## Busimess and eresonat.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at mublication offic as early as Thursaay morning to appear ir next issue The publizhers of this paper guarantee to adver tisers a circulation of not less than 50,000 copies every
weekly issue.
In the advertisement of H. W. Johns M'f'g Co. in last issue of this paper, the words felt packingsho. u .dread
flat packing. The advertisement as now inserted is
correct.
Parties manufacturing Traction Engines suitable for log hauling are requested to correspond with Drew \&
Bucki, Suwannee Steam Saw Mills, Eilaville. Florida.
Mica in sheet and scrap for sale in quantity to suit. Atlantis Land and Mining Co., Box 2762, Leadville, Col. A No. 6 RootBlower, steel shafts of extra strength and used less than four months, in good order. Charles
L. Oudesluys \& Son, $6:$ Exchange Place, Baltimore, Md. Wanted. - A live man (engineer preferred) to introduce the "Hydrostatic" Joint, for gas and water mains.
A lead joint and the best in the world. A good opporA lead joint and the best in the world. A good oppor-
tuvity for a competent man. W. Painter, 44 Holliday tuxity for a compe
St., Baltimore, Ma.
Asbestos Wick Packing for Valve Stems, etc., is one of the most desirable articles ever produced for u se
around steam. It is practically indestructible. H . W . Johns M'f'g Co., 87 Maiden Lane,
of genuine Asbestos materials.
New Economizer Portable Engine. See illus. adv. p. 108. A New Fruit Jar. Simple and durable; easily opened no mouldy fruit. Te
Portable Railroad Sugar Mills. Horizontal and Beam
Portable Forges, $\$ 12$. Roberts, 107 Liberty St., N. Y For Sale.-Foundry and Machine Shop, third city in
For Sale.--Horse Detaching Patent. Best ever in
vented. W. R. Kitchen, Willard, Ky.
Hydraulic Jacks and Presses. Polishing and Buffing Machinery. Patent Punche
Co., 470 Grand St., New York.

## Steam Engine f on another page.

A Rare Chance.-We have on hand a 40 H. P. Hori zontal Oscillating Engine, built for special work, but
never used. It is frst-class in all respects; has patent cuides to prevent wear; has balance wheel, but no pul-
For Sale.-One Wood Turning Lathe, $20^{\prime \prime}$ swing, 14 ft. bed. Jig Saw and Face Lathe, for pattern work; also
Blacksmiths' Tools. D. Frisbie \& Co., New Haven, Conn. Campbell's Self-acting Window Shade Rollers are the best in the market. Models and terms to the trade.
85 Centre Si., New York.
Cheapest Portable Forges. H. Crumlish, Buffalo,N. Y. Forsaith \& Co., Manchester, N. H., \& 213 Centre St., N. Y. Bolt Forging Machines, Power Hammers, Comb'd
Hand Fire Eng. $\&$ Hose Carriages, New $\& 2$ dh and Machinery. Send stamp for illus. cat. State just what you want. Electrical Indicators for giving signal notice of ex tremes of pressure or temperature. Costs only \&20. At
tached to any instrument. T. Shaw, 915 Ridge Ave.Phila. Partner Wanted. - See advertisement on inside page. Instruction in Steam and Mechanical Engineering. A thorough practical education. and a desirable situation Institute of Steam Engineering, Bridgeport, Conn. For particulars, send for pamphlet.
Collection of Ornaments.-A book containing over
1,000 different designs, such as crests, coats of arms, ignettes, scrolls, corners, borders, etc.., etc.., sent post free on receipt
New York city.
Best Oak Tanned Leather Belting. Wm. F. ForeThe Baker Blower ventilates silver mines 2,000 feet To Wilbraham Bros., 2318 Frankford A ve., Phila., Pa To stop leaks in boiler tubes, use Quinn's Pate
rules. Address S. M. Co., So. Newmarket, N. H.
Nickel Plating.-Sole manufacturers cast nickel anodes, pure nickel salts, importers Vienna lime, crocus,
etc. Condit, Hanson \& Van Winkle, Newark, N. J., and 2 and 94 Liberty St., New York
Wright's Patent Steam Engine, with automatic cutoff. The best engine made. For prices, a
Wright, Manufacturer, Newburgh, N. Y.
For Solid Wrought Iron Beams, etc., see advertisement. Address
lithograph, etc.
Presses, Dies, and Tools for working Sheet Metal, etc. Bradley's Split Pulleys at low prices, and of same strength and Works, Drinker St., Philadelphia, Pa.
Stave, Barrel, Keg, and Hogshead Machinery a spe-
cialty, by E. \& B. Holmes, Buffalo, N. Y. es, Buffalo, N.
Solid Emery Vulcanite Wheels-The Solid Original Cmery Wheel - other kinds imitations and inferior. Standard Belting, Packing, and Hose. Buy that only. Thebest is the cheapest. New York Be
ing Company, 37 and 38 Park Row. N. Y.
Sheet Metal Presses, Ferracute Co., Bridgeton, N. J Telephones repaired, parts of same for sale. Send
stamp for circulars. P. O. Box 205, Jersey City, N. J. Eclipse Portable Engine See illut N. Eclipse Portable Engine. See illustrated adv., p. 94. For best low price Planer and Matcher, and latest
improved Sash, Door, and Blind Machinery, Send for improved Sash, Door, and Blind Machinery, Send fo
catalogue to Rowley \& Hermance, Williamsport, Pa.
The only economical and practical Gas Engine in the market is the new "Otto" Silent. built by Schleich
Schumm \& Co., Philadelphia, Pa. Send for circular.
For Sale Cheap-The entire patent for best Egg
 Mann, Frankford, Pa.

