

## Index

## A

- Abeille carburettor, 326.  
 Accelerator of Panhard & Levassor-Daimler motor, 147, 148.  
 Accles & Turrell sparking plug, 369.  
 Accles-Turrell light car, 239–246.  
 Act, the 1896, and the Local Government Board regulations, 597.  
 Acts, the 1865 and 1878, 597.  
 Adamson, D., & Co.'s steam carriage, 34.  
 Adjustment of belt tension in Mors car, 182–184.  
 Agricultural Society, Royal, trials by, 514.  
 Air cooling of motor cylinders, 338.  
 — resistance, importance of, at high speeds, 59.  
 Amédée Bollée carriages, 212.  
 American single tube tyres, 609.  
 — steam carriages, 457.  
 Apprin's water cooler, 343.  
 Ariel quadricycle, 301.  
 — tricycle, 270–272.  
 Armstrong's steam carriage, 34.  
 Automobile Club, British, trials, 1899, 383.  
 — 100 miles trials, 578.  
 — 1,000 miles trial, results of, 615–623.  
 — of France, trials of electric vehicles, 395, 396.  
 — of Great Britain and Ireland, 614.  
 Axle and differential gear of Empress tricycle, 304, 305.  
 — bridge of motor tricycle, 302–304.  
 — Collinge, 345, 346.  
 — driving, jointed, de Dion, 485.  
 Axles and springs, strength of, 348.  
 — Gibbs' radiating, 22.  
 — Lemoine's, 346–349.  
 — of steering and driving wheels, 344–349.  
 — pivoted steering, 567.

- Axles, roller and ball-bearing, 425.  
 — steering, Lifu, 497, 510.  
 — steering, pivoted hub, Clubbe & Southey, 438.  
 — steering, rear, of Electric Vehicle Co., 426.  
 — steering, undesirable form, 346–348.

## B

- Balancing, and balanced motors, 564.  
 Baldwin detachable link chain, 467.  
 Ball-bearings, friction of, 46.  
 Battery, storage, Columbia Co., 437.  
 — storage, Crowds, 437.  
 — storage, of Electric Vehicle Co., 431, 432.  
 — storage, of London electric cab, 398–402.  
 — storage of, Riker electric carriage, 416.  
 Bayley, Messrs. E. H. & Co., estimate for motor tip vans, 593.  
 Bearing, effect of load on, 45.  
 — effect of width of, 44.  
 Bearings and friction, general considerations, 47.  
 — friction of, 44.  
 — roller, 46.  
 Belt-driven car, Maybach-Daimler, 108–115.  
 Belt transmission gear, Darracq-Bollée car 232–236.  
 — Benz cars, 132–134.  
 — Critchley car, 226–230.  
 — Turrell-Bollée voiturette, 280–285.  
 — of Mors car, 180–184.  
 Benz carriages of 1896–99, 121–136.  
 — mixer, 78.  
 — motor tricycles, 1885, 74.  
 — second motor tricycle carriage, 80.  
 — slow speed gear, 351, 352.

## INDEX

- Benz surface carburettor, 1885, 77.  
 — system of electric ignition, 364–367.  
 — third motor carriage, 80.  
 — two-speed and free motor gear, 80.  
 — water cooler, 77.  
 Bicycle, Daimler's patent, 62.  
 Bicycles, motor, 309–319.  
 Bisson Berges sparking plug, 369.  
 Blackburn's carburettor, 320.  
 — steam dogcart, 41.  
 Blackstone's vaporiser, 331.  
 Blessing's motor bicycle, 312.  
 Boiler, Church's, 21.  
 — Clarkson & Capel, 526.  
 — Coulthard, 535.  
 — Dance's, 17.  
 — de Dion, 482.  
 — Gibbs', 21.  
 — Gurney's, 14.  
 — Hancock's, 4.  
 — Hill's, 21.  
 — Holt's, 35.  
 — Lifu, 500.  
 — Maceroni & Squire's, 20.  
 — Olrick's Field system, 36.  
 — Perkins', 40.  
 — Scotte, 488.  
 — Serpollet, 447.  
 — Stanley, 460.  
 — Summers & Ogle's, 17.  
 — Thornycroft, 520–524.  
 — Weidknecht, 492.  
 — Whitney, 473.  
 — Yarrow's, 31.  
 Boilers, American light, 457.  
 Bolide carriages, 212.  
 Bollée, Amédée, carriages, 212.  
 — Darracq, carriages, 232–236.  
 — steam coach, 441.  
 — Turrell, voiturette, 276–285.  
 Bosch magneto generator, 370–372.  
 Boulton wheel, 39.  
 Brake blocks, pressure on, 561.  
 — Electric Vehicle Co., 431.  
 — Northey & Dudgeon, rim, 438.  
 — power required, 559.  
 — power required on hills, 562.  
 — Price's shoe, 350.  
 — pulley, proportion of, embraced, 562.  
 — Sampson's shoe, 351.  
 — shoes, spoon or tyre, 350, 351.  
 — the Riker, 422.  
 Brakes, dimensions and connections, 563.  
 — importance of, 559.  
 — Locomotives on Highways Act, 601.  
 — of Benz cars, 135.  
 Brakes of Cannstadt-Daimler car, 206.  
 — of Clarkson & Capel 3-ton lorry, 534.  
 — of Critchley car, 230.  
 — of Daimler-Maybach car, 115.  
 — of de Dion & Bouton tricycle, 268.  
 — of English Daimler car, 100.  
 — of London electric cab, 409, 412–414.  
 — of Mors car, 185, 186.  
 — of Panhard & Levassor light car, 253, 254.  
 — of Panhard & Levassor racing car, 152–154.  
 — of Peugeot car, 167, 168.  
 — of Roots & Venables car, 337.  
 — of Simpson & Bodman lorry, 553.  
 — of Thornycroft 3-ton lorry, 524.  
 — of Turrell-Bollée voiturette, 284, 285.  
 Bridge axle of motor tricycle, 302–304.  
 Brillié, Gobron &, motor carriage, 188–198.  
 — motor, 188–198.  
 Broadwood, Messrs. John & Sons, report for, on cost of transport, 581.  
 Brown's, Mr. John, viagraph, 614.  
 Burner, Clarkson & Capel's, 530–538.  
 — Coulthard, oil, 535.  
 — Lifu, 500.  
 — Longuemare, 448.  
 — regulator, Whitney mineral spirit, 470.  
 — Serpollet oil, 447.  
 — Stanley mineral spirit, for boilers, 460.  
 — tube ignition, of English Daimler motor, 95.  
 — Whitney mineral spirit, 473.  
 Burrell, Messrs., 38, 39.  
 Burstall & Hill coach, 1824, 20.  
 Butler's motor tricycle, 1884–5, 80.
- C
- Cabs, electric, 397, 425.  
 Cannstadt-Daimler cars, 199–208.  
 Carburettor, Abeille, 326.  
 — Ariel, 270.  
 — Benz, 77, 124, 128.  
 — Blackburn's, 320.  
 — Brillié, 191, 192.  
 — Daimler's 1885, 70.  
 — Decauville, 219.  
 — de Dion & Bouton, 258.  
 — float feed, of English Daimler car, 90, 96.  
 — float feed, spray-making, 66.  
 — Huzelstein's, 325, 326.  
 — Longuemare's, 323–325.  
 — Maybach's, float feed, 71.  
 — Mors, 174.

