coupling designed to be simple, durable and noiseless, whereby the pole may be conveniently connected to or detached from the axle by the most inexperienced helper. It also provides a means whereby the safety straps may be readily connected with or disengaged from the pole or shaft.

LOAD BINDER. — Harry M. Bradley, Canon City, Col. A longitudinally slotted bar with teeth on opposite sides has an aperture in one end for the attachment of a rope, the bar being passed through a slot in a lever, where it is held by a pin and spring-pressed pawls, and there being a rope attached to the lever, the whole forming a simple and convenient device for binding loads upon vehicles in a quick and secure manner. The device may also be used for pulling posts, tightening wire, and as a lifting jack.

WAGON BRAKE. — John W. Herrin, Mount Vernon, Ill. This invention provides a brake which will be automatically applied to the front wheels when the vehicle to which it is attached starts down on an inclined grade, and will be automatically released when a level grade is reached or the vehicle is started up hill. The invention also provides a locking device whereby the brake may be locked either when applied or released, thus taking all strain off the draught animals.

WATERING TROUGH.—John T. Thatcher, Frankfort, Ind. This trough has an apertured end, with a valve arranged to slide past the aperture, in combination with a float hinged to the side of the trough and a rod connected with the valve at its lower end and adjustably connected with the float at its upper end. It is designed that the trough shall always be filled to a definite level, the valve and float working to effect this automatically.

STOVE. — James W. Calta, Castalia, South Dakota. This is a stove of simple and durable construction for heating and cooking purposes, and specially designed for burning hay, straw, trash and rubbish as fuel. All the heat generated is passed around four sides of an oven, and the draught is readily so arranged as to entirely avoid the puffing of the burning fuel.

OIL CAN AND LAMP FILLER.—Charles W. Proctor, Lake Forest, Ill. This is a portable device, secured on a post having a suitable base, the can having a valved outlet at its lower end connected with a delivery tube through which oil is supplied to a lamp without any waste and without the use of pumps. The device is simple and durable, and the oil flows by gravity from the can to the lamp.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in the following week's issue.

Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication.

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

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

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 price.

Minerals sent for examination should be distinctly marked or labeled.

(3113) G. M. says: A question has come up as to whether a piece of iron dropped into water of any given depth would sink to the bottom or would find a point where its density and that of the water would be the same, and consequently remain suspended. Will you kindly answer this and give explanation, also please state the greatest depth of any well or boring in the world? A. The iron will sink to the bottom of the deepest oceans. Every solid substance that is heavier than water sinks to the bottom. The bottoms of the deep oceans are covered with gravel, sand and mud, with shells and vegetable growth of the deep seas. Fish and other living organisms are found at great depths. The pressure of the water is in proportion to the depth, but its density is but very slighty increased, as water can be but very slightly compressed under great pressures. The deepest bored well is about 5,000 feet.

(3114) A. C. R. asks: 1. Is lead a good electrical conductor? A. It has twelve times the resistance of copper. 2. Can you give me a recipe for a good cheap silver polish? A. Use whiting and alcohol. 3. Have the effects of a kaleidoscope ever been shown on the wall like a magic lantern? If so, is the apparatus difficult to make? A. The kaleidoscope can be thus used. It is described in Dolbear's "Art of Projection," $2 by mail.

(3115) M. T. F. asks for the cheapest way of making hydrogen gas. I wish to use it for a balloon in small towns where I can't find the manufactured gas. A. By treatment of iron or zinc scrap with dilute sulphuric acid. This is the usual way on a small scale. On the larger scale it may be made by passing steam over red hot iron scrap.

(3116) J. S. R. asks (1) as to the obelisk (in Central Park, New York), and also the Pyramids of Egypt. Are they not generally considered (by scientific men) a composition, and not blocks of natural stone? A. They are natural stone, not an artificial composition. 2. What was the date of publication of the first number of SCIENTIFIC AMERICAN? Was it a monthly paper, or or magazine, in its youth? A. September, 1845. It was a weekly.

(3117) W. F. B. asks how bird lime is made; it is used to trap birds. A. One receipt is to boil linseed oil until thick and viscid. There is much danger of conflagration in conducting this operation. A better way is to boil the middle bark of the holly for seven or eight hours in water, and put in a heap in a hole in the earth covered with boards or stones for some weeks, until reduced to a mucilaginous mass. It must be rubbed up in a mortar and washed until clean, and put into earthen pots.

