Business and Personal.

The charge for insertion under this head is One Dollar of line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in the following week's issue.

Marine Iron Works. Chicago. Catalogue free. "U. S." Metal Polish. Indianapolis. Samples free. Gasoline Brazing Forge, Turner Brass Works, Chicago Yankee Notions. Waterbury Button Co., Waterb'y, Ct Handle & Spoke Mchy. Ober Lathe Co., Chagrin Falls, O. Schwaab Stamp & Seal Co., Milwaukee. Send for cat'g.

For Sale-Gasoline Engines. 1 to 25 H. P.; also cast ings. Dirigo Engine Co., Portland, Me.

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Gear Cutting of every description accurately done The Garvin Machine Co., Spring and Varick Sts., N. Y. FERRACUTE Machine Co., Bridgeton, N. J. Full

line of Presses, Dies and other Sheet Metal Machinery Hub, spoke, wheel, bending, and handle machinery Single machines or full equipments, by the Defiance Machine Works, Defiance, Ohio, U. S. A.

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

The best book for electricians and beginners in elec tricity is "Experimental Science," by Geo. M. Hopkins By mail, \$4. Munn & Co., publishers, 361 Broadway, N. Y

Michigan Military Academy, Orchard Lake Michigan.

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MINTS 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 This is for our information and not for publication.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.

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

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

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly

Winerals sent for examination should be distinctly marked or labeled.

(7502) C. V. F. asks: 1. Will you please tell me if the moon gives any heat? A. Certainly; the moon gives off heat. You will find a statement on this point in "The New Astronomy," by Prof. Tode, price by mail, \$1.50. This, however, is probably heat which the moon has absorbed from the sun and afterward radiates. The part of the moon which is near the close of its long night of two weeks is probably at a temperature of about 300° below zero. 2. Where are some of the best art galleries in New York? A. The Art Gallery of the Metropolitan Museum is probably the best in New York.

(7503) F. D. B. writes: In a recent Notes and Queries column you gave the ingredients of a polarity tester that discolors at the positive pole. Will you please let me know what is used in the testers that give a purple discoloration at the negative poles? A. To produce a purplish discoloration at the negative pole prepare two solutions as follows:

1.	Alcohol 1	0	parts.
	Phenolphthalein	1	**
	Dissolve and add		
	Water distilled11	0	**
2.	Water distilled	0	parts.
	Sodium sulphate	1	44

Soak blotting paper in No. 1. Drain and soak in No 2. After this let it dry. To test pole of open circuit, moisten a strip of the paper and place the ends of the wires about an inch apart upon it.

(7504) J. L. C. writes: 1 should like to know if there is anything about new hay to attract the lightning, as a number of barns have been burned by lightning this year after the hay was in. A. We have no explanation to offer for the belief prevalent among farmers that barns are more frequently struck by lightning when full of hay. We have seen no statistics on this point. We have seen other buildings struck by lightning while barns near by were unharmed. Until it is shown by figures that more barns are struck than other buildings, we would not attempt to account for this belief. It should be remembered that thunder storms are frequent only at the season when barns are full of hay.

NEW BOOKS, ETC.

THE TELEPHONE. Outlines of the Development of Transmitters and Receivers. By William J. Hopkins. New York, London, and Bombay: Longmans, Green & Company. 1898. Pp. 83. Price \$1.

This book gives a clear and connected explanation of the principle underlying the design of the telephone transmitters and receivers. It is not a descriptive cata logue of instruments, but deals with the facts and principles in such a way that they will be easily and thoroughly understood. For this reason only those instruments have been described which have demonstrated their importance by long service or which seem to mark steps in the development of the modern transmitters and receivers. A thorough grasp of these principles will make it easy to apply them to the instruments.

Advertisements.

ORDINARY RATES.

