RECENTLY PATENTED INVENTIONS.

THIRD-RAIL SUPPORT.-L. STEINBERGER New York, N. Y. In regard to this improvement, it will be understood that in using thirdrails in connection with electric lines it is desirable to allow for various motions of the rail member, and especially for temporary disconnection as between the rail-insulator and the supporting member which normally engages the same. It is also essential to provide for allowing the rail to rock slightly in lateral direction and for the rail to rock slightly in a plane coincident with its general length. In other words, to provide for certain amount of flexibility in the rail-section, so that the section adjusts itself under varying conditions, thus insuring more perfect contact with trolley

Hardware.

EXPANDING, BEADING, TUBE CUTTING TOOL.—H. G. LYKKEN, Grafton, N. D. The object of this invention is to provide novel details of construction for a tool which adapts it for convenient and reliable service, facilitates the exchange of parts to effect the expansion, beading or cutting off of a flue or tube while in place, and affords a simple practical implement at a moderate cost.

LEVEL AND PLUMB .-- A. J. PATTERSON, Huntsville, Ala. This improvement comprises a stock recessed for the bob, and in the recess cross-pins for stopping the bob in amerent positions and above the recess a curved gradu- and terms write to C. W. Parker, Abilene, Kan. ated face, the stock being also provided with a transverse opening for use in indicating a vertical line, the bob having laterally-projecting pivot-pins and indicating pointer and arm, and the weight below the same, the weight provided on its under side with shoulders to engage with stop-pins in recess, and screws turned through opposite sides of the stock into the recesses therein, and provided in their inner ends with sockets extending lengthwise and of uniform diameter, and adapted to receive pivotpin on the bob or pendulum.

Machines and Mechanical Devices

MUSIC-LEAF TURNER.—L. S. MILLER, New York, N. Y. This invention relates to improvements in devices for turning sheets or ing. screw machine work, hardware specialties, machin-leaves of music, the object being to provide a ery and tools. Quadriga Manufacturing Company, 18 device that may be easily adapted to a plano South Canal Street, Chicago. device that may be easily adapted to a piano or similar instrument or to a music-rack and by means of which the leaves of music may be consecutively turned without interfering with a person's playing.

PROSPECTOR ORE-BREAKER.—A. CALKINS, Los Angeles, Cal. This breaker operates with a compound motion in causing the jaws when the handle lever is oscillated to alternately approach and recede from each other and also an up-and-down rubbing motion of one jaw upon the other that produces with a light construction a very powerful crushing effect. By connecting a bail to the rightangular extension of the lever increased motion is obtained for the front jaw, and at the same time the powerful effect of a toggle is made available whenever the bail and centers fall into line. Means prevent the lever falling too far outwardly when released.

MIXING MACHINE.—E. L. RANSOME, New Indiry No. 5649.—For the present address of York, N. Y. The chief object in view in this Cook's Patent Bow Facing Oar Co. MIXING · MACHINE.—E. L. RANSOME, New case is to produce a construction which may ously-acting mixer or as a batch-mixer without alteration of either of its parts. A further object is to comin the matter of the size you describe, Inquiry No. 5652.—For a small thicknessing ma.

power. A cylinder of the size you describe, Inquiry No. 5651.—For the address of Allen's of 4 cubic feet capacity, will hold at 1,000 pounds pressure 257 cubic feet of free gas the robbet is to comin the matter. ther object is to equip the machine with means which operate to intermingle the materials thoroughly and rapidly; furthermore, to provide for the rapid discharge of materials when desired, and, furthermore, to provide reversible driving means for rotating the revoluble drum in one direction or the other.

BELT GUIDE AND SHIFTER.-W. P. RUTH and W. H. JONES, Downs, Kan. The invention refers to a belt holder and shifter designed especially for use in traction and other agricultural engines, but capable of use in other connections. By means of their invention the belt may be held true on the pulley during the operation of the engine, and the shifter may be operated to throw the belt off of the pulley instantly and at any time during the operation of the apparatus.

PIPE BAND AND FASTENING.—A. W. HIGHT, Ballard, Wash. The invention is deespecially for holding together the staves of stave-piping-that is to say, of piping formed of wooden staves laid longitudinally and bound together. The invention is, how ever, useful in various other connections. For example, it may be used to advantage on water tanks and the like. The invention resides in certain peculiar constructions of the fastening and in the form and arrangement of the band which coacts with the shoe.

VIOLIN.-J. A. HECKENBACH, Chicago, Ill. The object of the improvement is the provision of a new violin, violoncello, or similar stringed musical instrument which is simple and durable in construction and arranged to insure the production of a full, sweet, and mellow tone when the instrument is played.

Nore.-Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of the paper.

Business and Personal Wants.

READ THIS COLUMN CAREFULLY,—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desir-ing the information. In every case it is neces-sary to give the number of the inquiry. MUNN & CO.

Marine Iron Works. Chicago. Catalogue free. Inquiry No. 5628.—For makers of furnaces for smelting lead, tin and Babbitt dross. AUTOS. - Duryea Power Co., Reading, Pa.

Inquiry No. 5629.-For a small canning outfit. "U. S." Metal Polish. Indianapolis. Samples free. Inquiry No. 5630.—For machinery to manufacture handkerchiefs by weaving.

Handle & Spoke Mchy. Ober Mfg. Co., 10 Bell St. Chagrin Falls, O.

Inquiry No. 5631.—For machinery to cut, hemetc., cotton or linen cloth into handkerchiefs.

If it is a paper tube we can supply it. Textile \mathbf{T} ube Company, Fall River, Mass.

Inquiry No. 5632.—For apparatus to weave, cut and hem handkerchiefs when made from piece.

Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

Inquiry No. 5633.—For the manufacturers of the International typewriter.

WANTED.-Exclusive sale improved automobile specialties. Specialties. Box 773. New York.

Inquiry No. 5634.—For makers of the vacuum disc or suction shoe for walking upside down on the ceiling.

The largest manufacturer in the world of merry-go rounds, shooting galleries and hand organs. For prices

Inquiry No. 5635.—For a toy balloon for experimenting.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Machine Company. Foot of East 138th Street, New York.

Inquiry No. 5636.—For makers of board suitable for playing cards.

Any metal, sheet, band, rod, bar, wire; cut, bent, crimped, punched, stamped, shaped, embossed, lettered. Dies made. Metal Stamping Co., Niagara Falls, N. Y. Inquiry No. 5637.—For machinery for making paper and straw board from straw.

Wanted position as superintendent or foreman machine shop or manufacturing. Wide experience and thoroughly practical. Address Foreman, Box 773, N. Y.

Inquiry No. 5638.—For makers of machinery for making towels. Manufacturers of patent articles, dies, metal stamp.

Inquiry No. 5639.—For machines for cutting tobacco leaves, green or dry.

INVESTORS.—Have six United States, five Canada and ten European patents for immediate sale. Abstracts titles complete. Act at once. Golden opportunity. Particulars free. H. W. Gander, Rudy, Pa.

Inquiry No. 5640.—For makers of a machine for breaking cocoanuts and removing the kernel.
Inquiry No. 5641.—For manufacturers of icemaking machinery for family use.

Inquiry No. 5642.-For makers of small drop

Inquiry No. 5643.—For makers of flower and plant pots from earth and fertilizer.

Inquiry No. 5644.—For castings for a steam engine bore about 2 inches, stroke about 3 inches.

Inquiry No. 5646.—For hand machines for making brooms, also for hand machines for manufacturing small paper boxes used by druggists.

Inquiry No. 5647.—For manufacturers of hair and cotton pickers or shredders.

Inquiry No. 5648.—For parties manufacturing Ferris wheels.

Inquiry No. 5650.—For the address of Baker's Patent Bow Facing Oar Co.

Inquiry No. 5652.—For a small thicknessing machine that will plane and thickness short lengths of teak.

Inquiry No. 5653.—Wanted, to buy in quantities, a small, cylinder-shaped instrument 2 or 3 inches long, fitted with certain lenses, which apparently enables one to see the bones in the hand (an imitation X-ray

Inquiry No. 5654.—For makers of shoe-polishing evices, such as motor brushes, etc.

Inquiry No. 5655.—For manufacturers of and dealers in gilsonite and elaterite.

Inquiry No. 5656.—For manufacturers of nathing machines for box and case making, also printing machines for printing ends and sides of boxes and cases.

Inquiry No. 5658.-For metallotype paper for ex-

Inquiry No. 5659.—For manufacturers of house-hold specialties. Inquiry No. 5660.—For manufacturers of square brass tubing.

Inquiry No. 5661.—For makers of musical instru-ment novelties, for use of drummers, show men, etc. inquiry No. 5662.—For a 5 h. p. gasoline engine, air-cooled, for automobiles, also for makers of vehicle springs, such as used on runabouts.

Inquiry No. 5663.—For a complete apparatus for turning waste soap into blocks or bars, without melting by fire.

Inquiry No. 5664.-For manufacturers of column

Inquiry No. 5665.—For dealers in light and heavy one and whips, also rawhide. Inquiry No. 5666.—For makers of metal collaps-

Inquiry No. 5667.—For a machine known as a granulated fuel cutter, for cuting up trash and waste wood, for bundling.

Inquiry No. 5668.—For the manufacturers of the new upholstered furniture and button brush, made of bristles, 3 rows, with a bristle pointed end.

Inquiry No. 5669.—For dealers in unvulcanized, masticated sheet rubber, for making toy balloons, etc. Inquiry No. 5670.—For the manufacturers of Clark's expansion bit.

Inquiry No. 5671.—For the makers of the nneu-matic saw with which two men can cut through a 5-foot

Inquiry No. 567.5.—For parties handling a complete line of ministure yacht fittings.

Inquiry No. 5676. -For a motor to saw wood,



HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

addresses of houses manufacturing or carrying the same.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific Americen Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

AND EACH BEARING THAT DATE [See note at end of list about copies of these patents.]

Addressing machine, E. D. Belknap. 762,609

Adjustable wrench, F. J. Leibman. 762,420

Addresting device and cigar cutter, F. M. 762,815

Minerals sent for examination should be distinctly marked or labeled.

(9411) J. G. W. wishes to know: 1. Whether a perfectly round iron ball two inches in diameter will attain greater momentum, or velocity, in rolling down an incline fifty feet long, with a fall of four feet, than it would, at the moment of stopping, if dropped four feet? A. The momentum of an iron ball rolling down an incline is the same theoretically as when falling the same height. save the rolling friction, which somewhat lessens the actual momentum. 2. If there is no difference, why would not a hydraulic ram operate as well if the water was supplied through a perpendicular pipe, instead of down an incline, as is always recommended? A. The conditions as to the pipe of a hydrant, i. e., ram, are quite different. For a given height, the weight of water moving in a long inclined pipe is much greater than in a vertical pipe of the same height; and the momentum of the moving mass is due to its weight and velocity. Momentum is the force that drives the ram.

'(9412) W. H. S. says: Would you kindly give me a little information through your paper or otherwise, as to the practicability of using gas taken from a gas well, storing it in a strong receiver compressed to a safe pressure, for transportation purposes, and used in a gas engine. Possibly this matter has been tried and it may not be practical, but I have not heard of it. What amount of gas could be stored in a receptacle, say 12 x 60 inches, and what pressure would it be advisable to use for transportation? I presume that a great deal would depend on the cost of transportation. I understand that compressed air is being used for power and air is being stored in strong cylinders; gas would have much more power to the cubic foot and cost very little at the well and a cylinder should not cost much for transportation. A. The laculry No. 5645.—For makers of bone and pearl acks for collar buttons. al gas for power purposes as in explosive motors, is the cost of compressing to the pressure required to make it available and convenient for transportation. It has been shown that to compress 100 cubic feet of gas to 1,000 pounds pressure per square inch by the fourstage or cheapest method requires 31 horsepower, and to 2,000 pounds pressure 38 horse-power. A cylinder of the size you describe, With a liberal allowance of 15 cubic feet of free gas per horse-power in an explosive motor, it will be seen that but 17 horse-power is available from an expenditure of 79 horsepower for compressing the gas.

(9413) A. D. says: It is a well-known fact that during spawning season fish will traverse vast distances and overcome natural and artificial barriers in their endeavor to Inquiry No. 5657.—For makers of self-nailing reach shallow water and quiet streams where heese box machines. to deposit their eggs. One claimed that salmon could (with great effort, it is true) mount to the top of falling water, provided the volume of water was large enough to admit of free, unrestrained action. He had seen photographs of such feats and it was his opinion that with gigantic effort some could even succeed in swimming up Niagara Falls. This was looked upon as a good "fish story." Could vou inform us whether any fish (say salmon) could perform such a marvelous feat? It would seem possible that as fish can swim against very strong currents they could also mount in such a large volume of water as comes over the American Falls. This, although almost vertical, does not seem to rush with such great velocity until the great mass of water has fallen some distance. After the first mighty effort it would require to get a start, why could they not reach the top of the Falls? You need not publish all I have written, but will satisfy us if you answer the query substantially but directly. The theoretical velocity of the water at the foot of Niagara Falls is not far from 100 feet Inquiry No. 5672.-For makers of portable a second. Its real velocity is probably quite a little less than this owing to the resistance Inquiry No. 5673.—For makers of ventilating ma. of the air. It doesn't seem to us at all problemery, electric and otherwise. Inquiry No. 5674.—For makers of glass novelties and bottles; also of collapsible tubes and small steel visual into such a mass of water with a velocoil springs 1-8 or 3 16 in. diameter. distance above the water in the river below. Of course, also the mass of falling water corn husking machine. J. E. Goodhue..... 762,523

plunges far below the water in the basin at the foot of the falls before it entirely loses its downward motion. The length usually assigned to the water in the basin is about 180 feet. The difficulties of the case are such that we should think it extremely unlikely that any fish could ever rise to the top of Niagara

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending June 14, 1904

AND EACH BEARING THAT DATE

ı	Advertising device and cigar cutter, F. M.	TOD, 220
2	Fox	762,815 762,372
	Alarm signal, E. L. & G. Hail	762,372 762,273 762,821
	Agricultural implement, H. P. Adams. Alr ship, S. T. Best. Alarm signal, E. L. & G. Hail. Amusement device, Webster & Hyde. Anchor, ground, G. Hail. Anchor, ground, R. H. Polk Anchor, guy, R. H. Polk	762,566 762,710 762.842
0	I Allillai exterminator J. O. Johnson	762,348 762,637
e n	P. Reichhelm Arch plate and shield, combined, F. Johnson Attaching and detaching device, N. B.	762,654 762,417
f	Clarkson Auger, R. B. Palmer Auger for erecting telegraph or telephone poles, earth, W. Parker Bag filling machine, S. B. Bowden Baking pan, B. Ycre.	762,278 762,750
n e	Auger for erecting telegraph or telephone peles, earth, W. Parker	762,490
.,	Bag filling machine, S. B. Bowden Baking pan, B. Ycre	762,275 762,460
-	Baking rack, B. Ycre Baling press, W. Eisenhauer	762,459 762,395
o a	Baling press, W. R. Colman	762,689 762,773 762,292
1	Bag filling machine, S. B. Bowden	762,292
ׅׅׅׅׅ֓֞֝֞֝֟֝֝֝֓֡֓֓֓֓֡֟֝	Basin, catch, W. J. Connell	760 000
,	Battery. See Electrical battery. Bed bottom, elastic, T. Klipfel	762,536
n	Belting and making same, textile fabric	762,699
-	Battery. See Electrical battery. Bed bottom, elastic, T. Klipfel. Bed, folding, G. C. Fuller. Belting and making same, textile fabric for, W. R. Smith. Belting, apparatus for treating textile fab- rics in the manufacture of, W. R. Smith Bicycle attachment, J. B. Rhodes. Binder, loose leaf, S. H. Mitchell Binder, loose sheet, A. Lawson. Block signal system, electric, L. C. Werner Boat ventilator, submarine, L. Y. Spear Bobbin, J. E. Lemyre.	762,357
- s	Bicycle attachment, J. B. Rhodes	762,356 762,558
9	Binder, loose sheet, A. Lawson C. W.	762,427 762,419
1	Boat ventilator, submarine, L. Y. Spear	762,509 762,498
1	Bobbin, J. E. Lemyre. Boller cleaning apparatus, F. L. Egan. Boller furnace for burning wet material, steam, H. E. Parson.	762,422 762,625
1	steam, H. E. Parson Boiler tube ferrule, A Cruise	762,344 762,897
,	steam, H. E. Parson. Boiler tube ferrule, A. Cruise. Book holder, check, J. G. Dickson. Book, investment and savings, D. J. Williams Bookcase, knockdown sectional. A. N.	762,393
	liams	762,855
.	Bookcase, sectional, C. J. Lundstrom. Bottle, G. W. Holt, Jr. Bottle, etc., closure, C. M. Young. Bottle, non-refillable, J. A. Foster. Bottle, non-refillable, L. M. McDermott et al	762,529 762,328
,	Bottle, G. W. Holt, Jr Bottle, etc., closure, C. M. Young	762,412 762,793
	Bottle, non-refillable, J. A. Foster Bottle, non-refillable, L. M. McDermott et al	762,475 762,487
.	Bottle, non-refillable, J. A. Linn	762,828 762,745
e E	Bottle stopper and sprinkler combined, C. B. Garwood	762,818 762,522
١	Duxes, etc., device for obening the covers	762,522
	Brace and suspensory, combined, A. C. Ran-	762,560
ŀ	Broke F L Constner	762,555 762,302
֚֡֡֓֜֡֜֜֡֓֓֜֜֜֜֜֡֜֜֜֜֜֡֡֡֜֜֜֜֡֡֡֡֡֜֜֜֜֜֡֡֡֡֡֡֡	ton	762,282 762,288
-	Brake rigging for trucks, etc., W. G. Price	
.	Brake shoe, J. R. Cardwell.	762,484 762,513
	Bridge, Strauss & Collins. Bridge, truss J W Headley	762,608 762,361
:	Brake apparatus, fluid pressure, M. Corrington Brake beam, S. A. Crone. 762,285, 762,287, Brake rigging for trucks, etc., W. G. Price Brake shoe, J. N. Maxwell. Brake shoe, J. R. Cardwell. Brick cutter, B. E. Bechtel. Bridge, Strauss & Collins. Bridge, truss, J. W. Headley. Brofler holder, meat, I. M. Hall. Broom corn combing machine, S. C. Lehman	762,632 762,401
		762,326 762,662
·	Buckle, H. W. Luhmann Bulletin board, A. A. Wallman	762,732 762,666
	Burning wet and slowly-combustible fuel, H. E. Parson	762,345 762,530
١	E. Parson Cabinet, drawing, E. Holman. Calculating machine, D. E. Felt. Calculating machine registering mechanism, D. E. Felt. Calipers, J. W. West.	762,530 762,520
1	Calculating machine registering mechanism, D. E. Felt	762,521
1	can. see on can.	762,786
i	Can testing machine, Adriance & Calleson	762,817 762,604
	Car coupling, A. R. Heath	762,604 762,779 762,308
l	Car, railway scoop, L. E. Johnson	762,670 762,314
۱	Car sill, A. B. Bellows	762 X5X
ļ	Car structure, A. B. Bellows	762,423 762,676 762,668
١	Car wheel, S. R. Costley. Car window, railway passenger, T. H. & A.	762,668 762,524 762,284
1	Car window, railway passenger, T. H. & A. Davis	762,692
1	Carbureter for motor cars, etc., Bennett &	762,271
	Caroureter, internal combustion engine, J.	762,707
	Grove Carbureting apparatus, air, H. Garde	762,477 762,734
1	Cart combined how and harrel L. C. Not-	762,785
1	DOUM	762,74 7 762,471
I	Caster, antifriction, G. E. R. Rothenbucher	762,657 762,624
ľ	Cervical director, C. W. McDade	762.743
l	Chair, W. A. Busse. Chairs, etc. spring for rocking, M. C. Bruce Chuck, drill, T. E. O'Brien. Churn and butter worker combined, C. J.	762,335 762,512 762,381
ľ	Chuck, drill, T. E. O'Brien	762,650
ŀ	Griffith Chute, delivery, C. W. Weld	762,306 762,508
ľ	Cigars, etc., machine for applying bands or labels to, W. C. Briggs	762,681
ľ	Clothes line, adjustable, G. M. Peck Clothes pin, G. B. Sawyers	76 2,5 98 76 2,4 94
K	Clutch, magnetic, A. C. Eastwood. 762,622, Coal drill, G. F. Weiss	762,623 762,863
ľ	Coat, F. Terramorse	762,772 762 , 805
ľ	Cocea beans, etc., combined machine for nibbling, grading, and winnowing, S.	769 70=
١	Connectance, J. J. Frank	762,705 762,697
ľ	Compass attachment, mariner's, J. Roper 7 Concrete construction, reinforced, H. Kamp-	62,761
19	Condenser, injector, J. F. A. Bruun	62,479 62,801
ß	Controlling device, L. A. Casgrain	62,684 62,80 2
[8	Cooking and heating apparatus, R. Nicholls 7	62,440 62,340
Ľ	man	62,795
	J. H. Pitkin	62, 438 62, 523



