

CAPT. CODY'S BRITISH ARMY AEROPLANE.

(Concluded from page 198.)

two-bladed propellers in opposite directions by means of sprockets and chain. These propellers, as noted in our former article, have blades which taper toward the tips, the widest part of the blade being at the hub. Another interesting point about these blades (which are made of aluminium) is that the arms which carry them are fastened to the rear or pressure side of the blades. These arms are inclosed by a false face, in order to avoid sharp angles, but there is a high ridge down the face of the blade, which is so great that the blade has in reality a triple curved face. From the cutting edge to the center the camber increases the pitch; then comes the reversal of the curve, where the false face rounds the arm; and finally a renewal of the sharp camber, where the false face runs off into the trailing edge. The propellers are said to give a thrust of over 20 pounds to the horse-power.

The weight of the Cody biplane complete with the aviator is about 2,000 pounds. Despite the fact that it is such a large machine, it has been designed with a view to ready portability. The main planes each divide into three sections, consisting of a central portion 20 feet in length, and two end portions each of 16 feet in length. The poles which support the rear rudder fold back against the planes, and the front rudder bamboos can be readily dismounted. The chassis also comes apart, and thus the whole machine can be easily and quickly dismounted for transport. Although no test has been made of its speed, this machine because of its powerful motor and efficient propellers, and, especially, because Capt. Cody has attempted to reduce all head resistance to a minimum, is undoubtedly a very fast one. It is probable that it will compete with the Bleriot and Antoinette monoplanes which are to race in England for a \$25,000 purse next month.

For the details and drawings of the Cody biplane published in this article, we are indebted to the English weekly flight.

Aviation Abroad.

The second foreign aviation meeting, which was held last week at Brescia, Italy, was by no means as successful as the first event at Rheims. The field was very rough, which made landing without breakage difficult, and in addition to this the weather was not always propitious. M. Lefebvre, the daring French aviator who piloted a Wright biplane at Rheims, was killed at Juvisy on September 7th when his machine plunged to the ground. This is the second fatal accident which has occurred with a Wright aeroplane. Lieut. Calderara, of the Italian army, who also had a bad fall in his Wright machine a couple of months ago, again came to grief when he took Lefebvre's place at Brescia on September 8th, the first day of the meeting. Just after starting the aeroplane tipped so badly that one runner struck the ground and was demolished. M. Bleriot struck a tree and broke his propeller. Anzani's propeller also broke while he was attempting to make a test flight. Both the latter accidents were attributed to the unevenness of the ground. Curtiss and Bleriot crossed the startling line every day in the 31-mile race for the Grand Prix, according to the regulations, but no extended flights were made up to the time of our going to press. It was much too windy on the 10th instant for any flight to be made. At Berlin Orville Wright continued to make daily flights. On September 7th he flew for 52 minutes, and on the 9th he made two flights for Crown Prince Frederick. He is teaching Capt. Englehardt to operate the machine. At Scarborough Beach, near Toronto, Can., Mr. C. F. Willard last week made two excellent flights out over Lake Ontario with the Curtiss biplane of the Aeronautic Society. Each time he started by running down an incline on

the shore of the lake, and made a circle from one to two miles in circumference, landing in the water successfully upon floats fitted to the aeroplane. This is the first time a motor-driven aeroplane has been fitted with floats and made to alight without damage upon water.

RECENTLY PATENTED INVENTIONS.**Pertaining to Apparel.**

SHIRT-COLLAR.—J. DORF, New York, N. Y. The collar is of the turn-down type, arranged to permit the wearer to conveniently slide the necktie in the collar to the desired position, the necktie not coming in contact with the rear collar button but passing over a flap overlying the collar button and forming an integral part of the turn-down portion; permitting the wearer to draw the collar tight in front by the necktie, causing the collar to appear with a lock front and keeping the top edges close together.

Electrical Devices.

BATTERY-COVERING.—G. E. ANDREWS, Providence, R. I. The more particular purpose of the inventor is to provide a two-part covering made of rubber, and provided with means for rendering a battery cell so completely water-tight that the cell may be effectively employed where moisture is excessive, or even be totally submerged under the surface of water.

SWITCH-HOOK-CONTROLLING DEVICE.—M. M. KAHN, Louisville, Ky. In operation, the weighted arm normally rests upon the hook of weight. When, however, the telephone is in use, the arm is thrown backwardly into position, and may be secured in this position by means of the set screw. After the telephone has been used, the arm is again turned forwardly into engagement with the hook.

Of Interest to Farmers.

PLANT-PROTECTOR.—E. R. DRAKE, De Land, Fla. In growing some vegetables, and particularly tomatoes, and especially in southern latitudes, great care is necessary in controlling access of the sun's rays to the plants so as to graduate their effect to a certain non-injurious degree. The north side requires no such protection as the others, but being open, it allows free access for setting the plants and for weeding, and otherwise tending them while growing.

BEE-HARVESTER.—M. J. ELY, Oxnard, Cal. An object here is to provide a device in which the plow can be raised or lowered and locked in either position so that when the digger is being used and the plow is locked in its lowered position, it cannot be lifted therefrom without lifting the entire weight of the whole frame of the machine together with the wheels and the weight of the driver.

THRASHING-MACHINE.—T. S. HAYNES, Bay City, Texas. The invention has in view a rigid frame arranged at one side of the harvester and adjustable to different elevations above the ground, the frame carrying the harvesting mechanism and braced intermediate its length by the frame of a downwardly and outwardly-inclined elevator.

Of General Interest.

CARD-INDEX CASE.—E. A. YUNGER, New York, N. Y. In this index case it will be impossible to place a card out of its correct position, and the invention may be broadly defined as consisting of a card-holding receptacle, with the bottom thereof having card-engaging members located in relatively different positions for each card or set of cards the case is to contain and without interruption between adjacent members.

EYE-SHADE.—G. E. HENRY, Philadelphia, Pa. This improvement has reference to eye shades of the kind mounted upon spectacles, the more particular purpose being to support the shade upon the end portions of the spectacles, and also to produce certain changes in construction of the shade and its support, thereby increasing the general efficiency of the device.

Hardware.

SELF-HEATING SOLDERING-IRON.—A. HUSSON, Oshkosh, Wis. The object of the invention is to produce an iron which will operate effectively to produce a thorough vaporization of the liquid as it is admitted to the burner. The invention relates especially to the types of irons which are heated by liquid fuel.

WIRE-STRETCHER.—F. STANLAKE, Owosso, Mich. This invention pertains to improvements in stretchers, and more particularly to that type in which there are employed a ratchet member and a pivoted lever member having dogs in engagement with the ratchet member and having its pivot movable longitudinally of the ratchet.

Heating and Lighting.

HOT-WATER HEATER.—E. B. SADTLER, Richmond, Va. In the present patent the invention is an improvement in hot water heaters and it has for its object the provision of a simple and effective structure which will be durable in operation, and which will not easily get out of order or leak and will produce a maximum heating effect in operation.

BOILER.—C. E. CHAPMAN, Fort Edward, N. Y. A purpose here is to provide a stationary flash boiler in which the steam dome and water column are removed from and are practically independent of the boiler proper, and

wherein the amount of water conducted to the boiler from the water column by excess air pressure in the water column over and above the boiler pressure is under complete control.

GAS-LIGHTER.—W. D. C. WRIGHT, Philadelphia, Pa. A spark coil and battery cells are disposed in a casing, to which is attached a hollow standard, at the top of which there is a stationary electrode and also a spring electrode, the latter being attached to an electrical conductive rod held in bearings in the hollow stem. The casing is of conductive metal and the rod is in electrical communication with the casing. Means provide for completing the circuits.

Household Utilities.

LIQUID-STRAINER.—M. ARRUEBARRENA, Cienfuegos, Cuba. The principal object the patent has in view, is to provide a continuously acting filter for sugar syrup, which may be operated with the minimum of power and readily cleaned. Throughout the whole of the construction, the material used is perforated, and therefore filtration is not arrested at any point.

Machines and Mechanical Devices.

CLUTCH.—J. SCHNEIDER, Ann Arbor, Mich. In the present patent the invention relates to clutches, and it has for one of its objects the provision of one which will permit of the ready engagement of the drive and driven shafts, with automatic means which will more securely connect the two shafts should there be any slip from the wearing of the parts after the clutch has been thrown into operative position.

CARD-EXHIBITING DEVICE.—A. J. THOMAS, Roubaix, S. D. Means are here provided for conspicuously displaying illustrated postal cards, or cards whereon fancy buttons or like merchandise are placed. The invention affords an apparatus of great capacity and extremely well adapted for the exhibition of cards in large number and of different design, that are brought into view by manual operation of the machine.

POT-FEEDER FOR TYPE-CASTING MACHINES.—L. A. SENGELE, Victoria, Texas. In this instance the invention relates to type-setting and type-casting machines, and more particularly to such machines as are employed to cast slugs provided with impression characters, each slug representing the line, or its equivalent, to be printed.

CENTRIFUGAL BOLTING-MACHINE.—G. CUSSON, Chateauroux, Indre, France. The invention has reference to an apparatus suitable for use in a flour mill as a flour extractor for the different grindings of wheat, as an extractor of semolina, oatmeal, or groats, as a meal-sifter, and capable also of being used in various industries.

Prime Movers and Their Accessories.

