this parachute rigid guys or braces operate in conjunction with a sail or kite to extend it; and the inventor's objects are to provide means for effecting the opening of the parachute in descent; to afford facilities for folding and stowing the device, and to provide a durable and simple construction of the several parts of the parachute and its entirety.

CAPPING-MACHINE. — C. A. YOUNGMAN, Louisville, Ky. The intention of the inventor is to provide a machine, arranged to press the cap or capsule snugly onto the head and neck of the receptacle, without danger of marring the cap or capsule, or scratching or removing the paint, wax, or other material with which the cap is decorated.

Railways and Their Accessories.

SWITCH MECHANISM.—F. F. YOUNG, Lowell, Ohio. The invention pertains to railway switches, and particularly to the switches of light railways such as trolley tracks. The inventor's aim is to provide means for operating the switch from the car platform so as to obviate the necessity for operating the switch by hand.

AUTOMATIC SWITCH-STAND. — E. E. STAGGS, Hachita, New Mex. An object here is to provide a switch in which the target will always indicate the true condition of the switch. This obviates a grave danger which arises from the use of switch stands of the ordinary kind since with this invention there must be a positive movement by some one who wishes the switch to be changed before the target will indicate such change. The change made, the target will be shifted to indicate the change and will be positively locked in its shifted position.

LOCOMOTIVE ASH-PAN.—J. S. DOWNING, Atlanta, Ga. The inventor's object is to provide a novel positively operating construction for discharging ashes from the ash pan. This is an automatic self-cleaning ash pan having a system of hoes attached to the piston rod, and a cylinder adapted to receive fluid pressure for reciprocating the hoes in the ash pans for discharging the ashes thereon.

RAIL CHAIR AND BRACE.—E. JANDREAU, Cherry Valley, N. Y. The object of the invention is to provide a chair and brace, by means of which railroad rails can be securely held in place upon the cross ties, and which serve to brace the rails against lateral movement at curves and other points of the track where such bracing is necessary.

METALLIC CROSS-TIE AND RAIL-CLAMP. —H. S. KILBOURNE, Washington, D. C. An object of this invention is to provide a cross-tie of light weight but strong and durable. In carrying this out I-beams of standard sizes and shapes are used, thereby reducing cost of manufacture. The tie requires but few bolts, the main connecting member being a clamp of a peculiar form.

Pertaining to Recreation.

MOVING-PICTURE DEVICE. — W. HENDRICK, New Haven, Conn. The object of the present invention is to provide certain improvements in chaplets and shrines of the holy rosary, whereby actuating mechanism is employed and the endless web containing pictures is properly actuated, to accurately display one of the pictures at a time and to display the several pictures in the proper order according to the intended devotional exercise.

Pertaining to Vehicles.

THILL-COUPLING.—V. B. HENBY and H. FINTEL, JR., Hardy, Neb. The main object in this case is to provide an improved means for enabling the draft eye to be detached or inserted, while at the same time means are provided for holding the draft eye in close contact with the coupling pin to prevent rattling of the various parts.

POLE-TIP.—J. W. DEAM, Geary, Okla. The invention relates to tips for wagon poles and the like, and more particularly such as have resiliently controlled means for securely holding a neck yoke in place on the pole. In operation, the latch cannot drop out through the slot of the casing, as the stop with its shoulders, which are transversely disposed with respect to the slot, is covered by the end of the pole.

PNEUMATIC TIRE.—P. I. VIEL, 37 Rue de Rivoli, Paris, France. This invention relates to a tire characterized by the use of a lining formed of a metal cable of wire. This packing or lining is intended to entirely do away with ruptures resulting from excessive pressure or excessive weight, or overheating and punctures. This lining diminishes in no way the flexibility of the tire.

BOLSTER.—J. HEIMLICHER, Defiance, Ohio. The aim in this instance is to provide a bolster for wagon bodies and the like, which is light in weight and inexpensive to manufacture, and which can be easily fashioned from standard structural iron or other metal pieces, such as I-beams and channels.

Designs.

DESIGN FOR A CUT-GLASS DISH.—T. B. CLARK, Honesdale, Pa. This highly ornamental dish is of a circular form and its height is about one-half the diameter of the top and open part. The pattern cuttings are of great variety and exquisite design.

DESIGN FOR A TOBACCO-PIPE.—J. M. TATUM, Athens, Texas. The bowl in this ornamental design represents the body of a tree with several roots sawed off close at the base. The handle has a symmetrical curve. The words Dum Tacket Clamet are inscribed across the bowl and also large initial letters W. O. W. arranged vertically.

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 this paper.

NEW BOOKS, ETC.

THE COMMERCIAL PRODUCTS OF INDIA. By Sir George Watt. New York: E. P. Dutton & Co., 1908. 8vo.; 1,189 pp. Price, $5.

This work is an abridgment of "A Dictionary of the Economic Products of India," which was published in 1893-4, and which has been out of print for some time. The government of India therefore decided that a correct and abridged edition should be brought out. The instructions provided that the work should be limited to a single volume, the arrangement of which should follow that of the dictionary and should be confined to products which are at present of prospective industrial and commercial importance. The book is a monumental work, and represents a vast amount of labor. It will prove valuable to those who are in any way identified with Indian industries.

THE PHOTOGRAPHIC MANUAL. Edited by H. Snowdon Ward. London: Dawbarn & Ward, Ltd. New York: Tennant & Ward. 12mo.; 287 pp. Price, paper, 50 cents; cloth, $1, postage extra.

This is the fifth edition of an excellent English manual which incorporates the figures, facts, and formulæ of photography, and is a guide to their practical use, and is intended for all photographers. This collection of formulæ is one of the best that we have ever seen. It is a book which should be in the hands of every photographer.

THE ANGLER'S GUIDE. A Manual for Campers and Anglers. Edited by Wainwright Randall. New York: The Field and Stream Publishing Company, 1909. 18mo.; 242 pp. Price, 50 cents.

This little volume contains a description of all popular fresh-water and salt-water fish. It describes tackle and bait for the expert angler; it gives complete information on how, when, and where to fish, and a summary of the fishing resorts of the United States and Canada. The book is admirably arranged, and is very well printed. Its form is so convenient that it can be carried in the pocket. Among the features which appeal to us particularly are the views and plans of bungalows, the fishing charts, and the directions for preparing food suitable for a fishing camp. The book should be in the possession of every fisherman.