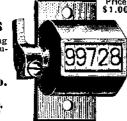
Star" Foot and Power Screw Cutting Gross Lathes FOR FINE, ACCURATE WORK Send for Catalogue B.
SENDCA FALLS MFG. CO.

ATHES SEBASTIAN LATHE COMMENTAL SEBASTIAN LATHER COMMENTAL SEBASTIAN SEBASTIAN SEBASTIAN SEBASTIAN SEBASTIAN SEBASTIAN SEBASTIAN SEBASTIAN

Veeder Counters

to register reciprocating movements or revolutions. Cut full size.

Booklet Free VEEDER MFG. CO. Hartford, Conn. Cyclometers, Odometers Tachometers, Counters and Fine Castings.





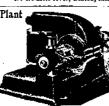








Price, \$84.00
Dynamo only, for eight 16-c.p.
lamps, \$26.00; lamps, wire,
fixtures, etc., \$8.00; just suitable for residences. small factories, yachts, etc. A strictly
first class guranteed outfit. We
wind for any special purpose
to order, usually without extra
cost. Send for Bulletin No. 3. The Elbridge Electrical
Mfg. Co., Water Street,
Elbridge, N. Y., U. S. A.



Patents, Trade Marks, COPYRIGHTS, etc., Address MUNN & CO., Solicitors of Patents.

Office of the SCIENTIFIC AMERICAN
861 Broadway, New York.
Branch Office: 625 F St., Washington, D.C.
Hand-book Sent Free on Application.



NO SOONER MADE THAN STANDARD. WITH THIS ROTARY MEASURE

You do not have to fisht your way inch-by-inch. It rolls easily and measures spirals, ogees, ellipses, circles, inside or outside cylindrical surfaces and straight work "To THE DIAMETER OF A HAIR." No lounge in its gait and never faiters as it rolls over walks, walls, and intri-cate places. Get our Circular. STECK ENREITER MFG. CO.

538 W. 58th Street, New York

DRILLING **Machines**

tyles, for drilling either deep or kind of soil or rock. Mounted hallow wells in any kind of son or rock. Incomes on wheels or on sills. With engines or horse powers, trong, simple and durable. Any mechanic can negate them easily. Send for catalog.

WILLIAMS BROS., Ithaca, N. Y.

Scientific A	merican
otton chopper and cultivator, G. Harwell 762,714	
otton picking finger, J. F. Appleby 762,606 otton stalk pulling machine, W. Swenson 762,771	
rushing and grinding mill, J. M. Dyer, 762,580	
ultivating means, J. W. Willett	
ultivator, B. P. Collier	
urtain fixture, G. H. Forsyth	1 1111111111111111111111111111111111111
urtain fixture, O. Malmquist	
urtain pole, F. Schaffer	
H. Hobson	grides and pr
utting or perforating machine, J. E. Watt 762,507	•
amper and smoke pipe section, check, A. Lynch	<u> </u>
ecorticator, F. Holtzhausen	ELECTE
ie stock ratchet mechanism, L. F. Hart 762,630 isease, appliance for treatment of, E. A.	
Learman 762,643	
istillation of wood, destructive, G. O. Gil- mer	✓ Ma
ividers and calipers, combination, P. S.	1710
Palmer 762,553 oor opener, T. E. Lee 762,729	ł XX
oor opener, trap, U. H. Moos	This Victoria
oor opening apparatus, H. S. Stewart 762,770	artistic lines, qui
oor, revolving, Sutton & Rennie	to handreds of po
raft equalizer, J. Duperron	34-80 H. F
rill. See Coal drill. Grain drill.	The
rill press, J. C. Mullinnix	12.14 M. P. NEW MOD
lectric conductors, safety apparatus for	Catalogue will be
use with overhead, H. F. Hill 762,410 lectric light, portable, C. Hubert 762,720	
lectric machines, means for regulating dy-	NT.
namo, C. R. McKay 762,744	THECT

BABBITT METALS.—SIX IMPORTANT

FOR SIA15 Was not exercise and cycles and cycl

Gate fastening, wire, G. E. Klipping. 762,3568 (Gate fastening, wire, G. E. Klipping. 762,3248 (Gate fastening, wire, G. E. Klipping. 762,481 (Gate opening or closing device, H. C. Morgan. 762,835 (Gar, differential or double driving, H. Austin. 762,674 (Gar, mechanism for providing rotation and reciprocation from a single driving, H. A. Houseman. 762,713 (Glass-grinding machine, Goehring & Troche 762,713 (Glass-grinding machine, Goehring & Troche Glass-grinding machine, Goehring & Troche Glass-grinding machine, Goehring & Troche Glue press, A. S. Nichols. 762,713 (Glue press, A. S. Nichols. 762,270 (Glue press, A. S. Nichols. 762,240 (Goernor, marine engline, J. Matthlesen. 762,736 (Governor, warine engline, J. Matthlesen. 762,736 (Grain binder knotter mechanism, P. Han son 762,402, Grain binder knotter mechanism, P. Han 762,813 (Grain separator, E. M. IGramer. 762,836 (Grain drill, W. Fetzer. 762,402, Grain drank, C. A. P. Turner. 762,564 (Grater, nutmeg, F. E. Snyder. 762,759 (Grinding and polishing machine, L. Schulte 762,766 (Grinding machine, E. A. Doolittle. 762,766 (Grinding machine, E. A. Doolittle. 762,291 (Grinding machine, E. A. Doolittle. 762,291 (Grinding machine, E. A. Doolittle. 762,388 (Ham branding apparatus, S. M. Bing. 762,388 (Harvester, beet, H. E. Dally 762,388 (Harvester, beet, H. E. Dally 762,389 (Teached) (Troched) (Tr





To Have

Montgomery & Co.'s Tool Catalogue

It is illustrated throughout and describes and prices Tools. 704 pages, 65x 45 ins. The latest edition, with discount sheet by mail for 25 cents. CAIMIGGUE Nº 21 105 Fulton St., New York City.

CREAT POWER SMALL COST.
The maximum of strength, dorse hilly and safety, with the muni-Helsting Engli

e Co., P. O. Box 1114 a, Kansas City, Mo, on, 115 Liberty Street, New York City,



The Franklin Model Shop. Experimental work for inventors: any-thing in metal from a single piece to a complete working model. Apparatus for colleges. Exhibition models. Introduc-tion samples of patented articles. Spe-cial tools for making metal novelties. Inventions perfected. Drawings and de-signs worked our from inventors' ideas. Send for circular 9.

PARSELL & WEED, 129-131 West 31st Street, New York.



This Insisting and Compelling Electrical Alarm Clock awakes you in spite of yourself. Bings for hours unless stopped. Com plete outfit, \$3.50. Electric bell attach-ment for ordinary clock, \$1.50.

GANNETT ELECTRICAL CO., 20 Weybosset St., Providence, R. I.

Lackawanna Motors



are Simple and Valveless. Easy to start and easy to operate.

For automobiles and launches.

3to 24 H.P.

Cut shows Lackawanna Reversing
Device attached to our 6 H. P. marine

motor. No reversing gear necessary LACKA WANNA MOTOR COMPANY

Buffalo, N. Y.

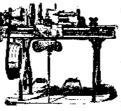
51-61 Letchworth St. -

for flattening wire for all purposes Send for Catalogue.

BLAKE & JOHNSON,

P. O. Box 7, WATERBURY, CONN.

SENSITIVE LABORATORY BALANCE. SENSITIVE LABURATURY BALANUES.
By N. Monroe Hopkins. This "built-up" laboratory
balance will weigh up to one pound and will turn with a
quarter of a postage stamp. The balance can be made
by any amateur skilled in the use of tools, and it will
work as well as a \$125 balance. The article is accompanied by detailed working drawings showing various
stages of the work. This article is contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1184. Price 10
cents For sale by MUNN & Co., 126 Broadway, New
York City, or any bookseller or newsdealer.



GUNSMÍTHS, TOOL MAKERS, EXPERI-MENTAL & REPAIR WORK, ETC.

From 9-in. to 13-in. swing. Arranged for Steam or or Stand-up Treadle. Send for Lathe Catalog. W. F. & JNO. BARNES CO. Established 1872. 1999 Ruby St., Rockford, LL

Gas Engine Complete with spark coil, \$12.00. The **Best Thing** on the market. Latest and most improved model.

Send for Circular. Carlisle & Finch Co., 233 E. Clifton Av., Cincinnati, O



The Sharer" A new footpower that can be applied

to all light machinery. A kick starts the machine and an occasional kick keeps it going. Send for our Booklet SLOTKIN & PRAGLIN,

210A Canal St.. New York.

A Handy Book THE AUTOMOBILE BARGAIN HOUSE

Largest in the world, 10,000 feet of floor space, crowded with new and slightly used autos, 55 now owned by us; 25 here to be sold on commission. Several parties going to Europe have offered splendid machines for guick cash very low. Autos \$125 to \$3,500. Oldsmobiles, & Mark, Locomotiles, U. S. Runabout, Stanbope, new; Mobile Dos-a-dos, \$250 up. Electrics of all makes; Columbia, American, and Waverly, \$150 up. All kinds delivery wagons and buses: Electric, Gasoline and Steam, Darracqs, Packads, French: Secting Auto, Searchmont, Cadillacs, and Notherns, \$400 to \$1,200; \$5,500 Mors, like new, \$3,500. Many others; call or send for list. Autos sold for owners on five per cent. commission.

MANHATTAN STORAGE CO. 332-342 West 44th Street, New York, N. Y.

Ten doors east of Ninth Avenue. Two blocks from 42d Street station. Open evenings. Telephone, 4290-38th

Globe GASOLINE Marine Engines

Improved. Simple. Reliable, Economical, Substantial. Prices Right. Guaranteed. Write for Catalogue. Built by

PENNSYLVANIA IRON WORKS CO., Philadelphia, Pa. and 136 Liberty St., New York. U.S. A.





THE MERKEL MOTOR CYCLE



For pleasure or business is quickest, most convenient, safest and cheapest. Long rides made without tiring yourself.
Durability, simplicity and economy are combined in the Merkel.

Write for our Free Book THE D. MERKEL MFG. CO., Factory, Layton Park, Milwaukee, Wise

Low-Priced Electric Wagons



Capacity 1 to 8 Tons Double Motor Equipment Direct Double Chain Drive No Gears or Pintons

THE AUTO-CAR EQUIPMENT CO.
Buffalo, N. Y.





An inexpensive library of the best books on Electricity. Put up in a neat folding box, as shown in cut. For the student the amateur, the workshop, the electrical engineer, schools and colleges. Comprising five books, as follows:

Arithmetic of Electricity 138 pages, \$1.00

133 pages, \$1.00
Electric Toy Making, 140
pages, \$1.00
How to Become a Successful Electrician, 183
pages, \$1.00
Standard Electrical Dictionary, 682 p ges, \$3.00

tionary, 682 p ges. \$3.00

Electricity Simplified, 158
pages, . . \$1.00

A valuable and indispensable addition to every library.

Our Great Special Offer.—We will send prepaid the above five volumes, handsomely bound in the eloth with silver lettering, and inclosed in a neat folding box, as shown in the illustration, at the Special Reduced Price of \$5.00 for the complete set. The regular price of the five volumes is \$7.00.

REVISED and ENLARGED EDITION

The Scientific American
Of Receipts,
Notes and 3
Queries, 5
15,000 Receipts, 734 Pages.

Price, \$5.00 in Cloth. \$6.00 in Sheep. \$6.50 in Half Morocco. Post Free.



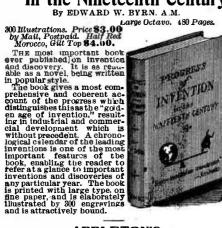
This work has been re-vised and enlarged, 900 New Formulas.

The work is so arranged as to be of use not only to the specialist, but to the general reader. It should have a place in every home and workshop. A circular containing full Table of Contents will be sent on application.

Those who already have the Cyclopedia may obtain the

1901 APPENDIX. Price, bound in cloth, \$1.00 postpaid.

The Progress of Invention In the Nineteenth Century By EDWARD W. BYRN. A.M.



APPLETON'S

Cyclopedia of Applied Mechanics

A Magaificent Set in Three Vols. Handsomely bound in half morocco, each volume containing over 900 pages with nearly 8.000 engravings, with tall evaluations details



Special Offer! Heretofore the publishers' price of this work has never been less than \$2250 and sold only by subscription. We have secured a special edition of this valuable work, and will box and ship, prepa d, the three volumes to any address in the United States or Canada on receipt of

\$12.00

By purchasing now from us you save half the original price and have in return a technicians, the great usefulness of which has been testified to by nearly 100,000 purchasers of this valuable work technicians and mechanics who refuse to estimate its value to them in their work by mere dollars and ents.

Add 81 extra for expressage to England and the Continent, or \$2 extra to Australia and other countries.

Special circular of contents of these volumes sent free.

MUNN @ CO. 361 Broadway

New York City

Valuable Books
Home Mechanics
For Amateurs

This book has achieved an unparalled success in one week, and a Special Edit of other with the largest and best book on the subject ever of eried at such a low price, it tells how to make things the rat small expense. It will prove of value to youmen more than you realize. Do things with your attempt of the contract of t

Write for To-morrow Dixon's Eterno WRITES BLACK—COPIES PURPLE

ELECTRO MOTOR. SIMPLE, HOW TO ELECTRO MOTOR. SIMPLE, HOW TO make.—By G. M. Hopkins. Description of a small electric motor devised and constructed with a view to assisting amateurs to make a motor which might be driven ith advantage by a current derived from a battery, and which would have sufficient power to operate a foot lathe or any machine requiring not over one man power. With 11 figures. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 641. Price 10 cents. To be had at this office and from all newsdealers.

Dixon's Pencil Guide, indexed by vocations, corectly indicates the right pencil for your use. Sent free. Dept. W JOSEPHDIXON CRUCIBLE CO., Jersey City, N.J.