## INDEX

- Carburettor, Panhard & Levassor, 142.  
 — Peugeot, 116, 160, 161.  
 — Phébus, 269.  
 — Smyer's vaporiser as, 321, 322.  
 — spray-making, 321–324.  
 — surface, theory of action, 320.  
 — Wordsworth's, 322–324.  
 Carcano motor bicycle, 312, 314.  
 Carratt & Marshall's road steamer, 29.  
 Carriages, steam, American, 457.  
 Chain adjustment of Mors car, 184.  
 — Panhard & Levassor car, 151.  
 Chain, Baldwin detachable link, 467.  
 — drive, used by Hancock, 25.  
 — driving gear, Coulthard, 541.  
 Change speed gear of Accles-Turrell car, 242–244.  
 — Benz cars, 132–134.  
 — Critchley car, 227–231.  
 — Daimler-Maybach car, 112, 113.  
 — Darracq-Bollée car, 232–234.  
 — Decauville car, 223.  
 — de Dion & Bouton voiturette, 256.  
 — Panhard light car, 252.  
 — Peugeot car, 166.  
 — Renault car, 237–239.  
 — Turrell-Bollée voiturette, 281–284.  
 Changing speed, effect on gear of, 106.  
 Chelsea Vestry, report to, on motor tip vans, by Mr. W. T. Higgins, 590.  
 Cherrier two-speed gear, 308, 309.  
 Church's boilers, 21.  
 Clarkson & Capel steam carriage, 476.  
 — 3-ton lorry, 526–534.  
 Clarkson's water cooler, 341, 342.  
 Clincher pneumatic tyre, 607.  
 Clipper tyre, 607.  
 Clutch, friction, Weston, Thornycroft, 512.  
 — main, of English Daimler car, 96.  
 — main, of Peugeot car, 166.  
 — Peugeot, cone friction, 120, 122.  
 Clutches, driving, of Roots & Venables' car, 336, 337.  
 Coach, Bollée steam, 441.  
 Coefficients, deduced power and dimensions, of petrol motors, 386–389.  
 Columbia Electric Vehicle Co.'s van, 433.  
 — motor carrier tricycle, 292–301.  
 Committee, select, report of, 1831, 3.  
 Committees, the select, of 1831 and 1873, 598.  
 Company, London and Paddington Steam Carriage, 1832, 10.  
 Compression pressure of Daimler motors, 67, 92.  
 Condenser, Clarkson, 480.  
 Condenser, Clarkson & Capel, lorry, 531.  
 — early evaporative, 26.  
 Condict, C. H., Electric Vehicle Co., 432.  
 Controller of Electric Vehicle Co., 431.  
 — of London electric cab, 402–410.  
 — the Riker, 420.  
 Cooler, Apprin's water, 343.  
 — Benz water, 77.  
 — Clarkson's water, 341, 342.  
 — Estcourt's water, 342, 343.  
 — the best form, 340.  
 — the least economical form, 340.  
 — water, of Cannstadt-Daimler cars, 208.  
 Cooling by evaporation, power equivalent of, 339, 340.  
 Cooling, limits to air, 338.  
 — of motor cylinders, 338–340.  
 — water system of, Benz cars, 131, 132.  
 — water system of, Panhard & Levassor racer, 148.  
 — water system of, Peugeot car, 164.  
 — water system of, Roots & Venables' car, 336.  
 — water-, the most economical, 338, 339.  
 Cooper's dirt-excluder bearing, 25.  
 Cost by horse and motor, comparison of, 573.  
 Cost of four-seat accommodation by horse vehicles, 578.  
 — motor carriage, 577.  
 Cost of transport, different lengths of haul, 581.  
 — Report for Messrs. John Broadwood & Sons, 581.  
 Cost of two-seat carriage accommodation by motor, 575.  
 — by horses, 574.  
 Cost of two-seat electrical carriage accommodation, 579.  
 Cost of working motor vehicles, 573.  
 Coulthard, Messrs. T., & Sons, estimate for motor tip vans, 592.  
 — 2-ton steam lorry, 535–542.  
 Crowden's motor car, 213–216.  
 Crowdus battery, storage, 437.  
 Critchley light car, 226–232.  
 Crompton, Major R. E. B., departure of, to South Africa with traction engines, etc., 612.  
 Crossley's & Holt's vaporiser, 330, 331.  
 Cugnot, Nicolas Joseph, 4.

## D

- Daimler-Cannstadt cars, 199–208.  
 — Critchley light car, 226–232.

