

# INDEX

Ninth Volume—January, 1916, to December, 1916

## GENERAL INDEX

[Illustrated articles are indicated thus\*. Editorials are indicated thus†]

- A**
- Accidents:  
 Baltimore & Ohio at Felton, Pa. . . . . 144  
 British Railways . . . . . 163  
 Caused by Absence of Block Signals . . . . . †35  
 Comparison of 1915 with Previous Years . . . . . †37  
 Investigated by I. C. C. . . . . 4  
 Monthly Summary:  
     July to September, 1915. . . . . †223  
     November, 1915 . . . . . 24  
     December, 1915 . . . . . 56  
     February, 1916 . . . . . 130  
     March, 1916 . . . . . 176, 220  
 N. C. & St. L., Near Rockledge, Tenn. . . . . †36, †47, †86, 105  
 National Railway of Mexico . . . . . 240  
 Necessity for Action at Distant Signal to Prevent . . . . . †134  
 New York Central at Amherst, Ohio . . . . . †103, 114  
     I. C. C. Report . . . . . †168, 170  
 New York, New Haven & Hartford at Bradford, R. I. . . . . 158  
 New York, New Haven & Hartford at Milford, Conn. . . . . 90  
 Relation to Progress in Signaling, Street Car in Boston . . . . . 378  
 Summary of in 1915 and Previous Years . . . . . †49  
 Addition to Bracket Post Platform . . . . . †156  
 Adjustable Rail Brace . . . . . †97  
 Adjustable Resistance Units:  
     Braoh . . . . . †219  
     G. R. S. . . . . †127  
     Law . . . . . †159  
 Adjusting:  
     Contact Springs . . . . . †217  
     Switch Circuit Controllers . . . . . 155  
 Advance Locking . . . . . †376  
 Advance Signals, Argument for . . . . . 256  
 Advantages:  
     Automatic Block Signals . . . . . 90  
     Definite Action at Distant Signals . . . . . †134  
 Adventures of a Maintainer . . . . . †125  
 (See also Confessions of a Maintainer.)  
 A. G. A. Railway, Light & Signal Co.:  
     Signal Supply News . . . . . 222  
 Air-Compressor, Fuel Oil-Driven . . . . . 187  
 Alabama Great Southern:  
     A. C. Signals . . . . . †257  
     Construction News . . . . . 283  
 Alger Supply Co., Signal Supply News . . . . . 192  
 All-Steel Passenger Cars, Number in Use . . . . . 165  
 Alternating Current Signaling:  
     Adjusting Track Circuits . . . . . 148  
     Cost of Changing from D. C. . . . . 71  
     Dangerous Condition in Track Circuits . . . . . †146  
     Development in 1915 . . . . . 17  
     Locating Track Circuit Troubles . . . . . 217  
 New Installations:  
     C. M. & St. P. Electric Zone . . . . . †262  
     Grand Trunk . . . . . †5  
     New York Municipal, Centre St. Loop . . . . . †79, †115  
     Public Service Ry., Newark Terminal . . . . . †273  
     Queen & Crescent . . . . . †257  
     Rhode Island Company . . . . . †235  
     San Francisco-Oakland Terminal . . . . . †292  
     Subway Protection on Winnipeg Electric . . . . . †54  
 New U. S. & S. Interlocking Relay . . . . . †161  
 Reconstruction of New Haven Signals . . . . . †85  
 Relay Tests . . . . . †148  
 Requirements for Electrified Chicago Terminals . . . . . †25  
 Service Tests of Apparatus . . . . . †267  
 Aluminum Cable:  
     Comparison with Copper . . . . . 7  
     Specifications . . . . . 106  
 American Electric Interlocking, Indication System . . . . . †205  
 American Electric Railway Association:  
     Annual Convention . . . . . 189, 282, 341  
     Committee Assignments for 1916 . . . . . 24  
     Mid-year Meeting . . . . . 84  
 American Museum of Safety:  
     Award of Memorial Medals . . . . . 84  
 American Railway Association:  
     Action of Spring Meeting . . . . . 189  
     Fall Session . . . . . 353  
     Standard Grade Crossing Protection . . . . . †167  
 American Synthite Company:  
     Signal Supply News . . . . . 101  
 Anchoring a Signal Foundation . . . . . 347  
 Anderson, B. T.:  
     Signaling on the Lackawanna Cut-Off . . . . . †197  
 Anderson, James:  
     Letter on Principles of Electric Locking . . . . . 323  
     Remedies for Track Circuit Aliments . . . . . †19  
     The Principles of Electric Locking . . . . . †71, †120, †204, †241, †297, †335, †373  
 Annual Banquet of P. R. R. Supervisors . . . . . †190  
 Annunciators:  
     Circuit Used on the Key Route . . . . . †139  
     Necessity in Outlying Towers . . . . . †4, 291  
 Application and Maintenance of Insulated Rail Joints . . . . . 275  
 Apprenticeship for College Men . . . . . †194  
 Apprentice and Instruction System . . . . . †356, †359  
 Apprentices of the U. S. & S. . . . . †220  
 Approach Locking:  
     Circuit Used on Southern Pacific . . . . . †139  
     General Discussion . . . . . †373  
 Arbitration, Necessity for . . . . . †253  
 Arrangement of Passing Sidings . . . . . †104  
 Arkenburgh, W. H.:  
     Cab Signals vs. Fixed Signals . . . . . 3  
 Association of Railway Commissioners:  
     Report on Signaling . . . . . 370  
 Association of Railway Electrical Engineers:  
     Annual Convention . . . . . 383  
     Change in Lamp Rating . . . . . †193  
     Semi-annual Meeting . . . . . 219  
 Association of Railway Telegraph Superintendents:  
     Annual Convention . . . . . 214  
     Convention Program . . . . . 189  
     Meeting of the Western Division . . . . . 74  
     New Secretary Elected . . . . . 282  
     Quarterly Meeting in Chicago . . . . . 130  
 Aspects:  
     R. S. A. Recommendation Revised Standard on New South Wales Railways . . . . . 366  
     With Position-Light Signals . . . . . †172  
 Atchison, Topeka & Santa Fe:  
     Construction News . . . . . 31, 285  
     Golden Gate Electric Interlocking . . . . . †137  
     Personal Mention . . . . . 164, 190  
     Train Sign . . . . . †44  
     Types of Signals in Use . . . . . †135  
 Atlanta & West Point:  
     Construction News . . . . . 284  
     Personal Mention . . . . . 221  
 Atlantic Coast Line:  
     Advances in Wages . . . . . 249  
     Construction News . . . . . 31, 164, 283  
     New Signal Protection . . . . . †210  
     Personal Mention . . . . . 165  
     Report Forms Used . . . . . †332  
 Automatic Crossing Gate Under Test . . . . . †215  
 Automatic Signals:  
     Details of New Work Completed, Under Way and Contemplated . . . . . 11  
     Methods of Locating . . . . . †51  
     Mileage, I. C. C. Table . . . . . 200  
     Mileage in Chicago Terminals . . . . . †25  
 New Installations:  
     Atlantic Coast Line . . . . . †210  
     Centre St. Loop Subway . . . . . †79  
     C. M. & St. P. Electric Zone . . . . . †262  
     Delaware & Hudson . . . . . †45  
     D. L. & W. Cut-Off . . . . . †197  
     Grand Trunk . . . . . †5  
     In Japan . . . . . 195  
     Louisville & Nashville . . . . . †88  
     Position Light on Pennsylvania Queen & Crescent . . . . . †257  
     Rhode Island Co. . . . . †235  
     Rock Island Government Draw Bridge . . . . . †325  
     San Francisco-Oakland Terminal . . . . . †292  
     Subway Protection on an Electric Line . . . . . †54  
     Protection of Outlying Switches . . . . . †37  
     Savings Effected by . . . . . †180  
 Automatic Switch on Power Supply Line . . . . . †6  
 Automatic Train Control:  
     Enforcing Observance of Distant Signals . . . . . †134  
     Installation on an Electric Railway On the Oakland Terminal . . . . . †292  
     Progress Made in 1915 . . . . . 18  
     Propaganda for Legislation . . . . . †68  
     Psychology of the Stop Signal . . . . . 364  
     Railway Commissioners Report . . . . . 372  
     Recommendations of I. C. C. . . . . 170  
 Systems:  
     American Tested on Chesapeake & Ohio . . . . . 189  
     Brownell's Mechanical Trip . . . . . 10  
     Bulla . . . . . †349  
     Gollos, Developments . . . . . †160  
     Gollos, I. C. C. Report . . . . . 212  
     Julian-Beggs, Improved . . . . . †128  
     Miller, Developments . . . . . †61  
     Tests on Boston & Maine . . . . . 185  
 Automobile Horn in Railway Service . . . . . †188
- B**
- Babbitt Metal, Substitute for . . . . . 218  
 Baggerman, G. L.:  
     Channel Pin Starting Punch . . . . . †348  
 Ballast Resistance:  
     For Slag and Alkali . . . . . 239  
     Normal and Unusual . . . . . †5  
 Baltimore & Ohio:  
     An Honest Signalman . . . . . †67  
     Construction News . . . . . 220, 250, 284, 319  
     Cost of Signal Maintenance . . . . . †2  
     Examination of Grade Crossings . . . . . 282  
     Mediation with Telegraphers . . . . . 282  
     Record Operation of Fast Trains . . . . . 74  
 Baltimore & Ohio Southwestern:  
     Construction News . . . . . 64  
 Baruch Electric Controller Corporation:  
     Signal Supply News . . . . . 166  
 Basford, George M.:  
     Signal Supply News . . . . . 132  
 Bates Expanded Steel Truss Company:  
     Signal Supply News . . . . . 287  
 Battery:  
     Desulphating Plates . . . . . 57  
     Dry Lead Storage . . . . . 185  
     Efficient Use of Caustic Soda on Track . . . . . 239  
     Exceptional Service on Track . . . . . 56  
     Performance Report . . . . . †332  
     Record . . . . . 334  
     Renewal Tray . . . . . †156  
     Testing and Remedying . . . . . †20  
     Cover for Lock . . . . . †95  
     Dumbwaiter for . . . . . 29  
 Bell Pole, Steps for Climbing . . . . . †29  
 Better Insulated Joint Maintenance . . . . . †133  
 Bezer, Henry:  
     Simple Track Circuit Calculations . . . . . 329  
 Biddle, James G.:  
     Signal Supply News . . . . . 101

