# Scientific American.

## Business and Personal.

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"U. S." metal polish. Indianapolis. Samples free. Cheap 2d-hand lathes & planers. S. M. York, Clev'd, O. For Sale-Valuable patent. A. M., box 109, Buffalo, N.Y Universal and Centrifugal Grinding Machines.

Pedrick & Ayer, Philadelphia, Pa. Best Handle Machinery. Trevor Mfg. Co., Lockport,

Fine manufacturing plant to let, sell, or invest in

promising business. Box 792, Ashtabula, O. Wanted-Catalogue and price list of Shell Button

Machinery. C. C. Reynolds, Prescott, Arizona. The Improved Hydraulic Jacks, Punches, and Tube

Expanders. R. Dudgeon, 24 Columbia St., New York. Stow-flexible shaft. Invented and manufactured by Stow Mfg. Co., Binghamton, N. Y. See adv., page 46. Screwmachines, milling machines, and drill presses

The Garvin Mach. Co., Laight and Ca al Sts., New York. Centrifugal Pumps for paper and pulp mills. Irrigating and sand pumping plants. Irvin Van Wie, Syracus

Portable engines and boilers. Yacht engines and boilers. B. W. Payne & Sons, Elmira, N. Y., and 41 Dey Street, New York. Guild & Garrison, Brooklyn, N. Y., manufacture steam

pumps, vacuum pumps, vacuum apparatus, air pumps acid blowers, filter press pumps, etc. Split Pulleys at Low prices, and of same strength and

nce as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa. Machinist and engineer desiring a change will con

sider proposals for taking charge of steamplant. Salary \$3.00 per day. "L. I. B.," Franklin, Delaware Co., N. Y. Perforated Metals of all kinds and for all purposes

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Hydrocarbon Burner (Meyer's patent) for burning

crude petroleum under low pressure. See adv. page 381. Standard Oil Fuel Burner Co., Fort Plain, N. Y. The best book for electricians and beginners in elec-

tricity is "Experimental Science." by Geo. M. Hopkins By mail, \$4; Munn & Co., publishers, 361 Broadway, N. Y. Kennedy Valve Mfg. Co., manuf'rs of brass, iron gate

valves, patent indicator valves, fire hydrants, globe, an gle, check, radiator, and safety valves, 52 Cliff St., N. Y.

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## HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our

information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

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

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

Books referred to promptly supplied on receipt of

Minerals sent for examination should be distinctly marked or labeled.

(4645) F. D. B. asks: How many elements are known to chemists at the present day? What light years of a few of the stars that have had their recognized by chemists at the present time. Lithium, potassium and sodium are lighter than water. Distance in light years:

a Aurigæ (Capella)...... 10 to 70 a Canis Major (Sirius)..... 11 to 16 a Lyræ (Vega)...... 12 to 32

A light year is 63,000 times the distance of the earth from the sun. The double numbers refer to the work of different astronomers.

(4646) G. C. M. asks: What size wire shall I use to convey a current of electricity, E. M. F. 9 to 12 volts, 1 to 1.50 amperes, a distance of 25 to 30 feet? A. No. 20 Am. W. G. will carry the current

(4647) H. & T. ask: Is there a pneumatic tube between Paris and Berlin, and if so, for what purpose is it used, and with what speed does the car travel? A. There are pneumatic tubes in Paris for

two cities. The speed is about 20 miles per hour. Size of tube 21/4 inches

(4648) J. O. and others ask how to ink typewriter ribbons. A. Take vaseline (petrolatum) of high boiling point, melt it on a water bath or slow fire, and incorporate by constant stirring as much lamp black or powdered drop black as it will take up without becoming granular. If the fat remains in excess, the print is liable to have a greasy outline; if the color is in excess, the print will not be clear. Remove the mixture from the fire, and while it is cooling mix equal parts of petroleum, benzine and rectified oil of turpentine, in which dissolve the fatty ink, introduced in small portions by constant agitation. The volatile solvents should be in such quantity that the fluid ink is of the consistence of fresh oil paint. Onc secret of success lies in the proper application of the ink to the ribbon. Wind the ribbon on a piece of cardboard, spread on a table several layers of newspaper, then unwind the ribbon in such lengths as may be most convenient, and lay it flat on the paper. Apply the ink, after agitation, by means of a soft brush, and rub it well into the interstices of the ribbon with a tooth brush. Hardly any ink should remain visible on the surface For colored inks use Prussian blue, red lead, etc., and especially the aniline colors.