BOILER-FLUE CLEANER.—J. WIECHMANN, Albany, N. Y. In this case the object of the inventor is to provide a new and improved boiler flue cleaner, arranged to insure a thorough removal of scale and to provide the desired flexibility of the cleaner to readily pass through bent or curved tubes, flues, or pipes.

INDICATOR.—C. W. SNYDER, Hudson, N. Y. The improvements are in indicators adapted for use in connection with engines, for making indicator cards to show the variations in the pressure in the cylinder during the movement of the piston. It is especially adapted for use with internal combustion engines.

Railways and Their Accessories.

GRAIN-CAR DOOR.—P. J. A. SCHNOOR, Holstein, Iowa. This door is intended to meet the several requirements in loading or unloading grain and can be conveniently manipulated to form openings of more or less extent according to the use to which the car is to be put. It may readily be attached to the door of an ordinary car.

DUMPING CAR.—T. LAWSON, New York, N. Y. This invention pertains to dumping cars admitting of general use, and particularly railway cars of the general type described in a former patent granted to G. I. King and T. Lawson. The object of the present invention is to improve the general construction of the car, and especially of the means for tilting the box and opening the doors thereof.

MAIL-BAG CATCHER.—D. W. COUNCIL, Rutherfordton, N. C. The object of this patent is to provide a device which may be applied to the car without any changes in the same, which will take the bags from the crane or support already in use, and hold it until it is removed from the holder, and which will deliver the outgoing bag, at the time it receives the incoming one.

Pertaining to Vehicles.

VEHICLE-SPRING.—J. N. BREWSTER, New York, N. Y. The invention refers to carriages, road wagons, trucks and like vehicles, and its object is to provide a spring, arranged to yieldingly support the vehicle body and to readily compensate for the variation of the load, without danger of breaking the springs and without requiring the heavy multiple leaf springs now generally employed.

HARNESS.—D. F. VALENTINE, Greenville, S. C. An object in this case is to provide simple harness for detachably securing a draft animal to a vehicle, by means of which the horse or other draft animal can be firmly secured to the vehicle, and which permits the

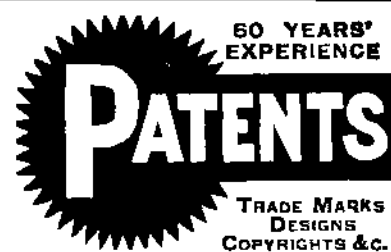
horse to be instantly released in case of necessity without the driver leaving his position in the vehicle.

CARBURETER FOR INTERNAL-COMBUSTION ENGINES.—P. J. GROUVELLE and E. H. ARQUEMBOURG, 71 Rue du Moulin Vert, Paris, France. The object of the inventors is to obtain an additional supply of air in a carbureter which is automatically operated by the vacuum which is created in the carbureter by the suction of the motor and to permit of varying the proportions of air and of carbureting fluid according to requirements by using the vacuum itself.

Designs.

DESIGN FOR A BADGE.—J. W. GREEN, Los Angeles, Cal. The badge has the shield form with a beaded border. Inside of this the flat surface is ornamented with a clock face at the top placed between the outspread antlers of a deer on whose collar are the capital letters B. P. O. E. A small flower is on each side of the animal's head at the lower corners.

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.

Legal Notices

INVENTORS are invited to communicate with Munn & Co., 361 Broadway, New York, or 625 F Street, Washington, D. C., in regard to securing valid patent protection for their inventions. Trade-Marks and Copyrights registered. Design Patents and Foreign Patents secured.

A Free Opinion as to the probable patentability of an invention will be readily given to any inventor furnishing us with a model or sketch and a brief description of the device in question. All communications are strictly confidential. Our Hand-Book on Patents will be sent free on request.

Ours is the Oldest agency for securing patents: it was established over sixty years ago.

MUNN & CO., 361 Broadway, New York
Branch Office, 625 F St., Washington, D. C.

INDEX OF INVENTIONS

For which Letters Patent of the

United States were Issued

for the Week Ending

August 31, 1909,

AND EACH BEARING THAT DATE

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

Abnormal potential discharging and arc disrupting device, Erickson & Lord.	932,541	933,027
Acid making apparatus, sulphuric, F. J. Falding	932,471	932,471
Adding machine, J. H. Ginet, Jr.	932,462	932,462
Advertising apparatus, C. F. De Soria	932,725	932,725
Advertising apparatus for cars, etc., J. Craae, Jr.	932,764	932,764
Advertising device, automatic dental, Lavallee & Constantineau	932,875	932,875
Air brake appliance, safety railway truck, J. L. Bering	932,875	932,875
Airship, E. S. & W. D. Le Fevre	932,712	932,712
Airship, J. Muecke	932,884	932,884
Airship, J. A. Rignon	932,999	932,999
Albumen and animal caselin and the product therefrom, treating vegetable, F. G. Wiechmann	932,527	932,527
Alfalfa cutting machine, D. L. Adelsperger	932,745	932,745
Ammonia from coal gases, recovering, F. J. Collin	932,758	932,758
Amusement apparatus, H. N. Ridgway	932,904	932,904
Annealing furnace with inlet sealed by steam, C. C. Baldwin	932,945	932,945
Antiseptic composition containing phenyl acetate, N. Sulzberger	932,647	932,647
Apparel apparatus, E. Kasralowicz	932,870	932,870
Assorting and sizing apparatus, E. W. Johnson	932,783	932,783
Atomizer, T. A. De Vilbiss	932,084	932,084
Atomizer for perfumes and other liquids, H. Rachmann	932,718	932,718
Automatic gate, J. W. Johnson	932,473	932,473
Automobile carriage, T. J. Van Pelt	933,007	933,007
Bag filling machine, J. L. Drohen	933,025	933,025
Bag tie, J. M. Stryker, reissue	13,017	13,017
Baggage records, manifold sheet for, W. Leach	932,620	932,620
Baling machine, R. A. Caswell et al.	932,755	932,755
Ball carrier, J. T. Cowley	932,762	932,762
Base ball, E. F. Shibe	932,911	932,911
Basket, folding, W. A. Snyder	932,826	932,826
Batteries, container for secondary, E. L. Oppermann	932,637	932,637
Battery covering, G. E. Andrews	932,841	932,841
Bearing, roller, J. H. Cook	932,766	932,766
Bed, folding, J. Maurer	932,626	932,626
Bed or couch, extensible, J. Ludwig	932,794	932,794
Bed pan, M. F. Cagle	932,442	932,442
Bedclothes clamp, G. W. Bacon	932,748	932,748
Bedstead shipping box or crate, S. Rosenthal	932,581	932,581
Beer dispenser, root, F. H. Anderberg	932,942	932,942
Belt cleaner, J. A. Bowen	932,434	932,434
Belting, P. L. Wooster	933,011	933,011
Bench, See Washbench	932,713	932,713
Billing sheet, multiform, E. Z. Lewis	932,801	932,801
Binder, loose leaf, S. H. Mitchell	933,009	933,009
Blacking machine, edge, W. E. Wentzel	933,000	933,000
Blank furnace, W. Scrimgeour	933,002	933,002
Boat for submarine vessels, life, H. J. Wallis	932,921	932,921
Boiler, C. E. Chapman	932,445	932,445
Boiler furnace, steam, D. L. Brownfield	932,440	932,440
Bolting machine, centrifugal, G. Cusson	932,847	932,847
Bottle, Smith & Hummel	932,560	932,560
Bottle, E. Burns	932,956	932,956
Bottle and jar stopper, D. Baxter	932,948	932,948