Inside Page, each insertion. - 75 cents a line Back Page, each insertion. - - \$1.00 a line

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AN ADVANTAGE OF BEING A SUBSCRIBER TO THE Scientific American

By special arrangement, subscribers to the Scientific American can obtain the



at once and pay for it on the installment

In thus making it easy to come into immediate possession of this wonderful invention, we believe we are conferring a favor on every one who takes advantage of the offer—and for these reasons:

The improved Gram-o-phone Zon-o-phone is not only a great scientific curiosity but an inexhaustible source of home entertainment—as practica as a piano and a thousand times more varied and entertaining.

The piano, banjo, or any other musical instrument has its limitations, but so far as addressing the ear is concerned the improved Gram-o-phone Zon-o-phone has none. It sets in motion sound waves exactly similar to those vibrated by the originals, reproduces the same results-and to a degree of perfection simply marvelous.

To confound the improved Gram-o-phone Zon o-phone with earlier and less successful methods i

to judge the "long distance" lines of 1898 by the telephone of 1877.

Its records are on disks of hard rubber-flat, circular, indestructible. They are made

by a process which permits of unlimited duplication without impairing their distinctness or brilliancy. Hence the pro-

prietors can afford to pay almost any price for a desirable record, as it

Signed records by Moody—Depew—Jefferson. can be copied indefinitely. The authenticity o every record is guaranteed, all later records being signed. They include those of

Chauncey M. Depew, Dwight L. Moody, Joseph Jefferson, Sol. Smith Russel,

Rev. T. DeWitt Talmage. Wm. H. Crane, Robert G. Ingersoll, Maggie Mitchell, etc.,

who will entertain you in your own homes exactly as they entertained you upon the platform. Sousa's band, including his most celebrated solo

artists, will play for you, Operatic artists, comedians, story tellers, banjo players, male quartets, "coon singers," are in-

stantly available. And most wonderful of all is its simplicity. Practical and profitable for exhibition purposes

Many are making money with it.

Price, improved Gram-o-phone Zon-o-phone, \$25; records, 50 cents each.

Special limited offer to actual subscribers to SCIENTIFIC AMERICAN, \$5 cash and \$3 per month, for seven months, records cash as ordered. The proprietors agree to refund the money, less express charges, if the instrument is not satisfactory and is returned immediately. For further particulars, address National Gramophone Co., 874 BROADWAY, NEW YORK.



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9 and 11-inch Swing. New and Original Featur Send for Catalogue B. Seneca Falls Mfg. Company, 695 Water St., Seneca Falls, N.Y.

SECTORLESS WIMSHURST MACHINE. -This article gives directions for making. 4 illustra-tions, SCIENTIFIC AMERICAN SUPPLEMENT 1131. Price 10 cents. For sale by Munn & Co. and all news-dealers. Send for new catalogue.





Highly polished pipes made up without scar or injury. For Circulars and Prices WALWORTH MFG. CO., 16 Oliver St., BOSTON, MASS.



INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted **SEPTEMBER 20, 1898.**

