The Railroads of Europe 1875-1899.

The table which follows has been compiled and converted from l'Economiste European, of Paris, by the Philadelphia Commercial Museum:

RAILROADS OF EUROPE ON JANUARY 1, 1875, AND JANUARY 1, 1899.

	Miles, 1875, per Million of Inhabitants.	Total.	Miles, 1899, per Million of Inhabitants.	Total.
France	352	12,898	670	25,897
Germany	381	16,109	563	30,776
England	499	16,449	527	21,528
Austria-Hungary	273	10,083	483	21,805
Belgium	324	2,131	560	3,781
Bulgaria	324	2,131	178	616
Denmark	339	635	669	1,617
Spain	211	3,484	445	8,102
Greece	4	7	232	591
Italy	166	4,578	305	9,759
Luxemburg	827	169	1,210	270
Netherlands	261	984	329	1,694
Portugal	137	641	280	1,466
Roumania	150	766	332	1,894
Russia	126	9,665	232	24,808
Finland	249	465	604	1.605
Servia	249	465	144	353
Sweden	514	2,235	1,247	6,359
Norway	22	311	571	1,230
Switzerland	371	1,017	730	2,302
Turkey	111	353	154	978
Isles of Malta	....	....	....	....
Jersey and Man	...	...	211	68
Total	5,317	83,680	10,676	167,439

The Kachin Developer.

We have submitted, says Photography, the new kachin developer to a most vigorous test; we have developed over a hundred negatives with it, using the formula given below. One cannot wish for a more satisfactory developer. It does not stain the plates or the fingers, and has no injurious action upon the skin. It gives good brownish-black negatives, quite free from fog, without the necessity of employing any bromide or other restrainer whatever. Development with it took about six to ten minutes to complete, ample density being obtained very easily.

The formula which we adopted to secure so excellent a result is a simple one. Three solutions, each ten per cent, are required: One of sodium carbonate, one of sodium sulphite, and one of kachin. In making up the ten per cent solution of kachin, instead of water some of the ten per cent sodium sulphite solution is used. For each ounce of developer we took:

Kachin (ten per cent solution)	40 minims.
Sodium carbonate (ten per cent solution)	½ ounce.
Sodium sulphite (ten per cent solution)	½ ounce.

We got, as will be seen, a trifle more than an exact ounce, but such a difference is unimportant, and the composition of the developer is easier remembered in this way.

The solution, as we finally used it, will be seen to contain approximately 4 grains of kachin, 26 grains (22 + 4) of sodium sulphite, and 22 grains of sodium carbonate.

Another formula, given in a little book entitled "How to Develop with Kachin," is as follows:

	British System.	Metric System.
A. Kachin	160 grains (avoir.)	9 grammes.
Sodium sulphite (cryst.)	2½ ounces.	62·5 "
Water up to	20 fluid ounces.	up to 20 c. c.
B. Sodium carbonate (cryst.)	2 ounces.	50 grammes.
Water up to	20 fluid ounces.	up to 500 c. c.

For use, take equal parts of A and B. More diluted developer gives softer results The solutions should be used at a temperature of 60° to 65° Fahr. Assuming exposure to have been correct, with this solution the image commences to appear in about one minute, and, when full density is required, development is completed in from four to six minutes. Softer effects are obtained in from three to four minutes.

For stand development, the plates are placed, a dozen or more at a time, in a grooved trough containing the developer, and development continues with a rapidity depending upon the strength of the solution.

With the following solution normal development is completed in about ten to fifteen minutes. To prolong development add more water:

	British System.	Metric System.
Kachin	115 grains.	7·5 grammes.
Sodium sulphite (cryst.)	560 "	36 "
Potassium ferrocyanide	140 "	9 "
" bromide	23 "	1·5 "
" carbonate	1,150 "	75 "
Water up to	70 fluid ounces.	up to 2 liters.

Throughout these experiments we employed no bromide or other form of restrainer whatever. Our plates, having been exposed (on all sorts of subjects) with an exposure meter and not by guesswork, were all correctly exposed, and however much they differed in the nature of the subject they developed up well with the very simple solution we have named. Bromides seem to have little effect on kachin. This is well shown by the fact that three or four plates can be developed one after another in the same solution without any marked prolongation of the time of development. With most developers, as our readers well know, this is not so. The soluble bromide liberated from the plate into the liquid during development acts as a restrainer, and retards the action of the solution upon the next plate that is put into it. With each plate that is developed it will be seen, then, that the developer is not only getting weaker in the active agent, but is also getting stronger in restrainer.

