colonies. The historical or business year in England began on the first da of Jannary as established by the Romans. The ecclesiastical calendar embracing the civil or legal year previous to 1752 began on the 25th of March, and events between the 1st of January and 25th of March were usually dated with both years, as February 11, 17314. The date of Washington's birth was fixed in the colonies to correspond with the new regulation; 1700 was a leap year under the Julian calendar, but not under the Gregorian.

(6022) C. B. W. asks (1) if the motor described in Supplement, No. 641, can be run from an alternating current. A. No. 2. If not, how must it be wound to run from an alternating current? A. See our SUPPLEMENT, Nos. 692, 717, 944, for alternating current motors. 3. What size wire should be used to have it run with 100 volts and 10 amperes? A. Use No. 28 wire on field and armature. 4. If I should make the field magnet on motor 641 twice as wide, which would be five inches, and the armatore core twice as large, which would be four inches, and put twice the amount of wire on the machine, would it be twice as strong as described in the SUPPLEMENT,? A. In general terms, doubling all the lineal dimensions gives sixty-four times the power. But as you only donble a portion, you may expect four or five times the power. 5. Can the motor 641 be run from the Crowfoot gravity battery? A. Not satisfactorily.

(6023) I. R. writes: 1 Can a storage battery be charged from an alternating circuitof 50 voltat If so, will the curent from the battery be direct? A. A storage battery cannot be charged from an alternating circuit. 2. What is the main difference between an al- power. 3. I wish to produce Tesla currents. What is ternating and direct current motor? A. Several kinds of alternating current motors have been invented. We ments on a small scale? A. There is no simple way. We have described several in our SUPPLEMENT. Nos. 692. 717, 944, to which we refer for their peculiarities. 3. Can a 1,200 volt continuous arc circuit be tapped in such a way as to get a current of 50 volts? A. There is no such thing as a current of 50 volts. By a shunt connection you can get such a potential difference. We advise you not to do it, as you expose yourself to great danger.

(6024) S. J. S. asks: How does the heat from the sun penetrate through the intense cold of the upper regions, and warm the surface of this planet? A. Heat is supposed to be a state of molecular motion or vibration conveyed through space in the medium of the luminiferous ether. A medium having no effect upon the progress of planetary bodies, yet capable of transmitting the pulsations of heat, light, magnetism and electa.city. It is probable that heat does exist in space to a very low degree in its radiant form and only develops into active energy by resistance of planetary bodies to its vibratory transmission.

(6025) W. F. asks: 1. What per cent of power developed at power house is lost in transmitting for street car propulsion of the three following methods: Cable, electricity (trolley system) and compressed airs A. No exact figures can be given, except that under average conditions the electric road may be pronounced the cheaper. 2. What Supplements or books would furnish me with information about compressed air? A. See SUPPLEMENT, Nos. 799, 857, 893, 510, 766, 900. Also SUPPLEMENT catalogue, sent by mail. 3. Why is compressed air not more used for street car propulsion? A. It is too expensive and cumbersome. See SUPPLEMENT, Nos. 176, 177, 182, 553, 637, 747, 845, 866, 890, 903, 904.

(6026) H. R. C. asks: 1. Does the induction coil increase both the tension and quantity of current or just the tension alone? A. The regular induction coil increases the tension and lowers the current strength. It also produces a sort of alternating current. 2. I used common table salt in place of sulphur of copper in making a gravity cell. When I connect a small motor in the circuit it runs very rapidly at first and then stops. What is the cause? A. The cell rapidly polarizes, the combination is in every way a very poor one. 3. How can the Leyden jar be charged with a gravity cell? A. Connect the knob to one pole and the outer coating to the other. The charge will be so minute as to be appreciable only by very delicate instruments. 4. Why are the magnetic poles continually changing? A. The reason is

(6027) C. L. writes: I have three storage batteries, and I would like to get some idea of what power I can get from them if attached to a proper motor. Each cell has 14 plates (7 to each pole), 616×9 inches (measured only the part that was supposed to be in the solution), making a total of 42 plates in the three cells. Can such cells be arranged to give small power for long time or large power for short time? A. Your battery will give about 18 amperes and 6 volts or 54 amperes and 2 volts, according to connection. The series connection (18 amp. 6 volta) is preferable. This gives 108 horse power. cells can be used from this as a maximum down as low as desired, according to the motor used.

