and add $\sqrt{2}$ gallon of the spirit to the sediment an
treat as before.
(40) J. S. M. says: I wish to paint on por
(40) J. S. M. says: I wish to paint on porAlso by what method is the finish obtained that causes it to withstand washing, etc.? A. The colors used are first and the enamel is burnt in, in a muffle. Prepared colors for painting on china can be purchased or large paint dealers. The burning in must be done by an es
(41) J. H. M. asks how to make a gold solution for battory gilding, such as is used by carriage
platers? A. You had better gild in the hot bath. The composition is crystalized phosphate of soda, 21 ozs.; oz.; pure gold, transformed into chloride, $\frac{1}{\text { oz.: dis }}$ tilled water, 2 g gallons. This is good for silver, bronze and copper alloys. For wrought iron and steellthe bath
consists of distiled water, 2, gallong, phosphate of ods 171 ors
 necessary to mind the weight of the chloride so long
(42) S. B. H. asks. 1. Are north, south,
east, and west relative or absolute terms? A. Relative.
2. State the greatest distance that could be traveled in any direction، A. You might go around the world an
indefinite number of tymes, always traveling in the me direction according to the compase
(43) J. E. S. asks how bright crimson writing fuid is made! A. Powdered cochineal, 1 oz.; hot
water, 132 pint. Digest, and when quite cold add amwater, 12 pint. Digest, and when quite cold ad am
monia 1 oz., diluted with 3 or 4 ozs. of water. Macerate for a few days and decant when clear.
(44) G. M. W. asks how to make a good $11 / 2$ lbs.; resin, 56 lbs . stone lime, 28 lbs ; palm eac zzs.; soft water, 28 gallons. Put soda lime and wate intoa kettle and boil, stirring well; then let it settle and pour off the lye. In another kettle melt the tallow, rosin, and palm oil, having it hot, the lye being also
boiling hot. Mix altogether, stirring well, and the boiling hot.
work is done.
(45) K. H. R. asks what laundrymen use use besides starch to give a smooth glossy appearance to starched goods? A. One tablespoon
(46) C. S. R. says: 1. If I bore a piece of 2 inch round bar iron 7 inches long, lengthways plug the ends of bore, what internal pressure will the tube resist? A. About 30,000 lbs. per square inch. 2. It I fll the tube with water before closing the ends, to
what degree of temperature can it safely be heated what degree of temperature can it safely be heated
without exploding? A. A very slight rise of temperainre only wonld be required. 3. How can the odor of petroleum and kerosene be destroyed? A. There are
several patented processes, one of which consists in the use of superheated steam.
(47) C. B. L. says: I have two flywheels, each 1,000 lbs., runningat the rate of 50 revolutionsper
minute; one is 10 feet in diameter and the other is 20 feet in diameter. Which would esert the most controlling influence on an engine, and why? A. The larger wheel would be the most effective, because its actual energy depends on the angular velocity and mo-
ment of inertia, both of which increase when the radi ment of inertia, both of which increase
(48) E. C. H. says: 1. Of two engines less than 2 horse power,running at 300 revolutions,and steam
pressure 80 lbs., one engine having stroke the same as diameter of cylinder, and the other having a strok wice the diameter of cylinder, which uses steam most economicaily, both engines cutting off at $3 / 4$ stroke? troke engine would ordinarily be the more economica of the two, on account of the higher piston speed and the less percentage of clearance in general. 2. What should be the size of engine ports of a $4 \times 4$ engine running 300 revolutions, steam pressure 80 lbs., cutting
af stroke? A. Port area 12 square inch at least.
(49) J. D. W. asks: What is the heating surfaceof a boiler 28 feet long, 42 inches in diameter. with five 8 inch fues? A. If the tubes are the whole ength of the boiler, the heating surface is about 29
(50) I. L. L. asks: What sized boat would be required for an engine 2 inch bore, 6 inch stroke,
with an upright boiler 4 feet high and 2 feet in dia neter and what siaed screw? A. Boat 18 to 20 feet long, 5 feet beam. Propeller, 18 to 20 inches diameter, 3 feet pitch.