On the subject of restrainers it has been found that a four per cent solution of ordinary borax used with kachin in the proportion of ten to thirty drops to each fluid ounce results in the production of enormously increased contrast. Plates which have received an exposure of many times the normal may be converted into satisfactory, and even brilliant, negatives by the judicious use of borax in the developer.

Building Loan Associations.

The secretary of the United States League of Local Building and Loan Associations has compiled the following statistics for 1899, which will be found interesting, as no data of this nature is collected through any other source from year to year. It should be remembered that the figures do not include "national" associations; only those that are local and truly co-operative:

States	Associations.	Members.	Assets.
Pennsylvania	1,174	281,456	$12,120,436
Ohio	773	287,477	102,400,699
Illinois	599	100,000	54,104.602
New Jersey	335	90,100	46,100,000
New York	299	89,409	37.253,725
Indiana	424	109,043	31.435,587
Massachusetts	125	68.349	26,744,647
California	151	37,780	20,285,454
Missouri	191	38,000	13,835,817
Michigan	72	32,775	10,159,562
Iowa	79	23,000	5,723,769
Connecticut	15	12,773	3,774,526
Wisconsin	52	13,450	358,902
Kansas	46	12,000	2,880,764
Nebraska	60	13,813	3,332.781
Maine	32	8,115	2,975.716
Tennessee	26	4,795	2,874,097
Minnesota	46	7.500	2,848,179
New Hampshire	17	4,950	1,921.927
North Dakota	7	1,000	364,130
Other States	962	267,800	97,137,800
Totals	5,485	1,503,625	$581,857,170

The Current Supplement.

The current SUPPLEMENT, No. 1286, is an unusually interesting issue. There is an excellent portrait of King Humbert, and also portraits of the present King and Queen of Italy. "The Borsig Engine" at the Paris Exposition gives a full-page engraving of this great engine. "The Future of the Automobile" outlines suggested improvements. "Excavations at Tell-el-hesy, the Site of Ancient Lachish, Syria," is an elaborately illustrated article. "Microbes—What Are They?" is by Dr. Henry G. Graham.

Contents.

(Illustrated articles are marked with an asterisk.)

RECENTLY PATENTED INVENTIONS.

Agricultural and Logging Implements.

GUIDE AND SUPPORT FOR DRAG-SAWS.—EDGAR F. LAFAYETTE, Sedro, Wash. This invention is a small device adapted for attachment to logs or felled trees for guiding or supporting a drag-saw while they are undercut. The device embodies spikes hinged to a bar and adapted to be driven into the log, and a slide adjustable along the bar to support the saw in proper position. The spikes can be folded flat upon the bar so that the entire device occupies but little space.

PLOW.—RICHARD H. PURNELL, Rosedale, Miss. The beam of the plow is made of metal tubing. The cultivating devices are carried by a standard formed with a concave or semicircular upper edge in which the beam fits. The beam and semicircular portion of the standard are bound together by a coupling-band. The entire arrangement is such that great rigidity is secured, as well as lightness and simplicity.

Electrical Apparatus.

ELECTROLYTIC APPARATUS.—ANDREW PLECHER. Habersham and Second Streets, Savannah, Ga. This apparatus is to be used for electrically decomposing any liquid into its constituent gases and especially for decomposing water into hydrogen and oxygen. The apparatus is spheroidal in shape and consists of two separate, closed cells having registering openings by which they communicate. An encompassing band or jacket completely encircles and holds them together. The cells are provided with electrodes, circuit-wires, and gas-discharging pipes. The inventor has been particularly careful so to construct his apparatus that it can be readily transported, that the greatest possible electrode surface is obtained, and that repairs can be easily made when desired.