- Block Signals:  
Early Installation in England..... 353  
Legislation to Require Universal Installation ..... 136  
On the Job..... 324  
Reasons for ..... 135  
Statistics ..... \*200
- Bolts:  
Measurement ..... 354  
Preventing Turning ..... \*4  
Bonding, Locating Defective..... 281  
Bonding Drill, Improved Buda-Wilson \*163
- Bond Wires:  
Excessive Breakage ..... 362  
Maintenance in Road Crossing..... 30  
Protector ..... \*188
- Book of Rules, Suggestions for Improving ..... 358
- Bootlegs:  
Improved Connections ..... \*158  
On the O. S. L. .... \*347  
Protection for ..... \*217  
Result of Wrong Connections..... \*315  
Standard on Queen & Crescent... \*258
- Borchers, P. N.:  
Maintainer's Emergency Light.... 225
- Borden Company:  
Signal Supply News..... 222
- Boston & Albany:  
Construction News..... 220, 283
- Boston & Maine:  
Automatic Train Stop Tests..... 185  
Personal Mention..... 32, 64, 190
- Boston Elevated:  
Construction News ..... 64, 382
- Brach Supply Company, L. S.:  
Adjustable Resistance Unit..... \*219  
Automobile Horn in Railway Service ..... \*188  
Signal Supply News..... 354
- Bracket Post Platform Addition..... \*156
- Brand, Thomas:  
Gin Pole for Lifting Signal Mechanisms ..... \*279  
What One Maintainer Has Learned \*217
- Broken Rail Protection..... \*356
- Broom, Scraper Attachment for..... \*380
- Brownell, Geo. W.:  
Automatic Train Stop..... 10
- Bryant Electric Co.:  
Signal Supply News..... 33
- Bryant Zinc Company:  
New Air-Gap Lightning Arrester. \*352
- Buda Company:  
Improved Buda-Wilson Bonding Drill ..... \*163
- Buell, Joseph W.:  
Signal Supply News..... 66
- Bulla Automatic Stop..... \*349
- Business Conditions in First Four Months of 1916..... \*133
- Byers Company, A. M.:  
Rust Resistance of Wrought Iron. \*245  
Signal Supply News..... 191, 222
- C**
- Cable Entrance, New..... \*63
- Cable Hangers, Davidson..... \*127
- Cab Signals:  
Necessity for Additional Service Tests ..... \*11  
Overlap Unnecessary? ..... \*3
- Cade, John T.:  
Signal Appliance Association Resolution ..... 313  
Signalmen Honor the Memory of. \*233
- Calibration of Relays, Use of Voltmeter or Ammeter..... 69
- Calling-On Arm:  
Semi-automatic ..... \*349  
Yellow Light for..... 293
- Cam Wear in Switch Rods..... 362
- Canadian Northern:  
Construction News..... 64, 319, 382  
Personal Mention ..... 64
- Canadian Pacific:  
Interlocking the Control of Two Drawbridges ..... \*264  
Personal Mention..... 99, 190, 221
- Cantilever Signal Bridge..... \*76
- Capacity of New York Elevated Lines 199
- Capping, Oil Treatment for..... 347
- Capping Nails ..... \*279
- Cars Ordered in 1915..... \*12
- Carter, E. E.:  
Maintainers and Their Tools..... 344
- Case, D. M.:  
A. C. Signals on the Queen & Crescent ..... \*257
- Caustic Soda Battery:  
Cost of Operation on Track Circuits ..... 258  
Efficient Use on Track..... 239  
New High Voltage..... \*159
- Centre St. Loop Signaling..... \*79, \*115
- Central Electric Company:  
Law Adjustable Resistance Units. \*159
- Central of Georgia:  
Construction News..... 130, 283  
Personal Mention ..... 99
- Centrifugal Frequency Relay, New U. S. & S..... \*161
- Chamber of Commerce:  
Considers Railroad Regulation.... 353  
Vote on Trainmen's Strike..... 219  
Channel Pin Starting Punch..... \*348
- Charging Storage Battery, Line Loss. 147
- Chatfield, C. E.:  
Cab Signals vs. Fixed Signals.... \*3
- Chausse Manufacturing Co.:  
Signal Supply News..... 192
- Cheap Power for Telephone Dispatching ..... 218
- Checking Mechanical Locking..... \*145
- Check Locking ..... \*377
- Cherman, Joe:  
Removing Pole Changer Covers... \*348
- Chesapeake & Ohio:  
Construction News..... 31, 283  
Personal Mention..... 64, 287  
Tests of American Train Control System ..... 189
- Chicago & Alton:  
Construction News ..... 99
- Chicago & Eastern Illinois:  
Automatic Crossing Gate Under Test ..... \*215  
Construction News ..... 283  
Developments of Miller Train Control ..... \*61
- Chicago & Northwestern:  
Construction News..... 64, 220, 283, 319  
Personal Mention..... 32, 287
- Chicago & Western Indiana:  
Construction News ..... 99
- Chicago Association of Commerce:  
Report of Committee on Smoke Abatement and Electrification. \*25
- Chicago, Burlington & Quincy:  
Construction News ..... 284  
Personal Mention ..... 250
- Chicago Great Western:  
Construction News..... 64, 99, 250, 283  
Highway Crossing Protection..... \*265  
Personal Mention..... 32, 131, 250, 354
- Chicago, Indianapolis & Louisville:  
Construction News..... 130, 250  
Personal Mention ..... 164
- Chicago, Milwaukee & St. Paul:  
Construction News ..... 164  
Correcting Inductive Disturbance in a Telephone Line..... 219  
Light Signals on Electric Zone... \*262  
Personal Mention..... 99, 221
- Chicago Pneumatic Tool Co.:  
Fuel Oil Driven Air Compressor.. 187
- Chicago Railway Signal & Supply Co.:  
New Bond Wire Protector..... \*188  
Signal Supply News..... 66, 132, 166  
Three Important Crossing-Bell Installations ..... \*97
- Chicago, Rock Island & Pacific:  
Government Drawbridge Signaling \*325  
Personal Mention..... 64, 164, 221, 251, 287, 353
- Chicago, St. Paul, Minneapolis & Omaha:  
Construction News..... 32, 130
- Childress, Wm.:  
Principles of Electric Locking.... 323
- Chromium, Copper and Metal Alloy for Resistor ..... 166
- Churchill, Wm.:  
Psychology and Signaling..... 255
- Cincinnati, Hamilton & Dayton:  
Construction News..... 31, 64, 250
- Cincinnati, New Orleans & Texas Pacific:  
Use of Safe Lock Switch Machine \*186  
Circuit Controllers, Interlocked... \*326  
Circuits:  
For Testing Relay Contacts..... \*348  
Special Highway Crossing Bell.... \*96
- Circuit Plans:  
On Cross-section Paper..... 246  
Securing Uniform Spacing for Wires ..... \*59
- Classification of Electric Motors.... 130
- Cleaning Gravity Battery Jars..... 218
- Cleveland, W. D.:  
Overcoming a Hazard in A. C. Track Circuits ..... \*146
- Cleveland, Cincinnati, Chicago & St. Louis:  
Construction News..... 31, 283  
Climbing Bell Pole, Steps for..... \*29
- Closed Track Circuits, Application in Electric Locking ..... 120
- Closing-in Signals on Interborough Rapid Transit ..... \*53
- Clothes and Efficiency..... 70
- Cloud, W. D.:  
Golden Gate Electric Interlocking. \*137  
Insulation of Gage Plates..... 195  
Maintenance Tools ..... 271  
"Old Man" for Drilling Switch Points ..... \*316  
Removing the Latch from Model 2 Machines ..... 281  
Should Signals Control Derails.... 358  
Train Signs on the Santa Fe..... \*44
- College Men in Signal Work..... \*194
- Colors for Signal Indications:  
Changed on New York Central and Pennsylvania ..... 261  
Theoretically Perfect ..... \*195  
Combination Crossing Signal..... \*195
- Combination Derail ..... \*162
- Commercial Acetylene Railway Light & Signal Company:  
Signal Supply News..... 192, 222
- Commission on Eight-Hour Day..... 346
- Commutator:  
Cleaner ..... \*317  
Filing ..... \*29
- Comparative Cost of Track Battery... \*258
- Compelling Observance of Signals... \*103
- Compensation of Pipe Lines..... 3
- Concrete Trunking ..... \*229
- Conduit:  
Construction in a P. R. R. Plant. 41  
Simple Connection ..... 217
- Confessions of a Maintainer..... 176, 265  
(See also Adventures of a Maintainer.)
- Congressional Committee on Railway Regulation:  
Beginning of Hearings..... 353  
Personnel of Committee..... 249
- Construction Methods:  
On A. C. L. .... 211  
Signaling and Interlocking..... \*141  
Construction Work in 1915..... 11
- Contact Springs, Adjusting..... \*217
- Contributory Negligence in Crossing Accidents ..... 182
- Co-operation Between Track and Signal Departments ..... 148
- Copper-Clad Steel Company:  
Signal Supply News..... 166
- Cost:  
Battery Charging ..... 329  
Caustic Soda and Gravity Battery. 240  
Interlocking Plant at a Crossing.. 319  
Position-Light Signals ..... 173  
Signal Maintenance ..... \*12  
Signal Materials ..... \*223  
Substituting A. C. for D. C. Power Track Battery Operation..... 258  
Valuation Field Work..... 353
- Cotter Pins, Increased Life..... 183
- Covers for Signal Locks..... \*96
- Counter Sinking Holes for Cotter Pins 183
- Counting Mechanism for Light Signals \*186
- Crossing and Route Levers, Use of... 299
- Crossing Bell (See Highway Crossing Protection). 122
- Crossing Fouling ..... 122
- Crossing Watchmen, Use of Periscope \*247
- Cross Licensing Agreement..... \*254
- Crossover:  
Equipped with Safe Lock Switch Machine ..... 186  
Fouling ..... 123
- Cross Protection ..... 74
- Cross-section Paper for Circuit Designs ..... 246
- Crouse-Hinds Company:  
Supply Trade News..... 287
- Cumberland Valley:  
Construction News ..... 382
- Current Consumption of Signal and Interlocking Apparatus ..... 327
- D**
- Dallas Union Terminal, Opening..... 349
- Davidson Cable Hanger..... \*127
- Definitions, Electric Wire and Cable Terminology ..... 106
- Delaware & Hudson:  
Construction News ..... 283  
New Single-track Automatics..... \*45  
Personal Mention..... 32, 287
- Delaware, Lackawanna & Western:  
Construction News..... 31, 286  
Cost of Signal Maintenance..... \*12  
New Switch Layouts ..... \*318  
Personal Mention ..... 286  
Signaling on the Cut-off..... \*197
- Demonstration of Some Savings Effected by Signals..... \*180
- Denver & Rio Grande:  
Construction News ..... 250
- Denver Union Terminal Company:  
Construction News ..... 99
- Denver & Salt Lake:  
Idle Poles Keep Sleet Off Wires. \*364
- Derails:  
Combination ..... \*162  
Control by Signals..... 324, 357  
English Opinions on Their Use... 164
- Designation of Pick-up and Release... 37
- Designing Battery Charging Lines... 327
- Desulphating Storage Battery Plates.. 57
- Detector Bars:  
Disadvantages of ..... \*241  
Holders ..... \*281
- Detroit, Monroe & Toledo Short Line: Construction News ..... 352
- Developments in Gollos Automatic Train Control ..... \*160
- Dinkel, Paul, Jr.:  
Method of Signal Testing..... 362
- Direct-reading Ohmmeter ..... \*159
- Directional Control Relay, New U. S. & S. .... \*162
- Discipline:  
And the Observance of Signals.... \*103  
For Enginemen on Pennsylvania.. 63  
For Signal Department Employees 256



|                                                                             |      |
|-----------------------------------------------------------------------------|------|
| Distant Signal, Importance of.....                                          | †134 |
| Door-holder for Terminal or Relay Box .....                                 | *183 |
| Drafting:                                                                   |      |
| Cross-section Paper for Circuit Design .....                                | 246  |
| Uniform Spacing for Wires on Circuit Plans .....                            | *59  |
| Drawbridge Protection:                                                      |      |
| D. & H. Single-track Automatics .....                                       | *45  |
| Hand-operated Circuit Controllers Interlocking Control of Two Bridges ..... | *235 |
| Massachusetts Commission's Recommendation and Orders .....                  | *264 |
| Trap Circuits on the Rock Island .....                                      | 378  |
| Drilling "A" Section Rails .....                                            | *325 |
| Drilling Machine .....                                                      | 314  |
| Drum Armature Valve Magnet, New U. S. & S. .....                            | *246 |
| Dry Cells, Reviving .....                                                   | *318 |
| Dryden, W. L.: Office Work with Combined Organization .....                 | 184  |
| Dry Lead Storage Battery .....                                              | 334  |
| Dunn, Samuel O.: Address at R. S. A. Annual Dinner .....                    | 185  |
| Duplex Bonding .....                                                        | 310  |
| Dwarf Signals:                                                              |      |
| Improper Wiring .....                                                       | *210 |
| Preventing Failures .....                                                   | *280 |

## E

|                                                                 |                                             |
|-----------------------------------------------------------------|---------------------------------------------|
| Early Signaling:                                                |                                             |
| Electro-Mechanical Interlocking ..                              | †321                                        |
| In England .....                                                | *345                                        |
| On the Pennsylvania .....                                       | *277                                        |
| Economic Psychology Association ..                              | †223                                        |
| Economy of Block Signals on the A. C. L. .....                  | 210                                         |
| Edison Company, Inc., Thomas A.: Signal Supply News .....       | 191, 384                                    |
| Edison Storage Battery Co.: Signal Supply News .....            | 65, 132, 166, 252                           |
| Edison Storage Battery Supply Company: Signal Supply News ..... | 222, 320                                    |
| Edison Co., Inc., Thos. A.: Signal Supply News .....            | 191                                         |
| Effect of Temperature on Relays ..                              | 302                                         |
| Efficiency Tests:                                               |                                             |
| New York, New Haven & Hartford ..                               | 126                                         |
| Efficient Use of Caustic Soda Track Battery .....               | 239                                         |
| Eight-hour Day Controversy:                                     |                                             |
| Commission Appointed Under Adamson Law .....                    | 346                                         |
| Conferences Between Men and Roads .....                         | 163, 222                                    |
| Hasty Settlement .....                                          | †253                                        |
| Menace of the Adamson Law Settlement .....                      | †289                                        |
| N. C. & St. L. Signalmen Express Opinion .....                  | 282                                         |
| Test of Adamson Law .....                                       | †355                                        |
| Unreasonable Position of Trainmen ..                            | †104                                        |
| Eight-hour Day for Dispatchers ..                               | 188                                         |
| Electrical Sales Company:                                       |                                             |
| Electric Horns for Motor-cars ..                                | 218                                         |
| Signal Supply News .....                                        | 101, 192                                    |
| Electric Bolt Locks .....                                       | 243                                         |
| Electric Horns for Motor-cars ..                                | 218                                         |
| Electric Interlocking:                                          |                                             |
| Improved Wearing Plate .....                                    | *156                                        |
| New Installations:                                              |                                             |
| Centre St. Loop Subway .....                                    | *115                                        |
| Near Sydney, Australia .....                                    | *365                                        |
| New York Central Plant in Chicago .....                         | *75                                         |
| New York Central at Utica, N. Y. .....                          | *226                                        |
| Pennsylvania at Philadelphia ..                                 | *39                                         |
| Santa Fe at Oakland, Cal. ....                                  | *137                                        |
| Removing the Latch from Model 2 Machines .....                  | 281                                         |
| Should Signals Control Derails? ..                              | 324, 357                                    |
| Electric Light Switch Indicators ..                             | *235                                        |
| Electric Locking, Principles of ..                              | †69, *71, *120, *204, *241, *297, 323, *335 |
| Electric Railway Signaling:                                     |                                             |
| Circuit Design of Trolley Contactor Signals .....               | *77                                         |
| Danger from Theft of Impedance Bond Cables .....                | *146                                        |
| Mileage Installed in 1915 .....                                 | 11                                          |
| New Installations:                                              |                                             |
| Centre St. Loop .....                                           | *115                                        |
| Chicago, Milwaukee & St. Paul ..                                | *262                                        |
| Electric Zone .....                                             | *273                                        |
| Newark Terminal .....                                           | *292                                        |
| Oakland Terminal .....                                          | *235                                        |
| Rhode Island Company .....                                      | *54                                         |
| Subway Protection on Winnipeg Electric .....                    | *345                                        |
| Electric Signals, Early Installation in England .....           | 33, 132                                     |
| Signal Supply News .....                                        | †1                                          |
| Effect on Signaling .....                                       | 183                                         |
| Electrolyte, Sure Test for .....                                |                                             |

|                                                    |                                 |
|----------------------------------------------------|---------------------------------|
| Electro-Mechanical Interlocking:                   |                                 |
| Development During 1915 .....                      | 18                              |
| Early Installations .....                          | †321                            |
| New Plant on Atlantic Coast Line ..                | *210                            |
| Typical Circuit Plans .....                        | 114                             |
| Electro-Pneumatic Interlocking:                    |                                 |
| Switch Movements in Newark Terminal .....          | *273                            |
| El Paso & Southwestern:                            |                                 |
| Construction News .....                            | 332                             |
| Increase in Wages .....                            | 282                             |
| Personal Mention .....                             | 131                             |
| Emergency Light for Maintainers ..                 | 218, 225                        |
| Emergency Switch .....                             | 73                              |
| Enamel on Metal .....                              | 317                             |
| Enginemen and Signal Interpretation ..             | 239                             |
| English Railways, Cost of Signal Maintenance ..... | †2                              |
| English View of Speed Signaling ..                 | 230                             |
| Equated Sections for Maintainers ..                | †355, 362                       |
| Equipment for Construction Gangs ..                | 141                             |
| Erle:                                              |                                 |
| Construction News .....                            | 31, 286, 332                    |
| Personal Mention .....                             | 32, 64, 100, 164, 190, 221, 250 |
| Excessive Voltage Injures Apparatus ..             | 347                             |
| Ex-New York Central Club Luncheon ..               | 189                             |
| Exposition of the Three Schemes of Signaling ..... | *114, *150                      |
| Extension Fuse Plug .....                          | *157                            |
| External Resistance With Gravity Battery .....     | 139                             |