Forges, for Hand or Power, for all kinds of
d dress Keystone Portable Forge Co., Phila., Pa. Solid and Opening Die Bolt Cutters, Screw Plates
aps. The Pratt \& Whitney Co., Hartford, Conn. Silent Injector, Blower, and Exhauster. See adv. p. 10 The Paragon School Desk and Garretson's Extension Planing and Matching by Buffalo Hardware Co. Planing and Matching Machines, Band and Scroll erss, Shaping, Sand-papering Machines. etc., manuf'd by
Bentel, Margedant $\&$ Co.. Hamilton, Ohio. " Illustrated History of
sent free.
Linen Hose and Rubber Hose of all sizes, with Fire Brick, Tile, and Clay Retorts, all shapes. Bor
O'Brien M'f'rs, 231 St., above Race, Phila., Pa. Machine Diamonds. J. Dickinson, 64 Nassau St., N. Y The Improved Hydraulic Jacks, Punches, and Tube For Superior Steam Heat. Appar., see adv., page 110 orPat. Quadruple Screw Power Press, see adv., p. 108. Steam Cylinders bored from 3 to 110 inches. L. B. landers Machine Works, Philadelphia, Pa.
Valve Refitting Machine. See adv., page 110
Valve Refitting Machine. See adv., page 110.
Cut Gears for Models, etc. Models, working matis. Cut Gears for Models, etc. Models, working machinery, experimental work, manufacturing, etc
D. Gibert \& Son, 212 Chester St., Phila., Pa.
Walrus Leather, Solid Walrus Wheels; Wood Wheels covered with walrus leather for pulishing. Greene,
Tweed \& Co., 18 Park Place, New York.
Holly System of Water Supply and Fire Protection
for Coties and Villages. See advertisement in ScIENtific ambrican of last week
The E. Lorton \& Son Co., Windsor Locks, Conn
manu facture the Sweetland lmproved Horton Chuck. Special Wood-Working Machinery of every va The best Truss ever used. Send for descriptive circu-
arto N. Y. Elastic Truss Co.,683 Broadway, New York. arto N. Y. Elastic Truss Co., 683 Broadway, New York.
ower Hammers. P. S. Justice, Philadelphia, Pa. p. 77 .

For Shafts, Pulleys, or Hangers, call and see etock
sept at 79 Liberty St., N. Y. $W$ m. Sellers \& Co. For Reliable Emery Wheels and Machines, address he Lehigh Valley Emery Wheel Co., Weissport, Pa. Hydraulic Cylinders, Wheels, and Pinions, Machinery Castings; all kinds; strong and durable; and easily worked. Tensile strength not less than $65,000 \mathrm{lbs}$. to Electro-Bronzing on Iron. Philadelphia Smelting Hand Fire Engines, Lift an
Hand Fire Engines, Lift and Force Pumps, for fire and all other purposes. Address Rumsey \& Co.,
Falls, N. Y., and 93 Liberty St., N. Y. city, U.S.A Wm. Sellers \& Co., Phila, have introduced
Ore Breaker, Crusher, and Pulverizer. Smaller size run by horse power. See p.77. Totten \&Co., Pitts'g. Comb'd Punch \& Shears: Universal Lathe Chucks. LamInventron Works, Lamberthil, J. J. Inventors' Institute, Cooper Union. A permanent ex-
ibition of inventions. Prospectus on application. ${ }^{733}$

NEW BOOKS AND PUBLICATIONS. Mills' Directory of Steam Boiler and
Engine Owners, Engineers and Steam UsErs IN New York AND Brooklea
New York: Jas. N. Mills. Price $\$ 3$.
Business men having dealings with engineers and
team users will readily appreciate the value of 6,000 Beam users will readily appreciate the value of 6,000 yn. The book is neatly made.