GAS-BATTERY.—ANDREW PLECHER, Habersham and Second Streets, Savannah, Ga. The surface action of sponge-platinum causes two gases (oxygen and hydrogen) to unite, as every one knows, and to heat the platinum red hot so that the gases are automatically ignited. It is Mr. Plecher's purpose to prevent the production of heat attending the union of the gases and to get its equivalent in electric current. In a porous cell finely-divided platinum is placed. To one side of the cell hydrogen is conducted; to the other, oxygen. When the hydrogen and oxygen unite through the action of the platinum, suitably placed electrodes will gather the liberated forces of opposite polarity as union takes place and carry them off through the conducting wires of an extraneous circuit.

ELECTROMAGNETIC TELEPHONE.—ANDREW PLECHER, Habersham and Second Streets, Savannah, Ga. The telephone includes in its construction an iron box to which an iron circuit-wire is attached. In order to render the boxes magnetic an insulated wire is wound around the circuit-wire. The box is provided with two diaphragms between which a variable-resistance medium is suspended. A small bulb is used to increase or decrease the air-pressure in the box and thus to regulate the amplitude of movement of the variable-resistance medium. The two diaphragms, as they vibrate in opposite directions in response to the vocal impulses, augment the effect on the resistance medium one hundred per cent. The fluctuations are electrically transmitted.

TIRE-SEPARATOR.—DELORE J. LAHAY, Nadeau, Mich. Ordinarily the two sections of a double tube tire adhere to each other so tenaciously that their separation is a matter of no little difficulty. The present invention provides means whereby this separation can be easily accomplished. The means in question comprise a frame or body portion capable of encircling the inner tube and provided with anti-friction wheels or rollers upon which the tire is compressed. The separator is movable between the two tubes to force them apart.

Vehicles, Harness, Etc.

DRAFT-EQUALIZER.—JOHN A. BELTZ, Buxton, N. D. This draft-equalizer, comprising broadly two doubletrees held to rock upon each other and also upon a wagon-pole, prevents any animal in a four-horse team from shirking his duty; for the pull of one horse will be thrown upon the neck of the delinquent animal. The draft-strain is entirely disposed at the rear end of the pole, so that the animals pull with greater effect in moving the loaded wagon than is otherwise possible. The device is so constructed that the forward pair of animals control the side movement of the wagon-pole together with the rear pair of animals and must pull equally with them, an arrangement particularly serviceable in rounding corners.

BIT.—MICHAEL MCNALLEY, St. Louis, Mo. The bit invented by Dr. McNalley is designed to induce a horse to carry his head outward and away from the chest rather than to drop his chin in the direction of the chest. The bit is simple and durable, and is so made that it will not irritate the horse or tend to injure the jaw or mouth.

Industrial Apparatus.

MAGNETIC SEPARATOR.—CHARLES F. COURTNEY and ROBERT BUTTERWORTH, Broken Hill, New South Wales. Comminuted ore or other mixture is passed through a highly-concentrated magnetic field in the form of a film, so as to prevent the paramagnetic particles from becoming prematurely detached from the magnetic poles and swept away by contact with the passing stream of matter of lower magnetic permeability with which they are associated. The material is prevented from falling freely until it enters the magnetic field, so that the particles, however low their magnetic permeability, are not lost. The invention is also adapted to separate paramagnetic substances of different degrees of magnetic permeability. For, by regulating the intensity of the magnetic field and the time during which the material is acted upon, a substance having a certain degree of magnetic permeability can be obtained.

CURTAIN FOR DUST-COLLECTING APPARATUS.—ARTHUR S. DWIGHT, Kansas City, Mo., and RUDOLF RUETSCHI, Argentine, Kans. In order mechanically to precipitate and collect metallic fumes and flue-dust in metallurgical establishments, the inventors employ curtains, the members of which present oblique surfaces or facets to the longitudinal currents of the gases between adjacent curtains, so as to divide the current into a larger number of smaller oblique currents and to form eddies or whirls near the facets. Thus is insured a thorough and rapid mechanical precipitation of the solid matter in the gases on the surfaces or facets. The inventors obtain a large frictional surface for a very short flue, and therein resides one of the merits of their device.

Railway-Appliances.

SPRING-SEAT.—WILLIAM BORCHERT, Carson, Nev. The seat is particularly adapted for use in locomotive-cabs. It is provided with such equalizing devices that it will always be parallel to the base, so that all springs will be equally compressed whether a man sit on a corner or edge. The seat is, therefore, comfortable under all conditions.

Miscellaneous Inventions.

