ENGINEERING INVENTIONS. An oscillating engine has been patented by Mr. Douia C. Putnam, of Wayne Center, N. Y. The
steam inlet and exhaust ports in the cylinder and the exhaust ports in the valve may belengthened to any de sired extent to permit quickerwork in engines designed for any special duty, but the travel of the valve is in any case comparatively short, on account of the rock ing movement of the cylinder.
A traction engine has been patented by Mr. Benjamin S. Benson, of Baltimore, Md. It has two obliquely arranged cylindrical boilers, with their highe ends in the middle "and next to each other, the epace beneath the cylinders forming the frebox, with hollow legs, which communicate with the water and stea
space of the boilers, and the apparatus having an end less track chain with feet passing beneath, around, an chain, to support the body of the engine and the track upon which it runs, with various novel features for re-
ducing friction and facilitating the guiding of the engine.

## agricultural inventions.

A grain separator has been patented by Messre. Francis Wadsworth and Henry N. Prentice, o Venice, $\mathbf{O}$. It is is intended to separate the straw and
chaff from the grain at the same time, and then remove chaff from the grain at the same time, and then remove
the unthrashed and partly thrashed heads and heavy the unthrashed and partly thrashed heads and heavy
impurities that may have passed through the thrasher impurities that may have pase
and separator with the grain.
A seed planter has been patented by Mr. Louis S. Flatau, of Pittsburg, Texas. Its construc tion is such that as the planter is drawn forward the hopper and a stirrer wheel are revolved, the latter forcwhich and the tubular plow they fall into the bottom o the furrow opened by the plow, where soil is thrown upou it by covering plows.

## MISCELLANEOUS INVENTIONS

A lemon squeezer has been patented by Mr. Sheridan S. Badger, of Chicago, IIl. It has a fixed or stationary jaw, a hinged swinging jaw, and a handle lever, so combined that the power from the com mencement of the operation con
A fire escape has been patented by Annie M. Jeffers, of Chicago, Ill. It is a spiral struc taining a ladder, being stretched or opened opposite the windows, and having safety chains at such openings, wind also an alarm bell.
A pipe tongs has been patented by Mr. James J. Palmer, of Fall Brook, Pa. The invention
consists essentially of tongs in which the bindin consists essentially of tongs in which the binding
contact surface is composed of a number of sections, contact surface is composed of a number of sections,
and by removing or adding links or sections the tonge may be adjusted to fit almost any sized pipe.
A nail plate furnace has been patented by Mr. Simeon Bunn, of Belleville, Ill. It has dou ble bottoms or decks, with openings, and outer walls
with openings, so arranged that the products of comwith openings, so arranged that the products of com-
bustion will be carried by a long, indirect passage, and the heat will be utilized to the greatest possible extent
A reflector has been patented by Mr. gas, lamp, or other artificial lights, and is so made that gaur concave refiectors, spun up from rectangular sheets of metal and polished, can be conveniently kept in the desired position behind a burner.
A tag making machine has been patented by Mr. Harmer Denney, of Brooklyn, N. Y. This machine takes the paper from a roll, and by a series of automatic operations the tags are printed, cut, eye-
leted, cut off, and their corners beveled, the machine leted, cut off, and their corners beveled, the machine
being readily adjusted to make tags of different widthe A motor has been patented by Mr. Jackson B. Miles, of Lincolnton, Ga. It is a spring motor intended for use in connection with churns to operate the dasher staff, and when wound up the mech-
anism works from fifteen to forty-five minutes, according to the speed at which it is allowed to run.
A tongue support has been patented by Mr. Mio M. Russin, its ind is combined with spring of peculiar construction, with lever and detachspring of peculiar construction, with lever and detach-
able connections for holding the tongue, whereby pro-
vision is made for adjusting the tension of the spring vision is made for adjusting the
and the whole heft is equalized.
