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athes, $25 \prime \prime \times 20 \mathrm{ft.} ,\mathrm{21} \mathrm{\prime} \mathrm{\prime} \times 8 \mathrm{ft}$. ; also six other lathes of vari ous sizes, in A No. 1 condition. Apply to or addre
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st., New York, undertakes the patenting and sale in St., New York, undertakes the patenting and sal
Europe of meritorious inventions on commission.
a. W. Johns M'f'g Oo., 87 Maiden Lane, Now York. 1882. I. W. Johns $M^{\prime}$ 'f'g Co., 87 Maiden Lane, Now York.
DEAR SIRS: I have been using your Asbestos Pack-
ing, and can recommend it to engineers and the public Ing, and can recommend it to engineers and the public
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American Fruit Drier. Free Pamphlet. See ad., p. 301 American Fruit Drier. Free Pamphlet. See ad., p. 301
Am Twist Drill Co.,Meredith, N. H., make Pat. Chuck Jaws,Emery Wheels,Grinders, Fire Brick, Tile, and Clay Retorts, all shapes. B
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Philadelphia, Pa... can prove by 20,000 Crank Shafts and 15.000 Gear Whe..ls. now in use, the superiority of thei
Cast ing over all others. Circular and price list free. Cast ings over all others. Circular and price list free. The Improved Hydraulic Jacks. Punches, and Tub
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Greenwood \& Co., Rochester, N. Y. See illus. adv. p. 302 Carmore's Artificial Ear Drums for relief of partial or
entire deafness. Invented by one who has been deaf thirty years. Simple and scientiffc in construction ; not observable in use. Send for circular. John
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Wanted.-A situation by a practical "nickel plater, Who understands polishing, grinding, dipping, and bras
tinishing. Address W. H. Wright, Indianapolis, Ind. For Sale Cheap-One Boiler Plate Power Punch and Clipper. Inquire of Noble \& Hall, Erie, Pa
The Double Induction Motor and Automatic Battery Griscom's patents, are manufactured and for sale by the
Electro Dynamic Co.. Philadelphia. This little electric motor, illustrated and described in our editorial, June 24, 1882, is now on exhibition at the American Institute Fair, Alcove 14. New York. Power from 1,000 to $6,000 \mathrm{ft}$. lb., according to battery. Weight $23 / \mathrm{lb}$. The only prac-
tical power for driving the family sewing machine, tical power for driving the family sewing machine
small lathes, dental and surgical instruments, etc. 1,000 stitches per minute on the sewing machine. 7,000 revo lutions per minuteon dental toois. A pparatus complete
for sewing machines, lathes, $\$ 35$ and $\$ 40$. Dental appafor sewing machines, lathes, $\$ 35$ a
Cope \& Maxwell M'f'g Co.'s Pump adr., page 285. The Berryman Feed Water Heater and Purifier and For Pât. Safety Elevators, Hoisting Engines, Friction lutch Puileys, Cut-off Coupling. see Frisbie's ad. p. 286 Mineral Lands Prospected, Artesian Wells Bored, by
Pa. Diamond Drill Co. Bex 423 . Pottsville. Pa. See p. 286 . C. B. Rogers \& Co., Norwich, Conn.. Wood Working 4 to 40 H. P. Steam Engines. See adv. p. 286. Sheet and cast brass goods, experimental tools, and fine machinery. Estimates given when models are furDrop Forgings. Billings \& Spencer Co. See adv., p. 270 Improved Skinner Portable Engines. Erie, Pa.
Engines, 10 to 50 horse power, complete, with gover-
nor. $\$ 250$ to $\$ 550$. Satisfaction guaranteed. Nearly seven hundred in use. For circular address Heald \& Morris U
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ENTIFIC AMLRICAN SUPPLEMINT sent to them free. The SUPPILEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physiMachinery for Light Manufacturing, on hand and built to order. E. E. Garvin \& Co., 139 Center St., N. Y