(6028) F. C. H. writes: We are putting in a steam heating plant in a large hospital. The boilers, five in number, must be situated on practically the same level as the building to be heated, unless an excavation at least 18 feet deep and  $40 \times 60$  is made for them. Is the gravity system of such advantage that you would advise this excavation, at an enormous expense, or would it be better to have the return water conducted into a receiver with automatic pump attached, so that the water could be delivered into the boilers? A. The sinking of the boilers in an excavation for the convenience of a return system is not desirable, in view of the well known appliances of the present day for returning the water of condensation to the boilers. A small cellar with tank and automatic pump, below the line of return pipes, is the cheapest and most satisfactory system. 2. In ventilating a large hospital would it be better to propel by fans warm air into the rooms through registers placed near the ceiling, expecting this pressure of air, assisted by the steam heated ventilating stacks, to force the foul air out through shafts near the mop board of each room or would it be best to permit the hot air to escape through the heated basement corridor through registers placed near theceiling, and connect fans with foul air ducts, drawing the foul air out of the room through registers near the floor, this draught to cause the hot air to circulate rapidly through the room, warm it and pass out through the foul air ducts, the latter plan being the reverse of the former? A. The plenum or pressure syst he clamp arc.

tem similar to the first named gives the most satisfac tory results for both winter and summer ventilation. It partially counteracts unequal heating on different sides of the building from outside wind pressure. It prevents indraughts from the windows by the draught of the fan in the other system. The heating and ventilation of a hospital for the insane is too important a matter for a general categorical answer. The plans should be passed upon by an expert in heating and ventilating such buildings. 3. Can you give me the colors used in making different colored sidewalk tile out of a mixture of Portland cement and sand? A. Venetian red, black oxide of manganese, and chrome yellow are the principal coloring matters of cement walks.

(6029) W. L. B. asks: In that class of heostate where change of resistance is caused by change of pressure on a carbon powder, is lampblack suitable for the powder? If not, where could I obtain carbon powder that would be? A. We advise you to use powdered battery or electric light carbon. If the latter, see that the copper plating is dissolved before powdering. Lampblack would give very high resistance.

(6030) W. W. P. asks: 1. What would the effect if I were to wind a flat iron ring with a continuous winding instead of alternating them, and place it in the fields of the Morday alternating machine? Would receive a great deal of current with low voltage, i.e., direct current? A. This might be donewith a proper commutator and connections. It is not advisable. 2. How many watte do you require for one man power? A. 746 watts=1 horse power, or 93 (about)=1 man the simplest way for reproducing some of his experirefer you to Tesla on "Alternating Currents," \$1, and Tesla's "Inventious, Researches and Writing," just published, \$4 by mail.

(6031) C. A. D. asks: Can you inform me the degree of heat necessary to transform limestone from its natural state into lime? And what length of time is required to complete the process in an ordinary furnace? Does it require a gradual heat, or would a blast furnace expedite the process? A. 36 to 48 hours may be needed to burn a kiln of lime, and a white heat is attained in the process. The carbon of the fuel acts to facilitate the operation by its reducing action. Gradual heating is not needed.

(6032) Reader writes: A says that a black overcoat is warmer than a light colored one of equal weight, because the dark colored cloth absorbs the ravs of light, while the light colored reflects them. B gives reasons which are almost identical for saying that the light colored coat is the warmer. Which is right? A In general terms the black coat would be warmer in the sun—the white one in the shade or at night.