SASH-HOLDER.—JOHN BOHLEN, Big Rapids, Mich. The sash-holder is designed to be used in connection with a rack of any kind and is so constructed that it can be locked in or out of engagement with the rack and supported in such a manner that the window to which it is applied may be conveniently operated when the latch is out of engagement with the rack.

LOCK.—THOMAS CHURCHILL, Hampton, Va. Mr. Churchill has already patented a lock in which the outer knob is made incapable of turning the spindle except when temporarily locked thereto by a key which is inserted concentrically through the knob and is made to act upon clutch devices which cause the knob to be coupled to the spindle. The present invention comprehends further improvements relating more especially to the locking or clutch mechanism which connects the knob with the spindle and which is applicable to any of the ordinary forms of locks, having the usual squared spindle.

SIGN OR SIGNAL FOR CALLING CABS.—ARTHUR G. R. NICHOL, Manhattan, New York city. The invention provides a simple means whereby a clerk in a hotel or theater may call cabs or other carriages successively or simultaneously. Electric lamps of various colors are used, which are flashed by inserting plugs in proper openings. In order to prevent mistakes, the plugs are made to fit only the contact plates for which they are intended. And in order still further to guard against mistakes, plugs of like shape are connected by strings. Hence the operator can not inadvertently leave one plug of a set in a contact-plate; for the entire set must be removed before the connecting-string can be taken off the switchboard.

VENTILATED BOOT OR SHOE.—JAMES J. PEARSON, 40 Wall Street, Manhattan, New York city. This ventilated shoe is provided with a ventilating mat interposed between a perforated insole and the outer sole. The mat is of elastic rubber and is connected with a channel leading to the heel-vent of the shoe for the ingress and egress of air. The most prominent feature of the invention, a feature, which, it is claimed, is not possessed by any similar shoe, is the impossibility of entrapping air in the sole. The air circulation is free, longitudinally and laterally. The cushioned tread, reinforcing devices, and cheapness of manufacture are other features which deserve to be mentioned.

COMBINED HEATER-SHIELD AND VENTILATOR.—ALLAN B. SHANTZ, Walkertown, Ontario, Canada. Much danger is incurred by improper ventilation and especially by arrangements which draw air into a room from a point near the ground, since the gases arising from decaying animal and vegetable matter must also be drawn in. The present invention provides an apparatus by which air is received from an elevated point, the lower impure strata being withdrawn from the room. The novel feature of the invention is an ingenious double-walled shield used in connection with a heater.

TAPE-MEASURE ATTACHMENT.—CORNELIUS H. ELKSKAMP, Telluride, Colo. The inventor has busied himself with the production of an attachment for the end of a tape, which attachment can be readily applied to a floor, stake, post, or the like, so that the tape can be readily run out. The end of the tape is provided with an eye in which a link is held pivoted in a post of such construction that it can be readily driven into a floor, tree, or the like.

PICTURE-FRAME.—ALBERT F. MESSINGER, Phœnix, Arizona Territory. The inventor has devised a novel construction which enables him to mount exteriorly on the frame a picture representing a building, and to move this picture out of sight so that a second picture is made to appear, which represents the interior of the building shown on the first picture. The device is particularly useful for advertising purposes, since it combines in one arrangement views of the exterior and interior of a business establishment.

DUPLEX PENHOLDER.—HARVEY and FRANK LONGENECKER, Beamsville, Ohio. This penholder contains a simple mechanism which permits a ready projection of one pen-socket and at the same time causes

the retraction of another socket to enable the writer to make use of separate pens for different inks, without one pen interfering with the other. In the case of the penholder a right and left hand screw is mounted, the threads of which are engaged by pen-sockets. When one socket is moved in one direction, the other is caused to travel in an opposite direction.

FEED-RACK.—JAMES MORRIS, Westchester, Bronx, New York city. This rack is so constructed that it can be easily put up in a stall and taken down and folded for transportation, thus particularly adapting it for racing stables, in which it is desirable that each horse should have his own rack to avoid danger of contagious diseases.

CHAIR-SEAT SUPPORT. — HEZEKIAH MORTON, Thomasville, N. C. The support comprises crossed straps extended under the chair-seat in order diagonally to connect a front leg with a rear leg of the chair. Each strap consists of two spaced pieces connected at the ends. Adjusting and supporting bolts extend from the legs through openings in the end connections; and nuts on the inner ends of the bolts abut against the end connections and are prevented from turning by engaging with the members of the straps. A very firm brace is thus formed which prevents the seat-frame from breaking and the parts of the back from spreading.