$\Lambda$ neektie fastener has been patented by Mr. Daniel T. Freese, of North Amherst, O. It consists of a plate slotted twice to receive the tie, and with a forked arm bent over parallel with the slotted por tion to receive the collar button, the arms of the
fork being at right angles with the slots of the body of fork being

A two wheeled vehicle has been patented by Messrs. William E. Davies and William C. Gay ley, of Deringer, Pa. This invention consists in mak
ing the thills in two partshinged together, with a ing the thills in two parts hinged together, with a spring and relieve the horse to some extent of the weight upon his back
A belt punch has been patented by Messrs. Henry Bouchy and J. Henry Bamberger, of
Newark, N. J. It has pivoted lever jaws, with a sliding tool in each handle end, and a revolving head carrying cutting devices on one of the jaws, with a rotary disk provided with $p$
convenient tool,
A metallic bayonet scabbard has been patented by Mr. James McKenney, of New York city
It is made with an outwardly projecting flange upon It is made with an outwardly projecting flange upon
the angularside of its upper end to overlap the edge of the throg, in such manner that the connertion between the scabbards and the throgs will be firmer and more secure than with the ordinary construction.
A bellows has been patented by Mr Jacob F. Weitzel, of Cincinnati, O It is intended
more espectally for bee smoking, and comprises main more espectally for bee smoking, and comprises main
plates of sheet metal bent at their edges, forming
grooves or pockets, while the bag or fiexible portion has its edges inserted and hel
A broom holder has been patented by Mr. James F. Barringer, of Bennettsville, S. C. A Ushaped plate and rod are fso combined with cross pieces and arms as to make a holder in which broom straw or
rattan can be clamped, as well as bagging, cotton waste, rattan can be clamped, as well as bagging, cotton waste,
or rope, to form a mop, and one can be easily removed or rope, to form a mop,
A safety device for elevators has been Atented by Mr. Peter Moran, of New Orleans, La. The object of this invention is to prevent the water in the as to empty the pipes and allow the car or cab to fall, and to this end a novel construction and combination of parts is provided.
A nutmeg grater has been patented by Mr. Albert L. Platt, of Bowling Green, Mo. It consists in a revolving barrel made of a spiral coil of steel wire having notched outer edges, combined with a block having a hole through it and a counter bole or hole at
right angles, to form a case in which the spiral cylinder

A land channeling roller has been patnted by Mr. Robert H. Banks, of Fort Lewis, Col. It so so made that as the machine is drawn forward plows pottom and sides of these furrows, while another roller rolls the surface, so as to form channels for irrigation purposes in rolled land.
A sawing machine has been patented by Mr. Daniel W. Smith, of Long Lake, Mich. The machine is attached to the log to be sawed, and then by
moving hand levers up and down a reciprocating motion moving hand levers up and down a reciprocating motion
is imparted to the saw through a shaft and pitman, the motion of the saw being directed by a guide, while the

## NEW BOOKS AND PUBLICATIONS.

Drnamo-Electric Machinery. By Silvanus P. Thompson. New
and London: E. \& F. N. Spon.
This is a second and much enlarged edition of a volume published by the same author in 1884, which was itself based on the Cantor lectures of Professor
Thompson before the Society of Arts, in 1882. The Thompson before the Society of Arts, in 1882. The
rapid multiplication of forms and perfecting of details rapid multiplication of forms and perfecting of details
in dynamo-electric machinery which has taken place in in dynamo-electric machinery which has taken place in of the facts given in the lectures of 1882 with the accumulated material that is presented in the present which has attracted any considerable attention is here described with sufficiently full explanations of details to render an understanding of its construction and operation perfectly easy, even if one has never
before made a special study of the subject. A good before made a special study of the subject. A good
deal of attention is given to special forms of and their government, and to the testing of dynamos and motors. In the appendix is a short but very interesting chapter, covering statistics and comparisons of some recent dynamos, in which the author states that "the old pattern Brush machine gave only about 59 watts per pound of copper on the armature, while
the new pattern Brush armature with the same field magnets gives about 90 ," and suggests that "if the
field magnets were remodeled, and their ield magnets were remodeled, and their cores made of soft wrought iron, the number of watts per pound more, and the old 40 -light machine which, as now im proved, supplies 60 arc lights, might then yield current for over 100 lights." The author also notes improvements in the Gramme machine from 87 watts per pound of copper in an old machine up to 306 watts in a late pattern, and asks correspondents for further statistical information of this character, "in view of
the posibility of further' editions of this work being alled for at a future date.
