The best method for your purpose is the Sylvester process: into each gallon of hot water required to cover the surface shave ½ pound of castile soap; let it dissolve, but do not make suds, and apply to the dry concrete surface boiling hot, using a wide soft brush such as a whitewash brush. After the soap solution has dried, apply lukewarm a solution of ½ pound powdered alum to each four gallons of water. Two repetitions of this process should close all pores and render the concrete waterproof; if not, try a further coat or two. There is no reason why the above preparation should be affected by soda, but if it is unsuccessful you might try a coat of water glass or write to the Concrete Association of America, 225 Fifth Avenue, which has conducted a number of valuable experiments in connection with varied uses of cement and is glad to give information.

NEW BOOKS, ETC.

A PORTFOLIO OF PORTRAITS OF EMINENT MATHEMATICIANS. Edited by David Eugene Smith. Chicago: The Open Court Publishing Company. Portfolio containing 12 plates with descriptive text on tissues. Price, $3.

The portfolio before us contains some admirable selections and reproductions of portraits of many mathematicians, such as Descartes, Pythagoras, Archimedes, Fermat, Leonardo of Pisa, Euclid, Cardano, Leibnitz, Napier, Viète, Newton, Thales, and the collection would make excellent illustrative material for the classification of mathematical industries. The portrait of Descartes is particularly fine.

HOW TO IDENTIFY THE STARS. By Willis M. Wilhelm, Ph.D. New York: The Macmillan Company, 1909. 8vo.; 38 pp.; plates. Price, 75 cents net.

The ability to recognize the important brilliant stars and to locate the more conspicuous constellations is both an interesting and a useful acquirement. The number of people who have a real interest in popular astronomy and a fair acquaintance with the stars and constellations is strikingly increasing, and they will find a real pleasure in this information. The object of this little book is to enable the latter persons to identify the various constellations and stars. The method here followed and the material presented is essentially the same as that used in the course of descriptive astronomy in Williams College.

LIGHT AND SOUND. A Textbook for Colleges and Technical Schools. By William S. Franklin and Barry Macnutt. New York: The Macmillan Company, 1909. 8vo.; 344 pp. Price, $1.60.

There always seems to be a field for a good book on the very important subjects of light and sound. The literature is already vast on these subjects, but the authors have succeeded in presenting some phases in an entirely new light. There is an entire absence of the time-honored illustrations which have been copied from book to book. The diagrams and illustrations are very numerous and are well executed. The book will prove of value to all physicists.

THE RISE AND PROGRESS OF THE BRITISH EXPLOSIVES INDUSTRY. Published under the auspices of the Seventh International Congress of Applied Chemistry by its Explosives Section. London: Whittaker & Co. New York: The Macmillan Company, 1909. 4to.; pp. 418. Price, $5.25 net.

This very enlightening book gives an exceedingly interesting history of British explosives, reproducing many curious engravings. This is followed by chapters on the concussion caps, safety fuses, military fireworks, and pleasure fireworks. Then comes an excellent bibliography and a chronology from 1242 to 1700. The existing government and private establishments are then described. The work is highly technical, but will prove of great interest to those whom it concerns.

THROUGH THE YUKON OF ALASKA. By T. A. Rickard. San Francisco: Mining and Scientific Press, 1909. 8vo.; 392 pages. Price, $2.50.

This book records observations made in the course of a journey in the Yukon Territory in the District of Alaska during the summer of 1908. The sections devoted to the development of mining methods are particularly valuable, and the book should prove of interest to everyone who has ever been to Alaska and the Yukon Territory or is thinking of doing so. We are particularly taken with the 175 illustrations, which are admirably executed. The book is well printed and bound.

EXPORTERS' ENCYCLOPEDIA FOR 1909. New York: Exporters' Encyclopedia Company, 1909. 12mo.; pp. 655. Price, $5.

The present volume contains full and authentic information relative to shipments for every country in the world. The Exporters' Encyclopedia is now in its fifth year, and is a recognized standard authority among export shippers, and has the strongest indorsement of all the transportation lines and export houses, manufacturers, etc., engaged in export trade. It gives exactly the information which exporters require to enable them to ship their goods with the minimum of expense and trouble. It is a valuable compendium for anyone who is at all interested in export trade.

