Wusitess and Persomal.

|  |  |
| :---: | :---: |
| Acme engine, 1 to 5 H. P. Bee adv. next fsene. <br> For pumping engines. J. S. Mundy, Newark, N. J. <br> "U. s." metal polish. Indianapolls. Samples free. Kemp's Manure Spreader, Syracuee, N. Y. See Adv. Improvediron planers. W.A. Wileon, Rochester, N.Y. Bankrupt Machinery Sales. Am. Tool W'ks, Clev., O. Shingle machinery, Trevor Mfg. Co, Lockport, N. Y. Steam Dílinfectors. <br> Qeo. T. McLanthin \& Co., 120 F Iton 8t., Boaton, Maes. <br> Patent Open-8ide Planing and 8bap,nk Machines. Pedrick \& A yer, Philadelphia, Pa. <br> Steam Hammers, lmproved Hydraulic Jachs, and Tube Expanders. R.Dudgeon. 2 Cofnmbla St., New York. <br> Hydranic Wheel Presses a specilty. The J. T. 8cbafrer mig. Co., Rocheater, N. Y. See adv. page 39. Screw machines, milling machines, and drill presees. 'Fbe Garvin Mach. Co., Loirht and Canal Sts., New York. Centrifugal Pomps. Capectty, 100 to 40,000 gale. per minute. Allaizesin atock. Irvin Van Whe, 8 yracuse,N.Y. <br> High Speed Finginea-8ingle Cylinder and Componnd, for all electrical and manufacturing uses. Watertown Steam Furine Co., Watertown, N. Y. <br> The beatbook for electricians and beginners in electriolty 1 s " Experiment I Sclence," by Geo. M. Hopkins. By wall, \& ; Mnnn \& no., publishers, 361 Broadway, N. Y. <br> Forthe onginal bogardus Univereal Fccentrio mill. Foot and Power Presses, Drills, 8hears, etc., address J.S. t G. F. 81 mpson, 28 to 36 Rodney St., Brooldyn, N. Y. <br> Canning machinery outfits complete, ofl bnrners for soldering, air pompe, can wipers, can teoters labeling machines. Prenser and dies. Burt Mfg. Co., Rocherter, N.Y. <br> Competent persons who desire aqencles for a new popular bcok. of ready eale, with handsome proft, may apply to Munn \& Co., Scientific American office. 361 Broadway, New York. <br> c:-Send for new and complete catalogue of 8cientiac and other Books for sale by Munn \& Co.. 361 Broadway, New York. Free on apdliration. |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

GINTA TO CORRESPONDENTS.




 expected withon rem oneration
sclentinc American suptume nty refern
 marked or labeled.
(5189) C. F. W. asks: 1. Would it be practical to torun a one horse power motor by storage bat
teriea, chargerl by cell batteries of some kind, if the moor only has to nun about five hoors per week $\%$ A
Yes. 2. Does it take more cells of battery (etorage bai tery) to run a motor a day than it does an hour 9 A
 it take more cellis of battery to c arge the storage
battery when the motor rans all day than when it cons only about one hour a day $q \mathbf{A} \mathbf{A}$. It would hardly b feasible to charge a atorage battery for all day run-
ning by meana of primary batterie, but it would be ning by means of primary batterieg, bot it would be
practicable to do so for i run of from one to oill hoors. 4. In the armature etationary in a "moltiphase" motor
A. Yea. 5 . What isa " utreeapole" motor 9 It isa ma chine haring an arroature provided with three radal poles. 6. What is the oil to labricatep printing presees an
such machinery A. Macchinery oil of good quasity. (5190) M. T. B. asks: 1. Is there an subetsuce suitable for a amall mirror which is fexible A. Flexilbe mirrors of plases have been made. 2. What
is the explosive force of an ordinary $45 \times 70405$ gre. carticige in the chamber of a rife to the eqqase inch. there more Yorce back ward hano siddewise $P$ Also, how moch more will the aame ballet drop in a thooseand yard shooting over water than land, also how mach highe . The explofive ancer 1. per square tich in every direction. We have no data as to any difference in the trajectory of a ballet over land and water, or at high alatudes. 8. How many tme gtronger is gun cotton than F. F. G. black rille powder A. The explosive force of gun cotton is from 40 to 60 per cent greater than ride powaer for equal welghte
(5191) H. E. C. writes : 1. I am making commatator for a simple motor out of gegmenta, Will
fron or brese do for annged Bleeve. If not, what is beat A. Brase will do for the fianged eleevee, but copper is pre ferable. 2. I have msti= a mutor with east fields and Wrooght iron rings for armature core; what metal mont
be osed formortled studs for holdthg bruahea $\mathcal{A}$. Brass be osed formortleed studa for holding brushee 9 A . Brass Is commonly osedfor thisporpose.. 8. Is there nothing can subetrate for ranber iming in plonge battery celle
A. TTY coal tar pitch. 4. Win one coll start motor? A. Yes. 5. Would 10 cells with plates $8 \times 5$ have any mor E. M.F. and volta thana battery of 4 or 8 celleof $6 \times 10$ A. The E. M. F. of the bictromate cell lis aboot 2 volta, whatever the size of the cell. Larger platee yield more carrent. 6. Ao it neccesary to golder jointo in winding