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these	patents.]
Acid, making salicylo-acetic, L. Limpach	611,014
Advertising device, G. A. Stout	611,045
Acid, making salicylo-acetic, L. Limpach. Advertising device, G. A. Stout. Air brake, H. S. Park. Alarm lock, E. N. Case. Alloy aluminum, W. A. McAdams. Auger twisting machine, W. M. Hamilton. Axles, hammers, etc., to their handles, mea for securing heads of F. Baker. Back pedaling brake, A. P. Morrow. Back pedaling brake, A. Randall. Back pedaling brake, H. Symes. Bail attachment for stone jars, J. T. Gill. Barrel, J. C. Estabrook.	47, 610.948
Alloy aluminum. W. A. McAdams	611,016
Auger twisting machine, W. M. Hamilton	611,120
Axles, hammers, etc., to their handles, mea	ns
For securing heads of, F. Baker	611,092
Back nedaling brake, S. A. Randall.	611.147
Back pedaling brake, H. Symes	611,154
Bail attachment for stone jars, J. T. Gill	611,033
Barrels, J. C. Estabrook. Barrels, etc., rolling shoe for coal, J. F. Schma eke.	611,067
eke	611,080
Basin and sewer trap, catch, G. H. Mowe	611,074
Bath tub, D. D. Buick	611,029
Beam, girder, and post, combination structur	ral
metal, C. M. Horton	611,202
Bearing, ball. P. Davies	610.961
Bearing, ball, J. McAlpine	610,970
Bearing, bicycle crank shaft, J. Morrison	611,137
Bed, folding, B. Krellenstein	611,115
Bed, folding camp, R. Long	611,176
Bed springs to cross wire bases, machine for a	At- 611 190
Bevel tool, F. Lafferty.	611.129
Bicycle driving gear, J. Howard	611,170
Bicycle frame, Nies & Dunn	611,077
Bicycle saddle. J. B. McManus.	611.221
Bicycle umbrella support, H. J. Abernathy	611,190
libil mechanism for, Z.	610 956
Boat, life, A. F. Pendleton	611,021
Boiler. See Steam boiler. Washboiler.	610.000
Boiler setting, steam, Kennedy & Williamson	611,219
Bootjack, C. F. Spaid	611,043
Bottle orice compress, hot water, J. F. Morrill	611,207
Bath tub, D. D. Buick. Bath valve, shower, Demarest & Cunningham. Beam, girder, and post, combination structumetal, C. M. Horton. Bearing, antifriction, T. R. Garnier. Bearing, ball, P. Davies. Bearing, ball, P. Davies. Bearing, ball, J. McAlpine. Bearing, ball, J. McAlpine. Bearing, bicycic crank shaft, J. Morrison. Bed, extension, Furnivall & Martin. Bed, folding, B. Krellenstein. Bed, folding, B. Krellenstein. Bed, folding, B. Krellenstein. Bed springs to cross wire bases, machine for a taching, J. P. Leggett. Bevel tool, F. Lafferty. Bicycle driving gear, J. Howard. Bicycle frame, Nies & Dunn. Bicycle gear case, Nies & Dunn. Bicycle saddle, J. B. McManus. Bicycles, etc., propelling mechanism for, Z. Buth L. B. McManus. Bicycle, See Steam boiler. Washboiler. Boiler, See Steam boiler. Washboiler. Boiler, Meier & Tidemann. Bootlask, C. F. Spaid. Bottle orice compress, hot water, J. F. Morrill Bottle washer, H. W. E. Mentze.	611,180 B.
Vernay	610,931
Box. See Display box. Hat box. Paper box. Box cover brace and support, N. S. Nissen	g11 n10
Brush, D. B. Forward. Bung, M. W. Shannon Calendar and whist counter, A. W. Mathews	611,224
Camera nanoramic k' L. Gregory	611,010
Camera, panoramic, F. L. Gregory	610,902
Cane from cars, etc., apparatus for unloadi	ng
Cane from cars, etc., apparatus for unloadi sugar, J. W. Bodley Car brake handle, E. C. Collins Car construction, R. P. Lamont.	611,058
Car construction, R. P. Lamont	611,069
Car coupling, A. Dougherty	611,066
Car coupling, H. H. Warner	611,124 611,025 610,940
Car coupling, A Dougherty Car coupling, H Dougherty Car coupling, H H Warner. Car door, W R Ellis Car door, W R John S Tor protecting, Jon	610,940
& Hodge	610.990
& Hodge	610,915
Car heating apparatus, J. F. McElroy	610,997
Car heating apparatus, J. F. McElroy Car replacer, H. Miller. Cars, seat recording device for passenger, N. Powell	M. 611,072
Powell	610,972
Carrier See Cartridge carrier Luggege carri	611,158
Cartridge carrier, T. E. Jackson	611,172
Cash register, J. H. McCormick	610,945
Chemical engine. T. Down	611,030
Powell	&
Thurman. Cigar machine, J. Reuse (reissue) Circuit breaker for three wire systems, E. Hewlett	611,220
Circuit breaker for three wire systems. E.	11,695 M.
Hewlett	610,903
Pomerov Bossert	610,887
Pomeroy	611,206
Clevis, plow, C. A. Johnson	610,968
Clothes line, pinless, J. W. Jackson	610,924
Clothes wringer, W. Aab	610,882
Coating upon surfaces, forming integral metal	lic,
Clevis, plow, C. A. Johnson. Closure cap, cover, stopper, etc., T. Sloper. Clothes line, pinless, J. W. Jackson. Clothes wringer, W. Aab. Cotting upon surfaces, forming integral metal E. T. Thomas. Coin controlled machine, J. G. MacPherson. Column, metallic, A. Nurick. Comb. See Currycomb. Contact finger for controllers or electric switch	610,954 611,071
Coin holder, D. J. Cable	610,959
Comb. See Curry comb.	611,019
Contact finger for controllers or electric switch	es,
T. Von Zweigbergk	611,087
T. Von Zweigbergk Controller. T. Von Zweigbergk. Cooker, heat retaining starch, J. E. Dann. Corkserew E. Walker. Corset, T. S. Gilbert.	611,090
Corkscrew, E. Walker.	611.046
Corset attachment, E. Young.	611,116 611,163

