The Charge for Insertion under this head is \$1 a Line. Pat. for Sale, Cheap-" Walking Motion"

S IM. Treadle-no "dead" center-no starting with hand fits all machines-finished complete for 50c. M. H. Knapp, Monroc, Wisconsin.

Pulleys, Shafting, Adjustable Hangers, &c. Send for Price List to Jully & Wilde, 20 Platt St., N.Y. Steam Boiler and Pipe Covering-Economy, Safety, and Durability. Saves from ten to twenty per

Chalmers Spence Company, foot East 9th St., N.Y. Mill Men-For the best Gang Edger and Ripping Machine, address E.C. Diccy, Grand Haven, Mich.

As Sup't or Draughtsman—Familiar with arine work : good reference-address Bell, Experiment Mills, Pa.

A practical Speed Counter-Can be carried n the vest pocket. Sent by mail for \$2.15. Samuel Har ris,51 West Washington St., Chicago, Ill.

Forewarned !- For pamphilet about Fruit-drying-the so called Alden process-and my patents, address Marshall P. Smith, Lock Box 825, Baltimore, Md. A mechanic, having some knowledge of drawing, desires a place under instructions at m chani-

cal drawing. Address A. M. Way, Lyles, Lancaster Co., Pa.

2nd Hand Portable Engines, 8 to 20 H.P thoroughly overhauled, good as new, at less than Half Cost. I. H. Shearman, 45 Cortlandt St., New York.

For Salo-English and French Patents on an article now successfully introduced in the U.S., and used by all Criminal officers, Prisons, &c. Address Judicial, 4 Warren St., Room 13, New York.

A Machinist and Draughtsman of 13 years' experience as Manager, wants a situation or the agency of some manufacturing concern. Address D. F. M., 1748 North 10th St., Philadelphia, Pa.

County and State Rights for Sale of a valuable Patent. Address R. Lawyer, Pittsburgh, Pa. Novelty Carriage, Square Canopy, wanted. Address F. B., Lock Box 304, Pittsburgh, Pa.

Glass Cutter and Putty Knife-Agents wanted. 35 cts., post-paid. T. Ray, Box 1268, Boston, Ms.

The best Gold Pens in use are those made by C. M. Fisher & Co., 10? Fulton St., New York. To Electro-Platers and Manufacturers of Lightning Rod Points-A first class Electro-Plater, who

thoroughly understands the business, wants to change his position. He has a patent for Plating with Platina. Address "Platina," Scientific American.

Wanted-Manufacturer for staple article of tools or heavy hardware, by improved tested. Address Geo. Everett, Mt. Hohey, New Jersey, Engines 2 to 8 II.P. N.Twiss, New Haven, Ct.

By touching different buttons on the desk of the manager, he can communicate with any person in the establishment without leaving his seat. The Minia-ture Electric Telegraph-Splendid for offices, factories shops, dwellings, etc. Price only \$5, with battery. etc., complete for working. Made by F. C. Beach & Co., 260 Broadway, corner Warren St., New York The Scientific American establishment, New York, is titted with these n struments.

Millstone Dressing Diamond Machines-Simple, effective, economical and durable, giving uni-versal satisfaction. J. Dickinson, 61 Nassau St., N.Y.

Nobody will buy the metal Truss with its tiless fron Finger. The New Elastic Truss, 63 Broadpitiless Iron Finger. ay, New York, holds the rupture easy till cured. Pres sure all around the body-

Protect your Buildings-Send for testimo-nials. N. Y. State Roofing Co., 6 Cedar St., N. Y.

Woolen and Cotton Machinery of every de-scription for Sale by Tully & Wilde, 20 Platt St., N.Y. Steam Engines-Special Machinery, Shaft-ing, Pulleys & Hargers. D. Frisbie & Co., N. Haver, Ct.

L. & J. W. Feucht wanger, 55 Cedar St., N.Y., Manufacturers of Soluble Glass, Water Glass or Silicates of Soda and Potash in all forms and quantitics.