Legal Notices

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending July 20, 1909,

AND EACH BEARING THAT DATE

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

Acid, making nitric, F. L. Schmidt 928,545
Acid, manufacture, concentration, and simultaneous purification of sulfuric, G. C. de Briailles 928,844
Adapter, H. S. Salt 928,474
Advertising automaton, D. F. Brown 928,628
Advertising shade for incandescent lamps, J. de Yongh 928,572
Agricultural implement, W. L. Paul 928,690
Air, centrifugal apparatus for separating solid matter from, A. Lebrasseur 928,673
Air compressor, T. O. Perry 928,326
Air moistener and deflector, hot, W. M. Roeder 928,703
Air mover, A. Mathis 928,775
Airship, S. Lake 928,524
Airship, aeroplane, F. A. Newell 928,687
Alfalfa drier, R. S. Rowland 928,541
Alkali chlorids, electrolysis of, J. Bilitzer 928,734
Anchor, stockless, W. S. Bickley 928,895
Animal trap, M. M. Franks 928,649
Animal trap, G. J. Miller 928,779
Animal trough, F. L. Stewart 928,560
Apparel apparatus, W. D. Forbes 928,437
Armature coils, machine for applying tape to, J. S. Downs 928,592
Armor plates, treating, S. S. Wales 928,412
Automatic lubricator, F. L. Allen 928,417
Automobile fifth wheel, E. A. Oliver 928,790
Automobile motor, M. & W. Eastman, reissue 12,993
Automobiles, friction drive mechanism for, A. B. Cole 928,739
Awning guide rod, R. Simms 928,806
Axle coupling, car, R. Hackbarth 928,445
Axles, method of and means for repairing, A. F. Hunt 928,519
Baby tender, self-adjusting chronometric, Wilson & Culley 928,415
Bag. See Hand bag.
Bag frame fastener, J. S. Isidor 928,661
Ball cleaning device, golf, H. Woodward 928,832
Ball players, training device for base, W. G. Lentz 928,674
Ballistic plate, S. S. Wales 928,348
Bank, portable, B. S. Wakeman 928,483
Barbers' chairs, paper actuating device for, D. B. Brown 928,243
Barrel bodies from pulp, apparatus for making, W. H. Decker 928,247
Barrel bodies of paper pulp, apparatus for making, W. H. Decker 928,248
Barrel bodies of paper pulp, apparatus for forming bilged, W. H. Decker 928,249
Barrel press, J. Teml 928,562
Basket for holding dishes and plates, A. Insinger 928,762
Bearing roller, A. Schilling 928,800
Bed, A. K. Taylor 928,821
Bed, covered, L. J. Wilson 928,298
Bedstead mounts and the like, machine for buffing, J. F. Gail 928,254
Beer dispensing apparatus, H. S. Cornish 928,588
Beets, machine for unearthing, O. N. Frankman 928,594
Bell and alarm, combined door, H. W. Dubbs 928,369
Bell fastener, sleigh, W. C. Frindell 928,376
Belt fastener, G. H. Smith 928,556
Belt fastener, R. M. Bennett 928,840
Bench clamp, J. W. Kincaid 928,460
Binder, loose leaf, L. Streit 928,342
Block signaling system, D. J. McCarthy 928,396
Blower, pressure, E. Bassler 928,624
Boat, A. E. Apel 928,579
Boiler tube cleaner, S. M. Cockburn 928,361
Book covers, making, C. L. Baldauf 928,623
Bookbinder, R. J. Nicholson 928,878
Bookbinding, D. Z. Howell 928,518
Bookcase door guide, sectional, Weis & Hehle 928,566
Bottles or other receptacles, machine for capping or closing charged, E. K. Moore 928,781
Box, W. R. Parsons 928,881
Box lids in an open position, means for supporting, Powell & Renwick 928,697
Box top, W. H. Perkins 928,793
Braids and trimmings, machine for making, J. E. Kirberg 928,461, 928,462
Brick machine, G. M. Griswold 928,913
Broom, F. Becker 928,490
Broom holder, G. E. Selsor 928,284
Brush, H. M. Schwartz 928,550
Brush bridle, adjustable, W. Reese 928,699
Brush holder, tooth, R. M. Ryan 928,542
Brush making machine, H. M. Schwartz 928,548, 928,549
Brushes, manufacture of, J. J. Potter 928,401
Buffing mechanism, J. F. Gail 928,253
Building structure, C. C. Stutz 928,343
Buildings, construction of, Marshall & Fox 928,314
Burglar alarm, W. A. Helphenstine 928,754
Burglar alarm, S. B. Perry 928,794
Burial shirt, C. C. Holcomb 928,655
Cable terminal, F. B. Cook 928,428
Cage, breeder's, T. H. Knaak 928,463
Calculating machine, A. J. Meier 928,873
Camping device, canvas, A. G. Lukenbill 928,391
Can, J. G. Swain 928,561
Can ends, runway for, J. F. Wing 928,725
Candlestick lubricator, E. F. Faul 928,861
Candy pail, C. A. Lee 928,263
Candy pail cover, Griffin & Johnson 928,381
Canning apparatus, L. L. Lawrence 928,773
Canopy, L. F. Busenbark 928,495
Capsule filler, P. H. Brown 928,356
Car and operating mechanism, dump, Stoltzfus & Miller 928,286
Car door, combination side and grain, H. Hedstrom 928,308
Car, dump, H. Pries 928,698
Car, dumping, C. P. Astrom 928,837
Car fender, Morganstern & Shephard 928,615
Car fender, street, J. Allez 928,575
Car rerailer, R. H. Smith 928,810
Car, stock, T. J. McKay 928,269
Carbid feeding device, A. Davis 928,853
Carbureter, F. Svagell 928,710
Carbureter, A. Winton 928,828
Cards, playing, W. T. Eddins 928,511
Carpet and matting holder, adjustable, G. E. Jackson 928,607
Cash register, W. H. Muzzy 928,267
Casting machine, F. N. Cline 928,246
Cement and like materials, process of and apparatus for burning, B. E. Eldred 928,512
Cement post attachment, E. M. Slayton 928,807
Cement, process of and apparatus for burning, B. E. Eldred 928,513
Centrifugal device, F. Hampl 928,750
Centrifugal machine, G. N. Goddard 928,912
Chair strap for holding babies, M. L. Carrington 928,305
Chuck for high-speed drills, J. O. Reynolds 928,700
Churn power, W. S. Whitney 928,297
Cigar lighter, C. S. Drake 928,252
Cigar, self-igniting, J. H. Hoover 928,451
Circuit breaker, automatic, H. W. Cheney 928,901
Circuit closer, O. M. Tustison 928,824
Clasp. See Piling clasp.
Clock, chime, P. H. Klein, Jr 928,388
Clothes frame, revoluble, J. A. Turpin 928,823
Clutch, C. P. Hollister 928,656
Clutch, friction, H. A. Krueger 928,671
Clutch, friction, A. Lint 928,871
Coal handling apparatus, G. W. Freeland 928,595
Coaster, wheel, L. R. Valentine 928,716
Cock, gas, C. W. Boyse 928,898
Cock seating washer, J. H. Glauber 928,599
Coffee roaster, N. T. Coley 928,500
Coin controlled lock, H. B. Meade 928,613
Coke oven, L. Bansart 928,302
Collar, coat, M. Koppelman 928,262
Collar stay, H. A. Aldred 928,573
Collar supporter, J. C. Doran 928,250
Collar supporter, H. A. Aldred 928,621
Comb, J. C. McLean 928,785
Comb attachment, H. H. West 928,485
Commutator for electrical machines, F. R. Kunkel 928,918
Compass, beam, H. E. P. Taylor 928,712
Concentrating apparatus, C. A. La Point 928,870
Concrete construction forms, bond of, C. M. Markham 928,392
Concrete constructions, means for reinforcing, J. T. Simpson 928,475
Concrete constructions, reinforcing bar for, J. M. Dudley 928,430
Concrete holding and carrying device, A. N. Doud 928,858
Concrete structures, constructing sunken, W. H. Fahrney 928,646
Concrete tiling, machine for making, R. Z. Snell 928,812
Conduit, W. Houghton 928,606
Conduit, underground, Way & Freeze 928,826
Conduits, cable operated carrier for, Alexander & Appel 928,300
Controller, H. Smith 928,707
Conveying apparatus, J. T. Cowley 928,365
Cooker, J. C. Prims 928,795
Cooking utensil, Hill & Zahnter 928,383
Cooking utensils, heat distributer for, A. B. Cruickshank 928,634
Cooler, V. F. Barbaro 928,420
Core, E. H. Proffitt 928,538
Coring machine, cabbage, C. B. Gedney 928,748
Corset, apparel, D. Kops 928,669
Cot and hammock, combined, H. Menten 928,317
Cotton press, B. Thoens 928,563
Coupling head, auxiliary, P. W. Hogan 928,654
Crane, P. H. Douglas 928,640
Crate, folding, C. E. Clark 928,586
Crate, folding poultry, H. D. Dennis, et al. 928,504
Crate, knockdown, J. B. Noyes 928,471
Crucible, P. W. Shimer 928,552
Crushing or pulverizing machine, C. A. Doen, et al 928,368
Culinary device, L. Nelson 928,397
Cultivator, J. C. & H. O. Williams 928,487
Cultivator, E. W. Werden 928,723
Cultivator or plow, wheeled, T. D. Heath 928,604
Cultivator, riding, A. E. Kistler 928,769
Culvert, Mahoney & Rounds 928,265
Currents, device for steadying, P. H. Thomas 928,287
Curtain fastener, E. J. Lombard 928,677
Curtain fixture, G. H. Forsyth 928,910
Cut off, float, H. Mohr, Sr 928,319
Cut off, rain water, E. E. Brott 928,846
Cutlery, metal handle for, W. B. Hatfield 928,515
Cutter, F. A. Meier 928,681
Cycle, P. C. Jeppesen 928,765
Cycles, detachable trailing carriage for, A. E. Abrahamson 928,416
Cyclometer for bicycles, A. Ruffin 928,473
Cylinder ring, Wehrman & Trueblood 928,294
Dating machine, B. B. Conrad 928,740
Desk, folding writing, C. Mohr 928,614
Die, W. H. Grissom 928,256
Disappearing table, G. H. Witthaus 928,726
Display holder, B. Rosenberg 928,281
Display rack, J. D. Walsh 928,292
Display rack, folding, R. E. McKay 928,533
Distant register, W. H. Muzzy 928,268
Door securer, J. U. Tabor 928,820
Door stop or securer, R. Pitt 928 279
Draft device, H. J. Klasing 928,667
Drain inlet, J. & D. D. Friedman 928,596
Draw bar carrier, C. H. Tomlinson 928,890