THE DIRECTORY OF DIRECTORS IN THE CITY OF NEW YORK. New York: The Audit Company, 1909. 12mo.; 860 pp. Price, $5.

The tenth edition of this useful work has just come from the press, and maintains the reputation of its predecessors for completeness and reliability. The Directory this year contains over 32,000 directors, each director's name being followed first by the name of the firm or company with which he is directly associated, and then by all the companies in which he is a director. Select lists of corporations in banking, insurance, transportation, manufacturing, and other lines of business, alphabetically arranged, accompanied in each case by the names of the company's officers and directors, are to be found in the appendix, as well as a list of the principal exchanges in New York, with their officers and managers. This is a book which no business house dealing with a large number of companies or their stocks and desiring to know by whom their clients' interests are controlled, can afford to be without.

THE IMPLEMENT BLUE BOOK. St. Louis: Midland Publishing Company, 1909. 8vo.; 460 pp.

This is a very useful book of reference for all users of or dealers in vehicles of all kinds, agricultural machinery and implements. A remarkable feature is the simplicity with which one can find any name or subject heading one wants, the book being described as "self-indexed, double-indexed, and cross-indexed." It begins with a classification of manufacturers in the alphabetical order of the implements they make, following with vehicles in the same manner. Then comes a list of manufacturers in alphabetical order, with lists of the specialties they make, and then a list of branch jobbing and transfer houses in geographical order, with the names of manufacturers whose lines they handle.

ENGINE LATHE WORK. By Fred H. Colvin. New York: Hill Publishing Company, 1909. 16mo.; pp. 180. Price, $1.

The writer is Assistant Editor of the American Machinist, and is the author of many well-known books on mechanical subjects. The present volume gives practical suggestions which will give the young machinist or apprentice the foundation principles of engine lathe work. The illustrations number 127, and are well executed. The author states that while the suggestions have been written especially for those with a limited experience, it is quite probable that many of the ideas and suggestions may be new to some of the older men who have not had a chance to see what other shops were doing.

RADFORD'S ARTISTIC BUNGALOWS. Unique Collection of 208 Designs. Chicago and New York: The Radford Architectural Company, 1908. 4to.; pp. 221. Price, $1.

In the last three years the number of bungalows which have been built in the United States has increased by leaps and bounds, and whole farms are being split up into lots for the erection of bungalows consisting of from two to five or more rooms. The work before us consists of a collection of wash drawings and floor plans. Plans and specifications for any of them are furnished by the publishers at moderate rates. The illustrations are hardly as attractive as they would be if they were made from photographs of bungalows which have actually been built.

THIRD REPORT OF THE WELLCOME RESEARCH LABORATORIES AT THE GORDON MEMORIAL COLLEGE, KHARTOUM. Andrew Balfour, M.D., B.Sc., F.R.C.P. Edin., D.P.H. Camb., Director. Published for Department of Education, Sudan Government, Khartoum, by Balliere, Tindall & Cox, 8 Henrietta Street, Covent Garden, London. Depot for U. S. A.: Toga Publishing Company, 45 Lafayette Street, New York city, 1908. 4to.; pp. 476.

The admirable work conducted in the Wellcome Research Laboratories is undoubtedly familiar to our readers. The laboratories were established to promote technical education in general; to further the study of tropical disorders, especially the infective diseases of both man and beast peculiar to the Sudan; to render assistance to the officers of health and to the clinics of the civil and military hospitals; to aid experimental investigations in poisoning cases by the detection and experimental determination of toxic agents, particularly the obscure potent substances employed by the natives of the Sudan; to carry out such chemical and bacteriological tests in connection with water, food stuffs, and health and sanitary matters as may be found desirable; to promote the study of disorders and pests which attack food and textile produce and other economic plant life in Sudan; and to undertake the testing and assaying of agricultural, mineral, and other substances of practical interest in the industrial development of the Sudan. The two volumes of reports previously issued by the laboratories cover the period from the foundation of these laboratories in 1903 to 1906. The third report completes the record up to 1908. The work of the laboratories has been so far extended that the latest report contains some 480 pages or detailed records of many interesting experiments, and researches principally connected with tropical medicine. The volume is profusely illustrated, and includes many valuable colored plates. Simultaneously with the Third Report, and as a Supplement to it, is published a Review of the Progress made in Tropical Medicine during recent years, compiled by Dr. Balfor and Dr. R. G. Archibald.

DICTIONARY OF CHEMICAL AND METALLURGICAL MACHINERY, APPLIANCES, AND MATERIAL MANUFACTURED OR SOLD BY ADVERTISERS IN ELECTRO-CHEMICAL AND METALLURGICAL INDUSTRY. First Edition. New York: Electro-Chemical and Metallurgical Industry, 1909. 12mo.; pp. 182. Price, 50 cents.

LA MORPHOLOGIE DE L'INSECTE. Par Charles Janet. Limoges, France: Imprimerie-Librairie Ducourtieux et Gout, 1909.

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Gas generator, N. Goodyear	931,293
Gas igniting device, electric, H. Jameson	931,427
Gas producer, F. Muller	931,460
Gas purifying apparatus, F. Sepulchre	931,229
Gaseous fumes or smoke, treating corrosive, C. B. Sprague	931,515
Gear, change speed, P. Evans 931,288,	931,289
Grate, J. W. Webb	931,534
Grate, electrically heated, Hermansen & Tygerson	931,605
Grease cup, A. F. Taylor	931,659
Grinder head, Puffer & Hayes	931,483
Grinding mill, G. S. Emerick	931,045
Grinding mill, W. R. Cunningham	931,279

A NEW SPEED INDICATOR FOR MARINE PROPELLERS.

(*Continued from page 156.*)

function enters largely. Each marine plant has its most efficient cruising speed, and in the case of cargo-bearing merchant marine vessels, every pound of coal saved means increased earnings, also increased cruising area to warships. When this economical speed had been determined, with a tachometer system consisting of a plurality of indicators distributed about the vessel to guide, the engines can be kept at this rate of speed accurately and with but slight effort. The captain, in his cabin or on the bridge, the chief engineer when off duty—all can keep track of exactly what rotation speed is being maintained.

