

plied holder for this purpose. An arrangement of the looped ends secures a comparatively rigid and strong pivotal support for the rod, while adding little to its weight.

SLEIGH.—A. P. LINN, Escanaba, Mich. Mr. Linn's invention refers to the running part of sleighs, sleds, and all devices adapted to run upon the snow and ice, and it is capable of general use upon articles of the class mentioned. The objects of the improvement are to secure greater rigidity, and cheapness in this class of articles of manufacture. The invention is equally applicable to a sleigh having a running portion consisting of two sleds or to a sleigh having only one set of runners.

DRAFT-TREE.—H. T. REEDER, Missoula, Mont. The purpose here is to provide a tree in which a double whiffletree or a swingletree will not break at the center or pivotal point by reason of a cross pull, as when the draft is on the tree instead of the tension being crosswise of the bar of the tree it will be endwise, thus adding to the lifetime of the device and preventing the tree from breaking under severe tension, under which conditions in the ordinary tree the tension is forward or crosswise directed to the weakest point of the tree—its pivotal point—which under the improved form of draft-tree is reinforced and the tension not directed thereto.

VEHICLE BRAKE.—W. M. FLEWELLING, Santa Rosa, Cal. The invention is an improvement in brakes for logging-trucks, and is especially designed for use in logging-trucks in which the logs are suspended from the trucks, and the weight of the log operates to hold the beam-carrying bars down in position for the proper operation of the brake when set by means of the devices.

NOTE.—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 desiring the information. In every case it is necessary to give the number of the inquiry.

MUNN & CO.

Marine Iron Works, Chicago. Catalogue free.

Inquiry No. 6385.—For parties to manufacture cast pans.

AUTOS.—Duryea Power Co., Reading, Pa.

Inquiry No. 6386.—For manufacturers of nickel tops for pocket purses.

"U. S." Metal Polish. Indianapolis. Samples free.

Inquiry No. 6387.—For the manufacturers of the electrical machine for making puffed rice.

Perforated Metals, Harrington & King Perforating Co., Chicago.

Inquiry No. 6388.—For manufacturers of leaden hair combs.

Adding, multiplying and dividing machine, all in one. Felt & Tarrant Mfg. Co., Chicago.

Inquiry No. 6389.—For an apparatus to destroy roll tickets in large quantities.

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

Inquiry No. 6390.—For manufacturers of table knives, forks and spoons sold under different names, as Australian silver, Mexican silver, etc.

Layden Chemical Works. Sole manufacturers of all luminous preparations. 636 East 132d Street, New York.

Inquiry No. 6391.—For makers of lead pencils in large quantities stamped with name and address, for advertising; samples wanted.

Robert W. Hunt & Co. bureau of consultation, chemical and physical tests and inspection. The Rookery, Chicago.

Inquiry No. 6392.—For the address of the manufacturer of glass which can be heated red hot and plunged in water without breaking.

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

Inquiry No. 6393.—For manufacturers of or dealers in German silver tubing 1/8 inch in diameter.

I have every facility for manufacturing and marketing hardware and house-furnishing specialties. Wm. McDonald, 180 Main St., East Rochester, N. Y.

Inquiry No. 6394.—For sectional posts 3/4 inch diameter, for use in making sectional post binders for loose leaf books.

We manufacture anything in metal. Patented articles, metal stamping, dies, screw mach. work, etc. Metal Novelty Works, 43 Canal Street, Chicago.

Inquiry No. 6395.—For wholesale dealers or manufacturers of the Handi Wagon Jack.

The SCIENTIFIC AMERICAN SUPPLEMENT is publishing a practical series of illustrated articles on experimental electro-chemistry by N. Monroe Hopkins.

Inquiry No. 6396.—For the manufacturers of the Plaza Lawn Mowers.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery and tools. Quadriga Manufacturing Company, 15 South Canal Street, Chicago.

Inquiry No. 6397.—For manufacturers of or dealers in machinery and supplies for corn-canning factories.

If you wish to buy patents on inventions or sell them, write Chas. A. Scott, 719 Mutual Life Building, Buffalo, N. Y.

Inquiry No. 6398.—For makers of telephone parts, also manufacturers of galvanized and telephone wire.

Inquiry No. 6399.—For manufacturers of brick-making plants.

Inquiry No. 6400.—For makers of small brass gears, either cut or stamped.