(3118) P. B. says A and B have an argument about the motion of a clock's pendulum. A says it never stops in its forward and backward motion. B says it does, or it could not reverse. Who is right? A. B is right. The pendulum must come to a dead stop before it can change or reverse its movement. The time required for the change is very short and not within our perception to measure it.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

June 16, 1891.

AND EACH BEARING THAT DATE.

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

Advertising device, H. G. Rich 454,292
Alarm. See Burglar alarm.
Ammonia from sodium nitrate, manufacture of, Baudouin & Delort 454,108
Animal tread, J. R. Bevil 454,200
Antipyrine and iodine, compound of, E. Ostermayer 454,223
Atomizer, R. Lockwood 454,056
Axle, adjustable vehicle, D. C. Crawford 454,397
Axle journal and journal bearing, A. E. Smith 454,075
Axle setting machine, G. W. Hunter 454,213
Axles, method of and die for making crank, J. C. Shea 454,073
Bag. See Feed bag.
Bag lock, M. V. Mitchell 454,058
Barrel rolling implement, Hilton & Monahan 454,042
Barrow and truck, combined hand, Martin & Bohn 454,174
Basket, fish, C. R. White 454,241
Bathing suit, buoyant, R. Wightman, Jr 454,193
Battery. See Galvanic battery. Secondary battery.
Bean cutting machine, J. Steudle 454,388
Bearing, ball, H. Howard 454,049
Bed, folding, H. S. Hale 454,121, 454,122
Bed, spring, J. H. Brothers 454,027
Bell, W. L. Upson 454,190
Bi-telephone, E. J. P. Mercadier 454,138
Binding posts, making, E. T. Greenfield 454,430
Blinds, friction device for inside, J. B. Hartman 454,349
Boiler. See Water tube boiler.
Boiler furnace circulator, C. A. McAllister 454,140
Boiler furnace, steam, M. E. Herbert 454,350
Boiler tube scraper, H. V. Clynick 454,032
Boilers, mechanical stoker for steam, J. Proctor 454,379
Book, flat opening blank, P. W. Nelson 454,373
Book, flat opening blank, O. W. Smith 454,076
Boot drier, E. A. Jones 454,050
Boring machines, adjustable stop for, W. P. Kellogg 454,051
Box. See Electric resistance box. Letter box.
Brake. See Car brake. Wagon brake.
Brush, A. Hitt 454,046
Brush for lithographic stipple work, G. Arnold 454,321
Buckle, J. C. & A. M. Hyde 454,170
Burglar alarm, portable, C. C. Davis 454,033
Burial apparatus, C. M. Chamblin 454,331
Burner. See Fuel burner. Hydrocarbon burner. Vapor burner.
Button, J. N. Gotendorf, Jr 454,266
Canal rack, F. L. Robinson 454,185
Car brake, J. L. Owen 454,224
Car coupling, G. Bell 454,417
Car coupling, G. W. Dickey 454,427
Car coupling, A. Hackman 454,133
Car coupling, D. Hirsh 454,095
Car coupling, A. C. McCord 454,406
Car coupling, H. G. Russell 454,385
Car, electric motor, E. M. Bentley 454,021
Car, electric railway, E. M. Bentley 454,020
Car door, grain, E. A. Hill 454,212
Car for underground electric systems, motor, J. J. Miller 454,178
Car, railway, W. C. Whitner 454,099
Cars, safety guard for sleeping, N. Brown 454,202
Car, sand box for, H. F. Parker 454,182
Cars, steam heating system for railway, J. F. McElroy 454,286
Card holder, G. K. Kelsea 454,277
Card list, J. H. Fezandie 454,265
Carding machine, hair, F. J. Mauborgne 454,175
Carrier. See Cartridge carrier.
Cart, road, M. Halfpenny 454,347
Cart, road, L. M. Smith 454,157
Cartridge carrier, L. M. R. Daudeteau 454,333
Case. See Pocket case.
Cash recorder, W. H. Thompson 454,089