(51) E. A. B. asks: 1. What are ocean uteam boilers made of? A. Wrought iron. 2. Are they
upright and tubular? A. Horizontal tubular. 3. Are apright and tubular? A. Horizontal tubular. 3. Are
the driving engines horizontal or upright? A. Vertical generally, in merchant steumers.
(52) F. H. R. asks: Is the pressure of a steam gauge diminished if it be located 20 feet frum
the boiler, the boiler being three horse capacity? A . the boiler, the boiler being three
Ordinarily, no, if properly located.
(53) F. H. says: 1. Can you give me a rule to find out how much packing is necessary to cover
a pipe 105 feet long. diameter of pipe 3 inches. with a covering 3 inches thick; the material सeighing 4 lbs. to $\mathrm{D}=$ diameter of packing, outside, in feet. $\mathrm{L}=$ length of ipe in feet. W =weight of pecking per suare Total weight required $=3 \cdot 1416 \times \frac{d-D}{2} \cdots \mathrm{~L} \times$ W What is meant by cold short iron? A. Iron that is brittle when cold.
(54) H. A. P. asks: 1. How can I ascertain the horse power of a punching machine, to which steam ransmitting dynamometer must be employed. 2.What is the relative toughness of cast steel and the best of "charcoal" iron castings? A. If you refer to tensile
strength, the steel is to cast iron about as 5 to 1. 3. What
ings? A. Cast iron toughened by the admixture of
wrought iron scrap. (55) J. C. wants to know how to drive seveal tilt hammers on the same driving shafts at varying thers, and hammer 1 ind independent of the to suit the heat being worked. Hammer heads are about 41/9 cwt. weight, so any suitable arrangement must be of a substantial character. Also what are the
best kinds of bits and anvils, the best kinds of bits and anvils, the present ones of chilled metal get soft in a very short time? A. Friction wheels or clutches will en able you to vary the speed at
pleasure. The same thing can be accomplished by pleasure. The same thing can be accomplished by
using a pair of continuous cones connected by a belt. used for your anvils.
(56) W. T. B. asks: Are there any schools teaching mechanical engineering, and if so, where is me best one, considering expenses? A. There are so
many schools of this character that we do not feel inclined to make a comparison. We give a partial list: Lehigh University, University of Pennsylvania, Rensselaer Polytechnic Institute, Massachusetts Institute of Technology, Yale College, Harvard University, Worester Institate, stevens Institute of Technology, Uni-
(57) N. W. H. ask 3 : Which of the two enines below noted will develop the greatest power? One 30 ibs. boiler pressure. The other 100 revolutions with 30 lbs. boiler pressure. The other is 4 inch cylinder, 6
inch stroke, 175 revolutions, with 60 lbs. boiler pressure. Both are the common slide valve type, and both re. Both are the common slide valve type, and both
cut off at $\frac{3}{3}$ stroke. A. Probably the first would derelopabout twice as much power as the second.
(58) A. C. asks: What power can be got from a curreut wheel? The channel is 50 feet wide and 24 inches deep, with a fall of 24 inches in forty rods. feet long, with 16 paddles. A. With a well designed wheel you may realize about 40 per cent of the effect of whe water. This effect in foot lbs. per second $=[$ bss. of water passing the wheel pe
in feet per second $\left.)^{2}\right]+644$.
(59) W. F. S. asks if moonshine has the same effect on fish to spoil them as sunshine? A. The influence of
the tides.
In our last week's issue the answer to N 2 of the inquiry column, 3,300 should be 33,000 .
Minerals, etc.-Specimens have been received from the following correspondents, and examined, with the results stated:
M. S.-It is zinc blende, and of good quality. Judgng from the sample, this ore should yield 40 per cen of zinc. It contains cadmium.-E. A. S. - The subtance cannot economically be purified as suggested. answer some of the purposes of whiting time, it may best be determined by comparative tests.-A.B. F.No. 1 is principally carbonate of lead. No. 2 contain much more mineral impurities than No. 1; but both contain enough lead to poison the sugar if, as we understand you, they remain together. This should be