Bott's non-refillable, L. Runner	932,498
Bottle, non-refillable, M. B. Diskin	932,687
Box making machine, F. E. Slayter	932,503
Bread cutting machine, G. Jendras	932,555
Brick press, A. & J. Berg	932,674
Bridge construction, J. D. Luttrell	932,483
Brush, E. Miltner	932,030
Brush for seven dogs, Hy, W. L. Johnson	932,474
Brush, sink, C. Plunkett	932,890
Buckle, I. P. Tenney	932,596
Building construction to resist the action of earthquakes, J. A. Calatrava	932,443
Burglar alarm, explosion, J. K. Rissel	932,642
Burner, C. S. Chrisman	933,019
Button blank distributing machine attachment, I. De Francisco	932,767
Calissons, shafting for, C. P. Downing	932,770
Call box, H. S. Bullock, Jr.	932,753
Camera, W. F. Folmer	932,457
Can coating or lacquering machine, J. G. Hodgson	932,609
Can lacquering or coating machine, J. C. Hodgson	932,610
Can lacquering or coating machine, C. S. Buckley	932,678
Canned goods sterilizing apparatus, A. Mill	932,629
Candle assembling machine, C. E. Manbeck	932,796
Car, J. E. Tesseman	932,728
Car bolster, hopper, A. Becker	933,014
Car brake mechanism, C. M. McCarthy	932,994
Car door lock, freight, L. Wadsworth	932,658
Car door operator, Uncklich & Seelye	932,835
Car, dump, T. R. McKnight	932,564
Car dumping apparatus, Wright & Scott	932,529
Car jacking apparatus, railway, C. Ruegg	932,811
Car side bearing and center bearing testing machine, railway, J. F. O'Connor	932,567
Car underframe, J. Tesseman	933,005
Car ventilating system, D. I. Cooke	932,761
Car wheel, R. J. Gardener	932,605
Cars and the like, spare wheel for motor, F. R. Dennison	932,969
Carburetor, C. A. Haas	932,465
Carburetor, M. Laux	932,478
Carburetor, J. A. Kenworthy	932,871
Carburetor for internal combustion engines, Grouvelle & Arquebourn	932,860
Card exhibiting device, A. J. Thomas	932,830
Cart for distributing concrete, etc., N. F. Amburser	932,746
Cash issuing, indicating and registering apparatus, Drobnik & Flaueckl	932,973
Casting, J. E. Glackler	932,856
Caster wheel, B. C. Mathes	932,624
Cattle guard, B. E. Mosher	932,634
Cement, manufacturing, M. Trembour	932,917
Centering form, C. D. McArthur	932,993
Chain, W. H. Trout	932,919
Chain and link therefor, J. T. Corbett	932,680
Cheese cutter, A. De Villiers, Jr.	932,540
Chuck, H. S. Johnson	932,798
Chuck, A. A. North	932,996
Chuck, N. Brier	932,455
Cigarette case, J. E. Pender	932,569
Circuit breaker, J. R. & H. E. Howe	932,843
Circuit making and breaking device, H. S. Baker	933,012
Clamp, J. C. Todd	932,516
Clevis, L. D. Bell	932,429
Clothes banger, folding, M. H. Cazier	932,756
Clutch, H. C. La Batt	932,558
Clutch, friction, N. W. Baehle	932,668
Coat, inflatable, F. F. Hodgkins	932,698
Cock gas service, J. T. Brady	932,437
Cock, safety gas, S. Allen	932,940
Coffee or spice mill, A. A. Warner	933,008
Cobweb, W. W. Massie	932,799
Collapsible box, O. A. Panison	932,806
Collar blanks and the like, machine for folding, W. L. Dixon	932,769
Collar, shirt, J. Dorf	932,848
Comb. See Currycomb.	
Composition, B. Friedlaender	932,460
Composition of matter, Lynch & Crane	932,622
Concentrator, Evans & Akins	932,691
Concrete construction, S. C. Fiddymont	932,692
Contact maker, J. E. Webb, Jr.	932,924
Conventicle, C. R. Bold	932,433
Conveyor, hydraulic dirt, J. E. Haarmann	932,544
Cooker, fruit, P. C. Roberts	932,905
Copper ores, leaching, G. C. Schneider	932,643
Copying press, roller, P. H. Yawman	932,665
Corset, L. J. McMillin	932,889
Corset, S. E. Covington	932,681
Coupling, J. M. Adams	932,744
Coupling, R. Johnson	932,959
Crane, traveling, E. E. Brosius	932,439
Crate, egg, E. E. Ward	932,922
Cream separator, core cleaner, L. L. Stahl	932,646
Creech, S. W. Wardwell	932,522
Crucible furnace, W. Scrimgeour	932,501
Crucible furnace, W. S. Rockwell	932,906
Cuff holder, L. E. Allen	932,423
Cullinary tool, A. G. Molnar	932,631
Cullinary utensil, O. Bagula	932,943
Cultivator attachment, T. A. Wylie	932,741
Curd agitator, E. Mandel	932,991
Curling iron heater, H. W. Denhard	932,539
Currycomb and brush, combination, J. Laborde	932,559
Curtain fixture, H. A. Depp	932,684
Curtain hook, M. L. Gould	932,778
Curtain pole, M. Scanlon	933,000
Curtain pole and shade roller holder, S. A. Dzilian	932,975
Cycle frame, motor, C. O. Hedstrom	932,516
Cylinders, treating, R. Morrill	932,802
Dentist's casting appliance, N. H. Smith	932,508
Dikes, anticipatory riprap, D. Neale	932,565
Door and window lock, portable, Fulton & Bengert	932,694
Door check, C. D. Wood	932,933
Door closer, compressed air, A. E. Hanson	933,034
Draft appliance, C. Lunde	932,561
Draft attachment, vehicle, C. V. Paul	932,639
Draft rigging, finishing and proving machine, friction, J. F. O'Connor	932,566
Drawing board attachment, M. R. Ethell	932,690
Drier, P. G. Sargent	932,499
Drying and grinding materials, apparatus for, G. Suter	932,727
Drying apparatus, K. Gammel	932,695
Drinking fount, poultry, C. F. Slifer	932,590
Dust removing apparatus, dry separator for, R. F. Disentens	932,686
Dye, azo, Runkel & Herzberg	932,813
Dye, disazo, Runkel & Herzberg	932,812
Ear muff and neck protector, combined, J. Melio	932,487
Educational appliance, T. I. Galloway	932,852
Electric circuits, current interrupter for, Lord & Erickson	932,481
Electric furnace, J. A. Hay	932,469
Electric furnace, J. B. Trillon	932,835
Electric light cord adjuster, O. Dodge	932,970
Electric machine brush, dynamo, E. R. Knight	932,616
Electric machine, dynamo, A. L. Cushman	932,537
Electric machine, dynamo, W. D. Pomeroy	932,641
Electric machine, dynamo, A. A. Pfifer	932,897
Electric motor, O. H. & A. F. Pieper	932,896
Electric switch, push button, L. H. Moulthrop	932,883
Electrolier shade holder, H. A. Torrey	932,834
Elevator automatic control device, L. J. Milke	932,714
Elevator brushing device, M. B. Goff	932,681
Ellipsograph, C. E. Dexter	932,768
Engine controller, gas, C. L. McHenry	932,804
Engine muffler, explosive, D. B. Smith	932,723
Engine starting device, automobile and other, A. G. Willard	932,735
Envelop, return, W. T. Morrison	932,715
Envelop, safety, W. F. Young	932,742
Excavator or dredger, R. Glogner	932,857
Extractor, Price & Hood	932,900
Eye shade, G. E. Henry	932,703
Eye-glass nose guard, J. H. Ostrander	932,491
Fan for sewing machines and the like, W. F. Tippit	932,832
Farming implement, T. J. King	932,785
Fastening driving machine, L. A. Casgrain	932,535
Faucet, M. Bachrach	932,747
Feed and water heater, Miller, D. Goff	932,777
Feed regulator, W. Baker	932,944
Feed water heater, J. Pollock	932,810
Feed water purifier, J. Wood, Jr.	932,660
Fence dropper and wire retaining means, C. Cromwell	932,987

"Star" Lathes
Automatic Cross Feed
FOR FINE, ACCURATE WORK
Send for Catalogue B.
SENECAFALLS MFG. CO.
695 Water Street,
Seneca Falls, N. Y., U. S. A.

Engine and Foot Lathes
MACHINE SHOP OUTFITS, TOOLS AND SUPPLIES. BEST MATERIALS. BEST WORKMANSHIP. CATALOGUE FREE
SEBASTIAN LATHE CO., 120 Culvert St., Cincinnati, O.

Foot and Power and Turret Lathes, Planers, Shapers, and Drill Presses.
SHPARD LATHE CO., 133 W. 2d St., Cincinnati, O.

USE GRINDSTONES?
If so we can supply you. All sizes mounted and unmounted, always kept in stock. Remember, we make a specialty of selecting stones for all special purposes. Send for catalogue "T."
The CLEVELAND STONE CO.
6th Floor, Hickox Bldg., Cleveland, O.

50 ENGRAVED CARDS OF YOUR NAME \$1.00
IN CORRECT SCRIPT, COPPER PLATE
THE QUALITY MUST PLEASE YOU OR YOUR MONEY REFUNDED
SAMPLE CARDS OR WEDDING INVITATIONS UPON REQUEST
SPECIAL STATIONERS **HOSKINS PHILA.**
920 CHESTNUT ST.

FOR GUNSMITHS, TOOL MAKERS, EXPERIMENTAL & REPAIR WORK, ETC.
From 9-in. to 13-in. swing. Arranged for Steam or Foot Power, Velocity or Stand-up Treadle.
Send for Lathe Catalog.
W. F. & JNO. BARNES CO.
Established 1872.
1899 Raby St., Rockford, Ill.

Incorporate
Your PATENTS and BUSINESS in ARIZONA

Lawsthe most liberal. Expensethe least. Hold meetings, transact business anywhere. Blanks, By-Laws and forms for making stock full-paid for cash, property or services, free. President Stoddard, FORMER SECRETARY OF ARIZONA, resident agent for many thousand companies. Reference: Any bank in Arizona
STODDARD INCORPORATING COMPANY, Box 8000 PHOENIX, ARIZONA

BABBITT METALS.—SIX IMPORTANT FORMULAS. SCIENTIFIC AMERICAN SUPPLEMENT 11,223.
Price 10 cents. For sale by Munn & Co., Inc., and all newsdealers. Send for catalogue.

AVIATION. The best book on AVIATION
The First Lessons on AERONAUTICS
Most scientific treatment on the subject. Fine illustrations and diagrams. Leather back, prepaid \$2.00. Send to Maxim Kasmar, Secy.

AM. AER. SOCIETY
1827 N. PAULINA STREET, CHICAGO, ILL.

