 'Shoe fastening, I. Banister', 'Shoemaker's finishing tool, Wilson & Foster', 'Sizing compound, T. Gorrel', 'Skate roller, W. P. Gregg', 'Slate frames, finishing, J. H. & G. S. Coffin', 'Slate washer, W. Westlake', 'Snow shovel, H. C. Cole', 'Soda water cock, etc., W. Gee', 'Soda water fountain attachment, W. R. Cady', 'Soldering apparatus, J. Gulden', 'Spikes, pointing, Waldron & Moore'