Pat. Double Eccentric Cornice Brake, m'f'd by Thomas & Robinson Cinu., O. Send for Circular. Dean's Steam Pumps, for all purposes; En

gines, Boilers, Iron and Wood Working Machinery of all descriptions. W. L. Chase & Co., 93, 95, 97 Liberty Street, New York.

Stove Patterns to order—Also, for sale a variety of new Styles. E. J. Cridge, Troy, N. Y.

Treatises on "Soluble Glass," \$1 per copy; on "Nickel," 50c. per copy; on "Gems," \$3.21 per copy; on "Fermented Liquors," \$3.12 per copy. Mailed free by L. & J. W. Feuchtwanger, 55 Cedar St., New York.

Mining, Wrecking, Pumping, Drainage, or Irrigating Machinery, for sale or rent. See advertisement, Andrew's Patent, inside page.

"Superior to all others"—for all kinds of work—Limet & Co.'s French Files. They are better, forged, better cut, better tempered, and cheaper than English files. Send for Price-List. Homer Foot & Co Sole agents, 20 Platt St., New York.

Price only three dollars—The Tom Thumb Electric Telegraph. A compact working Telegraph ap paratus, for sending messages, making magnets, the electric light, giving alarms, and various other purposes. Can be put in operation by any lad. Includes battery, key and wires. Neatly packed and sent to all parts of the world on receipt of price. F. C. Beach & Co., 260 Broadway, cor. Warren St., New York.

Lathes, Planers, Drills, Milling and Index achines. Geo. S. Lincoln & Co., Hartford, Conn. Machines. For Solid Wrought-iron Beams, etc., see ad-vertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Temples and Oilcans. Draper, Hopedale, Mass. Hydraulic Presses and Jacks, new and secnd hand, E. Lyon, 470 Grand Street, New York.

Peck's Patent Drop Press. For circulars, address Milo. Peck & Co., New Haven, Conn. Small Tools and Gear Wheels for Models.

Listfree. Goodnow & Wightman,23 Cornhill,Boston,Ms



A. E. C. can repair his meerschaum pipe by following the directions on p. 90, vol. 30.-J. F. and others will find explicit information on the subject of sumac in any good work on botany .-- G.C. B. can repair rubber boots by the process described on p. 155, vol. 26. -C. S. & Co. will find directions for bronzing malleable iron castings on p. 203, vol. 29.-C. B. and others can obvol. 30, from any optician .- A. S. will find directions for repairing rubber overshocks on p. 155, vol. 26 – J. H. should address the engineers of the Hoosac tunnel for the information he seeks. - J. W. A. will find a descrip-tion of nickel plating on pp. 91, vol. 29, and 187, vol. 28.

C, H, F, says; 1. In a self-feeding stove, the some 12 feet perpendicular into the garret, where it runs pip 20 feet horizontally and enters the chimney. A substance is constantly dripping from this 20 feet of pipe in the garret, and it ests its way through the pipe iu a short garret, and it easts its way through the pipe in a short time. There is no possibility of any water getting into the pipe from the chimney. I send you a few crystals which formed on the perpendicular part of the pipe in the garret where this substance runs down on it. What causes this substance, and what are the crystals composed of? A. Probably some corrosive substance is distilled from the coal, and condenses in the pipe. The spectra results and the statistical in the pipe. The spectra results are to be sequilable of from 2. How can the tore of a church steel bell that is cracked be re-stored? Could it be done in the steep le? The bell is so hard that steel tools will not cu! it. A. We scarcely think it can be done. 3. Is there a substance, and if so how is it made, that will take the temper out of steel or soften it, so that it can be drilled without heating? A. We do not know of any. 4. Which will stand the most pressure, a copper or an iron boiler, both of the same size and thickness? A. An iron one.

J. E. W. asks: 1. Why can a gimlet point-ed screw be driven more easily with a long screw driver than with a short one? A. On account of the greater leverage that can be obtained by inclining the long screw driver. 2. Can the same screw be driven more easily with a pressure on the screw more than enough to keep the screw driver in place? A. We think not.

F. D. asks: 1. How can I get a good spring temper on steel wire? A. Temper in oil. 2. How can I case harden it? A. With prussiate of potash. 3. If I case harden it, will it make it break more easily? A. We think it will.