YOU WILL NEVER CHUCK THIS DRILL "INTO THE MELTING POT"

trong Durable Economic



This Drill Chuck requires no Spanner wrench. Send for catalogue for points, sizes and prices.

GOODELL-PRAIT COMPANY

Greenfield, Mass

. dans williamistuis

MORRIS & RUSHTON Boats and Cances. We have in stock the most complete assortment of High Grade Ceder and Cancas over red Boats and Cances ever seen in this city. Also Fliestms and Sporting Goods of every description. Send for catalogue. The H. & D. Folsom Arms Co., 314 Broadway, NEW YORK

WE BUILD MACHINES

We have the advantage of having a large and perfectly appointed shop in a town where expenses are very light; and our customers profit by it. We are expert designers of experimental machinery, and are equipped to manufacture in quantities. quantities.

MARVIN & CASLER CO.,
Dept. L. Canastota, N. Y.

Yankee Spark Plug, \$2

FOR GAS ENGINES Cannot carbonize or short circuit. Compression end cleans point at each explosion. Guaranteed. Everything for the Automobile, Bicycle and Motor Boat.

Big Free Catalogue E. J. WILLIS CO. 2 Park Place, New York

"What a **Comfortable** Shave this is" "SAFETY RAZOR

Send for our FREE booklet-it will interest you. Razor Complete, - - - - - Morocco Case, with two blades, - - - Stropping-Machine and Strop, - -At dealers or write as and we will send direct on receipt of price. GEM CUTLERY CO., Dept. J, 34 Reade St., N. Y.

\$40.00 A WEEK.



Reliable man or woman each county as manager to exhibit, take orders

to exhibit, take orders, appoints agents for Harrison Valveless Oil-Gas Brows. Wonderful in vention—beats others—tuel gas from kerosene—Miniature gas works—absolutly safe—Enormous demand—Splendid for summer cooking—Delight oustomers—Cheap, clean, safe fuel. Gasoline is dangerous. Catalague Frase. Weitz-delight. cooking—Delight customers—Cheap, clean, safe fuel. Gasoline is dangerous. Catalogue Free. Write today, World Mfg. Co., 568? World Bld'g, Cincinnati, O.



WATER, 25 Bbls. for 1c.

Greatest Air-Cooled Wonder of the day. Operates any kind of pump. Runs any kind of machinery. No water to freeze No tanks to bother. Simplest in construction. Most reliable in work. Don't fall to write for circulars and prices to

THE AIR-COOLED MOTOR CO., Lansing, Mich.





Examine the Perfect System

of the Solar Generator and we feel sure you will agree with us that in lamps S-O-L-A-R spells success and satisfaction. You have enough other troubles without adding "lamp troubles," so don't experiment—use Solars that have stood the test for many years

BADGER BRASS MFG. CO. KENOSHA, WIS.

Eastern Office, 11 Warren Street, NEW YORK

UNSURPASSED ILLUSTRATIONS

Years of experience in the making of allkinds of high grade Cuts and Engravings enable us to give our customers the very best illustrations at a reasonable price. Our advice may save you much wasted printers' link. Send for s mples.

GATCHEL & MANNING, Illustrators and Engravers, 6th & Chestnut St., Phila., Pa.







NOW READY

BOUND VOLUME

OF THE

Scientific American Building ~ Monthly

VOLUME No. 37 January to June, 1904

A Monthly Magazine of Domestic Architecture, Sumptuously Illustrated

311 illustrations, 6 covers in tint, 132 bages Price of Semi-Annual Volume, \$2.00, postage paid

SPECIAL FEATURES

"WHITEHALL." - The House of Henry M. Flagler, Esq., at Palm Beach, Fla. The Stately Homes of America. A talk with Mr. H. W. Desmond on this fascinating subject.

"FAULKNER FARMS."—The Estate of Mrs. Charles F. Sprague, at Brookline, Mass. The House of E. J. Berwind, Esq., at Newport, R. I. A description of one of the most important of the newer houses at Newport.

"GREY CRAIG."—The magnificent castle of J. Mitchell Clark, Esq., at Newport, R. I.

"BLAIRSDEN."—The superb country seat of C. Ledyard Blair, Esq., at Bernardsville, N. J.

THE BUILDING MONTHLY

THE BUILDING MONTHLY
aims to help its readers to better building. The illustrations reproduce homes and other structures of
the highest grade and of varying costs. It seeks to
interest the architect, the house owner, the real
estate promoter, the home maker, and the builder.
It stands for the good and the true and the beautiful
in the art, Its "Talks with Architects" bring its
readers in immediate touch with the leading architects of the day. Its descriptions of houses are
brief but compact with information. Its departments constitute a "review of reviews" summary
of current comment, suggestion and help in all
matters relating to the construction of the home, its
decoration, equipment, and use.

EDITORIAL ARTICLES: "Some Home Builders and What They Did," "House Education." "The Interest of Houses." "The House of the Future," "The Small House," "The Association of Houses."

DEPARTMENTS: "The Household," "The Garen," "Heating Talk," "Domestic Problems," "Sanitation," "Construction," "New Books," "The House," "Legal Notes," "Fire Protection," "The Kitchen," "The Flat," "The Houseboat," "The Bachelor," "Stable Lore," "Furnishings," "Plumbing," "The Woman's House," "Trees," "The Foreign House," "New Building Patents," "Publishers' Department."

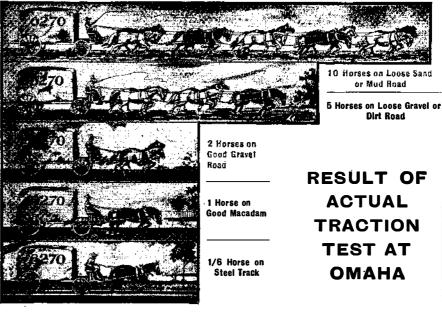
FOR SALE BY

		_
	Railways or tramways, contact box and con- ductor for electric, D. Kempt	762,319
	Range, cooking, K. S. Lawrence	762,550 762,797 762 755
	Railways or tramways, contact box and conductor for electric, D. Kempt. Range, cooking, R. S. Lawrence. Range, steam, H. J. Bisbop. Reciprocating engine, T. H. Phillips. Reference device, tabular, A. H. Merrill. Refrigerator, well, G. F. Charlesworth. Regulator. See Automatic regulator. Relay, F. R. McBerty. Rest, steady, C. H. Norton. Ropes, apparatus for automatically greasing boisting or haulins. P. Macadam	762,590 762,797 762,755 762,546 762,384
	Regulator. See Automatic regulator. Relay, F. R. McBerty	762,338 762,550
	Rest, steady, C. H. Nortongreating Ropes, apparatus for automatically greasing	762,550
	kopes, apparatus for automatically greasing hoisting or hauling, P. Macadam Rotary engine, A. T. Stimson Rubber, regenerating vulcanized, R. B. Price Rule, C. S. Fosselman Sand cleaning apparatus, W. S. Vanzant Sand tempering apparatus, molders, G. W. Packer	762,329 762,448 762,843 762,474
	Ruber, regenerating vuicamzeu, R. B. Fried Rule, C. S. Fosselman	762,843 762,474 762,775
	Sand tempering apparatus, w. S. Vands-Sand tempering apparatus, molders, G. W.	762,775
	Packer Sand, tempering molders, G. W. Packer Sash casing, window, H. Borgmann Sash lock, J. H. Moskow Sash lock, T. S. Alford Saw clamp, C. Bergstrom. Saw mill conveyor, band, D. C. Prescott. Scaffold, adjustable ladder, J. F. Rouze. Scaffold portable, W. C. Goheen.	762,597 762,464
	Sash lock, J. H. Moskow. Sash lock, T. S. Alford.	762,595 762,856
	Saw clamp, C. Bergstrom	762,677 762,653
	Scrapers on agricultural implements, mounting for rotary, A. E. Watson	762,783 762,280
	Scrapers on agricultural implements, mounting for rotary, A. E. Watson. Screw driver, S. E. Condon. Scrip meter, G. E. Beach. Sea beaches, device for reclaiming and retaining, C. H. Landenberger, Jr Sealing cap, W. E. Heath. Separator, R. W. Jessup. Sewage disposal system, Church & Hill. Sewing machine needle vibrating mechanism, R. L. Lyons.	762,280 762,511
	Sea beaches, device for reciaiming and re- taining, C. H. Landenberger, Jr	762,727 762,716
	Sealing cap, W. E. Heath	762,716 762,416
	Sewage disposal system, Unurum & Hill Sewing machine needle vibrating mechanism,	762,466
	Sewing machine rotating book, R. Scharn-	762,544 762,559
	berg Sewing machine thread cutting device, R. L. Lyons	762,543
	Shado rollon and auntain breaket C	
	Michaels Shaft coupling, C. W. Levalley Sheet metal bending machine, Stein & Mandel	762,827
	Sheet metal bending machine, Stein & Mandel Sheet metal can, H. O. Reese. Shingle machine, R. J. Thompson. Ships, means for working, W. Williams. Shoe cleaning machine, J. T. Waters. Shutter, curtain, H. W. Locke. Shuttle brake, J. Laforet. Sifter, flour, C. B. Comegys. Signal and switch trip, C. M. Hurst. Signaling apparatus, E. A. Faller. Signaling system, electric, S. M. Young Signaling system, electric, J. Dianovszky. Skirt and waist holder, F. S. Boedefeld. Skirt supporter, S. F. Nicolai.	762,500 762,557
1	Shingle machine, R. J. Thompson	762,557 762,563 762,790
	Shoe cleaning machine, J. T. Waters Shutter, curtain, H. W. Locke	762,790 762,782 762,424
	Shuttle brake, J. Laforet	762,424 762,642 762,805
	Signal and switch trip, C. M. Hurst Signaling apparatus, E. A. Faller	762,413 762,695 762,370
	Signaling system, electric, S. M. Young Signaling system, electric, J. Dianovszky	762,370 762,812
	Skirt and waist holder, F. S. Boedereld Skirt supporter, S. F. Nicolai	762,378 762,746
	Slasher compression roll, D. McTaggart, Slicer, vegetable, W. N. Dufford	762,433 762,579
į	Skirt and waist holder, F. S. Boedefeld Skirt supporter, S. F. Nicolai. Slasher compression roll, D. McTagart Slicer, vegetable, W. N. Dufford Snow from railway tracks, apparatus for removing, D. A. Beaudette	762,375
İ	Sound reproducing machine regulating mechanism, B. C. Schutte. Spinning frame, ring, R. Kron. Spoke vise, wheel, T. D. Harris.	762,661
	Spoke vise, wheel, T. D. Harris	762,640 762,712
	Spring roller for screens, curtains, or awnings, F. A. Mansell. Stacker, straw, J. B. Bartholomew Stackers, operating device for folding straw,	762,330 762,463
	Stackers, operating device for folding straw,	
	E. Huber Stage flooding system, G. J. Gibney Staple puller, G. W. Angus, 2d. Stave jointing and shaping machine, B. G. Juyne	762,532 762,702 762,672
	Stave jointing and shaping machine, B. G.	762,312
ĺ	Jayne Steam engine, G. S. Morison. Stoker, automatic, J. R. Luckey. Stopper. See Bottle stopper. Store M Schneider	762,646 762,731
	Stopper. See Bottle stopper. Stove, M. Schneider	
		762,847 762,407 762,588
	Stove, cook, J. F. Billman Strap tightener and fastener, O. Anderson	762,573 762,857
	Stump pulling machine, W. Smith Switch and signal track trip, C. M. Hurst	762,445 762,414
	Stove, J. H. Herriff. Stove, S. W. Jackson. Stove, cook, J. F. Billman. Strap tightener and fastener, O. Anderson Stump pulling machine, W. Smith Switch and signal track trip, C. M. Hurst Switch plate, J. Alexander. Syringe, hypodermic, C. Witkowski Table, bed, washstand, etc., combination, C. Reisch.	762,571 762,603
	Table, bed, washstand, etc., combination, C. Reisch	762,600
	C. Reisch. Taping device, J. F. Middleton. Target trap, D. J. Schulte. Tea or coffee percolator C. E. Ziegler.	762,600 762,739 762,353 762,794
	Tea or coffee percolator C. E. Ziegler Telegraphy, receiver for wireless, O. J.	
	Telegraphy, receiver for wireless, O. J. Lodge et al. Telephone call instrument, E. W. E. Thomp-	762,829
	Son Telephone, electric, E. Gundlach Telephone lamp jack, H. P. Clausen Telephone switchboard signal, McBerty &	762,364 762,820 762,279
	Telephone switchboard signal, McBerty &	762,279 762,337
	McQuarrie Telephone switchboard signaling apparatus, McBerty & McQuarrie	762,336
	Telephone switchboard supervisory signal.	762,432
	J. L. McQuarrie Ticket making and attaching machine, pin, F. Kohnle	
	Tiling for floors, etc., J. H. Munro Timepiece escapement, A. J. Butts	762,322 762,428 762,682
	F. Kohnle Tiling for floors, etc., J. H. Munro Timepiece escapement, A. J. Butts Tire, pneumatic, G. Steinberg Tire, pneumatic, T. Midgley Tire, pneumatic, T. Midgley	762,682 762,501 762,740
	Tire, pneumatic, G. Steinberg	762,310
1	for double tube, Seiberling & Stevens Tobacco sample binding machine, L. A.	762,561
	Tooth, crown, F. H. Davis. 762,860,	
	Trace fastening, G. D. Lexner. Trace holder, whiffletree, J. E. Johnson	
	Traction engine, W. M. Brown. Traction engine, E. W. Stone.	762,393 762,313 762,380 762,360 762,325 762,281 762,749 762,831 762,791
	Traveling hanger, F. B. Cook	762,281 762,749
	Trolley base, P. D. Milloy	762,831 762,791
	Trolley wheel, J. S. Briggs	762,379 762,823
1	Tooth, crown, F. H. Davis. Trace fastening, G. D. Lexner. Trace holder, whiffletree, J. E. Johnson. Traction engine, W. M. Brown. Traction engine, E. W. Stone. Traveling hanger, F. B. Cook. Trolley, R. K. Ortt. Trolley base, P. D. Milloy. Trolley hanger, M. W. Wood. Trolley hanger, M. W. Wood. Trolley wheel, J. S. Briggs. Trolley wheel, J. S. Briggs. Trowel, scoop, C. F. Hawksworth. Truck bolster, F. R. Cornwall. Truck bolster, F. R. Cornwall. Truck bolster or other beam, car, S. A. Crone. Truck bolster support, railway car, S. A. Bemis Truck swing bolster, railway car, S. A. Bemis Truck sylns bolster, railway car, S. A. Truck swing bolster, railway car, S. A. Truck F. Janik.	762,386
	Truck bolster, W. H. Scott	762,443
1	Crone Truck bolster support, railway car, S. A.	762,286
	Bemis	762,610
	Bemis Trunk, F. Janik. Trunk, F. Janik. Trunk actch, J. P. Clark. Tunnel construction apparatus, J. W. Reno Turbine, elastic fluid, L. Wilson. Turbine, elastic fluid, J. C. Sturgeon, 762,449 to Type chase, F. Kohnle.	762,611 762,636 762,685
	Trunk catch, J. P. Ciark	762,685 762,655 762,368
	Turbine, elastic fluid, J. C. Sturgeon, 762.449 to	
	Type chase, F. Kohnle	762,454 762,323
	Type chase, F. Kohnle	762,266 762,272 762,290
	Typewriting machine, L. P. Diss	762,290 762,418
	Underreamer, A. Willard	762,458 762,435
	Urethrotome, W. E. Washburn	762,366 762,499
	Vacuumizing and double seaming machine, automatic, E. Norton	762,551
	Valve, S. S. Herrick	762,406 762,436
1	Value estuation E I Denoumbe	762,619
	Value anninganta bushe M. Constructor	762,538 762,865
	valve, engineers brake, M. Corrington Valve gear, engine, S. L. Berry Valve mechanism. G. Bowen Valve, reducing, J. B. Bourseau Valve, reversing, W. H. Hume Valve, stop, A. C. Badger Vehicle, traction, J. S. Walker Velvet, silk, laces, etc., apparatus for steaming, J. A. Miller	762,377 762,680 762,274 762,721 762,268
	Valve, reducing, J. B. Bourseau Valve, reversing, W. H. Hume	762,721
l	Valve, stop, A. C. Badger	762,268 762,781
l	verver, slik, laces, etc., apparatus for steaming, J. A. Miller	762,333 762,602
	velvet, slik, laces, etc., apparatus for steaming, J. A. Miller. Vending machine, G. G. Sullivan. Vending machine, coin operated liquid, J. P. Muth. Ventilator. See Boat ventilator. Voltmeter switch, multiple pole, C. C. Badeau	762,429
	Ventilator. See Boat ventilator. Violin tuning device. W. Hutchins	762,723
	VIOLE DUMING CO. C	,.
	Voltmeter switch, multiple pole, C. C. Ba- deau	762,675
	Voltmeter switch, multiple pole, C. C. Badeau Wad testing device, W. L. Morris Wagon coupling, C. E. Keene Wagon, dumping, J. F. Day	762,675 762.548 762,480

One horse does the work of ten

and does it with less exertion

on the Steel Highway Track



The pictures tell the story plainly. The better the road the less horses are required.

The Steel Highway Track is the ideal road for all localities and is adapted to all kinds of travel.

Costs less than stone roads and is always in good condition. No ruts, or dust, or mud.

