## 2usiness and 20 ersonal.

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nufacturers, Philadelphia. Correspondnnce solicited Presses \& Dies. Ferracute Mach. Co., Bridgeton, N.J. Wood-Working Machinery of Improved Design and Workmanship. Cordesman, Egan \& Co., Cincinnati, 0 .
The " 1880 " Lace Cutter by mail for 50 cts.; discount Mechanical Counsel Experts in Patent Causes and Mechanical Coun
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Works, Drinker St., Philadelphia, l'a. M, Dione
Malleable and Gray Iron Castings, all descript
Erie Malleable Iron Company, limited, Erie, Pa. Long \& Allistatter Co.'s Power Punch. See adv., p. 285 . National Steel Tube Cleaner for boiler tubes. Adjust-
able, durable. Chalmers-Spence Co.,10 CortlandtSt.,N.v. Peck's Patent Drop Press. See adv., page 300. Corrugated Wrought Iron for Tires on Traction En-
gines, etc. Sole mfrs., H. Lloyd, Son \& Co., Pitsb's, Pa. gines, etc. Sole mfrs., H. Lloyd, Son \& Co., Pittsb'g. Pa Wren's Patent Grate Bar. See adv. page 300. Best Oak Tanned Leather Beling. Wm. F. Fore-
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cialty, by E. \& B. Holmes. Buffitlo, N. Y. Rollstone Mac. Co.'s Wood WorkingMacl'y ad. p. 301. Wright's Patent Steam Engine, with automatic cut
ort. The best engine made. For prices, address William oft. The best engine made. For prices, address $\forall$ illiam
Wright, Manufacturer, Newburgh. N. $\mathbf{Y}$. For Light Machinists'Tools, etc., see Reed's adv., p. 301. Nickel Plating.--Sole manufacturers cast nickel an-
odes, pure nickel salts, importers Vienna lime, crocus, odes, pure nickel salts, importers Vienna lime, crocus,
etc. Condit, Hanson \& Van Winkle, Newark, N. J., and etc. Condit, Hanson, $t$ Van Wing
92 and 94 Liberty St., New York.
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For Pat. Safety Elevators, Hoisting Engines, Friction Safety Boilers. See Harrison Boiler Works adv, p. 316 . Safety Boilers. See Harrison Boiler Works adv., p. 316.
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Pa. Diamond Drill Co Box For Thrashing Machines, Engines, and Horse Powers, For Thrashing Machines, Engines, and Horse Powe
seeillus. adv. of $\mathbf{G}$. Westinghouse \& Co., page 317 . Fire Brick, Tile, and Clay Retorts, all shapes. Bor
O'Brient, Nf'rs,23d St., above Race, Phila. Pa. Turbine Wheels; Mill Mach'y. O.J.Bollinger,York,Pa. The Brown Automatic Cut-off Engine; unexcelled for workmanship, economy, and durability. Write for in-
formation. C. H. Brown \& Co., Fitchburg, Mass. Brass \& Copper in sheets, wire \& blanks. See on p. 332. The Chester Steel Castings Co., office 407 Library St.,
Philadelphia, Pa., can prove by 15,000 Crank Shafts, and Philadelphia, Pa... can prove by 15,000 Crank Shafts, and
10000 Gear Wheels now in use, the superiority of their