## M Mase (Bherics

HINTS TO CORRESPONDENTS.
No attention will be paid to communications unless accomp
Names and addr
We renew our request thatcorrespondents, in referring
Whirers. to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.
Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then purlished, they may conc
Editor declines them.
Persons desiring special information which is purely Persons desiring special information which is purely should remit from $\$ 1$ to $\$ 5$, according to the subject, as we cannol beexpected to spend time and lahor to obtain such information without remuneration.
Any numbers of the ScIENTIFIC AMERICAN SUPPLE-
MENT referred to in these columns may be had at this office. Price 10 cents each.
(1) E. F. J. S. B., and others.-The dose salicylic acid recommended for rheumatism is from
(2) F. H. H. asks: What danger is there in an ordinary coal oil lamp (lighted) when about one third full, or has a large space between the oil and top or atmospheric air? A. Unless the best quality of or atmospheric air! A. Unless the best quality of
kerosene is used there is great danger of an explosion, as the lower grades of olls give off vapor at ordinary
temperatures which, when mised with a certain proportion of air, form an explosive which reguires only fire to develop its power. Many lamp burners are so contrived that it is possible for fire to run down in the ick tube and ignite the explosive below.
(3) C. F. A. asks: Will you be so kind as American, the relative cost and ebonomy of the rotary engine as compared with other forms of the steam en-
somewhat less than that of the reciprocatory, they have
never yet been made to equal the latter in economy. The relative economy depends upon the character and construction of the rotary.
(4) E. H. M. asks: Will shellac varnish form a sufficient insulator for the wire in the helix of a magnet for telegraphic purposes? A. Yes, if carefully as to crack.
(5) P. S. asks whether it is possible to obtain an electric shock by simply holding the poles of
a battery, or must I have a machine? A. You will require an induction coil like that described on p. 203, Vol. 39 (14), Scientific American.
(6) W. H. writes: I have a job in which there is one radiator that fills with water for Please tell me the reason of water andnoise, and how to remedy it. I will give you the way the pipes are placed. I start from the boiler with a 2 inch main to the first riser to 1 radiator, then I reduce to $11 / \frac{1}{6}$ pipe to the next riser to 1 radiator, and then reduce to $11 / 4$ to nest riser to 1 radiator, and from this to the fourth and las radiator Ireduce to one inch; there is about 30 feet be
tween the two last radiators. It is the last or further ween the two last radiators. It is the last or further
mostfrom the boiler that is not working right,the second and third risers go to radiators on the third flat; the firstandlastare on the ground fioor or store; the full length of the main from boiler is 65 feet. A. You do not send sufficient data for an intelligent reply, but judging from the action of the water and the noise, your pipes must be too small, or reduce in size too soon. According to the description given, a $11 / 2$ inch pipe has to supply steam to every radiator except the first one.
When the area of a 2 inch pipe is represented by 4 a 146 inch pipe is represented by 214 , which in practice for inch pipe is represented by 244 , which in practice for
long lengths should not be valued higher than 2. On page 356 , No. 23 , Vol. sli., it says: " Mains which ha ve given the best results leave the boiler of suficient size, and reduce very slowly, if at all, until verynear the
(7) I. M. asks: 1. What is the horse power of an engine: cylinder diameter, 18 inches; stroke, 20 inches; revolutions per minute, 165 ; boiler pressure, 80 lb ? A. If you call the average pressure on
the piston 50 lb .二212 horse power. 2 . Where can I get and what is the best work on mechanical engineering and management and care of steam engines and boilers, and what it will cost? A. "Roper on Land and Marine for sale by industrial publishers who Narine Engine, columns.
(8) J. C. J. asks what books to buy on
(9) C. H. C. writes: I have six cells of battery, the outer cup or jar is glass, and into this fits a porous cup containing a carbon core and some other in gredients. I also put in the bottom of the cells sal ammoniac, to produce the electricity. The point I de
sire to ascertain is, How much salammoniac should I keep in the cells to insure it in a working condition at keep in the cells to insure it in a working condition at
all times? A. Enough salammoniac should be placed in the cell to form a saturated solution. It will do n harm if some of th
bottom of the jar.
(10) "Printer" asks: 1. Will a windmill un a cylinder printing press having a reverse motion unlike others? A. We think the speed would be too irregular. 2. Doees a windmill always run nachinery in
the same direction? A. Yes. 3. Can it be regulate as regards speed by anything like a governor? A. Yes; governors are generally used in connection with the
best windmills,
(11) H. L. B. asks: 1. Are the wheels of the Hudson River steamers Vibbard and Powell placed
precisely amidship? A. They are not precisely in the precisely amidship? A. They are not precisely in the
middle of length, and we do not know their exact posimiddle of length, and we do not know their exact posi
tion. 2. What are the Powell's dimensions and size of engines and boilers? A. Length 290 feet by 34 feet