Hadn't you better find out all about this wonderful new road? Send for Booklet A,

Steel Highway Track Construction Co. OF AMERICA

Main Office, 758 Drexel Building, Philadelphia

"Let us put you on the Right Track"

AMERICAN JUMP SPARK IGNITION OUTFITS



AUTOMOBILE



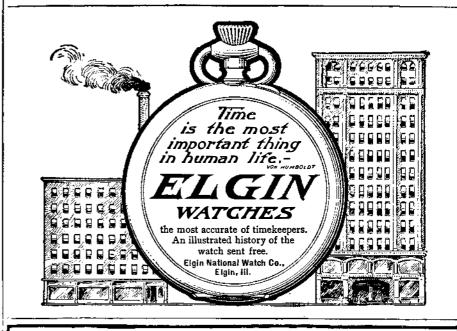
MOTORCYCLE



Steel Castings for Special Purposes

Our complete facilities enable us to undertake the:

Open Hearth Steel Castings for locomotives,
ment, Lloyd's, Railroad and other specifications. Rai SEABOARD STEEL CASTING CO., Chester, Pa.



COMFORT

Edison Fan Motor Outfits are indispensable for homes, private dining rooms, sick rooms, bed rooms, etc. They make the heated term not only endurable, but pleasant. Being independent of the street current, they may be used anywhere. Dealers in electrical supplies will put you in the way of knowing all about them. Send for Catalogue 23F.