Inquiry No. 6401.—For apparatus operated by air pressure, such as engines or pumps; a small hand air pump to generate sufficient air pressure in a small tank to give motive power of from 5 to 10 pounds for temporary raising weight.

Inquiry No. 6402.—For parties manufacturing Bull's Eye lenses, for concrete sidewalk lights.

Inquiry No. 6403.—For makers of hydraulic pumps, sand suckers and siphons.



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.

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 marked or labeled.

(9516) V. E. M. asks: 1. What is the method of making a small battery such as is used in a small vest-pocket electric light? The battery can be bought for about 25 cents. A. The battery for lighting miniature lamps usually contains two or three dry cells. We published in our SUPPLEMENT, Nos. 1383 and 1387, price 10 cents each, a full description with illustrations of the manner of making such cells, with all the materials used and all necessary instructions. 2. What is the method of making a Fuller battery? A. The Fuller cell (see SUPPLEMENT, No. 159, price 10 cents mailed) is a bichromate cell in which there is a continuous amalgamation of the zinc. The zinc is in the bottom of the porous cup, and has a quantity of mercury, an ounce to a cell will answer, poured around it, which maintains the amalgamation of the zinc through the life of the cell. A brass or copper rod covered with gutta percha is fastened to the zinc, and extends above the cell as a terminal to which the circuit is connected. The carbon plate is placed in the glass jar and surrounded with a bichromate solution. Water is poured into the porous cup upon the zinc. The acid diffuses through the porous cup fast enough to act upon the zinc and produce the current. The cell evidently will not furnish a strong current. A good formula for the bichromate solution may be given: Take 21 ounces of sodium bichromate and 3 quarts of water. When the solution of the salt is complete, add slowly and with constant stirring, 1 pint of strong sulphuric acid. The solution is ready for use when it has cooled.

(9517) W. R. C. writes: State in the column of Notes and Queries if there is any liquid that will dissolve amber that has no oil in it? Something like alcohol, that will soon evaporate. A. We do not think that there is any liquid that will dissolve amber that has no oil in it. We know of none.

(9518) W. D. O. says: I would like to know the composition of the preparation with which the particles of carbon, in the carbon pencils for electric arc lamps, are held together; that is, the cementing substance. A. Are light carbons, carbon plates for battery cells, and similar articles are made from coke. The higher grades are made from coke derived from the residue of petroleum stills. The crude material is dried, ground fine, and sorted into different sizes. The binding material may be a coal tar product, or some other substance containing carbon, and which will be reduced to carbon by the heat of the furnace. These are thoroughly mixed, pressed into forms by hydraulic pressure, and afterward baked in a furnace. For a full description see SUPPLEMENT, No. 1287, price ten cents.

(9519) R. S. C. asks: Why, if known, does the skin of a chameleon change in color, in moving from an object of one color to one of another color; that is, why does its skin always assume the same color as the object it may be resting upon? A. One answer to the question, "Why does the chameleon change the color of its skin?" is that the chameleon has a better chance of life by reason of this protective resemblance to its surroundings. Those chameleons which had the largest range of change of color in the past have survived, and the capacity of change has been evolved in their descendants to a higher degree, so that all chameleons now living readily change the color of their skins to that of the bark of the tree upon which they at the time may be. They are thus protected from their enemies. There are many such adaptations of creatures to their habitat or environment. The polar bear, living among Arctic snows, is white. The tiger in the jungles is striped, as if painted to resemble rushes, reeds, or other stiff and straight plants. Many fish have backs of the hue of the sand or sea bottom upon which they lie. Nature has thus attended to the needs of her weaker children. Another answer might be that the effect of the color of the surroundings is to produce a change in the pigment in the cells of the skin, so that the color becomes like that of the surface upon which the animal is resting. In the chameleon this is comparatively rapid.

NEW BOOKS, ETC.

THE TREATMENT OF SEPTIC SEWAGE. By George W. Rafter, M.Am.Soc.C.E. New York: D. Van Nostrand Company, 1904. 32mo.; pp. 137. Price, 50 cents.

The author has endeavored to give, in a limited space, the more important developments in the bacterial treatment of sewage. All the leading works on the subject have been consulted, and the present small volume is a compendium of the information contained in these. The book is non-technical in character, and is intended to give to the everyday person a knowledge of the proper and scientific treatment of sewage.