## F

|                                                                |                                                         |
|----------------------------------------------------------------|---------------------------------------------------------|
| Failures:                                                      |                                                         |
| Reports .....                                                  | *332                                                    |
| Switch and Signal on the Hudson & Manhattan .....              | 209                                                     |
| Fairfield, H.: Improved Detector Bar Holders ..                | *281                                                    |
| False-Clear Signals, Necessity for Discussion .....            | 105                                                     |
| False-Danger Signals Used by Robbers ..                        | 296                                                     |
| Federal Electric Interlocking Indication System .....          | *205                                                    |
| Federal Signal Company:                                        |                                                         |
| Electric Interlocking in Centre St. Loop .....                 | *115                                                    |
| New Cable Entrance .....                                       | *63                                                     |
| New Interlocked Circuit Controller ..                          | *30                                                     |
| New Spindle Circuit Controller ..                              | *282                                                    |
| Signal Supply News .....                                       | 33, 222                                                 |
| Time Element Relay .....                                       | *83                                                     |
| Federal Valuation, Progress up to July 31 .....                | 282                                                     |
| Felt for Commutator Cleaner .....                              | *317                                                    |
| Fiber Insulation in Joints, Increasing Life .....              | *379                                                    |
| Fiber Tags, Marking .....                                      | 247                                                     |
| Filling Rough Motor Commutators ..                             | *29, 157                                                |
| Filing System .....                                            | 332, 334                                                |
| Fiscal Year, Proposed Change in Dates .....                    | 63                                                      |
| Fisher, Israel, Connection With Early Signaling .....          | 261                                                     |
| Fishing Wires .....                                            | 218                                                     |
| Flagging to Protect Broken Rails ..                            | †356                                                    |
| Floor Pushes .....                                             | 73                                                      |
| Foreign Current, Testing for and Remedying .....               | *23                                                     |
| Formula for Iron Cement .....                                  | 316                                                     |
| Ft. Dodge, Des Moines & Southern Construction News .....       | 32                                                      |
| Foster, J. E.: Signal Instruction on the Pennsylvania .....    | *360                                                    |
| Fouling Protection .....                                       | 121                                                     |
| Foundation Tips .....                                          | 280                                                     |
| Fourteen Months Without a Failure ..                           | 144                                                     |
| Freight Car Shortage .....                                     | 163                                                     |
| "Freeing-up" a Switch or Signal Motor .....                    | 183                                                     |
| Friend of the Relay Man .....                                  | *280, *348                                              |
| From a Maintainer's Diary .....                                | 195                                                     |
| From Experience and Hearsay .....                              | *4, 38, 70, 105, 136, 170, 196, 225, 256, 291, 324, 358 |
| Frost Troubles, Overcoming ..                                  | 105, 136, 195                                           |
| Fry, O. V.: Scientific Selection and Location of Signals ..... | *237                                                    |
| Fuel Oil-Driven Air-Compressor ..                              | 187                                                     |

## G

|                                                       |               |
|-------------------------------------------------------|---------------|
| Gage for Adjusting Switch Points ..                   | *247          |
| Gage Plates, Insulation .....                         | 195           |
| Galena Signal Oil Company: Signal Supply News .....   | 166           |
| Gall, O. C.: "The Relay Man's Friend" .....           | *280          |
| Gasoline Storage Tank .....                           | *57           |
| Gassett, Oscar, Connection With Early Signaling ..... | 261           |
| General Electric Company, Signal Supply News .....    | 101, 252, 320 |

|                                                                  |                              |
|------------------------------------------------------------------|------------------------------|
| General Railway Signal Company:                                  |                              |
| Adjustable Resistance Units .....                                | *127                         |
| Dynamic Indication and Electric Interlocking .....               | *206                         |
| Plagiarism, a New Relay Contact ..                               | *98                          |
| Signal Supply News .....                                         | 66, 101, 132, 191, 192, 354  |
| Gin Pole for Lifting Signal Mechanisms .....                     | *279                         |
| Glass Cover Rack .....                                           | *316                         |
| Golden Gate Electric Interlocking ..                             | *137                         |
| Gollos Railway Signal Company of America:                        |                              |
| Developments in Automatic Stop ..                                | *160                         |
| I. C. C. Report on Automatic Stop ..                             | 212                          |
| Government Drawbridge Signaling ..                               | *325                         |
| Grade Crossings:                                                 |                              |
| Number in Chicago Terminals .....                                | 25                           |
| Grand Trunk:                                                     |                              |
| New Automatic Signals Near Chicago .....                         | *5                           |
| Personal Mention .....                                           | 64                           |
| Gravity Battery:                                                 |                              |
| Cleaning Jars .....                                              | 218                          |
| Cost of Operation .....                                          | 258                          |
| External Resistance for Track Circuits .....                     | 139                          |
| Renewing .....                                                   | 184                          |
| Great Northern:                                                  |                              |
| Construction News .....                                          | 284                          |
| General Instructions for Lamp Maintenance .....                  | *27                          |
| Personal Mention .....                                           | 131, 164, 190, 250, 320, 353 |
| Proposed Electrification .....                                   | 353                          |
| Rebuilding an Old Interlocking ..                                | *368                         |
| Great Western Railway of England, Number of Levers in Service .. | 249                          |
| Grinder, Motor-Driven .....                                      | *184                         |
| Ground:                                                          |                              |
| Emergency .....                                                  | *379                         |
| For Lightning Arresters .....                                    | 136                          |
| Ground Apparatus, Methods of Applying .....                      | 110                          |
| Ground Detector Circuit .....                                    | *379                         |
| Grounded Circuit Causes Trouble ..                               | *279                         |
| Grounds for Lightning Arresters ..                               | 136                          |
| Guaranty for a Signal Installation, Discussion of .....          | 308                          |
| Guard Plate for Bootleg .....                                    | *347                         |
| Guard Rails at Grade Crossings ..                                | 4                            |

## H

|                                                                   |         |
|-------------------------------------------------------------------|---------|
| Hale, J. F.: Testing for Shorts and Open .....                    | *59     |
| Hall Electric Interlocking Indication System .....                | *207    |
| Hall, Frank E., Overcoming Frost Troubles .....                   | 105     |
| Hall Switch & Signal Co.: Disc-signal as a Wig-Wag .....          | 63      |
| Signal Supply News .....                                          | 33, 101 |
| Style L Signal .....                                              | *350    |
| Handlan-Buck Manufacturing Company, The: Signal Supply News ..... | 222     |
| Handling Men and Material on Signal Construction Work .....       | *141    |
| Handling Mixed Paint .....                                        | 316     |
| Handling Motor-cars in Cold Weather ..                            | 59      |
| Handling Signal Office Work .....                                 | †289    |
| Hand Signals for Panama Canal Locomotives .....                   | 247     |
| Harmonizing R. S. A. Specifications ..                            | 113     |
| Harrington, C. O., Jr.: Locating Defective Rail Bonding ..        | 281     |
| Testing Track Circuit Safety .....                                | 278     |
| Voltmeter vs. Ammeter for Relay Calibration .....                 | 69      |
| Hawaiian Engineering Association, Address by Fred H. Jones .....  | 353     |
| Hayes Track Appliance Company:                                    |         |
| Combination Derails .....                                         | *162    |
| Signal Supply News .....                                          | 166     |
| Hazard Manufacturing Company:                                     |         |
| Identification Mark for Signal Wire ..                            | 159     |
| Signal Supply News .....                                          | 132     |
| Head of the Signal Department .....                               | †254    |
| Heating Units to Eliminate Moisture ..                            | 184     |
| Henry, Joseph, Monument to .....                                  | 219     |
| High-Voltage Signal Battery .....                                 | *159    |
| Highway Crossings:                                                |         |
| Number in Chicago Terminal Area ..                                | 25      |
| Highway Crossing Accidents:                                       |         |
| A. R. A. Special Committee Report .....                           | 163     |
| Contributory Negligence .....                                     | 182     |
| Highway Crossing Protection:                                      |         |
| A. R. A. Adopts Standards .....                                   | †167    |
| A. R. A. Special Committee on Prevention of Accidents .....       | 31      |
| Automatic Crossing Gate Under Test .....                          | *215    |
| Combination Signal on Knoxville Railway & Light Company .....     | *195    |
| Detailed Examination of Crossings on Baltimore & Ohio .....       | 282     |
| Development of Devices in 1915 ..                                 | 13      |
| Hall Disc-Signal as a Wig-Wag ..                                  | 63      |
| Joint Report on New Standards ..                                  | 249     |
| Legislation to Require Warning Devices .....                      | †36     |
| National Worm-Drive Wig-Wag ..                                    | *248    |

|                                                                   |                               |
|-------------------------------------------------------------------|-------------------------------|
| On the Chicago Great Western.....                                 | *265                          |
| Q. & C. Magnetic Wig-Wag.....                                     | *128                          |
| Special Bell Circuits.....                                        | *29, *59, *96, 182, *225, 256 |
| Three Important Crossing Bell Installations.....                  | *97                           |
| Hints for Maintainers.....                                        | 316                           |
| Hishon, W. H.:<br>Convenient Lamp Lighter.....                    | 317                           |
| Stray Current Drops Track Relay.....                              | *281                          |
| Holder for Terminal of Relay Box Door.....                        | *183                          |
| Holliday, John S.:<br>Phase Meter and Its Application.....        | *91                           |
| Holt, Henry R.:<br>Signaling a National Issue.....                | 169                           |
| Holt, R. W.:<br>Refilling Storage Battery.....                    | *157                          |
| Home-Made:<br>Drilling Machine.....                               | *246                          |
| Resistance Unit.....                                              | *246                          |
| Testing Board.....                                                | *381                          |
| Hooks for Fishing Wires.....                                      | *379                          |
| Housing of Railway Construction Gangs.....                        | 164                           |
| Hubbard & Company, Signal Supply News.....                        | 132                           |
| Hudson, Walter F.:<br>A. C. Signaling in the Centre St. Loop..... | *79, 115                      |
| Hudson & Manhattan Signal Operation.....                          | 209                           |
| Hydrometer, Proposed R. S. A. Standard.....                       | 109                           |

## I

|                                                                                   |            |
|-----------------------------------------------------------------------------------|------------|
| Identification:<br>For Repaired Material.....                                     | *334       |
| For Signal Wire.....                                                              | 159        |
| Idle Poles Keep Sleet Off Wires.....                                              | *364       |
| Illinois Central:<br>Construction News.....                                       | 99, 220    |
| Salary Increases.....                                                             | 189        |
| Illinois Traction System:<br>Construction News.....                               | 382        |
| Illuminated Warning Sign.....                                                     | *247       |
| Impedance Bonds:<br>Dangers from Theft of Copper Cables.....                      | *146       |
| New U. S. & S.....                                                                | *318       |
| Imperial Government Railways of Japan, New Signal Installation.....               | 195        |
| Importance of the Distant Signal.....                                             | *134       |
| Improper Wiring of Dwarf Signals.....                                             | *280       |
| Increasing Single-Track Capacity.....                                             | *104       |
| Indication Locking.....                                                           | *57, *204  |
| Individualism Among Signal Engineers.....                                         | 357        |
| Induction Motor Type Line Relay.....                                              | *160       |
| Inductive Disturbance in Telephone Line Eliminated.....                           | 219        |
| Inspectors, Welcome or Not.....                                                   | 291        |
| Institution of Railway Signal Engineers.....                                      | 165, 372   |
| Instruction Systems for Signalmen.....                                            | *356, *359 |
| Insulation of Gage Plates.....                                                    | 195        |
| Insulated Joints:<br>Application and Maintenance.....                             | 275, 362   |
| Better Maintenance.....                                                           | *133       |
| Increasing Life of Fiber.....                                                     | *379       |
| Proper Maintenance.....                                                           | 140        |
| Testing and Remedying Defective.....                                              | *22        |
| Interborough Rapid Transit:<br>Extension of Time for Signaling Elevated Road..... | 63         |
| Practice in Locating Automatic Signals.....                                       | *51        |
| Reasons for Not Installing Signals.....                                           | *193, 199  |
| Interlocker, The.....                                                             | 135        |
| Interlocking:<br>Artist's Idea of an Early Plant.....                             | *266       |
| Between the Control of Two Drawbridges.....                                       | *264       |
| On the Rock Island Government Drawbridge.....                                     | *326       |
| Simple Expedient for Grade Crossings.....                                         | *118       |
| Statistics.....                                                                   | *200       |
| Switch Lock Instead of.....                                                       | *133       |
| Interlocking Machine:<br>Lighting the Under Side.....                             | *185       |
| Interlocking Plants:<br>A. C. Power Equipment.....                                | *60        |
| Details of Work Completed, Under Way and Contemplated.....                        | 11         |
| Division of Cost.....                                                             | 319        |
| Number and Location in Chicago Terminals.....                                     | *25        |
| Interlocking Relay.....                                                           | *72        |
| Interlocking Tower, Concrete Block.....                                           | *76        |
| Intermediate Signals, Elimination.....                                            | 256        |
| Interstate Commerce Commission:<br>Abstract of Annual Report.....                 | 4          |
| Accident Bulletin for 1915.....                                                   | *49        |
| Block Signal and Interlocking Statistics.....                                     | *200       |
| Cost of Valuation Field Work.....                                                 | 353        |
| Personal Mention.....                                                             | 353        |
| Quarterly Accident Bulletin.....                                                  | *223       |
| Report on Amherst Accident.....                                                   | *168, 170  |
| Report on Gollos Automatic Stop.....                                              | 212        |

|                                                         |      |
|---------------------------------------------------------|------|
| Suggested Changes in Signaling Statistics.....          | *193 |
| Summary of Road's Revenues and Expenses.....            | 353  |
| Investigation of Boston Accident.....                   | 378  |
| Iron Cement, Formula for.....                           | 316  |
| Iron-Silicon Alloys, Magnetic and Other Properties..... | *163 |
| Iron Wire, Replacing Copper With.....                   | 163  |

## J

|                                                                       |      |
|-----------------------------------------------------------------------|------|
| Jacob, Harry M.:<br>Power Equipment for A. C. Interlocking Plant..... | *56  |
| Japan, Substitute for.....                                            | 380  |
| Japanese Signal Installation.....                                     | 195  |
| Johns & Company, The Lohmann Method of Protecting Metal.....          | 381  |
| Johnson, Arthur H.:<br>Reminiscences of America.....                  | 323  |
| Jones, Charles S.:<br>Safe Lock Switch Machine.....                   | *186 |
| Jones, L. E.:<br>A. C. Signaling on the Oakland Terminal.....         | *292 |
| Jones, W. A.:<br>Maintenance of Oil Lamps.....                        | 363  |
| Julian-Beggs Signal Company:<br>Improved Train Control.....           | *128 |
| Jumper Wire for Cutting Out Batteries.....                            | *379 |