## COMMONICATIONS RECEIVED.

The Editor of the Sctrywific Ampicosy acknowledges ontributions upon the following subjects:
On the Tides. By U. H.
On Petroleum. By W. S. R.
On a New Galvanic Battery. By E. G. A. On Matter. By W. B.
On Matter. By W. B.
On Mica Bronze. By R. S. V.
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We renew our request that correspondents, in referving name the date of the paper and the page, or the number of the question.
Correspondents whose inquiries fail to appear snould epeatthem. If not then published, they may conclude hat, for good reasons, the Editor declines them. The Idress of the writer should always be given
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Inquiries relating to patents, or to the patentability ere. All such questions, when initials only are given are tbrown into the waste basket, as it would flll half of our paper to print them all; but we generally take pleas
ure in answering briefly by mail, if the writer's address

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ess nature especially, can be expeditiously obtaine y advertising in the column of "Business and Per onal," which is set apart for that purpose subject We charge mentioned at its head
articulars, etc., regarding which can probably be elici ted from the writers by the insertion of a amall adver isement in the column specifled, by parties able to sup ply the wants:
Who makes Hyatt's patent sidewalk tiling? Who sellsgrape sugar?

INDEX OF INVENTIONS
Letters Patent of the United States
October 30, 1877,
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A complete copy of any patent in the annexed list ncluding both the speciffcations and drawings, will be furnished from this office for one dollar. In ordering, pease state the number and date of the patent desired,
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Bale tie, J. W. Petty....
Barrel hoop, L. Reed (r) Barrel hoop, L. Reed (r)..
Bet bottom, Read \& How
Bed bottom, spring, J. P Bed bottom, spring, J. P. Alliso
Billiard bridge, F. E. Doughty.
Boiler tue eleaner W. Billiard bridge, F. E. Doughty.
Boor tube eleaner, w. Dunn.
Bond shoe seam, G. Strible Boot and shoe seam, G. Stribley.
Bottle stopper, T. $\mathbf{H}$ Brady......
Bottle stopperfastener, w. H. H. Bottle stopperfastener, w.
Broom rack, C . W. Sheldon Bunks, Guenther \& $\&$ Hoeppner.
Bung extractor, w. A. Wiley Burglar alarm, J. J. Bradley Butter and lard packages, J. P. Perkins
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Ice surfaces, producing, J. Game
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Ladder and step, J. Lane
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Lamp, fishing and wharf, wilson \& Keagle
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Loom, E. OldAeld.
Loom heddle, J. M. Flagg.............
Loom stop motion, J. H. Mortimer
Lubm stop motion, J. H.
tubricator, G. H. Fowler.
Match safe, Wright \& Bill...
Mea* cutting device, C. Keis
Milking stool
Milking stool, o. G. Scriven .........................
Mosquito bar and clothes drier, C. Sundquist
Musical instrument, H. B. Horton.
Napkin holder, A. Barion.... ..........
Napkin ring and holder, J. Heberli
Necktie retainer, F. W. Koch.....
Nursing spheld.,. W. Patch .....
Oil wells, bailer for, D. C. Brawl
On wells, bailier for, D. C. Brawl......
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Paper, machine for finishing printed, J. Morris
Paper, manufacture of thick. D. Scrymgeour
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$.196,699$
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1
 DESIGNS PATENTED. 10,286 and 10,287 .-CAssimeres.-A. Carmichel, Wes erly 10,288.-Ornamental Scroil Work for Jewelry.L. Heckmann, Plainville, Mass. Wrentham, Mass.

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