Aniline black... ..... 3/2 02. Concentrated glycerine......15 "

Dissolve the aniline black in the alcohol and add the glycerine. Ink as before. From the "Scientific American Cyclopedia of Receipts, Notes and Queries."

(4649) J. P. B. asks: How narrow a belt will a four horse power engine run and develop all the power there is in the engine (steam or gasoline), also what number horse power steam orgasolineengine would be equal to three good (true pulling) horses in a sweep or lever power? A. The power transmitted by a belt depends upon its speed as well as width. A 2 inch belt running 1,700 feet per minute will transmit 4 horse power. A 3 inch belt for the same power should ruu 1,100 feet per minute. As the actual horse power of steam and other engines, or prime movers, is based on the actual mean pulling power of fairly strong horses, 3 horse power actual of a steam or gas engine should be equal to the pull of 3 good horses. The nominal horse power of a steam engine is only a partial indication of its actual or indicated horse power, which depends upon the steam pressure and point of cut-off. In a gas engine the nominal horse ower is not far from the indicated horse power, as the explosive pressures in a gas engine do not vary as much as the steam pressures in the steam engine.

(4650) M. S. K. writes: A friend says tbat a man weighs more at the equator than at the north pole, owing to the increase of gravity as the equator is approac ed. I say that the weight would be less at the equator, owing to the centrifugal force of the earth. Please let us know which is correct and what the variation per pound would be. A. Your friend isjon the wrong side and you are correct.

(4651) E. V. wishes to know the life and how many sbots can be fired from the 124 ton gun to be exhibited by Krupp at the World's Fair. What is the cause of disablement of so large a gun as the above after a number of rounds? A. The number of shots that a 124 ton gun can bear is very uncertain, depending upon the size of the bore and the powder charge. About 95 shots is all a 110 ton gun can usually

(4652) O. D. R. asks: What is the difference in the power necessary to perform a certain amount of work with the usual piston, link and crank and with the power applied tangentially to a crank of the same radius? In what ratio does the resistance of air increase with compression? A. The crank value of the piston mean pressure is 621/2 percent of the tangen force of the crank vin periphery. Volumes ×15-15 is the approximate equation for compressing air (isothermally) for pressure. Thus 3 cubic feet compressed to 1 cubic foot is 3×15-15=30 pounds pressure. When air is suddenly compressed the heat generated by compression expands the air, and if confined reaches a higher pressure, which on cooling returns to the preseure as above stated. Complete tables of pressures, volumes and temperature, with the theory, may be found in Scientific American Sppulement, No. 279 10 cents mailed.

(4653) C. A. G. writes: In a letter of the 13th century it is related that some Greenland fishermen on the 25th of July, 1266, were in a place where the sun was shining both nights and days, and was as high at midnight, as it used to be when seen northwest of their home," the home being situated at 63° 10' N. lat., and the time for the observation there the summer solstice. Is it possible to calculate the latitude of the unknown place, where they were on the above said day? A. The sun in the northwest at 63° of latitude at metals are lighter than water? Give the distance in the summer solstice was probably 5° or 6° above the horizon. A midnight sun of that elevation on July 25 parallax measured. A. There are about 70 elements would require the fishing party to be in latitude 78° or 79°. No exact computation can be made from the statement given.

> (4654) G. H. asks: Which is the largest and best shinyard where a man can get a job as carpenter, and what are the average wages for carpenters? A. The largest and most active shippards are at Newport News, Va., Philadelphia, Chester, Pa., Wilmington, Del., and Bath, Maine. Ship carpenters' wages, \$3 to \$3.50 for first class workmen.

(4655) X. Y. asks: Is there an acid or spirit that by placing on ordinary glassware will soften it so I can bore holes in it with a common awl? Please give some directions for use. A. No substance will soften glass. Heat is the only means of softening. You can drill a hole with a diamond or with emery in a small tube by revolving the tube.