Drier, H. W. Shepard 928,706
Drill and socket, J. M. Goodwin 928,749
Drilling machine tapping attachment, R. Milne 928,780
Drilling, tool for holding disks for, Oakman & Axtell 928,275
Drinking fountain, poultry, H. B. Anderson 928,836
Driving mechanism, E. P. Webster 928,565
Drum, A. D. Converse 928,741
Drum, mixing, J. W. Cumisky 928,850
Dye, vat, P. Thomaschewski 928,891
Electric arc light, S. E. Donnelly 928,857
Electric heaters, controlling means for, E. H. Richardson, et al 928,402
Electric iron, D. W. McClay 928,532
Electric machine, dynamo, F. R. Kunkel 928,771
Electric machine, dynamo, H. M. Scheibe 928,799
Electric meter, D. C. Jackson 928,521
Electric outlet box, C. J. Dorff 928,251
Electric wire conduit, H. N. Speer 928,285
Electrical currents, unidirecting, E. A. Burlingame 928,583
Electrical receptacle, weatherproof, F. J. Russell 928,282
Electrical starting device, J. L. Schureman 928,547
Electromagnetic wave signaling, R. A. Fessenden 928,371
Electromagnetically operated apparatus, R. E. Hellmund 928,516
Electroresponsive device, E. A. Terpening 928,345
Elevator, J. T. Cowley 928,364
Elevator door, sidewalk, C. S. Hoffman 928,756
Embroidery hoop, S. W. Gibbs 928,598
Engine, T. R. Thurber 928,715
Engine cylinder lubricator, J. A. Daubenspeck 928,906
Engines, drive gearing for traction, D. W. Keyes 928,458
Engines, fuel for internal combustion, G. B. Selden 928,803
Engines, leveling mechanism for traction, R. C. Gorham 928,380
Envelop, H. W. Stuart 928,407
Envelop, R. D. Townsend 928,410
Excavator shovel, tandem, C. C. Jacobs 928,258
Fabric, J. L. Patterson 928,535
Faucet, J. H. Glauber 928,378
Feeder, automatic, G. L. Poh 928,400
Fence tie forming die, B. A. Garlinghouse 928,377
Fertilizer distributer, W. J. Adams 928,835
Files, division plate for document, W. J. Vick 928,346
Filter, F. B. Anderson 928,576
Fire escape construction, W. O'Keefe 928,325
Fire extinguishing apparatus with siphon arrangement, W. Bockem 928,897
Fish line float, J. Garrard 928,439
Fish stringing device, R. Coleman 928,427
Fly wheel, G. Scaramuzza 928,544
Folding case, A. B. Sutzer, et al 928,818
Forming machine, H. C. O'Bleness 928,616
Fruit cleaner, F. Stebler 928,558, 928,559
Furnace, C. F. Diller 928,907
Furnace oven, removable, N. E. Storms 928,816
Furniture, etc., manufacturing material for making articles of, H. B. Morris 928,266
Fuse lighter, C. C. Myrick 928,685
Gage head, J. W. Beard 928,422
Galvanizing, G. L. Patterson, et al 928,398
Garment rack, F. Wolf 928,728
Garment supporter, G. Barfus 928,421
Gas, apparatus for generating hot compressed, H. Neumann 928,324
Gas burner valve, L. L. Carnahan 928,497
Gas engine, H. M. Yager 928,299
Gas extinguisher and lighter, J. A. Matonsek 928,776
Gas furnace, J. Bueb 928,494
Gas, generating producer, H. F. Smith 928,808
Gas heater, J. A. Eddy 928,742
Gas lighting appliance, F. F. Dier 928,307
Gas lighting appliance, Dier & Primeau 928,505
Gas producer grate and means for removing ashes therefrom, H. F. Smith 928,809
Gas suitable for illuminating and heating purposes and making said gas, liquid, L. Wolf 928,729
Gas, treament of acetylene, James & Watson 928,867
Gate, A. V. Rowe 928,798
Gear, variable speed, H. E. Williams 928,486
Gear wheel, N. D. Levin 928,676
Gearing, changeable speed, W. Scott 928,705
Gearing, speed, J. S. Barnes 928,240
Gearing, variable speed, W. A. Widmer 928,568
Gearing, variable speed, J. S. Barnes 928,894
Glass, annealing and hardening, J. J. Farling 928,860
Glass in the heat, apparatus for working, J. Kremenezky 928,670
Glass shade and screen, A. Steffin 928,340
Gradient instrument, R. Sobotka 928,557
Grain separator, E. G. Clymans 928,498
Grate, fireplace, J. H. Dwight 928,593
Grip device, intermittent, H. W. Fellows 928,434
Gun, machine, A. F. Swahn 928,344
Gun, oil, T. B. Wilkinson 928,351
Gun with breech action, F. Jaeger 928,608
Hand bag, A. Schonberg 928,801
Harvester, cotton, A. W. Johnson 928,662
Hat, man's, E. B. Hollenbeck 928,384
Hay rake and tedder, combined, L. M. Jones 928,457
Heading machine, W. D. Thomas 928,409
Heat conserving receptacle, Wilson & Friend 928,414
Heater, J. J. Kelly 928,665
Heaters, apparatus for automatically regulating, J. Naughton 928,323
Heating device for lacquering, W. W. Vincent 928,291
Hinge and brace, adjustable, T. D. Meyer 928,468
Hinge, extensible, W. F. Hunter 928,760
Hitching device, horse, R. Cardin 928,629
Hoe, W. S. Davis 928,590
Hoisting machine, J. Bowles 928,626
Hoisting machine, C. F. Dallman 928,851
Hoisting machinery, clutch for winding drums of, C. P. Turner 928,482
Holdback, C. Hastings 928,602
Hoof nippers, J. A. Ryden 928,335
Hook and eye, S. A. Cinnamon 928,585
Horse detacher, Borland & Benack 928,843
Horse rake, K. Hoshino 928,517
Horseshoe, G. F. Fassett 928,647
Hose connection, H. Strom 928,817
Hose coupling, J. P. Baird 928,237
Hosiery, looping machine for, F. & J. F. Nelson 928,787
Hot air furnace, J. M. Keller 928,259
Household utensil, E. C. Price 928,537
Hub, vehicle, J. T. Watters 928,413
Hydrant, G. W. Johnston 928,663
Hydraulic governor, A. Dickerson 928,854
Hydrocarbon burner, W. Scrimgeour, Jr 928,337
Hydrocarbon burner, W. Scrimgeour 928,886
Incandescent mantles, producing, G. Buhlmann 928,580
Inhaler, V. E. Randall 928,884
Ink, R. W. Hochstetter 928,450
Ink, R. Hochstetter 928,915
Insulating joint, C. A. Jaynes 928,763
Insulator for third rails, L. Steinberger 928,709
Internal combustion engine, H. H. Simon 928,405
Internal combustion engine, E. Berliner 928,842
Invalid's table, M. A. Hawley 928,752
Iron, refining, P. Sejournet 928,551
Kinetoscope, continuous film, C. B. Gillespie 928,443
Knitting machine, W. W. Burson 928,244
Lamp, arc, Knapp & Schlesinger 928,464
Lamp, gas, C. W. Boyse 928,899
Lamps, Bunsen burner for incandescent gas, M. Jacobs 928,453
Lantern top, D. C. Kline 928,260
Last, W. E. Ellis 928,909
Last cord fastener, P. H. Hickman, et al. 928,605
Latch, gate, J. B. Walser 928,825
Lathe, multiple spindle automatic, E. U. Harrison 928,382
Lathes for boring elliptical openings, attachment to, J. Shaw 928,404
Lathing, manufacture of metal, W. Klocke 928,610
Lathing, manufacturing metal, W. Klocke 928,917
Lavatory, H. Podmore 928,696
Lawn sprinkler, A. Fisher 928,372
Leather skiving machines, marking or printing means for, R. P. Grant 928,514
Letter, illuminated shaded, C. H. Hulse 928,916
Level and plumb, combined, J. L. Greene 928,600
Leveling bar head, I. S. Hearn 928,603
Life preserver, Krieger & Tallman 928,465
Lighting fixture, preheating, W. N. Best, Sr 928,241
Load retaining device, E. A. Thompson 928,288
Lock, W. A. Hurst 928,761
Locks, antifriction bearing latch bar for, J. B. Webb 928,721
Locker hook, W. N. Vance 928,717
Locomotive boiler, O. D. Orvis 928,880
Loom shuttle motion, J. A. Gendron 928,440
Looms, pattern mechanism of, O. L. Owen 928,278
Looms, reed actuating mechanism for, J. A. Gendron 928,911
Lotion, G. Pucciarelli 928,539
Low water alarm, F. D. Goodnough 928,650
Lubricator, W. L. Newbaker 928,686
Lubricator, H. A. Swanson 928,819
Macaroni and the like, machine for making, J. Rivara 928,796
Magnet, lifting, A. C. Eastwood 928,510
Magnet, polarized, E. A. Burlingame 928,582
Mail bag catching and delivering device, J. J. Cruse 928,502
Mail catching and transferring apparatus, F. Blankenberger 928,735
Main and pipe cleaner, Greenan & Redford 928,863
Mangle, C. H. Mattice 928,315
Manifolding pad, E. K. Bottle 928,625
Match box and cigar cutter, combined pocket, J. Havassy 928,447
Matter or objects in quantities, examining, J. I. Solomon 928,888
Mattress, D. E. Miller 928,778
Measuring apparatus, R. Hoyt 928,658
Measuring device, dress, N. E. Jaeger 928,454
Meat cutter, C. W. Kuhn 928,389
Meat hanging device, J. E. Mowinckel 928,530
Meat products, smoking and curing, M. Brand 928,900
Metal coating apparatus, H. M. Huxley 928,385
Metal shaping apparatus, W. W. Bissell 928,353
Meter system, electrically controlled, H. P. Clausen 928,245
Micrometer gages, spindle lock for, L. S. Starrett 928,889
Mine, buoyant mechanical submarine, T. Novero 928,789
Mold, J. F. Monnot 928,470
Mold, L. A. Brown 928,493
Mold for casting sash weights, J. C. & G. L. George 928,441
Molding device, A. M. Thompson 928,714
Molding machine, W. B. Bolles 928,354
Molding machine, T. E. McNamara 928,786
Monkey wrench, ratchet, A. C. Jenrich 928,764
Mortising machines, pneumatic attachment for, E. E. Houghton 928,758
Motor, J. R. Morrison 928,782
Multiple pendant switch, C. D. Gervin 928,597
Musical instrument, pneumatic, T. P. Brown 928,357
Musical instruments, automatic playing attachment for, P. Welin 928,295
Musical instruments, harmonic attachment for stringed, L. E. Hull 928,866
Musical instruments, pneumatic action for, P. Welin 928,296