The accuracy of dead reckoning is greatly facilitated by an exact knowledge of what engine speeds have obtained during stated and frequent intervals of time, instead of having to take the total number of revolutions over a protracted period and guess roughly at the distance traveled; because the distance traveled per minute by the ship at say 100 R. P. M. is not increased in proportion when 125 R. P. M. obtains. Therefore, during long periods the rate of speed of the shaft may vary considerably with no tachometer to guide the man at the throttle.

Efforts along this line have been made for a number of years, but have been productive of no dependable and accurate device prior to the invention of the system which is the subject of this article.

Centrifugal devices are not susceptible to mechanical transmission to various remote parts of the vessel, and lack extreme accuracy over protracted periods of operation. Pneumatic devices, operated by air-pumps actuated by the propeller shaft, are less accurate. Electrical tachometers have failed in accuracy heretofore because of the error introduced, and varying from day to day, by rubbing or abutting contacts becoming foul, thereby introducing a resistance in the circuit with corresponding inaccuracy of reading of a voltmeter operated by the dynamo, calibrated in R. P. M. of the propeller shaft. Owing to the former use of direct-current instruments, commutators and brushes were necessary on the magneto. The spring tension of these brushes varied, the commutator became oxidized and covered by oil from the bearings, and considerable error crept in. As a warship going ten knots per hour with engines turning over 72 R. P. M. is not traveling ten knots at 71 or 70 R. P. M., it is seen that a tachometer, to be of value, must be accurate to a fraction of a revolution, and maintain its calibration.

All reciprocating engines, owing to the use of connecting rods between the crank and the piston, impart rotation to their shafts of constantly varying angular velocity. The fewer the number of cylinders or the slower the speed of rotation, the greater this variation. These variations are smoothed out more or less by the flywheel on the stationary engine, but a marine engine has no flywheel except a propeller, the weight of which is not sufficient to possess flywheel action to any extent. Therefore, any tachometer actuated by the propeller shaft by gearing or otherwise, has imparted to it an unsteady rate of speed. If the tachometer is geared up to the shaft so that it will rotate faster than the shaft, any momentary irregularity in the revolution of the main shaft is multiplied in the tachometer proportionally to the ratio of gearing between the main shaft and the tachometer. Therefore, whatever indicating device is used in connection with the tachometer will pulsate, and the reading of the pointer on the scale of the instrument will be largely a matter of guesswork between two values of low and high. Hence it is evident that some sort of compensating device must be used to take up these momentary fluctuations of the propeller shaft, and impart to the generator of the tachometer a steady av-

(*Continued on page 168.*)