## K

|                                                                       |      |
|-----------------------------------------------------------------------|------|
| Kendall, A. B.:<br>Resetting a Highway Crossing Bell Circuit.....     | *182 |
| Special Switch Box Cam or Special Relay.....                          | 256  |
| Kinks, Large Collection from one Man.....                             | *167 |
| Knife for Scraping Insulated Wire.....                                | *315 |
| Knoxville Railway & Light Company<br>Combination Crossing Signal..... | *195 |

## L

|                                                                           |                    |
|---------------------------------------------------------------------------|--------------------|
| Labor Report.....                                                         | *332               |
| Lacquer for Signal Apparatus.....                                         | 281                |
| Lamp:<br>Lighter.....                                                     | 317                |
| Maintenance.....                                                          | *1, *27, *132, 363 |
| Rating in Lumens.....                                                     | *193               |
| Lascelles, T. S.:<br>Early Electrical Signals in England.....             | *345               |
| Law Adjustable Resistance Units.....                                      | *159               |
| Lead-Out Elbow.....                                                       | *63                |
| Leakage:<br>Testing for and Remedying in Track Circuits.....              | *21                |
| Leaks in an Oil Can, Stopping.....                                        | 379                |
| Left-hand Quadrant Indications:<br>Change in R. S. A. Recommendation..... | 302                |
| On the New Haven.....                                                     | *85                |
| Legislation:<br>Highway Grade-crossing and Block Signal Protection.....   | *136               |
| Lehigh & Hudson River:<br>Signal Maintenance Methods and Costs.....       | *231               |
| Lehigh Valley:<br>Construction News.....                                  | 32, 220, 250, 382  |
| Cost of Signal Maintenance.....                                           | *2                 |
| Lesson from the European War.....                                         | *121, 357          |
| Lever Locks.....                                                          | *73, *241          |
| Light:<br>For Emergency Work.....                                         | 218                |
| Under an Interlocking Machine.....                                        | *185               |
| Lightning Protection:<br>Address Before Washington Regional Meeting.....  | 119                |
| Experience with Non-Air Gap and Vacuum-Cartridge Arresters.....           | 256                |
| New Bryant Zinc Air-Gap Arresters.....                                    | *362               |
| On Telegraph Lines.....                                                   | 214                |
| Securing Satisfactory.....                                                | *253               |
| Light Signals:<br>Comparison of Color and Position.....                   | 238                |
| Counting Mechanism for.....                                               | *186               |
| New Installations:<br>Centre St. Loop Subway.....                         | *81, *115          |
| C. M. & St. P. Electric Zone.....                                         | *262               |
| Newark Terminal.....                                                      | *273               |
| Rock Island Government Drawbridge.....                                    | *326               |
| Rhode Island.....                                                         | *235               |
| Winnipeg Electric.....                                                    | *54                |
| Service Record on Pennsylvania Line Loss in Storage Battery Charging..... | 147                |
| Locating Defective Rail Bonding.....                                      | 281                |
| Locating Signals:<br>By Scientific Tests.....                             | *237, 255          |
| On Interborough Rapid Transit.....                                        | *51                |

|                                                              |                   |
|--------------------------------------------------------------|-------------------|
| Locking, Mechanical:<br>Method for Checking.....             | *145              |
| Locks:<br>Oil in.....                                        | 225               |
| Taking Out Paint and Dirt.....                               | 217               |
| Locomotives Ordered in 1915.....                             | *12               |
| Lohmann Method of Protecting Metal.....                      | 381               |
| Long Island:<br>Construction News.....                       | 31, 283           |
| Fourth of July Traffic.....                                  | 249               |
| Personal Mention.....                                        | 353               |
| Longer Rails, a Vote Against.....                            | 53                |
| Loose Nuts, Preventing.....                                  | 347               |
| Los Angeles & Salt Lake, Construction News.....              | 64, 189, 250      |
| Loud-Speaking Telephones, Development in 1915.....           | 30                |
| Louisville & Nashville:<br>Construction News.....            | 250, 285, 352     |
| Personal Mention.....                                        | 32, 221, 353, 383 |
| Signaling the Cincinnati-Atlanta Line.....                   | *88               |
| Low-Speed, What It Means in R. S. A. Standard Signaling..... | 151               |
| Low-Voltage Switch Machines:<br>Development During 1915..... | 16                |
| Lumens Should Replace Watts.....                             | *193              |
| Lundy, B. A.:<br>Electric Interlocking at Utica, N. Y.....   | 226               |

## M

|                                                                      |                 |
|----------------------------------------------------------------------|-----------------|
| McConahay, J. F.:<br>Who Should Buy Tools.....                       | 270             |
| MacDonald, A. C.:<br>Overcoming Frost Trouble.....                   | 195             |
| Magnetic Wig-Wag, the Q. & C.....                                    | *128            |
| Maine Central:<br>Construction News.....                             | 283, 382        |
| Maintainers:<br>Equated Sections for.....                            | *1355, 362      |
| Hints for.....                                                       | 316             |
| House.....                                                           | *231            |
| Poem by.....                                                         | 354             |
| Record on New York, Ontario & Western.....                           | 144             |
| Relation of Clothes and Efficiency.....                              | 70              |
| Relations to Section Foremen.....                                    | 291             |
| Tools.....                                                           | *224, 270, 344  |
| Unqualified.....                                                     | 291             |
| Maintenance:<br>A. C. Signal Apparatus.....                          | *267            |
| Better System.....                                                   | *168            |
| Cost on English and American Roads.....                              | *2              |
| Effect of Substituting A. C. for D. C. Power.....                    | 27              |
| Emergency Light.....                                                 | 225             |
| Improving.....                                                       | 147             |
| Instructions for Care of Lamps on Great Northern.....                | *27             |
| Insulated Rail Joints.....                                           | *133, 275, 362  |
| Oil Lamps.....                                                       | *132            |
| Protecting Bond Wires in Road Crossings.....                         | 30              |
| Record Forms.....                                                    | 316             |
| Reports.....                                                         | 331             |
| Man-Hole Construction in a Pennsylvania Plant.....                   | *41             |
| Marking:<br>Fibre Tags.....                                          | 247             |
| Mechanical Locking.....                                              | *97             |
| Turned Pins for Cotters.....                                         | 59              |
| Mason, E. F.:<br>Principles of Electric Locking.....                 | 323             |
| Material Record for Maintainers.....                                 | 316             |
| Material Reports.....                                                | *232, 331, *332 |
| Measuring Resistance With a Voltmeter.....                           | 155             |
| Measurement of Bolts.....                                            | 354             |
| Mechanical Interlocking:<br>Indication Locking for Small Plants..... | *57             |
| Marker for Laying Out Locking.....                                   | *97             |
| Passing of Wire-Operated Signals.....                                | *103            |
| Pipe Line Compensation.....                                          | 3               |
| Preventing Bolts in Plank Leads from Turning.....                    | *4              |
| Rebuilding an Old Plant.....                                         | *368            |
| Revised Specifications for.....                                      | 107             |
| Revision of Two Grand Trunk Plants.....                              | *8              |
| Six New Plants on the Lackawanna Cut-off.....                        | *197            |
| Uses for Pipe Rivets.....                                            | 156             |
| Mechanical Locking, Method for Checking.....                         | *145            |
| Mechanical Time Lock.....                                            | 73              |
| Mechanical Time Releases, Use With Switch Indicators.....            | *236            |
| Mechanism Case:<br>Cover for Locks.....                              | *95             |
| Platform for Wiring.....                                             | *380            |
| Medium Speed, What It Means in R. S. A. Standard Signaling.....      | 151             |
| Menace of the Eight-Hour Pay Day.....                                | *289            |
| "Men Wanted" Advertisement.....                                      | *103            |
| Mentzer & Co., J. P.:<br>Dry Lead Storage Battery.....               | 185             |
| Message from the Front.....                                          | 158             |
| Method for Checking Mechanical Locking.....                          | *145            |
| Methods of Handling Office Work.....                                 | 331             |



|                                       |                  |
|---------------------------------------|------------------|
| Michigan Central:                     |                  |
| Construction News .....               | 31               |
| Miller Train Control Corporation:     |                  |
| Recent Developments in System..       | *61              |
| Signal Supply News.....               | 222              |
| Misinterpretation of Signals Cause of |                  |
| Accident .....                        | 237              |
| Missouri, Kansas & Texas:             |                  |
| Construction News.....32, 220, 283,   | 352              |
| Missouri Pacific:                     |                  |
| Construction News .....               | 84, 99, 189, 283 |
| Personal Mention .....                | 131, 190, 287    |
| Salary Increases .....                | 189              |
| Mixed Paint, Handling .....           | 316              |
| Moisture Eliminated by Heating Units  | 184              |
| Monongahela Railway:                  |                  |
| Construction News .....               | 32               |
| Monthly Failure Statement.....        | †168             |
| Morehart, F. D.:                      |                  |
| Testing A. C. Relays and Adjust-      |                  |
| ing Track Circuits .....              | *148             |
| Morledge, J. E.:                      |                  |
| Another Friend of the Relay Man       | *348             |
| Motors:                               |                  |
| Filling Rough Commutators...*         | 29, 157          |
| Handle for Carrying.....              | *30              |
| Putting in Running Order.....         | 183              |
| Motor-Cars:                           |                  |
| Freeing Set-Screws .....              | 218              |
| Repairing Gasoline Pipe Leaks...      | *379             |
| Suggestions for Handling in Cold      |                  |
| Weather .....                         | 59               |
| Wiring .....                          | *58              |
| Motor-Wheel for Hand-Power Speeders   | *62              |
| Movable Bridges:                      |                  |
| Requisites for Protection of Traffic  | 107              |
| Movable Point Frogs, Fouling.....     | 124              |
| Mudge & Company:                      |                  |
| Motor Wheel for Hand-Power            |                  |
| Speeders .....                        | *62              |
| Signal Supply News.....               | 384              |

## N

|                                       |              |
|---------------------------------------|--------------|
| Nachod, Carl P.:                      |              |
| Circuit Design of Trolley Contact-    |              |
| or Signals .....                      | *77          |
| Nachod Signal Company:                |              |
| Combination Crossing Signal.....      | *195         |
| Nashville, Chattanooga & St. Louis:   |              |
| Accident Near Rockledge, Tenn...      | *47          |
| Change in Department Organiza-        |              |
| tion .....                            | 31           |
| Construction News.....32, 130, 285,   | 382          |
| Personal Mention .....                | 33, 64       |
| Signalmen Express Opinion on          |              |
| Eight-Hour-Day Controversy..          | 282          |
| National Carbon Company:              |              |
| High Voltage Signal Cells.....        | *159         |
| Signal Supply News.....65,            | 222          |
| National Fire Proofing Company:       |              |
| Signal Supply News.....               | 384          |
| National Lead Company:                |              |
| Signal Supply News.....               | 132          |
| National Railway Appliances Associa-  |              |
| tion:                                 |              |
| Benefits of Exhibits.....             | †35          |
| Signal Supply News.....               | 102          |
| National Railway of Mexico, Train     |              |
| Accident .....                        | 240          |
| National Regulation of Railways.....  | †322         |
| National Safety-First Association.... | †68          |
| National Worm-Drive Wig-Wag.....      | *248         |
| New Books:                            |              |
| Alternating Current Electricity:      |              |
| Second Course .....                   | 135          |
| Railway Signal Association Pro-       |              |
| ceedings .....                        | 135          |
| Train Operation, by William           |              |
| Nichols .....                         | 194          |
| New Lines Built in 1915.....          | †2           |
| New Orleans & North Eastern:          |              |
| Construction News .....               | 352          |
| New South Wales Railways, Interlock-  |              |
| ing at Flemington.....                | *365         |
| New York Central, Lines East:         |              |
| Arbitration of Telegraphers' De-      |              |
| mand .....                            | 249          |
| Construction News.....31, 99, 220,    | 382          |
| Cost of Signal Maintenance.....       | †2           |
| Electric Interlocking at Utica,       |              |
| N. Y. ....                            | *226         |
| Former Employees' Fourth An-          |              |
| nuual Luncheon .....                  | 163          |
| Personal Mention .....                | 190          |
| New York Central, Lines West:         |              |
| Adoption of Green for Proceed..       | 261          |
| Electric Interlocking Plant in Chi-   |              |
| cago .....                            | *75          |
| Personal Mention .....                | 320          |
| Signal Performance on the To-         |              |
| ledo Division .....                   | 114          |
| Train Accident at Amherst, Ohio,      |              |
| .....                                 | 114, 170     |
| New York, Chicago & St. Louis:        |              |
| Personal Mention.....99,              | 383          |
| New York Municipal Corp., A. C. Sig-  |              |
| naling in the Centre St. Loop..       | *79          |
| New York, New Haven & Hartford:       |              |
| Collision at Bradford.....            | 158          |
| Collision at Milford, Conn.....       | 90           |
| Construction News .....               | 31, 252, 283 |
| Cost of Signal Maintenance.....       | †2           |

|                                     |                  |
|-------------------------------------|------------------|
| Engineman in Bradford Accident      |                  |
| Indicted .....                      | 189              |
| Personal Mention.....64, 131, 190,  | 221              |
| Reconstruction of Signals, Wood-    |                  |
| lawn Junction to New Haven..        | *95              |
| Signal Performance .....            | 126              |
| Storm Damage to Electrified Zone    | 31               |
| New York, Ontario & Western:        |                  |
| A Maintainer's Record.....          | 144              |
| New York, Philadelphia & Norfolk:   |                  |
| Personal Mention .....              | 383              |
| New York Public Service Commission: |                  |
| Indictment of Former Member....     | 66               |
| Investigation .....                 | 34               |
| New Zealand Government Ry., In-     |                  |
| terlocking and Signals.....         | 180              |
| Non-Automatic Signals:              |                  |
| Details of Work Completed and       |                  |
| Contemplated .....                  | 11               |
| Norfolk & Western:                  |                  |
| Construction News .....             | 31, 284, 352     |
| Extension of Electric Operation...  | 853              |
| Personal Mention .....              | 64, 99, 190, 353 |
| Northern Pacific:                   |                  |
| Construction News .....             | 220, 319, 852    |
| Increased Pay to Telegraphers...    | 302              |
| Increase in Wages for Train Dis-    |                  |
| patchers .....                      | 282              |
| Personal Mention .....              | 64, 221, 280     |
| Northwestern Pacific:               |                  |
| Construction News .....             | 382              |

