ENGINEERING INVENTIONS.
An improved platform for railway cars has been patented by Mr. Samuel M. Beery, of Omaha, Neb
The object is to devise means so the poce between the Pnds of the platforms may be entirely closed, and to this end the invention provides a special construction of sliding platforms.
A car coupling has been patented by Mr. M. H. Merrill, of New Lebanon Center, N. Y. I has few and simple parts, may he cheaply made, and
has a positive self-coupling action, so trann men nee not pass between cars to conple them; the coupling is of same size as the ordinary link and
and may be readily substituted therefor.
and may be readily substituted therefor.
A torpedo holding attachinent for railway danger signals has been pateited by Mr. James A. Bon nell, of New York city. It consists in a bar or rod to
hold the torpeedo, and connected with the danger sig-, nal shaft, so that when the signal is set for "danger the rod holding the torpedo wil be operated, and the
torpedo placed and held on the rail, so it will be ex ploded by a train passing over it.
Au improved steam engine has been patented by Mr. Anton Eberhard, of Philadelphia, Pa. The
cyliuders are curved upon the arc of a circle, and have cyliuders are curved upon the arc of a circle, and have
four pistons connected in pairs by curved piston rods connected by levers with the slotted lugs of cross heads
whose pivot arms carry the inner ends of pitmen, the outerends of which are connected by crank pins with the fly wheels of the drive shaft.
An improved car axle bas been patented by Mr. Francis P. Smith, of Boston, Mass. The azle is in curves; one part of the axle may turn freely in a a sleeve carves; one part of the axile may turn freely in a sleeve,
and revolve independently when running on curves, and revove independently when running on carves,
while otherwiee both parts will be bound together and
to to the sleeve, so as to avoid slack and looseness, and
making the divided axle as substantial as the common solid ones.

## agricultural inventions.

An improved cultivator has been patented by Messrs. George W. Lilly and James E. Norman, of
Center, Mo. Its object is to keep the plows of each part of the cultivator frame at the same distance apart part or lye cand at the same angle witit the line of drapanan,
latere
whatever lateral movement may be given to the frame in guiding the plows.
A straw stacker has been patented by Mr. Joseph J. Cox, of Lawrence, Kas. It is intended for veys the straw as dropped from the carrier of the thrasher to the rick where it is to be stacked. It may be drawn from place to place in the rear of the
tor, or it may pe permanenty cold
A revolving harrow has beer
A revolving harrow has been patented by Mr. Thomas McCleland, of Mattoon, Ml. It bas rame carrying rollers with teeth for loosening the soil,
and rollers with knives to cut up rods, clods, and lumps cross bars to hold the knives to their work, a platform and its supports to carry the driver, and a depth regulating weight, the whole promoting, thorough harrowing
and easy clearing of the harrow teeth from rubbish.
A fertilizer, more especially adapted for tropical countries, has been patented by Mr. William
R. Wilkiuson, of Brooklyn, N. Y. It consists of special proportions of boue ash, gypsum, sulphate of iron sulphate of potash, and dried blood. This fertilizer in
proves the soil permanently, and produces exception ally large quantities of saccbarine matter. The prepar ed ingredients in tbeir spectifed proportions make
compound particularly vaiuable for orange culture and all tropical truits and vines, promoting rapid growth proved qualityard flavor.

## mechanical inventions.

A pipe tongs, that may also be used as nip. pers and as a hammer, has been patented by Mr.
James L.Strait, of Thomas, Mo. It is a cheap and sipes, rods, or bolts, of different sizes, without edist pipes,
ment.
A machine for forming and cutting links bas been patented by Mr. Henry A. Tddings, of Warren
O. The object is to bend and cat the links at one ope ration, instead of using separate machines therefor. The cutting is done slowly, while the bar of metal is being
forced around the mandrel, sothelink bar isbeing made forced around the mandrel, sothe link bar isbeing made
as it is cut, and with only a moderate use of power.
A machine for forming axle skeins ba been patented by Mr.Andrew C. Emmick, of Columbus rapidly and uni formly than can be done by hand, esue rapidly and uniformly than can be done by hand, esve-
cially betrer as to part extending inside the collar, and this may be changed deffintely from the round to the square form, to avoid dressing off the corners of wood axies to fit the skeins.