AUTOMATIC SURVEYING INSTRUMENTS AND THEIR PRACTICAL USES ON LAND AND WATER. By Thomas Ferguson. With an Introduction by E. Hammer, Ph.D., Professor of Geodesy at the Royal Technical High School of Stuttgart. London: John Bale, Sons & Danielsson, Ltd., 1904. 12mo.; pp. 87. Price, \$1.60.

This book forms a practical handbook on the use of automatic surveying instruments, such as the pedograph and cyclograph, which are used for the purpose of recording the topography of the country. The instruments and their mode of operation are described in detail, and clearly illustrated by drawings and photographs.

OBSERVATIONS SUR LES FOURMIS. Par Charles Janet. Limoges: Imprimerie-Librairie Ducourtioux et Gout, 1904. 8vo.; pp. 70.

This book contains much information upon ants, their anatomical construction, their length of life, means of subsistence, habits, etc. It is illustrated with about ten full-page plates containing drawings showing the anatomical structure of ants. The book contains considerable scientific information regarding these little insects.

UNTECHNICAL ADDRESSES ON TECHNICAL SUBJECTS. By James Douglass, LL.D. New York: John Wiley & Sons, 1904. 12mo.; pp. 84. Price, \$1.

This small volume is made up of three interesting addresses on the following subjects: The Characteristics and Conditions of the Technical Progress of the Nineteenth Century; the Development of American Mining and Metallurgy, and the Equipments of the Training School; and Wastes in Mining and Metallurgy. The first-named paper treats largely of the management of large works and of the methods of treating employes both here and abroad; the second tells of the requirements which will be made of a student after he has left a mining school, and of the methods obtaining in large American mining and metallurgical works; while the third tells of the approved processes and methods now in vogue for utilizing products in ores which heretofore have gone largely to waste. The papers will be found most interesting by all students of mining and metallurgy.

THE LOCOMOTIVE. Hartford, Conn.: The Hartford Steam Boiler Inspection and Steam Boiler Company, 1903. 8vo.; pp. 195.

This book contains the numbers of that excellent monthly, well known to many of our readers—The Locomotive. Much useful information regarding locomotives, boilers, burners, and boiler explosions is contained within its pages. The annual report of the Chief of the Bureau of Steam Engineering for 1902 on oil burners is given in condensed form in the first number of the volume, and is illustrated by large diagrams of the various burners used so successfully in the tests with freight steamers made by this bureau. The paper is too well known to our readers to need further comment, save that all the articles published in it are of an altogether practical character.

DIE MECHANISCHEN VORRICHTUNGEN DER CHEMISCH-TECHNISCHEN BETRIEBE. Von Friedrich Weigand. Illustrated. Octavo. Pp. 416. Price, \$2.

Many books have appeared on industrial chemistry, but so far as we know, the appliances of the industrial chemist have not been described in any work. The modern industrial chemist must be something of a mechanical engineer. It is the purpose of this work to describe the mechanical appliances which he employs. This purpose has been accomplished with praiseworthy thoroughness in this newly-issued book of Hartleben's.

ORNAMENTAL TURNING. A Work of Practical Instruction in the Above Art. By J. H. Evans. Three Volumes. London: Guilbert Pitman, 1903. 12mo.; pp., each volume, 165; with numerous engravings and plates. Price, \$1.50 each volume.

Followers of this fascinating occupation, and those who simply make of it a hobby, will alike be delighted with these three little volumes. Mr. Evans, well known as a maker of high-class lathes and a professional turner of marked ability, has issued this popular-priced edition of his "Ornamental Turning." The volumes are progressive, Vol. 1 dealing with the simpler processes requiring inexpensive apparatus, while Vols. 2 and 3 initiate the worker into the manipulation of the more costly and efficient chucks and appliances.

MODERN PRACTICAL ELECTRICITY. By R. Mullineux Walmsley, D.Sc., F.R.S.C. Chicago: W. T. Keener & Co., 1904. Quarto; pp. 325. Numerous illustrations; 4 vols. Price, \$12.