## INDEX

- Daimler high speed motor, 61.  
 — Maybach belt-driven car, 108–115.  
 — motor carriage, English, 1898–99, 90–107.  
 — motor carriage, Panhard & Levassor's 1894, 84–88.  
 — motor, general description of, 66–70.  
 — Panhard & Levassor, racing car, 140–157.  
 — the Peugeot, motor car, 1896, 115–122.  
 — V type engine, 63–65.  
 Daimler's bicycle, 62.  
 — carburettor, 1885, 70.  
 Dance's boiler, 17.  
 Darracq-Bollée carriages, 232–236.  
 Decauville light motor car, 218.  
 De Diétrich carriages and lorry, 213, 481.  
 De Dion & Bouton bicycle, 310.  
 — quadricycle, 300.  
 — system of electric ignition, 356–364.  
 — tricycle, 258–269.  
 — voiturette, 255, 256.  
 Delahaye carriages, 212, 385.  
 Didier two-speed gear, 307.  
 Differential gear, Benz cars, 134.  
 — (crank), Whitney, 469.  
 — Hills' 1843, 20.  
 — Lifu, 508.  
 — London electric cab, 410.  
 — Malicet & Blin's, 349, 350.  
 — of motor tricycles, 302–305.  
 — Riker's, 420.  
 — Stanley, 466.  
 Draught, effect of speed on, 50.  
 Ducroiset carriages, 212.  
 Dunlop tyres, 607.  
 Duryea carriages, 213.  
 — electric ignition system, 377.  
 Dust carts, steam motor, 590.  
 — cart, steam, Thornycroft, 512.
- E
- Efficiency, mechanical, of vehicles on the 1,000 miles trial of the Automobile Club, 617.  
 — of transmission, 385, 389, 390.  
 Eldin's two-speed gear, 307, 308.  
 Electric ignition apparatus, Benz cars, 129, 130.  
 — Decauville car, 219–221.  
 — de Dion tricycle, 264–268.  
 — Mors cars, 176–179.  
 Electric ignition, Benz high tension system, 364–367.  
 — comparison of, with tube, 354, 355.  
 — de Dion & Bouton high tension, 356–364.
- Electric ignition, Duryea system, 377.  
 — Lanchester system, 376, 377.  
 — magneto system, 370–374.  
 — Mors low tension system, 374–376.  
 — plugs, 368, 369.  
 — various systems of, 355.  
 Electric Motive Power Co.'s vehicles, 437.  
 — Vehicle Co. (New York) vehicles, 424.  
 — vehicles, Opperman, 439.  
 Engine, Daimler V type, 63–65.  
 Engine, steam, Clarkson & Capel, 526.  
 — Clarkson, six-cylinder, 478.  
 — Coulthard triple expansion, 536.  
 — de Dion & Bouton, 484.  
 — Gurney's, 15.  
 — Hancock's, 8.  
 — Holt's independent, 35.  
 — James' independent, 21.  
 — Lifu, 504.  
 — Scotte, 489.  
 — Serpollet, 449.  
 — Simpson & Bodman's, 554.  
 — Stanley, 464.  
 — Summers & Ogle's, 19.  
 — Thornycroft, 512, 519.  
 — Weidknecht, 493.  
 — Whitney, 474.  
 Engines, steam, American light, 458.  
 English Daimler motor carriage, 1898–99, 90–107.  
 Estcourt's starter, 344.  
 — water cooler, 342–343.  
 Evaporative condenser, early, 26.  
 Exhaust heater, Holt's, 35.
- F
- Feed heater, Simpson & Bodman lorry, 547.  
 — pump, Clarkson & Capel lorry, 529.  
 — pumps, Holt's, 35.  
 — pumps, Lifu, 506, 507.  
 — pumps, Simpson & Bodman lorry, 546, 552.  
 Feed water regulator, Clarkson & Capel, 526.  
 — Serpollet, 453.  
 Fielding's vaporiser, 331.  
 Float feed carburettor, 66.  
 Fore carriage and steering gear, Decauville car, 224.  
 Frame of Turrell-Bollée voiturette, 276.  
 Framework of Benz carriages, 1896–99, 122, 124. (See also Underframes.)  
 — of Maybach-Daimler car, 110.  
 French competitions, 1895–99, 382.  
 Frictional losses in transmission, 43, 45.