FRAME FOR BAGS, PURSES, SATCHELS, ETC., LOUIS B. PRAHAR, Brooklyn, New York city. A locking device has been provided by the inventor in which a catch-button has a rocking and guided movement on a member of the frame. The button can be released from a locking stud or studs on any number of members of the frame by a simple rocking movement from one side to another or by an upward movement.

BREAD OR CAKE-PAN.—MARIE VOSSBECK, Trinidad, Colo. The pan is made so that the parts can be quickly and conveniently detached, buttered, and assembled. When the loaves have been baked the body and bottom of the pan can be removed from engagement with the partitions, which partitions serve to hold the baked loaves apart and yet permit them rapidly to cool.

CIGAR-WRAPPER. — FRANCISCO E. FONSECA, 22 Fulton Street, Manhattan, New York city. Mr. Fonseca has received a patent for a novel paper cigar wrapper, the ends of which extend beyond the cigar and are twisted to form cords which are wound back upon the cover and secured. No matter how roughly the cigar may be handled, the wrapper will always maintain its position to protect the cigar. The twisted ends serve as cushions, which prevent the cigar from being damaged. One object of the invention is to enable the manufacturer to print descriptive matter on the wrapper. The invention has been practically applied and seems to fulfill its inventor's expectations. For presentation this cigar is specially adapted. Each cigar may bear the name of both the donor and recipient.

FIRE-EXTINGUISHER. —JOHN BRAUNWALDER, Davenport, Iowa. This fire-extinguisher is of a type in which a container for an extinguishing liquid is designed to be broken so that the liquid can escape. The invention seeks to furnish a means for breaking the container, which means are actuated by fire. These means consist of a powder-chamber and a fuse. When the fuse is ignited, the powder will eventually be exploded and the liquid-container shattered.

VIOLIN.—LOUIS H. HALL, Hartford, Conn. The body of the violin consists of a rim or ribs, to which a top and a bottom are secured. The edge-portions of the top and bottom at certain points are under a strain and tend to separate from the ribs. This tension is beneficial in more than one respect. It improves the tone; it opposes the pressure produced by the bridge and strings and, therefore, strengthens the body of the instrument; and it enables the inventor to vary the quality of the tone simply by giving more or less curve to the bottom and top.

AMIDOSULFONIC ACID.—JOSEPH TURNER, Huddersfield, York, England. Amidosulfonic acids, according to this invention, are produced from nitro bodies of the phenolic and carboxylic series by the action of sodium bisulfite. The products obtained combine with phenols, are slightly soluble in alcohol, insoluble in benzin, form crystallized diozo compounds with nitrous acid and all the sodium salts, and are very soluble in water.

BABY-EXERCISER.—CHARLES E. LATSHAW, Lincoln, Neb. The exerciser is a "baby-jumper," consisting of a spring-suspended frame of novel construction, in which the baby is supported. The elastic support enables the child to use its legs freely in springing or jumping, thus combining the benefits of exercise and amusement without requiring close watching.

NON-REFILLABLE BOTTLE.—JOSÉ M. URGELLÉS, 8½ Ricla Street, Havana, Cuba. Two balls are held in a valve-seat arranged to be locked in the neck beneath the cork. The larger ball acts as a valve to permit the outflow of liquid, and the smaller acts as a back bearing to follow up and hold the larger ball to its seat.

TRUNK-HANDLE. — BERTNIE M. WILHITE and FRANK A. HOYT, Gordon, Neb. In the handling of trunks, the pinching of the fingers between the handle and the trunk body is frequently experienced. To prevent this, the handle above noted is so connected by its ends that when gripped it slides outward in diagonal slots in the securing devices and so as to stand out from the trunk body.

TRAP. — THOMAS H. TAYLOR. Luzerne, N. Y. This trap is designed to kill small animals instantly, and to this end the inventor provides a pivoted bait-plate with one end turned up to form a jaw, and a spring frame which, when the trap closes, will spring downward, striking the animal and causing it to be caught between the frame and the jaw of the bait-plate.

Designs.