The Determination of Rock-Form-
ING MINERALS. By Fingene Hussak.
The authorized translation of this German work has been made by Dr. Erastus G. Smith. of Beloit College, Wis., for use more especially by the students of colleges
and universities. Part I treats of the methods of and universities. Part I. treats of the methods of ical sections and proper polarizing apparatus, givin optical and mechanical methnds, and describing the mechanical separation of rock-forming minerals, while Part II. gives an elaborate series of tables for deter mining minerals, accompanied by a great number of figures.
Methods of Research in MicroscopBy ANATOMY AND EMBRYOLOGY
By Charles O. Whitman. Boston S. E. Cassino \& Co.

This volume is intended for everyday use in the zoological laboratory, to secure uniformity in practice according to the best methods of investigation, and the proper selection of the objects of study and obtaining
the most complete information in regard to them. It gives'preservative and macerating fuids, dyes, fixatives, mounting media, methods of embedding, etc., with de scriptions of the different instruments used and comReceived. Science or MrndApplied to Teachina/Acord-
ing to Phrenological Methodis). By U. J. Hoinmani.
New York: Fowler \& Wells Company. chnical Vocabulary, English and (ekxan, By
F. J. Werghoven and A. Van Kaven. Leipzig: F.
A. Brockhaus.
 W York Aaricultural Experiment STation:
Third Annual Report of the Board of Control, for
1884. Albany, N. Y.: Weed, Parsons \& Co. Stafe Board of Healith: Third Bienial Re-
port, for fiscal period ending June 30, 1885. Des
Moines: George E. Roberts. vsprracr. A Cuban Romance. By Adam Badeau.
New York: R. Worthington. Farmer's View of A Protective Tariff. By
Iaraac W. Griscom. Published by the author, Wood-
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to may be had at the office. Price 10 cents each. to may be had at the office. Price 10 cents each.
Minerals sent for examination should be distinctly
marked or labeled.
(1) P. H. desires a stain to imitate cherry. A. Rain water 3 quarts, annatto 4 ounces; then put in a piece of potash the size of a walnut; eeep it on the fire about half an hour longer, and it ready to bottle for use.
(2) W. C. writes: In making a red or ellow stain with dragon's blood or turmeric, I want A. You can probably purchase an aniline black that is oluble in alcohol, or else use logwood.
(3) F. F. K.-Old zinc battery plates (3) F. F. K.-Old zine battery plates
can be melted in an iron pot and cast into plates in moulding sand, or may be cast in an iron mould. Zinc melts just below a red heat. If the zincs have been amalgamated, you should av
ing from the heated metal.
(4) J. W. B. desires a recipe for some -extinguishing liquid. A. One of the best solutions for the extinction of incipient fires consists of crude calcium chloride 20 parts, salt 5 parts, dissolved in
water 75 parts. Keep at hand, and apply with a hand pump.
(5) E. E. G. asks how to make a leaf bluing. A. Use unsized paper and any of the following solutions: 1. Dissolve indigo sulphate in water and
filter. 2. Dissolve good cotton blue in cold water 3. Dissolve Prussing good cotton blue in cold water. 3. DissolvePrussian blue with one-eighth part of oxalic
acid in water. 4. Dissolve Tieman's soluble blue in
(6) A Subscriber asks how to make sirit varnish suitable for varnishing carved wood. A. Take 1 ounce copal and $y / 2$ ounce shellac; powder them
well, and put them into a bottle or jar containing 1 well, and put them into a bottle or jar containge
quart alcohol. Place the mixture in a warm place and shake it occasionally until the gums are completely issolved; and when strained the varnish will be ready
or use.
(7) C. J. C. asks : i What is cut glass, such as is sold by dealers? A dealer here has two
berry dishes that look alike, prices $\$ 1.00$ and $\$ 2.00$. berry dishes that look alike, prices $\$ 1.00$ and $\$ 20.00$.
One he calls cut glass and the other an imitation, with ough surface. A. Any glassware that has been ground ou छ̂ketch is very expensive when cut. (8) W. A. E. asks how India ink (liquid), such as is sold in the art supply stores, is made. A.
