New Portable \& Stationary Centering Chucks for rapid centering. Price list free. Cushman Chuck Co., Hart ord,
Conn. Get estimates from Pa., for shafting, pulleys, hangers. and gearing before ordering elsewhe
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## NEW BOOKS AND PUBLICATIONS.

The Mechanics of Machinery. By New York: Macmillan \& Co.
The author, Professor of Engineering and Mechanical Technolugy in University College, London, has sought
herein to make a book specially adapted to the wants, requirements and dificulties of young engineers and students of engineering. It is far from being an elementary work, but rather such a one as would form an excellent aid for the more ambitious
students of our technological schools, such as Cornell, students of our technological schools, such as Cornell,
the RensselaerPolytechnic, the Massachusetts Institute of Technology, or the Stevens Irrstitute. This treatise isjnot as wide in its scope, and does not involve such complicated mathematical formulæ, as the great work of Dr. Weisbach, but it will be found to require dilient application and close thought in the studentnecessity which the young mechanic, be he ever so industrious, generally finds extremely irksome until he acquires the mental habit which comes only of steadily pursued intellectual work. The strong logic, clear
analysis, and smooth style of Dr. Kennedy's work will be great help to such young bernes, of ar as posible making an ordinarily very dry study attractive in itself.

## 

HINTS TO CORRESPONDENTS.