Caster, furniture, H. McDonald 454,284
Caster, socket, Crean & Stone 454,257
Cattle rack, J. H. Howard 454,357
Caustic alkali, etc., manufacture of, A. Kayser 454,136
Centrifugal machine, T. Long 454,056
Centrifugal separator, H. Stauton 454,408
Centrifugal vessels, balancing, P. M. Sharples 454,072
Chain link, drive, T. Maxon 454,176
Chair. See Convertible chair. Hammock chair.
Chair, J. G. Wilson 454,100
Chair and sewing machine top, combined, M. M. Bostick 454,251
Check book, W. F. Knowles 454,361
Chuck, drill, J. N. Skinner 454,074
Cigar bundling machine, Albert & Rathkamp 454,246
Cigarmaker's implement, T. Streat 454,084
Clock striking mechanism, G. W. Shuman 454,299
Closet. See Knockdown closet.
Clutch, friction, C. Hermann 454,435
Clutch mechanism, J. A. Dyblie 454,261
Clutching and releasing mechanism, E. C. McFarland 454,141
Coal separator and cleaner, Smith & Bishop 454,148
Cock, gas, Stafford & Hudson 454,234
Cofferdam, J. E. Robinson 454,383
Coffin cover, L. G. Kregel 454,363
Collar or cuff protector, E. J. B. Bowyer 454,201
Comb. See Curry comb.
Commode, D. H. Murphy 454,128
Compressing rolls, adjusting device for, J. G. Goldthwaite 454,402
Condenser, G. H. Simpson 454,396
Confectionery, machine for making, P. Knorpp 454,278
Convertible chair, L. Jorgensen 454,276
Corset, L. Harmon 454,167
Corsets, etc., clasp for, H. F. Wyatt 454,104
Cotton handling and cleaning apparatus, seed, R. S. Thomas *et al.* 454,146
Coupling. See Car coupling. Hose coupling. Pipe coupling. Thill coupling.
Cradle, H. Weber 454,191
Crank pin, G. W. Rogers 454,229
Cultivator, W. C. De Graffenried 454,036
Current collecting device, R. M. Hunter 454,437
Curry comb, E. C. Hempel 454,269
Cutter. See Glass tube cutter.
Cycle saddle, W. A. Hance 454,431
Dental engine, W. W. Williamson 454,242
Dentures, apparatus for making, R. E. Zellers 454,415
Dentures, vulcanizing rubber, G. B. Snow 454,079
Desk and document cabinet, combination, C. E. Lucas 454,368
Dies, taps, etc., machine for cutting, A. W. Cash 454,029
Display rack or case, S. B. Calkins 454,164
Distilling apparatus, T. McGowan 454,061
Door check, J. Keene 454,360
Door hanger, L. Terry 454,304
Door mat, metal, E. R. Landon 454,439
Door spring, W. C. Smith 454,078
Draught equalizer, W. Z. Runkle 454,069
Draw bars, anufacture of, J. T. Wilson 454,101
Drier. See Boot drier.
Drill. See Rock drill.
Drying line support, J. Paglughi *et al.* 454,377
Egg beater, W. H. Dennison 454,165
Egg beater, E. Hadley 454,345
Egg beater, D. A. Wilkinson 454,194
Elastic or corded fabric, woven, W. Lapworth 454,362
Elastic washer, C. E. Swan 454,085
Electric apparatus for treating deafness, G. F. Webb 454,313
Electric conduit, tubular, E. H. Johnson 454,275
Electric current indicator, A. B. Herrick 454,270
Electric head light, Pattison & Desmond 454,184
Electric locked switch, F. Teague 454,087
Electric machine, dynamo, R. Eickemeyer 454,336
Electric motor, H. M. Blades 454,024
Electric resistance box, R. Eickemeyer, Jr 454,207
Electric switch, H. T. Clark 454,031
Electric systems, conduit for underground or subway, J. J. Miller 454,177
Electric wire subway, W. Readman 454,155
Electric wires, connector for, E. L. Nash *et al.* 454,181
Electrical conductors, wall fixture for, Pieper & Watson 454,226
Electro deposition and cathode therefor, A. C. Reinfeld 454,381
Elevator controlling mechanism, W. O. Wakefield 454,095