(4656) P. G. asks: How fast can a man of ordinary strength row a sixteen foot boat containing one person besides himself? Also how large ought the propeller of a sixteen foot boat be, and how many carrying letters, also in Berlin; but none between the | revolutions must it make to drive the boat five miles ar

hour? A. One man can row a light shell boat from 5 to 51/2 miles per hour. It will require a 12 inch diameter wheel, 2 feet pitch, 250 revolutions per minute to make 5 miles per hour.

(4657) Subscriber in Sweden asks: What is it to vulcanize railway sleepers, what way is it done, and what preparation is used for the purpose ? A. The ties or other lumber are placed in strong cylinders of steel 6 feet diameter by about 50 feet in length, the cylinders being lined with coils of steam pipe. The cylinders are then closed tight and air pumped in until a pressure of about 150 pounds persquare inch is obtained, when steam is turned into the coils at 200 pounds pressure per square inch and the heat due to this pressure kept up for from 4 to 5 hours, when the steam is turned off, air pressure discharged and the ties or lumber withdraw . By the continued high heat under a pressure to prevent the sap boiling out of the wood the sap is thoroughly coagulated and the lumber dried. By this treatment lumber for interior work and furniture, and many kinds of wood heretofore rejected on account of liability to warp have become valuable for furriture and in decorative art work. The life of railway ties is largely lengthened by this process

(4658) C. S. K. asks if the tension in a clock spring increases by winding the same amount as a spring in spring scales by pulling. A. The action of a spring in a clock increases its tension in winding the same as the spring in a balance by pulling, only the clock spring has so much longer range, with only a part of it in use, that the difference is not felt in winding.

(4659) E. B.—Zinc has the greatest degree of expansion and contraction by changes in temperature of the common metals. Mercury expands and contracts more than any metal and is therefore generally used in thermometers.

(4660) S. H. W.—Malleable iron can be nickel plated.

#### TO INVENTORS

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequaled facilities for procuring patents everywhere synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at homeor abroad, are invited to write to this office for prices which are low, in accordance with the times and our extensive facilities for conducting the business. MUNN & CO., office Scientific American, 361 Broad-