ORVILLE WRIGHT'S RECORD FLIGHTS AT FORT MYER.

(*Concluded from page 88.*)

Mr. Wright naturally tried to follow and obliged him to make a turn to the right in order to circle around the stake balloon at Alexandria in the right direction. Upon the return trip, after passing over the top of Shuter's Hill—a high hill near the turn—a strong downward current drove the machine toward the earth, and the aviator was obliged to set the horizontal rudder sharply upward in order to regain his proper elevation. After doing this he flew steadily back to the starting point and crossed the line 14 minutes and 42 seconds after first passing over it on the outward journey. Deducting the time of the turn at the far end of the course, the time for the 10 miles was 14 minutes and 12 seconds, which corresponds to a speed of 42.25 miles an hour. This means that the Wrights will receive a bonus of $5,000 in addition to $25,000 they bid for supplying a 2-man machine. The flight was made with Lieut. Benj. D. Foulois as passenger, and, save for the points mentioned above, was uneventful according to Orville Wright. The precision with which he maintained his level while flying over a valley 200 feet or more in depth on the outward trip was remarkable, and had not the downward wind current caught him on the return trip, he would have accomplished this just as well. The undulation and veering out of the course owing to the wind doubtless made a slight diminution in the speed. Had there been no wind the brothers might have made faster time and obtained a greater bonus. But, on the other hand, a flight under such conditions as obtained was a far better demonstration of the possibilities of the machine for war purposes, and the Signal Corps may well be proud of its first war aeroplane, which is without doubt the premier machine of the kind in the world to-day.

THE FIRST SUCCESSFUL CROSS-CHANNEL FLIGHT.

(*Concluded from page 88.*)

when the motor slowed down and stopped and he again came down in the Channel. Although his monoplane struck the water rather more gently than on the previous flight, Latham's nose was broken and his head cut open by his broken goggles, so forcibly was he thrown against some of the guy wires of his machine. Nothing daunted, however, he has announced that he will again make the attempt as soon as he recovers. Thus has been opened a new era in aviation—the era in which the flying machine is to be used for traveling from one country to another, be it over land or sea.

The triumphant 25-mile flight of Bleriot across the English Channel, which was accomplished in 37 minutes, or at the rate of about 40 miles an hour, is the culmination of a large number of more or less lengthy, yet successful flights that have been made by this aviator with his "No. XI." machine since it was first brought out last January. Some of the more recent of these flights we mention herewith.

During the past two months, M. Bleriot has been experimenting almost daily with either his "No. XI." or "XII." monoplane. The former of these he has kept at Issy-les-Molineaux, while the "No. XII." machine has been at Douai. On June 8th he made two excellent 500-meter flights with the latter at Issy-les-Molineaux, the first alone, the second with his mechanic as passenger. On June 11th he made several short flights of from 500 to 600 meters in length, keeping the machine close to the ground; and afterward a magnificent flight of fully a mile, which was terminated by a double S turn at a height of 15 feet. With M. Guyot as passenger, another flight of 1½ kilometer (nearly 1 mile) at a height of 7 meters (23 feet) was accomplished. The following day M. Bleriot made a straight-line flight of about 250 meters (820 feet) with Santos Dumont and A. Fournier as passengers. This was the first time that three people had flown in an aeroplane. The same day several other flights were made with one passenger, the longest of these being about a mile in length at a height of 20 feet. By himself, Bleriot afterward flew about 3 miles.

On June 14th Bleriot made some more flights with his "No. XII." monoplane. After a short flight of 4 kilometers (2½ miles), he landed to repair his magneto. As soon as this was accomplished he made a magnificent flight of 10½ minutes duration, in the course of which he turned his machine in all directions and executed various maneuvers that demonstrated thoroughly its stability. Several times he took his hands off the steering wheel. The next day, after making a 5-minute flight at a height of 20 feet, he flew with a passenger, but the flight was stopped by the breaking of a connecting rod of the 8-cylinder motor.

On June 18th, Bleriot began flying again his "No. XI." monoplane, fitted with a 3-cylinder Anzani air-cooled motor of about 25 horse-power. He made a flight of 4 kilometers (2½ miles). On the 21st he made flights of 3 and 6½ minutes, the motor stopping from lack of oil. Just as he was starting on a third flight, the exhaust from the motor set fire to the gasoline in the carbureter, due to the latter being placed too near to the exhaust pipe. The flames were quickly extinguished with sand.

On June 25th, he took out his machine about 7 P. M., and, notwithstanding a quite heavy wind, he flew for 15½ minutes, making about 12 circuits of the parade ground and showing perfect stability in spite of the violent wind gusts. Each time he passed over the aeroplane shed he took his hands off the steering wheel. The flight was terminated because of too much oil, which fouled the spark plugs. The flight was officially timed by M. Ernest Zens. At 7 A. M. the next day Bleriot made a record flight consisting of 20 circuits of the parade ground in 36 minutes 55 3/5 seconds. In the early evening he made three more circuits.

On Monday, June 28th, Bleriot started making flights at Douai with his "No. XII." machine. He won the first of five prizes of $400 each in a magnificent 1½-mile flight at a height of 65 feet. In a second flight made on this day, he carried a passenger once around the field.

On June 30th, he tried to break his previous record at Issy with his "No. XI." machine, but after flying only 650 feet, the engine stopped on account of too much oil. Shortly after, he remedied this trouble, and then made four excellent circuits of the parade ground at a speed of over 37 miles an hour. The time of the flight was 6 minutes, 11 seconds. There was a gusty wind of from 15 to 20 miles an hour. More lubrication trouble was the cause of his alighting.

On July 4th Bleriot set up a new record at the Aerodrome at Juvissy. This record was made at an aeronautic meet for the benefit of the many people who suffered from the recent earthquake in the south of France. The flight this day was made with the "No. XI." machine. After making one circuit of the course, Bleriot started upon his long flight. This flight lasted 50 minutes and 8 seconds. It was brought to a close through trouble with the gasoline feed. The flight was made at a height that varied from 50 to 80 feet, and it was the best Bleriot had made up to that time.