Dissolve shellac in a hot aqueous solution of borax and rub up in'this solution a fine quality of India ink. Or rub down genuine India ink with good black ink until it will fiow easily from the pen. See ink erasers, in
article on inks, in ScIENTIFIC AMERICAN SUPPLEMENT, No. 157.
(9) F. C. E. asks how to make a mould from which he can get one or two dozen castings in
tin or its soft alloys. A. You may make a mould of tin or its soft alloys. A. You may make a mould of
iron or brass for casting tin or soft allogs. Plaster of Paris mouldd will allow of a few castings, but are
brittle and not reliable. If the mould can be cut easily, Prittle and not reliable. If th
(10) W. V. L. asks: Is it true that. gold is one of the constituent parts of silver? A. Both gold and Bilver are elements, and theoretically are free from
all admixture. In commerce they are generally alloyed with some harder elements, In mining, gold ore often yields a good proportion of silver.
(11) J. M. L. G. asks: 1. What is about the cost of the least complicated and plainest (and therefore the cheapest) lathes in the market? Also
planer of the same description. Both to be durable and strong, for working iron. A. The price of lathe and planers varies so widely that it is impossible to name a price without knowing the size. A new or
second hand lathe for iron work may be anywhere rom $\$ 50$ to $\$ 500$. Planers about the sur colun fores their lists of new and second hand machinery, stating 2bout the size you want. 2. II it injurious to slightly cil or grease boilers at night when quitting work? A. Thare is no harm in oiling the outside of your boiler.
3. Bo the safety plugs (in the crown sheet) ever melt out when properly filled with metal, when well covered with water? A. Safety plugg have been known to melt
by too hard firing with a thin sheet of water over by too hard firing with a thin sheet of $w$
them. Otherwise they are generally reliable.
(12) A: E. L.- Oberlin College, Ohio, CornellU University,Ithaca, N. Y., are institutions where
part of the dues are taken in labor. We do not know part of the dues are taken in labor. We do not know earning both board and tuition, but with the $\$ 300$ you have saved, some knowledge of the machinist's trade, and plenty of pluck, we do not doubt you can get
(13) M. I.-Lignite may be readily pressdin bricks fo fluid pitch or asphalt. Crude oil does not dry readily.
and might not be found practicable. Presses for this work are made in Pennsylvania.
(14) G. E. B. asks: Of what value would knowledgeof the process of hardening copper be to
any one at the present time? A. Such a process would any one at the present imee? A. Such a process would
be very valuable if it can be done after the copper has been worked to shape or combined with other metals,
as the linings of pump cylinders, hydraulic rame, and as the linings of pump cylinders, hydraulic rams, and pistons, and for a thousand uses in running
The hard alloys of copper are well known.
(15) F. W. asks the simplest way to tell how much a block and fall will safely carry.
Also, how many men it would take to lift a certain weight with a 2 and 3 sheave block, and the difference with 3 and 4 sheaves and blocks; also, if ropes are measured round or through, and if there is a book on
ropes and knots. A. With a pair of blocks of 2 and sheaves respectively, you will have a leverage of 5 to sheaves respectively, the leverage will be 7 to 1 , less pounds as a safe load per square inch of section. ope of 1 inch diameter will have $3 /$ of an inch section, and may be used for from 1,200 to 1,500 pounds load. Ropes are sold by their size in circumference. Thus a
3 inch rope is 0.95 inch diamter. A $21 / 3$ inch rope will 3 inch rope is $0 \cdot 95$ inch diamter. A $23 / 3$ inch rope will
be a little over $3 / 4$ inch diameter, etc. See Scientific a a little over $3 / 4$ inch diameter, etc. See
(16) T. H. G. writes: I have a mahogany table which has been varnished and has ink spots on
it. 1. By what means can I get the varnish and ink off, in order to rub on an oil finish? A. The ink spots can be washed off with water and the varnish with alcohol. 2. What is best to polish carved brass ? A. turpentine. 3. What will remove water stains from polished marble? A. Mix quicklime with strong lye, so as to form a mixture having the consistency of cream, and apply it immediately with a brush. If this composition be allowed to remain for a day or two, and be then washed off with soap and
(17) F. A. C. desires a receipt for a harness cleaner and oiler. A. Take 2 ounces mutton suet,
6 ounces beeswax, 6 ounces powdered sugar candy, 2 ounces soft soap, and 1 ounce indigo or lampblack. ounces soft soap, and 1 ounce indigo or lampblack.