## INDEX

- Friction and bearings, general considerations, 47.  
 — clutches (see Clutch).  
 — of ball- and roller-bearings, 46.  
 — of gear and bearings, 44.
- G
- Gauthier-Wehrlé carriages, 212.  
 Gear and bearings, friction of, 44.  
 — Benz slow speed, 351, 352.  
 — Marshall combined hill-climbing and reversing, 353.  
 — transmission (see Transmission gear).  
 — two-speed, Hills' patent, 20.  
 — two-speed, of motor tricycles, 305–309.  
 Gearing, estimates of frictional losses in, 47.  
 Gibbs' radiating axles, 22.  
 — tractor and boilers, 21, 22.  
 Gobron Brillié motor carriage, 188, 189.  
 Government, enlightened action in 1833, 2.  
 Governor of Brillié motor, 192–194.  
 — of English Daimler motor, 94.  
 — of Panhard & Levassor-Daimler motor, 145–148.  
 — of Peugeot motor, 164.  
 — of Root's heavy oil motor, 336.  
 — of Turrell-Bollée motor, 278–280.  
 Gradients, power required on, 55.  
 — resistance due to gravity on, 55, 57.  
 Guinness & Co., Thornycroft drag for, 516.  
 Gurney & Dance, power as used by, 43.  
 Gurney's boiler and steam separator, 14.  
 — coaches, performance of, 15.  
 — engines, 1827–28, 15.  
 — steam coaches, 4, 14.  
 — tractor, 16.
- H
- Hancock, "Autopsy," 1833, 10.  
 — boilers, 4, 6, 8.  
 — carriages, 8, 10.  
 — "Era," 10, 11.  
 — power used by, for his vehicles, 42, 43.  
 — second infant, 1830–31, 8.  
 — Walter, early work, 4.  
 — wheels, 12.  
 Hargreaves, J. R. T. P., 12-h.p. Daimler, 104.  
 Haynes-Apperson carriages, 213.  
 Higgens, W. T., report by, on motor tip waggons, 590.  
 Hill, Burstall &, 1824, 20.  
 Hill-climbing trials on Automobile Club 1,000 miles' tour, 617.  
 Hills' boiler, 21.  
 — coach, 1840, 20.
- History of steam coaches, 3.  
 Holden's motor bicycle, 314–319.  
 — sparking plug, 369.  
 Holder, Mr. J. A., 12-h.p. Daimler, 620.  
 Holts', Crossleys &, vaporisers, 330, 331.  
 — road steamer, 34, 35.  
 Horse haulage, cost by, 574.  
 Horses, cost of one- and of two-seat carriage accommodation by, 574.  
 House, H. A., steam vehicles (Lifu), 495.  
 Howard's vaporiser, 331.  
 Huzelstein's carburettor, 325, 326.
- I
- Ignition apparatus, electric, 354–378.  
 — Accles-Turrell car, 242.  
 — Benz, 129, 130, 364–367.  
 — Bosch & Simms', 370.  
 — Decauville car, 219, 221.  
 — de Dion & Bouton, 264–268, 356–364.  
 — Duryea, 377.  
 — Lanchester, 376.  
 — Mors, 176, 370.  
 Ignition apparatus, magneto electric, of Simms' motor, 289–291.  
 — tube, Panhard & Levassor racer, 142, 145.  
 — Turrell-Bollée voiturette, 278.  
 Ignition plugs, 368.  
 Indicator diagrams, very high speed, 388, 389.  
 Influences, conditions and laws, past and present, 1.  
 Inshaw's steam carriage, 41.
- J
- James's independent engines, 21.  
 Johnson, Mr. C., and the Automobile Club, 614.
- K
- Knight's motor carriage, 85.  
 Kreb's motor, 249.
- L
- "La Locomotion Automobile" trials, 389–393.  
 Lancashire Steam Motor Co. estimate for tip vans, 592.  
 Lanchester carriages, 384, 566, 619.  
 Lanchester's electric ignition system, 376, 377.  
 Lankensperger, inventor of pivoted steering axles, 567.

## INDEX

- Lawson's motor bicycle, 314.  
 Laws, turnpike, 1.  
 Lee's steam carriage, 34.  
 Lemoine's steering axles, 346.  
 Levassor in the Paris-Bordeaux race, 1895, 85.  
 Leyland steam lorry, 542.  
 Licences, 600.  
 Lifu steam vehicles, 495.  
 Light vehicles, strength and sufficiency of, 468.  
 Liquid Fuel Engineering Company steam vehicles, 495.  
 Local Government Board regulations, 597.  
 Locomobile Company's steam carriages, 468.  
 Locomotives on Highways Act of 1876, notes on, 599.  
 London electric cabs, 397-414.  
 Longuemare burners, 448.  
 — carburettors, 323-325.  
 Lorry, Clarkson Capel steam, 526-534.  
 — Coulthard steam, 535-542.  
 — Leyland steam, 542.  
 — "Lifu" steam, 496.  
 — Simpson & Bodman steam, 543.  
 — Thornycroft steam, 512-525.  
 Lubricating apparatus of Mors car, 179-181.  
 Lubrication, Coulthard engine, 536.  
 — effect of bath, 46.  
 Lubricator, Holden's, 318.  
 Lundell motor, 402.
- M
- Macdonald, the Right Hon. J. H. A., paper by, before the Automobile Club, 612.  
 Maceroni & Squires' coach and boiler, 20.  
 Mackenzie & Sons' Riker electric carriage, 414.  
 Mackenzie's steam brougham, 41.  
 Mackey motor, electric, 437.  
 Magneto, electric, ignition, Simms' motor, 289-291.  
 Malicet & Blin's differential gear, 349, 350.  
 Marseilles-Nice Tourbie race, 1897, 85.  
 Marshall combined hill-climbing and reversing gear, 353.  
 Maxim H.P. Columbia Co., 433.  
 Maybach-Daimler, belt-driven car, 108-115.  
 Maybach's carburettor, 71.  
 McLaren's road locomotive, 39.  
 Mechanical efficiency of cars on the 1,000 mile tour, 617,  
 — of motor vehicles, 383-392, 617.  
 Michelin tyre, 607.
- Mixer, Benz, 78.  
 Montague, Hon. J. Scott, 12-h.p. Daimler, 105.  
 Mors electric ignition system, 370-374.  
 — light car, 225, 226.  
 — 16-h.p. racing car, 187.  
 — touring carriage, 169-187.  
 Motor bicycle, Blessing's, 312.  
 — Daimler, 62.  
 — de Dion & Bouton, 310.  
 — Holden's, 314-319.  
 — Lawson's, 314.  
 — Shaw & Sons', 310, 311.  
 — Werner's, 314.  
 — Wulfmüller & Geisenhoff's, 309, 310.  
 Motor carriage, cost of two-seat accommodation by, 575.  
 — Daimler, general description of, 66.  
 — high speed, 61.  
 Motor, Lundell, of London electric cab, 402.  
 — Manufacturing Co.'s de Dion quadricycle, 300.  
 — of Accles-Turrell car, 239, 246.  
 — of Benz carriages, 1896-1899, 124-132.  
 — of Columbia tricycle carrier, 294-296.  
 — of Crowden's car, 213, 214.  
 — of Daimler-Maybach car, 110.  
 — of Darracq-Bollée carriage, 232.  
 — of Decauville car, 218-222.  
 — of de Dion & Bouton tricycle, 262-269.  
 — of English Daimler carriage, 90.  
 — of Gobron-Brillié carriage, 188-194.  
 — of Holden's bicycle, 314-318.  
 — of Mors carriage, 172-180.  
 — of Mors light car, 225, 226.  
 — of Panhard & Levassor light car, 249.  
 — of Renaux tricycle, 274,  
 — of Turrell-Bollée voiturette, 276-280.  
 — Phoenix-Daimler, of Panhard & Levassor racer, 140-148.  
 — Root's heavy oil, 333-336.  
 — Simms', 286-290.  
 Motor quadricycle, Ariel, 301.  
 — de Dion & Bouton, 300.  
 Motors, balancing of, 564.  
 — principles, construction and working of mineral spirit, 65.  
 — twin, of Electric Vehicle Co., 425.  
 Motor suspension, Columbia Co., 434.  
 — tip waggons, report on, by Mr. W. T. Higgens, 590.  
 — trials, "La Locomotion Automobile," 389-393.  
 Motor tricycle, Ariel, 270-272.  
 — Benz, 74, 80.  
 — Butler, 80.