## miscellaneous inventions.

Mr. Franklin B. Kendall, of Turnwater Washington Ter., has patented an improved construc--
tion of odorless privies. It has a special arrangement and de
odors.
A portable door fastener has been patented by Mr. E. F. Prund, of Sacramento, Cal. It is adapted held by a pary which is then set against the oloor, for
whichthe inventor has devised a novel construction A machine for making nuatch splints bas been patented by Mr. Henry A. Steber, of Utica, N. Y.
It consists of a peculiarly constructed die, in which the rows of holes are arranged parallel toplanes traversing tbe de at right angles to each other, and their upper
edges sharpened to effect the cutting of the entire block of wood into whole splints, in combination with

An improved pin tag has been patented by onsi is bent to form lips with the ends inclined inwarally toward each other and away from the bo.
then bent laterally under and outwardly.
An improved pipe coupling has been patent ed by Mr. Robert McConnell, of Omaba, Neb. The
coupling tube hasa conical end with an enlarged screw threaded portion back thereof, a collared thimble made ond a flanged coupling nu
An improvement in
An improvement in two wheeled vehicles or carts has been patented by Mr. Charles A. Foster, of
Elkhart, Ind. The invention consists in supporting Elkhart, Ind. The invention consists in supporting springs, so tbat it does not partake of the motion of the horse, and the vehicle rides easily,
An improved gas engine has been patented b Mr. Harmer Denney, of B.ooklyn, N. Y. It has a special arrangement and constroction of prarts whereby
the igniting gas jet can be cut off very rapilly and efthe igniting gas jet can be cut off very rapialy and ef ion cannot extingnish the igniting jet.
A safety oil tank has been patented by Mr Samuel Lander, of Bloomington, III. This invention cet, and vent of submerged oil tanks, to protect these parts from fre and from danger of being struck by lighning
A reservoir attachment for ammonia ice machines has been patented by Mr. Perrys Small, of
Guaymas, Mexico. It provides for separating the oil and black lead taken up by the gas in the pump, so the ame willeave the reservoir perfectly pure, and the ed.
A sheet metal fastener, formed from a sin Ile blank, has been patented by Mr. George W. Trapbagen, of Glens Falls, N. Y. It is more especially intend-
ed for securing buckles upon harnesses, carriuge tops,
 or general purposes, being cheap, durable, and easily pplied.
A buckboard wagon has been patented by Mr. John M. Mayer, of Rondout, N. Y. The buckloara works in combination with the asles and pechthe article is made easy riding, strong, and free from rattling noise and lateral or forward and backward