## O

|                                       |           |
|---------------------------------------|-----------|
| Oahu Railway & Land Company:          |           |
| Construction News .....               | 189       |
| Odious Comparison .....               | 38        |
| Office Work, Handling.....            | †289, 351 |
| Ogden, Logan & Idaho:                 |           |
| Personal Mention .....                | 99        |
| Ohmmeter, Direct Reading.....         | *159      |
| Ohm's Law, Simple Explanation of..    | *314      |
| Oil Can, Stopping Leaks.....          | 379       |
| Oil Guard for Reduction Gears.....    | *184      |
| Oil in Signal Locks.....              | 225       |
| Oil Treatment for Capping.....        | 347       |
| "Old Man" for Drilling Switch Points. | *316      |
| Opening of Our Washington Office...   | †289      |
| Open Track Circuits, Application...   | 120       |
| Operating Income:                     |           |
| High Record for American Rail-        |           |
| ways .....                            | 31        |
| Operation of Signals on the Hudson    |           |
| & Manhattan .....                     | 209       |
| Oregon Electric:                      |           |
| Examination Forms for Trainmen.       | 130       |
| Oregon Short Line:                    |           |
| Bootleg Construction .....            | *347      |
| Construction News .....               | 189       |
| Personal Mention .....                | 190       |
| Organization:                         |           |
| Changes in Signal Departments         |           |
| During 1915 .....                     | 18        |
| On Lehigh & Hudson River.....         | 231       |
| Overhead Construction, Illinois Pub-  |           |
| lic Utility Rules.....                | 219       |
| Overcoming Frost Troubles.....        | 195       |
| Outlying Switch Protection.....       | 37        |

## P

|                                        |                                    |
|----------------------------------------|------------------------------------|
| Pacific Electric:                      |                                    |
| Construction News .....                | 284, 382                           |
| Page Woven Wire Fence Company:         |                                    |
| Signal Supply News.....                | 252                                |
| Paint in Fiber Tag Marking.....        | 30                                 |
| Painting Mechanical Parts.....         | 304                                |
| Panama Canal Locomotives, Hand         |                                    |
| Signals .....                          | 247                                |
| Pan Coppers, Repairing.....            | *315                               |
| P. & M. Co.:                           |                                    |
| Signal Supply News.....                | 38                                 |
| Parle, L. V.:                          |                                    |
| Special Switchbox Cam for Bell         |                                    |
| Circuits .....                         | *225                               |
| Passing of Wire in Mechanical Inter-   |                                    |
| locking .....                          | †103                               |
| Passing Sidings, Rearrangement.....    | †104                               |
| Patterson, M. Lynn:                    |                                    |
| Methods of Locating Automatic          |                                    |
| Signals .....                          | *51                                |
| Pennsylvania:                          |                                    |
| Adoption of Green for Proceed..        | 261                                |
| Annual Banquet of Supervisors...       | *190                               |
| Construction News .....                | 32, 64, 286, 319, 352, 382         |
| Cost of Signal Maintenance.....        | †2                                 |
| Disciplining Enginemen .....           | 63                                 |
| Efficiency Tests and the Safety        |                                    |
| Record .....                           | 282                                |
| Electric Interlocking in Phila-        |                                    |
| delphia .....                          | *39                                |
| Examples of Early Signaling.....       | *277                               |
| Instruction for Signalmen.....         | †356, *360                         |
| New Track Instrument.....              | *248                               |
| Personal Mention.....32, 65, 100, 131, | 165, 190, 221, 251, 287, 320, 353, |
| Publication of the "Signal News",      | 119                                |
| Service Record of Position-Light       |                                    |
| Signals .....                          | *171                               |
| Two Years Safety Record.....           | 63                                 |

|                                       |                                          |
|---------------------------------------|------------------------------------------|
| Pennsylvania Lines West:              |                                          |
| Construction News .....               | 220                                      |
| Personal Mention .....                | 164, 287                                 |
| Pere Marquette:                       |                                          |
| Personal Mention .....                | 250, 353                                 |
| Performance of Signals:               |                                          |
| Hudson & Manhattan.....               | 209                                      |
| Lehigh & Hudson River.....            | 232                                      |
| New York Central, Lines West,         |                                          |
| Toledo Division .....                 | 114                                      |
| New York, New Haven & Hart-           |                                          |
| ford .....                            | 126                                      |
| Reports .....                         | 331                                      |
| Rhode Island .....                    | 237                                      |
| Periscope for Crossing Watchmen...    | *247                                     |
| Petroleum Asphaltum, Desired Melt-    |                                          |
| ing Point .....                       | 304                                      |
| Pick-up, Designation .....            | 37                                       |
| Pipes for Wire Carrier Stakes.....    | *157                                     |
| Pipe Rivets, Uses for.....            | 156                                      |
| Phase Meter and its Application....   | *91                                      |
| Philadelphia & Reading:               |                                          |
| Construction News .....               | 31, 285                                  |
| Pilot Staff for Emergency Operations. | *149                                     |
| Pipe Line Compensation.....           | 3                                        |
| Plagiarism, A New Relay Contact...    | *98                                      |
| Plug, Extension Fuse.....             | *157                                     |
| Plumbing a Signal Blade.....          | *217                                     |
| Pole Changer Covers, Removing....     | *348                                     |
| Pole Line Construction.....           | 7                                        |
| Pope, Frank L.:                       |                                          |
| Connection With Early Signaling.      | 261                                      |
| Position-Light Signals:               |                                          |
| Comparison With Semaphores and        |                                          |
| Colored Lights .....                  | 238                                      |
| Development in 1915.....              | 14                                       |
| Service Record .....                  | *171                                     |
| Pouring Acid Without Splashing....    | *317                                     |
| Power Consumption by A. C. Signals.   | *258                                     |
| Power Equipment for A. C. Interlock-  |                                          |
| ing Plant .....                       | *60                                      |
| Power Factor:                         |                                          |
| Determination by Phase Meter...       | 94                                       |
| Power Loss in Battery Charging Line.  | 328                                      |
| Power Signaling Near Sydney, Aus-     |                                          |
| tralia .....                          | *365                                     |
| Power Supply for Telephone Dispatch-  |                                          |
| ing .....                             | 218                                      |
| Preventing Dwarf Signal Failures...   | *379                                     |
| Prices of Raw Materials in 1915....   | 14                                       |
| Primary Battery, New High-Voltage.    | *159                                     |
| Principles of Electric Locking.....   | *120, *204, *241, *297, *323, *335, *373 |
| Protecting:                           |                                          |
| Bond Wires .....                      | *188                                     |
| Bootlegs .....                        | *217                                     |
| Broken Rails .....                    | †356                                     |
| Interior of Signal Battery Cases...   | 95                                       |
| Metal from Corrosion .....            | 381                                      |
| Metal Parts With Lacquer.....         | 281                                      |
| Traffic at Movable Bridges.....       | 107                                      |
| Voltmeter .....                       | 247                                      |
| Protective Signal Manufacturing Co.:  |                                          |
| National Worm-Drive Wig-Wag...        | *248                                     |
| Signal Supply News.....               | 101, 252                                 |
| Psychology and Signaling.....         | 223, 255                                 |
| Psychology of the Stop Signal.....    | 364                                      |
| Public Service Commission of New      |                                          |
| York, Investigation .....             | 34                                       |
| Public Service Company of New         |                                          |
| Jersey:                               |                                          |
| Construction News .....               | 32                                       |
| Newark Terminal Signaling.....        | *273                                     |

## Q

|                         |      |
|-------------------------|------|
| Queen & Crescent:       |      |
| A. C. Signals .....     | *257 |
| Construction News ..... | 353  |
| Q. & C. Company, The:   |      |
| Magnetic Wig-Wag .....  | *128 |
| Signal Supply News..... | 66   |

## R

|                                     |          |
|-------------------------------------|----------|
| Rabid Coyotes and Signalmen.....    | 230      |
| Racks for Glass Covers.....         | *315     |
| Rail Braces, Improved .....         | 293      |
| Railroads a National Issue.....     | †365     |
| Railroad Supply Co.:                |          |
| Signal Supply News.....66, 166,     | 192      |
| Rails We Have Met.....              | 314      |
| Railways and the National Guard     |          |
| Mobilization .....                  | 249      |
| Railway Conditions in 1915.....     | †2       |
| Railway Equipment in the Far East.. | 282      |
| Railway Signal Association:         |          |
| Annual Convention:                  |          |
| Advance Arrangements .....          | 234      |
| Advance Information .....           | *169     |
| Detailed Report .....               | *303     |
| Mackinac Island, Convention         |          |
| Place .....                         | *212     |
| Program .....                       | 278      |
| Committee Assignments .....         | 341      |
| Committee Meetings:                 |          |
| Committee I.....31, 78, 130, 189,   | 219      |
| Electrical Testing .....            | 31, 78   |
| Committee Reports:                  |          |
| D. C. Automatic Block Signal-       |          |
| ing .....                           | 177, 304 |

