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edition. Price, $\$ 2.00$. For sale by Munn $\&$ Co., 361 Broadway, New York.
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Tight and Slack Barrel Machinery a apecialty. John
Green wood \& Co.. Rochester, N.Y. See illus. adv., p. 28 . Lathes for cutting irregular forms. Handle and spoke lathes. I. E. Merritt Co., Lockport. N. Y.
One steam passenger elevator, "'Tufts." Two cylin-
ders. $8^{\prime \prime} \times 10^{*} ;$ car, $7^{\prime} \times 7^{\prime}$; inside fliely flished. Lately running in "Butler Exchange," Providence (displaced by two hydraulic elevators). In excellent order. For
sale low by Volney W. Mason \& Co., Providence, R. I. For best quality, order your steel castings from th
Wuntalo Steel Foundry, Buftalo, N. Y. selling machinery. Address, C. M. Lawrence, P.O. Box
773, New York. 3, New York.
Pattern makers' lathe. Back knife gauge iathe for turnin
Mase.
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## SCIENTIFIC AMERICAN

BUILDINGEDITION.
NOVEMBER NUMBER.-(No. 37. )

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Names and Address must accurrpany all letters,
on mo antention will be piat theret.
information, and no fis is for our
Rererencen on to former articles or an anwers should
give date of paper and page or number of question.
Inquirles not answered in reasonable time should



Books referred to promptly supplied on receipt of
Minerais sent for examination should be distinctly
marked or labeled.
(1) G. A. asks for a receipt how to make waterproof writing ink, an ink which will not blur if the writing is exposed to rain. A. Dissolve 2
ounces shellac in 1 pint alcohol (95 per cent), filter through chalk, and mis with beest lampblack
(2) D. H. A. asks: What is the best nown substance or preparation that will waterproof canvas and make it mildewproof and proof against
rot? What is the best known waterproof cement for canvas, that will make sewed seams in canvas waterproof? A. We recommend paraffine applied to the perfectly dry tissue and melted in with a hot sadiron, for both purposes, or 1 pint linseed oil and 1 ounce beeswax
may be mixed and applied with a brush and allowed to may be mixed and applied with a brush and allowed to dry before use.
(3) C. S.-Any conductor, carbon or metal, is heated by therelectric current. Lime is a nonconductor and will not be heated.
(4) W. B. asks what ingredients to use (5) W. W. W. seeks information as to the best methods of making magic lantern slides from dry plate negatives. By what is known as the "wet
plate process " very good slides are easily made, but it plate process
is somewhat messy and is productive of blackened
fingers. The glass plate, after being thoroughly cleaned, fingers. The glass plate, after being thoroughly cleaned,
is coated with collodion, which can be bought ready made from dealers in photographic supplies, and nest sensitized by dipping for a minut
silver bath prepared as follows:
ver bath prepared
Nitrate of silver.
437 grs.
16 oz.
Distilled wat
16 oz.
3 drops
Saturate the solution with iodide of silver and then filter. If the bath is milky, set the bottle in the sun for
two days, until the solution clears up. Thendecant nd it will beready for use. After sensitizing, the plate while wet is at once exposed in the camera, then re moved from the plate holder aud immediately devel ed with the following solution :
Protosulphate of iron.
Protosulphate of in
Nitrate of baryta
Water...
Nitrlc acid.
$\begin{array}{cc}11 / 2 & \text { oz. } \\ 1 & \text { oz. } \\ 16 & \text { oz. } \\ 1 & \text { oz. } \\ 40 & \text { drop }\end{array}$

After dissolving, filter out the white deposit and keep
After dissolving, filter out the white deposit and keep
all corked. When developed, it is washed under the