TRAM MARK Shomas a Edison

EDISON MFG. COMPANY Factory Orange, N. J.
NEW YORK CHICAGO

82 Chambers Street

304 Wabash Avenue



ILLUSTRATIONS.	Car, touring, Stearns 77	Hook, safety 173	Palace of Machinery 364 Palace of Manufactures 364	Tool, automobile 88 Tooth of a mammoth 60	Aurora borealis 8 Aurora Nordmann and the. 27
	Car, touring, Winton 79 Cars, Pullman	Horse, pulling power 289 Hose nozzle, new 295		Tool, automobile 88 Tooth of a mammoth 60 Torpedo boat destroyer 209 Torpedo boat destroyer, Jap. 383	
A .	Carriage, steam, of 1890 86 Cautery apparatus, electric. 296	Hydrobion, the	Paradox, another 495	Torbedo, modern, the 196	Automobile, buckboard '."
	Chafing dish, electric 232 Chair, railway 444	ı	Petroleum reservoirs 441	Trousers rack 445 Transformer, Berthier 476 Transporter bridge 420	Automobile in 1903 5
Aborigines of Japan 121 Abruzzi expedition252, 272	Chronograph, railway49 Chronometer, electric 325		Phonograph, electrochemical. 438 Photograph, the largest 193	Track, a warped 421	Automobile manufacture *29 Automobile notes386, 459
'Adzuma," cruiser 129 Aeroplane, Barton	Chloroform apparatus 24 Clamp, compressed air 173	Ice-breaker "Ermack" 360 "Illinois," accident to the 274	Photography of the eye 477	Tramways, rope, device for. 444 Trolley wheel	Automobile parade*391 Automobile race Florida*136
Ainus of Japan 121 Airship, Barton 44	Clay, modeling animals 496 Clock, electric 423	Inca relics	Pipe coupling	Trousers guard 49 Transmission, Cadillac 88	*Automobile races, coming 386 Automobile races, Monte
Airship, Beedle	Clock, electric, Tiffany 367 Clock, floral 365	"Ingomar," yacht	Pipes, frozen, thawing 231	Tractor, military	Automobile, racing 74
Aluminium welding machine 325	Cloth testing machine 405 Cloth examining 404	Ironing apparatus	"Polar Star," the 272	Tunnel, Hudson River.37, 42, 253	Automobile record, new 459 Automobile records, new 119
Alps, panorama of	Clothing, manufacture of 397, 404	Island of Jolo 64 "Iwate," cruiser 133		Turbine, 11,000 h. p 229	Automobile, Regas *83 Automobile relic, an *86
Antelope, giant	Coaling warships 293 Coat, bark, Ainu 121	· _	Printing machine 116 "Protector," submarine 218	υ	Automobile show
Arcade, New York City 442 Arc, electric, 3-phase 360	Coils, radiating 30	J	Pullman cars 117	Unicycle, novel 332	Automobile show, Paris *84 Automobile speed record 66
Armada, Spanish, relics 482 Armorclads, early 180 Arms, small, Russ. and Jap. 390	Coin holder	Joio, Island of			Automobile wheel, new*310 Automobiles, commercial,
Army, Japanese	Cooking device, camp 123 Coupling, pipe 13	Jupiter, currents of 197 Jupiter, satellites of 443	R	Walma dan alamatana 102	test of
"Asahi," battleship 133 "Asama" cruiser 133	Coupling, pipe 13 Crufser 'Adzuma' 129 Cruiser 'Bayan' 149	K	Boon Ford 90	l Valve. grain 229	Autumn leaves color of 23
Asbestos weaving 120 "Askold" cruiser 156	Cruiser "Bogatyr. 442 Cruisers, Japanese, new 61		Racers, automobile137, 350	Valve mechanism 255 Valve, rotary, sawmill 192 Vanor generator 367	Avalanche, Mt. Rainier 8 Awning, improved*162
Attachment, dredge 500	Cruiser "Novik"	"Kasaga," cruiser	Radiation, new form 438	Vapor generator 367 "Variag," cruiser 156 Vehicle wheel 464 Volturette, Renault 85	_
Auto-boat contest	Cruisers, United States 363 Cruisers, Japanese 133		Rail, third, protector 161 Railroad track, Lackawanna. 11	Voiturette, Renault 85	В
Automobile race, Florida 136 Automobile racer 391	Curling-iron, electric 232 Cyclograph	L	Railroad track, warped 421 Railway chair 444	w	Babbitt metal
Automobile show73, 78 Automobile speed trials 350	"Czarevitch," battleship 149	Labeling, automatic 481 Lager beer brewing 473, 480	Railway substructure 463 Railway, trans-Siberian 308, 309	Warships, coaling 293	Bag, hot-water, electric*232 Baku, power works 111
Automobile, Stanley	D	Lamp, arc	Receivers, wireless telegraph 347 Relics, Spanish Armada 482	Water meter, disk 161 Water shade, a 173	Balancing feat, novel*294 Balloon school, British 273
Automobile tricycle 76 Automobile wheel 310	Dam, cylindrical 312 Dam, roller 305	Launch, high speed 213 Lawn mower, steam 87	Reptile, harmless 47 Reservoir, oil, California 441	Wheat kernel, magnified 177	Ralloon propellers 402
Awning, improved 162	Deer, albino	Lawn sprinkler 162 Leopard, snow 216 Letter press, hydraulic 367	Poting photography of 477	Wheel, a resilient 310 Wheel, vehicle 464	Balloons, free and dirigible. 436 Balloons, war, inflation of*384 "Baltic," White Star 231
B	Divers, school for 457 Distilling app. sea water 400	Letter box, rural 478	Rifie army Jananese 390	Williamsburg bridge 424 Wind measurement Eiffel	Baltimore fire*154 Baltimore fire, lesson of*216
Bag, hot-water, electric 232	Dock, floating Durban 3	Life saving apparatus 407 Life saving globe 426	Director and brees 409	Wind mill, improved256, 295	Bananas, dry
Balancing device, novel 294 Balloons, war, inflation of . 384	Draft attachment	Lighter, fire	"Rossia," cruiser 157	"Wolvin," steamship 345 Wool, acid test for 404	Battery, primary, new*132
Bar cutter 464	Drill electric 41	Lizards, tame	"Rurik," cruiser	Wrench, new 368 Wright, Carroll D 115	Battery, storage, Edison.271, 358 Battleship 'Illinois,' acci-
Battery, Edison 92	Dynamometer, hydraulic 289	Lock for umbrellas 255 Locomotive, De Glehn 228 Locomotive, express, Italian 492	Runabout, Grout 87	.	dent *274 Battleship 'Kentucky' 474 Battleship 'Missas' *270 Battleship 'Missouri' disas-
Bettery, primary	IC	Locomotive, German 344 Locomotive, safety 132	s	Yacht "Ingomar" 385	Battleship "Missouri" disaster
Battleship "Czarevitch" 149 Battleship "Hatsuse," loss of 433 Battleship "Illinois," the 274	Electricity from light 476	Locomotive, working 28 Locomotives, auto control 477	S. A.N	Tacht Ingoliai	Battleship or torpedo boat 358 Battleship plans 439
Rettleshin "Mikese 265	Electricity on canals 25 Electricity in household 232	Log cabin, real	Saddle, riding 161 Scale formation, boilers 132 "Scooter," the 201	BRICCEL LABOR	Battleship "Shikishima" 134 Battleship stability 342
Battleship "Petropavlovsk". 321 Battleship "Shikishima" 134 Battleships, Japanese 133	Electrolysis, apparatus for, Ring's	Looping the double loop 493	Sea water distillation 400 Sea water evaporator 367	MISCELLANY.	Battleships in England 211 Battleships, Japanese, new 175
Dattleships, Durater 150 157 100		M		TO:	
Battleships, Russian. 156, 157, 198 Battleships, United States. 363	Engine, gasoline 249		Sewing machine, electric 232	Figures preceded by a star (*) refer to illustrated articles.	Beer, electric preservation 368 Bees, queer hiding place*219
Battleships. United States 363	Engines, locomotive, control 477 Eric canal, electricity on 25	Magnets, lifting, electric 436 Mail bag catcher 368	Sewing machine, invention of 65 Shaft fastening 444	refer to illustrated articles.	Bees, queer hiding place*219 Bending device*256 Benzine adulteration 107
Battleships, United States. 363 "Bayan," cruiser	Engines, locomotive, control 477 Erie canal, electricity on 25 "Ermack," ice breaker 360	Magnets, lifting, electric 436 Mail bag catcher 368 Mail bay improved 256	Sewing machine, invention of 65 Shaft fastening	refer to illustrated articles.	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290
Battleships, United States. 363 "Bayan," cruiser	Engines, locomotive, control 477 Erie canal, electricity on 25 "Ermack," ice breaker 360	Magnets, lifting, electric 436 Mail bag catcher 368 Mail bay improved 256	Sewing machine, invention of 65 Shaft fastening	A Aborigines of Japan*121	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296, *464 Bicycle support *500
Battleships, United States. 363 "Bayan," cruiser	Engines, locomotive, control 477 Erie canal, electricity on 25 "Ermack," ice breaker 360	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing 473, 480 Malting and brewing 285, 292 Mammoth, tooth of 60 "Marquess" 476	Sewing machine, invention of 65 Shaft fastening 444 Sharing mug 162 Shears, pruning, new 229 "Shikishima," battleship. 134 Ship, turret, Venetian 181 Shutter, photographic 291 Signal, block 477	A Aborigines of Japan*121 Abrasive wheels	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 *464 Bicycle support *500 Bicycles, motor *159 Bird case attachment *295
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage attachment 295 Bit, driving 162 Bees, hiding place of 219 Bending device 256 Block signal 477 Blowpipe, simple 61	Engines, locomotive, control 477 Erie canal, electricity on 25 "Ermack," ice breaker 360	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing 473, 480 Malting and brewing 285, 292 Mammoth, tooth of 60 "Marquess" 476	Sewing machine, invention of 65 Shaft fastening 444 Sharing mug 162 Shears, pruning, new 229 "Shikishima," battleship. 134 Ship, turret, Venetian 181 Shutter, photographic 291 Signal, block 477	A Aborigines of Japan*121 Abrasive wheels	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 *464 Bicycle support *500 Bicycles, motor *159 Bird case attachment *295
Battleships, United States. 363 "Bayan." cruiser	Engines, locomotive, control. 477 Eric canal, electricity on 25 "Ermack," ice breaker. 360 Evaporator, sea water 367 Exploition, St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 F Filter, air 292	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing. 473, 480 Malting and brewing. 285, 292 Mammoth, tooth of 60 "Marquess," dredger. 476 Match lighter, automatic. 385 Meteorite, a huge 10 Meter, water, disk 161 Miami canal, electricity 25	Sewing machine, invention of 65	A Aborigines of Japan	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 Bicycle support *500 Bicycles, motor *159 Bird cage attachment *295 Bird life, study of 22 Bird soaring 387 Blast furnace plants, new 195 Block signal *477 Blownice apparatus *61
Battleships, United States. 363 "Bayan." cruiser 149 Beer, Pasteurizing	Engines, locomotive, control. 477 Eric canal, electricity on 25 "Ermack." Ice breaker. 360 Evaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 F Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British. 407	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing 473, 480 Malting and brewing 285, 292 Mamnoth, tooth of 60 "Marquess," dredger 470 Match lighter, automatic 385 Meteorite, a huge 10 Meter, water, disk 161 Miami canal, electricity 25 Michaud apparatus, improved 386 Mine hoists, electric 437	Sewing machine, invention of 65	A Aborigines of Japan	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 *464 Bicycle support *500 Bicycles, motor *159 Bird cage attachment *298 Bird life, study of 22 Bird soaring 387 Blast furnace plants, new 195 Block signal *477 Blowpipe apparatus *61 Blowpipe, laboratory 160
Battleships, United States. 363 "Bayan." cruiser 149 Beer, Pasteurizing. 481 Bleycle attachment .296, 464 Bleycles, motor 159 Bird cage sttachment .295 Bird driving 162 Bees, hiding place of .219 Bending device .256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the .213 Boat, glass-bottom 94 Boat, globular 192 Boats, gasoline, motor 4905 Boats, motor .497 Boller scale detector 132	Engines, locomotive, control. 477 Eric canal, electricity on 25 "Ermack," ice breaker. 360 Evaporator, sea water 3367 Exphibition, St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 F Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British. 407 Fire escape, novel. 332 Fire in the Subway 315	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing. 473 Malting and brewing. 285, 292 Mammoth, tooth of 60 "Marquess," dredger 470 Match lighter, automatic. 385 Meteorite, a huge 10 Meter, water, disk 161 Miami canal, electricity 25 Michaud apparatus, improved 386 Mine holsts, electric 437 Mine, submarine 330 Moistener, gummed paper 464	Sewing machine, invention of 65 Shaft fastening 444 Shaft fastening 162 Shears, pruning, new 229 "Shikishima," battleship 134 Ship, turret, Venetian 181 Shutter, photographic 291 Signal, block 477 Signal, street express 408 Signaling, submarine 172 "Sissol Veliky," battleship 156 Sleeping bag 272 Sleigh runner, new 162 Smith, a floating 7 Smoke consumer 13 Spur attachment 123 Stage, opera house 113 Stage, opera house 113	A Aborigines of Japan	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 *464 Bicycle support *500 Bicycles, motor *159 Bird cage attachment *298 Bird life, study of 22 Bird soaring 387 Blast furnace plants, new 195 Block signal *477 Blowpipe apparatus *61 Blowpipe, laboratory 160
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage attachment 295 Bird driv'ng 162 Bees, hiding place of 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom 94 Boats, globular 192 Boats, gasoline, motor 406 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional. 483	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack," ice breaker. 360 Evaporator, sea water 337 Exphibition, St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British. 407 Fire escape, novel. 332 Fire in the Subway 315 Fire lighter, automatic 49 Fireman, suit for 296	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing 473, 480 Malting and brewing 285, 292 Mamnoth, tooth of 60 "Marquess," dredger 470 Match lighter, automatic 385 Meteorite, a huge 10 Meter, water, disk 161 Miami canal, electricity 25 Michaud apparatus, improved 386 Mine holsts, electric 437 Mine, submarine 330 Molstener, gummed paper 464 Monoltth, an Idaho 139 Monocycle course, somersault 159 Monocycle, novel 333	Sewing machine, invention of 65 65 Shaft fastening 444 Shart fastening 424 Shaving mug 162 Shears, pruning, new 229 "Shikishina," battleship 134 Shipt, turret, Venetian 181 Shutter, photographic 291 Signal, block 477 Signal, street express 408 Signaling, submarine 172 "Sissol Veliky," battleship 156 Sleeping bag 272 Sleigh runner, nèw 162 Smith, a floating 7 Smoke consumer 13 Spur attachment 123 Stage, opera house 113, 117 Stanley, H. M. 399	A Aborigines of Japan	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 Bicycle support *500 Bird cage attachment *295 Bird life, study of 22 Bird sagring 387 Blast furnace plants, new 195 Block signal *477 Blowpipe apparatus *61 Blowpipe aboratory 160 Blowpipe oxyacetylene 135 Blue-prints, introduction 27 Blue-prints, wirting on 43 Boat, a globular *192 Roat, surfor, contest *456
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage sttachment 295 Bird driving 162 Bees, hiding place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 613 Boat, automobile, the 213 Boat, glass-bottom. 94 Boats, globular 192 Boats, gasoline, motor 496 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling. 481 Bottle house, a 677	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack," ice breaker. 360 Evaporator, sea water 337, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British. 407 Fire escape, British. 407 Fire elghter, automatic 49 Fireman, suit for 296 Fish, live, carriage of 66 Flatiron. electric 232	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural 478 Malting and brewing 285, 292 Mammoth, tooth of 60 "Marquess," dredger 4770 Match lighter, automatic 385 Meteorite, a huge 10 Meter, water, disk 161 Miami canal, electricity 25 Michaud apparatus, improved 386 Mine holsts, electric 437 Mine, submarine 330 Mine, submarine 330 Moostener, gummed paper 464 Monolith, an Idaho 139 Monocycle, novel 333 Moon, craters of the 233 Moon, craters of the 233 Moon, craters of the 233 Mootor boats 2, 3, 406	Sewing machine, invention of 65 65 Shaft fastening 444 Shart fastening 424 Shaving mug 162 Shears, pruning, new 229 "Shikishina," battleship 134 Shipt, turret, Venetian 181 Shutter, photographic 291 Signal, block 477 Signal, street express 408 Signaling, submarine 172 "Sissol Veliky," battleship 156 Sleeping bag 272 Sleigh runner, nèw 162 Smith, a floating 7 Smoke consumer 13 Spur attachment 123 Stage, opera house 113, 117 Stanley, H. M. 399	A Aborigines of Japan	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 Bicycle support *500 Bird cage attachment *295 Bird life, study of 22 Bird sagring 387 Blast furnace plants, new 195 Block signal *477 Blowpipe apparatus *61 Blowpipe aboratory 160 Blowpipe oxyacetylene 135 Blue-prints, introduction 27 Blue-prints, wirting on 43 Boat, a globular *192 Roat, surfor, contest *456
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage stachment 295. Bit, driv'ng 162 Bees, hid'ng place of. 219 Bending device 256 Block signal 477 Blowplipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom 94 Boats, gasoline, motor 496 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional. 483 Bottle house, a 67 Bottles, labeling 481 Box, cigarette, 500 Brace and riverer 400 Brace and riverer 400 Brace and riverer 400 Brace and riverer 400	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." ice breaker. 360 Evaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expeess signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British 407 Fire escape, British 407 Fire escape, British 407 Fire lin the Subway 315 Fire lighter, automatic 49 Fire lighter, automatic 49 Fire lighter, automatic 49 Firelighter, automatic 49	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing. 473, 480 Malting and brewing. 285, 292 Mammoth, tooth of 60 "Marquess," dredger. 470 Match lighter, automatic. 385 Meteorite, a huge 10 Meter, water, disk 161 Michaud apparatus, improved 386 Mine hoists, electric 437 Mine, submarine 330 Moistener, gummed paper 464 Monolith, an Idaho 139 Monocycle, novel 333 Mooto, craters of the 233 Motor, Franklin 82 Motor, gasoline 81, 249	Sewing machine, invention of 65 Shaft fastening	A Aborigines of Japan	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 Bicycle support *500 Bicycles, motor *159 Bird cage attachment *295 Bird life, study of 22 Bird soaring 387 Blast furnace plants, new 195 Block signal *477 Blowpipe apparatus *61 Blowpipe avgractylene 135 Blue-prints, introduction 27 Blue-prints, writing on 43 Boat, a globular *192 Boat, autonobile *213 Boat, glass-bottom *94 Boat, life-saving, novel 295 Boat raising, prize for 27
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage stachment 295. Bit, driv'ng 162 Bees, hid'ng place of 219 Bending device 256 Block signal 477 Blowplipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom 94 Boats, gasoline, motor 496 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional. 483 Bottle house, a 67 Bottles, labeling 481 Box, cigarette, 500 Brace and riverer 400 Brace	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." ice breaker. 360 Evaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expeess signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British 407 Fire escape, British 407 Fire escape, British 407 Fire lin the Subway 315 Fire lighter, automatic 49 Fire lighter, automatic 49 Fire lighter, automatic 49 Firelighter, automatic 49	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing. 485, 292 Malting and brewing. 285, 292 Mammoth, tooth of 60 "Marquess." dredger. 476 Match lighter, automatic. 385 Meteorite, a huge 10 Meter, water, disk 161 Michaud apparatus, improved 386 Mine holsts, electric 437 Mine, submarine 330 Molstener, gummed paper 464 Monolith, an Idaho 133 Monocycle course, somersault 159 Monocycle, novel 333 Motor, caters of the 233 Motor boats 2, 3, 406 Motor, Franklin 82 Motor, gasoline 81, 249 Motor, Tygard 212	Sewing machine, invention of 65 444 Shaft fastening 444 Shart fastening 444 Shaving mug 162 Shears, pruming, new 229 "Shikishima," battleship 134 Shipt, turret, Venetian 181 Shutter, photographic 291 Signal, block 477 Signal, street express 408 Signaling, submarine 172 Sleeping bag 272 Sleigh runner, new 162 Smith, a floating 7 Smoke consumer 13 Spur attachment 123 Stage, opera house 113, 117 Stanhope, gasoline 81 Starlishes 98 Starfishes 98 Starbandows, photography of 152 Steering device 90 Strainer for locomotives 367 Straw hat manufacture 440 Street express signal 408 Submarine "Protector" 218	A Aborigines of Japan	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 Bicycle support *500 Bicycles upport *159 Bird cage attachment *295 Bird sage attachment *295 Bird soaring 387 Blast furnace plants, new 195 Block signal *477 Blowpipe apparatus *61 Blowpipe, laboratory 160 Blowpipe oxyacetylene 135 Blue-prints, introduction 27 Blue-prints, writing on 43 Boat, auto-, contest *456 Boat, automobile *213 Boat, glass-bottom *94 Boat, life-saving, novel 295 Boat raising, prize for 27 Boats for war department 386 Boats, motor 406
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage sttachment 295 Bird driving 162 Bees, hiding place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 611 Boat, automobile, the 213 Boat, glass-bottom. 94 Boat, globular 192 Boats, gasoline, motor 406 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottles, labeling 481 Box, cigarette. 500 Brace and riveter 408 Brake, magnetic 152 Breadstufs, manufacture of 159 Brewing, scientific. 473, 480 Bridge, East River, illum-	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." ice breaker. 360 Evaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expeess signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British 407 Fire escape, British 407 Fire escape, British 407 Fire lin the Subway 315 Fire lighter, automatic 49 Fire lighter, automatic 49 Fire lighter, automatic 49 Firelighter, automatic 49	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing. 485, 292 Malting and brewing. 285, 292 Mammoth, tooth of 60 "Marquess," dredger. 476 Match lighter, automatic. 385 Meteorite, a huge 10 Meter, water, disk 161 Michaud apparatus, improved 386 Mine hoists, electric 437 Mine, submarine 330 Molstener, gummed paper 464 Monolith, an Idaho 133 Monocycle course, somersault 159 Monocycle, novel 333 Motor boats 2, 3, 406 Motor, Franklin 82 Motor, gasoline 81, 249 Motor, Tygard 212 Motosacoche, the 84	Sewing machine, invention of 65	A Aborigines of Japan	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 Bicycle support *500 Bicycles upport *159 Bird cage attachment *295 Bird life, study of 22 Bird soaring 387 Blast furnace plants, new 195 Block signal *477 Blowpipe apparatus *61 Blowpipe, laboratory 160 Blowpipe, laboratory 160 Blowpipe oxyacetylene 135 Blue-prints, introduction 27 Blue-prints, writing on 43 Boat, auto-, contest *456 Boat, automobile *213 Boat, glass-bottom *94 Boat, glass-bottom *94 Boat raising, prize for 27 Boats for war department 386 Boats, submarine, epritsh 151 Boats, submari
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage sttachment 295 Bird driving 162 Bees, hiding place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom. 94 Boat, globular 192 Boats, gasoline, motor 406 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottles, labeling 481 Box, cigarette. 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of. 169 Brewing, scientific. 473, 480 Bridge, East River, illumination 6 Bridge, Manhattan 57, 624	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack," ice breaker. 360 Evaporator, sea water 387 Exhibition, St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British. 407 Fire escape, British. 407 Fire escape, novel. 332 Fire in the Subway 315 Fire lighter, automatic 49 Fireman, suit for. 296 Fish, live, carriage of 6 Flatiron, electric 232 Flour milling. 177, 178 "Florencia," relics of 482 Fly catcher, novel 444 Forum at Rome, the 273 "Fuji," cruiser. 133 Fumes, noxious, distribut. 445 Furnace, glass 349	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing. 473, 489 Malting and brewing. 285, 292 Mammoth, tooth of. 60 "Marquess," dredger. 476 Match lighter, automatic. 385 Meteorite, a huge. 10 Meter, water, disk. 161 Milami canal, electricity. 25 Michaud apparatus, improved. 386 Mine, submarine. 330 Molstener, gummed paper. 464 Monolith, an Idaho. 139 Monocycle, novel. 333 Moon, craters of the. 233 Motor, boats. 2, 3, 406 Motor, Franklin. 82 Motor, gaseline. 81, 249 Motor, or gaseline. 88 Motor, Tygard. 212 Motors, automobile. 29	Sewing machine, invention of 65 shaft fastening 444 Shaft fastening 444 Shaving mug 162 Shears, pruning, new 229 "Shikishina," battleship 134 Ship, turret, Venetian 181 Shutter, photographic 291 Signal, block 477 Signal, street express 408 Signaling, submarine 172 Sleeping bag 272 Sleeping bag 272 Sleigh runner, new 162 Smith, a floating 7 Smoke consumer 13 Stage, opera house 113, 117 Stanhope, gasoline 81 Stankahows, photography of 152 Steering device 90 Strainer for locomotives 367 Straw hat manufacture 440 Street express signal 408 Submarine "Protector" 218 Substructure, railway 463 Subway, fire in the 312 Subway, rapid transit 453, 461 <	A Aborigines of Japan	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 Bicycle support *500 Bicycles upport *500 Bird cage attachment *295 Bird life, study of 22 Bird soaring 387 Blast furnace plants, new 195 Block signal *477 Blowpipe apparatus *61 Blowpipe, laboratory 160 Blowpipe, laboratory 160 Blowpipe oxyacetylene 135 Blue-prints, writing on 43 Boat, auto-, contest *456 Boat, automobile *213 Boat, glass-bottom *94 Boat, glass-bottom *94 Boat raising, prize for 27 Boats for war department 386 Boats, submarine, British 151 Boats, submarine, entrapping 288 "Bogatyr,"
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage sttachment 295 Bird driving 162 Bees, hiding place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom 94 Boats, globular 192 Boats, gasoline, motor 406 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottle house, a 67 Bottles, labeling 481 Box, cigarette. 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of. 169 Brewing, scientific 473, 480 Bridge, Manhattan 57, 622 Bridge, Manhattan 57, 622 Bridge, Manhattan 57, 622 Bridge, steel, at Oufa 308	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack," ice breaker. 360 Evaporator, sea water 337, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British. 407 Fire escape, British. 407 Fire escape, novel. 332 Fire in the Subway 315 Fire lighter, automatic 49 Fireman, suit for 296 Fish, live, carriage of 6 Flatiron, electric 232 Flour milling 177, 178 "Florencia," relics of 482 Fly catcher, novel 444 Forum at Rome, the 273 "Fuji," cruiser 133 Fumes, noxious, distribut 445 Furnace, glass 349	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing. 473 Malting and brewing. 285 Matting and brewing. 285 Mammoth, tooth of 60 "Marquess," dredger. 470 Match lighter, automatic. 385 Meterorite, a huge 10 Meter, water, disk 161 Michaud apparatus, improved 386 Mine hoists, electric 437 Mine, submarine 330 Molstener, gummed paper 464 Monocycle, novel 333 Mono, craters of the 233 Motor, Franklin 82 Motor, gasoline 81, 249 Motor, Tygard 212 Motors, automobile 29 Motosacoche, the 84 Mound, Cabokia 236	Sewing machine, invention of 65	A Aborigines of Japan	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 Bicycle support *500 Bicycles upport *500 Bird cage attachment *295 Bird life, study of 22 Bird soaring 387 Blast furnace plants, new 195 Block signal *477 Blowpipe apparatus *61 Blowpipe, laboratory 160 Blowpipe, laboratory 160 Blowpipe oxyacetylene 135 Blue-prints, writing on 43 Boat, auto-, contest *456 Boat, automobile *213 Boat, glass-bottom *94 Boat, glass-bottom *94 Boat raising, prize for 27 Boats for war department 386 Boats, submarine, British 151 Boats, submarine, entrapping 288 "Bogatyr,"