This book forms Volume IV. of one of the most popular yet practical treatises on the application of electricity in modern life, which we have yet seen. It is written in a simple, concise style, and abundantly illustrated with fine half-tones and numerous diagrams. Volume IV. opens with a continuation of the chapter on the Magnetic Circuit, and also contains chapters on batteries of generators of both the continuous and alternating current types; continuous current motors, of the open, closed, and tramcar types; alternate current motors of the monophase and polyphase induction types; and electrical measurements and dynamo and motor testing. The chapter on electrical measurements contains descriptions of standard meters of all kinds, and discusses in a thorough manner the measurement of electrical energy. The work contains some 325 illustrations, which greatly aid in interpreting the text.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending

January 3, 1905

AND EACH BEARING THAT DATE

[See note at end of list about copies of these patents.]

Table listing various inventions and their patent numbers, including items like 'Acids, producing fatty', 'Adjustable brace', 'Advertising apparatus', etc.

THE PROTECTION OF ONE MILLION FAMILIES

New York Life Insurance Co.

=1845=

JOHN A. McCALL, President.

=1905=

This Company is Sixty Years old. The Sixtieth Report, covering the year 1904 and describing the assets in detail, is now ready. It will be mailed to any address on request.

1904 was the most prosperous year in the Company's history.

New paid business during 1904 exceeded 342 million dollars of insurance. This is 15 millions more than the new paid business of any previous year, by this Company; and 100 millions more than the new paid business of any previous year by any other regular life insurance company.

The expense ratio for 1904 is lower than for 1903.

This Company is purely mutual; it has no Capital Stock. The policy-holders are the Company and own the assets. Their title to the assets is recorded in 925,000 policies. The policies average about \$2,100 each.

This Company has returned to its policy-holders since organization in 1845 over 450 million dollars.

Cash payments to policy-holders during the single year 1904 amounted to over 40 million dollars. In addition the Company loaned to policy-holders during the year on the sole security of their policies 17 million dollars.

The accumulations under 925,000 policies amount to 390 million dollars, cost value, an average of \$420 per policy. These accumulations are required by law and for the fulfilment of the Company's obligations under these policies.

The Bonds owned aggregate at par 288 million dollars; they cost 287 million dollars; their market value is 294 million dollars. Not a single Bond is in default of interest.

This Company does not invest in stocks or industrial securities of any kind.

This Company files its Detailed Annual Report with the Department of Commerce and Labor of the United States; with the Insurance Department of the State of New York; with each one of the State Insurance Departments in the United States, and with the Governments of all the civilized countries of the world.

This Report, in all its details, including investments and general management, is therefore scrutinized by the severest Court of Critics in the world. No other list of securities held for any purpose presents so many official certificates of approval.

BALANCE SHEET, JANUARY 1, 1905.

ASSETS.

Government, State, City, County and other Bonds, cost value, (MARKET VALUE, \$294,309,761), <small>(Company does not include in Assets the excess \$7,247,377 of market value of Bonds owned over cost.)</small>	\$287,062,384
Bonds and Mortgages (413 first liens)	23,595,105
Deposits in 489 Banks throughout the world (at interest \$15,241,793)	17,694,110
Loans to Policy-holders on Policies as security (reserve value thereof, \$50,000,000)	35,867,475
Real Estate, 23 pieces (including eleven office buildings, valued at \$10,940,000)	13,257,500
Quarterly and Semi-Annual Premiums not yet due, reserve charged in Liabilities	4,086,171
Premium Notes on Policies in force (Legal Reserve to secure same, \$5,500,000)	3,331,618
Premiums in transit, reserve charged in Liabilities	2,746,326
Interest and Rents accrued	2,469,571
Loans on Bonds (market value, \$783,565) <small>(Company does not invest in stocks.)</small>	550,000
Total Assets	\$390,660,260

LIABILITIES.

Policy Reserve (per certificate of New York Insurance Dept.), Dec. 31, 1904	\$336,222,459
All other Liabilities on Policies, Annuities, Endowments, etc., awaiting presentation for payment	6,909,661
Reserve on Policies which the Company voluntarily sets aside in excess of the State's requirements	\$6,830,028
Reserve to provide Dividends payable to Policy-holders during 1905, and thereafter, as the periods mature:	
To holders of 20-Year Period Policies	24,982,787
To holders of 15-Year Period Policies	5,736,259
To holders of 10-Year Period Policies	344,601
To holders of 5-Year Period Policies	303,837
To holders of Annual Dividend Policies	868,953
Reserve to provide for all other contingencies	8,461,680
Total (not including \$7,247,377 excess of market value of Bonds owned over cost)	47,528,140
Total Liabilities,	\$390,660,260

INCOME, 1904.