	Thurman	611,220
	Cigar machine, J. Reuse (reissue)	11,695
	Thurman	
	newiett	610,903
	Circuit breaking switch, automatic, Bossert &	
	Pomeroy Circuit interrupting device, D. M. Moore	610,887
	Circuit interrupting device, D. M. Moore	
ŀ	Clevis, plow, C. A. Johnson	610,968 610,924 610,906
١	Closure cap, cover, stopper, etc., T. Sloper	610,924
	Clothes line, pinless, J. W. Jackson	610,906
	Clothes wringer, W. Aab	610,882
	Coating upon surfaces, forming integral metallic,	
	Circuit interrupting device, D. M. Moore Clevis, plow, C. A. Johnson Closure cap, cover, stopper, etc., T. Sloper Clothes line, pinless, J. W. Jackson Clothes wringer, W. Aab Coating upon surfaces, forming integral metallic, E. T. Thomas Coin controlled machine, J. G. MacPherson. Coin holder, D. J. Cable Coulmn, metallic, A. Nurick Comb Comb Contact fineer for countrollers or electrics witches.	610,954
	Coin controlled machine, J. G. MacPherson	611,071
	Coin holder, D. J. Cable	611,071 610,959
	Column, metallic, A. Nurick	611,019
	Comb. See Currycomb.	
	Contact finger for controllers or electric switches,	
	Contact finger for controllers or electric switches, T. Von Zweigbergk. Controller, T. Von Zweigbergk. Cooker, heat retaining starch, J. E. Dann. Corkscrew, E. Walker. Corset, T. S. Gilbert. Corset, T. S. Gilbert. Corset, bustle, D. Kops. Corset, bustle, D. Kops. Cowtail holder, E. J. & L. M. Trapp Cradle, self rocking, R. D. King. Cultivator, Head & Regester. Cultivator, cotton, J. E. Barron. Cultivator scraper, A. C. Butler. Currycomb, J. D. Brainard. Curtain fixture, window, W. W. Philips. Cuspidor bowls, supporting attachment for, G. E. Johnson.	611,087
	Controller. T. Von Zweigbergk	611,090 611,061
	Cooker, heat retaining starch, J. E. Dann	611,061
	Corkscrew, E. Walker	611.046 611,116
	Corset, T. S. Gilbert	611,116
	Corset attachment, E. Young.	611,163
	Corset, bustle, D. Kops	611,068
	Cow tail holder, E. J. & L. M. Trapp	611,068 611,156 611,174
	Cradle, self rocking, R. D. King	611,174
	Cultivator, Head & Regester	611,03 6 611,192
	Cultivator, cotton, J. E. Barron	611,192
	Cultivator scraper, A. C. Butler	611,195 610,891
	Currycomb, J. D. Brainard	610,891
	Curtain fixture, window, W. W. Philips	611,141
	Cuspidor bowls, supporting attachment for, G.	
	E. Johnson	611,218
	Cutter. See Hog nosecutter.	- 1
	Cycle parts, housing for screw threaded, C. P.	- 1
	Birner	611,194
	Birner	611,194
	Cycles with adjustable gearing, driving mechan-	611,194 611,210
	Cycles with adjustable gearing, driving mechanism for, F. H. Vagt	611,210
	Cycles with adjustable gearing, driving mechanism for, F. H. Vagt	611,210 611,057
	Cycles with adjustable gearing, driving mechanism for, F. H. Vagt	611,210 611,057
	Cycles with adjustable gearing, driving mechanism for, F. H. Vagt	611,210 611,057
	Cycles with adjustable gearing, driving mechanism for, F. H. Vagt	611,210 611,057
	Cycles with adjustable gearing, driving mechanism for, F. H. Vagt	611,210 611,057
	Cycles with adjustable gearing, driving mechanism for, F. H. Vagt	611,210 611,057