(1) D. E. M. asks: In a stick of timber 40 feet long, 24 inches square at one end. and 12 inches square at the other end, how many feet of lumber are
there? It is also stated that the proposition has been given to several lumbermen in the Chicago Exchange building, who have found various resulta; among others, the following : 60 feet, 600 feet. 720 feet, 876 feet, 1,080 feet, 1,200 feet, and 2.400 feet; that if the
cubical contents of the timber in feet is what is wanted, 1,200 would be the correct answer; but find how many feet of board measure there was in it, and put his rule at work, he would find
but 1,080 feet, an allowance being made for sawing but 1,080 feet, an allowance being made for aawing, or the "kerf." A. For obtaining the solid con-
tents, the rule in Haswell's is for the frustum of a tents, the rule in Haswell's is for the frustum of a
pyramid. Add together areas of the two ends and the pyramid. Add together areas of the two ends and the
square root of their product; multiply sum by height, square root of their product; multiply
and take one.third of product. Thus:
and take one-third of product. Thus:
4 sq. $\mathrm{ft} .+1$ sq. $\mathrm{ft} .=5 \mathrm{sq} . \mathrm{ft} .+\sqrt{1 \times 4}=7 \times 40=\frac{2 \mathrm{~s}}{3}{ }^{\circ}=933 / \mathrm{sb}$ ing for kerfs and waste. Considering the taper of the timber and allowing for kerf, you cannot make more than 10 feet of lumber to a cubic foot. Then $931 / 3 \times 10=$ 333 feet merchantable lumber 1 inch
(2) G. H. B. and others : For answers
(3) Reader.-For description and illustration of the "boomerang" see Scientific American
of January 29,1887 , which we can send you for 10 cents. One periodicity of fermentative action would de
(4) D. W. asks the meaning of the word "pitch" when used in connection with screw
propellers. A. The distance that the screw would ravel in one revolution without slip, or as an ordinar
(5) E. W. writes: Can automatic en gines be worked by the heat of the kitchen fire so as to supply electric light by night and to pump water and do other domestic work by day? A. There are devices
for utilizing the kitchen fire for raising water. An for utilizing the kitchen fire for raising water. An
electric light would probably require too much power electric light would prob
(6) J. S. G. asks : Do you know of a wash of any kind to prevent sun's raysfrom shining through stained roll cathedral glass? A church I built seems to be troubled with the sun's glaring rays. If you
can give me elther a recipe to make or a name by which it can be bought, I will be greatly obliged. A stivite." This may be too opaque.
(7) H. L., C. G., H. O., and T. L. write your paper, 保 of of uer malkiking fourgalvanometers from How can we test it after
Ho tion between. Place the coil exactly in adjas sional wire so that the plane of the coil is parallel with the face of the permanent magnet. Adjust the mirro so that it will be in a plane parallel with thatof the coil. Project a beam of light from the mirror on to the scale Arrange the scale so that the light spot will fall on 0 of the scale. Send a weak current through the coil. Note the deflection of the light spot. Now reverse the
current and note the deflection. If the two deflections are equal, the instrument is correct and needs no furcorrection may be made either by turning the mirro slightly on its support or by swinging the scale. 2 What instrument does it require, if we use the Daniell battery? All we know is the coil gives 150 obme resistance, as stated in your book. A. You will need to place enough resistance in the circuit to reduce the deffections to the limit of the scale. It is immaterial
what the resistance is. 3 . What does a what the resistance is. 3. What does a volt mean?
A. A volt is the unit of electromotive force. It about equal to the electromotive force of one Daniel cell. 4. What does an ampere mean? A. Acurrentde livered over the resistance of one ohm, by the elec
tromotive force of one volt, is an ampere. 5. I cannot find any book that will guide us. We have made splendid instrument according to Scientific Ameri can, December 4, 1886. Can you tell me name of boo we can get? We have lots of books, but it seems they have improved on the one with a mirror. A. Thomp. Popular Natural Pbilosophy.
(8) Dr. G. L. T. asks the best composition for blacking leather used in tannery. A. The composition and application of the black are largely con
trolled by the kind of leather, and more depends on its manner of use. It is a trade in itself. A good harness anu grain leather blacking is made as follows: Take nine pounds of copperas, a quarter of a pound Epsom salts, and six ounces of acetic acid; thoroughly dissolve together in 1 gallon of boiling water. Take a
vinegar or kerosene oil barrel, knock out one head. and put within 40 gallons of cool, soft water (condensed steam is much preferred), then add the above ingredi-
ents. Stir well, and it is ready for immediate use, at a cost not exceeding one cent per gallon.
(9) C. B. N. asks the cause of, and caused by the use of quinine, which produce caused by the use of quinine, which produces hyper-
æmia of the tympanum. In any case it is an abnormal condition, which may if it increases produce paralysis though in its commencement usually light and transitory. If continued, you should consult a physician.
(10) R. F. L. desires (1) a receipt for mak nish is made as follows: Take 700 parts of alcohol, parts of copal, 7 parts of gum arabic, and 30 parts of shellac. The resins are frrst pulverized and bolted through a piece of muslin. The powder is placed in a
flask, the alcohol poured overit, and the flask corked. By putting the flask in a moderately warm place, the solution will be accomplished in two or three days. It is then strained through a piece of muslin, and kept in
hermetically sealed bottles. 2 . A preparation for whitening ivory? A. Use hydrogen peroxide., See article on this
No. 339.
(11) C. F. M. asks (1) the method of to 5 pourías, proof spirit 2 gallons. Digeat for a few ayp, ańd then draw over by distillation 1 gallon of sence. For those flowers that are not strongly frarant, the product may be distilled a second and a third time, or even oftener from fresh flowers. These should
be picked to pieces, or crushed or bruised, as their nature may indicate, and should always be selected hen in their state of highest fragrance. 2. Is this ex re generally diluted with alcohol, depending largely pon what purpose they are to be put to. See Piesse, ristiani, and others on perfumery, etc.
(12) E. F. R. asks: What is used in undries in washing clothing to make it so white, kinds of indigo, etc.? Also what is used in getting that beauused to;get? A. See "Laundry Hints," on page 388 in Starch and American for December 18. 1886, also ries," in Scientific American Supplement, No 577. A solution of gum arabic
tiffen and impart a gloss to linen.
(13) I. V. M. writes : I wish to glue white holly silhouettes on black walnut, and then oil
thewalnut. Is there any preparation which I can put thewalnut. Is there any preparation which I can put
on the holly to prevent the oil from soaking into and discoloring, or rather coloring, the holly? A. Give both walnut and holly a thin coating of shellac in alcohol
over those surfaces which come in contact before you apply the glue.
(14) G. C. R. asks : When was the first electric street railroad put into practical use in the
United States? A. In Baltimore, Md., in 1885; it runs two miles, operates five cars, and last year carried in operation, and as many more under contract, in this country, and about a dozen operating in Europe.
(15) S. I. D. asks how to make water ces. A. Flavor water with the proper extracts, and
reeze with agitation as you do ice cream.
(16) W. H. writes : 1. I have a valuable work ready for binding, but through accident one number got stained with linseed oil; how can I removethe stain? A. Apply a little pipe clay, powdered and mixed it on for about four hours, and then scrape away. 2 . of powder in the skin must be removed by a surgeon, but will sometimes gradnally disappear with new
growth. 3. Which is the beat journal onelectricity?