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January 17, 1893,

# AND EACH BEARING THAT DATE.

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

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? • •	Buckle and snap hook combined, Stone & Smith. Bung, T. Marple. Buttonhole Binishing machine, F. D. Benedict. amera, Laighton & Hitchcock. amera sbutter, E. J. Molera. Can. See ice cream can. Can body forming machine, A. W. Livingston. Can filling machine, J. S. Moore. Can myping machine, C. A. Burt. Car and train railway, F. U. Adams. Car brake, A. Miller. Car coupling, I. M. Bunch. Car coupling, J. M. Bunch. Car coupling, J. M. Bunch. Car coupling, J. G. Garlick. Car coupling, J. Feard. Car coupling, J. Simpson. Car coupling, J. Simpson. Car coupling, J. Sterns. Car platform, A. C. McCord. Car, railway, F. U. Adams. Cars, air supply device for railway, F. U. Adams. Cars in trains, ventilating apparatus for railway, F. U. Adams. Carriage folding seat, H. A. Moyer. Carriage folding seat, H. A. Moyer. Cash and parcel carrier apparatus. W. H. Albach.	490,047 490,13 490,062 490,117 490,063 490,106 489,911 489,911 489,917 489,917 489,917 489,918 489,918 489,918 489,918 489,918 489,918 489,918 489,918 489,918 489,918 489,918 489,918 489,918
? • •	Buckle and snap hook combined, Stone & Smith. Bung, T. Marple. Buttonhole finishing machine, F. D. Benedict. amera, Laighton & Hitchcock. amera sbutter, E. J. Molera Can. See ice cream can. Can body forming machine, A. W. Livingston. Can illing machine, J. S. Moore. Can miping machine, C. A. Burt. Car and train railway, F. U. Adams. Car brake, A. Miller, F. U. Adams. Car coupling, J. M. Bunch. Car coupling, E. C. Garlick. Car coupling, E. C. Garlick. Car coupling, T. Heard. Car coupling, J. Feard. Car coupling, J. Simpson. Car coupling, J. Simpson. Car coupling, J. Sterns. Car coupling, S. G. Wilber. Car laid form, A. C. McCord. Car, ail way, F. U. Adams. Cars in trains, ventilating apparatus for railway, F. U. Adams. Carriage folding seat, H. A. Moyer. Carriage folding seat, H. A. Moyer. Castler, furniture, J. Elwood. Castler, furniture, J. Elwood.	490,13 490,13 490,103 490,003 481,920 491,103 483,931 483,931 483,931 483,931 483,931 483,932 483,933
	Buckle and snap hook combined, Stone & Smith. Bung, T. Marple. Buttonhole Binishing machine, F. D. Benedict. amera, Laighton & Hitchcock. amera sbutter, E. J. Molera. Can. See ice cream can. Can body forming machine, A. W. Livingston. Can filling machine, J. S. Moore. Can myping machine, C. A. Burt. Car and train railway, F. U. Adams. Car brake, A. Miller. Car coupling, I. M. Bunch. Car coupling, J. M. Bunch. Car coupling, J. M. Bunch. Car coupling, J. G. Garlick. Car coupling, J. Feard. Car coupling, J. Simpson. Car coupling, J. Simpson. Car coupling, J. Sterns. Car platform, A. C. McCord. Car, railway, F. U. Adams. Cars, air supply device for railway, F. U. Adams. Cars in trains, ventilating apparatus for railway, F. U. Adams. Carriage folding seat, H. A. Moyer. Carriage folding seat, H. A. Moyer. Cash and parcel carrier apparatus. W. H. Albach.	490,13 490,13 490,103 490,003 481,920 491,103 483,931 483,931 483,931 483,931 483,931 483,932 483,933