Grinding mill, S. Lieberknecht	931,321
Hame connection, J. A. McClellan	931,461
Hame fastener, W. L. Roper	931,652
Hammer, fluid pressure, L. E. Howard	931,609
Handle loop, W. S. Maxwell	931,698
Harvesting machine, grain, J. B. Deeds	931,575
Hay hook, Pennington & Chilton	931,339
Hay loader, S. M. Wixcel	931,109
Head rest, W. P. Clugsten	931,181
Heater. See Feed water heater.	
Heater, C. H. Henzel	931,422
Heating apparatus, hot water, O. Oster	931,337
Heating device, orchard, F. E. Barney	931,557
Heating system, J. Collis	931,037
Heating system, car, F. H. Gold	931,395
Heel for boots and shoes, composite, E. C. Leahy	931,438
Heel protector for rubber shoes and the like, metal, F. W. Boxer	931,261
Hinge, W. S. Maxwell	931,697
Hinge and bracket, combined, L. Bertrand	931,028
Hinge, pintle, F. Meyer	931,630
Hitching device, E. L. Harmer	931,419
Horn, amplifying, W. Tatelbaum	931,161
Horseshoe, C. T. Humes	931,067
Hose, flexible metallic, W. Schulz	931,091
Hot air wall pipe, J. W. Zuch	931,174
Hub, wheel, G. H. Du Bois	931,283
Hydraulic power apparatus, A. C. Ferguson	931,402
Incubator, Perkins & Davis	931,142
Indicator, H. P. Quick	931,484
Induction motor, R. E. Hellmund	931,302
Ink supplying apparatus, M. M. Buckler	931,560
Insulator for electric wires, A. V. Siler	931,507
Insulator, section, H. B. Clarke	931,385
Internal combustion engine, E. A. Rundlof	931,346
Internal combustion engine, G. L. Crook	931,389
Ironing table, W. T. Potter	931,217
Jar, G. T. Barr, Sr.	931,672
Jarring machine, W. Lewis (reissue)	13,012
Jetting mill, W. Adams	931,021
Jewel setting, H. Hess	931,309
Journal box lid, C. A. Lindstrom	931,442
Kneading machinery, W. H. Rippin	931,087
Knives, making table, C. E. Peck	931,471
Knuckle opener, F. H. Wendt	931,708
Knuckle opener, car coupler, F. H. Wendt	931,709
Ladder, step ladder, and scaffold, combined extension, P. Bucco	931,265
Lamp, L. Schepmoes	931,496
Lamp, arc, S. P. Wilbur	931,168
Lamp burner, Paul & McGinnis	931,642
Lamp chimney, W. S. Wiley	931,538
Lamp lighting and extinguishing system, gas, A. Grossmann	931,412
Lantern burner, A. F. Prahm	931,342
Last, E. Y. Austin	931,372
Lasting machine, second, H. F. Loewer	931,443
Latch, gate, T. R. Varnell	931,163
Leech, vacuum, J. E. Walter	931,102
Lens, bifocal, E. A. Covelle	931,571
Light protector, W. H. Geddes	931,407
Lightning arrester, W. E. Butler	931,033
Lightning arrester, W. Gifford	931,408
Limekiln, R. Buder	931,180
Liquid fuel supplying apparatus, F. Rademacher	931,647
Litharge, making, J. E. Sullivan	931,522
Load binder, R. L. Boyd	931,710
Lock, J. Blaszczyk	931,256
Lock, L. J. Harris	931,603
Locomotive ash pan, J. S. Downing	931,580
Logging apparatus, J. H. & M. H. Dickinson	931,576
Loom, haircloth, G. S. Cox	931,276, 931,683
Magnesium, electrolytic production of, Seward & Von Kugelgen	931,092
Mail and newspaper box, J. M. Lentz	931,696
Mail bag catching and delivering apparatus, H. R. Ladd	931,436
Mail bag delivering and receiving apparatus, W. L. Thompson	931,524
Mail pouch receiving and delivering apparatus for railway cars, etc., C. W. Broughton	931,263
Mailing machine, J. W. Orr	931,639
Mattress, I. J. Weinberg	931,361
Mattress strap, W. W. Allen	931,024
Measuring apparatus, whey and milk, J. Livingston	931,071
Measuring instrument, M. Picard	931,475
Measuring surface areas, machine for, L. O. Ramsdell	931,144
Meat tenderer, M. E. French	931,590
Metal shearing machine, Roesch & Wright	931,220
Metals, welding, H. Goldschmidt (reissue)	13,010
Metallic material, apparatus for treatment of, G. M. Heskamp	931,599
Metering panel board, A. C. McWilliams	931,464
Mine door, C. W. Carman	931,035
Mine prop, F. Nellen	931,466
Mining apparatus, M. Goldsmith	931,057
Mirror adjusting device, E. A. J. Germain	931,291
Mold ramming apparatus, H. Henderson, 931,199 to	931,201
Motive fluid, producing, H. Maxim	931,135
Motor brush holder, H. C. Grant	931,415
Motor controller, H. W. Cheney	931,384
Mower attachment, lawn, O. S. Tuttle	931,527
Music leaf turner, H. T. E. Covert	931,572
Music recorder, A. Saumell	931,494
Musical instrument, brass wind, C. G. Conn	931,273
Musical instrument, electrical, G. H. Davis	931,281
Musical instruments, rotary valve for wind, C. G. Conn	931,039
Nailing machine, J. M. Wiggin	931,107
Negotiable instrument, H. A. Anderson	931,246
Nut cracker, W. M. Burkle	931,562
Nut lock, C. Girardot	931,409
Optical instrument, C. B. Boyle	931,673
Ore crusher, C. O. Michaelsen	931,210
Ore granulator or pulverizer, J. G. Kirksey	931,316
Ore reducing furnace, G. F. Rendall	931,145
Ore separating apparatus, W. H. Silberhorn	931,153
Organ, folding, Caulkins & Wienand	931,678
Outlet box construction, E. W. Stull	931,521
Oven heat regulator, G. A. Stewart	931,232
Package fastening member, W. M. Conrad	931,569
Package tie, E. W. Milhado	931,631
Packing, cinch, R. R. Keith	931,128
Pail, H. E. Kerr	931,315
Paint and varnish remover, L. Ornstein	931,335
Paint, varnish, and lac, composition for removing dried, R. G. Stewart	931,519
Pan. See Douche pan.	
Paper bags, etc., machine for making, A. Darvas	931,041
Paper holder, toilet, F. H. Hoberg	931,118
Paper pasting machine, wall, A. C. Ross	931,492
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Pavement heating and rolling machinery, bituminous, Prescott & Kerns	931,085
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Penholder fountain attachment, D. O. Vaughan	931,530
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Permutation lock, W. Erbardt	931,287
Phonograph needle receptacle, W. E. Watson	931,103
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(*Continued from page 167.*)

erage speed, not affected except by decided slowing up or acceleration of the engine.

A tachometer has recently been perfected by Mr. Mellor Reece Hutchison, in which these defects are avoided by very simple and dependable means.

The accompanying illustration shows a merchant marine generating set of this electrical tachometer, installed in the shaft alley of a steamer.

The large split sprocket wheel *B*, of proper diameter to conform to the shaft *A*, is firmly clamped thereto. A Morse silent chain *C*, engaged by the sprocket wheel *B*, drives a similar sprocket wheel *D* mounted on a countershaft *E*, which forms part of the tachometer generating set. The rotation of this small sprocket is transmitted to the flywheel *F*, keyed to the countershaft *E*, through the intermediary of two opposite coiled spiral springs *G*, *H*. Inside the rim of the flywheel *F*, and on the end opposite to the spiral springs *G*, *H*, gear teeth are cut which engage two pinions. These pinions respectively actuate magnetos *XY*. It is seen that any momentary fluctuation in the rotation of sprocket *D*, occasioned by variations in the angular velocity of the main shaft *A*, are smoothed out by the springs *G*, *H*, imparting to the flywheel *F* and countershaft *E* a steady average speed. To protect the springs *G*, *H*, against rupture from sudden reversal of rotation of main shaft *A*, stop pin *K* is mounted on the flywheel, and engages radial arm *L*, mounted on the sprocket wheel *D*, thereby preventing more than one-half an independent revolution of the countershaft. This one-half revolution is sufficient to take care of practical conditions on marine equipments.

The magnetos *XY* are of the inductor type. The armatures and the pole pieces are stationary. 1 is a permanent magnet of finest steel, properly aged to insure absolute permanence. 2 2 are the pole pieces of soft iron attached thereto. 3 is a stationary shuttle armature, on which is winding 4. Rotating between the pole pieces and the armatures is the soft iron inductor 5. As the inductor is rotated, an alternating electromotive force is generated in the armature, two cycles per revolution.

The magneto is so designed that the voltage is directly proportional to the speed of rotation of the inductor, over a wide range. Therefore, the faster the propeller shaft turns, the higher the voltage directly proportional thereto.

It will be noted there are no commutators or brushes, the armature being stationary and the leading-out wires soldered to the main-line wires. Therefore, no error can creep in from increase of resistance of contacts.

The indicators are alternating-current voltmeters of the dynamometer type, i. e., having a moving coil and stationary coils.

In present practice, however, alternating-current voltmeters read but one way, with the zero on the left of the scale. A tachometer, specially for marine use, must show direction of rotation of main shaft as well as the speed. In the design of this, therefore, the zero is at the center, deflections of the pointer to the left indicating speed of rotation of the propeller shaft astern, and to the right ahead.