F. F. R. asks: 1. Will a common horseshoe m_s gnet, if bent straight, have the same qualities as a compass needle. as to polarity? A. Yes. 2. Would a compass needle lose its power if it were confined so that it could not turn on its pin, a weight being put on the ap of the needle so that it cannot move? If I turn the compass so that the north end of the needle would point south and let it remain for six months, what would be the result? A. Probably it would lose a little of its attractive force. 3. Is there any motor run by a magnet? A. Yes

C. A. W. says: 1. It seems to me that, in the present state of steam engineering, thereought to be rules for the construction of slide valves that would be generally recognized by bullders as giving the best result for average speeds. The diversity of practice seems to be as great as the number of builders, and the theories equal the mechanics in number. I know builders who give so large a compression in some cases as to force the valve from its seat, while others release almost as early as the cut off, and have practically no compres sion. I should suppose that the most economical point of cut-off, release, and compression would have been determined approximately, by actual experiment by this time. 1s there no work treating on these questions? Auchincloss assumes these points to be determined, and then gives rules for constructing values accordingly. A We think the subject is treated in several manuals of the steam engine and locomotives. 2. Are sirups pre pared from starch, cotton, wood fiber, etc., by the use of sulphuric acid or other re-agents deleterious? And is thereany simple test for detecting deleterious qualities? A. We think not, in general. Probably the simplest test would be with litmus paper.

R. H. says: In a shop heated with exhaust steam, conveyed through pipes made of galvanized iron the heat does not seem to radiate, no matter how much steam is turned on. Why is this? A. Probably the trouble is caused by insufficient radiating surface or too little steam.

 $W.\ asks: In estimating the heating su face of a vertical boller, should the surface of those parts of the tubes be measured which project above the surface$ of the water, through the steam chest? Is not the heatng surface as great in a boiler where the tubes only extend to the surface of the water as in a boiler of same dimensions where the tubes extend to the top of boiler? A. The heating surface is greater where the tubes extend the whole distance.

All Fruit-can Tools, Ferracute, Bridgeton, N.J. by a search. 5. Can I have my hydrant so arranged as to force the water out of my cistern into water pipes through the house, without letting any water out of the hydrant into the cistern? A. You can probably do it byputtingup a water engine, to be driven by the water from the hydrant. 6. Can you give me a good recipe for hair oil that will not injure the hair? A. Probably cas-tor oil is as good as anything. We cannot answer your other question, as the data are insufficient.

> J. T. H. asks: Should the propeller be of a greater or less pitch at the center than at the perimeter, to avoid drag? A. There is a great difference of opin-ion among engineers on this point. Makers of propellers with varying pitch assert that their screws, when in motion, do not shake the vessels so much as equally efficient screws with constant pitch.

J. W. D. E. asks: 1. How many different kinds of fire engines are there in use? A. Hand en-gines, steam engines, chemical engines. 2. How much fill issual on canals? A. Theyare generally level. 3. What is the common width? A. The widths vary great-ly in different localities. 4. Is it essential that canals should be walled up? If so, would brick be cheaper than any other material? A. Generally canals require to be walled up, but we do not think that brick is the most suitable material. 5. When will the committee de cide between the competitors for the reward offered by tain the lenses for the cheap telescope described on p. 7, { the State of New York? A. The time during which competition was allowed has expired.

N. L. T. asks: 1. How can I compute the pressure exerted outward by a ball weighing 11b., revolving in a circle the radius of which is 1 foot, at revolution per second? Is there anyfixedrule for determining the centrifugal force of a body? A. The centrifugal force of a body =

(Weight in pounds) \times (velocity in feet per_second)² radius×32.2

2. Do you know of any book published on the compass and the variations to which the magnetic needle is liable, treating the subject in such a way as to enable a person to acquire the skill and knowledge requisite for an expert surveyor? A. Gillespie's "Treatise on Land Surveying" has considerable information on the subject of the compass.

