the ground wire. They pass through one hole in the window frame and are insulated with two layers of cotton each. Whenever there is a lightning flash two or three miles away, perpendicular to the line, there is a flash between the wires where they pass through the window frame, as often and as ouick as the lightning flash follows. The sound is usually heard a tittle later. I think the waves strike the wire and when they get near the ground wire they jump to that and pass down into ground. We have little or no induction in our line and that is due to the fact, I suppose, that the two ends of the line are not more than one-quarter mile apart, although the whole line is about one mile long.

(7948) T. W. B., Jr., asks: Will vou please give me directions for making a frictional electric machine which will give about 12 inch spark? A. We do not think you can get a spark 12 inches long from a friction machine. We never saw one that would give such a spark. A static machine will give a spark of that length. It may be either of the Wimshurst, or of the Toepler-Holtz form. In SUPPLEMENT Nos. 278, 279. 282, 548, 647, 914, price 10 cents each, are articles describing various machines of this sort. From these you can make your plans. We have no description of a machine giving a spark of 12 inches in length.

(7949) H. P. asks: How should soda ash be inserted and in what quantities to remove scale in two 90 horse power horizontal tubular steam boilers? A. Soda ash for boiler incrustation may be pumped in with the feed water about 1/4 pound per horse power of the boiler, and left in for a day when the boiler should be blown out and cleaned out. A smaller quantity may be used if applied every week for two or three weeks and the boiler then cleaned out.

(7950) J. G. R. asks: 1. How many pounds of No.30 cotton covered wire would I need to make an induction coil 18 inches long, 9 inches diameter 2.inch core, allowing about one-sixteenth of an inch between layers for insulation? A. We could calculate the weight of wire required for the coil as specified, but it would be time poorly spent, as it would be to make a coil on these lines. No one should use wire courser than No. 36 for a coil of this size. Nor should it be wound in layers, but in sections, with much less than one-sixteenth of an inch of insulation between the layers in the sections. 2. How many square feet of tin foil would it need for a condenser? A. We cannot tell. 3. If properly made what size spark ought it give? A. It might give 6 to 8 inches, but would soon perforate the insulation, and break down. You would far betterget SCIENTIFIC AMERICAN SUPPLEMENT, No. 1124, price ten cents, and make a six-inch coil properly designed. It will give more satisfaction.

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INDEX OF INVENTIONS

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

AUGUST 21, 1900,

AND EACH BEARING THAT DATE

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

Acid and making same, propionyl-salicylic, O. Bonhoeffer	
Bouhoeffer	656,435
Acid and making same, tetraoxyanturaquinone,	020 100
disulfonic, H. Laubmann	656,463
Air brake, F. L. Clark	000.210
Air broke plann low traceure A H Darcone	656.261
Air brake alarm, low pressure, A. H. Parsous Alarm. See Air brake alarm. Burglar alarm.	000,201
Low water alarm. Alkaline earth silicid. C. B. Jacobs	0.000
Alkaime earth silicid, C. B. Jacobs,	666,366
Ammunition box, 11. W. Daly	696,320
Animal trap, C. D. Truppile	TRACTICAL.
Acongramus ata baldar for W Voral	656 (09
Automobile vehicle W W Valentine	656 191
Amnin #fixture H & Candon	656 343
Axle, H. B. Beebe	656 240
Axle box lid, car, C. E. Moore	656 607
Axle boxing, vehicle, G. H. Leathers	656,554
Bag. See Paper bag.	a=a 0.10
Bag machine, H. Bilgram	656,340
ag. see raper bag. ang machine, H. Bilgram Baling press, P. C. Southwick Band cutter and feeder, Erickson & Eamond-	656,429
sonson	UZU 117
Soll	656.447
Rearing shaft & I Warburton	656 310
Red bottom sectional I P Leggett	656 411
Red sofn F Rennett	656 161
son Basin stopper, W. Holmes Bearing, shaft. F. J. Warburton. Bed sottom, sectional. J. P. Leggett. Bed. sofa, F. Bennett Bedstead fastener, H. H. Hirsch. Beebiye. H. Johnson	656 456
Beebive, H. Johansen	656.251
Beer, etc., device for drawing steam, J. O'Con-	000001
	656,418
Bicycle, F. Weber.	656,311
nou- Bicycle, F. Weber. Bicycle, electric A. Hausel Bicycle handle bar heads, making, J. P. Schow- walter et al. Bicycle locking device, Wessnick & Gutowski.	656,323
Bicycle handle bar heads, making, J. P. Schow-	
walter et al	656.482
Bicycle locking device, Wessnick & Gutowski,	656,334
Bicycle saddle, W. M. Starr	656,588
Bicycle seat post clamp. J. B. L. McKenzie	656,567
Binder. loose sheet, T. Noble	606,068
Binder, temporary, W. P. Northcott656,367,	656.368
Bit, A. Castro	1001,244
Bicycle locking device. Wessnick & Gutowski. Bicycle saddle, W. M. Starr. Bicycle seat post clamp. J. B. L. McKenzie. Binder, temborary, W. P. Northcott	6,06,541
Rular D kitzglbbang	07 P 5 00
Ruler water purifier storm L' Dro	0066,060
Bolting will, II. Dietz	656 9 16
Book, check or dividend warrant and bank trans- actions. T. McCulloch.	000,540
actions T. McCulloch	656 225
Boot or shoe tinishing tool A. Herman	656 200
Bottle, non-refillable, E. Cindel	656 288
Bottle, non-refillable, C. B. Overbaugh	656 259
Boot or shoe finishing tool, A. Herman. Bottle, non-refillable. E. Cindel. Bottle non-refillable, C. B. Overbaugh. Bottle stopper fastening. A. Share. Bottle wijngtool. B. E. Concident.	656.587
Bottle wiring tool, P. F. Cassidy	656.514
Bottles, method of and means for wiring, P. F.	0,0,011
Cassidy	656,513
Bottle wiring tool, P. F. Cassidy. Bottles, method of and means for wiring, P. F. Cassidy. Box. See Ammunition box. Folding box. Match box.	
Box filling machine, E. T. Pollard	656 400
Bracket. See Lamp supporting bracket.	000.400
Drake. See Lamp Supporting bracket.	
Brake. See Air brake. Hydraulic brake. Rail-	
Brake. See Air brake. Hydraulic brake. Railway brake. Vehicle brake. Wagon brake. Brake, II. II. Abernathy.	656 574