beam, out to out, by 9 feet 4 inches hold; engine, 72
inches cylinder by 12 feet stroke; 2 boilers, 10 feet inches cylinder by 12 feet stroke; 2
diameter of waist, and 25 feet in length.
(12) J. P. M. asks: 1. Is there anything better than a lever to secure a great power in a small
space where but little motion is required? A. You might employ the principle of the hydraulic press. 2. If a system of compound levers is used, and not enough the increased motion without diminishing the power A. No.
(13) C. M. writes: I see in No. 2 of ScI entific American of 1880, in query No. 11, of W. S. W., how to find the cubic contents of a cylinder, your an I wish to make a correction. It is to multiply the square of the diameter, that is, the diameter multiplied into itself, by the decimal 0.7854 to get the area, then multi plying by the length you get the cubical contents. [You
are correct. By some oversight the diameter was given or the square of the diameter ]
(14) H S. C. asks: 1. How many bushels of coke will it take to melt 1,0001 ib. iron in an ordinary medium sized two tuyerecupola? A. From 240 to 280 b. to one ton. Much depends upon the form and pro
portions of cupola. 2. How many pounds of coal will it portions of cupola. 2. How many pounds of coal will it bed in both cases to he counted in; whole heat to melt about $10,000 \mathrm{lb}$. iron, in four charges? A. With anthracite coal and good furnace, from 10 to 12 lb . iron are melted to the Dound of coal consumed. 3. About how
manybushels of coke will a ton of bituminous coalmake manybushels of coke will a ton of bituminous coalmake
if coked to best advantage? A. From 60 to 75 per cent weight of coal.
(15) E. S. E. writes: A company of gentemen have agreed to ask your opinion upon a ques
tion which hopelessly divides them. I maintain that the reason a railroad engineer is placed upon the right side of his locomotive (thereby compelling him to use
his left hand tocontrol the levers) is becanse it is natural for him to do so: that is, the instinctively uses his left
strength is the main requirement. In violin, and occa sionally in piano playing, this appears. My opponents,
say that the mentioned peculiarity of locomotives is ac idental. I contend that there is a reason for it, and hat it is only a recognition of a fact, which though no explainable, is patent to all. A. There is no special reason for the position of the engineer except habit and custom. Some years since, on several railroads the
engines passed on the left side of each other, that the ngines passed on the left side of each other, that the but we believe that in every case they have now changed pass on the right, as is now the rule.
(16) F. H. L. writes: 1. Suppose a wind mill built with sails in the ordinary manner, but no urning to face the wind, and suppose friction, etc., re
duced to a minimum. Would the number of trrs minute vary as the velocity of wind, when the wind was in the direction of the axis? Thatis, if $n=$ number revolutions per minute, $v=$ velocity in miles, and $C$ some constant, should we have $n=C v ? A$. Yes, the pressure is as the velocity. 2. If the wind made an angle, A , with the axis, should we have $n=C v \cos$ A? A. What ver angle the course of the wind makes with the axis the speed will vary as the velocity of the wind so long
sthe direction is unchanged.
(17) H. M. asks: 1. What are the chemical properties of telegraph wire? Which of its separate properties act as a conductor of electricity? A. All metals, as well as many non-metallic substances, are to a certain
extent conduntors of electricity. The precise manner in which electricity is transmitted through these is not efinitely known. As to the chemical nature of metals, onsult some elementary work on chemistry lectricity-either a liquidorsolid, solid preferred or will not be affected by the current?
A. We know of no such substance. Acidulated water conducts electricity, but slowly suffers decomposition by its action.
(18) Short Hand.-" Student" and others ask: 1. What is the best system of short hand? A, There is no demonstrably "best" system. Any one of basis for the beginner. Ultimately every successful reorter has to develop his own system in accordance with his experience and the requirements of his own and and mind. The man who has the rare qualificaice discrimination of form, and capacity for manual kill, requisite for rapid reporting, will succeed with any system. Some of the most successful reporters have based their writing on ordinary script 2. Can short hand be learned without a teacher? A. Probably nine out of every ten reporters have acquired the art
withoutateacher. A good teacher, however, will be of without ateacher. A good teacher, however, will be of
great assistance to the learner. 3. How long will it take to learn to report? A. Three months under good in. truction, with several hours'daily practice, will suffice of the learuer being assumed. The great majority of those who attempt the art, however, fail to acquire kill enough, after yearsof practice, to report a fairly rapid speaker. 4. Are there any good books on the
subject? A. Any bookseller's list will show numsubject? A. Any bookseller's list will show num-
bers of them, each and all guaranteed to be the very bers of them, each and all guaranteed to be the very best. Is reporting a profitable occupation? A.
No, generally speaking. Still there is no occupation No, generally speaking. Still there is no occupation