## NEW BOOKS AND PUBLICATIONS

## Rocks, Minerals, and Stocks. By Frede-

 rick H. Smith, Chicago. The Railway Mr. SmithMr. Smith discusses rocks and minerals from the standpoint of the mining engineer, assayer, and expert.
His stgle is apt to be freer than comports with a sober His stgle is apt to be freer than comports with a sober
scientific treatise, and his vocabnlary is rather that of the "street" than of critical science or literature. Nevertheless, his book is well packed with practical in-
formation and is likely to meet with favor among, and formation, and is likely to meet with favor among, and prove a real ntility to a class of men whose interest in
mines and minerals is chiefly speculative. The chapmines and minerals is chiefly speculative. The chap-
ters on stock companies, stock dealing, stock tricks, ters on stock companies, stock dealing, stock tricks, and so on, are calculated to increase the wariness of
tending investors in mining stocks and properties. Magna Charta Stories. Edited by thur Gilman. Boston: D. Lothrop\& Co. with varying merit, intended to stimulate in young the book seems well suited for its purpose.
The Age of Fable; or, Beauties of M thologr. By 'Thomas Bulfinch. Enlarged edition, edited by E. E. Hale.
Boston: S. W. Tilton \& Co. $\$ 2.50$. This is a most acceptable edition of Mr. Bulench's to the principal literary writings of the thirty years the principal literary writings of the thirty years
ince the work was originally prepared. Nearly twenty since the work was originally prepared. Nearly twenty the editor, who has also considerably extended the chapters relating to the religions and mythologies of the
far East. The admirable plan of Mr. Bulfinch's work far East. The admirable plan of Mr. Bulfinch's work
has not been changed. The new edition is handsomely pas not been changed. The new edition is handsomely aving been materially increased.

## ublications of the Washburn Observa

Tory of the University of Wisconsin.
Vol. I. Madison, Wis. : State Printer. Thie, the first publication of the Washburn Observatory, contains a description of the buildings and in-
struments, with several illustrations, records of the first year's work of the Observatory observations and draw ings of the great comet of 1881, and other papers of
value. No. 1. Geology. By A. S. Packard,
Jr. Providence, R. I.: The Providence Lithograph Co.
This series embraces ten large and carefully drawn diagrams, designed to illustrate broadly the actions of water and $\mathrm{h}_{\mathrm{t}}$ at in giving character to the earth's surface, and the varying aspects of the American Continent,
and the typical animal and vegetable forms during the great geological periods. The drawings are ang the great geological periods. The drawings are accom-
panied by an explanatory text-book, "Easy Lessons in Geology," noticed some weeks ago.
in Geology," noticed some weeks ago.
Around THe House. Rhymes by Ed ward drick. New York: R. Worthington.
By long odds the most commendable ch las book By long odds the most commendable ch $1 d$ s book
yet made in this country. The verses are bright, rhythyet made in this country. The verses are bright, rhyth-
mical, and intelligible to American little folk, while the illustrations are artistic and charming. There is a refreshing element of naturalness and honesty about
both pictures and verses, with an equally refreshing abbuth pictures and verses, with an equally refreshing ab-
sence of cant and pretense that cannot fail to make the sence of cant and pretense that cannot fail to make the
book as popular with parents as it is sure to be with book as popular with parents as it is sure to be with
children.