New Premiums	\$16,133,824
Renewal Premiums	64,422,754
TOTAL PREMIUMS	\$80,556,578
Interest Receipts from:	
Bonds owned	\$10,634,987
Mortgage loans	1,069,232
Loan to Policy-holders secured by Policies,	1,943,063
Bank Deposits and Collateral Loans	702,056
TOTAL INTEREST RECEIPTS	14,349,338
Rents from Company's properties	946,723
Profits realized on Securities sold during the year	499,688
Deposits on account of Registered Bond Policies, etc.	538,945
Total Cash Income	\$96,891,272

DISBURSEMENTS, 1904.

Paid for Death-Claims (\$19,734,245), Endowments, (\$5,051,629), and Annuities (\$1,723,160)	\$26,509,034
Paid for Dividends (\$5,989,491), Surrender Values (\$7,790,058) and other Payments (\$95,279) to Policy-holders	13,874,828
Commissions and all other payments to agents, \$7,276,850 (on New Business of year \$342,212,569); Medical Examiners' Fees \$788,761, and Inspection of Risks \$178,155	8,243,766
Home and Branch Office Expenses, Taxes, Legal Fees, Advertising, Equipment Account, Telegraph, Postage, Commissions on \$1,586,396,739 of Old Business and Miscellaneous Expenditures	11,204,101
* TOTAL DISBURSEMENTS	\$59,831,729
Balance for Reserves—Excess of Income over Disbursements for year	37,059,543
<small>*The Expense ratio for 1904 is lower than for 1903.</small>	
Total Disbursements and Balance for Reserves, \$96,891,272	

New Business Paid for in 1904 (^{185,367} Policies) - \$342,212,569
GAIN IN 1904 (^{4,249} Policies) \$15,554,323

Total Paid-for Insurance in force (^{924,712} Policies) \$1,928,609,308
GAIN IN 1904 (^{112,001} Policies) \$183,396,409

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Endorsed by the medical profession. Send ten cents to pay postage on free trial bottle. Sold by Leading Druggists. Not genuine unless label bears my signature:

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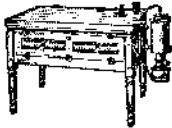
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 ban..... 779,044
 Pump, double acting, W. W. Robinson..... 778,898
 Punching bag apparatus, coin controlled, C.
 Melter..... 779,232
 Punching machine, J. E. Melvin..... 779,369
 Puzzle, G. R. Ford..... 779,121
 Puzzle or analogous device, W. C. Beers..... 778,944
 Radiator section mold, T. Holland..... 778,861
 Rail joint, N. Benjamin..... 778,839
 Rail joint, E. L. Hall..... 778,278
 Rail joint and tie, combined, T. B. Patton..... 779,309
 Rail securing device, J. H. Barr..... 779,361
 Rail system, third, G. D. Esposito..... 779,150
 Railway rail stay, Laas & Spenenburg..... 779,086
 Railway rail stay, H. H. Spenenburg..... 779,104
 Railway signaling, W. S. Berry..... 779,390
 Railway switch and signal, L. Griffith..... 779,156
 Railway system, electric, G. L. Campbell..... 779,204
 Railway trains, device for automatically
 stopping, L. Slingland..... 779,324
 Razor, L. S. Morgan..... 779,233
 Refrigerator building, J. Willis, reissue..... 779,329
 Register, J. Band, Tilden, McDonough..... 778,991
 Riveting device, C. T. Umsted..... 778,924
 Roadway, D. N. Long..... 779,295
 Roadway, etc., D. N. Long..... 779,296
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 Burke..... 778,949
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 Roofing, device for attaching, F. S. Howard..... 778,863
 Rope clamp, G. Agabian..... 779,019
 Rotary arbor, Wegner & Bourcau..... 779,308
 Rotary engine, L. P. Parmenter..... 779,308
 Rotary engine, B. Estby..... 779,460
 Rotary furnace, H. C. Davey..... 779,119
 Rubber articles, manufacturing rubbered
 cord for use in, T. Sloper..... 779,379
 Rust preventing compound, H. J. Romick..... 779,238
 Safe or vault locking mechanism, J. H.
 Williams..... 779,145
 Sash fastener, N. J. Lindbeck..... 779,291
 Sash, window, S. E. Roe..... 779,317
 Saw guide, band, F. T. McDonough..... 778,991
 Saw upper adjusting device, band, Harold
 & Wilderson..... 779,158
 Scaffold, portable, J. G. Hehr..... 779,362
 Scenery and preparations therefor, theater,
 V. Sellier..... 778,905
 Screen, G. W. Cross..... 779,149
 Screw press, J. M. Herron..... 778,969
 Seal, E. Bursker..... 779,396
 Seal lock, B. R. Draudt..... 779,032
 Seal press, F. W. Brooks..... 779,023
 Seat, paint box, and easel, combined, H. G.
 Burgess..... 779,202
 Sewing or other machines, spring meter for,
 J. Teel..... 779,382
 Shaft, flexible, R. M. G. Phillips..... 779,374
 Shearing and punching machine, C. Wunder-
 lich..... 779,387
 Sheet metal can, A. Wulff..... 779,339
 Shingle sawing machine, L. Braut..... 779,280
 Shoe fastener, A. Mikkelsen..... 779,127
 Shoe tongue retainer, W. J. Andrews..... 779,343
 Shoe uppers, machine for automatically
 lacing, W. Smith..... 779,008
 Shovels or drages, means for operating
 ipper handles for, E. S. Bennett..... 778,840
 Shuttle winder, H. B. Beckman..... 779,344
 Shuttle spindle, N. Foerster..... 778,851
 Skirt hanger, C. L. Heron..... 779,081
 Skirt hanger, R. H. Knight..... 779,168
 Sleigh, L. Norman..... 779,303
 Smelting ore, J. Gayley..... 779,037
 Smoke consuming furnace, O. E. Neumann..... 779,176
 Soap grinding mill, G. E. Duke..... 779,031
 Stadium seating, making, L. P. Lihme..... 779,290
 Sound recording machine, cutting tool for,
 E. R. Johnson..... 778,975
 Sound records, affixing tablets to, E. R.
 Johnson..... 778,976
 Spectacle shade, J. F. Wynkoop..... 779,340
 Speed indicator, F. E. Wolf..... 779,059
 Spike, S. W. Higgins..... 778,858
 Spike puller, E. Condon..... 779,028
 Spindle, see Shuttle spindle..... 779,077
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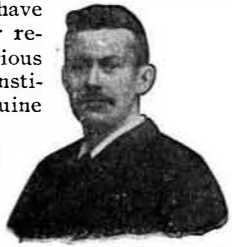
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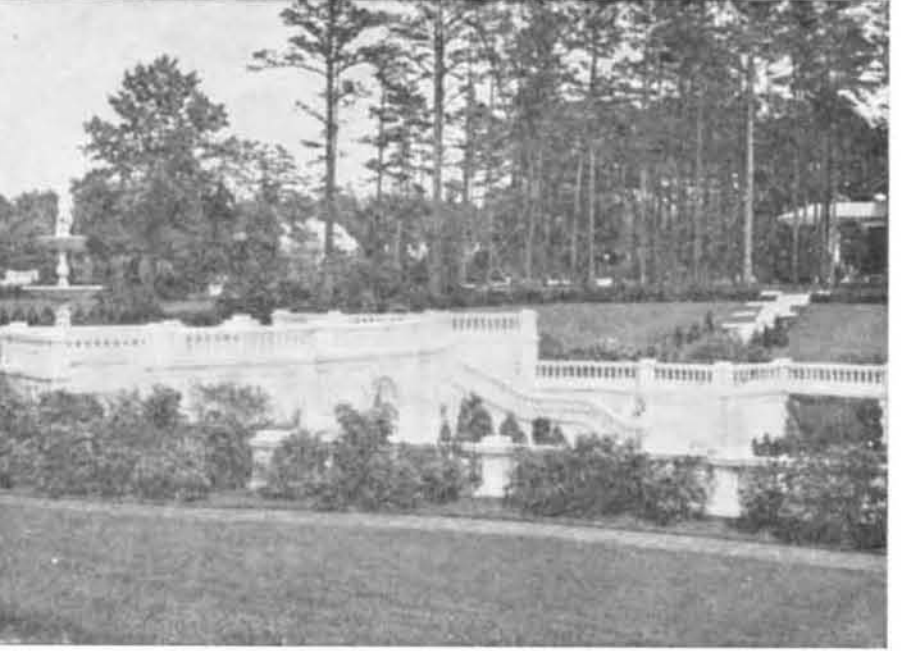
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