A magnetic call has been patented by Mr. Henry Thau, of New York city. It combines two or nore pulls and pairs of electrical contact points, etc., and a pull having an inclined or heveled shoulder for
operating contact springs, a toothed sector and mag-neto-electric machine, in contact with circuit wires an ontact springs.
A cap or shield for buckle straps of carlage tops has heen patented by Mr. George W. Trapha en, of Glens Falls, N. Y. Its object is to avoid the lhis purpose the caps or shieldes have metallic flanges with tongues that can be passed through the material of the carriage top or curtain and cliiuched.
A press for sacking bran, sawdust, and other substances has been patented by Mr. Arthur L. sattson, of Morrisburg, Ontario, Canada. In connect in position while being flled, is suitable mechauisn or compressing the bran, saw dust, etc., and the sack
A miner's safety lamp has been patented by Mr. John L. Williams, of Shenandoah, Pa. There is a
sleeve or tute on the wick tube and a wire extending sleeve or tute on the wick tube and a wire extending
therefrom into a recess in the bottom of the lamp, the herefrom into a receess in the bottom of the lamp, the
wick tube having a tlange with a notch for the other tube, and the whole so arranged that the lamp may be tabe, and the whole so arranged that the la
extinguiehed very quiclly without opening.
A flour mill feeder bas been patented by Mr. Peter Harnist, of Marine, Ill. It provides for a speaif construction and arrangement of parts to secure substances to sieves and rollers in flour mills, whereby the feed is delivered in a wide, thin sheet, so as to be venly distributed.
A machine for hulling and cleaning grain has been patented by Mr . Samuel K . Todd, of Eugene,
nd. It consists in a special construction and combinaInd. It consists in a special construction and combina-
tion of parts whereby the machine acts upon the wheat by abrasion, to reduce the hulls to powder, and by at mospheric suction to withdraw the powder and other
A machine for making the bodies of artifiial flowersbas been patented by Mr. Lonis Laton, of New Yorke, on which the ball is formed out of fleer, is pattern plate with an aperture of the shape the ball is to have, and in which the ball is revolved while being made to give it the desired shape.
A dough or butter worker bas been patented by Mr. William H. Bryan, of Warm Springs, Va.
Beaters with handles are pivoted to work in a sort of an or trough representing a section of a circle, in the rcof which they may also be moved ateterally, so as to thoroughly workall the dough or butter between the
An automatic lamp extinguisher and wick rimmer has been patented by Messrs. Thomas J. L. Smiley and Charles H. Stombs, of San Francisco, Cal. carrying plates adapted to be opened by the wick in raising it, and so pivoted to the frame as to fall by ravity, so they are automatically closed when the wick An improved separable button has been pa tented by Mr. Albert $G$. Weber, of New York city. The stem secured to the outer disk or head has a groove,
the stem being passed into a slot in the inner surface of the inner (lisk, where there is a locking spring, the object being to render tbe inner disk or head easily de tacbed from or attached to the end of the shank or
stem.

A frictional hinge for mirrors has been patented by Mr. James $\mathbf{C}$. Blair, of Columbus, O. It consists, in combination with the frame of a swinging mir-
ror, of an angular bracket with a split pivot a secon angular bracket with an oriflce for the passage of the split pivot, and a wedge forexpanding the split pivot, the whole to
desired angle.

A safety attachment for gun locks has been patented by Mr. Jeremiah Deyo, of Denton, Mich. It of the hammer in one or more positions, and can b easily and rapidly adjusted. It consists in a simple lever or pivoted catch, with a standard for carryin and a spring for controlling it, the whole designea to A headway and leeway indicator for ves sels has been patented by Mr. Burton E. Blakeslee, of Cambriage, Md. The invention consists of a device
after the general principle of a ship's log, but is more after the general principle of a ship's log, but is more
especially designed to indicate the leeway of a vessel, the case being pivoted on its center, and combined with a relatively stationary pointer, so that the scale indicat ing leeway moves about the pointer.
A regulator for dynamo electric machines has been patented by Mr. J. Edwin Giles, of Hazleton,
Pa. It is designed to obviate the dificulties arising Pa. It is designed to obviate the edififcultioes arising
from brushes running at a uniform speed, under from brushes running at a uniform speed, under gradual movement of one or both of the commutator brushes under ordinary variations, and a very rapid
movement of one or both brushes with a sudden and considerable increase in the strength of the current. A key board attachment for musical instru ments has beeu patented by Mr. Jethro M. Hooper, of
Fort Smith, Ark. A perforated paper or metal web with perforations corresponding to the music, is made to pass over a grooved roller; there are levers corresponding to the keys of the instrument, with bearing points
on the key $s_{\text {so }}$ so they will drop throng the roles on the key s, so they will drop throngh the holes of the
perforated web by their own weight when the attachment is set in accordence with the design of the pate
An improved gate has been patented by Mr. John B. Winteman, of Centerville, Oregon. has a long rearwardly projecting weighted top bar piv-
oted to a supporting post and resting upon a recessed oted to a supporting post and resting upon a recessed
cross bar with two tilting bars, the forward ends of the later inserted in slotted side posts with spring catches che spring catches have trip cords sapported by bars at
tached to the side posts, so the gate can be opened by one of the trip cord
A peanut cleaner and polisher has been patented by Mr. Charles W . Nicholson, of Assamoosick, Va. This is an improvement on a device for the same purpose patented in 1881 by the same patentee and
Richard
$H$ Leigh and ment of a cylindrical brush within the cylinder of the machine, geared to run in a direction opposite to that of
the cylinder for more thorongly cleaning the nuts of the cylinder, for more tho
dirtand other impurities.
An improved form of carbon for electric lights has been patented by Mr. Walter C. Beckwith, of Allegheny, Pa. The ends of the carbons are so shaped
with dovetailed slois and tenons adapted to engage each other, that they may be spliced one upon another, and will then burn right over the splice; there is in con nection a holder in which the carbon is similarly ftted, and the arrangement is such that each carbon may be