## (h)

HNIS TO CORRESPONDENTS
No attention will be paid 10 communications unless
companied with the full name and address of the accompa
writer.
Names
iven to inquirers
We renew our request that correspondents, in referring o former answers or articles, will be kind enough to name the date of the paper and the page, or the number
of the question. Correspondents whose inquiries do not appear after
reasonable time should repeat them. If not then puba reasonable time should repeat them. If not then pub-
lished, they may conclude that, for good reasons, the Editor declines them.
Persons desiring special information which is purely of a personal character, and not of general interest,
shoutd remit from $\$ 1$ to $\$ 5$, according to the subject, should remit from $\$ 1$ to $\$ 5$, according to the subject,
as we cannol be expected to spend time and labor to as we canno be expected to spend time and
obtain such information without remuneration. obtain such information without remuneration.
Any numbers of the Scientific American Any numbers of the Scientific American Supple-
MENT referred to in these columns may be had at tiis MENT referred to in hese co
office. Price 10 cents each.
Correspondents sending samples of minerals, etc.,
forexamination, should be careful to distinctly mark or label their specimens so as to avoid error in their identiication.
(1) J. K. H. writes: A friend of mine has a 619 horse power engine. Upon starting it the water
rose in the boiler, and a friend advised him to put a
quart of petroleum in the boiler. I desire to hav
your opinion as to whether it would be advisable to put petroleum in a boiler to settle the water? A. Would not advise you to put petroleum or anything into your boile but the purest water. Dirty water will make a boile foam. Probably you started the engine too suddenly,
or opened the valve widely, this may have caused or opened the valve widely, this may have caused
temporary foaming. If the boiler with clean wate temporary foaming. If the boiler with clean wate
will not drive the engine steadily at the speed you re quire without foaming so as throw water into the cylinder, it shows that the boiler is 100 small or you are trying to get too much work from it.
(2) E. E. T. writes: Can you give me a re ceipt for making a silver dip? It is used in manuof small brass work to silver, such as eyelets, buttons corset trimmings, etc., and do not use a battery A. Dissolve two ounces of nitrate of silver in a quart of water, add a solution of common salt until no more
precipitation takes place. Pour off the liguid, wash the Precipitation takes place. Pour off the liguid, wash the
precipitate thoroughly, and precipitate thoroughly, and dissolve it in a solution of
cyanide of potassium in five times its bulk of water. cyanide of potassium in five times its the solution, make it up to a gallon by adding water, and it is ready for use. The brass must be quit ciently deep color. The articles are then removed and ciently
washed.
(3) W. M. T. asks what to mix with lamp black to make a plumber's joint to keep the lead in proper place. A. The plumber's black is lamp black,
glue, and water. Boil a small piece of glue in water; just enough to make the solution feel sticky between the fingers, then stir in lamp black enough to make it of the consistence of very thin paint when cold. If it
should be too stiff when cold for the brush, add more
(4) E. P. B. W. asks for the best way to cut holes one thirty-secoud to three-eighths of an inch in
glass shades or covers. A. If you have many to cut use a diamond drill. A hole can be drilled with a very hard steel drill and turpentine. 2. How to give Bri-
tannia or white metal a brass coating? A. Coating white metal with brass. This can be done by the of copper, 20 parts sulphate of zinc, and 45 parts of copper, 20 parts sulphate of $z \mathrm{inc}$, and 45 parts cy
anide of potassium, in 300 parts of water. The anod should be two plates of zinc and copper of equal size Battery should be strung. If the brass oes not deposit clear and even, start it in a solution of susphate of cop-
per and cyanide, as the various compositions of white per and cyanide, as the various compositions of white
metal do not have as good electric affinity as the copmet.
(5) A. J. asks: 1. What is parchment papel as used for battery purposes, as described in the Rey
nier betery nier battery in Scientific American of July 22, and