The pointer of the indicator is deadbeat at its reading, and is not influenced by the rolling or pitching of the ship. Provision is also made to protect the instrument against concussion or atmospheric disturbance from heavy gunfire.

In the naval type each indicator is entirely independent of all the rest, being connected to its own pair of magnetos; hence, should one indicator be shot away or otherwise damaged, it will not affect the reading of any of the other indicators.

In the merchant marine type, however, this is not deemed necessary, one pair

(*Concluded on page 169.*)

Printing press, B. F. Upham	931,099
Printing press punch, adjustable, W. C. Dillingham	931,282
Propeller for boats, drop, F. E. Stribling	931,159
Propeller mechanism, collapsible, W. Morgan	931,456
Pump, centrifugal, F. Neumann	931,636
Pump, piston, H. P. Wedin	931,535
Punching machine, W. B. Kilgore	931,431
Push button apparatus, R. D. Burk	931,380
Putting out machine, F. J. Perkins	931,340
Puzzle, H. W. Cadwell	931,677
Rail, continuous, C. E. Weaver	931,104
Rail joint, J. S. Hickson	931,117
Rail joint, T. K. Diehl	931,577
Rail joint, Frederick & Chapman	931,589
Rail joint truss support, L. Mueller	931,459
Railway cattle guard, J. H. Wheeler	931,537
Railway construction, H. C. Grant	931,418
Railway frog, B. J. Morgan	931,073
Railway joint, D. B. Coupland	931,275
Railway overhead line construction, electric, T. Varney	931,354
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Rubber like gum from its vegetable sources, extracting, F. H. Humcke	931,120, 931,121
Sad iron, self heated, A. H. Davis	931,686
Safety switch, J. T. Krieger	931,208
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Sash lock, J. L. Grether	931,194
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Saw frame, flexible, C. Kusch	931,435
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Steels for industrial purposes, treatment of, E. Schneider	931,499
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Tanks from bursting by freezing, means to prevent, A. Ballard	931,112
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Telegraph and telephone pole, J. H. Hile	931,425
Telegraph pole arm, L. Tyreman	931,661
Telegraphy and telephony, receiver for wireless, S. Eisenstein	931,586
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Telephone exchange selector, automatic, F. H. Loveridge	931,072
Telephone exchange switchboard apparatus, J. L. McQuarrie	931,330
Telephone exchange system, measured service automatic, W. W. Leach	931,132
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Telephone key, J. L. McQuarrie	931,331
Telephone service rent collecting means, R. Yearneau	931,547
Telephone system, private branch intercommunicating, J. L. McQuarrie	931,138
Telephone system, private branch intercommunicating, N. H. Holland	931,307
Telephone transmitter, A. G. Kaufman	931,127
Telephone transmitting mouthpiece, R. E. Miller	931,452
Threshing machine, H. O. Sageng	931,347
Tie. See Cross tie.	
Tie plate, A. L. Stanford	931,517
Time recorder, W. Beresford	931,254
Tire antiskidding device, T. I. Duffy	931,284

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of magnetos supplying all the indicators, which are connected in multiple.

A very important fact in Mr. Hutchison's system is the use of an exceedingly small current value and low voltage; hence, in the event of the indicators being located in proximity to ammunition, should the circuit be opened by the breaking of a wire or otherwise, the resultant spark is barely perceptible and cool, therefore incapable of igniting anything. Should the line become short-circuited, no heating effect whatever is produced and no damage done to the magnetos, as they can run for an indefinite time on dead short circuit. No effect is produced on the compass by the current in the wires, and, taken all in all, the system seems to meet every requirement of accuracy and safety.

POWERFUL HOISTING AND CONVEYING MACHINE.

(Continued from page 156.)

in the machinery house at the pier end of the bridge, the power from which is transferred to the moving gear wheels by a line of shafting on top of the bridge, thence to lines of shafting down the pier and shear supports, and thence by a proper train of gears to the wheels.

The moving gear mechanism is attached to the operating mechanism by means of friction clutches, so arranged that the motion of the crane may be made in either direction at the will of the operator. Further provision is made for disconnecting the gearing, in order to skew the bridge within the limits given.

The main operating mechanism for the bridge is located in the machinery house, and consists of two drums. Each of these drums is mounted loose on its supporting shaft. Each drum is controlled by a Brown friction clutch and a band friction brake. The drums are connected one to the other through an equalizing gear mechanism, which is equipped also with a powerful foot brake, so that the two main operating drums may be made to rotate in opposite directions with the same speed. This feature of connecting the two drums is one of the all-important points in the Brown two-drum operating mechanism. The main operating machinery is further arranged to operate from the intermediate shaft the bridge crane moving gear mechanism, to which the supporting truck wheels are connected by shafting and gearing. This mechanism is controlled also by a powerful clutch and band friction foot brake.

In further connection with the two main operating drums is a small closing drum which, in conjunction with the two main drums, controls all of the motions of hoisting and lowering the load and traveling the trolley. The trolley, which in reality forms also a part of the main hoisting mechanism, is specially designed to operate in conjunction with the drum arrangement above described. In general, this trolley consists of a steel structural frame mounted on four turned cast-steel track wheels arranged to run on the trolley runway of the bridge crane. In the trolley there are mounted specially-designed drums, which run loose on their supporting shafts. The large section of each drum on the trolley is connected to the main hoisting drums in the machinery house in the following manner:

One length of wire rope will connect, from the under side, one of the main hoisting drums to the top side of one of the large sections of the trolley drums. The under side of this trolley drum is connected by wire ropes to the top side of the other main hoisting drum. The top side of this same hoisting drum is connected by suitable cable to the top side of the other trolley drum, and likewise this trolley drum from the under side is connected to the underside of the other main hoisting drum. By this arrangement of ropes, if one of the main

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Classified Advertisements

Advertising in this column is 75 cents a line. No less than four nor more than ten lines accepted. Count seven words to the line. All orders must be accompanied by a remittance. Further information sent on request.

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. There is no charge for this service. **In every case it is necessary to give the number of the inquiry.** Where manufacturers do not respond promptly the inquiry may be repeated.

MUNN & CO.

BUSINESS OPPORTUNITIES.