W. J. B. asks: What is the most reliable work on superheated steam, and where may it be ob-tained? What is the greatest number of degrees of heat that can be obtained from superheated steam? A. We do not know of any work that will answer your purpose. Steam can be superheated to any degree that the apparatus will stand. It would probably be well for you to consult an experienced engineer about the matter, as in this way you will avoid costly experiments.

T. L. C. asks: 1. What is the greatest perpendicularhight to which the waves on the ocean rise measuring from bottom of the trough? A. From 30 to 40 feet, we think. 2. What is the distance between them from top to top or center to center? A. About the is the water agitated by the strongest wind and largest waves? A. Probably about 2,000 feet.

M. J. S. says: I have a hollow rectangular vessel, two feet long and four inches square, made of sheet steel, one sixteenth of an inchthick. Can I pour in molten cast iron to make a solid piece, and secure a perfect weld with the steel without deteriorating the quality of the steel? Which is the best method to perform the operation? A. We do not think you can do it.

W.L. asks: Is any injury to be apprehend-ed in firing a boiler with the dust from mixed fabrics whence the wool has been extracted, from greasy rags with oil of vitriol? A. We scarcely think that any injury will result from the use of this material.

G. W. V. G. asks: 1. Will a thermometer indicate the same temperature hanging in the wind that it would if sheltered from the wind, everything else being equal? A. Probably the indication would be lower in the wind. 2. Is the temperature when air is put in motion by a fan or bellows changed? If so, what isthe cause? A. We think not, materially.

G. A. E. asks: 1. In the electrical plate machine described on page 402, vol. 28, if the disks are of glass, is it absolutely necessary to the proper working of the machine that the lower disk should be % and the upper $\frac{1}{16}$? Or is it only necessary that the lower one should be twice the thickness of the upper? A. Probably the 2. How or where can Iget ebonite? A. Ebonite is made by heating india rnbber with half its weight of snlphur You can doubtless obtain it from a rubber factory.

L. W. M. says: We conduct escape steam arough our building with tin pipe, for heating pur through poses. The pipe is not painted inside. Is there any way that we could coat the inside of the pipe withouttaking it down? We think we could economize part of the escape steam if we could apply some good radiator. A We scarcely think you can accomplish this.

E. P. C. asks: In Bourne's mode of setting what is meant by the centrics "? A. It has the same relative position as the center of any circular figure. 2. When a train of cars is going around a bend in the road, do the inside or the outside wheels slip on the track? A. The outer wheels will slip the most, if both have the same diameter.

A. B. D. asks: 1. What will remove black worms from the face? A. Friction with a rough towel has been highly recommended by some of our corresspondents. 2. Are the so-called black worms living insects, or merely a secretion? A. We think they secretions of matter. 3. Are hot air furnaces bad for the health? If so, what is a better and not too expensive way of heating a house. A. This is a matter about which there is a great diversity of opinion. For our own part, we think that hot air furnaces, in which water is constantly evaporated, may be used in well ven tilated houses without injury to health. A.C.E. says: 1. I have a small library of about 400 volumes which I wish to arrange and cata logue. What is a good method for so doing? A. It is a good plan to arrange the catalogue alphabetically, according to the names of the authors of the works. Example: "LLOYD, HUMPHREY. Elementarytreatise on the wave theory of light. 2d edition, 1 volume, 8vo. London, 1873. 2. E." The figure 2 refers to the book case, and the letter E to the shelf on which the book may be found. 2. In sharpening a knife or a similar tool, when the grindstone is turning towards you, should you hold the sharp edge of the knife toward you or from you? A. The latter way.

A. S. asks: How can I stop the leak in an aquarium? One of the glasses is cracked. A. Proba bly you can stop the leak by the use of marine glue.

T. E. asks : How can I ascertain the amount of any given element in any given mineral, for instance the lead in galena, or the zinc in blende? A. It can be ascertained approximately by a careful blowpipe analy-

R. C. G. asks: How can I tin pieces of iron vire? I have tried dipping them in melted tin, but wire? cannot prevent their sticking together, and they are veryrough and unevenly coated. A. Probably you will have to arrange the pieces so that they can be dipped separately, and wiped off as soon as removed from the tin bath

C. D. says: We have a private telegraph. My station would not work; upon seeking for the cause the copper insulated wire (running from the street wire into my cellar) was found corroded at the two ends of the cellar window where it touched the brick wall. will you inform me of the cause of this corrosion at these two points? A. Gases that corroded the wire night have been given off from some place in the vicin. ty.