where can it be obtäned? A. Ordinary paper dipped in dilute sulphuric acid, and well rinsed off with water. May be bought at any chemical or electrical apparatus
shop. 2. What principle of construction has been found shop. 2. What principle of construction has been found
the most economical for an electric motor, and at the same time the highest? A. See "The Double Induction Motor," No. 25, voi. slvi., Scient micic American.
(6) C. R. asks if a rotary engine of 3 and what would be the most economical style and size and what would be the most economical style and size
of boiler? What would the size of propeller be? A. It of boiler? What would the size of propeller bes A. It
would probably drive your boat three to four miles per
hour. A vertical tubular boiler would suit you best. hour. A vertical tubular boiler would suit you best.
The size of the screwdepends somewhat on draught of ater; about 18 inches to 22 inches diameter.
(7) R. W. N. asks: Can you tell me of some effective substance to put within the double sides
of a refrigerator? I would like something light. A. Powdered dry charcoal (not too fine) is best. Dry saw dust is commonly employed, and answers the purpos
very well.
(8) J. E. B. asks: 1. What will be the diameter of the air pump (single acting)? A. Air pump (double acting); the stroke being 5 inches? A. $6 \frac{1}{2}$ in diameter, if 5 in . stroke, if these pumps are worked direct by sleam engine. 3. How many square feet of cooling surface for an engine of the compound 9 inch diameter by 10 inch stroke, using the steam 9 inch diameter by 10 inch stroke, using the steam ${ }^{1} \mathrm{i}$ of 17 inches diameter by 10 inch stroke, and then to the condenser; the steam pressure being 100 lb . to th square inch? A. Condenser 260 to 270 ft . surface.
(9) J. K. T. says, in answer to E. F. B.: I have found it to be a curious fact that by putting into
a pan of any size, water (cold) two or three inches deep, placing a cloth (any kind) also in bottom of pan or vessel, then placing a glass fruit jar, without any
previous preparation, upon the cloth, surrounded previous preparation, upon the cloth, surrounded
slightly by the cold or cool water, he may with impunity slightly by the cold or cool w
fill the can with hot liquid.
(10) S. C. T. asks: 1. How can I fill up broken place in a marble slab, it to remain perfectly steady, so as to make the broken place perfectly hard
and smooth? A. This, we think, is impossible. Plaster of Paris mixed with a little oxide of zinc. will make a hard, white filling, but it cannot be polished like the quality of marble, in the commercial valueof Vermont and Italian marble. This I wish to settle a question in regard to which is the finer, Vermont or Italian marble for general use? A. The qualities of these marble vary. Italian marble ranks the highest in the market.
(11) T. C. H. asks: What will be the size of the smallest hoiler from which I can get six horse
power? A. Depending upon the kind of boiler, you should have from 75 to 110 ft . fire or heating surfacethe greater proportion in tubular boilers vertical. 2 . for a locomotive? A. We believe coal oil is not yet used economically, but many boilers are run with it in
the oil regions, where it has comparatively little value. (12) B. W. S. asks: Is white lime mora preservative for wood and iron : A. No; but hydraulic lime is preservative.
(18) O. B. asks for rules for the construction of symmetrical cone pulleys. A. The following for-
mula, by Rankine \& Cooper, for pairs of three pulley ones that are alike, gives good results: Where $R^{\prime}=$ diam. of large pulley
$\left.\begin{array}{l}\mathbf{R}^{\prime \prime}=\text { ". "s small " } \\ \mathbf{R}=\text { ". middle " required } \\ \mathbf{C}=\text { dist. "centers" } \\ \mathbf{R}^{\prime}+\mathbf{R}^{\prime \prime} \quad\left(\mathbf{R}^{\prime}-\mathrm{R}^{\prime \prime}\right)^{2}\end{array}\right\}$ in inches. Then $\frac{R^{\prime}+R^{\prime \prime}}{2}+\underset{6}{\left(R^{\prime}-R^{\prime \prime}\right)^{2}}=R$, the diameler of the middle pulley in inches. Or, in plainerwords, the midhe diameters of the large and small pulleys. Where four or more pulleys are required, or one cone smaller
fore than the other, the computation becomes more complex, and can be done in the following manner: First-Compute the speeds required approximately, and make the speed sizes a fixture for one con
cone, and the largest pulley upon the other cone.
Then make a diagram as here shown, putting in place