- D. C. Relays..... 306  
 Electrical Testing.....110, 180, 307  
 Electric Railway and A. C. Signaling..... 306  
 Harmonizing of Specifications.....113, 179, 307  
 Lightning Protection..... 110  
 Maintenance and Operation..... 305  
 Mechanical Interlocking.....107, 178, 304  
 Power Interlocking.....114, 179, 304  
 Signaling Practice.....114, 177, 303  
 Standard Designs.....112, 178, 305  
 Storage Battery and Charging Equipment..... 109  
 Wires and Cables.....106, 179, 307  
 Employment Bureau..... 320  
 Exposition of the Schemes of Signaling..... \*150  
 March Stated Meeting:  
 Announcement..... \*167  
 Benefit to Be Derived..... \*135  
 Report..... \*106  
 May Stated Meeting:  
 Announcement..... 140  
 Report..... 177  
 Regional Meetings:  
 Chicago.....99, 119, 140, 282  
 Cleveland..... 119  
 Kansas City.....55, 119, 219, 363  
 Los Angeles..... 362  
 Ogden.....78, 353, 362  
 Philadelphia..... 55  
 Texas..... 140  
 Washington.....119, 249  
 Place of Annual Meeting, Discussion of.....255, 291  
 Reaches Maturity..... \*1290  
 Result of Letter Ballot..... 78  
 Some Pertinent Thoughts on Conventions..... \*194  
 Work of Regional Committees..... 136  
 Raising Signal Foundations to Grade..... \*368  
 Rebuilding an Old Interlocking..... \*194  
 Receiving the "Man from College"..... \*2  
 Receivership Statistics for 1915..... \*334  
 Record Forms.....316, \*334  
 Reduction Gears, Oil Guard for..... 184  
 Reducing Speed in a Fog..... \*168  
 Regulation of Railways:  
 Relation to Business Conditions... \*2  
 State or National..... \*322  
 Relation of Signaling to Accidents... 370  
 Relays:  
 Advantages and Disadvantages of  
 Low Resistance..... 306  
 Designation of Release..... 37  
 Effect of Temperature..... 302  
 Contact Testing Circuits..... \*155, \*348  
 Marking Binding Posts..... 111  
 New Contact..... \*98  
 New U. S. & S..... \*160  
 New Ziegler..... \*127  
 Selective for Highway Crossing  
 Bell Circuit..... \*182  
 Testing and Remedying..... \*19, \*23  
 Testing Instruments..... \*280, \*348  
 Time Limit..... \*367  
 Trouble With Moisture..... 136  
 Relay Cases:  
 Cover for Lock..... \*95  
 Door-Holder..... \*183  
 In Pennsylvania Plant at Philadelphia..... \*40  
 On Q. & C..... \*258  
 "Relay Man's Friend"..... \*280, \*348  
 Relay Racks in Interlocking Towers... 228  
 Relay Support..... \*317  
 Reliable Electric Company:  
 Davidson Cable Hanger..... \*127  
 Signal Supply News..... 166  
 Relocating Passing Sidings..... \*104  
 Remedies for Track Circuit Ailments... \*19  
 Reminiscences of America..... 323  
 Removing Pole Changer Covers..... \*348  
 Removing the Latch from Model 2 Machines..... 281  
 Renewing Gravity Battery..... 184  
 Repaired Material, Record Forms for... \*334  
 Repairing Pan Coppers..... \*315  
 Repairs to Resistance Tube..... \*183  
 Reports:  
 Construction..... 142  
 Maintenance..... 331  
 Saving Labor in Making Out..... 256  
 With Combined Organization..... 334  
 Resetting a Highway Crossing Bell Circuit..... \*182  
 Resistance:  
 In Track Circuit Leads..... \*10, \*167  
 Of Track Circuit Relays..... 282  
 Of Treated and Untreated Ties... 169  
 Resistance Units:  
 Adjustable:  
 Branch..... \*219  
 G. R. S..... \*127  
 Law..... \*159  
 Emergency Repairs..... \*183  
 High Capacity..... \*185  
 Home-made..... \*246  
 In Track Circuits..... 239  
 Substitute for..... 315  
 Resume of Signal Construction Methods..... \*141  
 Review of 1915 in Signaling..... 11  
 Revised A. R. A. Standard Code..... 189  
 Reviving Weak Dry Cells..... 184
- Rhea, Frank:  
 Appointed Special Government Agent..... 282  
 Investigation of Foreign Markets... 333  
 Rhode Island Company:  
 Signaling for a 75-Second Headway..... \*235  
 Richmond, Fredericksburg & Potomac:  
 Construction News..... 382  
 Right-hand and Left-hand Quadrant Indications..... 303  
 Riley, H. D. W.:  
 Designing Battery Charging Line... 327  
 Resume of Signal Construction Methods..... \*141  
 Rising Cost of Railway Operation... \*1223  
 Rizer, F. W.:  
 Demonstration of Some Savings Effected by Signals..... \*180  
 Robinson, Wm., Inventor of the Track Circuit..... \*259  
 Roller-Smith Company:  
 Direct-Reading Ohmmeter..... \*159  
 Signal Supply News..... 252  
 Route Locking:  
 General Discussion..... \*297  
 In a Mechanical Plant..... \*9  
 On the Southern Pacific..... \*139  
 Rudd, A. H.:  
 Individualism Among Signal Engineers..... 357  
 Service Record of Position-Light Signals..... \*171  
 Rule Requiring Speed Reduction in Fog..... \*168  
 Rust Resistance of Wrought-Iron... \*245
- S**
- Safeguarding Signal Control Wires... \*136  
 Safe Lock Switch Machine..... \*186, \*258  
 Safety Appliance Bill in Congress... 130  
 Safety First Exposition:  
 Baltimore & Ohio..... 191  
 Department of Interior..... 99  
 Safety First Special Trains..... 191  
 Safety Record:  
 In 1915..... \*137, \*49  
 On the New York Roads..... 63  
 On the Pennsylvania..... 63  
 Safety Versus Track Capacity..... \*193  
 St. Louis & San Francisco:  
 Construction News..... 382  
 Personal Mention..... 99  
 St. Louis Municipal Railway:  
 Personal Mention..... 131  
 Salary Increases:  
 Illinois Central..... 189  
 Missouri Pacific..... 189  
 Salt in Interlocking Plants..... 4  
 San Francisco-Oakland Terminal Railways:  
 A. C. Signaling..... \*292  
 Construction News..... 32  
 San Pedro, Los Angeles & Salt Lake: (See Los Angeles & Salt Lake.)  
 Saunders, J. E.:  
 Service Tests on A. C. Signal Apparatus..... \*267  
 U. S. & S. Apprentice Course... \*359  
 Savings Effected by Signals..... \*180  
 Schermerhorn, E. F.:  
 Application and Maintenance of Insulated Rail Joints..... 275  
 Schrader, W. A.:  
 Semi-automatic Calling-on Arm... \*349  
 Scientific Selection and Location of Signals..... \*237, 255  
 Scraper Attachment for Broom..... \*380  
 Screw Releases..... 73  
 Section Foreman's Views on Signals... 195  
 Section Locking..... \*241  
 Selection of Signals by Scientific Tests..... \*237, 255  
 Semaphore Signals:  
 Comparison with Position-Light and Colored Lights..... 238  
 Semi-automatic Calling-on Arm... \*349  
 Service Tests on A. C. Signal Apparatus..... \*267  
 Settlement of the Eight-hour Day Controversy..... \*1253  
 Shaw, Elmer:  
 Improved Motor-car Wiring..... \*58  
 Shooting A. C. Track Circuit Troubles 217  
 Short Circuits:  
 Testing for and Remedying..... \*20  
 Shunting Tests of Track Circuits... \*1253 278  
 Signal Accessories Co.:  
 Signal Supply News..... 166, 192  
 Signal Business in First Four Months of 1916..... \*133  
 Signal Engineer or Superintendent of Signals..... \*1254  
 Signaling a National Issue..... 169  
 Signal Maintenance:  
 Methods and Costs on Lehigh & Hudson River..... \*231  
 On Rhode Island..... 237  
 Tools..... \*1224, 270, 344  
 Signalmen and the Public..... \*167  
 "Signal News," on the Pennsylvania... 119
- Signals:  
 Compelling Observance..... \*103  
 Control of Derails..... 324, 357  
 Failures:  
 Discussion of Causes..... \*136  
 Making Causes Known..... \*168  
 Mouse Electrocuter..... 291  
 Necessity for Discussing False-clears..... 105  
 Reports..... \*332  
 With Disastrous Results..... \*47  
 Foundations:  
 Anchoring in Soft Fill..... 347  
 Raising to Grade..... 315  
 Tips..... 280  
 For Crossing "Cops"..... 166  
 Interpretation..... \*1223  
 Lights and German Airships..... 249  
 Location for Congested Traffic..... 80  
 New Hall Style L Mechanism..... \*350  
 New Type of Lamp without Lens... 86  
 Performance:  
 Hudson & Manhattan..... 209  
 Lehigh & Hudson River..... 232  
 New York Central..... 114  
 New York, New Haven & Hartford..... 126  
 Reports..... 331  
 Rhode Island..... 237  
 Plumbing Blades..... \*217  
 Santa Fe Standard Types..... \*135  
 Selection and Location..... \*237  
 Simple Track Circuit Calculations... \*329  
 Sennett, E. C.:  
 Handling Mixed Paint..... 316  
 Size and Spacing of Battery Charging Units..... 328  
 Slip-switch Fouling..... 124  
 Smith Motor-wheel..... \*62  
 Soap on Wires for Fishing..... 218  
 Socket Wrench..... \*184, 246  
 Soldering Flux for Joints in Signal Wires..... 222  
 Solving Track Circuit Problems..... \*167  
 Some Pertinent Thoughts on Conventions..... \*194  
 Southern:  
 Construction News..... 31, 189, 252, 284, 382  
 Personal Mention..... 99  
 Southern Pacific:  
 Construction News..... 31, 189, 220  
 Personal Mention..... 190  
 Signal Testing..... 362  
 Spangler, D. E.:  
 Electric Interlocking in Philadelphia..... \*39  
 Spark-gap Lightning Protectors..... 256  
 Special Switch Box Cam or Special Relay..... 256  
 Speed Reduction in Foggy Weather... \*168  
 Speed Signaling:  
 An English View of..... 230  
 Spindle Circuit Controller..... \*282  
 Staff System, Pilot Staff for Emergency Operation..... \*149  
 Stahl, L. R.:  
 Method for Checking Mechanical Locking..... \*145  
 Standard Code, Discussion of Signaling Rules by C. C. Anthony... 130  
 Standard Designs of the R. S. A., Revised and New..... 112  
 Standard Highway Crossing Protection..... \*167  
 Standard Indications Used on the Santa Fe..... \*135  
 Standard Oil Co.:  
 Signal Supply News..... 66, 191  
 Standard R. S. A. Schemes of Signaling..... \*150  
 Standard Underground Cable Co.:  
 Signal Supply News..... 65, 132, 166, 222  
 Standardization of Apparatus... \*1321, 357  
 Starting Punch for Channel Pins... \*348  
 Statistics of Block Signals and Interlocking..... \*200  
 State Public Utilities Commission of Illinois, Rules for Overhead Construction..... 219  
 Steel Bridges and Track Circuits... \*1321  
 Steel Pipe, Coefficient of Expansion... 3  
 Steps for Climbing Bell Pole..... \*29  
 Stevens, Thos. S.:  
 Signals on the Santa Fe..... \*135  
 Stewart, A. W.:  
 One Supervisor's Report System... \*332  
 Stick Locking..... \*335, 373  
 Stick Relay:  
 In Stick Locking..... 336  
 Uses for..... 72  
 Stiles, T. Geo., Co.:  
 New Adjustable Rail Brace..... \*97  
 Signal Supply News..... 101, 192  
 Stillwell, W. H.:  
 Maintainer's Tools..... 270  
 Reports on Signal Maintenance... 331  
 Stock of Signal Material Carried by Lehigh & Hudson River..... 232  
 Storage Battery:  
 Arrangements and Supports..... \*137  
 Design for Charging Line..... 327  
 Jumper Wire for Cutting Out Cells \*379  
 Line Loss in Charging..... 147  
 Protecting Interior of Battery Cases from Fumes..... 95  
 Refilling..... \*157  
 Report for Maintainers..... 316



|                                                                               |            |
|-------------------------------------------------------------------------------|------------|
| Specifications for Composite Type Stationary .....                            | 109        |
| Specifications for Lead Type Portable .....                                   | 109        |
| Storm Damage to Signal Wires.....                                             | 31         |
| Stray Current Drops Track Relay.....                                          | *281       |
| Substations, Portable Building.....                                           | 6          |
| Substitutes:                                                                  |            |
| For a Resistance Unit.....                                                    | 315        |
| For Babbitt Metal.....                                                        | 218        |
| For Japan .....                                                               | 380        |
| Subway Protection on an Electric Railway .....                                | *54        |
| Suggested Changes in I. C. C. Statistics .....                                | †193       |
| Superintendent of Signals or Signal Engineers .....                           | †254       |
| Supervisor's Report System.....                                               | *332       |
| Surprise Tests, New York, New Haven & Hartford .....                          | 126        |
| Suspended Signals on the New Haven .....                                      | *85        |
| Sweating of Signal Apparatus.....                                             | 324        |
| Switch Adjustment Cover.....                                                  | *155       |
| Switch-and-lock Movements at Mechanical Plants, Development During 1915 ..... | 18         |
| Switch Circuit Controllers:                                                   |            |
| Proper Adjustment .....                                                       | 155        |
| Special Cam for Crossing Bell Circuit .....                                   | *225       |
| Switch for Telephone Booths.....                                              | 30         |
| Switch Fouling .....                                                          | 123        |
| Switch Layouts on D. L. & W. ....                                             | *318       |
| Switch Lock Used within Interlocking Limits .....                             | †133, *136 |
| Switch Machine, Safe Lock.....                                                | *186       |
| Switch Movements:                                                             |            |
| U. S. & S. Type B3 Electric.....                                              | *42        |
| Switch Point Gage.....                                                        | *247       |
| Switch Protection, a Problem in.....                                          | *136       |
| Switch Rods, Cam Wear.....                                                    | 362        |
| System in Maintenance.....                                                    | †168       |

## T

|                                                         |                   |
|---------------------------------------------------------|-------------------|
| Tags, Marking.....                                      | 30, 247           |
| Taking Paint and Dirt Out of Locks.....                 | 217               |
| Tales of the Road:                                      |                   |
| I. Introducing Myself .....                             | *87               |
| II. The End of a Perfect Day.....                       | *143              |
| III. The Boy Orator.....                                | 269               |
| IV. Maintenance .....                                   | *340              |
| Tank for Storing Gasoline.....                          | *57               |
| Telautograph Installation .....                         | 294               |
| Telegraph Lines on Railway Right-of-Way .....           | †36, 165          |
| Telephones:                                             |                   |
| Development by Western Electric.....                    | 30                |
| Engineers for United States Forest Service .....        | 189               |
| Portable Apparatus .....                                | 163               |
| Power Supply for Dispatching.....                       | 218               |
| Report by Telegraph Superintendents .....               | 214               |
| Terminals for Battery Leads.....                        | *138              |
| Terminal Wrench .....                                   | *58               |
| Testing:                                                |                   |
| A. C. Relays.....                                       | *148, *267        |
| Electrolyte .....                                       | 183               |
| For Shorts and Opens.....                               | *59               |
| Instrument Recommended by R. S. A. ....                 | 111               |
| Instruments for Relay Men.....                          | *280, *348        |
| Low-voltage D. C. Apparatus in Circuit .....            | 110               |
| Relay Contacts .....                                    | *155              |
| Signals on the Southern Pacific.....                    | 362               |
| The Interpretation of Signals.....                      | *237              |
| Track Battery .....                                     | 330               |
| Track Circuit Charts.....                               | *58               |
| Track Circuits.....                                     | †1, *19, 278, 330 |
| Voltmeter Versus Ammeter for Relay Calibrations .....   | 69                |
| Testing Board, Home-Made.....                           | *381              |
| "The Boy Orator".....                                   | 269               |
| Thefts of Copper Cables.....                            | *146              |
| "The New Tyranny," by Samuel O. Dunn .....              | 310               |
| Thomas, G. K.:                                          |                   |
| Determination of Resistance in Track Circuit Leads..... | *10               |
| Three-position Signals in England.....                  | 149               |
| Ties, Resistance of Treated and Untreated .....         | 169               |
| Tightening Rivets in Detector Bar Motion Plate .....    | 347               |
| Time Element Relay, New U. S. & S. ....                 | *160              |

|                                                              |           |
|--------------------------------------------------------------|-----------|
| Time Limit Relay on New South Wales Railways .....           | *367      |
| Time Locks for Stick Locking.....                            | 335       |
| Time Releases:                                               |           |
| For Stick Locking.....                                       | 335       |
| General Discussion .....                                     | 73        |
| Need for .....                                               | 256       |
| Tool Equipment for Signal Maintenance .....                  | 270       |
| Tools:                                                       |           |
| For Maintainers.....                                         | †244, 344 |
| Grinder .....                                                | 184       |
| Supplied to Maintainers on Lehigh & Hudson River.....        | 231       |
| Tower:                                                       |           |
| Pennsylvania at Philadelphia.....                            | *39       |
| Tower Lock Instruments.....                                  | 378       |
| Track Battery:                                               |           |
| In Mechanism Cases.....                                      | *210      |
| Testing .....                                                | 330       |
| Track Circuits:                                              |           |
| Adjustment of A. C. Relays by a Phase Meter .....            | 93        |
| Calculations for Maintainers.....                            | 329       |
| Cost of Operation with Gravity and Caustic Soda Battery..... | 258       |
| Determination of Resistance Required in Lead.....            | *10       |
| External Resistance with Gravity Battery .....               | 139       |
| Home-made Outfit for Testing.....                            | *59       |
| Improved Bootleg Connections.....                            | *158      |
| Invention by Wm. Robinson.....                               | *259      |
| Layout .....                                                 | *243      |
| Locating Trouble .....                                       | 217       |
| On Steel Bridges.....                                        | †321      |
| Solving Problems .....                                       | †167      |
| Proper Arrangement .....                                     | *120      |
| Shunting Tests .....                                         | †253      |
| Test Chart .....                                             | *58       |
| Tests .....                                                  | 278, 363  |
| Tests and Remedies.....                                      | *19       |
| Unusual Difficulties in Operation.....                       | *5        |
| Track Instruments:                                           |           |
| General Discussion .....                                     | 72        |
| New .....                                                    | *248      |
| Track Men and Signals.....                                   | 195       |
| Training for Signalmen.....                                  | *359      |
| Trainmen's Eight-hour Day Controversy .....                  | 249       |
| "Train Operation," by William Nichols .....                  | 194       |
| Train Signs on the Santa Fe, by W. D. Cloud .....            | *44       |
| Transformer House, Construction of.....                      | *257      |
| Transformer Mounting .....                                   | *258      |
| Transformer, New U. S. & S. for Track .....                  | *318      |
| Transposed Wires Cause Trouble.....                          | *279      |
| Trap Circuits:                                               |           |
| On a Drawbridge.....                                         | 325       |
| Used on Southern Pacific.....                                | *133      |
| Tray for Renewing Track Batteries.....                       | *156      |
| Treated Ties, Resistance of.....                             | 169       |
| Trolley Contactor Signals:                                   |           |
| Circuit Design .....                                         | *77       |
| With Standard Indications.....                               | 349       |
| Trolley Post Signal on the Southern Pacific .....            | *138      |
| Trouble from a Misplaced Spike.....                          | *59       |
| True Color Vision, Limits of.....                            | 238       |
| Trunking:                                                    |           |
| Concrete .....                                               | *229      |
| Connections with Switch Movement .....                       | *138      |
| Repairs .....                                                | *317      |
| Turnout Fouling .....                                        | 123       |