A process of coloring photographs has been patented by Mr. Charles L. Wright, of New York city. Il involves the use of egg albumen, neatral sulphate of
cerine, printing, toning, and fixing in the usual wal Then softening the albumen with concentrated ammonia, and applying the colors in a misture of albumen,
salicylic acid on serine setting the color in prints by passing them through a bath of alcohol, water, and nitric acid.
A process of producing artificial marble and rendering it freproof and waterproof has been pa-
tented by Mr. Richard Guelton, of Brighton, Eng rabrication is by means of cements, gypsum, or alum, applied to polished surfaces or placed in moulcs, fihers being applied to the surfaces to form the veins.
enamel is otained by laying on Cnamel is obtained by laying on one or more coats of
varnish, exposing the article to heat after each coat, and by polishing the varnished surface with pumice An improved projectile for breech-loading rifled guns has been patented by Mr. John $G$. Butle, of Watertown, Mass. It is designed to allow of the
projectile moving through the riffed barrel with leess friction than usual, while securing a good euough one or more circumferential grooves, in combination with sheet metai bands to fft said grooves, the ridges of the corruazations fo
and the projectile.
A liquid tester, for taking a fair sample of oil or other liquid in any receptacle, has been patented by Messrs. J. O. Schubert and Van H. Bukey, of Par
kersburg, W. Va. In combination with t abe of form diameter, and open al both ends there is a valve disk carried by a spring-retained rod, and a vertically acting trip rod engaging therewith, so the tabe may be inserted to any depth required in a iquid without age
tating the same, and when withdrawn bring up aspor its quality from top to bottom.
A barrel former has been patented by Mr. Thomas H.Lee, of Memphis, Tenn. It provides means ine holding the two heads and the partition or a hoop
in line, means for preventing the rotation of same and for holding the staves parallel with the axis, while they are nailed on to the partition or hoops. The same inventor has likwise obtained a patent for
ventilated barrel, in which the heads and stares are fit ted in the ordinary manner, but there is an open space
left between each two staves, and there is a central circular partition. The barrels can be easily taken apar and the material packed closely, it being designed to funisha a good means of conveying fruit to market and
readily returning the barrels.

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## NEW BOOKS AND PUBLICATIONS