## Hyposulphite of soda. <br> Water

## .50 grs.

The cyanide of potassium is a deadly poison, and is the slide to a blue color soon after tixing. When hypo sulphite of soda is used, the plate should be thoroughly washed under the tap for two or three minutes. After fixing, the slide may be toned to a brown color by a solution of chloride of gold 1 gr ., dissolved in 10 oz . of
water, or instead a purple color, by a solution of $1 / 4$ rain of bichloride of palladium to one ounce of water in a clean porcelain dish or tray. The solution should be strawberry in color. The plate should be left in the whay until the film assumes a lack color on both sides, easily obtained when the slide is fixed with cyanide of potassium. Very good slow gelatino-bromide plates cau be purchased, known as lantern or transparency plates These may be exposed in the camera, or by contact with
anegative. Then they are developed in solution of negative. Then they and
hydrochinon 15 grains, sulphite sodium 50 grs., wate 13 ozs., carbonate of potassium 30 grs , and fixed in a solution of hyposulphite of soda 1. oz. to 8 of water this developer, and are then removed as fast os deve loped.
(6) St. M. I. asks (1) for a simple method of purifying and decolorizing crude bitartrate of potassium as obtained from wine casks. I have a cer Indicate any method, but the simplest is preferable. A. The tartar, previously pulverized, is boiled with wate in copper boilers. The solution when saturated is transferred to earthen pans, where it deposits on cooling a crystalline layer, nearly free from color. This is re-
dissolved in boiling water, and the solution, having been mixed with 4 or 5 per cent of pipe clay, is evapor ated to a pellicle. The clay precipitates with the col white crystals in crusts, which, upon being exposed to white crystals in crusts, which, upon being exposed to degree of whiteness. These constitute the crystals of artar of Dharmacy. 2. We find some dificulty in
working the Toepler-Holtz frictional machine, and ar unable to placethe cause; for, a year ago, it worked after turning but a few times, and now it. requires quite length of time to charge it. If the plates are to be var
nished, please indicate how to prepare the varnish. A. nished, please indicate how to prepare the varnish.
chine. Dust as well as moisture interferes with it action. The varnish for the plates is alcoholic solu-
tion of shellac. 3. How many 1 gallon Bunsen cells are dequired to run two six-candle power lamps? A. About en celle.
(7) W. J. M. asks : 1. What is the vulcanzed fiber washer that clampe the glass disks to the bosses in a Wimshurst infiuence machine composed of
and how made? A. They are made of India rubber sulphur, and other substances. Youcan buy it in larg or small pieces of dealers in electrical supplies. 2. cury, tin, and zinc. I am told there is a better amalgam which is of an old gold color. Can you tell mehow to make it? A. It is bisulphide of tin, the old aurum mussivum, formed by sublimation from an amalgam of tin 1 part, mercury 6 parts. Of this amalgam 18 parts
are mixed with 6 parts salammoniac and 7 parts sulphur. are mixed with 6 parts salammoniac and 7 parts sulphur
The bisulphide of tin remains behind in the retort. No amalgam should be used on a Holtz machine. 3. Are dry cells which are made in Germany equal to the Leclanch A. Dry cells are of rather high resistance. Gelatin o agar-agar jelly is used in them instead of water. 4 glass A. Turpentine and camphor, or simple water -We can give no information as to the gas lighter you speakof.
(8) J. H. K. asks : 1. Will the motor described in Scientific American, March 17, run an ordinary tricycle and about what speed? A. It should would be to get a compact and light battery. 2. I there any good paste to make paper adhere to a brick wall exposed to the weather? A. Shellac is the best ver the wall and stick paper to that 3 I have rea with a great deal of interest the articles on speed of railroad trains, and would like to know the fastest York, West Shore and Buffalo Railroad, between Church ville and Geneva Junction, on July 9, 1885, a specia train attained a speed of 87 miles per hour. It ran 2266 miles in 9 hours and 23 minute
(9) D. J. B. - You cannot keep the bright color of polished iron on the hot parts of an en gine without constant attention and wiping with engine
oil. Oxalic acid may help the cleaning, but the acid oil. Oxalic acid may help the cleaning, but the acid
left on the bright surface favors oxidation. For cleanleft on the bright surface favors oxidation. For clean-
ing, use tripoli, rotten stone, or pulverized pumice stone, with engine or kerosene oil. Neglected or dirty spots and afterward rubbed with oil. Every part of bright work around an engine should be wiped with oil Moisturc immediately discolors a clean bright surface. Polish the labricator with rotten stone and oil only,
and only when necessary. Too much polishing soon and only when necessary. To
makes it look old from wear.
(10) G. asks how to make the preparation whereby solder will readily affix itself to other metal than tin; for instance, brass wire, etc. A. Use a solution of chloride of zinc and chloride of ammonium,