AGENTS WANTED.—$2.19 sample outfit free. 50 per cent. profit. Credit given. Premiums. Freight paid. Chance to win $500 in gold extra. Let the largest wholesale agency house in the United States start you in a profitable business without one cent of capital. Experience unnecessary. Write for free outfit at once. McLean Black & Co., Inc., 60 Beverly St., Boston, Mass.

Inquiry No. 8868.—Wanted to buy nickeloid for buttons.

FOR SALE.—Model Printing Press Co. Established over 40 years. Excellent opportunity for machinist. Mail order trade throughout the world. Will sell at a bargain. Model Printing Press Co., Chambersburg, Pa.

WILL MANUFACTURE OR SELL PATENT for a new carbide generator for house or town plant. Machines now out doing excellent service. Address O. Hasneder, Seaford, Long Island.

Inquiry No. 8918.—For manufacturers of "Wydt's Electro-Catalytic Sparking Plug."

MAIL ORDER GOODS WANTED.—Western firm wants quotations from manufacturers of quick-selling household specialties suitable for canvassers. Address Box 103, Victoria, B. C.

Inquiry No. 8921.—For the manufacturers of gilt paper.

PATENTS FOR SALE.

FOR SALE.—Patent No. 930,734. Metal shelf with folding brackets, as illustrated in Scientific American of August 28, 1909. Now being manufactured and marketed in New York and surrounding States with good results. Rights to distant States can be obtained by responsible manufacturers by applying to The Dahl Mfg. Co., 302 W. 14th Street, New York.

Inquiry No. 8922.—Wanted the address of Worthington Boiler Co.

FOR SALE—Patent No. 726,166. Purse or the like, chain purses, neck chains, fobs, belts, etc. For further information and particulars, Address P. O. Box 67, Attleboro, Mass.

Inquiry No. 8931.—For parties who manufacture the Western Stump Borer for boring stumps.

FOR SALE—Patent No. 895,863, rowing appliance; works perfectly, every boatman needs a pair. Make us an offer. James & Deacon, Velasco, Texas.

Inquiry No. 8941.—For manufacturers of machinery for making fly screens.

FOR SALE.—Patent No. 915,305. Metal telephone pole. Most durable, strongest, lightest, and cheapest pole in existence. Address E. J. Newhall, Waupaca, Wis.

SALESMEN WANTED.

SALESMAN WANTED to handle an exceptionally attractive real estate and timber proposition, which can be sold on annual, semi-annual or monthly installments. We furnish inquiries and strong literature. Capable, aggressive, energetic man can make desirable connection with largest and strongest house in its line in the country. Sacramento Valley Imp. Co., St. Louis, Mo.

Inquiry No. 8960.—For the address of the Windsor Mfg. Co., manufacturers of waterproof collars and cuffs.

HELP WANTED.

LOCAL REPRESENTATIVE WANTED.—Splendid income assured right man to act as our representative after learning our business thoroughly by mail. Former experience unnecessary. All we require is honesty, ability, ambition, and willingness to learn a lucrative business. No soliciting or traveling. This is an exceptional opportunity for a man in your section to get into a big paying business without capital and become independent for life. Write at once for full particulars. Address E. R. Marden, Pres., The National Co-operative Real Estate Company, Suite 378 Marden Building, Washington, D. C.

Inquiry No. 8966.—Wanted the address of the Cohendet Motor Co.

SUCCESSFUL Gasoline Light Salesmen to handle the only instantaneous lighting system known to science. No alcohol, step ladders, torches, matches or time wasted. Pull the chain and they light instantly. For home and commercial lighting. Write for territory. Small capital required. Gloria Light Co., 1235 Wash't'n Blvd., Chicago.

Inquiry No. 8969.—Wanted machines that make accordion dress plaiting (steam).

YOUNG MAN, graduate of some school in mechanical engineering, for position in woodworking plant in small Tennessee town. Good opportunity for advancement. State experience, if any, and salary. Answer "Position," Box 773, New York.

Inquiry No. 8977.—For manufacturers of machinery for manufacturing denatured alcohol.

LISTS OF MANUFACTURERS.

COMPLETE LISTS of manufacturers in all lines supplied at short notice at moderate rates. Small and special lists compiled to order at various prices. Estimates should be obtained in advance. Address Munn & Co., List Department, Box 773, New York.

Inquiry No. 8980.—For the address of manufacturers of mortars and pestles that are used by druggists.

A LIST OF 1,500 mining and consulting engineers on cards. A very valuable list for circularizing, etc. Price $15.00. Address Munn & Co., List Department, Box 773, New York.

Inquiry No. 8984.—Wanted the address of the manufacturers of Cypress wash tubs.

Inquiry No. 8987.—Wanted, the manufacturers of the Van Winkle, Woods & Sons, and the Weber power meters.

Inquiry No. 8990.—For information regarding shoes not made of leather but similar to the same and are as durable.

Inquiry No. 8996.—Wanted addresses of manufacturers of machinery for working orange wood manicure sticks.

Inquiry No. 8997.—Wanted the address of the manufacturers of bread or cake boxes.

Inquiry No. 9001.—For the address of progressive manufacturers of fruit jars.

Inquiry No. 9007.—Wanted, a tin churn for churning milk that has a wire spring at top and bottom of churn and operated by pressing the wire springs.

Inquiry No. 9009.—Wanted the address of the manufacturer of the "Leech" showcard holder, a device which is held to the outside of a show window by rubber cups.

Inquiry No. 9010.—Wanted to buy a "Rector Help-a-Phone."

Inquiry No. 9011.—For the manufacturers of a patent sewing needle that is made to slip over the thread; the eye is split so as to open and receive the thread.

Inquiry No. 9012.—Wanted to buy papier mache boxes in the shape of water melons, colored to resemble melons, etc.

Inquiry No. 9014.—For manufacturers of machinery, supplies, etc., to equip a small plant for the manufacture of iridium-tipped gold nib making for fountain pens.

Inquiry No. 9015.—Wanted the address of the manufacturers of a solid link chain made without welding, made in brass, several different sizes, made on an automatic machine.

Inquiry No. 9016.—Wanted, machinery necessary for an installation of a plant for refining salt by a modification of the Bessemer process.