 Die Haus und Hotel Telegraphie. Bearbeig. A Hartleben's Verlag Pp 217 Leip104 Abbildund. Price 3 marks= 4 francs This little book forms the 14th volume of the electrotechnical library. The author is a practical telegraph man, and gives a full and practical desciptors, antomatic burglar and fire alarms, electric clocks. telephones, microphones, etc. In the first chapter the different kinds of batteries are described and illustrated, alsocurrent breakers, switches, galvanometers, battery current breakers, switches, galvanometers, battery
testers, rheostats, etc. Ohm's law is explained, also the testers, rheostats, etc. Ohm's law is explained, also the
meaning of sucb terms as electromotive force, tension meaning of sucb terms as electromotive force, tension
of current, and the effects of induction. In the second of current, and the effects of induction. In the second
chapter the bells, push buttons, receiving, sending, and chapter the bells, push buttons, receiving, send recording instruments are fully explained with excellent cuts. The third chapter is devoted to automatic instruments, alarms, door contacts, foot contacts, clock con-
tacts, electric winding clocks, door closers, thermoscopes, and automatic fire alarms. In the fourth
chapter the wires and cablea are described, and directions given for finding and remedgiug defects and other disturbing causes. The book is intended as a text book for those engaged in putting in house telegraphs, and offers instructive reading for all who are
interested in the practical applications of electricity. interested in the practical applications of electricity. The mathematical formulas are given for calculating
resistances, strength of currents, size of wires, and other important practical data. In the appendix the prices :
(in Vienna) of the different instruments and supplies (inVienna)
are given.

## 

HINTS 'TO CORRESPUNDENTS.
No attention will be paid 10 communcations unless accomp.
Namesand addre
Werenewour request that correspondents, in referrin to former answers or articles, will be kind enough to name tue date of $t$
of the question.
Correspondents whose inquiries do not appear aftel a reasonable time should repeat them. If not then pub lished, they may conclude that, for good reasons, th Persons desiring sp
Fer perseng specialinformatiou which is purely should remit from $\$ 1$ to $\$ 5$, according to the subject, as we cannol be expecterl to spend time and labor to obtain such informatiou without remuneration.
Any numbers of the Scientific American Supplif-
ment referred to in these columns may be had at the ment referred to in these col
offlce. Price 10 cents each.
Correspondents sending samples of minerals, etc.
for examination, should be careful to for examination, should be careful to distinctly mark of
label their specimens so as to avoid error in their indentification.
(1) C. A. S. V. G. writes: Take a round stove pipe 6 inches in diameter at both ends and 2 feet long; then compress one end to an oval form so as to fit on to an oval opening in a stove, "compressing witharea than the oval end? The undersigned says it
(2) E. F. R. Z. asks: Are there saws made to saw imestone? If so, where could I get one? A.
Limestone is usually sawed with thin strips of iron and sand. A small piece may be sawed with a machinist's hack saw. A strip of tin stretched upon a frame like a wood saw with emery
(3) G. E. writes: Supposing a ship of any nationality to sail from any port whatever, and to circumnavigate the globe, at what point on her course is it
customary to add or drop a day from the calendar, in order that on again reaching her point of departure the
day of the week according to her reckoning may coincide with the actual local day? A. Marine reckoning is generally assigned to the meridian from which the ongituae is reckoned. The chronometers keep the the vessel in longitude. The log book days are from sun to sun, and are a serial from the commencement of day has to be added or deducted at some point of the voyage for a new reckoning. This is usually done at a
$180^{\circ}$ from Greenwich, which is about middle of Pacific.
(4) Le R. T.-Your diagrams of slide valves received. No. 2 is the most correct. No. 1 is bad, and No. 3 very bad. No. 2 w
to $1 / 3$ inch exhaust lap
(5) J. F. P. asks for the best whitewash. The wash is to be used for rough planks. A. The result of
experience in the manufacture of this article is given under the title of "A Durable Whitewash" "on page
52 of the ScIENTIFIC AMERICAN for July 23,1881 .
(6) R. M. K. writes: I wish to prepare many pictures (wood cuts, lithographs, etc.) for won-