	Cycles with adjustable gearing, driving mechanism for, F. H. Vagt	611,210 611,057
	Cycles with adjustable gearing, driving mechanism for, F. H. Vagt	611,210 611,057
	Cycles with adjustable gearing, driving mechanism for, F. H. Vagt	611,210 611,057
	Cycles with adjustable gearing, driving mechanism for, F. H. Vagt	611,210 611,057
	Cycles with adjustable gearing, driving mechanism for, F. H. Vagt	611,210 611,057
	Cycles with adjustable gearing, driving mechanism for F. H. Vagt. Damper operating mechanism, chimney, F. M. Clotworthy. Dental.tool, Hendrickson & Read. Display box, counter, C. E. Davis. Distiller, domestic water, J. E. Hicks. Door spring, O. Volgtlander. Door stop, Bor tman & Munkwitz. Drawers supporter, T. S. James. Drilling machine, J. L. Jones. Dye and making it, brown, E. Elsaesser. Dye and making it, blue black, E. Elsaesser. Electric battery, V. Jeanty.	611,210 611,057 610,987 611,063 611,123 611,024 610,886 610,989 611,173 611,111 611,112 611,012
	Cycles with adjustable gearing, driving mechanism for F. H. Vagt. Damper operating mechanism, chimney, F. M. Clotworthy. Dental.tool, Hendrickson & Read. Display box, counter, C. E. Davis. Distiller, domestic water, J. E. Hicks. Door spring, O. Volgtlander. Door stop, Bor tman & Munkwitz. Drawers supporter, T. S. James. Drilling machine, J. L. Jones. Dye and making it, brown, E. Elsaesser. Dye and making it, blue black, E. Elsaesser. Electric battery, V. Jeanty.	611,210 611,057 610,987 611,063 611,123 611,024 610,886 610,989 611,173 611,111 611,112 611,012
	Cycles with adjustable gearing, driving mechanism for F. H. Vagt. Damper operating mechanism, chimney, F. M. Clotworthy. Dental.tool, Hendrickson & Read. Display box, counter, C. E. Davis. Distiller, domestic water, J. E. Hicks. Door spring, O. Volgtlander. Door stop, Bor tman & Munkwitz. Drawers supporter, T. S. James. Drilling machine, J. L. Jones. Dye and making it, brown, E. Elsaesser. Dye and making it, blue black, E. Elsaesser. Electric battery, V. Jeanty.	611,210 611,057 610,987 611,063 611,123 611,024 610,886 610,989 611,173 611,111 611,112 611,012
	Cycles with adjustable gearing, driving mechanism for F. H. Vagt. Damper operating mechanism, chimney, F. M. Clotworthy. Dental.tool, Hendrickson & Read. Display box, counter, C. E. Davis. Distiller, domestic water, J. E. Hicks. Door spring, O. Volgtlander. Door stop, Bor tman & Munkwitz. Drawers supporter, T. S. James. Drilling machine, J. L. Jones. Dye and making it, brown, E. Elsaesser. Dye and making it, blue black, E. Elsaesser. Electric battery, V. Jeanty.	611,210 611,057 610,987 611,063 611,123 611,024 610,886 610,989 611,173 611,111 611,112 611,012
	Cycles with adjustable gearing, driving mechanism for F. H. Vagt. Damper operating mechanism, chimney, F. M. Clotworthy. Dental.tool, Hendrickson & Read. Display box, counter, C. E. Davis. Distiller, domestic water, J. E. Hicks. Door spring, O. Volgtlander. Door stop, Bor tman & Munkwitz. Drawers supporter, T. S. James. Drilling machine, J. L. Jones. Dye and making it, brown, E. Elsaesser. Dye and making it, blue black, E. Elsaesser. Electric battery, V. Jeanty.	611,210 611,057 610,987 611,063 611,123 611,024 610,886 610,989 611,173 611,111 611,112 611,012