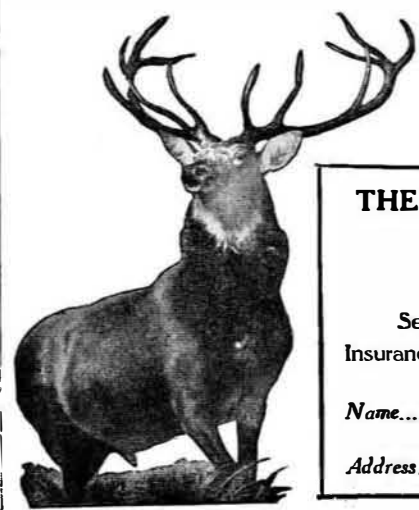
Filter, R. J. Goade	932,696
Finish, removing, J. M. Wilson	932,738
Fire escape, H. J. Brackelsberg	932,436
Fire escape, J. A. Grove	932,699
Fire escape, M. J. Lifshitz	932,753
Fireman's equipment, L. S. Meikle	932,880
Fishing reel attachment, C. W. Unget	932,837
Fluid pressure indicating device, T. Sloper	932,504
Fluids, method and apparatus for testing, H. B. Bishop	933,015
Flushing apparatus, F. de Alba B.	932,939
Flushing apparatus, water closet bowl, T. J. Murray	932,716
Forecasting device, W. F. Folmer	932,458
Folding bag, W. Rueter	932,721
Formaldehyde, apparatus for producing, W. B. McLaughlin	932,635
Foundations, constructing, J. B. O'Rourke	932,717
Frame. See Cycle frame.	
Friction rope drive elevator, E. Boening	932,432
Furnace, W. T. Summers	932,595
Furnace charging apparatus, D. Giles	933,031
Furnace oven, T. Houth	932,953
Furnace part cooling means, G. E. Parks	932,483
Fuse, double acting, J. Hable	932,701
Game apparatus, W. H. Cornford	932,846
Garment, combination body, C. H. Osborn	932,568
Garment protector, Madill & Mikesell	932,990
Gas apparatus, acetylene, L. J. Olson	932,997
Gas lighter, W. D. C. Wright	932,935
Gas meter connection, F. H. Seufelder	932,816
Gas producer, J. R. George	932,853
Gathering machine, F. S. Barnes	932,670
Gear case, T. L. Kennedy	932,784
Gearing, change speed, L. A. Saussard	932,814
Gearing, changeable speed, E. A. Johnston	932,611
Gold saving apparatus, V. Yehling	932,936
Grain grinding machine, W. F. & G. J. Moore	932,882
Grinder, cutter, Le Blond & Groene	932,791
Grinding machine, Davis & Ross	932,603
Guns, shell primer for breech loading, E. M. Funk	933,030
Harvester, beet, M. J. Ely	933,026
Hat pin holder, W. H. Plane	932,809
Hay holder, automatic, J. Weddle	932,524
Hay press, T. E. Turner	932,517
Hay rake, W. Whittier	932,542
Heat regulator, electrothermostatic, L. G. Copeman	932,964
Heater, P. Schill	932,500
Heating furnace, E. H. Robinson	932,579
Heating system and regulator therefor, water, C. E. Knickerbocker	932,615
Hinge, separable, J. R. Corbett	932,601
Hoe, weeding or chopping, T. J. King	932,872
Holisting apparatus, C. H. Hartwig	932,468
Hoof pad, E. C. Stewart	932,595
Hoof trimmer, G. M. Bates	932,671
Hoop article, M. E. & H. E. Donnell	932,838
Hot water heater, E. H. Sadtler	932,908
Husker, J. A. Ramsey	932,901
Hydrocarbon burner and water feed therefor, E. G. Mumery	932,863
Hydrocarbon engine, E. Troike	932,918
Hydromechanical press, A. Wilzb	933,010
Ice cutting machine, J. J. Tobin	932,729
Ice sawing rig, W. F. Smith	932,591
Incubator heaters, extinguisher for, C. A. Cyphers	932,448
Index case, card, E. A. Yungel	932,840
Indicator, C. W. Snyder	932,825
Induction motor, E. Mattingly	932,625
Ink, apparatus for recovery of ingredients of oils, Hopkins & Barnett	932,950
Ink, recovery of ingredients of oily, Hopkins & Barnett	932,470, 932,548
Insulator for third rails, E. M. Weaver	932,523
Insulators, supporting pin for, F. A. C. Perrine	932,570
Iron, copperizing, W. G. Clark	932,964
Ironing board, M. E. Geyer	932,854
Ironing board, step ladder, and bench, combined, T. Deuzbach	932,452
Jar cap, milk, W. B. Hays	932,779
Jar or can closure, A. V. Oldham	932,892
Journal box dust guard, J. L. Mansfield	932,484
Kettle cover, D. P. Foster	932,774
Key ring, G. J. Kirby	932,787
Knife, C. J. Landgren	932,874
Knitting machine, A. W. Redin	932,578
Knitting machine, J. Black	933,016
Label, shoe carton, L. M. Stiglich	933,004
Ladder, gymnasium, M. B. Reach	932,802
Lamp burner, J. H. Dunn	932,974
Lamp chimney holder, L. Hunt	932,471
Lamp cut out, arc, L. E. Jones	932,613
Lamp, electric, D. D. Lockwood	932,621
Lamp, electric arc, J. B. Ponder	932,773
Lamp, incandescent, R. Matheson	932,486
Lamp shade holder, electric, G. E. Palmer	932,893
Lamp switch, electric, Lefebvre & Miller	932,792
Lantern or shade, collapsible, C. Fleck	932,772
Last, A. G. Fltz	933,029
Last, locking, H. F. Loewer	933,041
Lasts, machine for removing shoes from, F. M. Moody	932,632
Latch, H. F. Smith	932,597
Lathe tool, J. D. Ramsey	932,576
Lathe, zinc, A. E. Johnson	932,782
Lathes, thread cutting attachment for automatic, J. J. Grant	932,667
Lawn sprinkler, J. C. Kutz	932,618
Lens, solid bifocal, C. W. Comer	932,905
Lift, air, R. N. Wood	932,914
Lighting and heating system, combined, H. A. Barr	932,747
Lime hydrating apparatus, C. C. Kritzer	932,789
Line spacing mechanism, E. B. Crum	933,021
Linotype machine, W. M. Rapp	932,577
Liquid dispensing apparatus, C. S. Buchanan	932,497
Liquids containing mineral value, apparatus for suspended matter from, P. J. A. Maiknen	932,795
Liquids from receptacles, apparatus for recovering, J. Willmann	932,931
Lock. See car-door lock.	
Lock and latch mechanism, H. G. Voight	932,736
Locket, H. E. Adams	932,938
Locomotive ash pan cleaner, T. Iwanami	932,553
Locomotive, electric, W. F. Hunt	932,707
Log haul, G. N. Gentner	932,770
Logging car bunk, C. W. Russell	932,583
Loom, web replenishing, C. Thibault	932,831
Lubricating compounds, manufacture of, J. E. Gill	932,855
Mail bag holder, E. S. Shipman	932,912
Mail box, E. W. Eastorling	932,453
Mail box flag, F. O. Hess	932,547
Mail carrier, automatic, Hacking & Bastian	932,700
Mailing box, G. Boden	932,431
Mailing tube, F. M. Ashley	932,425
Mantle holder, M. Offenber	932,636
Manure spreader, D. Garst	932,461
Massage and exercising implement, C. J. Hero	932,780
Match safe, J. T. Smith	932,645
Mattress stuffer, F. Franke	932,463
Measuring device, tailors, G. S. Tiffan	932,649
Measuring machine, hopper, A. del Castillo y Romero	932,754
Metal bodies, device for severing, E. Wiss	932,740
Metal severing device, E. Wiss	932,739
Metal sheets, apparatus for hling, H. E. Sheldon	932,587
Metallie compound or composition of matter and making the same, F. A. Hendson	933,036
Milling machine, F. H. Schley	932,585
Mill, L. E. Gaiser	932,543
Mines, apparatus for removing gases and foul air from, J. C. Strling	932,916
Mold, J. B. Blaw	933,017
Motor. See Electric motor.	
Mover, E. G. Goodwin	932,697
Musical instrument, self-playing, F. R. Goodman	932,606
Nozzle for vacuum cleaners, J. W. Smith	933,003
Nozzle, lawn spray, T. Cadwallader	932,858
Nozzle, liquid, J. G. Mastin	932,860
Nut and bolt, locking, G. W. Pothuberger	932,572
Nut, lock, M. B. Park	932,894
Oiling device for stock dies, F. Thatcher	932,533
Ores, oxidizing, B. E. Eldred	932,689
Ornamental pin or badge, C. W. Little	932,480
Oscillometer, H. Schoemaker	932,819
Oxides and the like, reducing and melting, O. Frick	932,459

Big Money In Drilling
Our customers all over the Country are making from \$25 to \$75 profit a day with the Cyclone Drill. No business offers such big returns for the money invested.
Contractors, prospectors, well drillers, find the Cyclone Drill more economical, faster and easier to operate than any other.
We make Hollow Rod, Cable and Core Drills, to meet every need.
We also make combination machines that will handle any or all of the systems equally well, a machine that will enable you to cover the entire field of drilling.
Cyclone Drill
Our Diamondite and Steel Shot Core Drills cut faster and at fraction of the cost of the old diamond drills. We sell Cyclone Drills on an easy payment plan. Some of our customers have made more than the price of the machine within one month. Our new traction Gasoline machine—only one made—is of particular value where fuel and water are scarce. Send for our free books on Drilling, and let us know in what branch of the work you are interested.
CYCLONE DRILL COMPANY, 11 Main St., Orrville, Ohio
Chicago Office, 419 Fisher Building

Fire Insurance Rates Too High?