## U

|                                                 |                   |
|-------------------------------------------------|-------------------|
| Union Pacific:                                  |                   |
| Construction News .....                         | 189, 382          |
| Personal Mention .....                          | 383               |
| Wireless Stations .....                         | 245               |
| Union Switch & Signal Company:                  |                   |
| Apprentice System .....                         | †356, *359        |
| Apprentices .....                               | *220              |
| Indication Systems for Power Interlocking ..... | *208              |
| New Products .....                              | *318              |
| New Relays .....                                | *160              |
| New Track Circuit Relay Winding .....           | 282               |
| Signal Supply News.....                         | 33, 132, 252, 354 |
| Union Soldering Paste.....                      | 222               |
| Union Traction Company:                         |                   |
| Award of American Museum of Safety Medal .....  | 84                |
| Construction News .....                         | 31                |

|                                        |      |
|----------------------------------------|------|
| United Electric Apparatus Company:     |      |
| New Ziegler Relay.....                 | *127 |
| United States Electric Signal Company: |      |
| New Contactor Signal.....              | 349  |
| U. S. Light & Heat Corporation:        |      |
| Signal Supply News.....                | 354  |

## V

|                                                   |     |
|---------------------------------------------------|-----|
| Valuation:                                        |     |
| Cost of Field Work.....                           | 353 |
| Instructions for Field Work.....                  | 63  |
| Tracing Cloth and Ink Required.....               | 44  |
| Veale, C. A.:                                     |     |
| Effect of Temperature on Relays.....              | 302 |
| Efficient Use of Caustic Soda Track Battery ..... | 239 |
| Voltmeters:                                       |     |
| For Use in Measuring Resistance.....              | 165 |
| Protecting .....                                  | 247 |
| Versus Ammeter for Relay Calibration .....        | 69  |

## W

|                                                                |                                 |
|----------------------------------------------------------------|---------------------------------|
| Wabash:                                                        |                                 |
| Construction News .....                                        | 31                              |
| Personal Mention .....                                         | 32                              |
| Wages:                                                         |                                 |
| Discrepancy Between Trainmen and Other Railway Employees ..... | †104                            |
| Increases in .....                                             | 163                             |
| Ward-Leonard Electric Co.:                                     |                                 |
| Resistance Units of High Capacity .....                        | *185                            |
| Warning Sign, Illuminated.....                                 | *247                            |
| Washington Office, Opening.....                                | †289                            |
| Washington-Virginia Railway, Automatic Stop Installation.....  | 381                             |
| Waste in Excessive Voltage.....                                | 347                             |
| Wearing Plate for Electric Interlocking .....                  | *156                            |
| Welding Resistance Tube Wires.....                             | *183                            |
| Western Electric Company:                                      |                                 |
| Development in Telephone Equipment .....                       | 30                              |
| Signal Supply News.....                                        | 33, 65, 101, 191, 192, 222, 320 |
| Western Maryland:                                              |                                 |
| Construction News .....                                        | 31, 382                         |
| Personal .....                                                 | 33                              |
| Whall & Co., C. H.:                                            |                                 |
| Signal Supply News.....                                        | 192                             |
| Wheelwright, B.:                                               |                                 |
| New Automatic Signals on Grand Trunk .....                     | *5                              |
| Wiegand, F. B.:                                                |                                 |
| Should Signals Control Derails?... ..                          | 357                             |
| Wig-Wag:                                                       |                                 |
| Hall Disc .....                                                | 63                              |
| National Worm-Drive .....                                      | *248                            |
| Willard Storage Battery Co.:                                   |                                 |
| Signal Supply News.....                                        | 65, 222, 354                    |
| Winnipeg Electric Railway:                                     |                                 |
| Subway Protection .....                                        | *54                             |
| Wire Carrier Stake, Pipe.....                                  | *157                            |
| Wire-holder on Terminal Blocks.....                            | *185                            |
| Wire:                                                          |                                 |
| Identification Mark .....                                      | 159                             |
| Protection from Sleet.....                                     | *364                            |
| Wireman's Platform .....                                       | *380                            |
| Wire-operated Signals, Passing.....                            | †103                            |
| Wire Scraping Knife.....                                       | *315                            |
| Wireless Telegraph:                                            |                                 |
| Development .....                                              | 215                             |
| On the Union Pacific.....                                      | 245                             |
| Wire Lines on Railway Right-of-way, Kentucky Legislation ..... | 130                             |
| Wiring for Motor-car .....                                     | *58                             |
| Worm-drive Wig-Wag .....                                       | *248                            |
| Wray, Archibald:                                               |                                 |
| Cheap Power for Telephone Dispatching .....                    | 218                             |
| Wrench:                                                        |                                 |
| Simple Socket .....                                            | 246                             |
| Terminal .....                                                 | *58                             |
| Wrought Iron Pipe:                                             |                                 |
| Co-efficient of Expansion.....                                 | 3                               |
| Rust Resistance .....                                          | *245                            |

## Y

|                                     |     |
|-------------------------------------|-----|
| Zapp, A.:                           |     |
| Trouble from a Misplaced Spike.. .. | *59 |

# PERSONAL MENTION

[Photographs are indicated thus\*. Obituaries are indicated thus†]

| A                   |               | B                  |          | C               |               | D                   |          | E                  |          | F                    |          | G                   |          | H               |          |
|---------------------|---------------|--------------------|----------|-----------------|---------------|---------------------|----------|--------------------|----------|----------------------|----------|---------------------|----------|-----------------|----------|
| Adams, E. G.        | 287           | Backus, Edward E.  | †354     | Buckley, James  | 100, 320, 353 | Daniels, David      | 64       | Eagon, H.          | 65       | Fairbrother, C.      | 190      | Gallagher, J.       | 286      | Haby, C. P.     | 99       |
| Adams, P. J.        | 320           | Bagley, F. H.      | 32       | Burbank, B. O.  | 353           | Darrow, Albert J.   | 100      | Edelman, C. H.     | 190      | Farrell, H. J.       | 221      | Galleher, J. M.     | 32       | Haff, T. M.     | 383      |
| Ahrens, C. R.       | 354           | Bailey, T. W.      | 165      | Burbank, L. H.  | 131           | Daves, George W.    | 320      | Eich, J. J.        | 33, 64   | Fearigo, W. F.       | 190      | Gardner, R. C.      | 64       | Hager, E. B.    | 252      |
| Akers, W. E.        | 165           | Baker, E. H.       | 166      | Burgess, O. E.  | 251           | Davis, Chas. W.     | 65       | Elinsick, H. F.    | 164, 287 | Fell, G. W.          | 252      | Garrison, H. E.     | 383      | Hagge, L. F.    | 251      |
| Allen, P. M.        | 287           | Baker, H. C.       | 100      | Burgin, J. A.   | 221           | Davis, S. B.        | 131      | Elder, John D.     | 354      | Fetherston, J. M.    | 220      | Gaskins, W. L.      | 165      | Hagge, Wm.      | 252      |
| Allen, W. F.        | 221, 252, 288 | Baker, Peter       | 286      | Burns, W. G.    | 190           | Davis, W. H.        | 353      | Ellenberg, D. T.   | 32       | Fischer, Einer       | 354      | Gass, O. C.         | 320      | Hallen, C.      | 353      |
| Allison, L. D.      | 164, 354      | Ballantine, W. E.  | 65       | Burrows, Robert | 165           | Davis, W. I.        | 100      | Ellis, P. N.       | 131      | Fischer, Joseph      | 354      | Gates, E. F.        | 32       | Haines, H. A.   | 65       |
| Amann, Paul         | 251           | Baldwin, C. C.     | 65       | Burton, Wm.     | 33            | Day, Salisbury M.   | *101     | Elton, L. E.       | 320      | Fisher, A. O.        | 190      | Gaslan, J. H.       | 33       | Hailey, J.      | 190      |
| Anderson, Arthur A. | 65            | Baldwin, R. F.     | 190      | Busby, J. A.    | 99            | Dean, Aaron         | 252      | Erwin, John        | 221      | Fisher, Arthur W.    | 131      | Gemmell, J. S.      | 220      | Hamer, R. L.    | 287      |
| Anderson, Lewis     | 64, 221       | Banks, Joseph      | 64       | Bush, P.        | 252           | De Freitas, J. W.   | 287      | Evans, J. J.       | 250      | Fisher, H. H.        | 131      | Gensheimer, John S. | 131, 165 | Hand, F.        | 251      |
| Andrews, W. C.      | 39            | Banks, Leonard     | 64       | Butler, H. J.   | 166           | Deiner, C. L.       | 320      | Ewing, R. H.       | 383      | Fitzgerald, J. M.    | 192, 252 | Gibboney, J. J.     | 64       | Haney, F. D.    | 252      |
| Anglum, W.          | 221           | Barbour, Chas.     | 66       | Byrne, J. B.    | 252           | Delaplain, H.       | 251      | Fussell, Jr. H. M. | 65       | Fox, M. J.           | 192, 250 | Gilbert, A. C.      | 253      | Haney, F. E.    | 252      |
| Arnold, E. F.       | 64            | Barbour, M. H.     | 353      |                 |               | Delaplain, J. H.    | 383      |                    |          | Forristall, S. A. D. | 165      | Gilman, F. L.       | 192      | Hardin, F. M.   | 64       |
| Ashton, J. V.       | 100           | Barger, E. E.      | 252      |                 |               | Christensen, Andrew | 190      |                    |          | Foster, F. C.        | 383      | Glasier, J.         | 166      | Harle, F. E.    | 383      |
| Ashton, Alexander   | 287           | Barr, R. W.        | 165      |                 |               | Christison, C. W.   | 251      |                    |          | Foster, I. O.        | 252      | Gladstone, J. E.    | 287      | Harmon, I. D.   | 252, 287 |
| Atchison, A. C.     | 383           | Barr, Jr., W. F.   | 251      |                 |               | Church, F. P.       | 220      |                    |          | Freeman, Charles B.  | 131      | Goodall, J.         | 99, 190  | Harper, D. B.   | 99       |
| Atkinson, M. F.     | 33            | Barrett, W. C.     | 252      |                 |               | Clapper, H. D.      | 383      |                    |          | Freeman, F. L.       | 251      | Goodloe, E. S.      | 192      | Harrison, A. W. | 131      |
| Austin, A. W.       | 65            | Bartee, R. M.      | 251      |                 |               | Clare, C. H.        | 166      |                    |          | Frisch, J.           | 251      | Goodrich, Frank     | 250      | Harrison, G. D. | 100      |
| Ayers, B. H.        | 220           | Bartlett, F. G.    | 164      |                 |               | Clark, C. E.        | 32       |                    |          | Frye, R. M.          | 251      | Grant, A.           | 252      | Hartig, Wm.     | 64       |
|                     |               | Barton, Enos M.    | †191     |                 |               | Clark, R. E.        | 252      |                    |          |                      |          | Grant, Roy G.       | 99       | Hartman, J. W.  | 251      |
|                     |               | Baruch, Sydney N.  | 166      |                 |               | Clayton, D. W.      | 99       |                    |          |                      |          | Gray, M. L.         | 354      | Hartman, W. N.  | 131, 221 |
|                     |               | Bates, E. I.       | 100      |                 |               | Clifford, H. G.     | 190      |                    |          |                      |          | Greegan, O. L.      | 251      | Hartvig, C. E.  | *251     |
|                     |               | Bates, G. O.       | *66      |                 |               | Cloud, W. D.        | 164, 190 |                    |          |                      |          | Greenwood, A. L.    | 383      | Hartzell, F. D. | 251      |
|                     |               | Bauer, W. F.       | 166      |                 |               | Cobb, Jr., C. H.    | 190      |                    |          |                      |          | Greigner, W. S.     | 287      |                 |          |
|                     |               | Baugh, F. E.       | 190, 287 |                 |               | Coe, E. R.          | 220      |                    |          |                      |          | Greterman, Bert     | 32       |                 |          |
|                     |               | Baughner, H.       | 252      |                 |               | Colby, J. A.        | 66       |                    |          |                      |          | Gribben, Harry H.   | 354      |                 |          |
|                     |               | Beal, L.           | 221      |                 |               | Coldiron, J. M.     | 251      |                    |          |                      |          | Griffith, C. B.     | 287, 354 |                 |          |
|                     |               | Beall, C. R.       | *288     |                 |               | Coleman, W. W.      | *192     |                    |          |                      |          | Groce, G. H.        | *132     |                 |          |
|                     |               | Bears, A. M.       | 221      |                 |               | Colombo, R.         | 221      |                    |          |                      |          | Groom, T. A.        | 100, 251 |                 |          |
|                     |               | Beasley, B. F.     | 251      |                 |               | Connell, D. O.      | 251      |                    |          |                      |          | Guild, C. A.        | 383      |                 |          |
|                     |               | Beasley, R. C.     | 251      |                 |               | Conner, Wm. Andrew  | 23       |                    |          |                      |          |                     |          |                 |          |
|                     |               | Beaton, A. S.      | 190      |                 |               | Connor, F. S.       | 251      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Beaven, W. H.      | 192      |                 |               | Conover, D. C.      | 131      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Beck, F. A.        | 251      |                 |               | Cooley, T. C.       | 320      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Beckner, C. N.     | *84      |                 |               | Cooper, S. F.       | 221      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Becksted, R.       | 99       |                 |               | Cornell, L.         | 32       |                    |          |                      |          |                     |          |                 |          |
|                     |               | Beeson, T. H.      | 252      |                 |               | Couch, E. A.        | 99       |                    |          |                      |          |                     |          |                 |          |
|                     |               | Belcher, R. G.     | 190      |                 |               | Courter, A. F.      | 287      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bell, Edwin H.     | *66      |                 |               | Cox, E. A.          | 251      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bell, W. I.        | 221      |                 |               | Crampton, R. C.     | 251, 287 |                    |          |                      |          |                     |          |                 |          |
|                     |               | Benedict, E. C.    | 222      |                 |               | Crawford, D. R.     | 190      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bennett, F. L.     | 190, 287 |                 |               | Cremer, T. O.       | 65       |                    |          |                      |          |                     |          |                 |          |
|                     |               | Benzenhafer, L. H. | 100      |                 |               | Creedon, J.         | 287      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Berthel, Chas.     | 64, 190  |                 |               | Creviston, J. E.    | 64       |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bickel, W. H.      | 99       |                 |               | Cronk, C. D.        | 190      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bingham, J. W.     | 190, 353 |                 |               | Cronk, J. S.        | 354, 383 |                    |          |                      |          |                     |          |                 |          |
|                     |               | Birch, R. A.       | 190      |                 |               | Crowder, O. P.      | 287      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Birk, Gordon       | 250      |                 |               | Culver, J. A.       | 190      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Blair, D. C.       | 353      |                 |               | Cunningham, A.      | 252      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bloom, H. C.       | 131, 354 |                 |               | Cunningham, J. R.   | 250      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bock, Ed.          | 32       |                 |               | Cutting, E. M.      | 166      |                    |          |                      |          |                     |          |                 |          |
|                     |               | Boker, E.          | 190      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bolar, J. F.       | 287      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bond, Fred         | 32       |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Booth, S. C.       | 190      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bork, William      | 99       |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bowie, W. F.       | 99       |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Brady, F.          | 251      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Brainerd, R. C.    | 64       |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Braniff, F.        | 354      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Brashares, H. E.   | 287      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Brennan, E. J.     | 65       |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bright, Jacob      | 131      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Brindle, E.        | 287      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Briney, M. R.      | 101      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Briney, W. J.      | 164      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bristoll, T. A.    | 190      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Broadbent, J. H.   | 221      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Brooks, L. R.      | 250      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Brown, J. H.       | 320      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Brown, L. W.       | 221      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Browne, Jr., R. J. | 190, 320 |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Brumbaugh, D. F.   | 131, 250 |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bryan, Edwin M.    | *165     |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bryan, F. A.       | 220      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Bryant, H. A.      | 190      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Buchanan, C. C.    | 220      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Buchell, John      | 353      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Buck, H. M.        | 66, 101  |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Buck, T.           | 65       |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |
|                     |               | Buckelew, W. F.    | 251      |                 |               |                     |          |                    |          |                      |          |                     |          |                 |          |