What varnish can Inse that will not blister and crack
on such slide? A. A good shellac varnish is the on such slide? A. A good shellac varnish is the articl 2. Also repeat method how to "split" a piece of paper, on which there are two engravings on opposite sides. A. How to splita a piece of paper will be found on pag
99 of Scientific American for February 17, 1883 . (7) J. H. M. writes: I have a difficulty in soldering small silver articles. I can't get the solder to run tillI use so high a temperature that I fuse part
of the article which I wish to solder. What solder and of the article which I wish to solder. What solder and what flux should I use, and what part of the blow pipe
fame is right? A. A soft silver solder, which is proba dame is right? A. A soft silver solder, which is proba
bly the article you need, may be prepared by melting of tin tort of lead; when the latter is fluid add two part ing fine work wet the parts to be joined with bydro chloric acid, in which as much zinc has been dissolved as the acid will take up. Borax can be used as a flux The pointed flame of the blow pipe is best, and should be directed on the parts to be soldered.
(8) A. Z. asks why acetate of soda absorbs longer period. I have not found the rationale of thts in any work on chemistry that I have consulted. I have an idea that he heat absorbing and retaining properties of acetate of soda may be applied to some other practical dium acetate has a large percentage of waterot crystal lization combined with it, whick is enough to dissolve faction takes place, crystals are heated. When this lique latent. As the fluid cools, it solidifies and gives out again the latent heat, thus taking a long time to return
(9) F. F. writes: I see in your answers to correspondents you mention a furniture polish (shellac how it is prepared? A. The following receipt is used by cabinet makers: Very pale shellac, sllis.; mastic,
oz. ; alcohol, ( 90 per cent), 5 or 6 pints; dissolve in the cold with frequent stirring. This is used for French
(10) A. E. I. asks: 1. How the rubber is treated in the manufacture of rubber stamps; and 2
what is used for the mould? A. For answer to 1 and 2 see Scientific American Supplement, No. 83. 3 How to make a "red "gold color in electroplating, with a bath that gives a yellow color. A. The anode used
should be of the " red " gold variety of metal, which in its turn
(11) C. Bros. write: We use a tubular boiler, the flues of which are rather thin and weak; which method of cleaning the flues would be preferable - with steam from dome or with an iron cleaner? We
wish to favor the flues as much as possible. Carry about 0 lb
(12) E. D. F. writes: If an iron tube be placed on a boiler the same as water glass tube, withan
outlet from the boiler at both ends, and a steam tight piston be fitted in the tube, in what part of the tube will the piston stand if the tube be fastened to the boiler he same as water glass tube is, so that the tube will stand about half full of water? Will the piston rise
and fall with the water? A. It will rise or fall with the changes in the level of the water, leaving friction out of the question. Of course the piston will settle in the weight.
(13) J. B. J. writes: 1. I have charge of an ngine $30 \times 36 \mathrm{in}$., 12 in . wrought iron crank shaft, with Babbitt bearing. It is a new engine. Will not run with
out water when working hard. It is well in line, but the Babbit metal don't seem to have "backbone" to stand up to the work. What is best to be done in the case? I filled the side bearings about two months ago The metal used was coarse looking. I don't think it
was the right kind, for the trouble still remains. A. was the right kind, for the trouble still remains. all qualities and degrees of hardness. Very little of mat sold in market is true Babbitt metal. 2. What is ing the metal is for two purposes-to fill the recess perectly and harden or condense the metal.
(14) J. A. asks: 1. What is the principle of a surface condenser? Is the water that passes over-
board from the hot well fresh or salt? A. The water circulated through the tubes and overboard is salt, but the water delivered by the air pump into the hot well