For best Portable Forges and Blacksmiths' Hand
Blowers, address Buffalo Forge Co., Buffaio, N. Y. Cope \& Maxwell M'f'g Co.'s Pump adv., page 332. The Twin Rotary Pump. Sce adv., p. 350. Millstone Dressing Diamonds. Simple, effective, and
urable. J. Dickinson, 64 Nassau street, New York. The Improved Hydraulic Jacks, Punches, and Tub Eagders. R. Dudgeon, 24 Cok Tully warranter The I. B. Davis Patent Feed Pump. See adv., p 332. Geiser's Patent Grain Tbrasher, Peerless, Portable, Ming Mee illu, adv. P. 333 Pat. Steam Hoisting Mach'y. See illus. adv., p.
Houston's Sash Dovetailing Machine. See ad., p. 334 Houston's Sash Dovetailing Machine. See ad., D. 334
Moulding Machines for Foundry Use. 33 per cen New Economizer Portable Engine. See illus. adv.p. 333 Rue's New "Little Giant" Injector is much praised ue Manufacturing Co., Philadelphia, Pa.
Skinner \& Wood, Erie, Pa. Portable and Stationary Engines, are full of orders. and witbdraw their illu
ted advertisement. Send for their new circulars. For Shafts, Pulleys, or Hangers, call and see stoc Wept at 9 Liberty st., N. Y. Wm. Sellers \& Wm. Sellers \& Co., Phila, have introduce
injector, worked by a single motion of a lever. Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Also manufacturers of Solo-
man's Parallel Vise, Taylor. Stiles \& Co..Riegelsville.N.J. Toope's Pat. Felt and Asbestos Non-conducting Re morable Covering for Hot or Cold Surfaces ; ' 'oope's Pat movable Covering for Hot
Grate bar. C.Toope \& Co., M'f'g Agt., 353 EE . 78 th St , N.Y.
Use Vacuum Oil Co.'s Cylinder Oil, Rochester, N. Y. Use Vaccuum Oil Co.'s Cylinder Oil, Rochester, N. Y.
Don't buy a Steam Pump until you have written ValDon't buy a Steam Pump until you
ley Machine Co., Easthampton, Mass.
Lightning Screw Plates and Labor-saving Tools, p. 333 . Use the Vacuuun Oils. The best car, lubricating, en gine, and cylinder oils made. Address Vacuum Oil Co. Skinner's Chuck. Universal, and Eccentric.