(6033) M. M. asks: What is the ratio of the volume of high pressure cylinder to that of the intermediate pressure cylinder in a triple expansion engine also the ratio of the intermediate to the low pressure cylinder? Also, what are the cylinders' diameter and stroke of the largest triple expansion engine? A. The ratio of the volumes of the cylinders of triple expansion engines varies somewhat with different makers, and to meet the requirements of expansion for steam at various pressures as well also the capacity of a receiver, if one is used. The usual practice for marine engines is for steam at 100 to 130 pounds pressure 1, 2.25, 5, and for 150 pounds pressure 1, 255, 690 as the relative volumes of the three cylinders. The cylinder diameters of one of our largest ocean steamers having two engines of 10,000 horse power each are 45, 71, and 113 inches with 60 inch stroke.

(6034) Inquirer, Newfoundland, asks: Would an ordinary kerosene lamp, with a sheet iron drum placed just upon its chimney so that the heat from it may radiate slowly through the apartment, heat the apartment better than the lamp without the above attachment? A. The absolute heating power of a lamp will not be increased by the absorption by and radia tion of a metal drum through which the heat passes, but the action of low radiant lest from such a source seems in some way to modify the susceptibility of the nerves to the sense of heat, and in that way appears to increase it. 2. Would the comparative heating value be the same whether the room had a chimney or not? A. The effect of a chimney opening into a room is to carry off heat, and may only be considered as a ventilator. 3. In case of feather bed on which a person with mild form of scarlet fever(scarlatina) lay till recovery, would it be sufficient disinfection to fumigate once or twice with good disinfectant, for three or four hours at a time, and then put bed in open air; or would it be necessary to take feathers out of tick, and wash case and feathers? Please state best way to disinfect in above case. A. The method of disinfecting as described may be proper and safe, if disinfectants such as carbolate of camphor or other approved methods are applied to the inside of the mattress and a quarter pound of camphor left among the feathers for a season. Such a bed should not be used by other children under six months. The safest way where wash everything appertaining to bedding and clothing.

(6035) P. S., N. O., asks: What horse ower will a gasoline engine having two cylinders  $4\frac{1}{4}\times6$ inches stroke give at 350 revolutions? What speed will above engine drive a 21 feet long, 5 feet 6 inches beam boat, propeller 18 inches, 3 blades, 41/4 feet pitch? A. The two-cylinder gasolene engine will have from 5 to 7 horse power, according to the perfection of the explosive mixture of gasolene vapor and air. It will propel the boat at from 7 to 8 miles per hour. The engine will not run with the speed named when attached to the propeller. 250 revolutions will be its speed for the above boatspeed.

(6036) R. W. S. asks if the valve of a high speed locomotive has to be changed to a shorter throw when running at a high rate? A. The throw of the valves in all locomotives and link valve gear engines is controlled by the link motion. The movement of the link from the dead point out in either direction controls thecut-off of the valve from 0 to the largest opening that is allowed by the construction, the amount of cutoff being generally designated by the check notches on