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage sttachment 295 Bird driving 162 Bees, hiding place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom. 94 Boat, globular 192 Boats, gasoline, motor 406 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottles, labeling 481 Bottles, labeling 481 Box, cigarette. 500 Brace and riveter 408 Brace and riveter 408 Brace, magnetic 152 Breadstuffs, manufacture of. 169 Brewing, scientific. 473, 480 Bridge, Manhattan 57, 622 Bridge, Manhattan 57, 622 Bridge, transporter 420 Bridge, Williamsburg 424 Bridges concrete 331	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack," ice breaker. 360 Evaporator, sea water 357, 364 Expedition, St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British. 407 Fire escape, British. 407 Fire escape, novel. 332 Fire in the Subway 315 Fire lighter, automatic 49 Fireman, suit for 296 Fish, live, carriage of 6 Flatiron, electric 232 Flour milling. 177, 178 "Florencia," relies of 482 Fly catcher, novel 444 Forum at Rome, the 273 "Fuji," cruiser. 133 Fumes, noxious, distribut 445 Furnace, glass G Gage, shingle 499 Gage, track 123	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing. 473, 480 Malting and brewing. 285, 292 Mammoth, tooth of 60 "Marquess," dredger. 470 Match lighter, automatic. 385 Meteorite, a huge 10 Meter, water, disk 161 Michaud apparatus, improved 386 Mine hoists, electric 437 Mine, submarine 330 Moistener, gummed paper 464 Monolith, an Idaho 139 Monocycle, novel 333 Mootor, craters of the 233 Motor, Franklin 82 Motor, Franklin 82 Motor, gasoline 81, 249 Motor, Ivel 86 Motor, Tygard 212 Motors, automobile 29 Motosacoche, the 84 Mound, Cahokia 236 Mower, lawn, steam <td< th=""><th>Sewing machine, invention of 65 shaft fastening 444 Shaft fastening 444 Shaving mug 162 Shears, pruning, new 229 "Shikishina," battleship 134 Ship, turret, Venetian 181 Shutter, photographic 291 Signal, block 477 Signal, street express 408 Signaling, submarine 172 Sleeping bag 272 Sleeping bag 272 Sleigh runner, new 162 Smith, a floating 7 Smoke consumer 13 Stage, opera house 113, 117 Stanhope, gasoline 81 Stankahows, photography of 152 Steering device 90 Strainer for locomotives 367 Straw hat manufacture 440 Street express signal 408 Submarine "Protector" 218 Substructure, railway 463 Subway, fire in the 312 Subway, rapid transit 453, 461 <</th><th>A Aborigines of Japan</th><th>Bees, queer hiding place 219 Bending device *256 Benzine adulteration 107 Berzellum 327 Bessemer, knighting of 290 Bicycle attachment *296 Bicycle support *500 Bicycles upport *500 Bird cage attachment *295 Bird life, study of 22 Bird soaring 387 Blast furnace plants, new 195 Block signal *477 Blowpipe apparatus *61 Blowpipe apparatus *61 Blowpipe oxyacetylene 135 Blue-prints, introduction 27 Blue-prints, wirting on 43 Boat, a globular *192 Boat, auto-, contest *456 Boat, glass-bottom *94 Boat, flee-saving, novel 295 Boat raising, prize for 27 Boats, motor 27 Boats, submarine, entrapping 288 "Bogatyr," cruiser, loss *442 Boiler scale</th></td<>	Sewing machine, invention of 65 shaft fastening 444 Shaft fastening 444 Shaving mug 162 Shears, pruning, new 229 "Shikishina," battleship 134 Ship, turret, Venetian 181 Shutter, photographic 291 Signal, block 477 Signal, street express 408 Signaling, submarine 172 Sleeping bag 272 Sleeping bag 272 Sleigh runner, new 162 Smith, a floating 7 Smoke consumer 13 Stage, opera house 113, 117 Stanhope, gasoline 81 Stankahows, photography of 152 Steering device 90 Strainer for locomotives 367 Straw hat manufacture 440 Street express signal 408 Submarine "Protector" 218 Substructure, railway 463 Subway, fire in the 312 Subway, rapid transit 453, 461 <	A Aborigines of Japan	Bees, queer hiding place 219 Bending device *256 Benzine adulteration 107 Berzellum 327 Bessemer, knighting of 290 Bicycle attachment *296 Bicycle support *500 Bicycles upport *500 Bird cage attachment *295 Bird life, study of 22 Bird soaring 387 Blast furnace plants, new 195 Block signal *477 Blowpipe apparatus *61 Blowpipe apparatus *61 Blowpipe oxyacetylene 135 Blue-prints, introduction 27 Blue-prints, wirting on 43 Boat, a globular *192 Boat, auto-, contest *456 Boat, glass-bottom *94 Boat, flee-saving, novel 295 Boat raising, prize for 27 Boats, motor 27 Boats, submarine, entrapping 288 "Bogatyr," cruiser, loss *442 Boiler scale
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage sttachment 295 Bird driving 162 Bees, hiding place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom 94 Boats, globular 192 Boats, gasoline, motor 406 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottle house, a 67 Bottles, labeling 481 Box, cigarette. 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of. 169 Brewing, scientific 473, 480 Bridge, Manhattan 57, 622 Bridge, Manhattan 57, 622 Bridge, Manhattan 57, 622 Bridge, steel, at Oufa 308	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." ice breaker. 360 Evaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British. 407 Fire escape, novel. 332 Fire in the Subway 315 Fire lighter, automatic 49 Firelliter, air 296 Fire lighter, automatic 49 Firenan, suit for 296 Fish, live, carriage of 6 Flatiron, electric 232 Flour milling. 177, 178 "Florencia," relics of 482 Fly catcher, novel 444 Forum at Rome, the 273 "Fuji," cruiser 133 Fumes, noxious, distribut 445 Furnace, glass 349 G Gage, shingle 499 Gage, track 123 Galley, English, old 181 Gasoline engine 249	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing 485, 292 Malting and brewing 285, 292 Mammoth, tooth of 60 "Marquess," dredger 476 Match lighter, automatic 385 Meteorite, a huge 10 Meter, water, disk 161 Minami canal, electricity 25 Michaud apparatus, improved 386 Mine holsts, electric 437 Mine, submarine 330 Molstener, gummed paper 464 Monolith, an Idaho 133 Monocycle, course, somersault 159 Monocycle, novel 333 Motor, Fanklin 82 Motor, gasoline 81, 249 Motor, Tygard 212 Motors, automobile 29 Motors, automobile 29 Motors, automobile 28 Mower, lawn, steam 87 Nawy, Japan	Sewing machine, invention of 65	A Aborigines of Japan	Bees, queer hiding place 219 Bending device *256 Benzine adulteration 107 Berzelium 327 Bessemer, knighting of 290 Bicycle attachment *296 *464 Bicycle support *500 Bicycles upport *500 Bird cage attachment *295 Bird life, study of 22 Bird soaring 387 Blast furnace plants, new 195 Block signal *477 Blowpipe apparatus *61 Blowpipe, laboratory 160 Blowpipe, laboratory 160 Blowpipe avyacetylene 135 Blue-prints, writing on 43 Boat, auto-, contest *456 Boat, automobile *213 Boat, automobile *213 Boat, glass-bottom *94 Boat, glass-bottom *94 Boat, glass-bottom *94 Boat, glass-bottom *94 Boat, glass-bottom *94 Boat, glass-bottom *94 Boat, glass-bottom *94 Boat, submarine, British *151 Boats, sub
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage attachment 259 Bird driving 162 Bees, hiding place of 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom 94 Boat, glass-bottom 94 Boat, glass-bottom 496 Boats, gasoline, motor 496 Boats, motor. 497 Bolier scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottle house, a 67 Bottles, labeling 481 Box, cigarette 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of 169 Brewing, scientific 473, 480 Bridge, East River, illumination 6 Bridge, steel, at Oufa 308 Bridge, transporter 420 Bridge, Williamsburg 424 Bridges, Williamsburg 424 Bridges, Content 756	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." ice breaker. 360 Evaporator, sea water. 367 Exhibition, St. Louis. 357, 364 Expeess signal, street. 408 Eye, photography of. 477 Filter, air. 292 Fire, Baltimore. 153, 217 Fire escape, British. 407 Fire escape, British. 407 Fire escape, novel. 332 Fire in the Subway. 315 Fire lighter, automatic. 49 Firelliter, air. 296 Fire lighter, automatic. 49 Firelliter, air. 496 Fire lighter, automatic. 49 Gage, shingle 499 Gage, track 123 Galley, English, old 181 Gasoline engine. 249 Gasoline motor 249 Gasoline motor 249 Gasoline motor 548	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing. 485, 292 Malting and brewing. 285, 292 Mammoth, tooth of 60 "Marquess." dredger. 476 Match lighter, automatic. 385 Meteorite, a huge 10 Meter, water, disk 161 Michaud apparatus, improved 386 Michaud apparatus, improved 386 Mine, submarine 330 Molstener, gummed paper 464 Monolith, an Idaho 133 Monocycle course, somersault 159 Monocycle, novel 333 Motor, Franklin 82 Motor, Franklin 82 Motor, rygard 212 Motors, automobile 29 Motors, automobile 29 Mower, lawn, steam 87 Navy, Japanese 133 Navy, Russian 157 Nipple, safety	Sewing machine, invention of 65	A Aborigines of Japan	Bees, queer hiding place 219
Battleships, United States. 363 "Bayan," ruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage sttachment 295 Bird driving 162 Bees, hiding place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom. 94 Boat, globular 192 Boats, gasoline, motor 406 Boats, motor. 497 Boller scale detector 132 "Bogatyr, ruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottles, labeling 481 Box, cigarette. 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of. 169 Brewing, scientific. 473, 480 Bridge, East River, illumination 6 Bridge, Manhattan 57, 622 Bridge, steel, at Oufa 308 Bridge, transporter 420 Bridge, transporter 420 Bridge, transporter 420 Bridges, concrete 331 Buckboard, Orient 76 Buckle, improved 499	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." ice breaker. 360 Expaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expeess signal, street 408 Eye, photography of 477 Filter, air 292 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British 407 Fire escape, British 407 Fire escape, novel. 332 Fire in the Subway 315 Fire lighter, automatic 49 Firenin, suit for 296 Fish, live, carriage of 6 Flatiron, electric 232 Flour milling. 177, 178 "Florencia," relics of 482 Fly catcher, novel 444 Forum at Rome, the 273 "Fuli," cruiser. 133 Fumes, noxious, distribut 445 Furnace, glass 349 Gage, shingle 499 Gage, track 123 Galley, English, old 181 Gasoline motor 249 Gasoline motor 5048 Gasoline motor Tygard 212 Geneva, view of 268	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing 485, 292 Malting and brewing 285, 292 Mammoth, tooth of 60 "Marquess," dredger 470 Match lighter, automatic 385 Meteorite, a huge 10 Meter, water, disk 161 Minami canal, electricity 25 Michaud apparatus, improved 386 Mine hoists, electric 437 Mine, submarine 330 Molstener, gummed paper 464 Monolycle course, somersault 159 Monocycle, novel 333 Motor pasoline 23 Motor, Franklin 82 Motor, Franklin 82 Motor, Tygard 212 Motors, automobile 29 Motosacoche, he 84 Mound, Cahokia 236 Mower, lawn, steam 87 Navy, Japanese	Sewing machine, invention of 65	A Aborigines of Japan	Bees, queer hiding place *219 Bending device *256 Benzine adulteration 107 Bersellum 107 Bersemer, knighting of 290 Bicycle attachment *296 Bicycle support *500 Bicycles upport *500 Bird cage attachment *295 Bird life, study of 22 Bird soaring 387 Blast furnace plants, new 195 Block signal 477 Blowpipe apparatus *61 Blowpipe, laboratory 160 Blowpipe, laboratory 160 Blowpipe oxyacetylene 135 Blue-prints, introduction 27 Blue-prints, introduction 27 Blue-prints, writing on 43 Boat, a globular *192 Boat, auto-, contest *456 Boat, glass-bottom *94 Boat, glass-bottom *94 Boat, glass-bottom *94 Boat, glass-bottom *94 Boat, glass-bottom
Battleships, United States. 363 "Bayan," ruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage sttachment 295 Bird driving 162 Bees, hiding place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom. 94 Boat, globular 192 Boats, gasoline, motor 406 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottle house, a 67 Bottles, labeling 481 Box, cigarette. 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of 169 Bridge, East River, Illumination 6 Bridge, Manhattan 57, 622 Bridge, steel, at Oufa 308 Bridge, transporter 420 Bridge, williamsburg 424 Bridges, concrete 331 Buckboard, Orient 76 Buckle, improved 499 Cabin, log, a real 67 Cab, hansom, gasoline 92 Cabin, log, a real 67	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." ice breaker. 360 Evaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British. 407 Fire escape, novel. 332 Fire in the Subway 315 Fire lighter, automatic 49 Firenan, suit for 296 Fish, live, carriage of 6 Flatiron, electric 232 Flour milling. 177, 178 "Florencia," relics of 482 Fly catcher, novel 444 Forum at Rome, the 273 "Fuji," cruiser. 133 Fumes, noxious, distribut. 445 Furnace, glass 349 G Gage, shingle 499 Gage, track 123 Galley, English, old 181 Gasoline engine 249 Gasoline motor 249 Gasoline motor 249 Gasoline motor 540 Gasoline motor Tygard 212 Geneva, view of 268 Glass, cut, large piece 341, 348 Glass front protector. 99 Gnu, blue, the 133	Magnets, lifting, electric. 436 Mail bag catcher. 368 Mail box, improved. 256 Mail box, rural. 478 Malting and brewing. 485, 292 Malting and brewing. 285, 292 Mammoth, tooth of. 60 "Marquess," dredger. 470 Match lighter, automatic. 385 Meteorite, a luge. 10 Meter, water, disk. 161 Michaud apparatus, improved. 386 Mine, submarine. 330 Moistener, gummed paper. 464 Monolith, an Idaho. 139 Monocycle, novel. 333 Moor, craters of the. 233 Motor, Franklin. 82 Motor, Franklin. 82 Motor, Tygard. 212 Motors, automobile. 29 Mover, lawn, steam. 87 Navy, Japanese. 133 Navy, Russian. 157 Niple, safety. 40 "Nissin," cruiser. 61 Nozzle, hose, new.	Sewing machine, invention of 65	A Aborigines of Japan	Bees, queer hiding place 219
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage sttachment 295 Bird driving 162 Bees, hiding place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom. 94 Boat, globular 192 Boats, gasoline, motor 406 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling. 481 Bottle house, a 67 Bottles, labeling 481 Box, cigarette 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of. 169 Brewing, scientific. 473, 480 Bridge, Manhattan 57, 622 Bridge, Manhattan 57, 622 Bridge, transporter 420 Bridge, Williamsburg 424 Bridges, concrete 331 Buckboard, Orient 76 Buckle, improved 99 Cabin, log, a real 67 Cage attachment 295 Calipers, improved 295 Calipers, improved 295	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." ice breaker. 360 Evaporator, sea water 357, 364 Expension St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British. 407 Fire escape, British. 407 Fire escape, novel. 332 Fire in the Subway 315 Fire lighter, automatic 49 Firenan, suit for 296 Fish, live, carriage of 6 Flatiron, electric 232 Flour milling. 177, 178 "Florencia," relics of 482 Fly catcher, novel 444 Forum at Rome, the 273 "Fuji," cruiser. 133 Fures, noxious, distribut 445 Furnace, glass 349 Gage, shingle 499 Gage, track 123 Galley, English, old 181 Gasoline engine 249 Gasoline motor 249 Gasoline motor 194 Gasoline motor 249 Gasoline motor 548 Gasoline motor 759 Gasoline motor 759 Ganu, blue, the 139 Grain valve 229 "Gromobol," cruiser. 156	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing 485, 292 Malting and brewing 285, 292 Mammoth, tooth of 60 "Marquess," dredger 470 Match lighter, automatic 385 Meteorite, a huge 10 Meter, water, disk 161 Minami canal, electricity 25 Michaud apparatus, improved 386 Mine hoists, electric 437 Mine, submarine 330 Molstener, gummed paper 464 Monolycle course, somersault 159 Monocycle, novel 333 Motor pasoline 23 Motor, Franklin 82 Motor, Franklin 82 Motor, Tygard 212 Motors, automobile 29 Motosacoche, he 84 Mound, Cahokia 236 Mower, lawn, steam 87 Navy, Japanese	Sewing machine, invention of 65	A Aborigines of Japan	Bees, queer hiding place 219
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage sttachment 295 Bird driv'ng 162 Bees, hid'ng place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom. 94 Boat, globular 192 Boats, gasoline, motor 406 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottle house, a 67 Bottles, labeling 481 Box, cigarette. 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of. 169 Brewing, scientific. 473, 480 Bridge, East River, illum- fination 6 Bridge, Manhattan 57, 62 Bridge, transporter 420 Bridge, transporter 420 Bridge, Williamsburg 424 Bridges, concrete 331 Buckboard, Orient 76 Buckle, improved 499 Cabin, log, a real 67 Cage attachment 295 Canlon of Colorado. 489 Canno of Colorado. 489 Canno of Colorado. 489 Canno of Colorado. 489 Canno of Colorado. 489	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." ice breaker. 360 Expaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expeess signal, street 408 Eye, photography of 477 Filter, air 292 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British. 407 Fire escape, British. 407 Fire escape, novel. 332 Fire in the Subway 315 Fire lighter, automatic 49 Firenlighter, automatic 49 Firellighter, a	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved. 256 Mail box, rural. 478 Malting and brewing. 485, 292 Malting and brewing. 285, 292 Mammoth, tooth of. 60 "Marquess," dredger. 470 Match lighter, automatic. 385 Meteorite, a huge. 10 Meter, water, disk. 161 Mindaud apparatus, improved. 386 Mine holsts, electric. 437 Mine, submarine. 330 Moistener, gummed paper. 464 Monolith, an Idaho. 139 Monocycle course, somersault. 159 Monocycle, novel. 333 Motor. 233 Motor boats. 2, 3, 406 Motor, Franklin. 82 Motor, Tygard. 212 Motor, Tygard. 212 Motor, Tygard. 212 Motor, Tygard. 212 Motor, automobile. 29 Motosacoche, the.	Sewing machine, invention of 65	A Aborigines of Japan	Bees, queer hiding place 219
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage sttachment 295 Bird driving 162 Bees, hiding place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom. 94 Boat, globular 192 Boats, gasoline, motor 406 Boats, motor. 497 Boiler scale detector 132 "Bogastyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottle house, a 67 Bottles, labeling 481 Box, cigarette 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of. 169 Brewing, scientific 4773, 480 Bridge, Manhattan 57, 622 Bridge, Manhattan 57, 622 Bridge, steel, at Oufa 308 Bridge, Wanhattan 57, 622 Bridge, Seconcrete 331 Buckboard, Orient 76 Buckle, improved 499 Cabin, log, a real 67 Cage attachment 295 Canno of Colorado. 489 Carbureter, automobile 295 Cannals, electricity on 25 Canno of Colorado. 489 Carbureter, automobile 295 Cannals, electricity on 25 Canno of Colorado. 489 Carbureter, automobile 295 Canno of Colorado. 489 Carbureter, automobile 295 Canno of Colorado. 480 Carbureter, automobile 225	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." lee breaker. 360 Expaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expeess signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British 407 Fire escape, British 407 Fire escape, novel. 332 Fire lighter, automatic 49 Fire lighter, automatic 40 Gasoline notor 233 Galley, Engilsh, old 181 Gasoline motor 549 Gasoline 549 Gasoline 540 Gasoline 5	Magnets, lifting, electric. 436 Mail bag catcher	Sewing machine, invention of 65	A Aborigines of Japan	Bees, queer hiding place 219
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage stachment 296, 164 Bird cage stachment 295 Bit, driving 162 Bees, hiding place of 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom. 94 Boat, globular 192 Boats, gasoline, motor 496 Boats, gasoline, motor 496 Boats, motor. 497 Boller scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottle house, a 67 Bottles, labeling 481 Box, cigarette 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of 169 Brewing, scientific 473, 480 Bridge, East River, illumination 6 Bridge, steel, at Oufa 308 Bridge, steel, at Oufa 308 Bridge, steel, at Oufa 308 Bridge, transporter 420 Bridge, steel, at Oufa 308 Bridge, transporter 420 Bridge, concrete 331 Buckboard, Orient 76 Buckle, improved 295 Cabin, log, a real 67 Cage attachment 295 Cafipers, improved 295 Canon of Colorado. 489 Carbureters, testing 30 Car, dumpling 13 Car, rapid transit 228	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." lee breaker. 360 Expaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expeess signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British 407 Fire escape, British 407 Fire escape, novel. 332 Fire lighter, automatic 49 Fire lighter, automatic 40 Gasoline notor 233 Galley, Engilsh, old 181 Gasoline motor 549 Gasoline 549 Gasoline 540 Gasoline 5	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved. 256 Mail box, rural. 478 Malting and brewing. 485, 292 Malting and brewing. 285, 292 Mammoth, tooth of. 60 "Marquess," dredger. 470 Match lighter, automatic. 385 Meteorite, a huge. 10 Meter, water, disk. 161 Minami canal, electricity. 25 Michaud apparatus, improved. 386 Mine holsts, electric. 437 Mine, submarine. 330 Molstener, gummed paper. 464 Monolycle course, somersault. 159 Monocycle, novel. 333 Moor. 235 Motor, Franklin. 82 Motor, Franklin. 82 Motor, Franklin. 82 Motor, Tygard. 212 Motors, automobile. 29 Motosacoche, he. 84 Mound, Cahokia. 236 Mower, lawn, ste	Sewing machine, invention of 65 shaft fastening	A Aborigines of Japan	Bees, queer hiding place 219
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage stachment 296, 164 Bird cage stachment 295 Bit, driving 162 Bees, hiding place of 218 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom 94 Boat, globular 192 Boats, gasoline, motor 497 Bolier scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottle house, a 67 Bottles, labeling 481 Box, cigarette 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of 169 Brewing, scientific 473, 480 Bridge, East River, illumination 6 Bridge, Manhattan 57, 62 Bridge, williamsburg 424 Bridges, teol, at Oufa 308 Bridge, transporter 420 Bridge, Williamsburg 424 Bridges, concrete 231 Buckboard, Orient 76 Buckle, improved 295 Canlas, electricity on 25 Canon of Colorado. 489 Carbureters, testing 30 Car, dumping 13 Car, rapid transit 228 Car replacer 408 Car, Regas 82 Car replacer 408 Car, Regas 82	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." lee breaker. 360 Expaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expeess signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British 407 Fire escape, British 407 Fire escape, novel. 332 Fire lighter, automatic 49 Fire lighter, automatic 40 Gasoline notor 233 Galley, Engilsh, old 181 Gasoline motor 549 Gasoline 549 Gasoline 540 Gasoline 5	Magnets, lifting, electric. 436 Mail bag catcher 368 Mail box, improved 256 Mail box, rural. 478 Malting and brewing. 485, 292 Malting and brewing. 285, 292 Mammoth, tooth of 60 "Marquess," dredger. 470 Match lighter, automatic. 385 Meteorite, a huge 10 Meter, water, disk 161 Mindaud apparatus, improved 386 Mine hoists, electric 437 Mine, submarine 330 Moistener, gummed paper 464 Monolith, an Idaho 139 Monocycle, course, somersault 159 Monocycle, covers, somersault 150 Monor, reaters of the 233 Motor boats 2, 3, 406 Motor, Franklin 82 Motor, Tygard 212 Motor, Tygard 212 Motor, Tygard 212 Motor, Tygard 212 Motor, Sautomobile 29 Mower, law	Sewing machine, invention of 65 shaft fastening	A Aborigines of Japan	Bees, queer hiding place 219
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 259 Bird cage attachment 295 Bit, driv'ng 162 Bees, hidi'ng place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom 94 Boat, globular 192 Boats, glass-bottom 497 Bolier scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottle filling 481 Box, cigarette 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of 152 Breadstuffs, manufacture of 168 Bridge, East River, illumination 6 Bridge, Manhattan 57, 62 Bridge, teel, at Oufa 308 Bridge, transporter 420 Bridge, Williamsburg 424 Bridges, concrete 231 Buckboard, Orient 76 Buckle, improved 295 Canlas, electricity on 25 Canon of Colorado 489 Carbureters, testing 30 Car, dumping 13 Car, rapid transit 228 Car, sleeping, electric 60 Car, touring, Coloumbia 92 Car, sleeping, electric 60 Car, touring, Coloumbia 92 Car, sleeping, electric 60 Car, touring, Coloumbia 92	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." lee breaker. 360 Expaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British 407 Fire escape, British 407 Fire escape, British 407 Fire escape, novel. 332 Fire lighter, automatic 49 Firelighter, automatic 49 Firelighte	Magnets, lifting, electric. 436 Mail bag catcher	Sewing machine, invention of 65 shaft fastening	A Aborigines of Japan	Bees, queer hiding place 219
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 259 Bird cage attachment 295 Bit, driv'ng 162 Bees, hidi'ng place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom 94 Boat, globular 192 Boats, glass-bottom 497 Bolier scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottle filling 481 Box, cigarette 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of 152 Breadstuffs, manufacture of 168 Bridge, East River, illumination 6 Bridge, Manhattan 57, 62 Bridge, teel, at Oufa 308 Bridge, transporter 420 Bridge, Williamsburg 424 Bridges, concrete 231 Buckboard, Orient 76 Buckle, improved 295 Canlas, electricity on 25 Canon of Colorado 489 Carbureters, testing 30 Car, dumping 13 Car, rapid transit 228 Car, sleeping, electric 60 Car, touring, Coloumbia 92 Car, sleeping, electric 60 Car, touring, Coloumbia 92 Car, sleeping, electric 60 Car, touring, Coloumbia 92	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." lee breaker. 360 Expaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British 407 Fire escape, British 407 Fire escape, British 407 Fire escape, novel. 332 Fire lighter, automatic 49 Firelighter, automatic 49 Firelighte	Magnets, lifting, electric. 436 Mail bag catcher	Sewing machine, invention of 65 shaft fastening	A Aborigines of Japan	Bees, queer hiding place 219
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 259 Bird cage attachment 295 Bit, driv'ng 162 Bees, hidi'ng place of. 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom 94 Boat, globular 192 Boats, glass-bottom 497 Bolier scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottle filling 481 Box, cigarette 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of 152 Breadstuffs, manufacture of 168 Bridge, East River, illumination 6 Bridge, Manhattan 57, 62 Bridge, teel, at Oufa 308 Bridge, transporter 420 Bridge, Williamsburg 424 Bridges, concrete 231 Buckboard, Orient 76 Buckle, improved 295 Canlas, electricity on 25 Canon of Colorado 489 Carbureters, testing 30 Car, dumping 13 Car, rapid transit 228 Car, sleeping, electric 60 Car, touring, Coloumbia 92 Car, sleeping, electric 60 Car, touring, Coloumbia 92 Car, sleeping, electric 60 Car, touring, Coloumbia 92	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." lee breaker. 360 Expaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British 407 Fire escape, British 407 Fire escape, British 407 Fire escape, novel. 332 Fire lighter, automatic 49 Firelighter, automatic 49 Firelighte	Magnets, lifting, electric. 436 Mail bag catcher	Sewing machine, invention of 65 shaft fastening	A Aborigines of Japan	Bees, queer hiding place 219
Battleships, United States. 363 "Bayan," cruiser 149 Beer, Pasteurizing. 481 Bicycle attachment 296, 464 Bicycles, motor 159 Bird cage stachment 296, 164 Bird cage stachment 296 Bird driving 162 Bees, hiding place of 219 Bending device 256 Block signal 477 Blowpipe, simple 61 Boat, automobile, the 213 Boat, glass-bottom 94 Boat, globular 192 Boats, glass-bottom 496 Boats, gasoline, motor 497 Bolier scale detector 132 "Bogatyr," cruiser 442 Bookcase, sectional 483 Bottle filling 481 Bottle house, a 67 Bottles, labeling 481 Box, cigarette 500 Brace and riveter 408 Brake, magnetic 152 Breadstuffs, manufacture of 169 Brewing, scientific 473, 480 Bridge, East River, illumination 6 Bridge, Milliamsburg 424 Bridges, steel, at Oufa 308 Bridge, transporter 420 Bridge, Williamsburg 424 Bridges, concrete 231 Buckboard, Orient 76 Buckle, improved 295 Canlas, electricity on 25 Canon of Colorado 489 Carbureters, testing 30 Car, dumping 13 Car, rapid transit 228 Car replacer 488 Car, Regas 82 Car, sleeping, electric 60 Car, touring, Columbia 92	Engines, locomotive, control. 477 Erie canal, electricity on 25 "Ermack." lee breaker. 360 Expaporator, sea water 367 Exhibition, St. Louis. 357, 364 Expedition, Abruzzi 252, 272 Express signal, street 408 Eye, photography of 477 Filter, air 292 Fire, Baltimore 153, 217 Fire escape, British 407 Fire escape, British 407 Fire escape, British 407 Fire escape, novel. 332 Fire lighter, automatic 49 Firelighter, automatic 49 Firelighte	Magnets, lifting, electric. 436 Mail bag catcher	Sewing machine, invention of 65 shaft fastening	A Aborigines of Japan	Bees, queer hiding place 219