|                     |          |
|---------------------|----------|
| Hasler, J. M.       | 287      |
| Hastings, F. S.     | 222      |
| Hastings, W. R.     | 221      |
| Hatten, C.          | 383      |
| Haun, C.            | 99       |
| Hayward, Geo. W.    | 32       |
| Heabner, W. D.      | 320      |
| Healy, W. A.        | 100      |
| Heck, D. N.         | 99       |
| Heeser, J. J.       | 190      |
| Heizer, J. C.       | 64       |
| Heeter, S. A.       | 100      |
| Held, P. T.         | 131      |
| Heller, Norman      | 286      |
| Helmcke, E. W.      | 131      |
| Henkel, W. A.       | 252      |
| Henry, W. S.        | *66      |
| Henwick, Jr., J. B. | 166      |
| Herbic, O.          | 252      |
| Herringer, W. F.    | 33       |
| Hershey, C. B.      | 220      |
| Hersog, H.          | 221      |
| Hewitt, A.          | 99       |
| Hildebrand, C. R.   | 251      |
| Hill, E. C.         | 64       |
| Hix, L. H.          | 251      |
| Hixson, W. J.       | 33       |
| Hobson, J. S.       | 252      |
| Hoffman, J. C.      | 99       |
| Hogan, Kirck        | 33       |
| Holden, A. C.       | *192     |
| Holden, George W.   | 166      |
| Holland, S.         | 252      |
| Holm, C. A.         | *100     |
| Holt, R. W.         | 33       |
| Homewood, Caldwell  | 287      |
| Hondorf, H. B.      | 251      |
| Hoss, A.            | 251      |
| Hough, V. J.        | 165      |
| Hovey, A. F.        | 65       |
| Howe, P.            | 221      |
| Howland, B.         | 251, 353 |
| Hubley, Carl        | 99, 131  |
| Hudson, E. E.       | *384     |
| Huff, Jess          | 287      |
| Hull, W. E.         | 251      |
| Hulmes, W. A.       | 221      |
| Hultman, M. G.      | 221      |
| Hunt, T. B.         | 320      |
| Hutchins, W. R.     | 287      |
| Hyatt, T. G.        | 32, *65  |
| Hyde, C. T.         | 383      |

## I

|                |     |
|----------------|-----|
| Ireland, E. E. | 164 |
| Irwin, W. C.   | 166 |
| Iverson, H.    | 131 |
| Ivey, W. L.    | 99  |

## J

|                    |          |
|--------------------|----------|
| Jackson, W. H.     | 99       |
| Jaques, Geo. C.    | 100      |
| Jennings, F. H.    | 354      |
| Jessum, H.         | 252      |
| Jewens, Richard H. | 383      |
| Jewett, F. B.      | 192      |
| Johanna, Otto      | 287, 353 |
| Johnson, H.        | 251      |
| Johnson, Henry E.  | *100     |
| Johnson, P. B.     | 221      |
| Jones, Wm.         | 251      |
| Jullan, W. M.      | 221      |

## K

|                    |          |
|--------------------|----------|
| Kaell, E. W.       | 221      |
| Kassing, G. W.     | 287      |
| Kay, H.            | 251      |
| Kearns, J.         | 251      |
| Kearson, T. H.     | 221      |
| Kelly, John        | 166      |
| Kennedy, James H.  | 320      |
| Kent, T. W.        | 353      |
| Kimple, G. W.      | 320      |
| Kingsley, E.       | 164      |
| Kinney, F. A.      | 251      |
| Kinney, F. E.      | 252, 353 |
| Kitchin, Harold L. | 354      |
| Knight, Lester B.  | 354      |
| Knight, T.         | 252      |
| Knowlton, N. B.    | 65       |
| Knowlton, S. J.    | 221      |
| Koch, A. W.        | 65       |
| Kocher, R. L.      | 251, 320 |
| Koenig, Emil L.    | 353      |
| Kohler, L.         | 99       |
| Kohnen, P. W.      | 66       |
| Krist, Ed          | 383      |
| Krouse, E. J.      | 33       |
| Krum, L. F.        | 320      |
| Kuhn, E. W.        | 64       |
| Kyle, W. T.        | 287      |

## L

|                |     |
|----------------|-----|
| Lackey, J. H.  | 165 |
| Lane, C. L.    | 354 |
| Laverty, P. J. | 252 |
| Layman, C. V.  | 64  |

|                   |          |
|-------------------|----------|
| Leary, J. B.      | 165, 353 |
| Lee, Henry        | *102     |
| Lee, John         | 32       |
| Lee, W. H.        | 165      |
| Lefferts, C. S.   | 383      |
| Leidecker, J. M.  | 251, 320 |
| Leitzinger, J. M. | 354      |
| Lentz, C. J.      | 164      |
| Lepreau, F. J.    | *384     |
| Lewis, A.         | 99       |
| Lewis, J. E.      | 251      |
| Lind, J.          | 251      |
| Lindberg, Adolph  | 250      |
| Lisle, E. C.      | 164, 287 |
| Lister, J. A.     | 250      |
| Little, E. J.     | 353      |
| Litton, Z. T.     | 190      |
| Locke, P. B.      | 100      |
| Logue, J. C.      | 32       |
| Lomyer, G. M.     | 33       |
| Long, E. F.       | 252, 353 |
| Loomis, H. S.     | 354      |
| Lubbers, J.       | 100      |
| Luckey, C. A.     | 222      |
| Lunlengreen, G.   | 383      |
| Lute, Herbert G.  | 32       |
| Lyons, E.         | 33       |
| Lyons, J. R.      | 33       |
| Lytle, J. H.      | 65       |

## M

|                     |           |
|---------------------|-----------|
| MacFarland, J. J.   | 190       |
| Mackey, T.          | 190       |
| Maddox, B. C.       | 252       |
| Mallanny, J. T.     | 221       |
| Malloy, J. H.       | 64, 190   |
| Mann, L. R.         | 287       |
| Marcum, J. L.       | 190       |
| Marsh, F. R.        | 165, 353  |
| Marsh, J. W.        | 65        |
| Marshall, C. L.     | 353       |
| Marshall, E. L.     | 65, *102  |
| Martin, G. E.       | 353       |
| Mason, C. B.        | 252       |
| Mathews, Thos. J.   | 251, 287  |
| Maxwell, C. O.      | 383       |
| May, T. W.          | 250       |
| Mayer, G.           | 222       |
| Mayer, George H.    | 99        |
| Mays, Joseph        | 287       |
| McAlpine, W. I.     | 221       |
| McCann, E. H.       | 383       |
| McCauley, J.        | 252       |
| McCraight, R. L.    | 165       |
| McCuen, Lawrence B. | 32        |
| McDonough, James    | 32        |
| McGinness, E. V.    | *132, 166 |
| McGloghan, J. H.    | 353       |
| McIntyre, J. A.     | 251       |
| McIntyre, L. W.     | 64        |
| McKay, F. N.        | 252       |
| McMaken, F. R.      | 287       |
| McNamara, T. H.     | 65        |
| McPherson, C. F.    | 131       |
| McPherson, L. N.    | 383       |
| McSweeney, B. A.    | 190       |
| Meals, R. C.        | 166       |
| Mealy, S. L.        | 252       |
| Meary, Jos. E.      | 383       |
| Meissner, L. F.     | 166       |
| Menser, A. I.       | 252       |
| Mercer, H. F.       | 165       |
| Meseroll, H. C.     | 320       |
| Metszer, Edgar      | 64        |
| Meyers, Albert C.   | 65        |
| Mickley, J. K.      | 220       |
| Miller, E.          | 99, 383   |
| Miller, W. P.       | 287       |
| Miller, R.          | 353       |
| Minton, F. J.       | 131       |
| Misenhamer, L. E.   | 33        |
| Mitchell, B. F.     | 99        |
| Moffett, F. W.      | 192       |
| Molloy, J. H.       | 353       |
| Moore, J.           | 99        |
| Moore, J. H.        | *100      |
| Moore, R. T.        | 131, 165  |
| Morgan, G. E.       | 287       |
| Morgan, J. W.       | 252       |
| Morris, Robert      | 65        |
| Morrison, H. F.     | 250       |
| Mortsen, H.         | 251       |
| Moseley, Joseph H.  | 221       |
| Mudd, A.            | 166       |
| Muller, S. J.       | 99        |
| Mulvihill, J.       | 383       |
| Murry, Walter       | 64        |
| Myers, E. L.        | 354       |

## N

|                    |      |
|--------------------|------|
| Nash, S. R.        | 165  |
| Nelson, C. A.      | 250  |
| Nelson, Harry      | *131 |
| Neubert, Walter P. | 288  |
| Newcomb, D. B.     | 64   |
| Newcomb, E. W.     | 191  |
| Nicholas, C.       | 131  |
| Nicholson, F. H.   | 190  |
| Nicholson, T.      | 99   |
| Noerr, J. O.       | 99   |
| Nolte, A. C.       | 220  |

|                 |     |
|-----------------|-----|
| Nordholm, L. E. | 251 |
| Nye, A. G.      | 32  |
| Nye, C. R.      | 65  |

## O

|                         |          |
|-------------------------|----------|
| Oakes, H.               | 220      |
| Ogden, H. J.            | 251, 353 |
| O'Hagen, B. F.          | 220      |
| O'Hara, W. H.           | 251      |
| Oler, B. F.             | 221      |
| O'Loughlin, F. M.       | 221      |
| Olsen, John             | 99       |
| Olson, Carl             | 221      |
| Olson, O. W.            | 251      |
| O'Meara, T. J.          | 190      |
| O'Neil, W. J.           | 131      |
| Orr, Harry H.           | 353      |
| Osborne, Charles Wesley | 190      |
| Osterkamp, H. J.        | 165      |
| Owens, T. H.            | 252      |

## P

|                      |           |
|----------------------|-----------|
| Packwood, G. Horatio | *131      |
| Parker, Robert       | 190       |
| Parkins, Earl        | 131       |
| Parrish, C. F.       | 131       |
| Perkins, Osborne     | 33        |
| Perkins, W. A.       | 165       |
| Perry, H. R.         | 252       |
| Peycke, W. J.        | 252       |
| Pfanz, H. J.         | 164       |
| Pfasterer, H. B.     | 33        |
| Pfasterer, Walter R. | 65        |
| Phinney, E. A.       | 320       |
| Pierce, C. M.        | 100       |
| Pierce, Floyd        | 32        |
| Pokorney, F. J.      | 165       |
| Pollard, Arthur      | 190       |
| Popple, T.           | 99        |
| Post, W. M.          | 221, *251 |
| Potter, P. M.        | 320       |
| Powers, Z. R.        | 221       |
| Pratt, A. E.         | 32        |
| Price, W. F.         | 190       |
| Price, Zack          | 353       |
| Pudney, E. H.        | 221       |
| Pulster, John        | 166       |

## Q

|                 |     |
|-----------------|-----|
| Quackenbush, L. | 164 |
| Quinn, M. J.    | 222 |

## R

|                    |          |
|--------------------|----------|
| Ragan, Jas.        | 287      |
| Rankine, J. C.     | 353      |
| Raymond, M.        | 251      |
| Reed, W. T.        | 190      |
| Reese, F.          | 383      |
| Reisz, J. W.       | 166      |
| Riefenstahl, L. W. | 165      |
| Rieves, G.         | 252      |
| Riseden, Ike       | 33       |
| Rittenhouse, E. E. | 100      |
| Rizer, F. W.       | 191      |
| Roberts, H. M.     | 166      |
| Robinson, J. P.    | 190      |
| Robinson, M. E.    | 65       |
| Robison, H. O.     | 190      |
| Rockwell, R. R.    | 221      |
| Rogers, Edward B.  | 190      |
| Ramans, R. G.      | 64       |
| Rosencrans, F. B.  | 320      |
| Ross, E. J., Jr.   | 166      |
| Roth, Jacob M.     | 166      |
| Roy, F. A.         | 354      |
| Ruby, E. L.        | 166      |
| Ruggles, O. B.     | 32       |
| Ryan, A. W.        | 251      |
| Ryborg, C. O.      | 164, 287 |

## S

|                   |          |
|-------------------|----------|
| St. John, C. E.   | 252      |
| Sanders, H. V.    | 353      |
| Sartini, James A. | 190      |
| Saunders, J. E.   | 288      |
| Savage, E. J.     | 287, 353 |
| Savage, J. W.     | 100      |
| Sawyer, E. T.     | *192     |
| Schenck, W. P.    | 251      |
| Scheve, A. B.     | 33       |
| Schmidt, F. H.    | 131      |
| Schneider, C. E.  | 65       |
| Schroeder, T. P.  | 32       |
| Schroff, E.       | 33       |
| Schultz, Gus      | 287      |
| Schultz, W. C.    | 64, 100  |
| Schumarty, G. W.  | 190      |
| Sconce, E. M.     | 250      |
| Scully, John      | 64       |
| Sears, Louis      | 320      |
| Secor, J.         | 251      |
| Selfridge, James  | 100      |
| Sellstrom, Calvin | 190      |
| Sharp, A.         | 99       |
| Shaw, A.          | 251      |

|                 |          |     |
|-----------------|----------|-----|
|                 | <b>Z</b> |     |
| Zane, W. F..... |          | 259 |