ceiling, metallic, L. J. Cherest. 490,186 chair fan attachment, P. A. Tornwall 40,224 check or token and missive, combined, J. P. Stout. 490,043 chuck, Screw machine, C. M. Conradson 489,303 churn and butter worker, combined, R. B. Disbrow. 490,106 chute, coal, I Burnett. 489,926 champ. See Screw clamp. clamping device, ball and socket joint, E. M. Low. 490,150 chttes banger, T. M. Garrison 490,166 chttes banger, T. M. Garrison 490,166 chttes banger, T. M. Garrison 490,167 chttes branger, T. M. Garrison 490,167 corn mutator brush C. O. C. Billberg 490,167 commutator brush nd holder, J. F. McLaughlin, 490,167 compressor, D. Neale. 489,369 copying, device for facilitating, J. Hill. 489,363, 489,364 corn popping apparatus, W. B. Douathen 489,369 cotton picker, Call & Clough. 489,364 coupling, See Car coupling, Whiffietree coupling, crank power, P. Bright. 490,184 crusher. See Rock crusher.	
Check or token and missive, combined, J. P. Stout	
Chuek, screw machine, C. M. Conradson	
Chute, coal, I. Burnett	
Lów 490,150 Lów 490,150 Low See Tug clip. Lothes banker. T. M. Garrison 490,145	
Intel., friction. J. Walrath	
Commutator breafs, C. O. C. Billberg	
Copying book, J. P. Julia. Copying, device for facilitating, J. J. Hill. 489,953, 489,954 Corn popping apparatus, W. B. Domathen	
Cotton picker, Call & Clough	
Zrank power, P. Bright       490,134         Zrusher.       See Rock crusher.         Zultivator, T. Lull       490,151	
Out-out, electric, W. B. Potter 489,883 Cutter. See Egg cutter. Twine cutter.	
Desk receptacle, E. P. Carolan et al. 490,225 Dial, sun, C. E. Chamberland 490,185 Disks, mechanism for controlling the action of	
Door closing device, H. C. Montgomery 490,032 Door lock, sliding, F. Hubbell 490,251	
Draught equalizer, P. V. Schandoney. 490,274 Drier and carbonizer, M. J. Spencer. 490,171	
Dyeing apparatus, A. Hinze	
Electric battery, J. H. Davis 483,958 Electric circuit breaker, E. Thomson 490,173 Electric heater J. F. McLaughlin 490,689	
Electric heater, T. E. Morford	
Embroidering machine fabric holding frame, J. Graf. 490,111 Engine. See Blowing opgine. Gas or similar mo-	
Corri popping apparatus. W. B. Donathen	
Feed box, G. J. Schlosser. 490,045 Fence, J. F. Ogletree. 490,162 Fence post, W. H. Ringle. 489,986	
Fence tension device, wire, P. Hack	
File cabinet, letter, B. Brower. 490,099 File, paper, G. W. Mills. 490,155 Fire escape, L. Anid jab. 499,915	
Fire escape, D. J. Arnold	
Flood gate, self-hoisting, H. A. Corliss	
chet	
Furnace, W. & J. C. Swindell	
Gas         and         air         mixing         apparatus         Smethurst         &           Wade         490,087         490,187           Gas         meter frame         H. Logne         490,149	
Gas or similar motor engine, H. Williams	
Glo sawfender, H. S. Taylor. 490,049 Glove or dress fastener, D. R. Reynolds. 490,049 Gold, silver, and copper from ores, obtaining, A. French. 490,193	
French. Governor for me chanical motors, J. E. Hart	
Unis, fixed magazine for breech-loading bolt, P. Mauser	
Harrow and roller, F. B. Harvey. 400,150  Harrow or cultive or facility F. Krabach 49,000  49,000	
Harrow, spring tooth, H. W. Eisenhart. 69,286 Harrow, wheeled, F. Anderson. 40,132 Harvester brake C. Grattan. 401,197	
Hat tray, H. Likly 489,688 Hay loader and carrier, combined, D. McCarthy. 499,588 Hay press attachment Graham & Knann	
Head rest, S. C. G. Watkins. 430,060 Heater. See Electric heater. Wat r heater. Hedge trimmer. J. L. Jackson. 490,074	
Hook. See Whiffletree hook.  Horseshoe, E. Bouchard	
Hot air furnsce, E. R. Stasch	
Hub, vehicle, A. P. Taylor.       490,398         Ice cream can, G. A. Thurston       498,938         Inhaler, R. E. Woodward       490,008	
Iron, manufacturing sheet, W. D. Wood. 491,236 IroningImachine, A. R. Gustafson. 490,113 Jack. See Lifting jack. Wagon jack.	
Keyboard, transposing, B. French. 490,194 Kitchen cabinet, I. S. Hartsock. 488,951 Kneading machine, W. Woolcott. 498,182	
Label holder, J. Ready	
Lantern, Veazie & Bevalt Lantern weather guard attachment, J. P. Warner 490,003 Latch, gate, B. Bernstein. 489,918	
Lifting Jack, A. P. Aiken. 490,221 Lock, See Alarm lock, Door lock, Locking device conveying HA Britan. (20 nm.	