Buildings, Dept. Agricult 495 Bulkheads, longitudinal 344	Electricity in household*232	Insects. winter	Navy and army 5 Navy, Brit., program for 1904 227	Railway, Vesavius, new 270 Railway, working, single phase 271 Railways of London 310	Telegraphy, wireless, Germany
Cable, Borkum-New York 174 Cables, tension regulator for *442	Electricity on Miami Canal. *25 Electrode, zinc amalgam 174 Electrostatics a fiction 475 Electrolysis phenomenou	32, 50, 68, 102, 123, 140 163 183, 202, 219, 238, 257, 277 297, 316, 334, 351, 370, 391 411, 427, 446, 467, 483, 501	Navy, Japanese*134 Navy, Japanese, disasters*438 Navy, Japanese, fuel supply 131 Navy, Russian*157	Railways, narrow-gage	Telegraphy, wireless, on tugs 8 Telephone service in Japan 111 Temple, Buddhist, Amer*460 Tension regulator cable *445
Cabin, log, real *67 Cacodyl, cyanide of 191 Cactus; water from 323 Cage, bird, attachment *295 Calcium carbide industry 455	new	Inventions, oddities in.*49, *162 296 Investigation, scientific 39 Invoice, Priestley's*422 Irrigation in the Punjab 346	Navy, U. S., growth of	Rays, infra-red, polarization 267 Rays, N, emission by body 170	Tennis racket, new *464 Tent, portable *445 Termitariums
Calcium, cheap production 458 Calipers, in.proved *295 Cameos and their hist 491 Camphor, artificial 28	ing	Iron industry in Belgium. 160 Iron ore deposit, enormous. 138 Iron ore supply, our	150, 171 Newspaper illustration	Rays, N, from vegetable org. 267 Rays, N, recent exper	22, 59 Theater, floating
Canal, Baltic-Black Sea	Enginees, gasoline, novel*249 Engineers, building for251 Engineering, civil4 Engineering Club, Union40	.) Jack, lifting*123	Nipple, safety *49 'Novik,'' cruiser *178 Nozzle, fire hose, new 333 Nozzle, bose, new *295 Nozzle, Swift *173	Rays radium	Tie, concrete
Canal, ship, first modern 248 Canal systems, improvement 310 Canals, electricity on *25 Canals of Mars 219 Canon, Grand, Colorado *494	402, 423, 494 "Ermack," ice-breaker*360	Japan and Russia, navies. 58 Japan, commercial	Nutrition, phys. economy in 366	Relics, Spanish Armada*482 Reptile, a harmless*47 Retina. photography of*477	on
Car, double-deck 271 Car, dumping, new *13 Car fender, improved 175 Car illumination 230	Exhibition, floating	Jolo treaty, phonograph in. *66 Jupiter, satellites of, photog.*443 Jupiter, surface currents*197	Oak pruner beetle, the*179 •bservatory, naval, Samoa 171 Ocean, Antarctic, depth	Reservoirs, oil, California*141 Retrospect of 1903	Tonneau, electric, Wood's*79 Tonneau, Franklin*83 Tool for automobiles*88 Tooth of a mammoth119
Car replacer *408 Car, street, electric, exper 347 Car, touring, Columbia *92 Car, touring, gasoline *77 Car, touring, Knox *82	Exposition, internat. of 1905 66 Exposition. St. Louis 858, *364	K Kansas River, flooding of 131 "Kasaga," cruiser*61	•il fuel, military value 474 •il, surface indications 474 •il tank, removal of an*138 •iler. loose pulley*499	Riveter and brace	Torpedo boat destroyer*214 Torpedo boat destroyer "Eden"
Car, touring, Pope*76 Car, touring, Winton*79 Cars, call for stronger	Express can	"Kentucky," battleship. 474 King, John S., death of. 236 Knife, carving, a large. 383 Korea and the U. S. 63 Korea, commercial. 250	organs, pipe, greatest of*328 Ore, iron, our supply of 382 ore loader, automatic*288	Rowing attachment*296 Rubber supply, diminution 327 Ruins, preservation of 151 Runabout, autocar*87	Torpedo boat or battleship. 358 Torpedo boat in mod. warf. *387 "Torque," meaning of 175 Touring car, Thomas *80
Cars, Pullman in accidents.*117 Cars, railroad, strength of 27 Cars, sleeping, electric *60	Eye, photographing the*477	Korea, gold in	Ore-sampling machine*256 Ore smelting, electric	Runabout, steam*87 Runabout, Waverly*92 Russia and Japan, navies 58 Russia and U. States, trade 118 Russia, last hope at sea*293	Tower Eiffel, preservation of 130 Track gage, automatic
Cars, the Mitchell *83 Cars, touring, of 1904 *79 Carbon, melting of 291 Carbon wool 47 Carbolinium 327	Falls, Victoria, possibilities. 43 Farm animals, census of 274 Farm labor wages 160 Fat series, heat of combust. 227 Faucet. a new 333	Labor problem	Ostrich farm, Carolina	Russia, losses of	Traction, electric, railway 111 Traction, electric, tests 382 Traction of man and animals.*289 Traction, steam and electric 275
Carnegie grants	Fence, a long	Lamp, arc, new *49 Lamp, Hewett, the 43 Langley, S. P *194 Launch, high speed *213	ezone in water purification 310	S Saddle, riding*161 Salt, solar, industry296	Tractor, military, prize *83 Trade mark infringement 409 Traffic, London, statistics 326 Trains, moving, noise of 108 Trains, stoppage of 155
of	Fire, Adams Express	Lawn sprinkler *162 Lawn mower, steam *87 Law, patent, elements of .465 Lead glaze rule, British 179 Leaves, autumn, color of 23	P	Salt water fire protection 170 Salt water for fire protection 246 Salt water vs. fires 291 Sanding device, pneumatic 310 Sabal ballon Written	by
Caves at Chiselhurst 323 Cautery, instrument for *296 Cement, Portland, discoverer of 368 Census, first, cost of 67	Fire escape, new*332 Fire escapes, British*407	Leopard, snow, the*216 Letter box, rural*478	Paper, asbestos*120 Paper, gummed, moistening.*464 Paradox, another*495	323, 343, 455, 475, 491	Transportation bridge, English*420 Transportation, electrical 155 Trans-Siberian railway*308
Chafing dish, electric *232 Chair, railway *444 Cheddar, discoveries at 475 Chemistry, studies in 273	Fire in the Subway*315 Fire protection, salt water. 170 Fire service, motive power	Letter press, hydraulic. *367 Library, Turin, fire. 139 Life saving apparatus. *406 Life saving globe. *426 Light, actinic. 251	Passenger cars, strong22, 27 Patent, a sewing machine 48 Patent claim, importance of 140	"Scooter" the *201 Searchlight, biggest 329 Sea water, distillation of *400 Sea water evaporator *367	Tricycle, electric
Chiselhurst, caves at 323 China, empress, safeguarding 130 Chloform apparatus, new *24 Chronograph, railway *49 Chronometer, electric, new*325	Fires, theater	Lighter, match, automatic *385 Lighthouse off Cape Hatteras.*462 Liquid, surface tension 108	Patent decision, English 140 Paper, invention of 151 Patent, numbering machine 48	Seri Indians, exped. to 307 'Sirra,' motor schooner 108 Sewage treatment, Brunn 441 Sewing machine, electric*232	Tunnel construction, syst 382
Clamp, compressed air*173 Clipper, wonderful	Wigh live corrigge of #6		Patent practice, history of 276 Patents, brief notes on 236, 296	Sewing machine, invention *65 Shaft fastening *445 Shaving mug, improved *162 Shears, pruning, new *229	Tunnel disaster, Paris 109 Tunnel, Hudson River, 114, *253, *324 Tunnel, North River 226
Clock, Horal	Flatiron, electric	Locomotive, Part Consumption 230 Locomotive, De Glehn*228 Locomotive, electric	Patents, exhibition of 368 Patents for inoperat. devices 409 Pele Club. the	Ship canal, first modern 248 Show, automobile, Paris *84	Turbine, 11,000 h. p*229 Turbine, Curtis, 5,000 kw 26 Turbine engines for Cunarders 306 Turbine liner transatlantic 122
Clothing, manufacture of*404 Clothing rack, new*445 Coal, first discov. in U. S 218 Coal in Brazil	Flour milling, modern*176	Locomotive, safety*132 Locomotive, working, oldest. *28 Locomotive test, German 479 Locomotive, trials of 139 Locomotives, auto control*477	Perspectartigraph, the 268 Petroleum briquettes 271 Petroleum fires	Shutters, photo, timing of.*291 Signal, street express*408 Signaling, submarine*172 Silkworm culture459	Turbines, steam, floor-space 109 Turbine, steam, in marine work
Coal, pulverized 346 Coal-saving apparatus 326 Coaling warships at sea *293 Cocoanut fat 607 Coffee berries, analysis of 151	Fogs, dispersing 67 Fogs, dispersion of 115 Forcing plants by fire 150 Formetal 83	Lock for umbrellas	Phaetons, glass-front protec- tors	Smithson body of arrival 118	Turin library fire 139
Coherers, working of 190 Coin holder *123 Collisions, rear 398 Columbus, problem of 294	Forum, Roman, discoveries in 59 Forum, Roman, excavations.*273 Fraud, procurement by 465 Frederick, Sergeant, death of 43 Frost on show windows 115	Loom, Jacquard, damask 407 Looms, Ainu	Photography of star shadows.*152 Photography of the retina*477 Photograph, the largest*193 Photolinol	Smoke consumer*13	Turpentine gathering, method 23 Turrets, battleship
Comet, a new	Fuel, oil, military value	M Magnets, lifting, electric*436 Mail, carrying of the 463	Pigeon, carrier, service	Snyder, F., death of 31 Soap from tree 497 Soaring, bird 387 Soaring flight 242	Unicycle, a novel*332 United States in 1903247 United States and Russia,
Competition, unfair, case. 237 Concrete piling *248 Concrete, reinforced 155 Conduits, underground 27	G Gage, shingle*499	Mail-bag catcher *368 Mail box, improved *256 Mail box, rural delivery *478 Mails, conveyance, record 437	Pipes, frozen, thawing*231 Planets, observation of 383	Sodium, bisulphate	trade
Consumption, electricity in. 43 Consumption, immunity from 230 Consumption, treatment 403 Converters, rotary 288 Cooking device, camp *123	Gage, track, automatic*123 Galvanometer, chord	Malting *292 Malting and brewing *480 Mammoth, discovery of a 181 Mammoth tooth 119 Mammoth, tooth of a *60	Plants, climbing of 8 Plants, experiments on	Springs, spiral, large	Valve for elevators *193 Valve, grain, new *229 Valve mechanism *255 Valve, rotary, sawmill 192
Cooling, artificial	Gasoline engine, novel*249 Gasoline engines, Leader's 27 Gasoline motor, airship*249 Gasoline motor boats 406 Gasoline motors, improved 386	Manganese alloys	Polar regions	Sprinkler, lawn	Vapor generator
Coupling, electro-mechanical 310 Coupling, pipe	Gasoline motor, Tygard*212 Gasoline Stanhope*81 Generators, wind-dr., farming 490 Geographical Soc., Philada362 Geometry, non-Euclidean39	Marine, merchant, U. S 454 Mars canals of 219	Port Arthur, blocking of 286 Port Arthur disaster 418 "Protector," submarine 479 Portraits autoplastic process *402	Starfishes *98 Star shadows, photography of. *152 Stars, brightness of 107 Stations, electrical 155	W Wagon gearing, new 483
Crulser "Adzuma" *1.34 Crulser "Bogatyr," loss of . *442 Crulser "Novik"*178 Crulsers, armored, new	Geranium oil, melting point. 23 Glesel emanation body, the 307 Gilsonite, how used	Match lighter, automatic*385 Marey, E. J., death of	Prints, blue	Steam radiation	Wagons, steel, new
Crystals, light in 307 Cyclograph, the *421 Cypress, the 366 Curie declines medal 119	Glass, cut, manufacture of.*348 Glass front protector*90 Glass, how to turn483 Gnu, blue, the*139 Gold, action of hydrochl. acid 249	Microbalance, Salvioni's	"Protector," submarine*218 Pulling of man and animals.*289 Pullman cars in accidents*117	Steel industry in Belgium 160 Steel roads, rural 286 Steel rolling, recent work in 271 Steering device, Brown-Lipe *90 Steering, electric	Warships, German
Curling-iron heater*232	Gold, estimat., electrolyt. meth	Milk, skimmed, new use	Python, how it eats *31	St. Marks, crypt of	Water meter, disk*161 Water pipes, frozen, melting 200 Water pipes, thawing 327
Dam, Assouan	Grain valve, new*229 Grate area experiments	Mineral, a new	Race, Gordon-Bennett 327 Race, motor-boat *497 Racer, Ford *90	Strainer for locomotives*367 Straw hat manufacture*440 Submarine and searchight 288 Submarine, blindness266 Submarine construct., Brit151	Water-plane principle, appl. 479 Water-power, develop, cost of
Danysz, Dr., discovery of 58 Darkness, effect on animals, 322	Gun, man behind the 150 Gun, wire wound, 6-inch*361 Gun, wire-wound, 9.2-inch*250 Guns, naval, Russian	"Missouri" disaster, the 459 Medicine, advance in 59 Metal powders, electrolytic 268 Meteorit 290 Meteorites and collectors 10	Radio-active bodies	Submarine for coast defense 210 Submarine, lake, test of 87 Submarine "Protector" *218 Submarine "Protector" 479	Water shade, a*173 Water still infringement 465 Water supply, New York 342 Water wheel, Burden, Troy 296
Diamonds of So. Africa 420 Diamonds, fluorescent 171 Dikes in Kentucky 43 Dimidiation in heraldry 455 "Discovery," ship, British 312	Guns of Russian army*400 Guns, premature firing 347	Meter, water, disk*161 Models, inventors', disposal of 462 Modeling animals in clay*496 Monument, Sheepeater's215	Radium, action on metals. 359 Radium and aluminium 383 Radium and radio-activity. 131 Radium banquet 155 Radium, blackening of glass 455	Subway extension, future 246 Subway, New York, fire in*315	Waterworks, boring for 443 Waters, mineral, and radium 131 Wave detector, a novel 8 Weather vane, simple 87 Weevil, cotton-boll271, 290, 438
Di-methylarsine cyanide 191 Distilling apparat. sea water.*400 Divers, training of*457	Handkerchief, an old 138 Harrow tooth	Moon, our knowledge of *232	Radium bromide emanation 455 Radium clock 403 Radium emanations	Sulphur of Sicily	Welding aluminium, machine.*325 Westrumite, experim. with 386 Whale carcasses, utilizing 344 Wheel for vehicles*310
Drawing instrument, novel. *268 Dredge attachment. *500 Dredger 'Marquess' *476 Drill, Bates, patent 182	Haswell, C. H., birthday 435 Hats, straw, manufacture of.*440 Heat, latent, discoverer of 441 Heating, new system of 195 Heavens in January 9 Heavens in February 119 Heavens in March 195	Morris canal condemned 346 Mosquito, disease carrier. 287 Motosacoche, the *84 Motor, agricultural *80	Radium, how obtained,98 Radium, luminous phenom386 Radium, mysteries96 Radium phenomena108	Sun, atmosphere cf. 343 Sun charlot, a Viking 8 Sun spots, utility of. 475 Sunfish, deep-sea. *30 Superheaters, locomotive 495 Superheater Pulpok *442	Wheel, trolley
Dumping car, new *13	Heavens in May	Motor boat races. Monte Carlo*351	Railroad fatalities 418	Surrey, electric *92	Windows of the sea *94 Wind pressure at Eiffel tower*230 Wind vane, home-made 439
E Eagle two-headed symbol 455	Hale, Prof., medal for 178 Hook, safety 173 Hose nozzle, new 295 Horse, a long-maned 113	Motor for airships	Railroad run, record	Survey, magnetic, Maryland 23 Sword exercise, Japanese*235 Sword making, Japanese*269 Synchronizing, suppression of 181 T Tammany and new bridge58 Tank, oil, moving an*138 Tarquinia, discoveries at475	Winter insects
Eagle, two-headed, symbol . 455 Earth, magnetic energy of. 23 Earths, rare, Oklahoma 329 Earthquake in Lima	Hydroscope, success of 131	Motors, gasoline, improved 386 Motors, gasoline, Leader's 27 Motors, series 231 Mound groups of U. S 236 Mount Vernon threatened 436	Rail, third, contact shoe*368 Rail, third, protector*161 Railway chair, new*444 Railway, Chinese, new 481 Railway, electric, Rome-	Tammany and new bridge 58 Tank, oil, moving an*138	Wool, carbon 47 Worlds, mystery of 215 Weights, Brit. standard, new 43 Wrench, a new *388 Wright, Carroll D *115
"Eden," torpedo boat des 271 Edison and Patent Office 490 Edison, birthday of 181	Ice-breaker "Ermack"*360	Museum, civic, New York 495 Museum, British, how started 442	Railway fatalities	Telegraph cables, overhead 173 Telegraph in Congo 247 Telegraph, wireless, De For-	¥
Eduson memorial	Ignition, defective, auto 215 Illustration, newspaper 63 Inca civilization	"Narval," submarine; collision	Railway, Sloerian, commerce 346 Railway, sliding	est *40 Telegraphy and telephony, 327, *459 Telegraphy, Delany system *249 Telegraphy of pictures. 290 Telegraphy, sound. 172 Telegraphy, wireless. 5	Yacht "Ingomar"
174, 231, 271, 291, 327, 458 Electricity from light*476	'Ingomar,' yacht*385 Insects, temperature of 191	Naval powers, strength of. 114 Navigation, aerial 4	Railway, trans-Siberian*308 Railway, underground, Berlin 291	Telegraphy, sound	Zeppelin experiments of 331 Zinc, white, from slag 43