Doubtless. But the rate simply measures the fire loss as a hermometer does the temperature. Rates in America are ten times higher than in some parts of Europe, but—in 1908 the fire loss in America was 238 Millions of Dollars. This enormous waste was largely preventable. Slipshod methods of construction and criminal carelessness in the use of property bring about this terrible fire loss. It is any wonder fire rates are high in America?

Do you want to help reduce the fire cost and fire insurance rates? THE HARTFORD FIRE INSURANCE COMPANY has published a book on this subject which contains chapters for the Householder, the Merchant and the Manufacturer. It tells each how to reduce the chance of fire in his particular class of property. If all property owners would follow the suggestions of this book the fire waste would be lessened and fire insurance rates would be greatly reduced. The book also gives valuable advice as to how insurance should be written and tells in simple language common errors to avoid. This book may save you thousands of dollars and much trouble, no matter in what company you are insured. It is free. Send for it at once.



THE HARTFORD FIRE INSURANCE COMPANY
HARTFORD, CONN.
Send me your Book "Fire Prevention and Fire Insurance" advertised in The Scientific American.
Name.....
Address.....

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., Inc.

BUSINESS OPPORTUNITIES.

\$5 PER DAY PAID to competent automobile drivers. A complete instruction book that will qualify you for these positions will be sent postpaid for 25c. This book tells all about driving and adjusting automobiles, explains all gasoline and automobile troubles. Satisfaction guaranteed or money refunded. Address George N. Pearson, Dept. S, Bala, Pa.

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

NEWEST BASKET BALL on royalty. Indoors and outdoors. Fascinating, healthy, harmless, skillful game. Popularity greater than "Ping Pong" or "Diabolo" predicted for it. "Fross," 225 Epler Block, Seattle, Wash.

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

A COMPANY IN DALLAS, TEXAS, operating a good foundry and machine shop, and wishing to engage in manufacture of gas and gasoline engines, gas producers, and possibly automobiles, desire to procure the services of a thorough, competent, reliable and experienced man capable of designing and manufacturing this line successfully. Address W. S. Myers, Dallas, Texas, care Olive & Myers Mfg. Co.

PATENTS FOR SALE.

FOR SALE—Patent No. 832,885. Speed gear for automobiles. So constructed that all vibration of the indicator is obviated. For further information write to J. K. B., Box 773, New York.

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

FOR SALE.—Patent No. 821,328. Screw driver with joint handle giving auser handle purchase when screw goes hard. Nothing like it on market. H. D. Bartlett, 322 N. Marshfield Avenue, Chicago, Ill.

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

FOR SALE OR ROYALTY.—Patent just issued on non-slipping self-adjusting clutch. Simple and light. For further particulars address John Schneider, 717 Miller Avenue, Ann Arbor, Mich.

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

FOR SALE.—French Patent 363,674. Pneumatic automobile spring. For further information, address W. H. Staats, Cohoes, N. Y.

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

FOR SALE ON ROYALTY.—A new and improved rotary engine, operated by compressed air and steam. Sure seller when merits are known. Canadian patent also for sale. Thos. Jorgensen, Martinez, California.

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. 8960.—For the address of the Windsor Mfg. Co., manufacturers of waterproof collars and cuffs.

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., Inc., List Department, Box 773, New York.

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

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

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

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

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

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 manure 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. 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. 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. 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 fountain pens.

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

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

Inquiry No. 9021.—For manufacturers of machinery for manufacturing alcohol and turpentine from sawdust.

Inquiry No. 9022.—Wanted, to buy a light, small motor, not exceeding three pounds in weight, including everything in going order.

Inquiry No. 9023.—Wanted, to buy silk machines from re-reeling, twisting, doubling, to the final process of making it into clothes.

Inquiry No. 9024.—Wanted, the address of parties who can manufacture fire extinguishers of metal.

Inquiry No. 9025.—Wanted, address of rubber manufacturers in Germany.

- Ozone, producing, J. F. Place..... 932,898
Package, rolled, G. J. Fallesen..... 932,456
Packing machine, T. R. Weyant..... 932,732
Paddy separator, F. Streckel..... 932,594
Paper and apparatus therefor, manufacturer of, C. Bertini..... 932,430
Paper roll protector, H. B. Pelton..... 932,808
Pattern carrier, E. H. Mumford..... 932,563
Paving composition, making and laying, J. H. Amies..... 932,941
Pea huller, R. W. J. Stewart..... 932,510
Pen, fountain, P. D. Corrigan..... 932,447
Pencil sharpener, E. F. Smith..... 932,724
Perforator, J. F. Jewart..... 932,472
Photographic shutter, P. J. Marks..... 932,485
Piano action, A. D. Dimick..... 932,685, 933,024
Piano, mechanical, N. D. Hosley..... 932,705
Pickle grading machine, L. B. Barnett..... 932,749
Picture puzzles, adjustable frame for assembling, T. G. Strater..... 932,512
Pigment and making the same, green, F. F. Hunt..... 932,864
Pipe coupling, J. W. Anderson..... 932,424
Pipe coupling, G. E. McLaughlin..... 932,805
Pipe coupling, J. Clark..... 932,963
Pipe cutting machine, F. La Vine..... 932,989
Pipe joint, H. N. Moseley..... 932,633
Plane, carpenter's, M. M. Beahm..... 932,672
Plane, sandpapering, A. May..... 932,879
Planing and sandpapering machine, F. Harbers..... 932,466
Planing device, meat block, D. F. Dempsey..... 932,449
Planing, shaping or slotting machine with reciprocating strokes of variable lengths, J. H. Wicksteed..... 932,734
Plant protector, E. R. Drake..... 932,972
Plants and vegetables, protecting growing, E. R. Drake..... 932,971
Plow and harrow, combined, W. E. Cartilage..... 932,961
Pole support, J. Neff, Jr..... 932,891
Portable wagon, S. C. Paulson..... 932,807
Portable fan for handling crushed stone, etc., S. F. Welch..... 932,598
Portable hose, C. V. Wyckoff..... 932,663
Potato bug catcher, G. L. Emery..... 932,454
Powder puff pin, J. Wetzler..... 932,526
Powder receptacles, attachment for tooth, J. M. Tobin..... 932,833
Power producing apparatus, P. Danckwardt..... 933,022
Power producing process, P. Danckwardt..... 933,023
Power transmitting device, L. J. Harris..... 932,467
Press for agglomerating combustible briquets, O. Crochet..... 932,682
Pressure elevator, balanced, G. P. Steadman..... 932,726
Printing machine, stencil, C. L. Burdick..... 932,640
Printing plate casting machine, A. H. Cruse..... 932,602
Printing press, F. H. Van Loosen..... 933,006
Printing press attachment, T. Martin..... 932,797
Propeller, J. F. Ball..... 933,013
Propellers, liquid gear for, G. A. Boyden..... 932,435
Pulley, See Spike pulley..... 932,838
Pulley, J. T. Voigt..... 932,838
Pump, double acting, A. A. Bowser..... 932,531
Pump, rotary, Combs..... 932,446
Puzzle, R. D. Glover..... 932,845
Rabbit arm, O. H. Repath..... 932,496
Rail joint, Ferre & Kennedy..... 932,850
Railway frog, J. H. Laney..... 933,040
Railway block system, W. L. Rummel..... 932,582
Railway rail, H. C. Grant..... 932,464
Railway rail joint, J. Jordan..... 932,614
Railway rail joint, A. J. Gaumer..... 932,679
Railway switch, G. E. Lemmon..... 932,560
Railway switch, W. H. Shugart..... 932,588
Railway switch stand, O. B. Grant..... 932,859
Railway tariff, A. W. Standing..... 932,827
Railway tie, H. Hille..... 932,751
Railway tie and rail clamp, W. C. Neel..... 932,890
Railway tie plate, C. W. Jennings..... 933,038
Railway tie plate and rail brace, W. H. Tanner..... 932,648
Railway ties to be used with screw spikes, apparatus for preparing, J. W. Kenrick..... 932,475
Railway train controller, automatic, L. E. Fugate..... 933,042
Railway trains, apparatus for the control of, R. J. White..... 932,928
Rakes, push off attachment for sweep, J. L. Merrell..... 932,881
Razor, safety, P. H. Unsinger..... 932,518
Razor, safety, C. R. Lawrence..... 932,619
Razor, safety, O. A. Clark..... 933,020
Razor strop, safety, I. Conrad..... 932,536
Razor stropping device, safety, F. M. Williams..... 932,736
Receiving apparatus, H. Shoemaker..... 932,913
Receptacle, combination, F. H. Shaw..... 932,910
Recording device, labor cost, J. T. Quigley..... 932,575
Refrigerating apparatus, F. L. Beckoll..... 932,948
Refrigerating machine, R. Whitaker..... 932,599
Refrigerating system, multiple effect absorption, G. T. Voorhees..... 932,657
Refrigerator drip cnp, A. May..... 932,878
Retailer, G. C. Headley..... 932,985
Resilient wheel, J. Edman..... 932,976
Respiratory apparatus, J. Tissot..... 932,515
Roaster for coffee and other material, R. Burns..... 932,957
Rolling hoop, E. F. Draper..... 932,451
Roost, poultry, A. J. Baldwin..... 932,908
Rope socket clamp, J. N. Johnson..... 932,556
Rotary internal combustion engine, F. W. Goyette..... 932,463
Rotary steam engine, reversible, L. Hills..... 933,037
Rotor construction, A. H. Wouters..... 932,662
Roving frames, etc., means for cleaning the drawing rolls of, A. P. Escobos..... 932,977
Ruler, compass, J. A. Ryman..... 932,907
Ruling machine, automatic, C. U. Brewster..... 932,676
Sacks, apparatus for automatically filling, weighing, and registering, C. Droz..... 932,688
Sash weight, McKinley & Steenburgh..... 932,995
Saw gummer, J. B. Bristol..... 932,977
Saw moving machine, part, J. E. Hibbert..... 932,617
Saw tooth gage, A. C. Jones..... 932,612
Saw tooth mold, diamond, W. F. Meyers..... 932,488
Saws, joint for band, C. J. Brey..... 932,752
Sawmill carriages, rotating steam feed for, C. Suptaw..... 932,914
Scouring machine, W. A. Parmenter..... 932,638
Scraper, J. D. H. A., G., J., & L. Zum Brunnen..... 932,954
Seal lock, I. J. Palmer..... 932,492
Seal press, E. J. Brooks..... 932,438
Sealing machine, envelope, C. F. G. Umbach..... 932,920
Seed drill, S. L. Allen..... 932,666
Separator tank, A. A. Bowser..... 932,532
Sewer construction, J. H. Zinn..... 932,743
Sewing machine, C. F. Gray..... 933,032
Sewing machine shuttle, A. G. R. Williams..... 932,929
Sewing machine trimming mechanism, A. Grieb..... 933,033
Shaft holder, C. N. Weller..... 932,927
Shaft holder, C. E. Bergh..... 932,952
Sharpening device, shears, G. P. Sheffield..... 932,586
Sheeting machine, J. M. Maxwell..... 932,932
Sheet metal can, seamless or drawn, G. W. Weber..... 932,597
Shell, G. A. Muenzenmaier..... 932,562
Ship repair apparatus, J. H. Reinhardt..... 932,719
Ship's ballast tank, G. Simpson..... 932,722
Ships or closing holes therein, means for buoying, J. H. Reinhardt..... 932,720
Shoe polishing stand, F. A. Johnson..... 932,868
Shoe scraper, E. R. Thiel..... 932,514
Shoe support, W. O. Chase..... 932,757
Shovel board and end gate, combined, W. A. Giermann..... 932,980
Shuttle, pinless, J. H. Devlin..... 932,450
Sieve, Williamson & Blue..... 932,930