Dissolve the soap in $1 / 4$ pint of water. then add the Dissolve the soap in $1 / 4$ pint of water. of turpentine, lay it on th
nd polish off with a brush
(18) C. H. B.-The coarse emeries are sifted. You may buy sieves of brass for grades down to No. 80 or 90 . After that, wash by placing the emery in a basin, pail, or tub, according to the quan-
tity you wish to wash, with a small pipe attached to tity you wish to wash, with a small pipe attached to
a hose from a water supply, and a faucet to regulate a hose from a water supply, and a faucet to regulate
the flow; stir the emery at the bottom of the pail with flow; stir the emery at the bottom of the pazzle, allowing the water and fine emery to run over the side of the pail into a pan larger than the pail, and, if necessary, continue the
overflow into two or three pans. The different pans will catch different grades of emery. Your own judgment and a little tact must be used in regulating
(19) L. S. P.-Height of Washington monument, 555 feet. The depth that a body sinks in
sea water depends upon its density. Sea water weighs 64312 pounds to a cubic foot, while fresh water weighs $621 /$ pounds to a cubic foot. From this a comparison of the floating capacities may be estimated.
All bodies heavier than water go to the bottom at et reached is about 23000 feet see Scienturic American Supplement, No. 398, for illustration of deep sea sounding apparatus. 6,000 to 10,000 pounds have heard of being used; 4,000 to 6,000 pounds per
quare inch in common use.
(20) C. B. writes: 1. I have an iron
wash sink with a common trap and $3 / 4$ inch waste pipe
leading to a cesspool in yard. When water is thrown in the sink, it does not run off readlly; a pint would take the water bubbles up two or three times and then runs
down all right. What is the troubles A. The sink down all right. What is the trouble? A. The sink pipe is air bound, and the bubbling is caused by air escaping. The pipe should be ventilated between the trap and sink; vent should be outdoors. 2. What is
sweet oil made of ? A. Sweet oil is the oil of the sweet oil made of? A. Sweet oil is the oil of the olive, which grows in Spain, Italy, etc. 3. What is
celluloid? A. The manufacture of celluloid, parkesine, celluloid? A. The manufacture of celluloid, parkesine,
and zylonite are described in Scientific American Supplement, No. 22\%. 4. Does the word "Redditch on needle labels stand for the maker's name? A. Red-
ditch is a trade mark. You may obtain prices ditch is a trade mark. You may obtain prices through the johbing trade in your city.-The sample
you ask about is called pebble cloth, made by passing You ask about is called pebble cloth, made by passing
it through embossed calenders. Mastic varnish is pro$r$ for it.
(21) W. B. H. writes: Have you a recipe composed of linseed oil and resin, mixed, to make
muslin semi-transparent and waterproof? A. Dissolve together white resin pulverized 8 ounces, bleached linseed oil 6 ounces, white beeswax $11 / 2$ ounces; add the
turpentine while hot. Apply to both sides of the cloth while it is stretched tight. 2. How are the yellow oil proof coats made? A. The yellow jackets referred to are made by treating the cloth with a solution made
by dissolving 1 ounce beeswax in 1 pint best lin. seed dissolving 1 ounce beeswax in 1 pint best lin piece of rag, rubbing it well in and then drying.
(22) S. G. W. writes: Sam Jones, the noted revivalist, is trying to make people believe that 13 worlds have been lost sight of by the astronomers, and it is a sure sign that one world or planet will
soon be destroyed. Give your opinion. A. We do not think it follows that the stars referred to have been destroyed because they have been lost sight of. Astron heavens attaining a high magnitude and then suddenly disappearing again. In some cases these phenomena have been observed to be periodic. We do not see that the destruction of the earth follog
(23) J. J. W. asks: 1. The ingredients for a good water stain to imitate walnut? A. Burnt
umber 2 parts, rose pink 1 part, glue 1 part, water suficient; heat all together and dissolve completely; a ply to the work first with a sponge, then go over it with a brush, and varnish over with, shellac. 2. A good
jet black water stain. A. Pour 2 quarts boiling water over 1 ounce of powdered extract of logwood, and when the solution is effected 1 drachm of yellow
chromate of potash is added and the whole well stirred chromate of potash is added and the whole well stirred.