On July 9th and 10th, at Douai, he made several flights before 20,000 spectators; but his greatest performance prior to that of July 25th was his cross-country flight of 25 miles on July 13th. This flight from Etampes to within 8 miles of Orleans was accomplished early in the morning and was broken by a descent in a field near Barmainville. The flight was for the "Prix de Voyage." While it was not necessary to make a descent, Bleriot chose to do this so as to show

(*Concluded on page 100.*)

the practicability of his machine. Soon after he started up again, Bleriot passed Toury and Dambron. As he came in sight of Artenay, which was the half-way point of the cross-country flight last year, a rather strong wind from the west caused him to make a semi-circle. He flew sufficiently high to clear the telegraph wires and then came to earth on the selected spot at Croix-Briquet-Cheville. The start was made at 4:44 A. M. and the landing took place at 5:40. Deducting the 11-minute stop, the net time was 45 minutes and the distance 41.2 kilometers (25.58 miles). The average speed was therefore 34.1 miles an hour. In making this flight Bleriot received a prize of 5,000 francs as pilot and 4,000 francs as constructor. The motor manufacturer received 3,000 francs and the designer of the propeller 2,000 francs. All these prizes are conditional upon the performance not being beaten before the first of next January. The practicability of Bleriot's machine is shown by the fact that 35 minutes after he had alighted the machine had been taken apart and shipped back to his factory at Neuilly, near Paris.

M. Bleriot's two latest aeroplanes have been illustrated and described heretofore in our columns, but it would perhaps be well to give the particulars of these machines again at the present time. The spread of the "No. XI." is 7.8 meters (25.58 feet) and the length of the body 7 meters (22.96 feet). The lifting surface is 14 square meters (150.69 square feet). The machine is equipped with a 3-cylinder Anzani air-cooled motor which weighs 60 kilogrammes (132.27 pounds) complete in running order. A 2.1-meter (6.88-foot) diameter Chauviere wood propeller is driven direct from the motor. Complete with Bleriot (whose weight is said to be 195 pounds) and with fuel sufficient for a two-hour run, the "No. XI." machine weighs but 300 kilogrammes (661.38 pounds). It rises in the air at a speed of 55 kilometers (34.17 miles) per hour when the surfaces are loaded to the extent of 22 kilogrammes per square meter (4.46 pounds per square foot). This is about double the weight carried per square foot of surface by most bi-planes. It is probable that this machine, which is the smallest and lightest that Bleriot has built, is able to raise even a greater weight. It might perhaps carry an extra passenger, although this has not yet been tried. The plane is said to be warpable, somewhat similar to those of the Wright bi-plane. Consequently, there are no wing tips. The "No. XII." monoplane, on the other hand, has rectangular balancing planes attached to the body framework just below the aviator's seat. It is somewhat surprising that planes so near the center of the machine will work satisfactorily for this purpose, but photographs of the "No. XII." making a turn show that it tips very little. Bleriot has two vertical surfaces on each side of the body at the front end and he has also covered the framework about half way back to the rear end and placed a fin keel above it. As a result of all this vertical surface the machine does not tend to skid very much in making a turn, and consequently it does not have to be tipped inward to counteract the effects of centrifugal force.

The "No. XII." monoplane has a spread of 9 meters (29.52 feet) and a surface of 22 square meters (236.8 square feet). It is equipped with an 8-cylinder V-type E. N. V. motor of 30-35 horse-power. The total weight of the monoplane in running order with water in the radiator, but without fuel, is 350 kilogrammes (771.61 pounds). With Bleriot, Santos Dumont, and A. Fournier on board, and with 16 kilogrammes (35.27 pounds) of fuel, the total weight was 560 kilogrammes (1,234.58 pounds). Therefore this machine, which weighs only 350 kilogrammes (771.61 pounds) carried a dead weight of 210 kilogrammes (462.97 pounds). The total weight lifted per square foot in this instance was 5.21 pounds—an altogether unprecedented amount. The machine rises at a speed of 55 kilometers (34.17 miles) per hour with 25 kilogrammes per square meter (5.12 pounds per square foot) loading of its single surface. The weight lifted per horse-power varies from 35 to 41 pounds, according to whether the motor is taken as developing 35 or 30 horse-power. This monoplane is therefore by far the most efficient aeroplane flying machine that has ever been constructed.

After his record flight M. Bleriot was presented with a gold medal by the Aero Club of Great Britain and also by the Aero Club of France. A few days before, he and Gabriel Voisin had been awarded the Osiris prize, which is given every three years to the men who make the greatest advance in science. He was also decorated with the ribbon of the French Legion of Honor, as were the Wright brothers. In addition to winning the prize of the London Daily Mail ($5,000), Bleriot also won a prize of $2,500 offered by a French wine firm two years or more ago. The Alaska-Yukon Exposition has put up a prize of $25,000 for a race between Bleriot and the Wright brothers.

ELECTRIC LAMPS IN THE MAKING.

(*Concluded from page 89.*)

the bulb are then joined together. The operation is known as "tubulating," and the tube thus made temporarily a part of the bulb furnishes the means for the removal of the air inside at almost the final stage in the manufacture of the lamp.

With the filament now made and the bulb washed, cleaned, dried, and tubulated, the filament-bearing stem and the bulb proper are assembled at one machine. The operation of sealing these two parts can best be likened to inserting a stopper in a bottle; the bulb being the bottle, and the stem the stopper. A girl inserts this stem into the neck of the bulb, and both parts are revolved on the sealing machine into jets of flame, where they melt together. Knowing the exact amount of glass that must be melted away and the shape the molten glass will assume when it cools, the operative is able to unite the stem and bulb skillfully.

Then the bulb goes into another tray along with other bulbs, and is taken to a girl in the vacuum room. This girl is seated before an earthen pot in which there is a bubbling liquid—phosphorus in a liquid state—which is kept stirred by a jet of water. She takes the bulb, and with a brush hardly larger than a knitting needle coats the air-extraction tube with a phosphorus solution.

After this the bulb is ready for the exhaustion of the air and final sealing. Already the air has been drawn from the bulb several times in the processes of manufacture, but each time the bulb has been left unsealed. It is now ready for the final air test. The tube at the big end of the bulb, through which the air is withdrawn by a most ingenious pump, is to be sealed by melting.

When the bulb is placed in position for exhausting the air, the wires running through the neck are connected with an electric current, which causes the filament to glow. If it were allowed to glow more than a few seconds with oxygen present in the air, the filament would burn up and collapse So, while the tube is connected with the vacuum pump, the operative touches it with a blue flame spray which melts bulb and stem apart, and the melted end next to the bulb draws up and closes automatically, leaving the little point seen in the finished bulb over your desk or table. Before the sealing is completed the light within the bulb has a bluish cast, and this reveals the fact that all the oxygen has not yet been withdrawn from the bulb. It is then that the coating of phosphorus in the air extraction tube plays its part. The heat upon the tube converts the phosphorus into a phosphorescent gas, and this gas, entering the bulb, neutralizes the oxygen in the bulb. Almost instantly the color of the bulb changes from blue to white. In this manner the operative

(*Concluded on page 101.*)

knows that the effect of the oxygen has been overcome.

The bulb is next taken into the photometer room for the purpose of making final tests. It is a large dark room divided into several small stalls. In each stall is an induction coil, from which the bulb is held about two feet away. The induced current from the coil passes through the body of the operator to the bulb, and causes the filament to glow faintly. If the glow is bluish gray, it shows that there is still a leak somewhere; although it may be so infinitesimal that it can scarcely be measured by mils. If the glow is of a purplish hue, it shows that there is air still within the bulb and that the bulb must be further exhausted. This means an operation involving many more handlings.