which cannotbe made to yield a living. often verymuch which cannot be made to yield a living. often verymuch
more, to any one of proper capacity who will pursue it with prudence, zeal, and energy. Considering, however, hort hreat time anting and the low averager the art of occupation is not an inviting one. Nevertheless as an auxiliary to other lines of business short hand is well
worth studying by any one who has time for it. The worth studying by any one who has time for it. The
incidental training of hand and eye and memory is aluable.
(19) R. B. N. asks (1) how to cut carbon dicks in the best manner. A. A hardened steel point ressed against the carbon with considerable force, will at it if the strokes are repeated a sufficient number of times. 2. What mixture with bichromate of potash is
used in the battery which consists of a zinc plate sus. pended between two carbon plates? A. Dissolve 2 parts of bichromate of potash in 20 parts of warm water. When cold add slowly 1 part of sulphuric acid. .3. Is
there a cheap device by which I can wind wire on an ron core for an induction coil? A. See directions for making an induction coil, p. 203, Vol 39, Scientific American, and Supplement, No. 160
(20) W. H. A. writes: There are being constructed in Illinois a line of towers extending longitudinallyacross the State, made of wood, frame of pyra-
midal shape, ranging from 125 to 200 feet high, from 1 to midal shape, ranging from 125 to 200 feet high, from 1 to 3 miles apart, as we understand. What is their purpose?
A. They are used by the engineers in the United States . They are used by the enginees
(21) G S. J. asks (1) if platinum is fusible in the electric arc of the ordinary carbon lamp. A.
Yes. 2. Is there any substance that is not fusible in the electric arc, and at the same time a non-conductor
of electricity? A. There is no known substance that of electricity? A. T
has these qualities.
(22) L. M. writes: 1 All our machinery is not having been run more than four months. We have
battery of flue boilers, one of which has on the first heet a fiaw in the iron above the fire box aboat $1-3$ ong and has a side of the boiler, it is about 12 inches ong and has a ragged appearance. This outside shell is 5 lb s steam. Do you think it is dangerous to run it in his condition? A. Yes; repair your boiler before using. . Our hoisting engines are strongly bult, size of cylinder 12x.20, the best time we can make is 9 seconds; throttle open wide, 90 lb . steam. The coal is hoisted one hundred feet out of a shaft. How can I make the en-
gines quicker. without increasing the steam pressure? gines quicker, without increasing the steam pressure?
The valves have $\%$ lead, $\%$ lap.steam cut-off at $\%$ stroke. The valves have 3 in lead, $\%$ lap, steam cut-off at $\%$ stroke.
A. We think you cannot make them quicker, if you A. We think
have now proper size of openings. 3. Is there any such have now proper size of openings. 3. Is there any such
an invention as an apparatus for opening the doors of locomotives by means of levers or springs? A. We know of no such thing in practical use.
(23) W. F. asks (1) why an engine in makIng a curve will travel more on the high than on the low side. How do they do it when the wheels on both sides are making the same number of revolutions? A.
The face of the tire is generally coned, ${ }^{\text {an }}$ and the outer wheel runs on a larger diameter; also, the inside wheel sips or slides to a certain estent, depending on the
radius of the curve. 2 . On what principle does an injector work? A. By the velocity and consequent mo mentum given the water by the effuent steam
(24) V. V. G. asks: Will a locomotive withoot train, with a 43 foot wheel disconnected on
one side, be equal to a 9 foot wheel? Will a locomotive run faster with one side disconnected? A. The loco motive will not travel faster than the wheel travels.
Disconnecting one side makes no difference so long as Disconnecting one side makes no difference so long as
the wheels have the same velocity.
(25) R. H. D. asks: What is the best way to irrigate a strawberry field, $t / 2$ acre, water to be taken
from a lake. highest point 9 feet above low water: the month of June? I can pump in a tank by hand and spread by gravity, or draw with tean and self-filing spread by gravity, or draw with tean and self-filing
tank attached under wagon. Is there a better or
chaner cheaper plan? A. Put up a windmill to pump into your tank, and spread by gravity.
(26) W. F. H. writes: We had a 40 horse water from a pond covered with ice, boiler was out water from a pond covered with ice, boiler was out
doors; thermometer about $26^{\circ}$, or $6^{\circ}$ below freezing, cloudy day; gave it a pressure of 120 lb . in that condition. How much steam pressure would it be equal to?
I claim it would be as hard on the boiler as 150 lb . steam I claim it would be as hard on the boiler as 150 lb . steam
orhot pressure. A. It would be harder on the boiler orhot pressure. A. It would be harder on the boiler,
because the water has no elasticity, while the actual pressure would be the same. The iron would also be
(27) A. B. P. writes: I have a large cistern, and the pipe that feeds my boiler is constantly five
feet under water. Would it be injurious to the boiler, or in any way objectionable, to let the exhaust from the
engine into tine cistern at the top of the water if I use engine into tiee cistern at the top of the water, if I use
country tallow only in the cylinder? A. No, unless you use the tallow in large quantity.