Elevator safety device, A. Eichert 454,263
Embossing works in sheet metal, machine for, S. W. Babbitt 454,149
Enameling powders, machinery for distributing, Walters & Smith 454,312
Engine. See Dental engine. Pumping engine. Steam engine.
Engine, G. White 454,192
Engines, electric pole in gas or vapor explosive, Tremper & Eisenhuth 454,238
Engraving machine, J. C. Parmerlee 454,063
Envelope, W. E. Thomas 454,237
Exhibition rack, H. A. Buckholz 454,328
Explosive, Ward & Gregory 454,239
Extractor. See Pen extractor. Stump extractor.
Fabric. See Elastic or corded fabric.
Fabric stretching frame, S. Hough 454,134
Facing slip and label holder, T. W. Gaines, Jr 454,341
Fare register, J. W. Meaker 454,370
Feed bag, animal, G. D. Leonard 454,054
Feed water regulator, automatic, J. Thomas 454,088
Fence making machine, B. Duley 454,260
Filter, J. A. Fulton 454,340
Fire escape, A. R. Brandt 454,325
Fishing reel, P. H. Yawman 454,319
Fistula ligatures, device for applying, M. M. Brown 454,327
Flanger, rotary, E. P. Caldwell 454,110
Fog horn, W. Le Blanc 454,280
Fork. See Hay fork.
Frame. See Fabric stretching frame. Photographic printing frame.
Fruit gatherer, A. B. Anderson 454,320
Fuel burner, liquid, E. De Beauharnais 454,125
Funnel, indicating, A. Whelan 454,240
Furnace. See Boiler furnace. Heating, puddling, or boiler furnace. Hot air furnace.
Furnace, E. F. Edgar 454,037
Furnace, R. L. Walker 454,310
Galvanic battery, W. Macmillan 454,057
Game apparatus, S. M. Barnett 454,161
Game apparatus, J. D. Jackson 454,358
Game or puzzle, J. J. Erin 454,147
Gas and oil tank, J. N. Barker 454,106
Gas, apparatus for the manufacture of, J. L. Stewart 454,409
Gate, W. Brayton 454,026
Generator. See Steam generator.
Glass tube cutter, P. Smith 454,233
Governor, J. F. Kirby 454,218
Grader, road, J. A. Houser 454,048
Grain scourer, W. B. Anthony 454,159
Grapple, J. H. Dungan 454,335
Guard. See Life guard.
Gun, T. Nordenfelt 454,374
Gun cotton, making, H. S. Maxim 454,281
Gun, recoil-operated machine, A. Odkolek 454,403
Gun, spring air, M. F. Stanly 454,091
Gunner's arm rest, R. B. Sproul 454,300
Hair tonic, S. T. Fraser *et al.* 454,401
Hame fastener, C. S. Ellis 454,400
Hammock chair, J. C. Bach 454,248
Ham stuffing machine, boneless, G. N. De Loriea 454,112
Hanger. See Door hanger. Picture hanger.
Harrow, W. Hetrick 454,352
Harrow and roller, combined, G. M. West 454,098
Harrow or cultivator, P. Blaker 454,324
Harrow, revolving, S. Sheets 454,188
Harvester, J. & W. Paterson 454,225
Harvester, corn, J. Wise 454,102
Hat and coat hook, C. H. Thurston 454,305
Hay fork, H. H. Wright 454,103
Heater. See Tire heater.
Heating apparatus, steam, J. F. McElroy 454,285
Heating, puddling, or boiler furnace, J. James 454,359
Hedge trimmer, R. H. Elliott 454,337
Heel shaping or compressing machine, C. W. Glidden 454,428
Hinge, S. P. Gibson 454,343
Holder. See Card holder. Jar holder. Map or chart holder. Sash holder.
Hook. See Check book. Hat and coat book. Snap hook. Whiffletree hook.
Hose coupling, J. F. McElroy 454,287
Hose or other pipes, device for stopping leakage in, J. Lawrence 454,279
Hot air furnace, J. Evans 454,264
Hot air register, T. G. Wanless 454,096
Hydrocarbon burner, C. E. Cookerly 454,332
Incrustation preventive, J. F. Stephenson 454,083
Indicator. See Electric current indicator.
Inhaler, C. A. Simpson 454,142