When rubbed on wood, it produces a pure black. 3 . A good size for gilding with gold leaf, one to be A goody for gilding in an hour. A. Good drying oil pound, pure gum anime powdered 4 ounces. Bring pot, add your gum gradually and cautiously to the
oil, stirring all the time to dissolve completely. Boil toa tar:y consistency and strain, while warm, throug silk, into a warm bottle with a wide mouth. Keep it well corked; use as required, thinning with turpentine.
4. The compositition of the so-called oil finish? A. Boiled linseed oil 1 pint, yellow wax 4 ounces; melt and color
(24) H. N. S. asks: ${ }^{n}$ Which is the fastertoboggan or a sled (steel shod); assuming that the otal weight is the same in each case, the incline of the Also, the reasons governing your reply. A. We should say the steel shod sled. Although the frictional resistance is independent of the area of contact (so much larger in the toboggan than in a sled) or the velocity yet the rubbing surfaces of the toboggan prese more asperities to interlock with those of the ice snow than do the steel runners of a sled. Bodies hav
ing rough surfaces, those made of compressible material, and those of irregular surface and form ex
(25) N N Art work is so various in (25) N. N.-Art work is so various in its specialties that we cannot venture on speciflc names
without knowing what you should know, viz, what your taste leans to in art study. When a young man bility, he should at once consult with his friends or those that know his habits, opportunities, and pro clivities, as to the probability of his success in any
trade or art that presents itself to his grasp. believe that you have an excellent library in you own in which are to be found books on the trade (26) C. R. asks whether successive coat glue, applied hot to wood or articles of a wood nature, would permeate the material, giving it tough ness and rigidity, or would said glue remain as a
mere coating, not permeating? If the glue would not materially permeate, what would you suggest as fluid that would permeate and produce rigidity and, sired that the article should be very cheap and the process very simple. A. Glue will not penetrate wood
sufficiently to affect its stiff ness or rigidity. Boilin the articles in thin glue for a few minutes will allow the glue to penetrate slightly further than the mer crushing of the hot glue upon the surface. Whatever
can be forced through the grain endwise, that would dry easily and of a glutinous nature, would stiffen the
(27) J. M. D. asks: Is there any virtu the "divining rod," so called, as a means of dete mining the locality of hidden streams of water? A
None whatever. The bobbing of the' stick is due to a muscular pressure by the holder.
(28) T. E. writes: I have a marine boiler in use on a steamboat that gives plenty of steam
but the motion of the engine ( 12 inches in diameter, but the motion of the engine ( 12 inches in diameter,
feet stroke) raises the water in said boiler at least nches. There is a steaim drum on top of boiler about 18 inches diam. and 24 inches high. Would an addi-
tional steam drum connected horizontally to top of drum now on boiler, with a three inch pipe, prevent
the raising of water when the engine is in motion ? If
so, how large a drum would be necessary? Would
this additional drum save fuel? My steam pipe is 3 inches. A. The additional steam drum willnot help you. It will only add to the work of the boiler by
condensing the steam. If your steam pine condensing the steam. If your steam pipe and drum is naked, it should be felted. The raising of the water
is, no doubt, a surging of the surface into waves by the action of the engine, which shows in the wate by making another connectio
boiler, between the boiler and near the end of the 2 inch or 236 inch pipe. This will partially relieve th water under the dome from the reciprocating action of the engine. Felting the exposed parts of the boile (20)
(29) L. H. R. writes: In a hydraulic grooves running vertically with the ram. This caused he water to leak so badly, I had a new ram cast. now notice smallgrooves beginning in the same man ner, which, in less than a year's time, will compel me o get another new ram, unless the evil is remedied What is the cause? What is the remedy or prevent
ive? The water used is from the Kansas River, and ive? The water used is from the Kansas River, and
is not filtered; but if the cause was from sand or any is not filtered; but if the cause was from sand or any