of the word Axed, the semi-diameters in figures of the peed sizes assigned. Beginning with Fig. 1, compute The dolte length.
Tome lengih ine, BC, being parallel with and of the pairs, and A B the sistance of the centers, which may e marked upon the diagram, all the triangles will be ound proportional and their relative values found as $\begin{aligned} & \text { follows: } \\ & \text { No. 1. }\end{aligned} \mathrm{A}^{\prime}-\mathrm{BD}=\mathrm{AC}$.
No. 2. $A B^{2}-A C^{2}=B C=$ straight part of belt. No. 3. A B : A C :: $\mathbf{A} E^{\prime}: D^{\prime} E^{\prime}=$ the lap in excess
.4. $A B: A C: B D: D E=$ the lap less than
$3 \cdot 1416-D E=D G$
$3 \cdot 1416+D^{\prime} E^{\prime}=D^{\prime} F$
C above $=$ half belt length.
enters or straight For Fig. 2. $\quad$ E $\mathbf{E}^{\prime}=$ distance of centers or straight art of belt.

Half belt length $-G E E^{\prime}=E^{\prime} F$.
Half
$\frac{E^{\prime} \mathrm{F} \times 2}{3^{\prime} 1416}=\mathrm{A} \mathrm{E}^{\prime}=$ radius of required pulley, Fig. 2.
For Fig. 3. $\frac{A E^{\prime}}{2} \times 3 \cdot 1416=G E^{\prime}$ Find $D^{\prime} E,,^{\prime}$ as in
Fo. 3.
Find $D^{\prime}$
$D$ , as in No. 2, and D E , as in No. 4.
Half belt length - $\mathrm{C}^{\mathbf{E}^{\prime}}+1 \cdot \mathbf{D}^{\prime} \mathbf{E}^{\prime}+\mathbf{D}^{\prime} \mathbf{D}=\mathrm{D} F$
Then
$-\frac{\text { D E }}{3 \cdot 2 \cdot 2}=\mathbf{B D}=$ radius of required pulley,
For Fig. 4, the same formula as for Fig. 3.
The small difference for the curve of the overlap,
(14) F. D A. asks: 1 Will
(14) F. D A. asks: 1. Will you please tell me what part is iron of the iron ores found at Iron
Mountain, Mo., and at the other iron mines in the United States? A. From 32 to 48 per cent iron. Some of the clay ores run as low as 27 per cent. 2. With what wind-i.e., whether fair, beam, or otherwisewill a sail boat attain its greatest speed, and on what principle? A. If properly rigged, usually on the three-
quarter beam. quarter beam. See "Velocity of Ice boats,"
MENT, No. 214. The same laws apply bere.
(15) G. S. asks: 1. How many feet of wire re required for the primary and secondary coils of an nduction coil, the current of which is supplied from a
ingle Smee's cell, pint size, so as to give shocks as single Smee's cell, pint size, so as to give shocks as
great as can possibly be borne, and of what size wire? A. Make the coreof the coil half an inch in diameter and five inches long, wind it with four layers of No. 20 magnet wire; cover this with two thicknesses of shellacked writing paper, and wind around this about ten or twelve courses of No. 36 silk covered wire. 2. Would
atton covered wire answer well? A. Cotton covered cotton covered wire answer well? A. Cotton covered
wire will answer, but not as well. 3. Is electro-magnet. ism affected by the size of a cell or by several? A It epends upon the wiuding. If wound with coarse wire more powerful than Grove's. and how is it constructed? A. No; but the bichromate batteries are more desirable on account of the absence of smell. $\overline{\mathbf{j}}$. Would thin lead oil answer for a Faure's secondary battery, and could be charged from a plate efectrical machine? A. Rather thick lead is to be breferred, say one-sixteenth of an inch thick. It may be charged very feebly by a plate machine. 6. What battery is most suitable for an nduction coil? A. For continuous use employ the ravity battery; for occasional use the Grenet answers
vell. 7 . In what proportion does Smee's, Bunsen's, and eclanche's stand to Grove's battery? A. The electro. Leclanche's stand to Grove's battery? A. The electro-
motive force of the Grove battery is $1 \cdot 956$ volts; Bunotive force of the Grove battery is $1 \cdot 964$; Smee's, 1.090 vots; Leclanche, $1 \cdot 481$ volts. (16) F. C. F. asks: 1. The best and easjest ay to polish a violin? Have been using shellac dissolved in alcohol, but don't like it. It is too much work
to apply, and does not give satisfactory results. Is
there any kind of oil that can be added to give more body to the varnish, and at the same time have no injurious effect on the tone? A. Use best French spirit copal or amber varnish. It is much cheaper and more satisfactory to buy than to attempt making either of
these. 2. Also a good stain for staining them so they these. 2. Also a good stain for staining them so they
will look well? Have used extract of logwood, but the will look wells Have used extract of logwood, but the color is too red. A. Use a warm solution of one ounce
bichromate of potash in a pint of water, and touch up with nitric acid dilated with an equal volume of wate: if necessary. 3. Can you give me any information about the cutting of gear wheels for screw cutting lathes? I mean particularly the size of a train for cutting any particular number of threads to the inch, say, for example, twelve threads. What size should they be, beginning with one on spindle? How many teeth to