Inkstand, J. A. Macmeikan 454,173
Insecticide distributer, H. Myers 454,117
Insulated electric conductor, E. D. McCracken 454,060
Interfering straps, rubber pad for, M. Haughey 454,210
Iron, melting, H. J. Graf 454,209
Jack. See Lifting jack.
Jar holder, fruit, O. R. Cooke 454,396
Journal bearings, composition for, P. H. Holmes 454,354
Key fastener, W. Bishman 454,419
Knife for turning irregular forms, T. W. Gardiner 454,041
Knitting machines, needle cylinder for, E. R. Branson 454,163
Knockdown closet, H. Pattberg 454,123
Lace fastener, shoe, W. Wellock 454,314
Lacing hooks, machine for setting, W. Halkyard 454,114
Lamp, Argand, Atwood & Tobey 454,247
Lamp, blow, G. E. Moody 454,139
Lamp controller, incandescent electric, J. J. Fanning 454,038
Lamp, electric arc, P. Clarke 454,253
Lamp, electric arc, J. E. McAuley 454,443
Lamp, electric arc, S. W. Rushmore 454,294, 454,295
Lamp filament, incandescent, T. A. Edison 454,262
Lamp fixture, suspension, J. E. Bohner 454,420
Lamps, mast arm for electric, T. Dillon 454,166
Lantern, vehicle, T. B. Jefferey 454,171
Latch, C. Koegel 454,053
Lawn sprinkler, I. W. McGaffey 454,288
Letter box, E. Franke 454,127
Letter box, W. Shempp 454,298
Letter feeding and separating apparatus, G. W. Hey 454,405
Life guard, T. L. Johnson 454,214
Lifting jack, L. Meeker 454,441
Lifting jack, Sutphen & Bray 454,302
Light. See Electric head light. Ship's side light.
Liniment, B. E. Donham 454,334
Lithmetalography, C. L. Kling 454,438
Lock. See Bag lock. Nut lock.
Lock, W. C. Smith 454,077
Loom for weaving tufted pile fabrics, H. Wyman 454,414
Loom shedding and shuttle box operating mechanism, G. F. Hutchins 454,135
Loom shedding mechanism, J. Cashman 454,252
Loom, terry, F. Leake 454,367
Lumber for veneers, etc., compound, F. Koskul 454,362
Mail bag catcher, H. & C. Soggs 454,387
Map or chart holder, adjustable, A. L. Eilar 454,126
Mat. See Door mat.
Matrix making machines, type die for, C. L. Redfield 454,066
Meat tenderer, O. L. Cady 454,330
Metal slitting machines, scrap cutter for, A. P. Hine 454,353
Metals from quartz or other gangue, liquid for separating, J. S. Lurie 454,116
Milk, vessel for sterilizing and transporting, Gronwald & Oehlmann 454,267
Mine shafts, electric signal for, F. W. Bacorn 454,018
Miter cramp, D. Foster 454,039
Mop wringer, A. M. Burnham 454,203
Motor. See Electric motor.
Neckti e fastener, J. Walter 454,311
Nets, machine for making, W. J. Hooper *et al.* 454,355
Nut for securing pinions on shafts, differential, N. C. Bassett 454,019
Nut lock, M. Kroell 454,364
Oil for general painting, J. C. Decker 454,035
Ore sampling device, D. W. Brunton 454,120
Ores, grading and concentrating, H. Scovell 454,071
Overshoe, W. H. Sprague 454,143
Packing, piston rod, G. W. Rogers 454,384
Packing, rod, Udstad & Ryan 454,093
Painter's overshoe, A. S. Olson 454,375
Paper calendering rolls, A. S. Bacon 454,322
Paper fixture, toilet, S. Wheeler 454,317
Paper roll, wrapping and toilet, S. Wheeler 454,316
Paper shells, machine for making, G. B. Farrington 454,113
Paper tube winding machine, M. C. Stone 454,145
Pawl and ratchet mechanism, J. M. W. Long 454,440
Pen attachment, writing, D. Lubin 454,221
Pen extractor, F. C. Pfeiffer 454,064
Pen, ruling, H. H. Love 454,220
Photographic printing frame, adjustable, H. B. Hennemann 454,433
Pianoforte, G. Caddick 454,204
Picker. See Slate picker.