The next process is the measurement of the bulbs for voltage, a work of the greatest possible delicacy. Two girls, working together, do the measuring. One places the bulb in connection with a current that lights it, and the light from it shines through a small aperture upon a white paper screen. In the center of this screen is a faint star-shaped spot. It requires a certain voltage in the light to bring out this spot.

When bulbs pass the tests and measurements successfully, they are then ready for the appliances with which they are attached to the current-carrying fixtures in general use. They are taken to another part of the factory, where a girl places them in a tray. Threaded brass collars are placed about the necks, and the space between the collars and the necks is filled with plaster cement. The tray revolves through a heating oven that bakes the cement into a hard and holding mass. The ends of the wires running through the necks are cut off; small round brass plates are placed on the ends, the wires are soldered fast, and the lamp is completed.

Once more there is a sort of farewell test for leakages that may have escaped notice or may have developed from the last handlings. This final test is very quick and simple. The sealed ends of the bulbs are held against two electric poles. If the lights are white and perfect, the lamps are considered ready for the last cleansing of the glass, classification, and shipment. Throughout the entire process of development of the bulb into a perfect lamp there are scarcely ever any broken. This is really remarkable when it is remembered that the bulb is not only picked up many times and placed in machines, but is heated and cooled many times.

THE FIGUREHEAD AND ITS STORY.

(*Concluded from page 92.*)

other meaning of the word dragon denotes watchfulness, so that it is not surprising to find that the *drakkars*, or dragon ships of the Vikings, generally belonged to their chieftains and were the largest ships in their fleets. The next largest were generally *esnekkers* or "long serpents" with snake figureheads. In both cases the hull of the vessel played the part of the monster's body, the stern often terminating in a representation of its tail. But although the dragon and serpent were the favorite devices they were not the only ones that did duty at this period as figureheads. When Sweyne, King of Denmark, made a descent on the Norfolk coast in 1004, his own ship "The Great Dragon" was made in the form of the animal whose name it bore, but the bows of the other vessels of his squadron were adorned with the figures of lions, bulls, dolphins, and men, all made of gilded copper.

After the Norman conquest the figurehead disappears from view for some centuries, and it is not until the reign of Henry V that we again find references to its use. Images of the saint after whom a ship was named used, it appears, to be sent on board in the time of Edward III, but there is no record of their having been utilized as figureheads. The reason of their temporary disappearance was the gradual changes in the status of navies and in the build of the ships of which they were composed. The fast oar-propelled long-ship, built only for speed and for war, gradually gave place to the round-ship, relying on her sails and built primarily for commerce and the conveyance of mail-clad nobles and their men-at-arms to the country where they intended to carry on a campaign. Fierce sea fights certainly took place from time to time, but for this purpose any ships that could be assembled together were utilized and prepared for action by the addition of stern and fore castles, built-up stages or platforms which overhung the actual stem and stern of the ships and left no place for a figurehead. In process of time the square bow platform or forecastle became triangular and its foremost extremity once more offered a suitable position for the figurehead. Gradually, too, the king became possessed of a certain number of ships of his own, the nucleus of a royal navy. These vessels, though occasionally hired out as merchant ships, were more or less elaborately decorated, and among other decorations the figurehead reappeared. Thus in the year 1400 the "Good Pace of the Tower" had a large golden eagle with a crown in his mouth as figurehead, and in representations of ships during the fifteenth century little, insignificant figureheads are here and there to be met with. The famous "Henri Grâce à Dieu," built in 1514, had a squatting lion as figurehead, while the big French man-of-war "Grande-Françoise," built at St. Nicholas de Leure in 1527, was decorated forward with a salamander above which was placed a statue of St. Francis. The Elizabethan men-of-war seem generally to have been ornamented with figureheads, but with some exceptions they were neither very large nor very noticeable. At this time a long, almost straight projection ran abruptly out from the bow of the ship a little way below the bowsprit. It was very different from the gracefully curved stem which in the seventeenth and eighteenth centuries replaced it and would not, in all probability, support any very great weight at its extremity. Still it often carried a figurehead of sorts. Thus the "Ark-Royal," Effingham's flagship in the Armada fight, had a mild-looking bird as figurehead. The "Bonaventure" and others had dragons on their beakheads; others had lion figureheads, one, at any rate, being gilded. The "Mary Rose" had a unicorn, the "Swiftsure" a tiger, while the "White Bear" was adorned with "an image of Jupiter sitting upon an eagle with the cloudes." In Holland the "Finis Belli," the earliest ironclad, bore the figure of a man in armor at her bow. About the time of James I equestrian figures were introduced as figureheads, and in succeeding reigns these were surrounded with other figures, forming a most elaborate bow decoration. Thus the famous "Sovereign of the Seas," launched in 1637, had on her beakhead the figure of King Edgar on horseback trampling upon seven kings. The figurehead of the Commonwealth ship "Naseby" was equally exuberant, consisting as it did of the Protector on horseback "trampling upon six nations." It was evidently a colorable imitation of that borne by the "Sovereign of the Seas." Curiously enough this was the ship in which Charles II returned to England at the Restoration. In honor of this she was renamed the "Royal Charles." She was fitted with a new figurehead, which is now in the museum at Amsterdam, the ship having been captured by the Dutch when they came up the Medway. Furtenbach in his "Architectura Navalis," published a few years earlier, gives an engraving of a very peculiar figurehead which terminated the beakhead of a Turkish pirate brigantine of a class known as *caramunzels*. It is probably intended to represent a drag-

(*Continued on page 102.*)

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Rail splice, C. G. Gates 928,747
Rail tying mechanism, W. F. Andrews 928,301
Rails, automatic cleaning device for tramway, J. Sandoz-Sutter 928,543
Railway block system, G. W. Nistle, et al, 928,271, 928,273, 928,274
Railway crossing, J. W. Baldwin, Jr. 928,238
Railway crossing gate, J. W. Noel 928,788
Railway, elevated suspended track automotor, F. E. Felts 928,435
Railway rail fastener, M. L. Byers 928,496
Railway selective apparatus, Wright & Deible 928,571
Railway selective signaling device, S. R. Wright 928,570
Railway signal, W. J. Rader 928,328
Railway sleeper, reinforced concrete, with special fixing device, B. Sani 928,617
Railway switch, T. W. Cox 928,632
Railway switch, B. Ruhbaum 928,704
Railway switch, automatic, I. A. Call 928,738
Railway switch locking system, G. W. Nistle, et al 928,272
Railway tie, J. Staats 928,479
Railway tie, D. Stevens 928,480
Railway tie, H. Cockell 928,499
Railway tie, G. A. Starkweather 928,814
Railway tie, G. Whitaker 928,827
Railway tie and rail fastener, H. A. Olson. 928,791
Railway tie, concrete, J. B. Pope 928,472
Railway tie, metal, Meebling & Smith, 928,467, 928,529
Railway tie plate, L. Dilworth 928,429
Range finder, W. H. M. Christie 928,902
Ratchet wrench, F. E. Walden 928,719
Razor blade stropping device, O. Kaupfe .. 928,664
Razors, device for stropping double edged safety, F. Mitchell 928,318
Receptacle, adjustable attachment, L. P. Benson 928,841
Refrigerating apparatus, J. Schneible 928,546
Refrigerator cars, floor construction for, J. Strain 928,406
Relay, electrical, E. E. Clement 928,360
Relay, frequency, D. J. McCarthy 928,531
Resistance cup, F. Gottschalk 928,652
Rheostat, Meston & Finch 928,394
Ring travelers, holding and delivering means for, L. S. Burbank 928,303
Riveting machine, J. A. Mosher 928,783
Rock cutting apparatus, F. W. Allan 928,574
Rolling mill, H. Keitel 928,768
Roofing nail, J. Conway 928,630
Rotary engine, L. L. Driggs 928,506
Rotary motor, M. Naeder 928,270
Rubber spading boot, Van Denburgh & Glissmann 928,718
Rudder, jury, W. Manwaring 928,612
Safety device, W. Cooper 928,903
Safety stop signal, automatic, W. E. Adams 928,834
Sash balance, adjustable, E. M. Erb 928,644
Sash lock, A. A. Solaway 928,339
Sash lock, R. Taube 928,408
Sash operating and locking mechanism, R. H. Jones 928,767
Sash support, window, N. H. Conger 928,362
Screen. See Glass shade screen.
Screen, N. Ellwart 928,643
Screw thread cutting mechanism, Allen & Henry 928,489
Scythe snathe, J. N. Radcliff 928,883
Seal and lock, window or door, C. E. Lahart 928,466
Sealing device, bottle, R. V. Lyon 928,872
Sewing machine ruffler, W. R. Parsons ... 928,792
Sewing machine tuck creaser, F. W. Beckert 928,838
Sewing tool, C. E. Betts 928,424
Shade and curtain pole bracket, adjustable, A. L. & C. L. Renzenbrink 928,329
Shade bracket, H. Wittmann 928,829
Shade bracket and curtain pole support, combined, R. B. Jefferey 928,522
Shade fixture, window, D. Hoyt 928,864, 928,865
Shampoo tray, C. B. Lovett 928,313
Sharpener, file, J. C. Rink 928,331
Sharpening, file, J. C. Rink 928,331
Sharpening machine, saw, G. H. Robinson .. 928,332
Sheet feeding device, F. B. Davidson 928,637
Sheet metal structures, uniting the component parts of composite, A. F. Rietzel 928,701
Sheet metal wheel, sectional, J. F. Craven. 928,633
Shingles from paper pulp, apparatus for making, J. T. Collins 928,501
Shoe polishing machine, E. F. Stratton 928,341
Shoe rack, W. F. Atwood 928,419
Shovel, A. Schultze 928,283
Shuttle operating device, G. Schwabe 928,802
Sign board structure, M. P. O'Brien 928,534
Sign, illuminated letter, C. H. Hulse 928,309
Signal, Kennedy & Gleason 928,666
Silicon nitrid, manufacturing, A. Sinding-