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| Car fender, S. C. Kindig. 51<br>Car platform gate, J. Krehhtel 51  | 1,128   1<br>1,066   1                             | L                                       |
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| Clay pigeons, machine for manu acturing, W. G. Jones Cloth felting machine, W. A. Richardson. 55 Cloth sking and drying machine, R. Partington. 51 Clothes drier, Douglas & Austin. 51   | 9.127<br>9.073                                     | N                                       |
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| Coin tray, H. A. Hayden  | 9,020  | Ä                                       |
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| Cracker cutter, mockwell & mull  | 9,293<br>9,222                                     | y                                       |
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| Cultivator and planter, J. E. Miller. 51 Cultivator, lister, F. P. Craig. 51 Curtain fixture, I. Williams. 51  | 9,044<br>8,940<br>8,977                            | 7                                       |
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| Drier. See Clothes drier.<br>Dr 11. See Rock drill.  |  | P                                       |
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| Dye, brown, petroleum, H. A. Frasch  | 9,036 ;<br>8,991 ;                                 | I                                       |
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| tential schmid & Lamme   | 9.098  | Ē                                       |
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| Electric motor, F. E. Herdman 51   | 8,946<br>9,116                                     | Î                                       |
| Electric motor, Ries & Scott   | 9,272  | Ē                                       |
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| Electric motor or generator, W. Baxter, Jr   | 9,281  <br>9,120                                   | Î                                       |
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| 16<br>78<br>13        | Hose bridge, H. Sandrock. Hose nozzles, portable and adjustable support for, W. A. Cain. Hot air furnace, G. W. Fridrich.  Hot better companies of D. M.   | 519,186<br>518,986                        |
| 53<br>17<br>51        | Hut arr rumace, G. W. Fridrich.  Hub protector, vehicle, N. D. Hodgkins.  Incubator, H. R. Davis.  Indicator springs and steam gauges apparatus  | 518,986<br>519,304<br>518,951<br>519,24 4 |
| 53<br>50              | Hub protector, vehicle, N. D. Hodgkins. Incubator, H. R. Davis. Indicator springs and ateam gauges, apparatus for testing, R. C. Carpenter. Ink, manufacture of printing, J. & J. Bibby. Insulating material into conduits, means for in- troducing, D. Brooks, Jr. Jewel setting machine feeder, W. Rondquist Klin See Drying klin.   | 519,235<br>519,032                        |
| 36<br>74<br>12        | troducing, D. Brooks, Jr   | 519,171<br>519,027                        |
| 39<br>21<br>85        | Knife, R. J. Christy   | 519,237<br>519,068<br>519,170             |
| 76<br>47              | Knitting machine, circular, Branson & Cook. Lace fastener, J. B. Craig. Ladder for sleeping care, folding, J. B. Holbrook. Ladder, sectional. H. H. Lang.  | 519.018<br>519,184<br>518,961             |
| 73<br>31<br>00        | I amp, electric arc, J. C. Fyfe. Lamp, electric arc, J. B. McKeown Lamp, incandescent electric, F. S. Smith Lantern, Gill & Atwood   | 519,288<br>519,045<br>519,099             |
| 06<br>22<br>92        | Last, F. E. Benton. Last. J. C. Kupferle. Latch and lock, combined, N. B. Gregory.   | 518.985<br>619.067<br>519.284             |
| 68<br>05<br>16        | Lathe, turret, F. H. Richards. Laundry banging rod, W. S. Coburn. Leather skiving machine, N. D fresne. Life-preserver, buoy, etc., automatic, A. Colomes  | 518,969<br>519,017<br>519,282<br>519,242  |
| 57<br>28<br>66<br>16  | Lubricant for bley cle chains, and bearings, W. L.   | 519,085<br>519,096                        |
| 72<br>89<br>58        | Lubricating device for car or other axles or<br>shafts, J. S. Washburn.<br>Lubricator, P. S. Whiting.<br>Magnet for electric machines, field, A. Schmid  | 519,212<br>519,055<br>519,097             |
| 37<br>09              | Mail box, J. G. Cutler.  Mailing machine, J. A. Horton.  Malt liquors, apparatus for cooling and aerating,   | 519,057<br>519,185                        |