grity substance, it surely would ruin the leather pack ings before it would eat away the ram. A. The ram pistons in the lead pipe presses in New York and vi cinity have a life of only about one year, wearing in grooves as you describe. The present pratice is t cover the pistons with copper, which wears two to
three years. Old pistons are also covered and recov three years. Old pistons are also covered and recov-
ered. If you have the old piston, you can have it red. If you have the old piston, you can have
covered. Gritty substances, as fine sand, iron rust, he hardening of the leather by absorption of iron, ogether with
(30) C. R. desires a simple size for making decalcomanie or transfer paper. A. Use gelatin size rinting could be drawn slightly like a blacking bo printing could be drawn slightly, like a blacking bo
lid? A. If the picture is coated with a transparen apan varnish, it can be baked same as any other var nish. If the japan is quite thin, the metal may be
(31) H. L. writes: 1. I wish to melt a gold coin in a sand crucible, and want instructions how to proceed. A. Break into small pieces, mix with danger of heating too hot? A. No. 3. Can I remedy its tendency to crack ? A. Only by proper annealing. 4. I have seen gold coin as yellow as brass and some almost as red as copper. What is the cause of so much difference in color? A. The red color is due to its being alloyed with copper. The natural color is yellow, but it becomes red by the addition of copper. Se
"The Practical Gold Worker," by George Gee, which e can send for $\$ 1.75$
(32) J. G. H.-We could not recommend steam pump to be used once a fortnight. It would ure steam pump in the market will cost about $\$ 125$ We consider gasoline a dangerous element in its liquid tate, in the vicinity of fire. Its vapor, mixed with air, as used for lighting purposes, where the vaporiza-
tion is carried on outside of the premises, will be safe
ournea in jers mastoro
(33) J. C.-A first class ice boat, sailing first class ice, will sail from three to four times faster than the wind that drives the boat. For example, a wind having a velocity of fifteen miles an hour miles an hour.
(34) W. H. O. desires a formula for naking white miners' oil, for burning in lamps. A ake 50 to 60 per cent mineral, seal, or some other 300 cheaper article is made by using 40 to 50 per cent cotton
r rape seed oil.
(35) E. W. asks: What is a good, cheap substitute for beeswax to cout wooden patterns for nse but a few times, something that can be applied with a brush, without heat? A. Shellac varnish. 2. What
s a good flux forwelding iron in a blacksmith's fire, and the desirable qualities of coal for same? A. Clear white
sand or borax. Use best Cumberland coal, free from sand or bor
sulphur.
(36) J. C. writes: I am burning in my boiler slabs that are saturated with salt water, and find hat the tubes of the boiler have to be cleaned out heavily upon them. Is there any danger of the salt eating into them or doing any injury? A. The burning he iron while the boiler is in use, but may make coating or form a coat upon the surface of the tubes
by the condensation of the evaporated salt that will b roublesome to clean off. When the boiler is not in use, the salt crust will absorb water and rust the tubes. Abese examination of the rear whether of the tubes are accumulating a crust that the tube brush does not remove. If so, not affect the iron. The salt absorbs water when the oiler is cold, when rust takes place.
(37) J. S.-Cast or tool steel cannot be welded together with any certainty. Low grade steel hat will harden, such as shear and double shear, can
be welded together fairly with borax and sal ammoniac or borax alone, which are also good for welding steel
to iron. Use about one-tenth sal ammoniac, pulverized with the borax and heated to evaporate the water, then ulverize again and weld with the powder.
(38) E. M. asks (1) what to add to hair oil that will give the hair a yellow color. I have very ight hair, and would like to color it a darker shade. A. A bibmuth hair dye is described in Scientific
American Supplement, No. 356, which is not considred injurious at all to the head. 2. Give me a remedy physician for a remedy of this character. 3. A good soap. A. See "The Manufacture of Tonet MENT, Nos. 518 and 519.
(39) P. M. A. asks: Would you please ve some remedy whereby tattoo marks may be comletely expunged? A. We know of no means by which
hey can be completely removed. Pricking in milk, in ome cases, rather fades them.

## INDEX OF INVENTIONS

## For which Letters Patent of th

January 12, 1886,
AND EACH BEARING THAT DATE.