Inquiry No. 9017.—Wanted, the address of manufacturers or dealers in card board plaster or wood pulp for plastering.

Inquiry No. 9018.—Wanted, the address of parties manufacturing gold-plated pens for use in cheap fountaipens.

Inquiry No. 9019.—Wanted, address of The Old Town Canoe Co.

Inquiry No. 9020.—Wanted the addresses of the manufacturers of metal novelties.

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hoisting drums is connected through its clutch mechanism to the driving shaft, and the other main hoisting drum is allowed to work through the equalizing gear mechanism loose on its supporting shaft, the motion of the drums will be in opposite directions and with the same speed, and when working under this condition the motion produced on the trolley drums will be *nil*, thus giving to the trolley a motion or translation along its supporting runway, and by the reversal of the motion of the main hoisting drums the trolley will be traveled in an opposite direction. Further, if the main hoisting drums are both rotated in the same direction, the drums on the trolley will be rotated in opposite directions with respect to one another, and by the proper reeving of the ropes from the small drums on the trolley, the suspended load may be raised and lowered by the reversal of the motions of the main hoisting mechanism. When equipped with grab bucket, the opening and closing of the same is accomplished by the ropes leading from one of the main trolley drums. The shell lines from the grab bucket are attached to the other of the main trolley drums, and for the same reasons as given above, the bucket may be raised and lowered. But to carry out the motion of opening and closing, the two main hoisting drums in the machinery house are held stationary, and the small auxiliary hoisting and closing drum is put in operation. This drum is connected to a sliding loop attachment located at a convenient point on the bridge structures, and in such a way that the ropes leading from the large section of the drum controlling the opening and closing lines of the bucket are reeved through this sliding loop mechanism, and, by the operation of this closing drum, the one set of lines leading to the trolley is lengthened while the other set is shortened. By this means the one drum, controlling the opening and closing of the bucket, may be rotated in either direction by the proper operating of the closing drum above referred to. From this description it will be seen that in reality the main hoisting mechanism consists of the two main hoisting drums and the auxiliary closing drum, all of which drums are under the complete control of the operator, and work in conjunction with one another to properly carry out the various motions of the trolley and its load.

In the operation, however, of the scoop bucket, with which the above bridge crane is equipped, only one main drum on the trolley is used, this being the drum operating the shell lines of the grab bucket. The lines leading from the small drum sections of this main drum are arranged to work in parallel and carry the shovel bucket. All of the clutches, brakes, etc., going to make up the main operating machinery are connected to the operator's cage by suitable rods and levers, so that the entire mechanism is under the complete control of one operator.

The 200 horse-power motor and electrical equipment is designed so that dur-

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ing a run of twenty-four hours, when handling material at the speeds as specified in the contract, no part of the motor will rise in temperature more than 70 deg. C. above the surrounding air. All electrical equipment is designed for a direct current of 220 volts. The grab bucket has a cubical capacity of 100 cubic feet of limestone, and the scoop bucket of 132 cubic feet. Both buckets are especially designed for working in limestone. The grab bucket has an over-all width of about 7 feet 6 inches and an over-all length when open of 17 feet 6 inches. The capacity of the machine is 200 tons per hour. The hoisting speed is 250 to 275 feet per minute; the racking speed 900 feet per minute; and the whole bridge travels at the rate of 100 to 150 feet per minute.

MEASURING A RIVER'S FLOW.

(*Concluded from page 160.*)

the velocity recorded at a number of different depths in each strip. By the vertical integration method the meter is moved at a slow uniform speed from the surface of the stream to the bottom and back again.

For convenience of reference and comparison the results obtained are plotted in the form of a curve on a chart.

Another illustration shows the Great Falls of the Missouri River in Montana. A gaging station at the point from which the photograph is taken was established by the Geological Survey in July, 1902.

The river is favorable at this point for water-power development and shows the kind of stream, apart from navigable rivers, measured and reported upon by the Survey. In this way the Survey constantly brings to the attention of the investing and developing public many previously unnoticed but valuable water-power sites.

We are indebted to the director of the U. S. Geological Survey for the use of the accompanying illustrations.

THE AVIATION MEETING AT RHEIMS.

(*Concluded from page 159.*)

with their Bleriot monoplanes. Both Bleriot and Curtiss tried to lower their speed records for one circuit of the course, and the latter succeeded in making 2 seconds better time than before. His time of 8:09 1/5 corresponds to almost 45.7 miles an hour. Bleriot made the circuit in 8:08 2/5, which was 4 seconds slower than formerly.

At the end of 2 hours, 22 minutes, and 51 seconds, Farman had flown 140 kilometers (86.99 miles) and beaten Paulhan's record. It was getting dark rapidly and the spectators could only see the machine as it passed before the grand stand. Ten minutes and 19 seconds later he completed his fifteenth round, and less than five minutes later he had beaten Latham's record. One hundred and sixty kilometers (99.4 miles) were covered in 2:43:35 2/5, and 180 kilometers (111.88 miles) in 3 hours, 4 minutes, 55 2/5 seconds. As it was now 7:30, the nineteenth round afterward made by Farman was not counted in the official figures. He actually covered over 190 kilometers (118.06 miles) and remained in the air all told about 3¼ hours. As he finished in front of the grand stand a searchlight was thrown upon him. He was pulled from his machine and carried upon the shoulders of his friends, receiving a decided ovation. Thus, for the second time, he has won a $10,000 cash prize, the first instance being when he flew 1 kilometer in a closed circuit on January 13th, 1908. It is possible that he will try again to win this sum by making the 140-mile flight from New York to Albany. In the flight for the Grand Prix, he carried enough fuel to fly 3½ hours.

The other prizes awarded in the Grand Prix de la Champagne distance race were as follows:

Second, $5,000, won by Hubert Latham on his Antoinette monoplane. Distance, 154.5 kilometers (96 miles).

Third, $2,000, won by M. Paulhan with his Voisin biplane. Distance, 131 kilometers (81.4 miles).

Fourth, $1,000, won by Count de Lambert with his Wright biplane. Distance, 116 kilometers (72.1 miles).