each wheel, and what size mesh? Canyoureferme to any good work on the subject one that is easy under tood? A. The makers of lathes arrange the sizes of ears to accommodate the distance between the center of the lathe head and the driving screw. The pitch of the thread on the driving screw must first be decided; then the sizes of the traiu wheels are to be computed by the number of teeth; then the pitch multiplied by
the number of teeth gives the diameters. Much judgthe number of teeth gives the diameters. Much judg.
ment and experience is needed in deciding the pitch or ment and experience is needed in deciding the pitch or
size of the teeth and arranging the best proportion. Would advise you to study the gears on the lathes in a 22 , May 20 . 1882 "Notes and Qustin Cutting, and Joynson on Gearing are good work
(17) H. O. T. writes: I would be pleased to have you kive the receipt for a paste which is used sity of pasting a strip of paper over the part that is glued together. The paste is colored a hight that suit the taste of the patrons. The tablets are not glued first, only thick paste put on the whole lot to be made and afterward, when dry, a knife is run through where the tabletsare to be parted, making an easy and neat looking job? A..The composition is said to be prepared as follows: Glue, four pounds; glycerine, two pounds; linseed oil, half pound; sugar, one-quarter pound; aniline dyes, q. s. to color. The glue is softened by so aking it in a little cold water, then dissolved togethe:
with the sugar in the glycerine, by aid of heat over a water bath. To this the dyes are added, after which the oil is well stirred in. It is used hot. Another com_ position of a somewhat similar nature is prepared as follows: Glue, one pound; glycerine, four ounces; glucose sirup, about two ta blespoonfuls; tannin, one-tenth ounce. Give the compositions an hour or more in
which to dry or set before cutting or handling the pads.
(18) H. H. H. writes: I am engaged in making artificialice, and on account of alkali and other impurities in the water the ice is not clear. The water is frozen in cans one foot square and three feet long, making a block of ice the same size. The center of
the block is not good, owing to the outside freezing the block is not good, owing to the outside freezing
first, and the impurities in the water going to the center frst, and the impurities in the water going to the center nd freezing last. Now I wish to know what to put if taste or be in jurious, as the ice is used for a great many purposes. Or, how can I purify the water to make my purposes. Or, how can I purify the water to make my
ice clear? A. It is very difficult to purify water economically so that it may be artificially congealed in clear cakes. Perhaps the most effectually remedy is to boil the water and then fllter it through charcoal. Ordinarily
no simple addition to or doctoring of the water will no simpl
suffice.
Minerals, etc.-Specimens have been received from the following correspondents, and examined, with the results stated
A. G.-1. Quartz with silver glance. 2. Obsidian.-D.J.C.-Both are fine grained sardstones, and No. 1 little iron. No. 2 is inferior for this purpose.-J. s. R. No. 1. Quartz, holding a green was not large enough to test. No. 4. Carbonate of copper, malachite, and red oxide of copper, with a small proportion of silicate of copper, crysocolla. No. 5. Mispickel, sulpho-arseniate of iron-sulphur, arsenic, and ron -C. E. P.-Sample A, Copper pyrites-zinc blende and iron pyrites in quartz, probably contains gold and B, Crystals of choadrodit in mranular lime adine, , Crystals of chondrodte in gran lar heestone, of no gangue, containing gold and possibly silver. An assay pyrites, with malachite in quartz, which holds silver Small unlabeled piece in package with $\mathbf{D}$, chondrodite and rutile on granular limestone (of no value).

## OFFICIAL.

INDEX OF INVENTIONS

## NV

Letters Patent of the United States were
Granted in the Week Ending
Octoider 24, 1882,

## AND EACH BEARING THAT DA'TE.

['Those marked (r) are reissued patents.]
A printed copy of the specifcation and drawing of any
patent in the annexed list. also of any patent iscued patent in the annexed list. also of any patent issued
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patent desired and remit to Munn $\&$ Co., 261 Broadway. corner of Warren Street, New York city. We also furnish copies of patents granted prior to 1866 brinted, must be copied by hand.


A nnunciator, electric. J.C. Warner................
Annunciators of telephone exchanges, circuit for C. E. Scribner........
Bale tie, D. B. Eastburn Baling machines, conveyor for, J. L. Riter
Band cutter and feeder, G. w. sharp Band cutter and feeder, G. W. Sharp
Bath tub, W. W. Rosenfeld
Bath tub, W. W. Rosenfield
Bed bottom,
Bed bottom, Ogborn \& Kendrick (r)
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