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DEAL	WITH U	S ONCE AN	GET AND VD YOU	THE BE	VE
	≀out,	WALE 0G Nº 4.)	DRON	1 & C	0.

Brake, Seymour & Kahler	379 508 445 TUS
Bricks, or artificial stone, automatic machine for manufacturing, Van den Berg & Janssen. 656. Bridle blind brace, I. II. Ellsworth 656. Brush holder ring, H. G. Reist. 654. Brush, rotary, W. H. Robinson. 656. Bucket safety bail, well. H. N. Crawford. 656. Buggy top attachment, P. G. Austin. 656. Burgs and tap, G. W. Jackson. 656. Burglar alarm and door check, W. H. Reiff. 656. Burglar alarm, electric, P. V. Vandevelde. 656. Burner. See Garbage burner. Gas burner. Button, C. M. Horton. 656.	808 397 421
Brusti, rotary, W. H. Robinson	173 154 450 586 Electri
Burglar alarm and door check, W. H. Keiff	100111 407 WEDLETIER C
Button, S. M. Merrill. 656, Button, F. Oldfield. 656, Button, C. Radeliffe. 656, Button, C. Radeliffe. 656,	412 419 214 508 forn tric exer
Burglar alarm, electric, P. V. Vandevelde. 50h, Burner. See Garbage burner. 63t, Button, C. M. Horton 55, Button, S. M. Merrill 656, Button, F. Oldfield 656, Button, C. Radeliffe 656, Button, tack fastened, C. A. Bryant 656, Calculing or roasting france A. B. Johnson 356, Caliper attachment T. A. Panyard 656, Cane See Dispensing can Oil can 656, Canceling and postmarking machine stamp, C. 656,	580 260 Th ary
V. Fyke	401 mou pane
Candlest ick, miner's. C. Peacock. 656, Caoutchoue, gutta percha, etc., compound as substitute for. Hornung & Liebl. 656, Car coupling, L. N. Dobbins. 656, Car coupling centering device. E. F. Chaffee. 656, Car door, grain, W. P. Brown, Jr. 656, Car door, grain, W. P. Brown, Jr. 656, Car driving year and gear changing device motor.	
Car coupling centering device. E. F. Chaffee	438 pass bedy the i
Car driving gear and gear changing device, motor, A. Rawlinson. 656. Car floor, baggage, T. Eubank. 656. Car gate, open, C. M. Fairbanks. 656. Car mover, auxiliary, P. Ryan. 656. Car, railway freight, C. B. West. 656. Car seat, H. S. Hale 656. Car seat, H. S. Hale 656.	183 feet, be r slide
Carbids, manufacturing, R. Doolittle 656	599
Carbureter, J. P. Auderson 656 Carbureter, Laraway & Houser 656 Carbureter for petroleum or other engines, A. &	495 409 trea the s
Carburg air or gas, J. E. Shearer. 656.	,484 cises
Arnold	403 408 Sons orou trac 1867 tion
Chafe iron, roller, A. P. Smith, Jr	.258 is re MA .527
Chuck, A. Dinkel. 656 Chuck, bit brace, L. F. Kramer. 656 Charcase, B. Hilson. 656,349, 656 Charcase, B. Hilson. 656 Charette box cap. E. Hilson. 656 Circuit breaker. Brubaker & Twining. 656	.:157 ed., .351 wea .350 batt .282 be r
Circuit breaker. Brubaker & Twining	PRICE, complet
Closet. See Dry closet. Cloth cutter, W. F. Caldwell. Cloth nachonism, H. C. Kennedy.	If your dealer express, prepaid.
Coat, apparel D. Murphy. 656 Collapsible post, beam, etc., J. Saudmayer, 556 Commutator, J. T. H. Dempster, 658 Composition of matter, E. Bushman,	10 BROOK ST
Conduit for distributing fluids, E. Fox. 658 Contact parts, system of non-interchangeable, M. Froschl. 658 Controller brush guard, A. L. Riker. 656	2000
Copying press, L. Bailey 656 Core drying car. T. I. Rankin 656	.313
Cresols, separator, centrifugal, E. G. N. Salenius, 556 Cresols, separating, F. Raschig, 656 Cultivator fender, Brinkley & Wetrich 656 Currents, apparatus, for converting alternating	.423 .263 .3242
Curtain fixture, F. Hysert. 656 Curtain pole, K. R. Brondstreet. 656 Curton, See Band output, Cleek, output	,604 ,506