Practical and Instructive Scientific Books

AGRICULTURE.—The New Agriculture. By T. Byard Collins. 12mo.; 374 pages; 106 illustrations. \$2.00

A popular outline of the many changes which are revolutionizing the methods of farming, and the habits of farm life. It is one of the most practical treatises on the subject which has ever been issued.

ALCOHOL.—Industrial Alcohol. Its Manufacture and Uses. By John K. Brachvogel. 8vo.; 528 pages; 107 illustrations. \$4.00

A practical treatise based on Dr. Max Maercker's "Introduction to Distillation," as revised by Drs. Delbruck and Lange, comprising raw material, mashing and yeast preparation, fermentation, distillation, rectification and purification of alcohol, alcoholometry, the value and significance of a tax-free alcohol, methods of denaturing, its utilization for light, heat, and power production, a statistical review, and the United States law.

AMATEUR MECHANICS.—Home Mechanics for Amateurs. By George M. Hopkins. 12mo.; 370 pages; 326 illustrations. \$1.50

This is a thoroughly practical book by the most noted amateur experimenter in America. It appeals to the boy as well as the more mature amateur. Holidays and evenings can be profitably occupied by making useful articles for the home or in the building of small engines or motors or scientific instruments.

AMUSEMENTS.—The Scientific American Boy. By A. Russell Bond. 12mo.; 317 pages; 340 illustrations. \$2.00

This is a story of outdoor boy life, suggesting a large number of diversions which, aside from affording entertainment, will stimulate in boys the creative spirit. In each instance complete practical instructions are given for building the various articles.

COMPRESSED AIR.—Compressed Air. Its Production, Uses, and Application. By Gardner D. Hiscox. 8vo.; 665 pages; 540 illustrations. \$5.00

The most complete book on this subject. It treats on its physical and operative properties, and is written by an expert. Taken as a whole it might be called an encyclopedia of compressed air.

DIES.—Their Construction and Use for the Modern Working of Sheet Metals. By Joseph V. Woodworth. 8vo.; 384 pages; 505 illustrations. \$3.00

A most useful book, and one which should be in the hands of all engaged in the press working of metals; treating on the designing, constructing, and use of tools, fixtures and devices, together with the manner in which they should be used in the power press, for the cheap and rapid production of sheet metal articles.

ELECTRICITY.—The Standard Handbook for Electrical Engineers. Written and compiled by a Staff of Specialists. Second edition, corrected. 12mo.; 1285 pages; 1260 illustrations. Bound in flexible morocco. \$4.00

A new pocketbook consisting of twenty sections; each written by a specialist of engineering experience and containing the latest data and information regarding standard electrical practice.

ELECTRICITY.—Electrician's Handy Book. By T. O'Conor Sloane. 761 pages; 556 illustrations. Handsomely bound in red leather, pocket-book style. \$3.50

This work is intended for the practising electrician who has to make things go. Although the principles of electricity and magnetism are treated, the greater part of the book is devoted to practical handling of machinery, details of construction, and computations such as will be encountered in every-day practice.

GAS ENGINES.—Modern Gas Engines and Producer Gas Plants. By R. E. Mathot. 8vo.; 314 pages; 152 illustrations. \$2.50

A practical treatise setting forth the principles of gas engines and producer design, the selection and installation of an engine, conditions of perfect operation, producer gas engines and their possibilities, the care of gas engines and producer gas plants, with a chapter on volatile hydrocarbon, and oil engines.

GAS ENGINES.—Gas, Gasoline, and Oil Engines. Including Producer Gas Plants. By Gardner D. Hiscox. 8vo.; 442 pages; 351 illustrations. \$2.50

A complete book on the subject for gas engine owners, gas engineers, and intending purchasers of gas engines, treating fully on the construction, installation, operation, and maintenance of gas, gasoline, kerosene, and crude petroleum engines, with special information on producer and suction gas engines.

GAS ENGINES.—Gas Engine Construction. By H. V. A. Parsels and A. J. Wood. 8vo.; 304 pages; 145 illustrations. \$2.50

A practical treatise describing the theory and principles of the action of gas engines of various types, and the design and construction of a half-horse-power gas engine, with illustrations of the work in actual progress, together with the dimensions working drawings giving clearly the sizes of the various details.

HEATING.—Practical Steam and Hot Water Heating and Ventilation. By Alfred G. King. 8vo.; 402 pages; 304 illustrations. \$3.00

An original and exhaustive treatise, prepared for the use of all engaged in the business of steam, hot water heating, and ventilation. The standard and latest book published. Describes all of the principal systems of steam, hot water, vacuum, vapor, and vacuum-vapor heating, together with the new accelerated systems of hot water circulation, including chapters on up-to-date methods of ventilation.

HYDRAULICS.—Hydraulic Engineering. By Gardner D. Hiscox. 8vo.; 315 pages; 305 illustrations. \$4.00

A practical work treating on the properties, power, and resources of water for all purposes, including the measurement of streams, the flow of water in pipes or conduits; the horse-power of falling water; turbine and impact water wheels; wave motors; centrifugal, reciprocating, and air-lift pumps, etc.

INDUCTION COILS.—The Design and Construction of Induction Coils. By A. Frederick Collins. 8vo.; 295 pages; 160 illustrations. \$3.00

This work gives in minute details full practical directions for making eight different sizes of coils, varying from a small one giving a 1/2-inch spark to a large one giving 12-inch sparks. The dimensions of each and every part down to the smallest screw are given, and the descriptions are written in language easily comprehended.

LATHE.—Modern American Lathe Practice. By Oscar E. Perrigo. 8vo.; 424 pages; 314 illustrations. \$2.50

A new book describing and illustrating the very latest practice in lathe and boring mill operations, as well as the construction of and latest developments in the manufacture of these important classes of machine tools.

MAGIC.—Magic, Stage Illusions, and Scientific Diversions. Including Trick Photography. Compiled and edited by Albert A. Hopkins. 8vo.; 568 pages; 420 illustrations. \$2.50

This very interesting volume is acknowledged to be the standard work on magic. It appeals to the professional and amateur alike. The illusions are all explained in detail, showing exactly how the tricks are performed.

MECHANICAL MOVEMENTS.—Mechanical Movements, Powers, and Devices. By Gardner D. Hiscox. 8vo.; 403 pages; 1,800 illustrations. \$3.00

This is a collection of different mechanical motions and appliances, accompanied by appropriate text, making it a book of great value to the inventor, the draftsman, and to all readers with mechanical tastes.