(28) G. H. C. asks: 1. What was the depth side of same across the track on the recently destroyed side of same across the track on the recently destroyed
spans of the Tay bridge? A Depth 27 feet, width bespans of the Tay bridge? A Depth 27 feet, widh be-
tween girders aboul 12 feet. It was a single track bridge. 2. Are hexagonal nuts ever used on bolte in fish plates in this country, or are they all square? A. They are
almost invariably square. 3. Is a fish plate bolt screwed almost invariably square. 3. Is a fish plate bolt screwed
up tight as any other bolt in any piece of machinery, or up tight us any other bolt in any piece of machinery, or
is it left moderately loose to admit of expansion and construction of rails? A. It is screwed up tight, but the
(29) A. O. K. writes: 1. I have charge of
boiler of the locomotive type. I have considerable a boiler of the locomotive type. I have considerable
trouble with leaks at the bottom of the water legs, trouble with leaks at the bottom of the water legs,
caused by fractures in the cast iron "ring" surrounding the fire box. Calking does no good; I have also tried placing it on the cracks, but that also failed to stop the lacks. Bran does better, but does not stop them en-
tirely. How can they be stopped effectually? A. First tirely. How can they be stopped effectually? A. First
ase coarse Indian meal on the inside, and when it has worked well into the cracks, fill above it with hydraulic cement 1 to 2 inches thick, being careful that the top of the cement issome distance below the top of grate bars.
2. I want to black small casting by dipping. Can you 2. I want to black small casting by dipping. Can you
give a recipe for a paint for this purpose that will have a gloss after becoming dry? A. Use asphaltic black (30) A. R. B. writes: Riding with a friend
recently he asserted that the wagon brake produced recently, he asserted that the wagon brake produced
greater effect in retarding the vehicle when barely greater effect in retarding the vehicle when barely
allowing the wheels to turn, than when it locked them allowing the wheels to turn, than when it locked them
entirely. I said he was mistaken, but could give him no entirely. I said he was mistaken, but could give him no why? A. Your friendis correct. It is true also of rail.
road brakes when the wheels are locked; the same surroad brakes when the wheels are locked; the same sur-
face is constantly presented for friction and soon becomes glazed; when allowed to turn, new surfaces are
presente
(31) C. E. B. asks: 1. Of what kind of metal is the rings in an engine cylinder composed of?
A. Generally cast iron. 2. How can I run Babbit $t$ A. Generally cast iron. 2. How can I run Babbit t
metal boxes for a saw mandrel or other shafts? A. metal boses for a saw mandrel or other shafts? A.
Fit a mandrel the size of the shaft in the box and cast Fit a man
(32) J. H. W. asks for a recipe for a toilet lotion that will improve complesion of ladies, which
contains nothing injurious. A. We do not recommend contains nothing injurious. A. We do not recommend the skin attainable by no artificial means.
(33) J. F. P. writes: I have a well that is 20 feet deep, and I have a pump with 1 inch gas pipe; it is common iron piping. The water tastes a little of
the iron. How can I keep it from tasting? A. Use wood tubing instead of the iron pipe.
(34) J. C. S. asks: How can cattle hoofs or horns be melted so as to form a transparent composi-
tion? A. Horns are soaked in hot water until the bone is easily separated, when they are softened in hot water, slit up, and spread out between warmplates under
pressure. From these plates the articles referred to pressure. From these plates the articles referred to
are cut. Hoofs are usually cold pressed. Neither are melted as suggested.
(35) J. A. W. writes: Can you tell me the usual way of covering lead with powdered chromium for to carbon ? Do you know of an imitation or any substitute for hard rubber? A. The metallic chromium, according to Beasley, is pressed into the surface of the lead by passing between steel rolls. It compares favor-
ably with carbon in some electrotypes. Celluloid can be ably with carbon in some electrotypes. Cellulod
made to closely resemble ebonite or vulcanite.
(36) J. S. writes: I wish to build a small all25 feet, beam 5 feet, depth $32 / 2$ feet. Boiler 24 inches
diariuser, 36 inches himp, 90 or 100 one inch tubes. En-
gine, cylinder 5 inches by 6 inches stroke, work:ng pressure 150 lb . The exhaust steam to be led through the bottom of the boat and along the keel to and around the stern, then forward and empty into a tank in the boat. The diameter of the exhaust pipe will be $11 / 4$ inches, length about 30 feet under water. Will 30 all the steam; if not, how long ought the pipe be: A. No; do not use less than 2 inch pipe.
(37) R. E. W. asks: By what process is cordensed milk made? A. The fresh milk is pumped into large air tight vessels (vacuum pans) placed over a which a partial vacuum is maintained within them. Under these circumstances the milk boils and parts with its water at a very low temperature. Where the milk so condensed is to be preserved for a very long
time, 1 is mixed with a certain per cent of pure white ugar and put up in hermetically sealed cans.
(38) A. B. F. asks (1) for the dimensions of a scow that will carry about 40 tons of freight in addiA. About 75 or 80 feet long aver 18 inches of water. What would be the power of an engine to drive it at about 4 miles per hour with a stern wheel? A. Two