	Cycles with adjustable gearing, driving mechanism for F. H. Vagt. Damper operating mechanism, chimney, F. M. Clotworthy. Dental.tool, Hendrickson & Read. Display box, counter, C. E. Davis. Distiller, domestic water, J. E. Hicks. Door spring, O. Voigtlander Door stop, Bor tman & Munkwitz Drawers supporter, T. S. James. Drilling machine, J. L. Jones. Dye and making it, brown, E. Elsaesser. Dye and making it, brown, E. Elsaesser. Electric brake, J. B. Linn. Electric controller, S. Harris. Electric coupling, J. F. McElroy. Electric furnace, R. Pignotti et al. Electric heater, J. F. McElroy. Electric heater, J. F. McElroy. Electric machine safety device, dynamo, E. M.	611,210 611,057 610,987 611,063 611,123 611,024 610,886 610,989 611,173 611,111 611,112 610,908 611,215 611,000 611,142 610,999
	Cycles with adjustable gearing, driving mechanism for F. H. Vagt. Damper operating mechanism, chimney, F. M. Clotworthy. Dental.tool, Hendrickson & Read. Display box, counter, C. E. Davis. Distiller, domestic water, J. E. Hicks. Door spring, O. Voigtlander Door stop, Bor tman & Munkwitz Drawers supporter, T. S. James. Drilling machine, J. L. Jones. Dye and making it, brown, E. Elsaesser. Dye and making it, brown, E. Elsaesser. Electric brake, J. B. Linn. Electric controller, S. Harris. Electric coupling, J. F. McElroy. Electric furnace, R. Pignotti et al. Electric heater, J. F. McElroy. Electric heater, J. F. McElroy. Electric machine safety device, dynamo, E. M.	611,210 611,057 610,987 611,063 611,123 611,024 610,886 610,989 611,173 611,111 611,112 610,908 611,215 611,000 611,142 610,999
	Cycles with adjustable gearing, driving mechanism for F. H. Vagt. Damper operating mechanism, chimney, F. M. Clotworthy. Dental.tool, Hendrickson & Read. Display box, counter, C. E. Davis. Distiller, domestic water, J. E. Hicks. Door spring, O. Voigtlander Door stop, Bor tman & Munkwitz Drawers supporter, T. S. James. Drilling machine, J. L. Jones. Dye and making it, brown, E. Elsaesser. Dye and making it, brown, E. Elsaesser. Electric brake, J. B. Linn. Electric controller, S. Harris. Electric coupling, J. F. McElroy. Electric furnace, R. Pignotti et al. Electric heater, J. F. McElroy. Electric heater, J. F. McElroy. Electric machine safety device, dynamo, E. M.	611,210 611,057 610,987 611,063 611,123 611,024 610,886 610,989 611,173 611,111 611,112 610,908 611,215 611,000 611,142 610,999