MECHANICAL APPLIANCES.—Mechanical Appliances, Mechanical Movements, and Novelties of Construction. By Gardner D. Hiscox. 8vo.; 396 pages; 970 illustrations. \$3.00

This book, while complete in itself, is in fact a continuation of the author's "Mechanical Movements, Powers, and Devices." The author presents to the reader information regarding nearly all conceivable devices for producing motion or accomplishing mechanical results.

SPECIAL OFFER: These two volumes sell for \$3 each, but when they are ordered at one time from us, we send them prepaid to any address in the world, on receipt of \$5.

PATENTS.—Practical Pointers for Patentees. By F. A. Cresce. 12mo.; 144 pages. \$1.00

Containing valuable information and advice on the sale of patents and elucidation of the best methods employed by the most successful inventors in handling their inventions. It gives exactly that information and advice about handling patents that should be possessed by every inventor who would achieve success.

PHYSICS.—Experimental Science. Elementary, Practical, and Experimental Physics. By George M. Hopkins. In two volumes. 8vo.; 1,105 pages; 918 illustrations. Cloth, \$5.00. Half morocco, \$7.00

This book treats on the various topics of physics in a popular way and describes with rare clearness and in detail the apparatus used, and explains the experiments in full, so that teachers, students, and others interested in physics may readily make the apparatus without great expense and perform the experiments without difficulty.

PLUMBING.—Modern Plumbing Illustrated. By R. M. Starbuck. 392 pages; 10 1/4 x 7 1/2; 55 full-page engravings. \$4.00

A comprehensive and up-to-date work illustrating and describing the drainage and ventilation of dwellings, apartments, and public buildings, etc. The very latest and most approved method in all branches of sanitary installation are given.

PUNCHES.—Punches, Dies, and Tools for Manufacturing in Presses. By Joseph V. Woodworth. 8vo.; 483 pages; 702 illustrations. \$4.00

This work is a companion volume to the author's other work entitled "Dies, Their Construction and Use." It might well be termed an encyclopedia on die making, punch making, die sinking, and sheet metal working.

RECEIPTS.—The Scientific American Encyclopedia of Receipts, Notes and Queries. Edited by Albert A. Hopkins. Containing 15,000 selected formulas. 8vo.; 734 pages. Cloth, \$5.00. Sheep, \$6.00. Half morocco, \$6.50

Over 15,000 selected receipts are here collected, nearly every branch of the useful arts being represented. The alphabetical arrangement with abundant cross references makes it an easy work to consult. It has been used with equal success by chemists, technologists, and those unfamiliar with the arts, and is a book which is useful in the laboratory, factory, or home.

REFERENCE BOOK.—Scientific American Reference Book. Compiled by Albert A. Hopkins and A. Russell Bond. Containing 50,000 facts. 12mo.; 516 pages; illustrated. \$1.50

This book deals with matters of interest to everybody. It contains 50,000 facts, and is much more complete and more exhaustive than anything of the kind which has ever been attempted. It is indispensable to every family and business man. It is a book for every-day reference—more useful than an encyclopedia, because you will find what you want in an instant in a more condensed form.

STEAM ENGINE.—Modern Steam Engineering in Theory and Practice. By Gardner D. Hiscox. 8vo.; 487 pages; 405 illustrations. \$3.00

This is a complete and practical work issued for stationary engineers and draughtsmen, dealing with the care and management of boilers, engines, pumps, superheated steam, refrigerating machinery, dynamos, motors, elevators, air compressors, and all other branches with which the modern engineer must be familiar.

TELEPHONE.—Telephone Construction, Installation, Wiring, Operation, and Maintenance. By W. H. Radcliffe and H. C. Cushing, Jr. 16mo.; 171 pages; 125 illustrations. \$1.00

A practical book intended for electricians, wiremen, engineers, contractors, architects, and others interested in the installation of telephone exchanges in accordance with standard practice. Intricate mathematics are avoided, and all apparatus, circuits, and systems are thoroughly described. Selected wiring tables, which are very helpful, are also included.

TOOLS.—American Tool Making and Interchangeable Manufacturing. By Joseph V. Woodworth. 8vo.; 535 pages; 601 illustrations. \$4.00

A complete practical treatise containing a valuable collection of drawings and descriptions of devices, the results of the author's own experience.

TOOLS.—Modern Machine Shop Tools. By W. H. Vandervoort. 8vo.; 552 pages; 673 illustrations. \$4.00

A new and fully illustrated work describing in every detail the construction, operation, and manipulation of both hand and machine tools; being a work of practical instruction in all classes of machine shop practice.

WIRING.—Electric Wiring, Diagrams and Switchboards. By Newton Harrison. 12mo.; 272 pages; 105 illustrations. \$1.50

This work is a thoroughly practical treatise on electric wiring in all its branches, beginning with the simple circuit and working up to the practical every-day problems, all being presented in a simple and intelligent manner. It is in every respect a handy, well written, instructive, comprehensive volume on wiring for the wireman, foreman, contractor, or electrician.

Any of the above books will be sent postpaid on receipt of price. Our complete catalogue of scientific and technical books sent free on application. MUNN & COMPANY, Inc., Publishers, 361 Broadway, New York City

WANTED.—One first-class ordnance draftsman at \$5.04 per diem. A competitive examination will be held September 30, 1909, to fill the above position. For further information address Inspector of Ordnance in charge, Naval Torpedo Station, Newport, R. I.

INVENTORS

We manufacture all kinds of Machine Novelties. Consult us as to developing, perfecting and marketing your patents. MACHINE ACCESSORIES AND NOVELTIES MFG. CO. PROVIDENCE, R. I.

CONSULTING ENGINEER.

ERNEST L. RANSOME Reinforced Concrete 11 Broadway, New York

SOUTHERN STAMPING & MFG. CO. Manufacturers of special and patented articles. R. S., Nashville, Tenn.

REBUILT TYPEWRITERS All Makes. All Prices. Quality Unsurpassed. American Writing Machine Co., 345 Broadway, N. Y.

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

MODELS & EXPERIMENTAL WORK. Inventions developed. Special Machinery. E. V. BAILLARD CO., 24 Frankfort Street. New York.

RUBBER Expert Manufacturers Fine Jobbing Work PARKER, STEARNS & CO., 238-290 Sheffield Av., B'klyn, N. Y.

MODELS & EXPERIMENTAL WORK Anything from a Watch to an Automobile Chas. E. Dressler & Co., Metropolitan Bldg., 1 Madison Ave., New York

DIE MODELS SPECIAL WORK TOOLS MACHINERY NATIONAL STAMPING AND ELECTRIC WORKS 153-159 S. Jefferson Street. Chicago, Ill.

MODELS CHICAGO MODEL WORKS ESTABLISHED 1867 179 E. MADISON ST. CHICAGO, ILL.

Experimental & Model Work Div. & advice free. Wm. Gardam & Son, 221 Fulton St., N.Y.

MODELS & EXPERIMENTAL WORK, Gears, Dies, Tools, Novelties manufactured. M. P. SCHELL, 1739 Union Street, San Francisco

A MACHINE SHOP E. D'AMOUR 80 Cortlandt Street New York Good Work—Fair Prices

THE INTERNAL WORK OF THE Wind. By S. P. LANGLEY. A painstaking discussion by the leading authority on Aerodynamics, of a subject of value to all interested in airships. SCIENTIFIC AMERICAN SUPPLEMENTS 946 and 947. Price 10 cents each, by mail. Munn & Co., Inc., 361 Broadway, New York City, and all newsdealers.

THE SCHWERDTLE STAMP CO. STEEL STAMPS, LETTERS & FIGURES BRIDGEPORT CONN

Magical Apparatus. Grand Book Catalogue. Over 700 engravings 25c. Parlor Tricks Catalogue, free. MARTINKA & CO., Mfrs., 438 Sixth Ave., New York

TELESCOPES W. & D. MOGEY, BAYONNE CITY, N. J.

Free Catalogue of Scientific and Technical Books Free We have just issued a new edition of our Catalogue of Scientific and Technical Books, which contains 144 pages, and a copy will be mailed free to any address on application.

MUNN & CO., Inc., Publishers of Scientific American 361 Broadway, New York

Government Homesteads

Over one and one half million acres of land open for settlement in Cheyenne River and Standing Rock Indian Reservations, October 4th to 23rd.

Registration at Pierre and Aberdeen, S. D.

Direct route to registration points is the Chicago & North Western Ry. Special low homeseekers' round trip rates.

This land is well watered by the Cannon Ball, Grand, Moreau and Cheyenne Rivers and their tributaries. The soil is a light loam, fertile and makes a good grain producing land. The land must be lived on and improved. A low valuation of from 50 cents to \$6.00 per acre has been placed on the land by the Government, arranged in easy annual payments covering a period of five years.



The C. & N. W. Ry. prints a descriptive pamphlet, telling how to secure a homestead of 160 acres from the Government. Free copies on application.