Cycle seats, wire mesh for, A. E. Wale	5.610 5.231 5.476 5.556
Dental root canal drier, D. Perry	Over 70 sizes at \$392 \$417 Shallow wells in a on wheels or on s
Moorefield	5.582 WILLIA
Draught evener, gang plow, R. C. McCormick 656 Dredge anchoring device, R. R. Osgood	5,602 5,248 5,565 1,369
	3,503 3,224 3,225 4,5555
G. Morgan	3,415 3,400 \$5 PRESS
Dust separator, T. Lee	5,194 maker or saver. Se 1,255 1,182 1,569 maker or saver. Se paper, etc. TH
Educational system. A. E. Osborne. 656 Electric controller, C. J. Reed. 656 Electric generating apparatus, J. H. Bickford. 656 Electric light cord adjuster, F. H. Stewart. 656 Electric motor controller, T. S. Perkins. 656 Electrical conductor pipes or conduits, manufacture of A. H. Uwward.	DEFIANC 1,465 1,451
Electrical connections, continer of wires for, C. F.	i, 192 i,158
Electrical contact paris, system of non-inter- cuanscable, Frosch & Hundhausen 66 Electrical currents, controllum, A. B. Holmes 65 Electrical distribution system, W. J. Davis, Jr. 55 Electrical distribution system, H. F. Roach 66	3,454 1,324 3,578
Electrolytic apparatus, G. Loiselet	1,558
Engine operating and governing means, C. Rob-	Gyclopedia of
Engines, apparatus for lining, C. II. Hopkins	1.406 6.293 1.156 1.2 500 R
Kyglasses, I. W. Bugbee. 65 Eyeglasses, P. H. Flowers. 65 Eyeglasses, H. F. Sanger. 65 Fastening device and padlock, J. T. Dufau. 65 Feed water beater. J. F. Hanser. 65	5.399 1269 Price, \$5.00 in (5.245 1.248 Hal
Feed water heater, J. F. Hauser 65 Feeder for stock, salt, D. Frese, 65 Fence, G. M. Beerbower 65 Fence post, W. L. Penney 65 Fender, See Cultivator fender.	
Fertilizers, apparatus for making, J. F. Bus- sells. 65 Fifth wheel, C. L. Townsend. 65 Filling machine, H. A. & R. C. White 65 Filter, J. Posch. 65 Filter, J. Schinneller. 65	6.595 ket for nearly 6.332 six years, and 6.278 thedemand for it
Filter, J. Posch. 65 Filter, J. Schinneller. 65 Filtering material, N. Lanser. 65 Fire Scatte, T. T. Brown 65	6,212 hasbeenso great 6,376 that twelve edi- 6,507 tions have been
Filtering material, N. Lauiser. 65 Fire escape, T. T. Brown. 65 Floor covering, E. Berliuer. 656,162, 65 Fluoro-hydrocarbon, aromatic, F. Valentiner. 65 Fly catcher, G. Senior. 65 Folding box, H. M. Hoover. 65	5.163 called for, 5.229 The work may 5.378 be regarded as 5.250 the product of
Folding box. H. M. Hoover. 65 Folding chair, portable, A. I. Levin. 65 Furnace. See Calcining or roasting furnace. Furnace hoisting apparatus, blasting, W. Ken- nedy. 65	noviouse of the
Furnaces, oil and gas burner for, J. Tyler	ablest chemists 6.391 and workers in all parts of the
Galvanizing apparatus, E. I. Braddock, \$55,500 to 656 Garbage burner, domestic, C. R. Harris	ing of the high-
Gas, composition of matter for making, C. H. Worsnop	ed and condensed 6,238 in concise form, 6,539 convenient for
Gas purifying apparatus, E. J. Duff	in the various ma
Gate, S. O. Campbell	6.512 Those who are 6.390 of industry wil 6.277 is of practical v Those who are i
Bilgram 65 Generator. See Gas generator. Gib. saw, B. F. McGaw 65	or employment, of salable articles excellent sugges
Glass, apparatus for producing wire, J. Locke 65 Glass bottle blowing machine. L. Grote656,286, 65 Glass bottles making L. Grote	6.206 5.296 6.322 6.322
Glass, manufacture of wire, J. Locke	5,295 5,180 SCIENTIFIC

(Continued on page 142)

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