or what is called tinner's acid, which you can make by or what is called tinner's acid, which you can make by
dissolving zinc in hydrochloric acid to eaturation. Add 10 to 20 per cent water and as much sal-ammoniac as the bulk of zinc dissolved
(11) C. F. R. asks a formula for giving a green color to finished steel. A. We know of none
that will wear well. The sulphide of lead process gives a film of variegated colors, which may be covered with lacquer. The article must be perfectly clean, with a
dead tinish, then dip in a solution of $11 / 2$ ounces hyposulphite soda in 1 pint water, in porcelain dish, to which add $11 / 2$ ounces acetate of lead previously dissolved in 1 pint of water. Mix and heat the whole to nearly boil-
ing, $200^{\circ}$. Boil the article in caustic soda and water strong enough to clear of grease or finger marks, rinse in boiling water. Dip in the hot solution and examine until the desired color is obtained, which may be seconds
or minutes. The effect runs through several colors in (12) Yacht.-The determination of the raught lines of a yacht is not an easy matter for an amateur. The weight of all the materials composing
the hull, rigging. ballast, and furniture of the yacht the hull, rigging. ballast, and furniture of the yacht must be computed from the details of the design, and
the displacement of an equal weight of water computed within the lines of the boat. For the details of construction we refer you to Scientific American SupPlement, Nos. 42 and 67. also "Model Yachts and for $\$ 1.25$
(13) P. H. G. asks (1) why steam exhausted into the atmosphere on a cold day lasts much longer than the same amount exhausted on a hot sum-
mer's day. A. In a hot, dry air the steam is instantly mer's day. A. In a hot, dry air the steam is instanty
bsorbed by the air and becomes transparent, warm, dry air having a large capacity for holding moisture. water and has little or no capacity for further absorption. Then the exhaust floats away in clouds. 2 What is the cause of that peculiar roar which often What is the cause of that peculiar roar which often
issues from elevated road locomotives? A. The roar you refer to is probably that caused by the vibration of
the safety valve in blowing off. As it is held by a pring only, it at times vibrates or chatters when the team pressure is just enough to barely lift the valve.
(14) V. M. C. writes: 1. Can you decripe any process by which drawing paper can be made ome back to its regular appearance andcoaditionagain arter the process, when required ? A. Treat with castor oil, and it will be transparent ; lafterward dissolve out he oil with alcohol. 2. Can you describe something to kketches so that they will not fade soon or rub off: some thing easily applied and able to give satisfaction in eneral ? A. Lay paper in a shallow dish, and pour skimmed milk over it. When well wet all over, zaise into vertical position and allow it to drain, removing with a feather the last drops from bottom edge. Dry care-
fully. Or wash it over with warm starch solution, thin isinglass water, or rice water, applying it with a broad
(15) J. D. B. and E. R. C. ask : 1. The inredients, and their proportion, for the best cement to attach bicycle tires to their wheels \& A. You can make very strong and tough cement by dissolving 1 part pure India rubber in 12 parts benzine, thenadding 20 parts shellac, and heat carefully away from fire until the
shellac is dissolved and the benzine has evaporated. 2. hellac is dissolved and the benzine has evaporated. 2. of bicycles \& A. No, except as you will see the different styles described in trade catalogues. 3. Is there a work on japanning or enameling, giving description of best arrangement of drying ovens, etc. $~$ A. You will find an article on japans and japanning in Scientific American Supplement, No. 316. Also see " Workshop Receipts,"
third series, which we mail for $\$ 2$.
(16) B. M. P.-Tell your friend the fin(16) B. M. P.-Tell your friend the fin-
est stationary engines made in the world, for cconomy, durability, and elegance in design, are made in the United States of America. English engines are often bulky and clumsy. French engines are frequently erratic in design and fragile in construction.
(17) D. M. M. asks if there is any way extract the oil from lamb's wool in alcohol. What proportion of alcohol to wool should be used ? Will
the result besolid llke lard or look more like the alcohol? I have tried the experiment of boiling both together, have tried the experiment of boiling both together,
but it does not seem to change either. Perhaps you will tell me why. A. For estraction of oil we should adise the use of ether and a continuous fat extractor. On xposing the ethereal solution to the open air, the ether will spontaneously evaporate, leaving the oil. We doubt you extracted much with alcohol, as the latter is radily diluted by any water in the wool. Such an exAn Stpplement, No. 628 . The oil will probably be yellow and thick as butter.
(18) D. T. S. asks : 1. Whether or not here is any way of preserving (permanently) the beaufrul polish of which copper is susceptible. A. Var-
nishing with shellac while the metal is warm and abso htely free from the least particle of grease is a good method. 2. Can you give recipes for making gold and ilver inks $?$ A. Gold or silver leaf are rubbed up with honey and duluted with water.