| 04<br>63<br>74        | Match making machine. J. C. Donnelly   | 518,941<br>519,150<br>519,994             |
| 56<br>27<br>78        | Mattress filling machine, W. H. Putnam<br>Measuring dress skirts, device for, A. S. New-<br>comb   | 519,203<br>519,090<br>518,947             |
| 00<br>78<br>73        | Measuring implement tailor's, D. Hawley Measuring textile fairtes, apparatus for, F. C. Stephan Meat chopping machine, A. J. Kull  | 519,277<br>519,000                        |
| W<br>48<br>88<br>20   | Metal, machine for joining and rolling sheets of, Grafton & Spears.  Meter. See Grain meter.  Mill. See Grinding mill.   | 519,084                                   |
| 18<br>11<br>18        | Mould making machine, L. Ribereau y Marteaux.<br>Moulder's tack, F. Schuite  | 519,310<br>519,164<br>519,146             |
| 06<br>64<br>02        | motion, device for converting reciprocating into rotary, F. Jackson  | 519,064                                   |
| 93<br>22<br>70        | Motors, by draulic apparatus for controlling fluid<br>preseure, C. Benjour.<br>Mower, R. McGabey.<br>Mower, lawn, H. Deck.<br>Music leaf turner, J. W. Darley, Jr.   | . 519,168<br>519,167                      |
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| 112<br>38<br>29<br>36 | Pen, drawing, Haug & Holler.   | 519,153<br>519,155<br>519,166             |
| 91<br>92              | Pianofortes, self-playing attachment for. T. L.<br>Lebeau.<br>Pie rack, folding, T. J. Shannon.  | 519,157<br>519,007                        |
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| 23<br>81<br>20<br>76  | Prover wheel, A. Bienkowski.  Precious ores, converting and smelting, C. M.  Allen   | 519,226<br>519,217                        |
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| Sifter, flour, D. McKenzie  | 519,003 ;<br>519,009                     |
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| Soldering machine, can bead, W. H. Hmyth<br>Sole leveling and buruisbing machine, E. C. Judd  | 519,206<br>519,187                       |
| Sole leveling and buruisbing machine, E. C. Judd<br>Spade or shovel, P. Caldwell, Jr<br>Spark arrester, K. Ringheim<br>Spoke socket, P. Schneide:<br>Spools, machine for dressing half, E. Hubbard<br>Stamp holder and moistener, G. Lounis<br>Steam engine, W. C. Church.  | 519,104<br>519,026                       |
| Spoke socket, P. Schneide   | 519,026<br>519,273<br>518,954            |
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| upon, C. I. Marourg. Tobacco pipe. C. Peterson. Tobacco pipe. L. D. Keller  | 519,135<br>518,000                       |
| Toggle press, double-acting, A. C. Campbell Tool combination, G. J. Capewell  | 519.174<br>519.033                       |
| Tool, combination. G. J. Capewell. Toy, pistol, W. Duechting Trimming machine, J. W. Oliver   | 518,987<br>519,199                       |
| Trunk, R. L. Forsgren. Tube drawing device, C. G. Larson  | 519,179<br>519,096                       |
| Tool, combination. G. J. Capewell. Too, pistol, W.Duechting. Trimming machine, J. W. Oliver. Trunk, E. L. Forsgren. The drawing davice, C. G. Larson. Tug, hame, W. Timmins. Typewriter counter, A. V. Gearhart. Valve device, C. H. Watters. | 519,030<br>519,180<br>510,659            |
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| Wheel. See Power wheel.<br>Wire reel and stretcher, H. Frick  | 519,037                                  |
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| pagnie. Disinfectants, Rea Holliday & Sons  | 24,645<br>24,650<br>24,635<br>24,635 |
| Firearms, Wiebusch & Hilger   | 24,637<br>24,637<br>24,638           |
| Creme de menthe, E. Cusenier Fils Aine & Compagnie.  Disinfectants, Rea Holliday & Sons   | 24,614<br>24,64                      |
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| Hanger, J. M. Andersen23,244 to                 | 23,240 |
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| Lace fabric, J. K. Fletcher                     | 23.23  |
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| musical matrument, at security                  | 00,00  |
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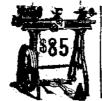
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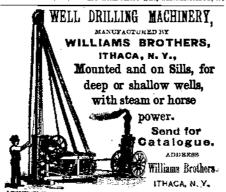
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