##  <br> HINTS 'TO CORRESPONDENTS.

No attention will be paid to communications unless accomp
writer.
Names and addresses of correspondents will not be given to inquirers.
We renew our request that correspondents, in referring to former answers or articles, will be kind enongh to
name the date of the paper and the page, or the number name the date of
Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.
Persons desiring special information which is purely of a personal character, and not of general interest,
should remit from $\$ 1$ to $\$ 5$, according to the subjeet, should remit from $\$ 1$ to $\$ 5$, according to the subjeet,
as we cann be expected to spend time and labor to obtain such information without remuneration.
Any numbers of the Scientific American SuppleMENT referred to in these columns may be had at this office. Price 10 cents each.
(1) W. R. S. asks: 1. How can I successfully weld cast aud spring steel? Please give fluxes best adapted for each. A. You will find directions in
'Spons' Workshop Receipts," page 361. 2. What is the 'Spons' Workshop Receipts," page 361. 2. What is the
best flux for welding iron? A. Silex is most commonly best flux for welding iron ? A. Silex is most commonly
used, also borax, and sometimes a mixture of the two. used, also borax, and sometimes a mixture of
3. Can cast iron be welded? A. No, but they can be united by burniug. 4. What is the best Amerim can steel as well adapted for these as the English steel? A. Each maker has his own especial process. Sometimes the beating is regulated by heating in a composi-
tion having a d determined temperature and then cooled in water. Others heat in a clear fire and cool in a special fluid.
(2) F. G. writes: To settle a dispute among foundry men please state the height which the
tuyere should be from the base in a cupola 22 inches tuyere should be from the base in a cupola 22 inches
diameter in the clear ? A. From 14 to 16 inches.
(3) H. C. asks: Has a boiler, 44 inches diameter and 26 feet long, showing 100 lb . steam, more
power than a boiler 36 inches diameter and 26 feet long, power than a boiler 36 inches dameter and 2 feet long,
with the same pressure? A. The pressure of steam determines the power. The form of boiler does not (4) J. A. G. asks: Can you teli me of any out the use of sulphur? We have alwaysused sulphur, but it gives a very unpleasant smell to the goods. A. We know of no way of bleaching such goods that will
compare favorably with the sulphur method. If properly washed after bleaching no unpleasant smell will remain
(5) J. L. L. asks (1) for the best way to frost machine work. A. Use fine emery cloth or paper
on a small revolving disk. 2. Is there a better way of on a small revolving disk. 2. Is there a better way of
finishing up work than by the use of emery cloth ? A. For plain surfaces use French emery paper, for irregu(6) W. B. P. asks how to ascertain the height of a steeple, using as the surveying instrument
pocket rule bent so as to form a right angle. A. Open your rule so as to form a right angle, place one arm of the rule on a level surface in the same plane with the base of the steeple, allowing the other arm to stand vertically; place a straight edge against the side of the rule so as to touch both arms and look along the straight edge, moving it until it is exactly in range with the top
of the steeple. Now by noting on the rule the perpenof the steeple. Now by noting on the rule the perpen-
dicular height and base of the triangle, of which the
straight edge is the hypothenuse, you have thepropo
tions of a triangle of which the distance between you tions of a triangle of which the distance between you
point of observation and the center of the base of the $\left\lvert\, \begin{aligned} & \text { steeple forms the base; } a, \text { being the base of your trian- } \\ & \text { gIe; } b \text {, its perpendicular height; } c, \text { the dietance from ob- }\end{aligned}\right.$ server to center of base of steeple; and $d$, the height o the steeple, your formula would be, $c: b:: c: d$.
(7) M. L. asks: 1. How many cells on eact end of the Watson battery will it require for a tele graph line three miles in length ? A. Use about eigh cells at one end only. We cannot give definite informa tion in regard to this without knowing the resistance of
the line. 2. Does it need more battery for a groun tion than a cound connections are good. Which is the best way to make ground connections A. Connect with gas or water pipes if you have them;
otherwise, bury a sheet of copper 2 feet by 6 or eight otherwise, bury a sheet of copper 2 feet by 6 or eight
feet in ground that is always moist, and fasten you feet inground that is always moist, and fasten your
ground wire to it by soldering. 4. Will sounders, wifb line A Yes 5. What distance is line ? A. Yes. 5. What distance is considered one
ohm resistance? A. 330 feet of No 9 B. wire gauge iron wire has a resistance of one ohm-a trifle over six-
teen ohms to the mile; No. 10, about nineteen and a half ohms to the mile; No. 12 about thirty ohms to the hall o.
mile.
(8)
(8) H. B. C. asks why an injector or in-
eurator will not do its work so perfectly when fed sirator will not do its work so perfectly when fed that such is the case, and a number of theories have been advanced; but I apply to you for information. A
Probably because the current or agitation of the wate in the main affects the regularity of the jet through th injector. This has been found to be the effect in othe
(9) J. L. asks: 1. If to an engine, 7 inches y 10 inches, running with 100 lb . pressure, cutting of at $2 / 2$ stroke, another cylinder 12 inches by 10 inches be
added, into which the first is to exhaust, and thence into the atmosphere: what will be the gain? A. From 30 to 35 per cent. 2. Will the area of ports in large cylinderhave to be proportionate to its piston area, or will the area of ports of small cy linder do A. Ports should