Founded by Mathew Carey, 1786. A' House in touch with Three Centurie HENRY CAREY BAIRD & CO., INDUSTRIAL PUBLISHERS, BOOKSELLERS & IMPORTERS. 810 Walnut St., Philadelphia, Pa., U.S.A.

LEF Our New and Revised Catalogue of Practical and Mediatry, Mining, Prospecting, Mineralogy, Geology, Assaying, Analysis, etc.; a Catalogue of Books on Steam Engine, Machinery, etc., a Catalogue of Books on Steam Engine, Machinery, etc., a Catalogue of Books on Steam Engine, Machinery, etc., a Catalogue of Books on Stantiary Science, Gas Fitting, Prumbing, etc., and our other Catalogues and Circulars, the whole covering every branch of Science applied to the Arts, sent free and pressed prostage to anyone in any part of the world who will furnish his address.

The other place

is full of men whose greatest regret is that their wives and children were left unprovided for. How easy it would have been to have made the future of their loved ones secure. May we send you our little booklet telling "how"? We insure by mail.

PENN MUTUAL LIFE INS. CO. PHILADELPHIA



Save Your Valuables! SECRET SAFE-DEPOSIT BOXES!

For HOMES! All sizes, papers, jewelry, table silver, \$5.00 up, charges prensit. Securely anchor in wall, desk, dresser, trunk, etc. Send postal for free description. LOWRIE SAFE & LOCK CO. Flatiron Bldg., N. Y. City.

Insure You

against all loss and guarantee at least 200 per cent. per annum on your investment in a



Dean Boiler Tube Cleaner

Order one on trial. If the cleaner has not paid for itself in six months' use and given complete satisfaction, we will refund your money.

WM. B. PIERCE CO. 319 Washington Street, Buffalo, N. Y.

STIMULATION without IRRITATION Means New Life to the Scalp.

Means New Life to the Scaip.

The Evans Vacuum Cap gives the scalp a thorough massage and encourages a free and healthful circulation without rubbing and without the use of drugs or irritants. It will stop hair from falling out and restore a normal growth where live follicles exist. The Cap is used about fen minutes twice a day and its effects are pleasant from the very beginning. We will retund your money in full if results are not satisfactory after a thirty days' use. Call on or address EVANS VACUUM CAP CO.

ST. LOUIS OPPER, EUBIETON Building.

NEW YORK OPPER, 1300 Bread way.

NEW YORK OPPER, 1300 Bread way.

NEW YORK OPPER, 1300 Bread way.

MIND the MICROBES!



You get them in all ordinary drinking water. Before drinking purify it. You can transform it into pure water in the surest and quickest way by using the well-known

which is so constructed as to eliminate from the water all foreign bodies. One gallon of pure water in 4 minutes. Easy to clean, easy to care for.

BERKEFELD FILTER CO., 4 Cedar Street, New York





Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. Handbook on Patents sent free. Oldest agency for securing patents. Patents taken through MUNN & Co. receive Special Notice, without charge, in the

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers MUNN & CO.361 Broadway, NewYork

Branch Office 625 F St. Washington, D. C.

| Windmill, L. Joyce | 122,318 | Window casement stay, C. J. Fooks | 762,296 | Window etc., fastener, J. A. Belk | 762,368 | Window frame, N. E. Parish | 762,631 | Window horizontally pivoted, H. B. Hiteshew | 762,634 | Window lock, J. T. Myers | 762,634 | Window lock, J. T. Myers | 762,634 | Wire attachment, earth or ground, J. J. O'Connell | 762,341 | Wire connection, feed, G. L. Osborn | 762,341 | Wire stretcher, W. R. Lott | 762,327 | Wire tightener, T. J. Corrigan | 762,341 | Wire stretcher, W. R. Lott | 762,327 | Wire tightener, T. J. Corrigan | 762,369 | Wrench, J. W. Todd | 762,456 | Wrench, J. W. Todd | 762,456 | Wrench, L. Kules | 762,537 | Wrench, C. U. Reams | 762,537 | Wrench, W. Leach | 762,592 | Wrench, S. M. Rowe | 762,762 | Wrench, S. M. Rowe | 762,762 | Wrench, I. Weisnek | 762,762 | Wrench, I. Weisnek | 762,764 | Wrench, I. Weisnek | 762,764 |

DESIGNS.

Belt, waist, L. Hauser	36,979
Cards, back for playing, S. N. Barker	36,963
Cards, front for playing, J. G. A. Fortier	36,96+
Casket trimming, W. E. Stevens	36.982
Chafing dish or casserole stand, C. Rohlfs	36,972
Hat ornament, C. Nuebling36,977,	36,978
Lamp, A. H. Humphrey	36,976
Mantel, F. A. Broadbent	36,984
Mirrors, brushes, or similar toilet articles,	
back for, G. H. Berry36,965 to	36,968
Pillow sham or similar article, R. Zedler	
Robe, P. Bellisio	36,981
Silver, plated, or similar ware, metal orna-	
ment for, G. H. Berry36,969 to	
Souvenir brick, H. J. Reynolds	36,962
Stove, H. W. Beattie	36,986
Vehicle seat, C. H. Davis	36,985

TRADE MARKS.

LABELS.

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1863, will be furnished from this office for 10 cents, provided the name and number of the patent desired and the date be given. Address Munn & Co., 361 Broadway, New York

Canadian patents may now be obtained by the inventors for any of the inventions named in the foregoing list. For terms and further particulars address Munn & Co., 361 Broadway, New York.



Roof/Leak?

Ellictt's Durable Asphalt Coating

(Is composed of pure Utah Asphalt. Prepared Linseed-Oil and Pine Creosote)

applied on an old leaky shingle, tin or felt roof will make it absolutely waterproof. Stops the rusting process in tin or iron, and stops warping or rotting of shingles. Will add ten years to the life of a new or old roof.

- ¶ ROOF LEAK is the most durable sun or winter proof paint or coating possible to make. Does not crack in winter or soften in summer. Easily applied. Imparts no taste to water.
- ¶ ROOF LEAK SHINGLE DIP renders the wood absolutely weatherproof, and when the shingles are nailed on the roof they become cemented together so tightly that warping which causes cracked shingles and loose nails is positively prevented.
- ¶ ROOF LEAK is shipped in the heavy liquid cement form, and is applied as received on worn and leaky surfaces. It is reduced with one quart of boiled linseed-oil to each gallon if used as a durable paint on surfaces in good condition. Shingle Dip is shipped ready for dipping.
- ¶ ROOF LEAK COATING AND ROOF LEAK SHINGLE DIP are made in Black, Maroon and Dark Green. Five gallons up to any quantity, 75c. per gallon, freight paid east of Denver. Returnable at our expense if not approved.
- ¶ ROOF LEAK is sold by up-to-date paint and hardware dealers Those who try to sell you something else are not doing you justice, because "there is nothing else like ROOF LEAK."
- ¶ Liquid samples, together with an interesting booklet showing its Particular samples, together with an interesting booket showing its various uses, will be sent on request, or to enable you to give it a practical test, we will send you for \$1.00, delivered free to your door, one gallon, which is sufficient for cementing 100 square feet of leaky surface, or painting 200 square feet. One gallon of Shingle Dip covers about 400 square feet, shingles both sides.

ELLIOTT VARNISH CO., 156 Fulton Street, CHICAGO Pearl Street, NEW YORK

Manufacturers of Fine Varnishes and Inventors of

Rōóf/Leak?



DIES AND STAMPINGS TO ORDER.
SPEC'L MACHINERY-MODELS-EXPERIMENTAL WORK
DROP FORGING DIES AND DROP FORGINGS

EASIER TO ROW

CE MACHINES, Corliss Engines, Brewers' and Bottlers Machinery. THE VILTER MFG. CO., 899 Clinton St., Milwaukee, Wis

CHEMICAL EXAMINATIONS OF ALL DR. H. C. STIEFEL, Bissell Block, Pittsburgh. Pa.

MODELS WINION MODEL WORKS

MODELS & EXPERIMENTAL WORK.
Inventions developed, Special Machinery.
E. V. BAILLARD, Fox Bidg., Franklin Square, New York.

BUILDERS of Special Machinery. Models, oped. The FENN-SAILER MACH. Co., Hartford, Conn.

MECHANICAL MANUFACTURERS wishing to establish branch in New York City, can be represented by NATIONAL SUPPLY CO., 835 Broadway, N. Y.

NAME PLATES—STEEL STAMPS EMPLOYEE CHECKS, KEY TAGS & BADGES. J. ROBBINS MFG. CO. 58 KNEELAND ST. SEND FOR CATALOGUE BOSTON, MASS.

DRYING MACHINES. S. E. WORRELL Hannibal, Mo.

Manufacturers of HARDWARE SPECIALTIES

Contract Manufacturers and will market articles of merit

LORIMER MFG. CO., 153 S. Jefferson St., Chicago, III.

MODEL AND EXPERIMENTAL WORK. Electrical and Mechanical Instruments. Small Mach'y. EDWARD KLEINSCHMIDT, 82 W. Broadway, New York.

ABSOLUTELY SAFE Mullins Unsinkable **Steel Pleasure Boats** Made of steel. Practically indestructible Air chamber each end. Cannot sink. Can for family use, summer resorts, parks. Gaaranteed. Will v boat for pleasure, safetyand durability. No other boat so desired.

W. H. MULLINS, 384 Depot St., Salem Ohio

"THE CRYSTAL" Plate Glass Gum Vender Designers and constructors of vending machines of all kinds, on contract.
MICHIGAN NOVELTY WORKS, Kalamazoo. Mich.

MODELS reflicago model wor

"How to Successfully Operate a Gas or Gasoline Engine." This book is the latest and the Last Word on the subject. Pocket Edition. Price Fifty Cents. For sale by the GENEREE LAUNCH AND POWER COMPANY, BOX 467, ROCHEATER, N.

SPLITDORF SPARK COILS

MODEL MAKER I make Models for Electrical and machinery. M. SANGER, 62 Cortlandt S., NEW YORK

WANTED—An experienced draughtsman and esti-mator, building marble, interior-and ex-terior. Must be capable of superintending draughting department, dictating correspondence, etc. Plant em-ploys 100 men. Interior finish principal output. Address III East Fith Street, Atlanta, Ga,

Designs for parts or complete Automobiles. Aerial Engines. Motor Boat Machinery Free literature. S. M. HOWELL, Zanesville, Ohio.

TYPEWRITER HEADQUARTERS

Eclipse Pocket Ammeter
for general battery testing. Pto 20 appears.
Flexible over attached and contact spurin case, which is drawn back into case, when carried in pocket. Size on watch and very light weight. Can be used in 25 per prior 265.00.
File 255.00.
File 255.00.
File 255.00.



MR. MANUFACTURER

Steam plants have leaks: leaks that you can't Our booklet tells how we have stopped some of these for others. Perhaps we could for you.

THE G. M. PARKS CO. 345 Main Street, Fitchburg, Mass.