Locomotive and tender housing, F. U. Adams 490,057 Loom, H. Wyman 490,238, 490,238	
Clark 490,287 Loom shedding mechanism, C. Falvey 490,287 Loom shuttle, J. W. Deen 486 618	
Gate, J. H. Dickenson. 490,016 Gin sawfiender, H. S. Taylor. 490,049 Glove or dress fastener, D. R. Reynoids. 490,049 Gold, silver, and copper from ores, obtaining, A. French. 490,148 Governor for mechanical motors, J. E. Hart. 490,249 Gun, breech-loading breakdown, H. Greener. 489,947 Guns, auxiliary valve for pneumatic, J. Repleff. 490,249 Guns, auxiliary valve for pneumatic, J. Repleff. 490,249 Hammock attachment. F. J. Herrick. 490,249 Harrow R. E. Whipple. 490,139 Harrow and roller, F. B. Harvey. 490,139 Harrow and roller, F. B. Harvey. 490,139 Harrow, spring tooth, H. W. Elsenhart. 490,239 Harrow, spring tooth, H. W. Elsenhart. 490,239 Harrow, wheeled, F. Anderson. 490,131 Havester brake, C. Grattan. 490,137 Hay press attachment, Graham & Knapp. 490,172 Head rest, S. C. G. Watkins. 490,194 Hay press attachment, Graham & Knapp. 490,172 Head rest, S. C. G. Watkins. 490,000 Hook, See Whiffletree hook. 490,000 Hook, See Whiffletree hook. 490,000 Hoose, E. Bouchard. 490,000 House or tent, portable, A. C. Lauber. 490,000 House or tent, portable, A. C. Lauber. 490,000 Hub attaching device, C. F. Carlson. 490,000 Hub, vehicle, A. P. Taylor. 490,000 Hub, vehicle, A. P. Taylor	
Lubricator, Glover & Jean. 491,247 Mail bag, H. Stephens. 490,232 Mail bag or pouch, J. W. C. Springstun. 491 172	
Map stand, C. E. Linabury. \$80,223 Meat pounder, J. A. Carlson. \$81,228 Metal, machine for cutting scrap, E. H. Wheeler. 490,064	
Meter. See Electric meter.  Milk or butter cooling device, J. L. Wilder	
Boulter 489,923 Mil. See Coffee mill. Mould. See Brick mould.	
MOUGH, T. A. STARK. 490,173 Mower or reaper cutting mechanism, L. King. 490,173 Musical instrument reed tube, H. Janes. 490,116 Musical instrument.	
Muli. See Conee min. Mould. See Brick mould. Motor, T. A. Stark. Mower or reaper cutting mechanism, L. King. 490,123 Mower or reaper cutting mechanism, L. King. 490,024 Musical instrument reed tube, H. Janes. 490,115 Musical linstruments, combined bridge and tail- piece for, Owen & Eggert, Jr. 490,218 Necktie fastener, J. A. Cupler. 490,138 Nitro-cellulose or celluloid surfaces, producing, B. B. Goldsmith. 490,185	
B. B. Goldsmith	
Ore separator, centrifugal, O. B. Peck. 490,040, 490,084 Packing, R. G. Ferguson. 490,107 Packing and 190,067	
Nitro-cellulose of celluloid surfaces, producing, \$9,156 Nozzle, variable exhaust, H. R. Walker. \$9,106 Nozzle, variable exhaust, H. R. Walker. \$9,007 Oe separator, centringal, O. B. Peck. \$49,040, \$9,070 Oe separator, centringal, O. B. Peck. \$49,040, \$9,070 Packing, R. G. Ferguson. \$9,050, \$49,050 Packing, metallic, T. Tripp. \$49,050, \$49,050 Pan. See Basking pan. Dust pan. \$9,050, \$49,050 Paper box, T. F. W. Schmidt. \$49,167 Paper box, T. F. W. Schmidt. \$49,167 Paper box, folding, C. A. Spittell. \$49,938 Paper feeding machine, R. Burnet. \$48,957 Parafine swax and apparatus therefor, treating or puritying, N. Henderson. \$49,193 Pattern for draughting garments, adjustable, H. \$49,022	
Paper box, folding, C. A. Spittell. 489,938 Paper feeding machine, R. Burnet. 489,936 Paper title, P. Carvey. 489,936	
Parafine Iwax and apparatus therefor, treating or purifying, N. M. Henderson	
Horn 490,022 Pea sheller, Clark & Russell 489,022 Pear cleum refining suparatus, H. Frasch 490,144	
Pea sheller, Clark & Russell         489,229           Petroleum refning apparatus, H. Frasch         491,229           Photograph bolder, G. F. Bambridge         480,059           Photog aph machine, coln-operated, P. V. W.         490,180           Weish         490,180	
Piles preparatory to rolling, machine for reduc-	
G. W. Harrington	
Plow, gang, McMillan & Gormley 490,210 Pneumatic dispatch or transit system, H. Clay, 480,331, 489,932	1
Pocketbook frame, L. Messer 489,521 489,922 Pocketbook frame, L. Messer 489,521 480,922 Portable gate. J Losey 480,077 Post. See Fence post. 900,077 Power. See Crank power.	,
Power. See Crank power. Preserving foods, apparatus for, A Baker 489,916	j