be in proportionto area of piston. 3. Will the arrangement be of practical value? A. Yes, but it is very old (10) A. J. T. asks: Are the bulbs of spirit levels made curved for any particular purpose? If so, bubble of air will rise readily to the central point of the $\begin{aligned} & \text { bubble } \\ & \text { glass. }\end{aligned}$
(11)
(11) J. R. G. asks (1) how to make a paste to put fancy cards in an album, something that will no tried a preper and hold the cards perfectly tight. Have pose. A. Thick starch paste mixed with a few drops of clove oil answers very well. It is better to strain the paste while hot through a coarse linen cloth to remove
lumps. Use a rather stiff brush. 2. Will not an ordilumps. Use a rather stiff bakng. a lantern? A. No. 3 Tell me how to make a cheap drying box for drying the smooth pine, of a width and depth to suit the plates and long enough to hold two dozen plates one-eighth of an inch apart. Nail across this length wiseat the top, close to the sides, twohalf inch pine strips notched at the face soas toloosely grip and bold the plates one-eighth of an
inch apart. Similar notched strips are tacked inside at the bottom so as to support the plates and hold them apart. 4. Tell me how to makea sensitive paper to use on these plates? A. Nitrate of silver, 5 drachms; distilledwater, 5 oz.; nitric acid, 2 drops: purified kaolin, 1 oz . Add the latter after the silver is dissolved, shake,
and let settle. Pour off the clear solution into a clean shallow porcelain dish. Having cut good albumenized paper to the proper size, place it gently, albumen side
down, upon the surface of the bath, lifting each corner in turn and letting it down slowly to exclude air bubbles. Remove from the bath in about two minutes, and hang it up by the corner to dry in the dark. When required foruse expose it for about ten minutes to the fumes of
aqua-ammonia in a tight box. 5. Will gelatine that aqua-ammonia in a tight box. 5. Will gelatine that
you buy in grocery stores answer as well as Nelson's you buy in grocery stores answer as
No. 1 gelatine? A. No, not very well.
(12) P. M. asks how to reclaim silver acci dentally dropped in some diluted nitric acid. A. Dilute muriatic acid until no further precipitate forms. Let settle, pour off the liquid, cover with clear water slightly acidifled with muriatic acid, add a few fragments of clean zinc, and let the action proceed until the white chloride is reduced to spongy metallic silver. What re-
mains of the zinc may then be picked out, the liquid poured off, and the silver washed with boiling water quickly when placed to drain on filter paper. Mised with a little borax and heated to bright redness in a small clay or blacklead crucible, the dry, spongy meta will melt and afford, on cooling, a button of compact and pure silver.
(13) F. W. writes: I am building a steam buggy, two engines, cylinders $2 x 4$, with 50 lb . of steam inch tubes, 18 inches. long, be enough to run them? A With your boiler about $11 / 2$ horse power, your bo
(14) J. M. J. writes: We have sunk a wo curb well, 12 feet square, 25 feet deep, near the bank of the Missouri river, from which we can take clear water. it soaking through the earth from the river; friction
on the sides of the curbs prevented us from sinking further: also, in drawing water therefrom and taking out the sand when sinking, the quicksand would flow in about as fast as we could take it out, thereby causing
the earth surrounding the curb to cave in and endanger the foundations of the buildings near the well. Now, indriving $21 / 2$ inch well points, from which we are satis fied we can get the same clear water, would they have a tendency to cause the quicksand to run in the same
proportion as it did with the large well, and which make of well points in your opinion would be most
suitable for the purpose $?$ A. If there is underlymg
quicksand, the $23 / 2$ inch wells will draw itoff and in
time produce tbe same evil resalt as the large well. There are two niodesy ou can pursue: either drive you
$3 / 2$ inch well through the quicksand, so as to draw the water from lower strata, or select a location wbere you
will avoid the quicksand, wbich you can do by boring (15) W. B. asks: 1. What could I put on an rron cider screw to keep the cider from eating it ? I rron cider screw to keep the cider from eating it ? It occasionally and keep every part of it well oiled. 2. Which would have the most force at the bottom: a
tube one inch in diameter and ten feet high, filled with tube one inch in diameter and ten feet high, filled with
water, or a funnel-shaped vessel with an opening at the water, or a funnel-shaped vessel with an opening at the
bottom the same as the tube, ten feet high, five feet in diameter at top, filled with water? Both vessels are to be kept full of water. A. The pressure per square incb at the bottom would be the same in both.

## [OFFICIAL

## INDEX OF INVENTIONS

Letters Patent of the United States were Granted in the Week Ending

April 26, 1881,
AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]
A printed copy of the speciflcation and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for one dol lar. In ordering please state the number and date of the patent desired and remit to Munn \& Co., 37 Park Row,
New York city. We also furnish copies of patent granted prior to 1866, but at increased cost, as the spe granted prior to 1866; but at increased cost, as the sp
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Boot and shoe upper, H. P.
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Brick, manufacture of J . Mille
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Bullets, machine for greasing, H. R. Allen.
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Chair seat, W. II. Bartels.
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- 24.689
$.240,756$
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ing..........................
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for treating. A. L. Bruce et al or apparatus
for treating. A. L. Bruce et al.................
Dextrine maltose, etc., and apparatus therefor,
treatment of, A. L. Bruce et al...............