There are so many journals now making this subject specialty that we would not like to decide, unless
were in favor of the Scientific American and Supple ment.
(17) J. S. asks how to make the minera ater thatis drawn from fountains in the drug store A. It generally consists of water charged with the proper salts and with carbonic acid, and require ure. The special mineral waters desired are made by diseolving the
natural water.
(18) L. F. B. asks: 1. How can I clean number of Carter, Stafford, and Arnold ink bottles, , ike use? A. For cleaning ink bottles, the best and quickest agent is oxalic acid, bnt it is a violent poison Try shaking amall nails, with water or vinegar, in them, and if this does not answer, use muriatic acid (also poisonous), carefully wasbing out two or three times
fter its application. 2. Will you tell me whether after its application. 2. Will you tell me whether 1
have made on correct principles an induction coil which
and have made on correct principles an induction coil whicb
I describe as follows: Core of soft iron wires No. 16, core 1 inch in diameter, wound tightly with al layer of Gish line, whole thickly covered wilh hot sealing wa about $\frac{1}{26}$ to $1 / 6$ thick, then wrapped twice with No. 1 ble insulation, the whole varnished several times, and overed with several turns of waterproof packing, cas lining, and brown Manila paper, and then wrapped, and not very evenly, by hand, with a pound or a pound and a quarter of No. 36 cotton-covered copper wire.
should judge there to be 25 or 30 feet of No. 16 in should judge there to be 25 or 30 feet of No. 16 i frst coil, wound on core (primary) A. With regard to
your induction coil, you do not give the length. You haveapparently used an unnecessary thickness of inFor deacription of induction coil see Scientific Amerian Supplement, No.160. 3. How many cells Leclanche battery would be necessary for the above coil? A. Thre Leclanche cells would answer for your coil, but they of
course would rapidly polarize. 4. How and what to course would rapidly polarize. 4. How and what to
use, to produce a good wax or other polish for cabine work? A. For wax-polishing wood work, many receipts are given. We give the following: 1. Dissolve bee日 wax in cold alconol to the consistency of butter, and bing with a clean linen cloth. 2. 8 parts white wax 2 parts resin, b' part Venetian turpentine, are heated over a moderate fire, and 6 parts of rectified oil of tur pentine are stirred in. After 24 hours' standing, when it should have the consistency of butter, it may be used
The wood should be perfectly clean, and after this i The wood should be perfectly clean, and after this is
rubbed in, a second rubbing may be given after one half hour. If necessary, the wood should be cleaned and dried perfectly
(19) F. T. asks : What will remove oi stains from marble statuary? A. Make a paste with laller'searth and hot water, cover the spots therewith,
(20) J. F. G. asks: Is there any way to are and maintain th pressure while the supply is being exhausted, the same best way to do it? How many cubic feet of such gas doe take to equal a ton of conl for heating purposes? What does it cost per 1,000 cu bic feet? How much coa gine? A. You can generate gas in a retort under pres sure by inniting coal therein but better resulte are tained with lower pressure. About forty thousand feet would be required to equal in heating power a ton of
coal. It will cost about 75 cents a thousand. For run ning a steam engine $1 / 2$ to 5 or more pounds of coa are required per horse power per hour.

## TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the equaled facilities for procuring patents everywhere. A foreign countries may be had on application, and person contemplating the securing.of patents, either at home o
abroad, are invited to write to this office for price which, are low. in accordance with the times and our ex MUNN facilities for conducting the business. Address MUNN \& CO.. of
way, New York.

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