on's head, and flames are shown spouting from its mouth. It seems possible that some kind of a gun may have been mounted inside the beakhead with its muzzle concealed in the monster's mouth.

The French were always noted for the excellence and beauty of their warships, and it is not to be supposed that their ornamentation was a whit behind that of their English contemporaries. As a matter of fact they were, if anything, the more elaborately decorated of the two, and often expensively gilded.

The lion about this period became as favorite a figurehead in the French and English navies as was the dragon among the Vikings. Sometimes he was rampant and fierce, at others he assumed a calm and majestic attitude. The lion went out of fashion in the French fleet after a short time, but was retained rather longer in the British service and adopted very extensively by the Dutch navy. The "Vreyheid," Admiral Winter's flagship, had a lion figurehead. Later full-length figures, often of a classical nature, emblematic of the name of the ship they ornamented, quite ousted the king of beasts, and these lasted right up to the beginning of the ironclad period between 1860 and 1870. There were a few exceptions to the lions and the full-length figures that succeeded them, notably the figurehead carried by the "Britannia" of 100 guns in the reign of William III, which was an elaborate representation of the royal arms embellished with scrollwork and other devices, and that which adorned the "Victory" at Trafalgar, which was also the royal arms with the figures of a seaman and a marine as supporters. Some years afterward these were transformed into a pair of cherubs. But the full-length—or more often the three-quarter length—figure continued to ornament the bows of all classes of men-of-war right up to the beginning of the ironclad period.

The French were ahead of everyone in launching the first seagoing ironclad—"La Gloire." She had no figurehead, but the "Warrior" and the "Black Prince," a pair of sister ships, which England constructed in reply, were ornamented with two of the finest figureheads that have ever been made. But both these ships had overhanging or "swan" bows, while their successors had the ram bow, which did not lend itself so well to this style of decoration, and a shield or coat of arms surrounded with more or less elaborate scrollwork became the vogue for the bows of an ironclad. There were exceptions, of course, especially in ships of low freeboard. Thus, the figurehead of the old "Royal Sovereign" turret ship (which by the way, was an old wooden line-of-battle ship cut down) was unique in having a lion standing at the top of the stem above the medallion of Queen Victoria, which was below it. The "Rodney" and "Centurion" both had bust figureheads illustrative of their names, while the French battleship "Brennus" was decorated in the same way with a very fine piece of wood carving. At this period there were plenty of small craft among the warships of the world which still preserved the swan bow, and with these the older style of figurehead still preserved its supremacy. H. M. S. "Iris," for instance, had a beautifully designed angel, while the unfortunate gunboat "Serpent," wrecked off the Spanish coast, bore a snake. Toward the end of the nineties the figurehead began to disappear altogether from the British and the French man-of-war. The principal reason alleged for the abolition of the figurehead in England was that it got in the way when rigging out the torpedo-net defense, which on its part often damaged the ornamentation, necessitating an expenditure on repairs. Probably the initial cost was also thought to be an extravagance. But the practical and economical Germans have retained the

(Concluded on page 103.)

figurehead in their new and formidable navy and have evolved some very handsome specimens despite the ram bow. What, for instance, could be more decorative and appropriate than the fine figure of Germania on the bow of the "Deutschland," one of their very latest battleships? The scrollwork on the cruisers "Bismarck" and "Eber" is also very artistic. The probability is that the German Admiralty regards *esprit-de-corps* as a very valuable and practical asset and thinks that nothing is ill-spent which in any degree serves to stimulate this feeling. Certainly in the old days seamen venerated the figurehead of their floating home in much the same way that a regiment adores its special and distinctive badge. "So, now, my lads," said Capt. Hall when in command of a frigate on board of which there was an epidemic of bickering and quarreling among the ship's company, "if this be not put an end to, and hearty good-will restored, I'll blacken your figurehead and put the ship in mourning." The threat had a most salutary effect, and the handsome bow-ornament shone resplendent to the end of the commission.

In the far East the Japanese and Chinese have one uniform bow decoration for their men-of-war, the former using a conventional representation of the Imperial chrysanthemum and the latter the national dragon with the head of a camel, the horns of a deer, the eyes of a rabbit, the ears of a cow, the neck of a snake, the belly of a frog, the claws of a hawk, and the palms of a tiger.

In the United States the figurehead has followed much the same lines as in Europe. That of the "Chesapeake," famous for her duel with the "Shannon," can be seen in the gardens of Ashford House in Woolmer Forest. That of the "Delaware," representing the Indian chief Tecumseh, is in the grounds of the naval academy at Annapolis, and is saluted by every cadet when he passes it, lest haply the omission to do so should bring him ill-luck in the passing-out examination. Though not on so elaborate a scale as in the German navy, the United States ships, even of the newest types, are still decorated with scroll-work at the bow and in some cases a new departure has been made in placing a handsome full-length figure or figures of bronze on the foremost turret between the two bow guns. The "Massachusetts," for instance, has a most handsome and decorative figure of a Winged Victory which was presented to her by the State whose name she bears, while the "Kearsarge" and "Alabama"—whose former namesakes fought so desperately with each other off Cherbourg in 1864—have similar decorations symbolizing in the figures the North and South clasping hands, a reunited country.

This seems an excellent idea and one that might well be followed in all navies. A bronze figure on the foremost turret would more than replace the figurehead of former days. It would, unless destroyed in action, be practically everlasting and be passed on from one ship to its successor of the same name. It would be a far better and more appropriate heirloom than the services of plate which it is becoming the custom to present to various ships. Being carried inboard instead of outboard it can be seen and admired day after day by the ship's company, which was not always the case with the figurehead even in its palmiest epochs. May we in conclusion express a hope that the time-honored figurehead may in this form rise "phœnix-like from its ashes" and be once more promoted to a place of honor in the world's war navies?