Fifth, $1,000, won by Paul M. Tissandier. Distance, 111 kilometers (68.97 miles).

Sixth, $1,000, won by M. Roger Sommer with a Farman biplane. Distance, 60 kilometers (37.3 miles).

The distances covered by the other competitors were: 50 kilometers (31.1 miles) by M. Delagrange, with a Bleriot monoplane; 40 kilometers (24.9 miles) covered by M. Bleriot with one of his monoplanes; 30 kilometers (18.64 miles) covered by Mr. Curtiss with his biplane; and 21 kilometers (13.04 miles) covered by M. Lefebvre with his Wright machine.

This first aviation meeting has demonstrated beyond a doubt that the real flying machine is here. That aeroplane races will soon supersede the dangerous automobile races, there can be no question. We expect in our next issue to give full details of the successful machines at Rheims and their motors, as well as further particulars of the flights which were accomplished.

Tire cover and fastening therefor, G. W. Brown	931,674
Tire inner tube, pneumatic, H. K. Raymond	931,648
Tire plug, pneumatic, J. Glanz	931,056
Tire upsetter, J. H. Macdonald	931,325
Tires for wheels, manufacturing elastic, T. L. Carbone	931,563
Tires, making casings for pneumatic vehicle, J. ●. King	931,207
Tobacco cutter, rotary, W. A. Hagemeyer	931,295
Toe calk machine, D. G. Wyman	931,364
Tongs, A. G. Kjellerstedt	931,317
Toothpick machine cutter, H. A. Dorr	931,044
Top, T. N. Reed	931,187
Toy, S. H. Rogers	931,221
Toy air gun, S. T. Allen	931,553
Toy motor, electric, H. C. Grant	931,417
Toy, moving picture, E. W. Davis	931,184
Toy, musical, ●. Einicke	931,286
Toy musical instrument, S. R. Divine	931,578
Track, carrier, W. & J. F. Mitchell	931,455
Track laying machine, J. H. White	931,166
Track rail support, J. W. Kemmerle	931,206
Track sanding device, E. A. Longmire	931,444
Train lighting system, D. C. Jackson	931,613
Tray adjustable support, aseptic, C. F. Booth	931,378
Tripod, tilting top, J. C. Fyfe	931,692
Trolley and support therefor, S. S. Goldman	931,292
Trolley clamp, E. E. Rose	931,345
Trolley clamp, T. Varney	931,357
Trolley clamp, H. P. Davis	931,390, 931,391
Trolley conductor clamp, C. Aalborg	931,368
Trolley conductor hanger, H. P. Davis	931,593
Trolley hanger, T. Varney	931,353, 931,356, 931,358
Trolley hanger, H. P. Davis	931,392
Trolley hanger, G. B. Dusinberre	931,397, 931,398, 931,400
Trolley hanger and clamp, C. Aalborg	931,366
Trolley harp, T. A. Gannoe	931,592
Trolley wire hanger, Heimbecker & ●rum	931,301
Trough and glass support for glazed structures, combined, J. A. ●lsson	931,638
Truck, H. C. Grant	931,413, 931,414
T-slot bar, G. H. Vining	931,164
Tube and bar mill conveyer, North & Harrison	931,545
Tube drawing device, W. T. Adams	931,551
Tube making machine, G. A. Lutz	931,134
Tube mill tube trough, J. S. Worth	931,544
Turbine, elastic fluid, B. Ljungstrom	931,323
Typewriter, G. W. Downing	931,689
Typewriting machine, W. F. Helmond	931,303
Typewriting machine, J. J. Cooper	931,680
Typewriting machine, J. C. Doane	931,688
Umbrella, folding, P. L. Page	931,079
Umbrella lock, R. E. Adams	931,550
Undergarment, R. M. Sidey	931,151
Upholstering attachment, H. G. Westmore	931,106
Upholstering machine, I. Karpen	931,313
Urinal ventilator, A. J. Cheney	931,268
Valve, F. C. Smith	931,155
Valve, L. Schutte	931,228
Valve, C. Wainwright	931,532
Valve, flush, E. Nanfeldt	931,465
Valve for gas main joggle, L. Shaw	931,506
Valve, gas regulating, C. C. Armstrong	931,668
Valve gear, air, E. A. Rix	931,650
Valve, lavatory supply, W. A. Speakman	931,512
Valve, triple, W. V. Turner	931,238
Valve, triple, J. W. Cloud	931,271
Vapor electric apparatus system, F. Conrad	931,114
Vapor generator, R. W. Zierlein	931,664
Vapor rectifiers, system of distribution for, F. Conrad	931,115
Vault, burial, W. E. Haworth	931,299
Vehicle, D. H. James	931,614
Vehicle automatic brake, F. D. Kaser	931,430
Vehicle brake, automatic, G. R. Kelly	931,621
Vehicle foot board, J. Hage	931,601
Vehicle shock absorber, F. N. Rosenstengel	931,653
Vehicle wheel, B. C. Oblinger	931,214
Vehicle wheel, C. L. Shaw	931,505
Vehicle wheel, T. B. Jeffery	931,615
Veil clasp, R. Honsowetz	931,308
Ventilator. See Draft ventilator.	
Ventilator, F. G. Andrews	931,667
Violin chin rest, G. Beisheim	931,251
Wagon brake, W. L. Roper	931,491
Washing compound and making same, clothes, J. H. Schlueter	931,498
Well drilling apparatus, H. B. Walker	931,101
Whalebone stretching and straightening machine, O. Holzhauer	931,204
Wheelbarrow, R. T. Todd	931,096
Wheelwright's tool, F. M. Sturgis	931,160
Whip, H. Flesch	931,047
Whip socket, J. H. Larson	931,437
Windmill regulator, M. S. Newcomer	931,140
Window or shutter operating mechanism, E. Van Noorden	931,239
Window screen, D. M. Henry	931,421
Wire bender, J. S. Pratt	931,480
Wires and cables, hanger and clamp for, C. Aalborg	931,367
Wrapping machine, A. M. Price	931,646
Wrench, F. Smith	931,510
Wrench, J. J. Parsons	931,640
Writing machine, E. R. Hess	931,305
X-ray apparatus, E. W. Caldwell	931,034

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.