	Cycles with adjustable gearing, driving mechanism for F. H. Vagt. Damper operating mechanism, chimney, F. M. Clotworthy. Dental.tool, Hendrickson & Read. Display box, counter, C. E. Davis. Distiller, domestic water, J. E. Hicks. Door spring, O. Voigtlander Door stop, Bor tman & Munkwitz Drawers supporter, T. S. James. Drilling machine, J. L. Jones. Dye and making it, brown, E. Elsaesser. Dye and making it, brown, E. Elsaesser. Electric brake, J. B. Linn. Electric controller, S. Harris. Electric coupling, J. F. McElroy. Electric furnace, R. Pignotti et al. Electric heater, J. F. McElroy. Electric heater, J. F. McElroy. Electric machine safety device, dynamo, E. M.	611,210 611,057 610,987 611,063 611,123 611,024 610,886 610,989 611,173 611,111 611,112 610,908 611,215 611,000 611,142 610,999
	Cycles with adjustable gearing, driving mechanism for F. H. Vagt. Damper operating mechanism, chimney, F. M. Clotworthy. Dental.tool, Hendrickson & Read. Display box, counter, C. E. Davis. Distiller, domestic water, J. E. Hicks. Door spring, O. Voigtlander Door stop, Bor tman & Munkwitz Drawers supporter, T. S. James. Drilling machine, J. L. Jones. Dye and making it, brown, E. Elsaesser. Dye and making it, brown, E. Elsaesser. Electric brake, J. B. Linn. Electric controller, S. Harris. Electric coupling, J. F. McElroy. Electric furnace, R. Pignotti et al. Electric heater, J. F. McElroy. Electric heater, J. F. McElroy. Electric machine safety device, dynamo, E. M.	611,210 611,057 610,987 611,063 611,123 611,024 610,886 610,989 611,173 611,111 611,112 610,908 611,215 611,000 611,142 610,999
	Cycles with adjustable gearing, driving mechanism for F. H. Vagt. Damper operating mechanism, chimney, F. M. Clotworthy. Dental.tool, Hendrickson & Read. Display box, counter, C. E. Davis. Distiller, domestic water, J. E. Hicks. Door spring, O. Voigtlander Door stop, Bor tman & Munkwitz Drawers supporter, T. S. James. Drilling machine, J. L. Jones. Dye and making it, brown, E. Elsaesser. Dye and making it, brown, E. Elsaesser. Electric brake, J. B. Linn. Electric controller, S. Harris. Electric coupling, J. F. McElroy. Electric furnace, R. Pignotti et al. Electric heater, J. F. McElroy. Electric heater, J. F. McElroy. Electric machine safety device, dynamo, E. M.	611,210 611,057 610,987 611,063 611,123 611,024 610,886 610,989 611,173 611,111 611,112 610,908 611,215 611,000 611,142 610,999
	Cycles with adjustable gearing, driving mechanism for F. H. Vagt. Damper operating mechanism, chimney, F. M. Clotworthy. Dental.tool, Hendrickson & Read. Display box, counter, C. E. Davis. Distiller, domestic water, J. E. Hicks. Door spring, O. Voigtlander Door stop, Bor tman & Munkwitz Drawers supporter, T. S. James. Drilling machine, J. L. Jones. Dye and making it, brown, E. Elsaesser. Dye and making it, brown, E. Elsaesser. Electric brake, J. B. Linn. Electric controller, S. Harris. Electric coupling, J. F. McElroy. Electric furnace, R. Pignotti et al. Electric heater, J. F. McElroy. Electric heater, J. F. McElroy. Electric machine safety device, dynamo, E. M.	611,210 611,057 610,987 611,063 611,123 611,024 610,886 610,989 611,173 611,111 611,112 610,908 611,215 611,000 611,142 610,999
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Fabric. See Plush fabric.

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