PLATE. — ARTHUR S. HIGGINS, Manhattan, New York city. The border of the plate is a ribbon of tulips with their leaves. A second and inner border of fancy foliate figures is also employed.

NOTE.—Copies of any of these patents can be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.

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Notes & Queries

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.

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(7940) C. R. asks: If it were possible to build a tower 100 miles high and from the top of such a tower a ball be dropped, would the ball strike the earth exactly toward the center of gravity? Would the motion of the earth imparted to the ball throw the ball out of a direct line toward the center, not considering the attraction the tower has for the ball. A. A ball dropped from a height strikes the earth to the east of the vertical line in which it started. All parts of the earth move with the same angular velocity, but not with the same linear velocity. The smaller the circle of rotation the slower the velocity of motion. As the ball drops it maintains the velocity of motion toward the east, which the point had from which it was dropped. As it approaches the center of the earth, it comes to points which have a slower velocity than it has. It will, therefore, be moving to the east faster than the place to which it has come. This has been proved by dropping balls into deep mines.

(7941) W. G. asks: 1. Could $\frac{1}{32}$ inch brass be used instead of $\frac{1}{16}$ inch for the spool of the ammeter described in SUPPLEMENT, No. 1215. A. Any thickness of brass can be used which will hold the wire without bending. 2. How many pounds of No. 31 copper wire does it take for the high tension transformer described in SUPPLEMENT, No. 1087? A. About 48 pounds by calculation. You will probably not get so much in as you cannot wind it perfectly true. 3. How many layers is there on the secondary of high frequency transformer. A. One.

(7942) B. U. S. writes: I desire to know what size and amount of wire to use to convert eight light dynamo in SUPPLEMENT, No. 600, pages 9586 to 9590 inclusive of July 2, 1887. I wish to change to 500 volt motor. Have you a SUPPLEMENT with this information? A. It is not feasible to change the eight light dynamo into a motor to run upon a 500 volt circuit. The commutator could not stand it. You would need to wind each of the armature coils with about 40 turns of No. 28 wire and use a resistance of about 400 ohms with the present field. This is not figured out accurately because it is not desirable to make the change. It would be far better to build a new machine.

NEW BOOKS, ETC.

EIN LENKBARER FLUGAPPARAT. Von Dr. Constantin Danilewsky. Charkow, Russia: Author's Edition. 1900. Octavo, 82 pages. Illustrated. Price, paper 75 cents.

Danilewsky's experiments in aerial navigation have already been described in the SCIENTIFIC AMERICAN. The present monograph contains a very thorough, and it must be confessed, convincing account of the possibilities of mechanical flight. Dr. Danilewsky writes with the confidence of one thoroughly versed in his science. He claims much for his experiments, but not too much. His monograph is valuable because it contains the only exhaustive account of what he has really accomplished.

SYMBOLISM OF THE HUICHOL INDIANS. By Carl Lumholtz. Memoirs of the American Museum of Natural History. Volume III. Anthropology II., May, 1900. Quarto. Pp. 228, plates and illustrations.

During the years 1890 to 1898 the author made three expeditions to Mexico under the auspices of the Museum. The author spent ten months among the Huichols in 1895 and obtained valuable information on the state of their culture. The author has produced a most solid and satisfactory contribution to ethnological research and the Museum is specially to be commended for the substantial and sumptuous manner in which the book has been clothed. The illustrations are good and the plates are specially fine.

TECHNOLOGISCHES LEXIKON. Handbuch für alle Industrien und Gewerbe. Redigirt von Louis Edgar Andés. Illustrated. Parts 2–5. Vienna: A. Hartleben. Large Octavo. Price, per part, 70 cents.

The parts of this new lexicon which lie before us extend from "Arsenhüttenbetrieb" to "Eichenholzfärbungen." Long articles are to be found under the headings "Ausdehnungskoëffizienten verschiedener Körper," "Baumwollgewebe," "Bleigewinnung," "Desinfektion," etc. The illustrations which accompany the text are, for the most part, excellent woodcuts. The parts which, up to the present, have come to our notice deserve unstinted praise for the evident care which the author has taken in their preparation.