(19) A. G. B. asks how to make cake ix Mix and dissolve hot, 1 part gelatine in 1 part water, and add and stir in sufficient coloring matter; 3 parts above 1 to 2 parts of glycerinemay be added to make
(20) C. I. M. asks for a receipt for a stove blacking. A. 2 parts copperas, 1 part boneblack,
part black lead, mixed to consistency of cream with water. Two applications are recommended.
(21) C. A. B. writes : I should like to now the most simple method of accurately determin ing the amount of tannin in the various tan liquors used in tanning leathers? A. The determination of tannin is sometimes attempted by the use of the hydrometer in chemical analysis re weighed dry, eighed, and the increase in weiglt is called tannin This is not a very accurate method.
(22) S. C.--The outside of finished bells are turned at a slow speed with very hard tools or cold ( $300^{\circ}$ to $400^{\circ}$ temperature) will throw off the sand If the metal has been poured very hot and the sand burnt in, an acid bath may be used, of nitric acid 1 part water 4 parts.
(23) P. P. D.-Steam and the water in the boiler at 95 pounds pressure both have a temperature of both will be $352^{\circ}$ Fah. Water can be heated to any temperature by confinfng it.
(24) W. H. G.-If you cannot wash off the fiy specks with soap and warm water on a cloth, here is no way that an amateur can refinish lamp wor with any satisfaction. To do this, the lamp must be rem and dip in strong nitric acid for a few seconds only when it will come out clean and bright then rinse clean in boiling water. Dry in sawdust, brush off, and lacquer with thin sheltac varnish. The metal must be
(25) K. K. W.-The rust on the inside of yoar shot gun can be removed by rubbing with a berforated cork glued a rel. Then with oil and ground pumice stone, or tripoli, polish the inside of the barrel untll it is free from rust. (26) H. S.-A little pulverized sal-am moniac sprinkled on tin will make it flowfreeand clear make it melt at less than its normal temperature.
(27) S. C.-The best covering for pul leys is leather. Roughen the pulley with an old file. Use whe best clae, with its dry weight of glycerine
made in the ordinary way. Glue the leather to the iron pulley and lap from two to three nches Tough irost board does well while it lasts. Leather is the cheapest by its durability.
(28) H. C. J. asks whether it requires greater velocity for arifleball to go through two 1 inch boards nalled together or through one 2 inch board. A. nation of the resisting medinm. The two 1 inch boards gether require the least velocity for perforation.
(29) G. B. C. asks: Can you tell me of any filter or material fot one that will filter lime water
and remove every trace of lime from it, leaving it pure? A. Lime cannot always be removed from water by fil. fration. Sometimes it has to be boiled to secure precipitation, sometimes it cannot be practically removed by any means. It gll depends on the form in which it is present. If once precipitated, any good filter will re-
move it.
(30) T. D. B. asks : 1. How to stain a sole leather bag somewhat abraded a dark mahogany color. A. Mix 15 grains alkanet root, 30 grans aloes,
30 grains dragor's blood, all in powder, with 500 grains 30 grains dragor's blood, all in powder, with 500 grains alcohol ( 95 per cent). Moisten the bag with dilute apply acove solution. Repeat until dark enough then apply above solution. Repeat until dark enough. 2. I
wish to calculate the power of a flow of water which flows in a broad, thin stream over a dam. A. Determin the "head" measured from level of main body of water above the dam to the level of the top of the dam, then multiply length of dam by $3 \cdot 33$, and multiply this by the square root of the cube of the head expressed in feet and decimals. The result will be in cubic feet. See Trautwinc's "Eugineer's Pocket Book," page 265.
3. What is the resistance approximately of carbon in 3. What is the resistance approximately of carbon in sectional area such as is used in arc lamps and how to
calculate the resistance at different temperatures? A. Carre's circular carbons 1 millimeter ( 0.04 inch ) diameter have 50 ohms resistance per meter ( 39.37 inches). The resistance diminishes as the temperature increases Between $0^{\circ}$ and $100^{\circ}$ C. the coefficient of reduction is 1-1912. This you can easily reduce to Fahrenbeit's
(31) T. A. R.-There is no way to bend wood better or cheaper than by stcaming. Gun stocks, if bent at all, are steamed and bent in the rough.
The trimmings are put on after the stock is flnished.
(32) M. F. S. asks how to solve the following questions: No. 1. Aclerk spends 20 per cent saves $\$ 533$. What is his salary? No. 2. A cabinet maker directed his salesman to mark a set of furniture so that, by allowing 20 per cent on the marked price, he would realize a gain of 25 per cent. The salesman marked the set by mistake $\$ 200$, or at a loss to the
dealer of 20 per cent of the sale. At how much less than the required marking price were the goods marked by mistake? A. Solve No. 1 by ?ollowing equation: Let $x=$ salary; then:

$$
\begin{gathered}
x=\text { salary; then: } \\
x-(2 / 3 \times t+1 / 2) x=533 \\
x=\$ 1,453.63 .
\end{gathered}
$$

$x=\$ 1,453.63$.
Let $x=$ proper marking price, then $y=$ cost

$$
\begin{aligned}
& \text { (1) } y=x-\frac{1}{8} x-\frac{x-\frac{1}{8} x}{5} \\
& \text { (2) } y=200-\frac{200}{5}-\frac{200-\frac{200}{6}}{5}=192
\end{aligned}
$$

$$
x=300
$$

Or by analysis they may thus be solved: 1. He spende 1/2 of his salary plus $\frac{66 \% / 3}{5}$ of his salary, and what is left amounts to $\$ 533$. Taking it by percentages, what he spends reduces to 50 per cent $+13 \cdot 33+$ per cent $=$
$63 \cdot 33+$ percent Subtracting this from 100 gives $36 \cdot 66+$ per cent of his salary left unspent, which is equal to
\$533. His full salary, therefore, is equal to $\frac{}{36 \cdot 66 \times 100}$ or $1,453.90$ within limits of errors due to continued frac-
tions. This is one solution, but the problem is worded tions. This is one solution, but the problem is worded
so badly that several meanings may be drawn from it. 2. The suit marked at $\$ 200$ was sold at $\$ 200$ less 20 per cent, or $\$ 160$. This gave a loss of $\$ 160 \times 20$ per cent or $\$ 32$. Thus the goods cost $\$ 192$. They were to be 25 per cent; $\$ 192 \times 25$ per cent gives $\$ 48$. The selling 25 per cent; $\$ 192 \times 25$ per cent gives $\$ 48$. The selling cent must be added for the marking price, or $240 \times 25$ per cent, giving $\$ 60$. The marking price should have per cent, g.
been $\$ 300$.
(33) Benzine asks: 1. How can I color solution of rubber in benzine, black and brown? $A$ Use asphalt or coal tar. 2. Does dragon's blood dis-
solve in benzine? A. Yes. 3. Would be glad to know through your valuable paper of a few colors that dissolve in beuzine. A. Alkanet root extracts are peculiarly available for coloring benzine
(34) L. M. R. writes.: I have an incomplete Bunsen 6 by 8 inch battery, a $z i n c$ plate $21 / 2$ in.
wide being substituted for the zinc cylinder. Will you please inform me how much and what kind of acid I must use to complete the battery? A. For porous cup use following solution: Mix $1 / 2$ part by weight of sulcool. Dissolve six parts by weight bichromate of cool. Dissolve six parts by weight bichromate of cool mix two solutions and stir weil. Use when cold. for glass jar use water
(35) C. H. asks: How to transfer a printed illustration on paper to a glass magic lantern slide. A. Soak the print in soft water, varnish or float Allow to nearly dry; when still tacky carefully press
the wet print upon it, and let all dry. Then with a wet the wet print upon it, and let all dry. Then with a wet
finger you can rub off the paper, leaving the ink. A finger you can rub off the paper, leavin
second coat of varnish will improve it.
(36) W. McP. asks : 1. Before a rain, the atmosphere contains moisture. The atmosphere and moisture weigh more than the atmosphere alone. Why then does the barometer not rise instead of falling? A. A falling barometer indicates the center of a storm disturbance, a rising one indicates its margin. These and not to the presence or absence of watery vapor in he air. 2. Can an electro-magnet be constructed in the form of a ring? If so, what parts correspond to the oles? A. It can be magnetized so that one end of a given diameter will be north and the other end south, or it may be magnetized so that it will exhibit no polarity until broken, when the ends will become magnetic poles. 3. Are street cars propelled by electricity a success? If so, why are they not more generally used? rnot, where does the troable he? A. Yes; they are being rapidly introduced all over the country. 4. How
fine a wire must be used in the secondary coil of an in uction coil? A. No. 36. For induction coil construction we refer you to our Supplement, No. 160, which we cansend you for ten cents.
(37) J. C. K. asks the most economical and most efre there is a coupling between them, to get best results. A. Set the cranks at right angles

## TO INVENTORS.

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tents at home and abroad, enable us to understand the laws and practice on both continents, and to possess un equaled facilities for procuring patents every where. synopsis of the patent laws of the United States and all
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and EACH BEARING THAT DATE [See note at end of list about copies of these patents.

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