J. M. D. asks: What will be the advantage of inserting a % inch pipe into each end of a cylinder thereby making direct communication from one end to the other? The object of this is to provide for the drainage of the cylinder. A. As we understand the question, the effect will be to increase the back pressure on the piston

H. F. M. asks: 1. How many feet to the mile are there in a grade of three degrees? A. About 275 feet to a mile, measured on the incline. 2. How can I ascertain the amount of water that a roadside gutter will carry? A. Knowing the construction, you can de-termine by experiment the velocity, and consequently the amount of water discharged in a given time. 3. How much fall should be given to an open spout, made of two planks nailed together, in a distance of 500feet so as to carry 30 gallons of water per minute? A. You can use the formula given on p. 48, vol. 29, multiplying the coefficients there given by 0.571. In this way you can find the inclination necessary for a wooden pipe Then make your trough so that the wet surface is the same as the surface of the pipe. 4. Is there anyway to repair the screw on a common auger when it is slightly damaged or worn? A. It can often be done with a file. 5. Is there a way to clean keroscne barrels, so as to make them fit for packing meat in? A. We think theycan be cleaned by steaming. 6. What is the best way to wash flannel? A. This is a disputed point. Perhaps the la dies, who know all about such matters, will send us their views.

G. R. E. says: 1. In your article on the initial velocity of projectiles on p. 400, vol. 29, you say that the circuit of the battery of the Bouton instrument can be closed or broken at will by means of a disjunctor. What is that disjunctor composed of, and what is its position ? 2 In the description of the Schultz chronoscope you men tion the interrupter, and sayit closes and open cuit about 500 times per second; can you explain it? A. In these instruments an electro-magnet is employed and the attraction is destroyed by interrupting the con nection of the conducting wire with the battery. 3 What will cut off or stop the current of a common horse shoe magnet? A. We do not know of anything that you can use to cut off the attractive force of a perma. nent magnet.

C. R. asks: In the compound engine, in which the steam does duty twice, what is the ratio between the first and second cylinder? A. From 25 to 5. 2. What gain is claimed for this sort of engine? A. Greater facility for a high grade of expansion, and less cooling and reheating of the cylinder during alternate strokes. 3. Is there not a back pressure on the piston of thesmallcylinder on the return stroke? A. Yes. 4. Is there any way of avoiding this back pressure, and, if it could be obviated, would not the gain be large over the ordinary engine where the steam is used only once? A. Reducing this back pressure reduces the working pressure in the second cylinder.

G. E. W. asks: Is not the curvature of the arth for the first mile nearer six and a half than eight nches? Reckoning diameter eight thousand, and cirinches? cumference twenty-five thousand, miles, the fail from pole to equator is four thousand miles, of course. Then, as the square of 6,250 miles is to the square of 1 mile, so 4.000 miles are but a small fraction more than 6% inches A. The polar diameter of the earth is 41,707,536 feet, or 7899 155 miles; the mean diameter at the equator is 41, 547,662 feet, or 7925694 miles. It is sufficiently accurate. in calculating the curvature of the earth, to regard it as a sphere with a diameter of 41,778,000 feet = 13,926,000 vards=7912.5 miles. The curvature for any distance, al dimensions being taken in feet, is found by dividing the square of the distance by 41.778.000-or the curvature. n feet, for any distance expressed in miles, is equal to wo thirds of the square of this distance. For a dis ance of 5,280 feet, or one mile, the curvature will be $(5280)^2$ $i_{1,778,000} = (1)^2 \times \frac{2}{3} = 0.667$ feet as given in the table. 2.