## INDEX

- Motor tricycle, Columbia, 292–301.  
 — de Dion & Bouton, 258–269, 356, 364.  
 — Phébus, 269, 270.  
 — Renaux, 274, 275.  
 — Roots', 84.  
 — Simms', 286–291.  
 — Turrell-Bollée, 276–285.
- Motor vehicle development, 613.
- Motor vehicle, electric, Bouquet Garcin Schivre, 396, 397.  
 — Columbia Co., 433–437.  
 — Electric Motive Power Co., 437, 438.  
 — Electric Vehicle Co., 424–432.  
 — Jeantaud, 396, 397.  
 — Jenatzy, 396, 397.  
 — Krieger, 396, 397.  
 — London cabs, 397–414.  
 — Mackenzie Riker, 417.  
 — Mildé & Mondo's, 397.  
 — Opperman, 439.  
 — Riker, 414.
- Motor vehicle, petrol, Accles-Turrell, 239–246.  
 — Amédée Bollée, 212.  
 — Benz, 74, 77, 78, 80, 121–136, 351, 352, 364–367.  
 — Bolide, 212.  
 — Bollée-Turrell, 276–285.  
 — Cannstadt-Daimler, 199–208.  
 — Critchely-Daimler, 226–232.  
 — Crowden, 213–216.  
 — Daimler, 61, 63–65, 66–70, 84–88, 90–107, 103–115, 140–157, 199–208, 226–232.  
 — Darraçq-Bollée, 232–236.  
 — Decauville, 218–224.  
 — de Diétrich, 213.  
 — de Dion & Bouton, 255, 256.  
 — Delahaye, 212, 385.  
 — Duryea, 213, 377.  
 — Gauthier Wehrlé, 212.  
 — Georges-Richard, 212.  
 — Gobron-Brillié, 188–198.  
 — Haynes-Apperson, 213.  
 — Knight, 85.  
 — Lanchester, 384, 566.  
 — Maybach-Daimler, 71, 108–115.  
 — Mors, 169–188, 225, 226.  
 — Panhard & Levassor, 85–89, 140–157, 247–255.  
 — Peugeot, 115–122, 158–168, 246–247.  
 — Renault, 236–239.  
 — Vallée, 209–212.  
 — Winton, 213.  
 — Wolseley, 618, 621.
- Motor vehicles, electric, French trials, 395, 396.  
 — electric, general, 394–397.  
 — for war purposes, 612.  
 — Opperman, 439.  
 — popular and commercial uses of, and cost of working, 573.
- Motor vehicle, steam, Adamson, 34.  
 — Armstrong, 34.  
 — Burstall & Hill, 20.  
 — Blackburn, 41.  
 — Bollée, 441.  
 — Carratt & Marshall, 29.  
 — Church, 21.  
 — Clarkson & Capel, 476, 526.  
 — Coulthard, 535.  
 — Cugnot, 4.  
 — Dance, 17.  
 — de Dion & Bouton, 481.  
 — Gibbs, 21, 22.  
 — Gurney, 4, 14, 15, 16.  
 — Hancock, 4, 6, 8, 10, 11, 12, 42, 43.  
 — Hill, Burstall &, 20.  
 — Hills, 20, 21.  
 — Holt, 34, 35.  
 — Inshaw, 41.  
 — James, 21.  
 — Lee, 34.  
 — Leyland, 542.  
 — Lifu, 495.  
 — Maceroni & Squire, 20.  
 — Mackenzie, 41.  
 — McLaren, 39.  
 — Pattison, 32–35.  
 — Perkins, 39, 40.  
 — Rickett, 27, 28.  
 — Scotte, 488.  
 — Scott-Russell's coaches, 4.  
 — Serpollet, 444.  
 — Seward & Co.'s carriage, 34.  
 — Simpson & Bodman, 543.  
 — Stanley, 458.  
 — Summers & Ogle, 17, 19.  
 — Tangye's carriage, 34.  
 — Thomson's "Ravee," 36.  
 — Thornycroft, 512.  
 — Weidknecht, 490.  
 — Whitney, 469.  
 — Yarrow's carriage, 29, 30.
- Motor vehicle, the best, 612.
- Mulliner, A. F., Northampton, carriage bodies, 101.

## N

Napier car, the 8-h.p. and Mr. S. F. Edge

## INDEX

in the 1,000 miles trial of the Automobile Club, 619, 621.

## O

- Oil feed regulator, Clarkson, 479.
- Serpollet, 453.
- Stanley, 460.
- Whitney, 470.
- Oil gas, 330.
- Oils, use of heavy, 327.
- Omnibus, steam, de Dion, 481.
- Lifu, 494, 497.
- Scotte, 488.
- Weidknecht, 490.
- Omnibus traction, resistance of, 52.