W. B. KNISKERN Passenger Traffic Mgr., C. & N. W. Ry., Chicago, Ill.

Table listing various scientific and technical items with their corresponding page numbers, such as Signaling system, electrical, F. M. Slough, 932,505; Silo, E. M. Wilson, 932,737; Slag handling apparatus, D. T. Croxton, 932,765; Sleigh or bob for riding, E. Polletier, 932,895; Smelting furnace, transforming, H. Heiberger, 932,986; Smoke preventer, time operated, B. L. Ames, 932,667; Snap, E. A. Benjamin, 932,673; Soldering iron, self heating, A. Husson, 932,865; Spade, W. L. Iwan, 932,866; Spectacle and pince-nez frame, H. P. Frost, 932,978; Speed gage, Munn & Brachvogel, 932,885; Speed power transmission, variable, L. G. Bayrer, 932,843; Spike puller, G. K. Reiley, 932,903; Spinning frame attachment, ring, A. A. Lovejoy, 932,482; Sprayer for animals, disinfectant, E. Goeke, 932,858; Spraying apparatus, portable, D. W. Wadsworth, 932,520; Spraying machine, W. D. Knapp, 933,039; Spring structure, vehicle, J. P. Murrey, 932,489; Stacker, L. M. Blackman, 932,751; Stairway, J. N. Coleman, 932,679; Stand. See Railway switch stand, 932,851; Statement delivery roll, R. W. Gallagher, 932,867; Stencil apparatus, O. James, 932,950; Still, water, H. J. Behrens, 932,950; Stirrup, F. J. Pflumer, 932,574; Stirrup, safety, J. C. McClure, 932,886; Stone composition, artificial, B. Hovermann, 932,706; Stop-motion mechanism, thread controlled, C. H. Whiteher (reissue), 13,018; Stove, E. R. Cahoon, 932,959; Strainer, liquid, M. Arruebarrena, 932,842; Stretcher support, J. Linxweiler, 932,479; Stump burner, W. W. Pope, 932,573; Stump puller, S. Chambers, 932,444; Sugar boiler, J. F. Martter, 932,923; Suit, combination, F. J. Pflumer, 932,540; Sunbonnet, N. H. Cudeback, 932,968; Switch hook controlling device, M. M. Kahn, 932,557; Synchronizer, automatic, H. Marshall, 932,877; Table, A. J. Iwan, 932,552; Tabulator, E. B. Cram, 932,763; Tank, C. H. Zwermann, 932,530; Telephone and telegraph transmitting apparatus, H. Shoemaker, 932,821; Telephone antiseptic mouthpiece, J. M. Haf, 932,545; Telephone system, E. R. Broxton, 933,18; Temperature regulating system, Knight & Lum, 932,711; Tent, H. J. Saunders, 932,909; Therapeutic instrument, electric, C. W. Gaston, 932,775; Thread cutter, J. W. Klemm, 932,788; Threshing machine, T. S. Haynes, 933,035; Tie loader, E. Platter, 932,571; Tin oxid used for enameling metal ware, substitute for, R. Weimer, 932,839; Tire casing, pneumatic, J. H. Seiberling, 932,815; Tires, detachable rim for pneumatic or other, M. A. Lemercier, 932,876; Toaster, O. Schellert, 932,584; Tobacco cartridge and stem, combined, B. Ziegler, 932,937; Toilet seat, infants, M. Stein, 932,476; Tool centering device, C. E. Kennedy, 932,476; Tool, combination, R. C. Johnson, 932,710; Toy, A. Gregory, 932,982; Toy, figure, Beal & Gray, 932,428; Toy, figure, C. H. Clark, 932,962; Toy, oscillating, J. E. L. Larson, 932,988; Track raising machine, L. Tanner, 932,829; Traction wheel, W. L. Martin, 932,798; Train orders and messages, device for handling, S. Kipp, 932,873; Train stopping system, J. F. Webb, Jr., 932,923; Train stopping systems, closed circuit wiring for automatic, J. F. Webb, Jr., 932,925; Transmitting apparatus, H. Shoemaker, 932,820; Traveler magazine, waste proof, J. R. Grubb, 932,983; Treadle governor, J. A. Robison, 932,850; Trestle, folding, S. R. Harris, 932,702; Trolley, Storer & Varney, 932,511; Trolley, Davis & Varney, 932,558; Trolley, Jackson & Aalborg, 932,554; Trolley, T. Varney, 932,651, 932,653, 932,654; Trolley for electric vehicles, Varney & Storer, 932,519; Trolley for electric vehicles, T. Varney, 932,655; Trolley for electric vehicles, T. Varney, 932,655; Trolley guard, F. V. Polakoskey, 932,998; Trolley pole base, C. C. Hale, 932,984; Trolley replacer, Austin & Cooper, 932,426; Trolling hook, Krantz & Smith, 932,477; Trombone, F. Holton, 932,704; Turbine, enforced flow elastic fluid, W. L. R. Emmett, 932,849; Turbine, reversible steam, W. M. Esterling, 933,028; Turbo generator, direct current, A. H. Wouters, 932,661; Turn table, folding, A. Reitz, 932,495; Twine machine, grass, T. W. Jerrens, 932,708; Type casting machine, pot feeder for, L. A. Sengele, 932,817; Type writer, adding, J. G. Kingsburg, 932,786; Type writing machine, C. H. Shepard, 932,644; Type writing machine, C. B. Yaw, 932,664; Underreamer, J. W. Brackney, 932,533; Valve, E. A. Reeves, 932,494; Valve, J. H. McDaniel, 932,887; Valve, automatic drain and check, F. M. Barton, 932,427; Valve, combined throttle and trip, H. O. Weldon, 932,525; Valve, hydraulic, J. L. & W. P. Brunton, 932,955; Valve, pressure regulating, J. I. Cappon, 932,960; Valve, radiator, F. A. Simons, 932,589; Vehicle, road, J. Hopper, 932,551; Vehicle wheel, W. L. Howard, 932,862; Vending machine coin operated mechanism, A. E. Griffith, 932,698; Ventilator, See Window ventilator, 932,490; Ventilator, E. C. Noe, 932,659; Ventilator, H. S. Welker, 932,733; Vessel hulls, construction of, C. Weyher, 932,844; Violin shoulder rest, G. Beisheim, 932,750; Voting machine, C. A. Benke, 932,915; Voting machine, S. R. Shoup, 932,683; Washbench, G. L. Darrow, 932,949; Washing device, H. J. Behrens, 932,617; Washing machine, A. L. Koenke, 932,759; Washing machine, W. D. Combs, 932,534; Washing machine operating mechanism, H. G. Braunlich, 932,822 to 932,824; Water closet, sanitary, S. Smith, 932,824; Water elevator, E. J. Meyer, 932,628; Water meter, W. H. Sitts, 932,502; Welding machine, electric, A. E. Buchenberg, 932,441; Wells, heaving plug for, D. Daniels, 932,766; Whiffletree, spring, F. R. Wilson, 932,932; Windmills, wind wheel for, H. M. Wallace, 932,621; Window covering, Mealand & Capps, 932,627; Window self closing device, E. M. Stephens, 932,509; Window ventilator, Hintz & Althouse, 932,861; Wire handling tool, M. Totten, 932,650; Wire screen for windows and the like, Welch & Mumford, 932,731; Wire stretcher, F. Stanlake, 932,525; Work support, E. I. La Chapelle, 932,790; Wrench, A. Serfozo, 932,818; Wrench, A. R. Bell, 932,951; Yoke and pole strap connection, neck, C. B. Schleicher, 933,001



The Multiplication of Power

There is no higher efficiency in the world than that of the American business man. The multiplication of power in a business man—if he has the ability within him—depends upon the increased number of people whom he can, by personal contact, interest in his purposes.

Has the vast development of industries since 1890—the greatest period of advance in the world's history—when America has advanced faster than all the rest of the world, been the force that has built up this great, unified, efficient telephone service; or

He does this by telephone, and the multiplication of the telephone's usefulness depends on the increased number of persons whom he can reach.

Has the increased ability of the American business man to bring people to him from every locality, far and near, over the Bell Telephone System, been the cause of the multiplication of his power and his principality?

In 1890 the Bell System had 200,000 subscribers' telephones in use. As late as 1899—ten years ago—it had only 500,000.

Whichever the cause and whichever the effect, the advancement of one is inseparably linked with the advancement of the other.

To-day it has 4,400,000—one for every twenty persons in this country—and is increasing at the rate of 500,000 a year.

The business man's Bell Telephone, with its long distance and emergency advantages, is his most precious asset next to his capital itself.

The Bell Long Distance Telephone means as much to the home as it does to the office. It is the most marvelous convenience of modern times—if not all time—added to home life.

The American Telephone and Telegraph Company And Associated Companies

Every Bell Telephone Is a Long Distance Station

Solders and Soldering

If you want a complete text book on Solders and the art of Soldering, giving practical, working recipes and formulæ which can be used by the metallurgist, the goldsmith, the silversmith, the jeweler, and the metal-worker in general, read the following SCIENTIFIC AMERICAN SUPPLEMENTS:—

1112, 1384, 1481, 1622, 1610, 1434, 1533 Price 70 Cents by mail

Order from your newsdealer or from MUNN & CO., Inc., 361 Broadway, New York



Scientific American Hudson-Fulton Celebration Number

September 25th, 1909

THIS valuable issue will be filled with a collection of interesting illustrations of unique interest in connection with the important events. It will contain a history of inland river transportation, with engravings from authentic sources. The articles have been written by experts in a readable, understandable way. Order at once from your newsdealer, if you are not a regular subscriber. Price 10 cents. For sale at all news stands.

MUNN & CO., Inc., Publishers Scientific American Office, 361 Broadway, New York City