conductors on elther field magnet or armature dynamoe and motors.
(5192) J. J. C. writes: 1. What seemed ome to be a very currious occarrence last Wedneada night, being a very heavy storm, the lightning gtrack the a young man, going tiown in the cellar next mordog, young man, going 4own in the celar next morndog the key, he was krocked acroes the cellar and almoe atunned ; bot the atrange part of it is you cannot tonch the lighto to turn them on ever since. I tried it Sunday night, bat I got a ahock whichmademe leave them alone
The electriclan of the company waa there, he toched one The electriclan of the company was there, he tooched on witt aplece of wood, and he also got a heavy shock; now what do yon think was thecause orallthin A. Poosibly the electric light current reached the key. The thin conld not rebinin the charge of lightning for more than ain Instant. 2. In the steel-melting shop where I work, wo have considerable trouble wit the bottome in the monda yon know the ateel is poared from cracibles into moulds Which are made ont of caet iron, and also the bottoms;
the weight of the etteel striking the bottom in the mould the weight of the efteel atribing the botiom in the mould
 makes them very costiy. We have tried a great many think wolld remedy thla defect \& A Try inding ted think would remedy thia defect A. Try inclining tibl
ingot molld sothat the atree will atrike the bottom with less force.
(5193) A. S. J. writes : Lightning committed a treak here todas. At $100^{\prime}$ 'clock during a vers
 followed it down to the atore stove, demolithbing everythlng as it went. The matchec board hard pine floor is not marked in the least, and
there is no silgn about the room where the bolt paeed there is no sign about the room where the bolt paseed
out, but dir tuly noder where the atove atood the ground is torn ap, learing a hole in which conld be pliseala bar rel. The fie ran from the celling of the room throug ne roaf, not from the ground up. How did the ligat Poseibly the lightringfoliowed a anall through the floo or the disaribance in the groumd may have been cansed by a branch discharge or another bolt.
(5194) H. D. R says: 1. In two guns, bre 1 inch and 1x inch, pleasee etate the maximum Moc depends upon the etrength and length of the gun, andalso upon the strength of the powder. As to the inch gan end 8 onnces por the 13 in inchgon is as mach caube need effectively. 2. How is the abo compoted The computation involves all the conditions of compool-
tion of the powder and the stergth and length of the ton
gon.
(5195) J. H. S. agks: 1. How to gild the
 hen dry, burvinh with an agete yorlaher. 2. Th eneral principles onbnation lock is a mact intericatio one to auswer in l letter or Note andQuerles. s. How to stop leaks around the ittungs of ateam ipes where it is imooesibleto takethemdown : A. Clampeandrabberpack
ing is the asaal practice for stopping leaks ing is the usaas practice for stopping leaks as yon de
(5196) A. M. says: Having built an engine with 8 cylindern (atteam one way only), cylinderaire 1 inch by 88 atroke, and makes about 250 revolution
with 71 b. Ateamper minate, howmach horse powerwill it have with 50 ib. of atteam, and how many revolutiona will it maka mere being no dead center $?$. Your en ine ag deecribed is do atroke, hore power; 8 cyinders ower. 2 What gize cylinders will be neceanary for 2 horse power engine, i. e., using 8 cyllindera, also please give dimenesions of a titblar boller for the same? bee Scientinic Amprican PUpplem
(5197) A. H. says: The propeller on my team launch is a four-bladed one. It is 18 inches in $n$ angle of 45 degrees. Will you please linform me the pitch of the propeller, and what percent the slip is gener ily allowed in atllu water? A. The propeller is $4 / 8$ feet pitch. The sllp will be governed by the ayze of the boat
and its model which is the measare of reslatance; abont 20 to 25 per cent 0 Ifip should be allowed.
(5198) B. J. R. asks how much approxi mately a brase rod 50 feet long will expand with an in raase of ten degrees in temperature, and what weigh inch for the length and change of temperatnre named It lifting welght will depend npon its aize and tracing to keep it from hactling.
(5199) E. W. asks: Will a Bunsen 1 gal. battery run a motor 20 to 30 hours with load 9 A. vided the nealathoces of the motor and battery arepro portionate.
(5200) A. C. W. asks : Is it possible to run a storage battery, charged with clooed circult batteries, Bo hat it can be used at any moment for lighting parposes, cut outfrom the storage battery and storage battery torned on to the light P If so, what is the effect on each battery if any? How long will each battery lant ? A. You can arrange storage batteries in connection with prtmary
batteries in the manner saggested. A stonage battery of sood make will laat almoet indefnitely, and gravity cell
ased for chargiog will ran a year with Hitlo attention
(5201) H. V. H. asks: 1. Would the Sclence", "nd the Sclence," and the ejmple polarined bell, page 488, work
well as a call for the edmple telephone, page 577 : A Yes. 2. Woald it be better or cheaper than a bell ope half a mile long ? The telephone line is to be abou a magneto call would be prefteride to elther. 8 . Wha bell ? What welght of wire woild be req atred for Ul