engines, 6 inches cylinder and 2 feet stroke. A. Which engines, 6 inches cylinder and 2 feet stroke. A. Which
is best for such a boat, an engine with one cylinder or best for such a boat, an engine with ones.
(39) F. A. S. asks: 1. Is it true that Bessemer steel cannot be used for mould boards for plows, or
bottoms of road scrapers. A. Yes. 2. Is it because such steel cannot be properly hardened? A. Yes. 3 . It contains too little carbon to be materially affected by
(40) J. B. R. writes: I have a private telegraph line, two wires, $1 / 8$ mile long. The line is annealed wire, such as tin men use in putting up
stoves. The line bas been in use three years. It has been broken several times and spliced. I use three cells Watsons battery to charge the line. It works good for three or four days, then it ceases to work
until I cross the wires in the office for a few minutes, until I cross the wires in the office for a few minutes,
then it will work again as stated. Why will it not then it will work again as stated. Why will it not
work all the time? The current is very strong when cross the wires in the office. A. Without further data be cannot explain the action of your line. It is probar, that the resistance of your line is excessive. Use regular tele
small wire, use copper
(41) F. H. L. asks if there is any composi tion of brass that can be melted in an ordinary coal
stove that is of sufficient hardness to cast small model from and its composition. A. Common yellow brass may be readily melted in a coal stove, but it is doubtful if brass can be easily made in an ordinary stove, as the
copper, which must be first melted, fuses at a much higher, temperature than brass. A very good formula for how brass is copper 76 parts, zinc 30 parts.
(42) J. A. C. asks how are the teeth put in the small bracket saws not larger than 1-16 inch wide.
A. A number of steel plates having the thickness of the A. A number of steel plates having the thickness of the
saws are clamped together and placed in a milling machine, which cuts teeth in the edges of the whole series of plates simultaneously. The saws are then sheared
from the edges of the plates, and the plates are again melted, and so on.
(43) G. D. R. writes: On page 69, current volume, SCIEntific American, I find an article by G. F. Barker, entitled "Crystalization in Canada Balsam."
I have frequently observed the figures assumed by glass; and they are like the cut in the article referred to. If the gum is thick enough and allowed to cool under pressure, the figures are permanent. I am not prepared
to dispute or discuss anything; but unless I was sure the glass in question had not been exposed to a "prairie fire " or some other source of heat,I should say beat was the cause of the figures instead of crystallization, as a
heat sufficient to boil balsam will not char wood, or if carefully applied, scorch varnish. My proposition can balsam and two small pieces of windowglass.
(44) B. T. F. writes; In Scientific AmeriCAN, February 7 , 1880, page 91 . article 4, C. M, K. ąks:
What will drive away or destroy fieas? I reply sian insect powder. I tried it and got rid of the terrible (45) G. H. writes: Having discovered traces of silver in several places upon large tracks of
land we own in this region, we should. like to have some simple method of testing or assaying specimens of the rock. From tests made in the East of several different specimens, we are led to believe the stuff will
yield from $\$ 35$ to $\$ 40$ a ton, but wish to try this our selves, Can you tell us of any simple apparatus? A. Charge into a 6 -ounce crucible (a Battersea $F$ answers very well) 1 ounce each of the ore and dry bicarbonate
of soda, 2 ounces of litharge (free from silver), ounce of argal, and cover with 2,4 frch of dry salt. Heat the crucible until the contents are in a quiet state the lead button by pounding on an anvil. If the button weighs more than, say, half an ounce, scorify it down in a scorifying dish in an open muffle. Heat $11 / 4$
nch bone ash cupel in the muffe, drop into it the button, and keep up the temperature of the muffle to a bright red heat until all the lead has been scorified off or silver (if the ore contains any) becomes well roundor and clear. The ore must be finely powdered, and the whole of it passed through an eighty-mesh sieve.
(46) E. B. L. asks: How to cut up and work into shape retort carbon. It is very hard, and will turn the edge of everything I have tried. A. It is
worked in the same manner as glass or stone. To saw it, use a revolving disk of thin sheet iron or copper sup-
plied plentifully with emery and water To shape it plied plentifully with emery and water. To shape it,
use an iron lap supplied with sharp sand or emery and
(47) G. W. H. asks how can I drill
through stone or earthenware vases holes, $1 / 4$ in. say, to
$1 / 2$ in. diameter? The vases are about $2 / 4$ in. thick. A. $1 / 2$ in. diameter? The vases are about 24 in . thick. A.
Use a copper tube for a drill, and supply it with emery and oil.
(48) W. H. P. asks: Who was the first man who had knowledge of the existence of the Ameriean continent? $A$. Seeing than ancient vestiges nent in formations antedating a portion, if not the whole, of the Glacial Period, history may be pardoned for not recording the first comer's name. The first
white man certainly known to have visited our conti nent was Leif Ericsson, in the year 1001. There are traditions of earlier voyages of Europeans to America, b the historical evidence of such visits is insufficient.
[OFFICLAL.]