should be fresh. 2. What is the principle of a keel condenser? After the exhaust goes into the keel pipes. he sea? Does the air pump take it from thecondenser to put it into a tank, then from the tank to the boiler? A. A keel condenser is a pipe outside of the vessel and nd then returned again to the engiae and connected to the air pump. The exhaust is into this pipe, and the water of condensation is fresh. It takes no salt water from the sea. 3. What is the principle of a jet
condenser? A. In a jet condenser the water tocondense ondenser? A. In jet condenser the water to, condense he exhaust steam. The water resulting is a little brackish, resulting from the mixing of the ealt water to the con.
steam.
(15) A. C. G. writes: 1. We have a boiler with a grate surface of 16 sq. feet, 40 flues 3 in. $\mathbf{x} 16 \mathrm{ft}$. About 22 in. diameter. 2. What would be the theoretieal result of a smoke stack one mile high? A. To reduce the draught. Any height beyond the point where the gases in the chimney are reduced to the temperature of the surrounding atmosphere would tend to reduce
(16) J. R
(6) J. R. M. writes: In putting up a steam gauge, is it necessary to put a bend in the pipes If so,
what is it done for. Should water be allowed to remain in the pipe, or should the steam be allowed to act directly upon the gauge? A. A bend is given to the pipe or trapp'ng the water, so tbat the water only has access to the gauge, and it is protected from the heat of
the steam. The water acts directly upon the gauge,
but should be drawn off in freezing weather when the jure the gauge.
(17) R. O. W. asks what deg as oil is, such as tanners use, also sod oil? A. Degras oil is a leather, and is used as a filler. It is imported and on sale by dealers in tannery supplies. The degrasis composed of the oil and alkali expressed in making oil dressed leather in Europe, where palm oil is principally used for this purpose. Sod oil is the oil and alkali ex-
pressed in the manufacture of oil dressed leather in this pressed in the manufacture of oil dressed leather in this
country, where fish oils are principally used. In each country, where flsh oils are principally used. In each
case their character has something more than that of the simple constituents. on account of their first use f dressing the raw skins.
(18) A. M. asks whether the glass coating described in our issue of August 26, 1882, page 130, will
adhere as firmly to sheet iron forms as when applied by ahere as firmly to sheet iron forms as when applied by
oxide. Can it be used with good results on sheet iron oxide. Can it be used with good results on sheet iron
forms? A. The enamel stock as described is suitable for sheet iron dishes, that are so made as not to buckle or kink, the same as the porcelain glazed ironware, so much in vogie for kitchen use. We would not recommend it for large surfaces of sheetiron.
(19) P. S. asks how to hang a grindstone A. It requires a pretty fair mechanic to hang a grindstone to run true and stay true. It is supposed that you have no flanges upon the axle. The hole sbould be at
least three-eighths or one-half inch larger than the axle, least three-eighths or one-half inch larger than the axle,
and both axle and hole square; then make double and both axle and hole square; then make double
wedges for each of the fonr sides of the square, all alike and thin enough, so that one wedge from each side will reach clear through the hole. Drive the wedges
from each side. If the bole through the stone is true, the wedges will tighten the stone true; if the hole is made so, or the wedge corresponding must be altered in the taper to meet the irregularity in the hole.
(20) C. B. writes: If a tangential line should be extended from any point ou the earth's surface into
space, what wonld he the perpendicular distance between said line and the eartl's surface at any given distance
from the point of contact,say one mile or fifty miles? If from the point of contact,say one mile or fifty miles? If
this line were to be extended 4,000 milcs, the perpenthis line were to be extended 4,000 milcs, the perpen-
dicular would seem to be 4,000 miles, $i$. $e$., one-balf dicular would seem to be 4,000 miles, i. e., one-bala
the earth's diameter, but at one mile the perpendicular would not be one mile nor anything like it. What is the ratio of increments A. For ordinary purposes the
square of the distance in miles divided by the earth's diameter gives an approximate answer in par
mile. The following table is nearly correct:

\section*{| Distance | Depression |
| :---: | :---: |
| in miles. | in feet. |
| 1 | 0.6 dir |
| 2 | 2.669 |
| 3 | 600 |
| 4 | 10.677 |
| 6 | 24.024 |
| 8 | 69.709 |
| 10 | 96.733 |
| 12 | 130.796 |
| 14 | 170.836 |
| 16 |  |}

(21) F. P. B. asks: 1. What is the best way of polishing tor toise shells A. Having scraped the work perfectly smooth and level, rub it with very fine sand
paper or Dutch rushes; repeat the rubbing with a bit paper or Dutch rushes; repeat the rubbing with a bit
of felt dipped in very finely powdered charcoal with water, and lastly with rotten stone or putiy powder, and finisbed with a piece of soft wash leather, damped with bismuth by the palm of the hand. 2. What is the way of joining or welding same? A. Provide a pair of pin-
cers or tongs, constructed so as to reach four inches beyond the rivet; then have the tortoise shell filed clean to a lap joint, carefully observing that there is no grease about it. Wet the joint with water, apply the pincers hot, follow them with water, and the shell will he joined as if it were one piece. The heat must not be so
great as to burn the shell, therefore try it first on a piece of white paper. it into moulds? . The softering of the shell is accom plished by heating it under water and then pressing it into moulds.
(22) S. M. T. writes: If a man should take a light but firm cylinder, 6 or 7 feet in diameter, and 2 or 3 should set the cylinder up on one side, should stand up within it and walk or runn, the cylinder would of course der one mile him. Now, could he thus drive the cylinmile on the ground, quickide tban he could run the one out using it? A. The man would have to run his mile to the greatest disadvantage. He not only would have
to run tha full mile, but would have to drive or pual the weight of the cylinder, and also overcme or puss tion and pressure of the air against the cylinder and would also bave torun up hill. We think that he could make the mile quicker by drawing the cylinder after
(23) P. S. K. asks: 1. Is the gas that is in beer of the same nature as that produced in carbonated gas in both is the difference, if any? A. The principal called carbonic acid gas. 2. What is the usual composition of good bell meral in making good church bells: A. The composition of bell metal varies; gene-
rally about 80 per cent copper and 20 per cent tina; small rally about 80 per cent copper and 20 per
(24) U. H. P. writes: Please give composition of a metal that will cast easy and smooth in ness to polish nicely and will, be of right bard ed with silver. Something suitable to make light orna ments of, yet not too soft to burnish the silver on, and to be as cheap or cheaper than brass, and more easily melted. A. The white alloy on page 312 of Scientific American for May 20, 1882, will probably be suitable
(25) H. U. writes: 1. I have a graphoscope ns $23 / 4$ mehes in diameter, 111/3 sun focus; supposing to be a single crown glass, what would be the diameter and focus of the flint glass, and distance betwee
view possible. A. The focus of your graphoscope len
is too short for its diameter, and is probably double is too short for its diameter, and is probably double
convex, which is not the best form for a dialytic tel scope. As a rule they are not a very good quality glass. 2. How can I tell whether my lens is a crow glass or not A. You can tell if it is crown by its greenish shade of color by looking edgewise, orby its specific gravity, which should be from $2 \cdot 45$ to $2 \cdot 80$. 3, Would an achromatic object glass $1 \frac{5}{18}$ in. diameter, 4 in . focus, do or a finder for a telescope $2 / 2 \mathrm{in}$. diameter, $44 \mathrm{in.focus}$ If so, what would be the diameter and focus of the ey cave flint of $7 \not 2$ in. focus, 13 in 1 require A. A con midway of the focus of the object gase, may give you better satisfaction than no glass at all. You small object glass is good for a finder vex eye glass of $3 / 4 \mathrm{in}$. focus. $1 / 2 \mathrm{in}$. diameter. Oneglas
(26) W. S. R. asks what article is used in make manufacture of paper wash basins and buckets to same capacity in pressing dry pulp into any shape? Al so what would answer if wet pulp is used? A. The ar ticles referred to are generally made by pulping straw, which when in suitable condition is properly moulded and pressed by means of hydraulic pressure into th

Minerals, etc.-Specimens have been re eived from the following correspondents, and examined, with the results stated:
D. G. McD.-This sample has the appearance of being a good fire clay, and if on analysis this opinion is
sustained, the clay would be worth $\$ 4$ to $\$ 5$ per ton in New York. It would be well to submit it to a prelimi nary fire test and so examine its refractory power.-H R.-Mica is found in all of the tranitic, gneissoid, an schistose areas of this country. The mica is generally
found in layers from 3 to 4 feet between various rocks There are no means of determining the anexposed min eral. See "Mineral Resources of the United States," ustissued by the Department of the Interior.

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Belt shifter for elevators, automatic, F. W. Fuller. Bicycle seat, B. F. Peet............
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