Has a telescope a lifting power, so to speak, as well es a power for enlarging; and, if so, are the two powers equal? A. In general, a correction for refraction (which makes the object appear higher than it really is and thus reduces the curvature) should be applied. This varies with different states of the atmosphere, but its average value maybe assumed as one sixth of the curvature, so that the corrected curvature is five sixths of that given by calculation. Hence it appears that the urvature, at a distance of one mile, corrected for re fraction is, on an average, $\frac{(5280)^2}{41,778,000} \times \frac{5}{6} = (1)^2 \times \frac{5}{9} = 0.556$ feet. 3. From what bases have the earth's circumfer-ence and diameter, as these are now measured, been estimated? A By the measurement of the lengths of a legree of latitude and longitude at different parts of the earth's surface.

Rue's "Little (fiant" Injectors, Cheapest and Best Boller Feeder in the warket. W. L. Chase & Co., 93, 95, 97 Liberty Street, New York.

Brown's Coalyard Quarry & Contractors' Apparatus for holsting and conveying material by irol cable. W.D. Andrews & Bro. 414 Water st. N. Y.

Parties needing estimates for Machinery of any kind, call on, or address, W. L. Chase & Co., 93, 95 97 Liberty Street, New York.

Iron Steam Boxes for Stave Bolts & Veneer cutting Machines. T. R. Balley & Vail, Lockport, N.Y.

Partners Wanted—We want to find one or two good careful Managers who have capital, to buy an interest in 746 Acres Big Muddy Coal, heavy Timber and Farm land, who shall superintend the Farming, a Saw Mill and Coal Shaft. Safe investment. See "Iron Age for Jan., 1874. Address Dobschutz & Abend. Belleville. Ill.

For Solid Emery Wheels and Machinery, send to the Union Stone Co. Boston. Mass., for circular,

For best Presses. Dies and Fruit Can Tools For best Fresses, Dies and Fruit Can Tools Bliss & Williams, cor, of Plymouth & Jay, Brooklyn, N.Y. Best Steam Traps made, non-freezing. Scotch Tubes and Engineers' Supplies, &c. A. G. Brouks, 426 Walnut Street, Philadelphia, Pa.

T. J. McM. asks: How can I divide a given straight line into two parts, so that the square on one of the parts may be double of the square on the other? A Youcan solve the question, to any degree of approximation desired, by the following formulas: Let l=length of the line. Lesser part= $1 \times \sqrt{2}$ -l. Greater part=21-l× **ب**⁄2.

T. C. W. asks: 1. Can you give me a recipe for making blackberry wine? A. Cook the berries slightly; let them stand until the next day. Then strain them, add I quart of water and 3 pounds of brown sugar to each gallon of the juice. Place the mixture in a cask when it can be bottled. 2. Is it a healthy drink or not? A. We think so. 3. Would it not be practical to ring the bells in the different churches by telegraph, providing each church had its own battery, and could not one man ring all the bells in one church ? A. Yes. 4. Can I get the

different drawings and specifications of all the patent ice elevators? How can I find out how many have been Steam Fire Engines, R.J. Gould, Newark, N.J. patented? A. Yes. You can only the out the number TIFIC AMERICAN.

E. E. B. asks: What course of study is necessary for a civilengineer? What books are necessary, and where can they be procured? A. Send to some publisher of scientific works, for his catalogue, in which you will find the different subjects classified. You will see the advertisements of such publishers in the SciEN

R. J. B. R. asks: At what age does a person usually stop growing? A. Some one has recently pub-lished the following *sata* in regard to the growth of men and women : Average weight of boys at birth, 6% Then and women : Average weight of boys at birth, 5_{2} lbs.; average weight of girls at birth, 6_{3} (bs.; average 1 weight of males at 20, 143 lbs.; average weight of females at 20, 120 lbs. Men acquire greatest weight, on an average, at 35, weighing 152 lbs., women, at 50, weighing 128 lbs. Weight of an average man or woman when ful growth is attained is about 20 times that at birth.

J. G. asks: Why will a hollow cast iron cylinder sweat on the inside when a flame of illuminat inggas is turned into it for heating purposes? Is it be-cause the moisture is contained in the pores of the iron and liberated by heat, or is the gas condensed into wa ter upon coming in contact with the cold surface of the iron? A. The steam formed by the combustion of the gas condenses on striking the cold cylinder.