## P

- Panhard & Levassor car, 12-h.p., of the Hon. C. S. Rolls in the 1,000 miles trial of the Automobile Club, 619.
- Panhard & Levassor light car, 247–255.
- motor carriage, 84–88.
- racing carriage, 140–157.
- Paris-Amsterdam race, 1898, 86.
- Paris-Bordeaux race, 1895, Levassor in, 85.
- Paris, Dieppe, and Trouville races, 1897, 86.
- Paris-Marseilles race, 1896, 85.
- Paris-Rouen race, 85.
- Past and present influences, conditions and laws, 1.
- Patents mentioned, Benz surface carburettor, 1885, 77, 78.
- Benz tricycles, 1885, 74.
- Blackburn's, 41.
- Bosch magneto generator, 370.
- Brillié carburettor, 191.
- Brillié motor, 190.
- Butler's, motor tricycle, 80.
- Columbia tricycle carrier, 300.
- Daimler bicycle, 62.
- Daimler motor, 61.
- Daimler's, carburettor, 70.
- Daimler V type engine, 63.
- de Dion axle, 485.
- Duryea electric ignition apparatus, 377.
- Duryea motor, 213.
- Gibbs & Chaplin's, steering gear, 22.
- Gibbs', boiler, 21, 22.
- Hancock's, boiler, 5.
- Hills', differential gear, 20.
- Hills', two-speed gear, 20.
- Koch heavy oil motor, 337.
- Lanchester oil motor, 377.
- Maybach's, carburettor, 71.
- Patent, Morse electric ignition apparatus, 374.
- Renault tricycle, 274, 275.
- Riker frame, steering axle and differential gear, 423.
- rim brake, Northey & Dudgeon, 438.
- Roots', motor tricycle, 83.
- Simms', low tension electric ignition apparatus, 370.
- speed changing gear of Panhard light car, 253.
- Stanley motor vehicle, 460.
- steering axle, Clubbe & Southey, 438.
- Summers & Ogle's, boiler, 17.
- Wade, E. J., controller connections, 439.
- Whitney, 478.
- Wulfmüller & Geisenhoff bicycle, 309.
- Pattison's steam carriage, 31–33.
- Perkins' Loftus single-wheel tractor, 38, 39.
- Pernoo's motor bicycle, 312.
- Petit Journal* competition, 1894, 379.
- Petrol feed measurer, Brillié motor, 192.
- motor vehicles (see Motor vehicles, petrol).
- Peugeot-Daimler motor car, 1896, 115–122.
- light car, 246, 247.
- racing carriage, 158.
- Phæton, Columbia electric, 435.
- Phébus tricycle, 269, 270.
- Plugs, ignition, 368, 369.
- Pneumatic tyre, American single tube, 609.
- Clincher, 607.
- Clipper, 607.
- Dunlop, 607, 608.
- Michelin, 607.
- Thomson's, 38.
- Pneumatic tyres, conditions of wear and tear, 604.
- reduced cost of car maintenance with, 605.
- valves for, 610.
- Pope, Colonel, Columbia Co., 433.
- Power and dimensions, coefficients deduced, 386–389.
- costly waste of, under present road conditions, 42.
- large reserve necessary, 42.
- mean, per cwt. of the old coaches, 43.
- required on gradients, 55.
- required to meet frictional losses, 43.
- used by Gurney & Dance, 43.
- used by Hancock on "Automaton," 42.
- used by Patterson, 43.
- used by Rickett, 43.
- used by Yarrow, 43.
- Price's shoe brake, 350.
- Pump, air, Lifu, 507.



## INDEX

- Pumps, feed (see Feed pumps).  
Pumps, oil and water, Serpollet, 453, 454.
- Q
- Quadricycle, Ariel, 301.  
— Motor Manufacturing Co's., de Dion, 300.
- R
- Race, motor vehicle, Marseilles, Nice, Tourbie, 85, 382.  
— Paris, Dieppe, and Trouville, 86, 380.  
— Paris to Amsterdam, 86, 381.  
— Paris to Bordeaux, 380, 381, 441.  
— Paris to Marseilles, 85, 380.  
— Paris to Rouen, 84.  
— Pau, 382, 383.  
— Tour de France, 388.  
— Versailles-Bordeaux, 86.  
Racing car, Cannstadt-Daimler 24-h.p., 199.  
— Panhard & Levassor, 140–157.  
— Mors 16-h.p., 187.  
— Peugeot, 158.  
— Vallée, 209.  
Ravee, Thomson's, 36.  
Reclus sparking plug, 369.  
Regulations under the Locomotives on Highways Act of 1896 which affect construction, 599.  
Regulator, Stanley, 462.  
Renault light motor carriage, 236–239.  
Renaux tricycle, 274, 275.  
Resistance due to air at high speeds, 59.  
— due to gravity on gradients, 55, 57.  
Reversing gear, Accles & Turrell car, 244.  
— Cannstadt-Daimler cars, 206.  
— Coulthard, 539.  
— Critchley light car, 230.  
— Darracq-Bollée carriage, 234.  
— de Dion & Bouton voiturette, 256.  
— English Daimler car, 97.  
— Lifu, 509.  
— Locomotives on Highways Act, 601.  
— Marshall's combined hill-climbing and, 353.  
— Mors car, 184, 185.  
— Peugeot car, 167.  
— Peugeot-Daimler car, 1896, 120.  
— Thornycroft, 516.  
Richard, Georges, carriages, 212.  
Rickett, power used by, 43.  
Rickett's road steamers, 27, 28.  
Riker electric carriages, 414–423.  
— motor, 418.  
Road locomotive, McLaren's, 39.  
Road resistance, increase of, with speed, 49.  
— resistances, 49.  
— resistance with rubber tyres, 52–56.  
— steamer, Carratt & Marshall's, 29.  
— steamer, Holt's, 34, 35.  
— steamer, Rickett's (Earl Caithness), 28.  
— steamer, Rickett's (Lord Stafford's), 27.  
— steamer, Thomson's, 36.  
Roller bearings, 46.  
Rolls, Hon. C. S., in the 1,000 miles trial of the Automobile Club, 617–619.  
Roots & Venables' Petroleum motor car, 332–337.  
— motor tricycle, 83.  
— oil motor, 333–336.
- S
- Salomans, Sir D., Peugeot carriage, 168.  
Sampson's shoe brake, 351.  
Sangster's pneumatic tyre valve, 610.  
Scott-Russell steam coaches, 4.  
Select committee, report of, 1831, 3.  
— committees of 1831 and 1873, 598.  
Serpollet boiler, Simpson & Bodman's, 543, 546.  
— steam carriage, 444.  
— steam engine, 449.  
— steam generator, 447.  
Seward & Co.'s steam carriage, 34.  
Shaw & Sons' motor bicycle, 310, 311.  
Simms "motor wheel," 286–291.  
Simpson & Bodman steam generator, 543.  
— steam lorry, 543.  
— three-cylinder engine, 554–556.  
Smyers vaporiser, 321, 322.  
Snow, formation of, at carburettors, 326.  
Speed change gear, Clarkson & Capel lorry, 533.  
— change gear, Coulthard lorry, 539.  
— changing arrangements, Electric Vehicle Co., 432.  
— changing, effect on gear of, 106.  
— changing gear of Benz cars, 132–134.  
— changing gear of Cannstadt-Daimler cars, 202–206.  
— changing gear of Critchley car, 227–230.  
— changing gear of Daimler-Maybach car, 112, 113.  
— changing gear of English Daimler car, 96, 97.  
— changing gear of Mors car, 180–182.  
— changing gear of Peugeot car, 166.  
— effect of, on draught, 50.  
— great growth in, 382.  
— increase of road resistance with, 49, 58.  
— varying device of Mors motor, 174, 175.