A 7-foot flywheel upon a Russel engine went to pieces the other day at the station of the Allegheny Valley Lighting Company, at Creighton, Pa., causing about $3,000 worth of property damage, but no personal injuries.—Power and the Engineer.

Larsen	928,476
Single phase commutator motor, V. A. Fynn	928,438
Sink, washtub, and similar article, F. H. Caldwell	928,425
Skate, J. E. Martin	928,528
Skirt gage, J. D. Ball	928,239
Skiving machine attachment, G. A. Henderson	928,755
Smoke producing device, H. & R. Pinegar	928,695
Snow plow for sidewalks and highways, W. W. Cowan	928,363
Sound producing instrument, F. Gottschalk	928,651
Sound reproducing machine, J. Wellner	928,567
Sparker, G. A. Weidely	928,484
Speaking tube, W. F. Simpson	928,554
Speed changing mechanism, W. O. Foss	928,648
Speed controlling mechanism, A. M. Wolf	928,727
Speed indicator, Dahl & Martin	928,635
Speed mechanism, variable, A. G. Mather	928,679
Spinning or twisting machine, W. P. Wood	928,830
Square and bevel, combined, E. A. Williams	928,569
Stamps to lecters, device for affixing postage, A. Tebbit	928,713
Stave formed structure, machine for tying bands in, D. E. Vanvactor	928,290
Stave punching machine, D. E. Vanvactor	928,289
Steel toughening, S. S. Wales	928,347
Stove attachment, gas, H. Knudsen	928,770
Stove, heating, E. R. Cahoone	928,737
Straightening machine, E. A. Lane	928,672
Strainer, sink, A. W. Andrews	928,236
Stud or button, E. L. Anderson	928,622
Suit case handle connecting device, G. W. Wood	928,619
Surface indicator, F. Brink	928,492
Suspenders, J. Weis	928,722
Sweeping machine, J. O. Johnson	928,456
Swing gate, Kendrick & Carroll	928,387
Tanks or cans, safety attachment for, N. B. Ippolito	928,660
Tapper, beer, R. B. Spikes	928,813
Tare weight, J. W. Ford	928,745
Telegraph and telephone wires, guard for, C. J. Elliott	928,431
Telegraph pole, W. H. & H. R. Smalley	928,478
Telegraph sounder intensifier, R. W. Crawford, et al	928,589
Telephone system, D. W. May	928,680
Telephones, sanitary guard for, S. E. Florsheim	928,373
Telephonic apparatus, E. A. Graham	928,862
Telescope mounting, F. L. Smith	928,555
Tent, folding, H. G. Hergelroth	928,448
Tent pin or anchor, J. F. Miles	928,469
Textile fabric, J. G. Elliott	928,642
Thread, spool of, J. J. Drury	928,507
Tie plate, J. H. King	928,869
Tile, H. C. Moore	928,320, 928,321
Tile and sewer outlet protector, drain, O. A. & J. A. Tenold	928,481
Tins or canisters for preserves, apparatus for flanging, A. Wilzin	928,618
Tire armor, pneumatic, C. E. Evans	928,433
Tire, non-skid, E. Kempshall	928,868
Tire setter, H. M. Lourie, et al	928,264
Tire signal, pneumatic, Silverman & Trahan	928,553
Tire, vehicle, W. A. Koneman	928,611
Tire, vehicle, M. Behrer	928,731
Tire, pneumatic, R. J. Ruths	928,334
Tires, gaiter or patch for repairing pneumatic, H. Maries	928,678
Tires, etc., hose connection for wheel, E. J. Rohrbacher	928,797
Tires, valve for pneumatic, G. De Vigne	928,411
Toilet case, E. B. Pike	928,694
Tongs, A. G. Carlson	928,849
Top, Gropper & Schmidt	928,257
Towing post, W. F. Johnstone	928,766
Toy, O. S. Meyer	928,777
Toy, figure, W. H. Fisher	928,744
Traction wheel, N. Campbell	928,848
Train stop, time limit, W. Brewer	928,355
Trains, means for controlling the operation of, J. F. & J. F. Webb, Jr.	928,350
Trap, J. C. Wood	928,352
Trap, D. Morgan	928,395
Trolley, F. Kompe	928,668
Trolley base, C. E. Gierding	928,442
Trolley pole controlling means, C. E. Cozzens	928,306
Trolley pole for electric railway cars, T. Oliver	928,879
Trolley switch plate, E. Bell	928,839
Trunk, J. Finzler	928,743
Trunk lock, H. W. Cottrell	928,904, 928,905
Tube cleaner, W. S. Elliott	928,432
Tubes, bottles, etc., closure for collapsible, Pike & Hayne	928,692
Tumbling apparatus, Patterson & Boax	928,399
Turn table, M. J. Leonard	928,675
Typewriter, telegraphic, E. Burlingame	928,581
Typewriting machine, C. Delvigne	928,591
Typewriting machine, A. T. Brown	928,627
Typewriting machine, J. C. Doane	928,856
Typewriting machine, H. S. McCormack	928,876
Typewriting machine, J. C. McLaughlin	928,877
Typewriting machine, E. L. Pfunder	928,882
Umbrella, folding, J. Charlesworth	928,426
Umbrella window, G. R. Livergood	928,774
Valve, C. G. Harcourt	928,751
Valve, J. Stevison	928,815
Valve, D. F. Morgan	928,874
Valve, automatic intermittent flushing, H. A. Kieselhorst	928,459
Valve, gas, J. Melnik	928,316
Valve operating mechanism for internal combustion engines, S. Loffler	928,390
Valve operating mechanism, furnace, J. W. Seaver	928,403
Valve, regulating, H. C. Benwitz	928,732
Valves, disengaging device for motor driven, Ward & Yerrick	928,720
Vault, burial, S. E. Burke	928,847
Vaults, mold for concrete burial, M. J. Demorest	928,638
Vehicle, B. Tippmann	928,564
Vehicle cushion wheel, F. Groff	928,601
Vehicle spring, Bollbach & Waindzioch	928,242
Vehicle top, foldable, W. S. Butler	928,584
Vehicles of any kind, antivibration device for, G. Huysmans	928,520
Vehicles, stalk cutting attachment for, R. B. Human	928,759
Velocipedes, pumping device for, P. G. Larsson	928,919
Vessel lid holder, R. M. Dixon	928,855
Vessels, apparatus for elevating submerged, G. Pino	928,536
Vinegar, making, W. Antoni	928,578
Wagon box, drop, A. T. Cyr	928,503
Wagon, dumping, G. M. Head	928,753
Wagon jack, A. A. Roon	928,587
Washing machine rake, A. C. Sargent	928,336
Water closet fastening device, J. F. Kelly	928,523
Water cooler, W. G. Eads	928,908
Water distributer, W. C. Johnson	928,386
Water gage, C. Carlson	928,304
Water heater, F. A. Knapp	928,261
Water heater, H. S. Humphrey	928,310, 928,311
Water heater, J. W. Ellebrecht	928,859
Water heater, automatic, R. Hoffman	928,757
Wedge, ax and tool handle, G. P. Morrill	928,322
Weighing machine, K. Bottcher	928,491
Wheel attachment furrow, L. J. Hamilton	928,446
Wheel lock, hand, Ward & Yerrick	928,893
Whetstone, blotter, and ruler, combined, E. B. Pike	928,963
Whip socket, J. C. Feickert	928,370
Windlass, C. H. Richardson	928,336
Window and door screen, A. C. Davis	928,366
Window, flexible, W. E. Walsh	928,349
Window pane fastener, A. E. Cherry	928,359
Window screen, W. A. Loper	928,526
Wire rope clamp, C. C. De Witt	928,367
Work clamp, H. Howell	928,657
Wrench, A. Frick	928,375
Wrenches, pipe-gripping attachment for monkey, F. Gorman	928,444
Yarn, W. P. Wood	928,831

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1863, will be furnished from this office for 10 cents, provided the name and number of the patent desired and the date be given. Address Munn & Co., 361 Broadway, New York.

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