DIE SOCIALEN AUFGABEN DES INGENIEURBERUFES UND DIE BERECHTIGUNGSFRAGE DER HÖHEREN SCHULEN. Eröffnungsrede zur 40. Jahresversammlung des Deutschen Vereins von Gas-und Wasserfachmännern. Von Generaldirektor W. v. Oechelhaeuser, Dessau. München: R. Oldenbourg. 1900.

DIE ELEKTRISCHE VOLLBAHN BURGDORF-THUN. Separat-Abdruck aus der "Schweizerischen Bauzeitung." Zürich: Ed. Rascher, Meyer und Zeller's Nachfolger. 1900.

INDEX OF INVENTIONS

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AUGUST 14, 1900.

AND EACH BEARING THAT DATE.

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

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Bicycle, W. C. Dunn ... 655,697
Bicycle pump, O. Keen ... 656,122
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Bicycle support, O. Weston ... 656,129
Billiard cue tip, J. Prince ... 655,990
Bit. See Bridle bit.
Block. See Building block. Sheet leader block.
Board. See Kneading board.
Boat, life, P. U. & A. M. J. Riess ... 655,993
Boiler. See Pipe boiler. Water tube boiler.
Boiler blow off, steam, C. R. Partington ... 655,988
Boiler furnace, steam, J. Thurell ... 656,059
Bolster, collapsible, J. E. Long ... 655,790
Book, account, E. Mayer ... 656,031
Book, manifolding sales, D. B. Kearney ... 655,876
Book, separable, F. H. Gilson (reissue) ... 11,846, 11,847
Boring tool brace head, A. Weisenhorn ... 656,069
Bottle, J. T. Johnson ... 655,872
Bottle carrier, holder, or hanger claw, C. A. Law ... 655,722
Bottle, non-refilling, J. Walber ... 656,148
Bottle or similar receptacle, J. O'Connor ... 655,887
Bottle washing machine, F. Lugviel ... 655,792
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Box machine, honey, C. Mondeng ... 655,938
Bracket. See Flagstaff bracket. Steel tower bracket.
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Brake application valve for train pipes, J. J. Sullivan ... 656,058
Brake mechanism, differential, Brill & Adams ... 655,754
Brick mold sanding machine, H. Schoonmaker ... 655,740
Brick press, C. M. Steele ... 656,056
Bridle bit, M. H. Sims ... 655,913
Brush, L. Roth ... 655,833
Brush holder, Erben & Potter ... 655,824
Buggy top attachment, H. C. Stockton ... 655,806
Buggy top raiser, J. C. Ford ... 655,767
Building block, W. A. Robinston ... 656,138
Burglar alarm, J. W. Rough ... 655,834
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Cables, manufacture of chain, J. Verity ... 655,814
Calcium, etc., producing carbid of, W. S. Horry ... 656,156
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Canopy frame or support, J. T. Johnson ... 655,873
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Car coupling, R. P. Norton ... 655,886
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Car, grain, G. Douglas ... 655,767
Car loader, J. L. Roberts ... 655,831
Car, parlor compartment, J. B. Strauss ... 655,892
Car replacer, J. D. Hoover ... 655,778
Car roof, D. C. Ross ... 655,941
Car sand box, A. W. Ham ... 655,863
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Car spring, W. Robinson ... 655,738
Car step, J. B. Thacber ... 655,839
Carbon, manufacture of, W. J. Burke ... 655,920
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Carriage body, S. R. Bailey ... 656,006
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Convertible tub, Levy & Holt ... 655,980
Cord fastener, C. J. W. Hayes ... 656,114
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Electrical party lines, system for individual service on, W. Torst, Jr ... 655,916
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Engine indicator, steam, Doran & Taggart ... 655,857
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Engines, incandescent igniter for gas, A. G. New ... 656,145
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Excavating machine, L. V. Brophy ... 655,955
Excavator, A. E. Cheney et al ... 655,758
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Feed water strainer, locomotive, R. B. Paxton ... 655,795
Fence machine, wire, T. M. & T. M. Conner ... 655,760
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Gas lighter, automatic, Jones & Barrett ... 656,118
Gas meter, coin freed, B. Paterson ... 656,042
Gas producer charging hopper, G. R. Hislop ... 655,931
Gas regulating tip for burners, J. W. Hentz ... 656,136
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Grate, W. C. Higgins ... 655,930
Grinding machine, H. W. Bolens ... 655,753
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Journal bearing, G. Fulton ... 656,017
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