## INDEX

- Speeds, high, great increase of brake power required with, 560.
- Spray-making vaporisers, 321–324.
- Spring driven wheel, Thornycroft, 522.  
— wheels, attempt to use, 39.
- Springs and axles, strength of, 348.
- Stanley steam carriages, 458.
- Starter, Estcourt's, 344.
- Steam, advantages and limits of, 440.  
— Carriage and Waggon Co., Limited, estimate for motor tip vans, 594.  
— carriages, American, 457.  
— carriages, light, boilers for, 457.  
— carriages (see Motor vehicles, steam).  
— coach, Bollée, 441.  
— coaches, 3.  
— coaches, old, mean power per cwt. of, 43.  
— condenser, Clarkson, 480.  
— dust cart, Thornycroft, 512.  
— engines (see Engines, steam).  
— motor vehicles, heavy, French trials of, 481.  
— pressures, early use of high, 19, 20.  
— renewed attention to, in France, 440.  
— superheated, use of, 456.  
— vehicles, modern and recent, 440.  
— vehicles, Thornycroft, 512.
- Steering arms, setting out angles of, 568.
- Steering axles and gear, Bollée coach, 442.  
— Clubbe & Southey, 438.  
— Lifu, 497–510.  
— pivoted, 567.  
— rear, Electric Vehicle Co., 426
- Steering gear and wheel, Riker, 423.
- Steering gear, Crowden's, 214.  
— Gurney's, 16.  
— of Benz cars, 134, 135.  
— of Cannstadt-Daimler cars, 206.  
— of Clarkson & Capel lorry, 534.  
— of Coulthard lorry, 542.  
— of Critchley light car, 230, 231.  
— of Darracq-Bollée carriage, 234.  
— of Daimler-Maybach car, 115.  
— of Decauville car, 224.  
— of English Daimler car, 100.  
— of Gobron-Brillié car, 194.  
— of London electric cab, 412.  
— of Mors car, 185.  
— of Panhard & Levassor light car, 254.  
— of Panhard & Levassor racer, 154.  
— of Peugeot car, 167.  
— of Peugeot-Daimler car, 1896, 120.  
— of Simpson & Bodman lorry, 553.  
— of Thornycroft lorry, 524.
- Summers & Ogle's boiler, 1830, 17.
- Summers & Ogle's carriage, 1831, 17.  
— coach and boiler performance, 19.  
— engines, 19.
- Superheated steam from Serpollet boiler, 547.
- Surface carburettor, Benz, 1885, 77.  
— objection to, 116, 119.

## T

- Tangye's steam carriage, 34.
- Temple, Col., successful use of traction engines for war purposes, 612.
- Tests of Simpson & Bodman Serpollet boiler, 549, 552.
- Thomson's road steamers, 36.
- Thornycroft steam vehicles, 512–525.
- Thousand mile trial of the Automobile Club of Great Britain and Ireland, results of, 615–622.
- Tip vans, steam, estimate for, by Messrs. T. Coulthard & Co., 592.  
— by the Lancashire Steam Motor Co., 592.
- Tip waggons, steam motor, 590.
- Tire or tyre, 603.
- Toward's boiler, 556.
- Traction resistance of an omnibus, 52.
- Tractive coefficient, Sir W. Anderson's experiments, 36.
- Tractor, Gibbs', 21, 22.  
— Gurney's, 16.  
— Loftus Perkins' single wheel, 39, 40.
- Transmission gear of Accles & Turrell car, 242–244.  
— Benz cars, 132.  
— Bollée coach, 442.  
— Cannstadt-Daimler cars, 202–206.  
— Clarkson & Capel lorry, 526.  
— Columbia carrier, 296–300.  
— Coulthard lorry, 541.  
— Critchley car, 227–231.  
— Daimler-Maybach car, 111–113.  
— Darracq-Bollée car, 232–234.  
— Decauville car, 222, 223.  
— de Dion & Bouton omnibus, 484.  
— de Dion & Bouton tricycle, 266.  
— de Dion & Bouton voiturette, 256.  
— English Daimler car, 96–99.  
— Gobron-Brillié car, 193.  
— Leyland lorry, 543.  
— Lifu vehicles, 507.  
— London electric cab, 410.  
— Mors car, 180–185.  
— Opperman electric vehicles, 439.  
— Panhard & Levassor light car, 252, 253.