Wre coat? A. Use No. 36 whre for the magnet of the Thiswill require abont 500 feet of wire. The reaistance fthe key should be abont the same. We believe the Fire coste about is cents an onnce.
(5202) W. J. B. says: I have a $3 / 4$ inch inch. Now I would like to know what eize wer square whee and what aize jet I woald have to ose to drive the and power dynamo (Supplimentib1). Ihave removed e copper plating from electric light carbons with nitric cid. The acid has seemed to have soaked into the car on. Will this do any harm if used in the battery, or would it take to run an induction coill gravity cell long and 136 toches in dlameter 9 A. Yon will require 12 inch water motor, with a half inch nozzle, to drive the dynamo ; aboot one eighth horse power. Thenitric acia bborbed by the carbons will do no harm in $t$ e battery Four gravity cells for the induction coil.
(5203) W. A. F. asks: 1. Would like to now if it is poealble for me to recharge the exhauste if so, state how and what wanted. A. A chloride of silver cell can be clarged by remoring $t$ e reduced ailver and replacing it with a cyllader of fused silver chlorlde. The solution is made by diasolving pure chloride of am
moniom in water or, in llea thereof, common salt. 2. I it poseible to make a chemical battery atrong enough to un a phonograph and not be larger than 12 inchea same? And what ingredienta are required to ron the ordinary leagth of time? A. A good sired Grenet battery will run a phonograph. The solution for the Grenet ba tery is made by disoolving bichromate of soda in water to sataration and adding slowhy one-afth its balk of com
(620)
(5204) L. B. asks : 1. Cap the field mag ge batteries canable current dynamo be excled hy stor ion : A. Yes. 2. Can an Edisod dynamo be changer rom manufactured state to alternating current dynamo by imply having a ring commatator 9 A. No. 3. Are necturic incandescent lights commonly used ran by alter tinuoos and interrupled carrenta, and what will be the each astem? A. Incandescent lamps are ru in both
able.
(5205) F. H. asks: 1. What kind of battery to uae to ring ady inch electric bell continuonely the Fuller battery would a battery would polarize in a short time. B. How long would a diak Leclanche ring it ? $A$. This battery will our's ose.
(5206) W. H. F. writes: I have made the telephone described in Supplibicant 142, and it worke
fine. Bat how in the world can I give a eignal on the same ? Itcan't be done by tapping on the daphragm. switch a teachendof your line and nse a magneto call nah bottor and electric bell
(5207) S. C. K. asks: 1. What should be the proper sarface apeed at which the wax or tinfoll cyl inder of a phonograph should ron : A. Its periphera he area in circular millu of a copper oire to wha ampere of current ? A. 848-47. 8. Is the carrying capacity in direct proportion to the sectlonal area 9 tion 9. What is the resistance of Grenet batiery gallon size is about one-balf ohm.
(5208) F. H. asks: Which will leak through the amallest opening, water or steam, the pres sure and temperature being the same, say 70 pounds and water will Fahrenheit? The claim has been made that pass throagh holes or apoogy material that is impervion to water under the same preseare. Its issue is not as
(5209) A. G. F. asks: Doesitin anyway ednce the pressure on a atation pump, ufting water 800 reet vertical, by tapping water column 10 feet above dis charge valves and allowing the full of a 2 inch pipe to realways foll to point of discharge $\%$ Is not the peasir always foll to point of dibcharge is Is not the pieasure
the same at discharge valves, lessthe friction of eacaping water through the 9 inch pipe ? $\mathbf{A}$. The discharge pipe from the main will leseen the work of the pomp in the only leasen the pressure on the pump valves by the amount of the friction head dne to the decreased velocity device. $\quad$ (5210) A. M. asks: Give the proportion a small A. M, ask win a one-har pinch hole, 80 a to be perfectly safe. A. For one-hal inch boremake the
cannon $6 X$ inches long, $13 / 9$ inch diameter atmazze, 2\%/9 diameter at breech.
(5211) F. X. S. asks how to make Gurley's Norweglan dipping compase, how long to make the
needle, and it $t$ e jewel bearingo ont of a watch will do for the Dearing. A. The needles of dipping compasea re made from 2 to 4 inches in length. You may nos (52inge, such as are used in ine acales.
(5212) L. B. writes: Have seen a statement in Gage's "Element of Physics," that somebattery in circuith but mardy connected with the earth. electricity can be taken in that way, pleace explain how, and if not, what is meant by this etatement. A. It notromenta pecullar elecirical condicons that is is not poesible, at any time and at uny ploce, to talke sufficient (5213) G. B.- You will find a com-
 tncloding the fall cend
Burplemant. No. Eri.

## ${ }^{6}$



TO INVENTORS.


INDEX OF INVENTIONS
Por whieh Letters Patent of th
United Sates were Granioa
Jaly 11, 1893 ,
AND EACH BEAIEING THATP DATE,


d


Cos