## INDEX OF INVENTIONS

Letters Patent of the United States

## January 20, 1880,

AND EACH BEARING THAT DATE.

## [Those marked ( r ) are reissued patents.]

A complete copy of any patent in the annexed list, in.
cluding both the speciflcations and drawings, or any cluding both the speciflcations and drawings, or any
patent issuedsince 1867 , will be furnished from thisoffice dat one dollar. In ordering please state the number and
date of the patent desired, and remit to Munn \& Co., Park Row, New York city.
Air, apparatus for separating the water of con pneumatic apparatus for economizing com pressed, S. B. Hunt

## Album clasp, B. Posen.

Animal trap, A. G. Roger
Balcony, portable, H. H.
Bale tie, cotton, W. D. Field
Bed canopy frame, w. W. Whitehead
Bed stead, cabinet, J. W. Stanton
Boiler furnace, steam, H. Cowell.
Booi binding, J. J. Hanlon....
Boot and shoe edge burnishing machine, H. D Stone.
Boot and sb
Boot and rubber, G. Watkinson
Boot, rubber, G. Watk nsson ...........
Boot treeing machine, J. E. Crisp (r)
Bow and arrow rack, E. T. Church...
Bow and arrow rack, E. T. Church
Bracelet, W. . . Edge............
Bracelet, W. C. Edge .........
Boiler furnace, L. B. Parks
Burial
Butter worker, J. Sattison
Camphor, apparatus for refling, W. . V. McKenzie Cane handle, telescopic, Cha
Car coupling, E. J. Clark ....
Car coupling, H. E. Hepwood
ar coupling, E. Shafer
Car coupling, C. G. Weidling.....
Car door fastening. Buser $\&$ Sh


Chain, drive, L. W. Stockwell..
Check rower
Churn, G. R. Nebinger ....................................
Churn and butter warker, combined, E. Williams.
Churn dasher, J. E. Finley.....................223.642,
Ciurn operating device, J. B. Bolinht, E. L. Bryant............
Clock movement, A. E. Hotchkiss
Clock movement, A. E. Hotch
Clothes pounder, H. Howell...
Cornice, adjustable win
Cotton , in, W. W. Ellis.
Cultivator,
Cultivator, J. J. Dea
Cultivator, comb'd riding and walking..................................... Curry comb, M. Sweet .............
Door plates, making, H. D. Krame
Drum, heating, W. C. Doddriage.
Exercising machine. o. Duplessis
Felt fabrics, manufacture of wool, E. Belknap.
Fence, post, H. M. Beecher .
Fifth wheel, J. Wampach...
Filtering apparatus, M. Lansburgh
Firearm lock, W. w. Wetmore..
Firearm, magazine, w. Trabue
Firearm, magazine, W. Tra bue ....
Firearm, revolving. P. A. Holter.
Fish, preserving, H. Sellman et al.
Flame regulating device, F. Koesewitz
Flour mill dust separator. G. T. Smith.
Flour mill dust separator. G. Y. Smith
Fruit gatherer. J. P. Eddleman


Grain binder, W. M. Piatt
Grain binder, D. Strunk .
Grate, J. Collins
Grinding and polishing implement, T. B. Stone. Harness breeching stay. M. M. Sulgrove .......... Horseshoe, D. Hudson..
Hydraulic motor, Class \& Briegleb
Hydraulic press, J. Watson......
Ice reamm freezer, C. W. Packer
Ice cream freezerer, C. . F. Preezer, T. Scantin
nhaler, nasal, J. H. Yates.
nhaler, nasal, J. H. Yates...
Iron and steel, manufacture
Jeweler's clamp, A. A. Cowing , J. Reese
Journal box, anti-friction, ED. Draper.
Cornfield
Lamp, electric, F. Winters, Jr
Lamp regulator, electric, Houston \& Thomson.
Lens. optical, L Allen.
Lock, optical, Juhl


Loom, J. Lyall (r)
agnetic-electric machines, armature and com-
mutator for, Thomson \& Houston
hagneto-electric machines, automatic aiduster
for commutator brushes on, Thomson \&
Houston.

223,685


Carpet, A. Heald .........................................................611, 11,611
 TRADE MARKS
Cotton fabrics, unbleached, bleached, and colored,
woven, Hill Manufacturing Company......7,796, woven, Hill Manufacturing Company.......7,796, 7,797
Flour, wheat, Empire Mill Company............. 7,795 Flour, wheat, Empire Mill Company...

oolen goods, su
E. Oelbermann

## English Patents Issued to Americans.

From January 16 to January 20 , in clusive.
Car starters, J. Hill, Williamsport, Pa.
Gas regulator, M. G. Wilder, Brooklyn, N. Y. N. Y.
Paper, compound for, R. A. Fisher, Philadelphia, Pa.
Paper, manufacture of, R. A. Fisher, Philadelphia, Pa
Paraffin, retlining, $\mathbf{w}$. Bell, New York city.
Photo relief engraving, G. C. Bell, Brooklyn, N. Y.
Puddling furnace, W. Stubblebine, Bethlehem, Pa. Railroad rails, manuf. of. G. Webb, Johnstown, Pa.
Steam boiler, heating apps., J. Evans, Philadelphia, P
Steam boiler, heating apps.,J. Evans, Philadelphia, Pa
Steel, treatment of, G. Webb, Johnstown, Pa.
1,611
1.612
1,613
1,615
1,614


PRINCIPLES OF HORSE SHOEING.