## INDEX

- Transmission gear of Panhard & Levassor racer, 148–151.  
 — Peugeot car, 166, 167.  
 — Peugeot-Daimler car, 1896, 119, 120.  
 — Renault car, 237–239.  
 — Riker electric carriages, 420.  
 — Roots & Venables car, 336, 337.  
 — Scotte omnibus, 489.  
 — Serpollet vehicles, 455.  
 — Simpson & Bodman lorry, 556.  
 — Thornycroft 3-ton lorry, 516–520.  
 — Turrell-Bollée voiturette, 280–285.  
 — Weidknecht omnibus, 493.  
 Transmission shaft, Lifu, telescopic, 508.  
 Transport, cost of, by motor vehicles, etc., 581.  
 — report on cost of, for Messrs. John Broadwood & Sons, 581.  
 Trial, speed, on the 1,000 miles tour, 619.  
 — the 1,000 mile, of the Automobile Club, 614, 615.  
 Trials, hill climbing, on the 1,000 miles tour, 615.  
 — of hackney vehicles, French table XIX., 396.  
 — of motor vehicles, “La Locomotion Automobile,” 390.  
 — of motors, “La Locomotion Automobile,” 389.  
 — Royal Agricultural Society’s, 514.  
 Tricycles, motor (see Motor tricycles).  
 Tube ignition apparatus of Panhard & Levassor racer, 142, 145.  
 Tube ignition, comparison of, with electric, 354.  
 Turnpike laws, 1.  
 Turrell, Accles &, light car, 239–244.  
 Turrell-Bollée voiturette, 276–285.  
 Two-speed gear, Hills’ patent, 20.  
 Two-speed gear of motor tricycles, 305–309.  
 Tyre adhesion, coefficient, 560.  
 — pneumatic, Thomson’s, 38.  
 — valves, pneumatic, 610.  
 Tyres, 601, 603–611.  
 — American single-tube, 609.  
 — Dunlop, 607.  
 — Michelin, clincher, and clipper, 607.  
 — pneumatic, conditions of wear and tear, 604.  
 — pneumatic, reduced cost of car maintenance with, 605.  
 — rubber, experience with large solid, 38.  
 — rubber, road resistance with, 52–56.  
 — rubber, tractive coefficient with, 36–38.  
 — rubber, vulcanised on rims, 39.  
 — solid, width of, 603.  
 Tyres, tangential pull on driving, 607.  
 — vulcanised on rims, 609.  
 — wear of solid cab, 609.  
 — with rubber blocks, 38.  
 — with solid rubber blocks, 38.
- U
- Underframe of Cannstadt-Daimler car, 199.  
 — Columbia Co.’s Stanhope, 435.  
 — Critchley light car, 226.  
 — Electric Motive Power Co.’s carriage, 437.  
 — English Daimler carriage, 90.  
 — Lifu lorry, 495, 497.  
 — London electric cabs, 399, 400.  
 — Mors carriage, 172.  
 — Panhard & Levassor racer, 140.  
 — Peugeot carriage, 160.  
 — Peugeot-Daimler car, 116.  
 — Riker electric carriages, 416.  
 — Simpson & Bodman lorry, 543.  
 — Scotte steam omnibus, 488.  
 — Stanley steam car, 459.  
 — Thornycroft lorry, 516.  
 — Weidknecht omnibus, 490.  
 — Whitney steam car, 471.
- V
- Vallée racing car, 209–212.  
 Valve arrangement of Benz motor, 127.  
 — Columbia motor, 294.  
 — de Dion & Bouton motor, 262.  
 — English Daimler motor, 90.  
 — Holden’s motor, 316, 317.  
 — Mors motor, 174.  
 — Panhard motor, 142.  
 — Peugeot motor, 162.  
 — Roots’ motor, 333.  
 — Simms’ motor, 286.  
 — Turrell-Bollée motor, 278, 280.  
 Valve piston, Lifu, 506.  
 Valves, mushroom, in steam engines, 456.  
 Van, electric, Columbia Co., 433.  
 — Lifu, 495.  
 — Thornycroft steam, 512.  
 Vans, cost of steam tip, 590.  
 Vaporiser, Blackstone’s, 331, 332.  
 — Crossley & Holt’s, 330, 331.  
 — Fielding’s, 331.  
 — Howard’s, 331.  
 — Roots and Venables’, 333–335.  
 Vaporisers for heavy oils, 327–335.

## INDEX

- Vaporisers, Schiltz, 327.  
 — Smyers, as carburettor, 321, 322.  
 — spray-making, 321–324.  
 Vapour, petroleum, use and control of, 329.  
 Venables, Roots &, petroleum car, 332–337.  
 Versailles-Bordeaux race, 1899, 86.  
 Viagraph, the, designed by Mr. John Brown, 614.  
 Vibration, balancing and balanced motors, 564.
- W
- War purposes, motor vehicles for, 612.  
 Water circulating system of Benz cars, 131, 132.  
 — English Daimler car, 94.  
 — Maybach-Daimler car, 110, 111.  
 — Mors car, 179.  
 — Panhard & Levassor racer, 148.  
 — Peugeot car, 164.  
 Water cooler, Benz, 77.  
 — of Cannstadt-Daimler cars, 208.  
 Water cooling system of Roots & Venables' car, 336.  
 Water lifter, Lifu, 507.  
 Weidknecht steam omnibus, 490.
- Weight of Hancock's carriages, 10.  
 Welch's pneumatic tyre valve, 611.  
 Werner's motor bicycle, 314.  
 Wheel, Crowden's, 215, 216.  
 — the Boulton, 39.  
 Wheels, advantages of high, 606.  
 — desirability of large steering, 137.  
 — effect of diameter on draught, 50.  
 — effect of width of, 50, 51.  
 — Hancock's, 12.  
 — Lifu armoured cushion, 509.  
 — pivoted hub, 423, 438.  
 — small, destructive impact on, 606.  
 — spring, attempt to use, 39.  
 — Thornycroft, with spring drive, 522.  
 — use of small, 605.  
 Whitney steam carriages, 469.  
 Winton carriages, 213.  
 Wolseley voiturette, 618.  
 Woods' pneumatic tyre valve, 611.  
 Worby, William, agricultural tractor, 21.  
 Wordsworth's carburettor, 322–324.  
 Wulfmüller & Geisenhoff's bicycle, 309, 310.
- Y
- Yarrow's steam carriage, 1862, 29, 30.